RENEWAL APPLICATION TO THE EPA FOR NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) GENERAL PERMIT AUTHORIZATION FOR DISCHARGES FROM CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs)

Prepared for:

Oppliger Feedyard, Inc.
North
NPDES Permit #NMG10031
PO Box 854
Clovis, NM 88101

Prepared By:

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Oppliger Feedyard (North)
Curry County, New Mexico

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SECTION 1 NOTICE OF INTENT

Form Approved
OMB No. 2040-0250

EPA I.D. NUMBER (*copy from Item 1 of Form 1*)
NMG010031

FORM 2B NPDES

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATIONS FOR PERMIT TO DISCHARGE WASTEWATER
CONCENTRATED ANIMAL FEEDING OPERATIONS AND AQUATIC ANIMAL PRODUCTION FACILITIES

I. GENERAL INFORMATION Applying for: Individual Permit ☐ Coverage Under General Permit ☒

A. TYPE OF BUSINESS	B. CONTACT INFORMATION	C. FACILITY OPERATION STATUS
☒ 1. Concentrated Animal Feeding Operation (complete items B, C, D, and Section II) ☐ 2. Concentrated Aquatic Animal Production Facility (complete items B, C, and section III)	Owner/or Operator Name: Oppliger Feedyard, Inc Telephone: (575) 389-5321 Address: P.O. Box 854 Facsimile: (575) 389-5324 City: Clovis State: NM Zip Code: 88101	☒ 1. Existing Facility ☐ 2. Proposed Facility

D. FACILITY INFORMATION

Name: Oppliger Feedyard Telephone: (575) 389-5321
Address: P.O. Box 854 Facsimile: (575) 389-5321
City: Clovis State: NM Zip Code: 88101
County: Curry Latitude: 34.4655 Longitude: -103.1115

If contract operation: Name of Integrator: _____
Address of Integrator: _____

II. CONCENTRATED ANIMAL FEEDING OPERATION CHARACTERISTICS

A. TYPE AND NUMBER OF ANIMALS

1. TYPE	2. ANIMALS: NO. IN OPEN CONFINEMENT	2. ANIMALS: NO. HOUSED UNDER ROOF
☐ Mature Dairy Cows		
☐ Dairy Heifers		
☐ Veal Calves		
☒ Cattle (not dairy or veal)	40,000	
☐ Swine (55 lbs. or over)		
☐ Swine (under 55 lbs.)		
☐ Horses		
☐ Sheep or Lambs		
☐ Turkeys		

B. Manure, Litter and/or Wastewater Production and Use

1) How much manure, litter and wastewater is generated annually by the facility? 37216 tons 72.8 gallons

2) If land applied how many acres of land under the control of the applicant are available for applying the CAFOs manure/litter/wastewater? 720 acres

3) How many tons of manure or litter, or gallons of wastewater produced by the CAFO will be transferred annually to other persons? tons/gallons (*circle one*) 37216 tons

[redacted]

☐ Chickens (Broilers)			[redacted]
☐ Chickens (Layers)			
☐ Ducks			
☐ Other Specify _____			
3. TOTAL ANIMALS			

C. ☒ TOPOGRAPHIC MAP

D. TYPE OF CONTAINMENT, STORAGE AND CAPACITY

1. Type of Containment	Total Capacity (in gallons)
☐ Lagoon	
☐ Holding Pond	
☐ Evaporation Pond	
☒ Other: Specify Playa Basin	98732853

2. Report the total number of acres contributing drainage: 853 acres

3. Type of Storage	Total Number of Days	Total Capacity (gallons/tons)
☐ Anaerobic Lagoon		
☐ Storage Lagoon		
☐ Evaporation Pond		
☐ Aboveground Storage Tanks		
☐ Belowground Storage Tanks		
☐ Roofed Storage Shed		
☐ Concrete Pad		
☐ Impervious Soil Pad		
☒ Other: Specify Playa Basin	30	98732853

E. NUTRIENT MANAGEMENT PLAN

Note: Effective February 27, 2009, a permit application is not complete until a nutrient management plan is submitted to the Permitting Authority.

1. Please indicate whether a nutrient management plan has been included with this permit application. ☒ Yes ☐ No

2. If no, please explain:

3. Is a nutrient management plan being implemented for the facility? ☒ Yes ☐ No

4. The date of the last review or revision of the nutrient management plan. Date: _____

5. If not land applying, describe alternative use(s) of manure, litter, and or wastewater:

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F. LAND APPLICATION BEST MANAGEMENT PRACTICES
Please check any of the following best management practices that are being implemented at the facility to control runoff and protect water quality:

☐ Buffers ☐ Setbacks ☒ Conservation tillage ☐ Constructed wetlands ☐ Infiltration field ☐ Grass filter ☐ Terrace

III. CONCENTRATED AQUATIC ANIMAL PRODUCTION FACILITY CHARACTERISTICS

A. For each outfall give the maximum daily flow, maximum 30-day flow, and the long-term average flow.

1. Outfall No.	2. Flow (*gallons per day*)		
	a. Maximum Daily	b. Maximum 30 Day	c. Long Term Average

B. Indicate the total number of ponds, raceways, and similar structures in your facility.

1. Ponds	2. Raceways	3. Other

C. Provide the name of the receiving water and the source of water used by your facility.

1. Receiving Water	2. Water Source

D. List the species of fish or aquatic animals held and fed at your facility. For each species, give the total weight produced by your facility per year in pounds of harvestable weight, and also give the maximum weight present at any one time.

1. Cold Water Species			2. Warm Water Species		
a. Species	b. Harvestable Weight (*pounds*)		a. Species	b. Harvestable Weight (*pounds*)	
	(1) Total Yearly	(2) Maximum		(1) Total Yearly	(2) Maximum

E. Report the total pounds of food during the calendar month of maximum feeding.

1. Month	2. Pounds of Food

IV. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. Name and Official Title (*print or type*)	B. Phone No. ( )
Don Oppliger owner	575-389-5321
C. Signature	D. Date Signed
	12/2/09

General Permit Application Summary

1.1 Permittee

Owner/Operator: Oppliger Feedyard (North)
Address: P.O. Box 854, Clovis, NM 88102
County: Curry

1.2 Facility Information

Physical Location: 520 CR 14, Clovis, NM 88101
Latitude: 34.465492
Longitude: -103.111528

Maximum Capacity: 40,000 total head

1.3 Nature of Business Producing Waste

Concentrated Animal Feeding Operation (CAFO): Beef Cattle Feedyard
SIC No.: 0211

1.4 Type of Containment, Storage and Capacity

Table 1.1: Retention Control Structure (RCS) Summary

RCS #	Design Rainfall Runoff (ac-ft)	Process Generated Wastewater (ac-ft)	Sludge Volume (ac-ft)	Additional Volume (ac-ft)	Required Capacity without Freeboard (ac-ft)	Actual Capacity without Freeboard (ac-ft)	Actual Capacity without Freeboard (gals)
1	178.08	1.93	19.67	.07	199.75	303.00	98,732,853

SECTION 2 FACILITY MAPS

Figure 2.1 - Vicinity Map
Figure 2.1, entitled Vicinity Map, was generated in ArcGIS using USGS digital line graph (DLG) transportation data obtained from WebGIS.com. The location of the facility is depicted on the map.

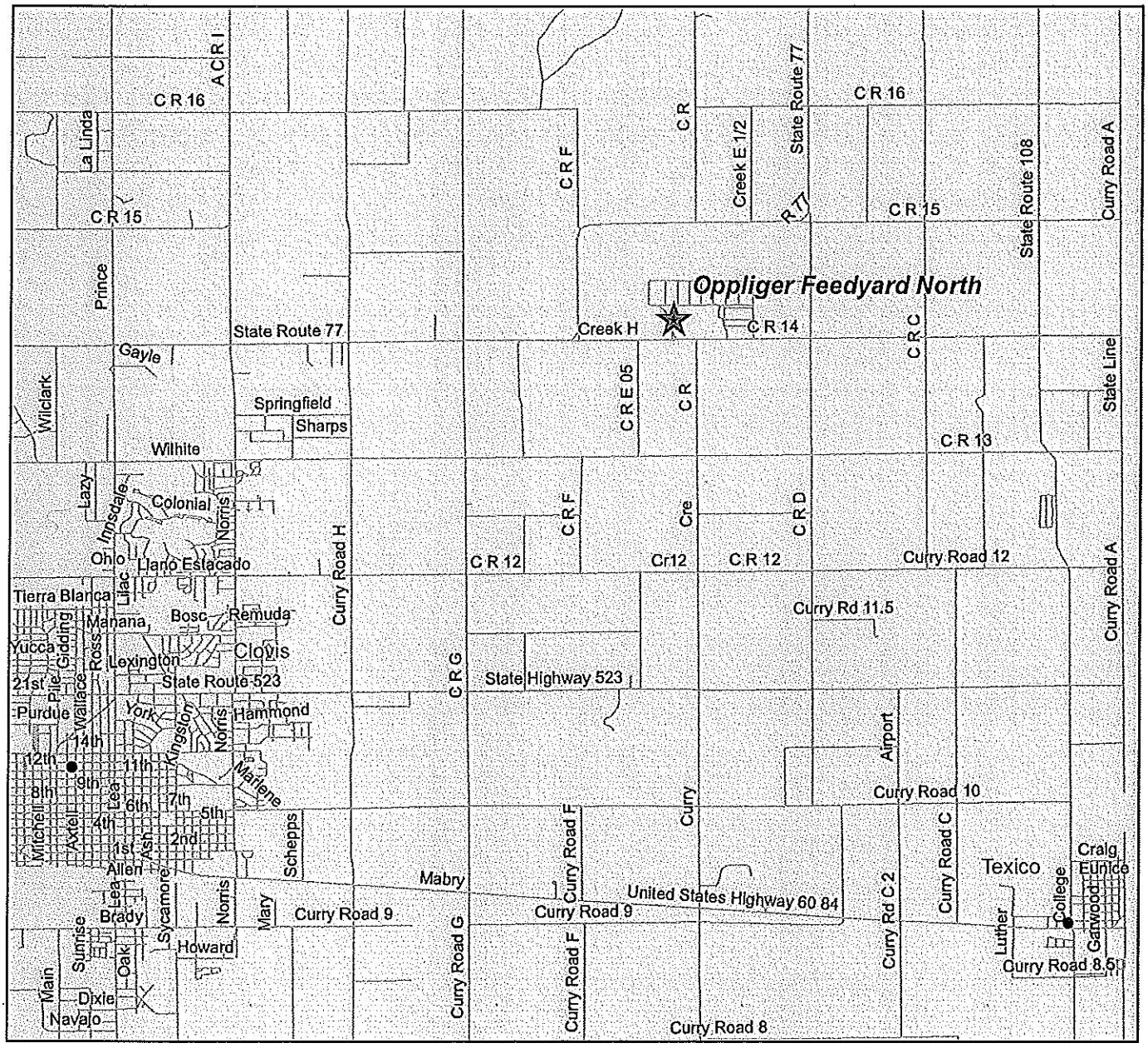
Figure 2.2 – USGS 7.5-Minute Quadrangle Map
Figure 2.2, entitled USGS 7.5-Minute Quadrangle Map is a seamless, high-quality copy of the 7.5-minute USGS quadrangle map (Farwell, Texas, quadrangle), that depicts the boundaries of land owned, operated, or controlled by Oppliger Feedyard (North) and used as part of the concentrated animal feeding operation and all springs, lakes, or ponds located on-site and within one mile of the facility boundaries.

Figure 2.3 –Site Map
Figure 2.3, entitled Site Map, is a scaled drawing depicting the locations of the following information:

- Location of the facility and associated waste retention structures, and all land application sites
- The site plan will be maintained in the on-site PPP and updated on an as-needed basis.

Figure 2.4 – NRCS Soils Map
Figure 2.4, entitled NRCS Soils Map, was generated in ArcGis using SSURGO soils data obtained from the USDA Geospatial website. Soil descriptions are included in supporting documentation.

Figure 2.5 – 100-Yr Floodplain Map
Figure 2.5 is a map obtained from the FEMA Map Service Center.



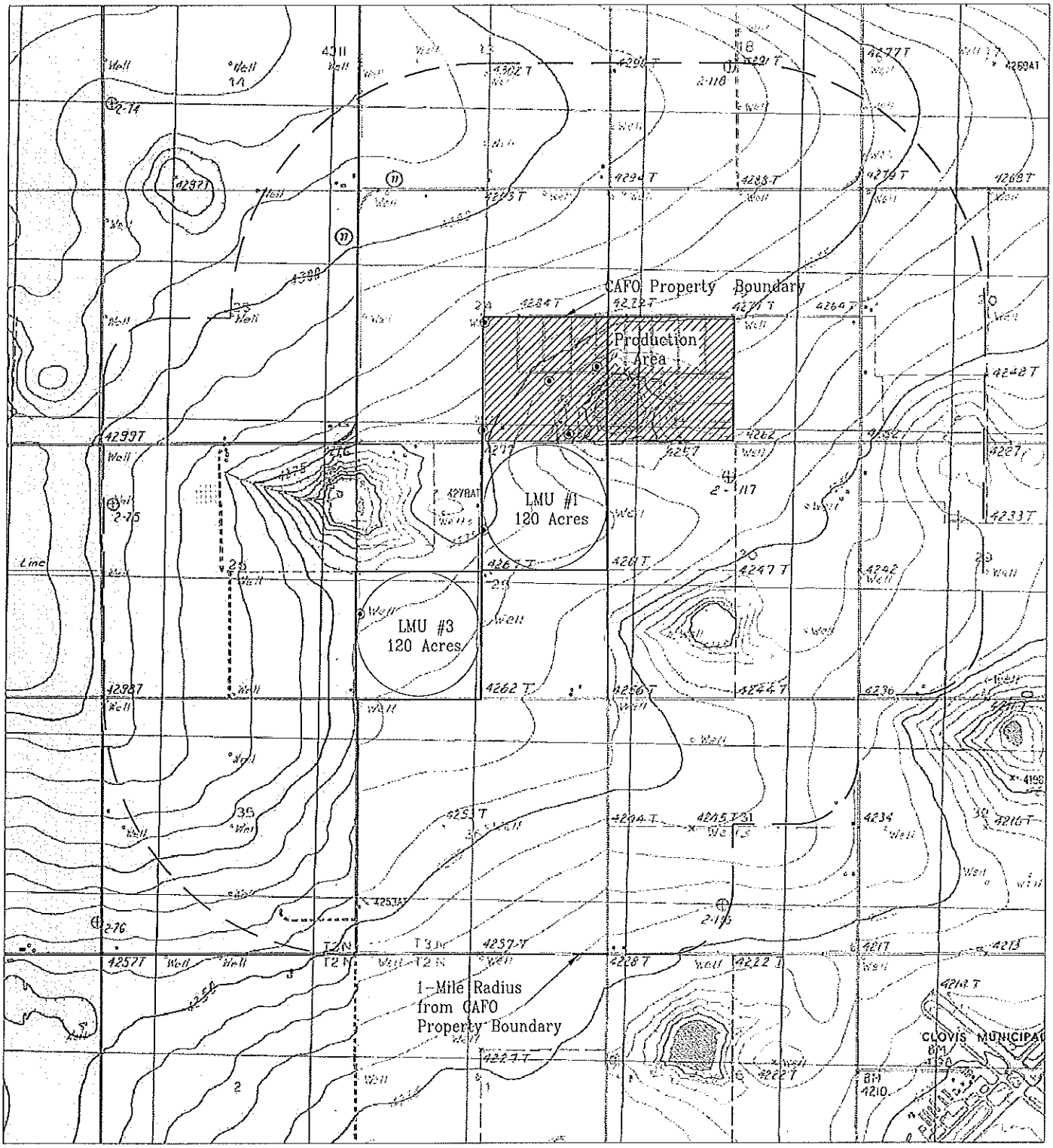
Legend

- Towns
- Curry Co. Roads
- Site

N
W E
S

0 0.4 0.8 1.6 2.4 3.2 Miles

Oppliger Feedyard North Curry County, NM	Vicinity Map Figure 2.1	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Blvd Amarillo, Texas 79118 806-353-6123; FAX 806-353-4132



Legend:

◉ Denotes Well with Buffer and/or BMPs

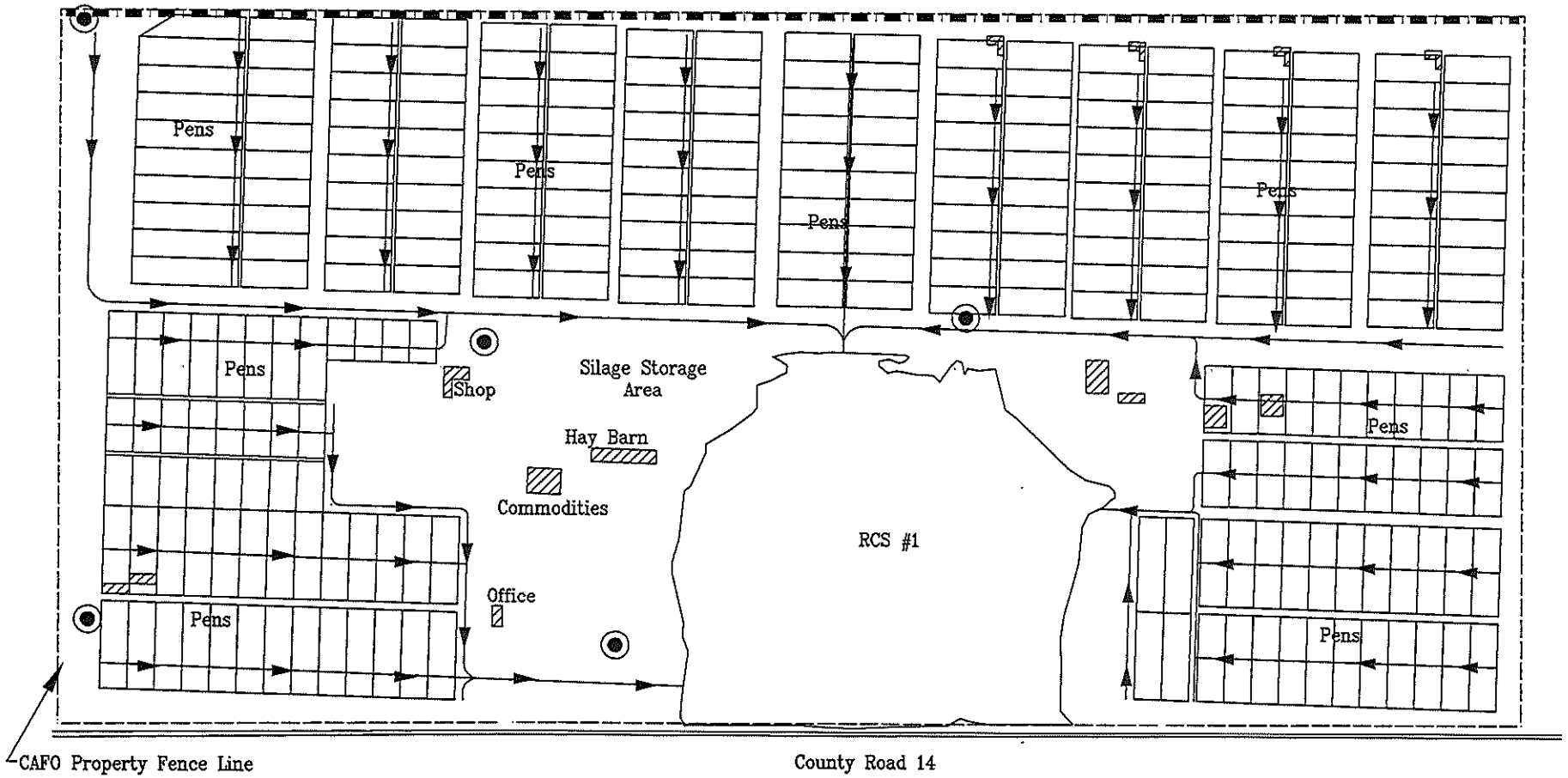
N
W E
S

Source: TOPO! Software, National Geographic Seamless Topographic Maps on CD-ROM, 2001. Farwell, TX. 1980

3/8-MI 0

SCALE

Oppliger Feedyard North Farwell Curry County, New Mexico	USGS 7.5 Minute Quadrangle Map Figure 2.2	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



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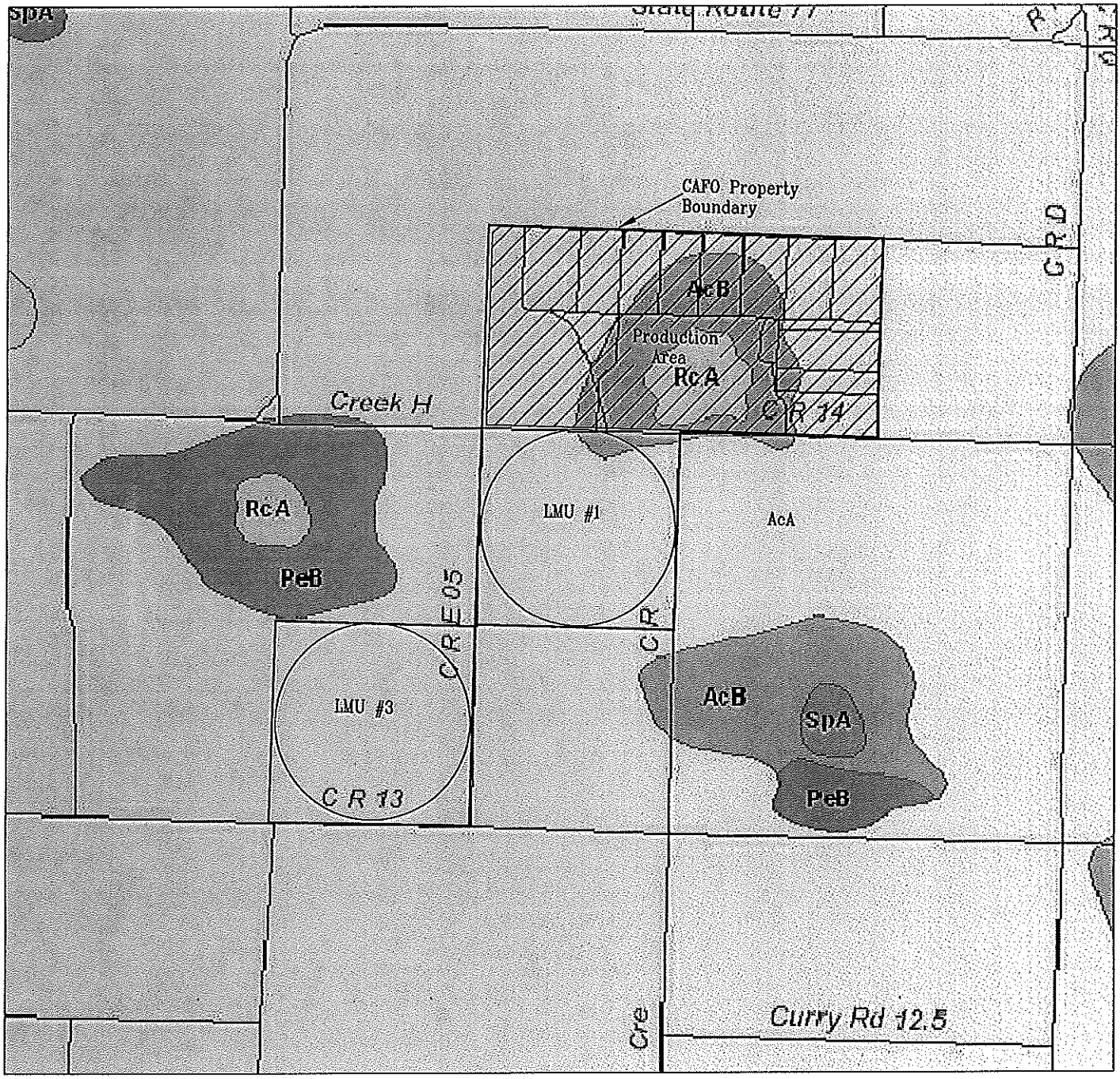
Legend:
- Denotes Well with Buffer and/or BMPs
- Denotes Barn/Roofed Areas
- Denotes Berm
- Denotes Drainage

600 Ft 0

SCALE

Oppliger Feedyard North Farwell Curry County, New Mexico	Site Map Figure 2.3	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, In ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132



Soil Unit Name and Symbol Legend:
AcA – Acuff loam, 0 to 1% slopes
AcB – Acuff loam, 1 to 3% slopes
RcA – Ranco clay, 0 to 1% slopes

Refer to supporting documentation for soil description information.

N
W E
S

Source: Soil Data Mart. Available at: http://soildatamart.nrcs.usda.gov/ – Curry County, NM Soils – Accessed 24 October 2007. Tiger Roads, Available Curry County, NM Roads – Accessed 8 March 2002.

1/4-MI 0
SCALE

Oppliger Feedyard North Farwell Curry County, New Mexico	NRCS Soil Map Figure 2.4	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Boulevard AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

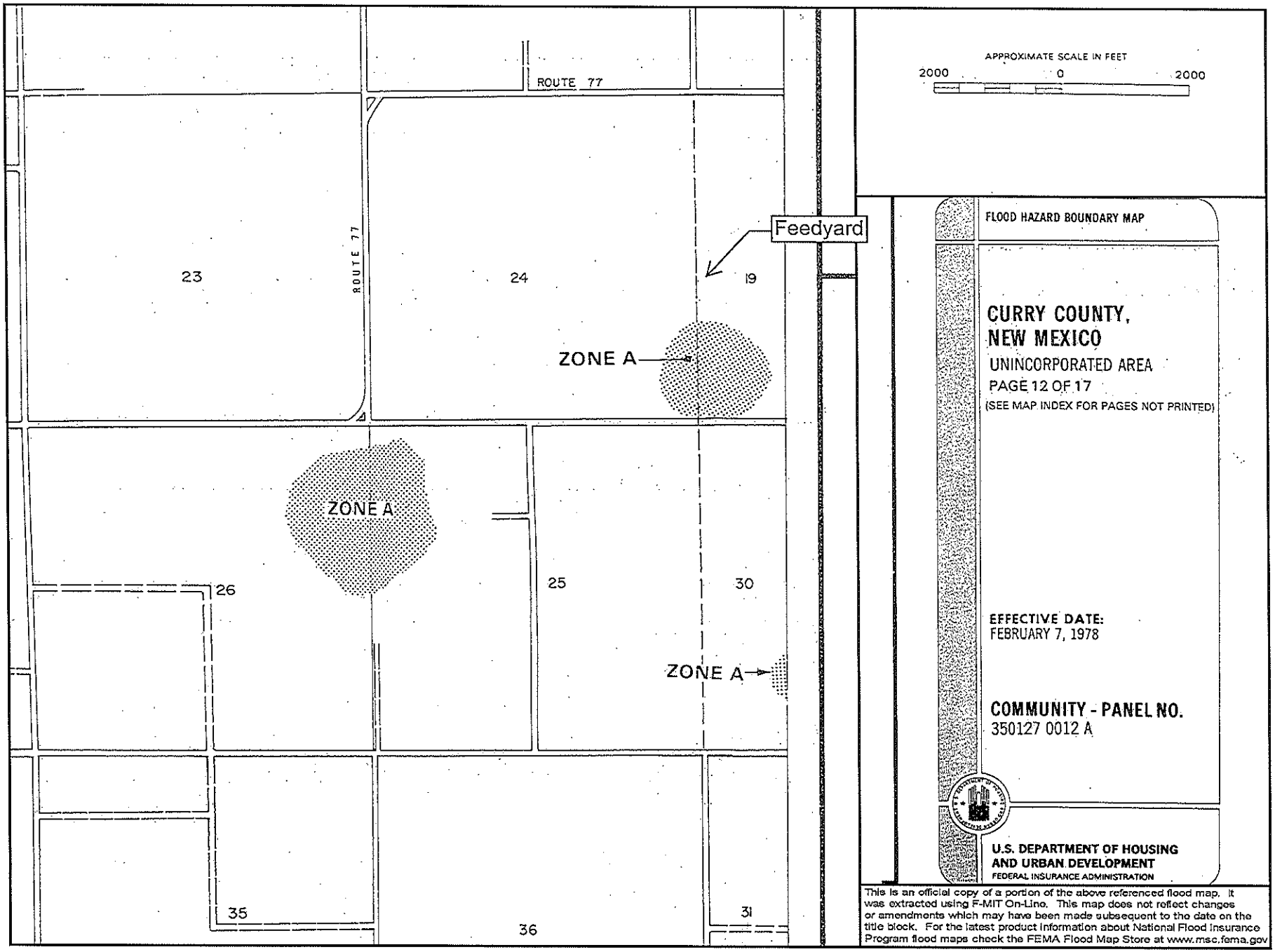


Figure 2.5 Flood Hazard Boundary Map

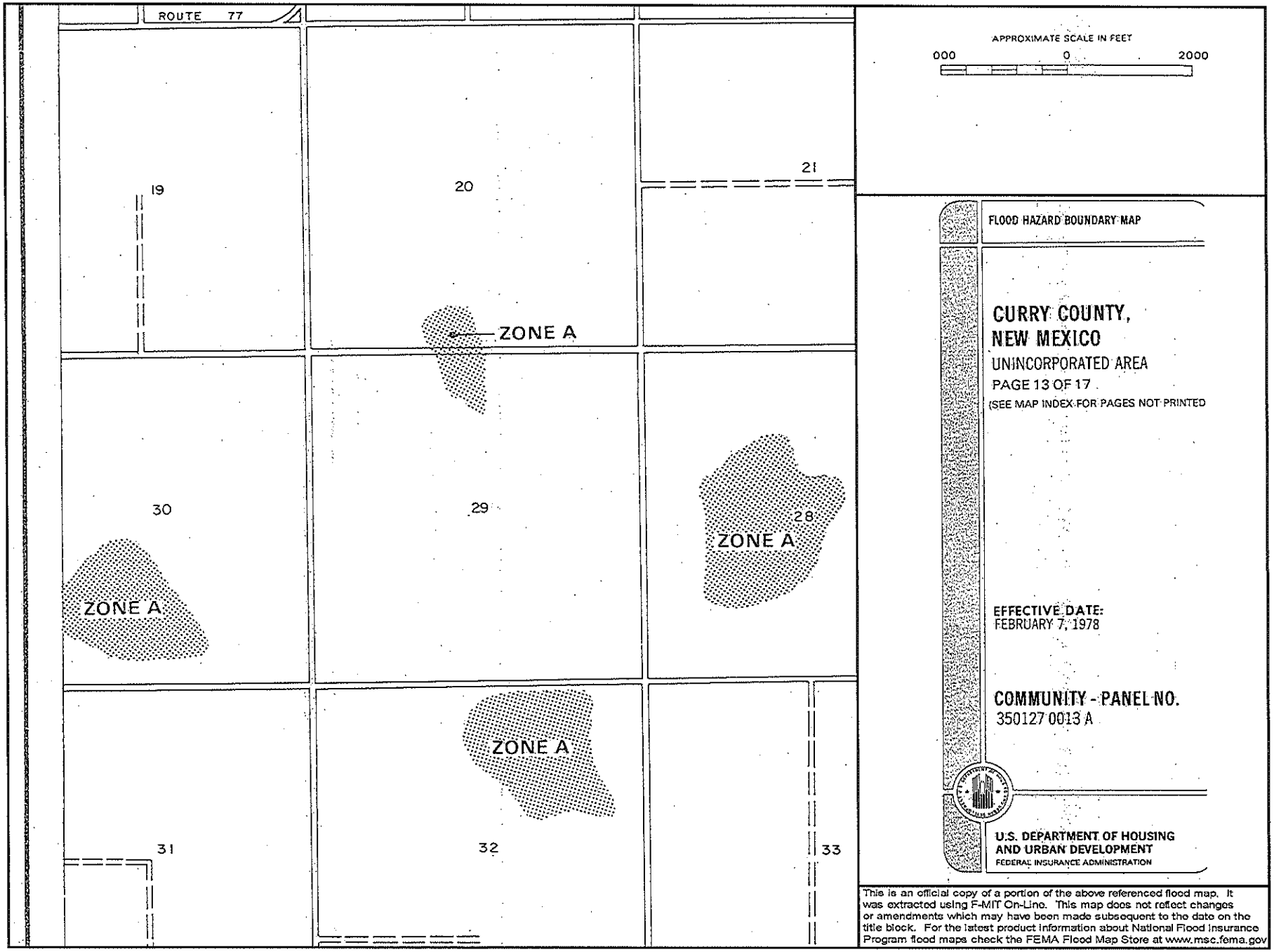


Figure 2.5b Flood Hazard Boundary Map

SECTION 3 PRODUCTION AREA

3.1 Storage of Manure and Process Wastewater

The CAFO will ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the storage facilities. Figure 3.1, Manure & Wastewater Flow Chart shows the waste handling and storage practices at the feedyard.

3.1.1 Manure Production

The manure and nutrient production for the feedyard was calculated using ASABE Standards (ASAE D384.2 MAR05, Table 1.b – Section 3). Table 3.1, entitled Estimated Manure Production Data for a Feedyard Facility, is included as a summary of the annual manure and nutrient production for the facility. The totals in Table 3.1 represent as-excreted manure and nutrient values for the maximum head count shown in the application. This data is intended for planning and design purposes and is not to be used for whole-farm nutrient mass balance calculations.

Excess manure not utilized by the facility is transferred to a third party for beneficial use. All open lot pen manure is dry scraped and stockpiled in the pen area. Manure is periodically removed from the pens by a contract manure hauler.

3.1.2 Process Generated Wastewater Volume

This feedyard facility has two sources of process generated wastewater in the form of trough overflow during the winter months and boiler blowdown water. All open lot pen manure is dry scraped. The volume of process wastewater generated daily is estimated to be 30 gallons per day. The design storage volume for process generated wastewater is 30 days and is calculated in Table 3.2.

3.1.3 25-Year, 24-Hour Rainfall Storage Volume

The drainage area runoff volume is calculated using curve numbers (CN) applied with a 25-year, 24-hour storm. The 25-year, 24-hour storm event for this location is 4.6 inches of rainfall. Table 3.2 show the calculated storage volumes required in the pond for the rainfall runoff from a 25-year, 24-hour storm.

3.1.4 Sludge Accumulation Volume

A 5-year sludge accumulation volume is included in each retention pond. The sludge volume in the runoff ponds is estimated using the USDA/Agricultural Field Waste Handbook (Kansas Part 651.1083, Suggested Procedures for Sediment Volume Estimation). The sludge volume calculated for RCS #1 includes the sludge accumulation from the manure produced in the parlor calculated using an accumulation rate of 0.0729 cubic feet of sludge per pound total solids (taken from USDA-NRCS Agricultural Waste Management Handbook).

3.1.5 Water Balance Model

Table 3.3, Water Balance Model Irrigation and Evaporation, considers inflows and withdrawals to the RCS, including rainfall runoff, direct rainfall, process generated wastewater, evaporation, and irrigation demand.

3.1.6 Facility Certifications

The retention pond has been certified by a Professional Engineer for lack of hydrologic connection and capacity. These certifications for the retention pond are maintained on-site.

3.2 Clean Water Diversion

The facility will ensure that clean water resulting from a 25-year, 24-hour storm event is diverted, as appropriate, from the production area. Where clean water is not diverted, the facility has taken into account this area in the required storage capacity. Table 3.1 identifies the clean water diversions used at this facility.

Table 3.1: Clean Water Diversion

Check applicable:	Type:	Location Used:
☐	Berms	
☐	Channels	
☐	Diversion Ditches	
☑	Natural Topography	Facility utilizes a playa basin as the retention structure; therefore, natural drainage area of playa is included in the facility calculations.
☑	Other (specify)	Roads

3.3 Mortality Management

The facility will properly dispose of dead animals within three (3) days. Mortalities must not be disposed of in any liquid manure or process wastewater system that is not specifically designed to treat animal mortalities. Animals shall be disposed of in a manner to prevent contamination of waters of the United States or creation of a public health hazard. Table 3.2 identifies the method(s) of animal mortality handling used at this facility.

Table 3.2: Handling Method

Check applicable:	Type:
☐	Composting
☑	Rendering
☐	Burial
☐	Other (specify)

3.4 Prevention of Direct Contact of Animals with Waters of the United States

Animals confined at the CAFO shall not be allowed to come into direct contact with waters of the United States.

Do waters of the U.S. flow through the production area? ☐ Yes ☑ No

Do animals have access to waters of the United States? ☐ Yes ☑ No

If yes, identify measures used to prevent direct contact of animals with waters of the United States.

- Fences may be used to restrict such access.

Definition:

Waters of the United States or waters of the U.S. means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(b) All interstate waters, including interstate ``wetlands;''

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, ``wetlands,'' sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) ``Wetlands'' adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States. This exclusion applies only to manmade bodies of water which neither were originally created in waters of the United States (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. [See Note 1 of this section.] Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.

Wetlands means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

3.5 Chemical and other Contaminant Handling

The CAFO will ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals or contaminants. All wastes from dipping vats, pest and parasite control units, and other facilities utilized for the management of potentially hazardous or toxic chemicals shall be handled and disposed of in a manner sufficient to prevent

ESTIMATED MANURE PRODUCTION
for a FEEDYARD FACILITY
Table 1.1
ENVIRO-AG ENGINEERING, INC.

NAME OF CAFO: Oppliger Feedyard North
LOCATION: Curry County, NM
DATE: August-07

MANURE PRODUCTION CRITERIA (a)	
FACILITY TOTAL	**Beef Cattle**
1. Number of Animals (head):	40,000
2. Finishing time period, days (b):	153
4. Total Solids Production (Dry Manure), lbs/day:	203,922
5. Dry Manure Production, tons/year	37,216
6. Total Nitrogen Production, lbs/day:	14,379
7. Total Phosphorus, P2O5 lbs/day (c)	4,370
8. Total Potassium, K2O lbs/day (c)	11,922

NOTES:
(a) - Manure and nutrient production values are taken from American Society of Agricultural and Biological Engineers Data: (ASAE D384.2 MAR05) Manure Production and Characteristics, Table 1.a - Section 3.
(b) - ASAE beef cattle values based on an assumed finishing time period of 153 days.
(c) - ASAE reports P and K in the elemental forms. Convert to P2O5 by multiplying by 2.29 and to K2O by multiplying by 1.2.

REQUIRED STORAGE VOLUMES
for RETENTION CONTROL STRUCTURES
Table 1.2
ENVIRO-AG ENGINEERING, INC.

NAME OF CAFO: Oppliger Feedyard North
LOCATION: Curry County, NM
DATE: August-07

PARAMETER		RCS #1
1. Processed Generated Water Storage and Rainfall Runoff Storage		
a. Trough Overflow between Nov. - Feb. (gal/head/day):		0.5
b. Number of Head:		40,000
c. Volume of process Water - Boiler Blowdown water (gal/day):		1,000
d. Volume of Process Water (gal/day):		21,000
e. Number of Days of Storage:		30
f. Storage Volume for Process Water (gal)		630,000
	ac-ft	1.93

2. Drainage Areas	CN	Area (ac)
a. Pen/Open Lot areas	90	187
b. Adjacent area between pens and RCS	71	568
c. Roofed/Paved areas	100	56
d. RCS surface area	100	42
e. Total Area (acres)		853

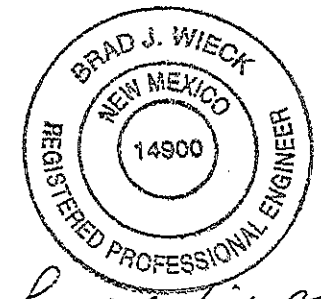
3. 25-Year, 24-Hour Rainfall Event	(inches)	4.6

4. Runoff Volume Determination (a)	(inches)	(ac-ft)
a. Pen Area	3.49	54.41
b. Adjacent Area	1.82	86.10
c. Roof Area	4.60	21.47
d. RCS Surface Area	4.60	16.10
e. Total Runoff (ac-ft):		178.08

5. Summary of Required Storage Volumes	(ac-ft)
a. Processed Water Storage	1.93
b. Required Volume for Rainfall Runoff	178.08
c. Sludge Accumulation Volume (b)	19.67
d. Additional Required Volume from Water Balance	0.07
Total Volume Required for RCSs	199.75
Certified Volume of RCS	**303.00**

NOTES:
a. Using SCS method:
Where:
S = (1000/CN) - 10
Q = ((P - 0.2S)^2)/(P + 0.8S)
S = Potential maximum retention after runoff begins(in)
Q = Runoff (in)
P = 25-year, 24-Hour rainfall (in)
CN = Curve Number from SCS 210-VI-TR-55,
2nd Edition, June 1986

(b) USDA Agricultural Field Waste Handbook, Kansas, Part 651.1083, Suggested procedures for sediment volume estimation.



Brad J Wieck, PE
8/27/2007

WATER BALANCE MODEL
IRRIGATION AND EVAPORATION for RCS 1
Table 1.3
ENVIRO-AG ENGINEERING, INC.

NAME: Oppliger Feedyard North
LOCATION: Curry County, NM
DATE: August-07

HYDROLOGIC CHARACTERISTICS

Pen Area (acres):	187		
Adjacent Areas (acres):	568		
Roof Area (acres):	56		
Total RCS Surface Area (acres):	42.0		
Total Irrigated Area (acres):		240.0	120.0
Cropping scheme:		Corn	Wheat
Effective Evaporation Surface Area (acres):	35.7		

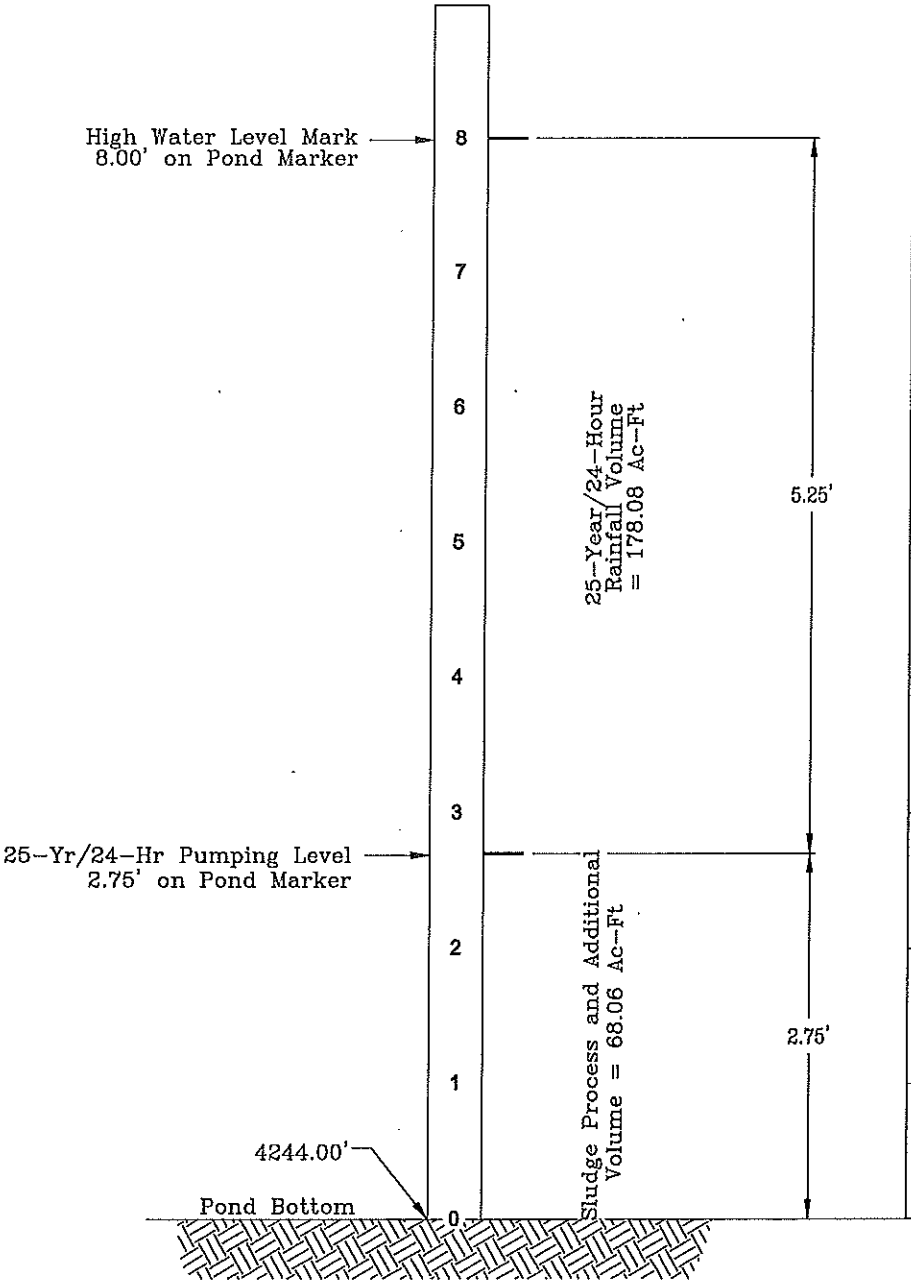
IRRIGATION CELL VOLUME SUMMARY DATA

25-Year, 24-Hour Rainfall Volume (ac-ft):	178.1
Process Generated Wastewater Volume (ac-ft):	1.9
Sludge Accumulation Volume (ac-ft):	19.7
Additional Volume (ac-ft):	0.1
Total Required Capacity (ac-ft):	199.8

	RCS INFLOW CALCULATIONS					HYDRAULIC CROP DEMAND CALCULATIONS					RCS STORAGE SUMMARY			
MONTH	(1) (inches)	(2) (inches)	(2) (inches)	(3) (ac-ft)	(4) (ac-ft)	(5) (inches)	(6) (inches)	(6) (inches)	(7) (ac-ft)	(7) (ac-ft)	(8) (inches)	(9) (ac-ft)	(10) (ac-ft)	(11) (ac-ft)
													start value →	19.9
JAN	0.5	0.0	0.0	2.0	5.8	0.5	0.0	0.0	0.0	0.0	2.7	8.0	0.0	19.7
FEB	0.4	0.0	0.0	1.8	5.3	0.4	0.0	0.0	0.0	0.0	2.9	5.3	0.0	19.7
MAR	0.7	0.0	0.0	0.1	5.7	0.7	0.0	0.0	0.0	0.0	4.6	5.7	0.0	19.7
APR	1.0	0.1	0.0	0.1	9.5	1.0	0.0	3.3	0.0	22.6	6.1	9.5	0.0	19.7
MAY	2.0	0.5	0.0	0.1	24.0	2.0	0.0	5.3	0.0	32.4	7.1	21.2	2.8	19.7
JUN	2.6	0.8	0.0	0.1	34.9	2.6	3.0	2.7	8.0	1.0	8.0	23.9	9.0	21.7
JUL	2.6	0.8	0.0	0.1	35.3	2.6	6.5	0.0	77.8	0.0	8.2	24.3	13.0	19.7
AUG	3.0	1.1	0.1	0.1	44.0	3.0	7.1	3.4	83.0	4.3	6.7	19.9	24.1	19.7
SEP	2.1	0.5	0.0	0.1	25.6	2.1	4.2	3.9	41.4	17.7	5.3	15.8	9.8	19.7
OCT	1.8	0.3	0.0	0.1	19.4	1.8	0.0	2.5	0.0	7.3	4.1	12.0	7.3	19.7
NOV	0.6	0.0	0.0	1.9	7.0	0.6	0.0	0.0	0.0	0.0	2.8	8.2	0.0	19.7
DEC	0.6	0.0	0.0	2.0	6.9	0.6	0.0	0.0	0.0	0.0	2.3	6.7	0.0	19.9
TOTALS	17.9	4.1	0.1	8.5	223.3	17.9	20.8	21.1	210.2	85.3	60.7	160.5	65.9	

NOTES:
(1) AVERAGE PRECIPITATION - Average precipitation taken from the Western Regional Climate Center for Clovis, NM (1910-2005).
(2) RUNOFF PENS AND ADJACENT AREA - Runoff from pens, adjacent areas calculated using SCS Curve Number Method adjusted from 1 to 30-day Curve Number.
(Ref. USDA-SCS, Texas Engineering Technical Note No. 210-18-TX3, Figure 1, March 1983).
(3) PROCESS INFLOW - Process Inflow is calculated from process generated wastewater, Table 1.2.
(4) TOTAL INFLOW - Total Inflow is calculated as that volume of rainfall that falls on the RCS and process water that enters the RCS.
(5) RAINFALL ON IRRIGATED AREA - Monthly rainfall on the irrigated area.
(6) CONSUMPTIVE USE - values taken from crops on irrigated land. (Ref. NRCS CNMP Refresher Course on CD_ROM / CU Values, August 2002)
(7) NET CROP DEMAND - Net Crop Demand = ((Consumptive Use(6) - Effective Rainfall(5))/12) x Irrigated Area.
(8) EVAPORATION - 70 % of Average PAN Evaporation taken from the Western Regional Climate Center for Clovis, NM (1929-2002).
(9) NET POND EVAPORATION - Net Evaporation from the water surface is taken as (Monthly Lake Surface Evap/12) x (RCS Surface Area).
(10) ACTUAL WITHDRAWAL - Actual Withdrawal from the irrigation cell not to exceed Net Crop Demand. (No consideration given for nutrient demand of crop)
(11) STORAGE AT END OF MONTH - Storage volume in the irrigation cell at the end of the month. The storage calculated in this column should not encroach in the volume reserved for the 25-year, 24-hour rainfall event.

Brad J. Wieck, PE
8/27/2007



Cumulative Volume	Gallons By Foot
246.14 Ac-Ft	12,626,726 Gal.
207.39 Ac-Ft	11,906,596 Gal.
170.85 Ac-Ft	11,153,880 Gal.
136.62 Ac-Ft	10,440,266 Gal.
104.58 Ac-Ft	9,628,897 Gal.
75.03 Ac-Ft	8,905,508 Gal.
47.70 Ac-Ft	8,146,275 Gal.
22.70 Ac-Ft	7,396,818 Gal.

Oppliger Feedyard North
Clovis, Curry County, New Mexico

RCS #1 Capacity Drawing
Pond Marker Schematic

ENVIRO-AG ENGINEERING, INC.
Enviro-Ag Engineering, Inc.
ENGINEERING CONSULTANTS
3404 Airway Boulevard
AMARILLO, TEXAS 79118
TEL (806) 353-6123 FAX (806) 353-4132

DISCUSSION OF SITE SPECIFIC ASSESSMENT
(CERTIFICATION OF "LACK OF HYDROLOGIC CONNECTION")

GENERAL:

The purpose for this engineering assessment report is to supply Oppliger Feedyard - North with "*site specific documentation that no significant hydrologic connection exists between the contained wastewater and surface waters of the United States*" as required by the EPA Region 6 NPDES General Permit. Oppliger Feedyard - North is a commercial confined animal feeding (cattle) operation located on a playa lake in Curry County of eastern New Mexico. Wastewater disposal from this facility is through evaporation and irrigation.

METHODS USED OR REFERENCED TO MAKE DETERMINATION:

A thorough inspection of the existing wastewater facilities located at Oppliger Feedyard's cattle feeding facility was conducted by Tim Noack, P.E. of Enviro-Ag Engineering, Inc. in January, 1994. Results of the inspections did not reveal evidence of wastewater seepage from the existing runoff control structure (RCS #1 is a playa lake) or in any of the hydraulically downgradient areas surrounding this structure.

Actual construction methods of each runoff control structure is not applicable for the RCS since this structure is a naturally occurring depression common to the High Plains of Texas and New Mexico. The liner of these depressions consists of Randall Clay often in thicknesses greater than 80 inches. This material is known to meet liner requirements specified in SCS Technical Note 716. The clay has geotechnical properties which exceed those outlined in SCS Technical Note 716 which include: Liquid Limit >30; Plastic Index >15; Percent passing 200 sieve >30% and a permeability less than 1×10^{-7} cm/sec when compacted to 90% of standard proctor density (see attached laboratory report).

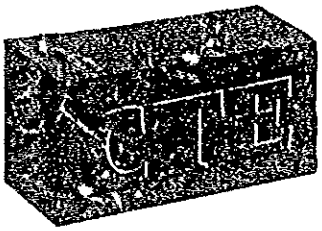
CONCLUSIONS:

Based on results of the thorough site inspections on the date given above, geotechnical characteristics of in-situ soils found in the bottom of the RCS and data presented on playa lakes used for runoff control structures, it is my professional opinion that no significant hydrologic connection exists at this facility. This does not preclude the possibility of disturbing the liner material (Randall Clay) at a future date to a point where insufficient thicknesses remain in the areas which contain the wastewater. This could possibly take place by removing or excavating amounts of material in the playa basin bottom. If this takes place re-inspection and re-certification of the retention facility must take place.

Respectfully Submitted,

Tim Noack, P.E.
Enviro-Ag Engineering, Inc.

Attachments (4)



Cornerstone
Testing &
Engineering, Inc.

To: Enviro-Ag Engineering
P.O. Box 134
Dumas, TX 79029

Date: 12/27/93
Report No.: 1070

Project: Randall Clay

ATTERBURG LIMITS

ASTM D 4318-84: Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit = 53

Plastic Limit = 19

Plasticity Index = 34

PERCENT PASSING NO. 200 SIEVE

ASTM C 117-90: Materials Finer the No. 200 Sieve in Mineral Aggregates by Washing

88.4% Passing No. 200 Sieve

PERMEABILITY

Determined by Constant Head Method using a Rigid Wall Mold

Coefficient of Permeability @ 90% Standard Compaction = 2.5 x 10E-8 cm/sec

Remarks: Sample was delivered to testing laboratory on 12/14/93.

Copies To: 2-Above

Gene Noble

215 S. Fannin 79106 • P.O. Box 30728 • Amarillo, Texas 79120-0728 • 806/374-TEST (374-8378) • Fax 374-0422

CAPACITY CERTIFICATION
OF RETENTION FACILITY(S)

ENVIRO-AG ENGINEERING, INC.

NAME OF CAFO:	Oppliger Feedyard, North	*COMMENTS: Capacities are based*
LOCATION	Curry County, NM	*on existing conditions as of this date.*
DATE:	13 February 1994	*RCS #1 is a playa lake.*

REQUIRED CAPACITIES					
PARAMETER	RCS #1	RCS #2	RCS #3	RCS #4	RCS #5
Min. Design Wastewater Storage Vol. (ac-ft) :	1.51	0.00	0.00	0.00	0.00
Min. Design Runoff Storage Vol. (ac-ft) :	151.28	0.00	0.00	0.00	0.00
MINIMUM REQUIRED CAPACITY (AC-FT)	152.79	0.00	0.00	0.00	0.00

ACTUAL CAPACITIES					
PARAMETER	RCS #1	RCS #2	RCS #3	RCS #4	RCS #5
Freeboard used to determine capacity (ft)*	1.00	0.00	0.00	0.00	0.00
MEASURED CAPACITY OF RCS (AC-FT)	303.00	0.00	0.00	0.00	0.00
**NOTE: Elevation of paved county road was used to determine freeboard of RCS.*					

DETERMINATION OF ADEQUATE OR DEFICIENT CAPACITIES					
PARAMETER	RCS #1	RCS #2	RCS #3	RCS #4	RCS #5
Measured Capacity of RCS (ac-ft):	303.00	0.00	0.00	0.00	0.00
Minimum Required Capacity (ac-ft):	152.79	0.00	0.00	0.00	0.00
EXCESS (SHORTAGE) CAPACITY (AC-FT):	150.21	0.00	0.00	0.00	0.00

CONCLUSIONS:

Calculations shown on this and attached pages are intended to determine the adequacy of this facility's wastewater retention pond(s) with regard to compliance of the EPA-Region 6 NPDES General Permit for stormwater discharges by Concentrated Animal Feeding Operations. RCS's with "Excess Capacities" (positive values) are considered to be adequate using the minimum guidelines as established in the General Permit. Conversely, RCS's with "Shortages" (negative values) are considered to be inadequate using the same minimum capacity requirements. RCS's shown to be deficient in capacity must be cleaned or modified to at least the minimum required capacity as calculated above in order to achieve compliance under the General Permit.

These calculations have been performed by:

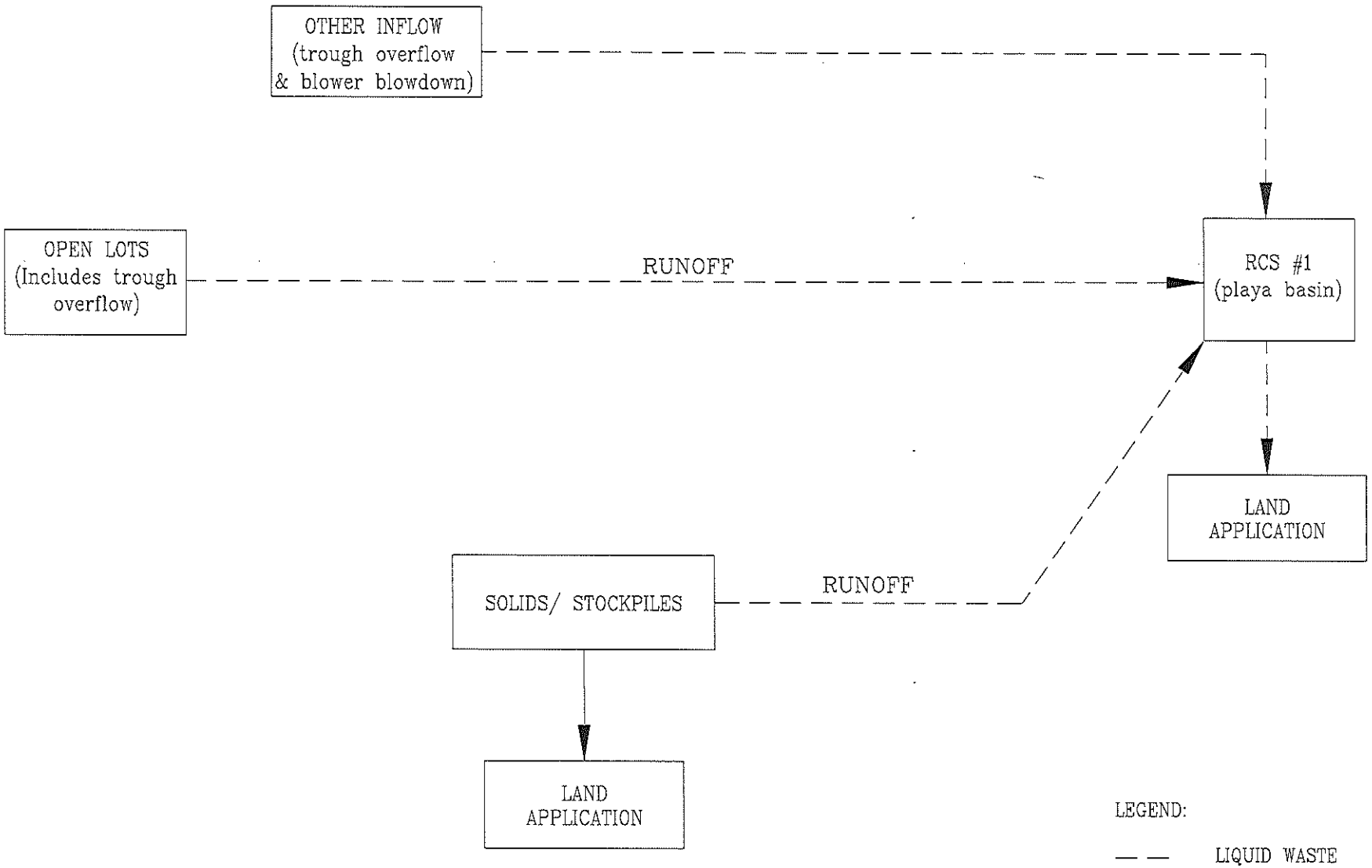
TIMOTHY J. NOACK, P.E.
Enviro-Ag Engineering, Inc.

3/23/94

pollutants from entering the manure, litter, or process wastewater retention structures or waters of the United States.

Check all that are applicable:

- ☐ Chemicals are used and empty containers are disposed of in accordance with manufacturer's guidelines.
- ☐ Where are chemicals stored?
- ☐ Storage is covered?
- ☐ Storage has secondary containment?
- ☐ Chemicals are stored in proper containers?
- ☐ Where are chemicals disposed?
- ☑ No chemicals are used at this facility. According to discussion with the feedyard no chemicals are stored on site.
- ☐ Other: _____



Oppliger Feedyard North Curry County, NM	Manure & Wastewater Flow Chart Figure 3.1	ENVIRO-AG ENGINEERING, INC. Enviro-Ag Engineering, Inc. ENGINEERING CONSULTANTS 3404 Airway Blvd. AMARILLO, TEXAS 79118 TEL (806) 353-6123 FAX (806) 353-4132

SECTION 4 LAND APPLICATION

4.1 Conservation Practices

4.1.1 Conservation Practices for Land Application Sites

The facility will identify appropriate site specific conservation practices to be implemented, including as appropriate buffers or equivalent practices, to control runoff of pollutants to waters of the United States and specifically, to minimize the runoff of nitrogen and phosphorus. These practices may include, but are not limited to, residue management, conservation crop rotation, grassed waterways, strip cropping, vegetated buffers, riparian buffers, setbacks, terracing, and diversions. Table 4.1 indicates the best management practices that are being implemented to control runoff of pollutants to surface water:

Table 4.1: Conservation Practices

Conservation Practice:	**Land Application Site ID where the practice is being implemented:**
Vegetative Buffer	n/a
Setback	Compliance alternative used for wells – Refer to Section 4.4.
Conservation Tillage	LMU 1-3 – Minimal tillage (such as strip and no till are used on these fields.
Grass Filter Strips	n/a
Terraces	n/a
Tailwater Control	n/a
Other (describe):	*Revised 3/11/10*

4.2 Land Application Protocols

4.2.1 Best Management Practices

No land application will be made to a land application site that will exceed the planned crops. The following Best Management Practices (BMPs) are employed by the facility to ensure the loss of nutrients is minimized:

- Incorporate waste with tillage equipment.
- Adjust sprayers and spreaders so the waste is applied at low pressure and apply waste as close to the ground as possible.
- Apply manure during times when air is warming and rising from the ground.
- Manure will be incorporated as soon as possible after application; unless the field has perennial vegetation or is no-tilled cropped.
- When wastewater is sprinkler applied, the soil water holding capacity of the soil shall not be exceeded.

- Manure or wastewater will not be applied to saturated or frozen soils.

4.2.2 Application Methods

1. Method(s) of manure (solids or semi-solid) application?
   - ☑ Dry Manure Spreader
   - ☐ Honey wagons
   - ☐ Injectors
   - ☐ Injectors
   - ☐ Traveling Gun
   - ☐ Spreader Bar

2. Method(s) for wastewater application?
   - ☑ Center Pivot
   - ☐ Flood Irrigation
   - ☐ Furrow Irrigation
   - ☐ Traveling Gun
   - ☐ Stationary Gun

4.3 Land Application Equipment Inspections

Manure and wastewater shall be applied as uniformly as possible with the properly calibrated equipment. Center pivots and manure spreaders for broadcast application will be checked annually/seasonally to ensure that application rates are accurate. All other equipment and components of the waste management systems shall be checked on a regular basis and during application periods. Adequate maintenance will be supplied to equipment that may have the potential to cause spills.

4.4 Setback Requirements

Manure, litter, or process wastewater must not be applied closer than one-hundred (100) feet to any down-gradient water of the United States, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to waters of the United States. The permittee may elect to use a 35-foot vegetated buffer where applications of manure, litter, or process wastewater are prohibited as an alternative to the 100-foot setback to meet this requirement.

As a compliance alternative, the permittee may demonstrate that a set-back or buffer is not necessary because implementation of alternative conservation practices or field-specific conditions will provide pollutant reductions equivalent or better than the reductions that would be achieved by the 100-foot setback.

In regards to agricultural well heads located within 100-feet of a wastewater land application field, the facility shall document additional wellhead protective measures will be or have been implemented that will prevent pollutants from entering the well and contaminating the groundwater. Additional protective measures may include a protective structure, sanitary seal, annular seal, a steel sleeve or surface slab. Those protective measures shall be used as a compliance alternative to the setback.

4.5 Phosphorus and Nitrogen Transport

The application rate calculation shall be based on the results of a field specific assessment of the potential for nitrogen and phosphorus transport from the field to surface waters using the assessment tools and procedures described in New Mexico NRCS Conservation Practice Standard 590 (Nutrient Management), including the New Mexico Phosphorus Index (New Mexico NRCS Agronomy Technical Note 57). The outcome of the field-specific assessment of the potential for nitrogen and phosphorus transport from each field is included in Section 5.

SECTION 5 NUTRIENT BUDGETS AND ASSESSMENTS

5.1 Land Application Data

Land application data for each field to which manure, wastewater or sludge/slurry will or may be applied for the period of the 5-year permit is represented on Table 5.1. The table demonstrates compliance with the following specific permit terms:

1) The outcome of the field-specific assessment of the potential for nitrogen and phosphorus transport from each field. The potential for nitrogen and phosphorus transport shall be determined using the assessment tools and procedures described in New Mexico NRCS Conservation Practice Standard 590 (Nutrient Management) including the New Mexico Phosphorus Index (New Mexico NRCS Agronomy Technical Note 57);
2) the crops to be planted in each field or any other uses of a field such as pasture or fallow fields, including alternative crops if applicable. Any alternative crops included in the NMP must be listed by field, in addition to the crops identified in the planned crop rotation for that field; and
3) the timing and method of land application.

LAND APPLICATION DATA

Table 5.1

Facility Name: Oppliger North

This spreadsheet shall be filled out for each field to which manure, slurry or wastewater will or may be applied for next five (5) years.

Field ID	Crop 1 (a)	Crop 2 (a)	Alternative Crops (b)	Irrigated ☑	Dryland ☑	Phosphorus Risk Assessment (c)	Time of Year when Application will Occur (season)	Potential Application Frequency (per month)	Form of Waste (liquid, solid or slurry)	Method of Application (pivot, spreader, etc.)	Manure Incorporated or Broadcast?	Frequency of Application (annual or biannual, biennial)
1	Corn Silage	Small Grain (SG) Silage	Sorghum/SG Silage	x		1	Spring/Summer/Fall	1	Liquid	Pivot	N/A	A
			Forage Sorghum	x		1	Summer	1	Liquid	Pivot	N/A	A
			SG Silage	x		1	Fall/Spring	1	Liquid	Pivot	N/A	A
3	Corn Silage	SG Silage	Sorghum/SG Silage	x		1	Spring/Summer/Fall	1	Liquid	Pivot	N/A	A
			Forage Sorghum	x		1	Summer	1	Liquid	Pivot	N/A	A
			SG Silage	x		1	Fall/Spring	1	Liquid	Pivot	N/A	A

(a) Planned crop rotation.
(b) Alternative crops that may be planted.
(c) Assessment shall be conducted for each field to which manure, slurry or wastewater will or may be applied on an annual basis. Refer to the Phosphorus Risk Assessment Tool.

5.2 Nutrient Budgets

A nutrient budget for each field to which manure, wastewater or sludge/slurry will or may be applied for the period of the 5-year permit is represented on Tables 5.2. The table demonstrates compliance with the following specific permit terms:

1) The maximum amounts of nitrogen and phosphorus that will be derived from all sources of nutrients (pounds/acre for each crop and field);
2) the realistic annual yield goal for each crop or use identified for each field for each year, including any alternative crops identified;
3) the nitrogen and phosphorus recommendations from EPA approved sources for each crop or use identified for each field, including any alternative crops identified;
4) credits for all nitrogen in the field that will be plant-available;
5) the amount of nitrogen and phosphorus in the manure, litter, and process wastewater to be applied;
6) consideration of multi-year phosphorus application (for any field where nutrients are applied at a rate based on the crop phosphorus requirement, the methodology must account for single year nutrient applications that supply more than the crop's annual phosphorus requirement);
7) accounting for all other additions of plant available nitrogen and phosphorus to the field (i.e., from sources other than manure, litter, or process wastewater or credits for residual nitrogen);
8) volatilization of nitrogen and mineralization of organic nitrogen; and
9) any other factors necessary to determine the amounts of nitrogen and phosphorus to be applied in accordance with the Narrative Rate Approach.

EXECUTIVE SUMMARY

This plan recommends that wastewater be applied to LMU 1 only. Currently, subsoil nutrients associated with all LMUs is high. LMU 3 does not warrant additions of organic and/or inorganic fertilizers. Further applications of nutrients may be warranted once the soils have been reanalyzed in 2010.

The producer does have access to acreages considered as offsite application areas that are currently owned/operated by other producers that may receive manure.

Primary crop rotations for this facility are wheat and corn for silage. Wheat crops may be utilized for grazing, silage and grain. These decisions will be made by the producer based upon climatic conditions and commodity prices.

Producer desires to have grazing options on all fields. Producer desires to graze all crops with all grazing options based upon commodity and climatic conditions. It is not uncommon for producers to utilize a light to moderate grazing scheme while utilizing the crops for haylage or grain production.

Although this plan illustrates specifics pertaining to the location of manure and wastewater applications, it is not the intent of this document to limit application of wastewater and manure to specified LMUs. It may be necessary to apply a mixture of source nutrients to other LMUs in addition to, or in place of, the recommended LMUs. Specifically, climatic conditions may necessitate manure and wastewater to be placed on other LMUs, or portions of, to ensure compliance with applicable rules. At no time should the maximum allowable application rates shown within the NMP be exceeded during the crop year. Application at or above the maximum rates may result in a buildup of nutrients within the soil profile and hamper further application activities during the following growing season(s).

Table 5.2
Oppliger North
Curry County NM
Nutrient Management Budgets

2010

			Column A	B	C	D	E		F	G	H	I	J	K	L	M
Field ID	Crop	Yield	Crop N Req. lb/Ac (1)	Crop P2O5 Removal Rate lb/Ac (1)	0-24" Soil N Residual lb/Ac (2)	0-6" Soil P Residual ppm (2)	Remainder Crop N required lb/Ac (3)	Source	Effluent lb/Ac-in N (4)	Effluent lb/Ac-in N Adjusted for availability (5)	Ac-In/Ac effluent to apply (6)	P Loss Risk (7)	Com. Fert. Rate N lb/Ac	Effluent lb/Ac-in P2O5 (4)	PI Adjusted P2O5 (8)	End Of Year Soil ppm P (9)
Wastewater																
Field 1	Corn Silage-SG Silage	25/8	445	136	376	156	69	Lagoon	52	32	2.1	1	0	39	83	133
Field 1	Small Grain Silage	8 T	134	43	376	156	-242	Lagoon	52	32	0.0	1	0	39	0	137
Field 1	Forage Sorghum	10 T	240	83	376	156	-136	Lagoon	52	32	0.0	1	0	39	0	120
Field 1	Sorghum Silage-SG Silage	20/8	375	117	376	156	-1	Lagoon	52	32	0.0	1	0	39	0	105
Field 3	Corn Silage-SG Silage	25/8	445	139	497	143	-52	Lagoon	52	32	0.0	1	0	39	0	133
Field 3	Small Grain Silage	8 T	134	43	497	143	-363	Lagoon	52	32	0.0	1	0	39	0	124
Field 3	Forage Sorghum	10 T	240	83	497	143	-257	Lagoon	52	32	0.0	1	0	39	0	107
Field 3	Sorghum Silage-SG Silage	20/8	375	117	497	143	-122	Lagoon	52	32	0.0	1	0	39	0	92

Notes:

(1) Crop Nutrient Needs, lbs/ac and based on Crop Requirement tables utilized by the Texas Code 590. New Mexico specific information in non existant and cropping mechanisms are similar for west Texas and east NM.

(2) Taken from annual soil tests results.

(3) Column A-Column C-Column J = Remainder Crop N Required to be supplied by organic source. Negative value indicates residual is higher than requirement. No waste application planned.

(4) Wastewater values from site specific analysis.

(5) Availability of N is estimated utilizing the USDA Ag Waste Management Handbook, Chapter 11. Wastewater Available N = (Organic * 49%) + (Ammonia * 75%); Manure Available N = (Organic * 53%) + (Ammonia * 75%)

(6) The amount of waste (ac-in for effluent and ton/ac for manure) to apply based on analysis of crop requirement, PI requirements, soil residuals.

(7) Calculated using the New Mexico Site Assessment Index-Phosphorus (1=Very Low, Low, Medium (N rate), 2=High (1.5 P removal), 3=Very High (P removal or less), 4=Excessive (no application))

(8) If P loss risk is 1 then application rate is at the N rate. If the remainder of crop N Required is less than zero, then no application is proposed. If P loss risk is greater than 1 then rates are according to PI rating class.

(9) Projected end of year ppm P based on the application rates established in this spreadsheet.

Table 5.2
Oppliger North
Curry County NM
Nutrient Management Budgets

2011

			Column A	B	C	D	E		F	G	H	I	J	K	L	M
Field ID	Crop	Yield	Crop N Req. lb/Ac (1)	Crop P2O5 Removal Rate lb/Ac (1)	0-24" Soil N Residual lb/Ac (2)	0-6" Soil P Residual ppm (2)	Remainder Crop N required lb/Ac (3)	Source	Effluent lb/Ac-in N (4)	in N Adjusted for availability (5)	Ac-In/Ac effluent to apply (6)	P Loss Risk (7)	Com. Fert. Rate N lb/Ac	Effluent lb/Ac-in P2O5 (4)	PI Adjusted P2O5 (8)	End Of Year Soil ppm P (9)
Wastewater																
Field 1	Corn Silage-SG Silage	25/8	445	139	50	133	395	Lagoon	52	32	12.3	1	0	39	478	281
Field 1	Small Grain Silage	8 T	134	43	242	137	-108	Lagoon	52	32	0.0	1	0	39	0	118
Field 1	Forage Sorghum	10 T	240	83	136	120	104	Lagoon	52	32	3.2	1	0	39	126	138
Field 1	Sorghum Silage-SG Silage	20/8	375	117	1	105	374	Lagoon	52	32	11.6	1	0	39	452	251
Field 3	Corn Silage-SG Silage	25/8	445	139	52	133	393	Lagoon	52	32	12.2	1	0	39	475	280
Field 3	Small Grain Silage	8 T	134	43	363	124	-229	Lagoon	52	32	0.0	1	0	39	0	105
Field 3	Forage Sorghum	10 T	240	83	257	107	-17	Lagoon	52	32	0.0	1	0	39	0	71
Field 3	Sorghum Silage-SG Silage	20/8	375	117	122	92	253	Lagoon	52	32	7.8	1	0	39	306	174

Notes:

(1) Crop Nutrient Needs, lbs/ac and based on Crop Requirement tables utilized by the Texas Code 590. New Mexico specific information in non existant and cropping mechanisms are similar for west Texas and east NM.

(2) Taken from annual soil tests results.

(3) Column A-Column C-Column J = Remainder Crop N Required to be supplied by organic source. Negative value indicates residual is higher than requirement. No waste application planned.

(4) Wastewater values from site specific analysis.

(5) Availability of N is estimated utilizing the USDA Ag Waste Management Handbook, Chapter 11. Wastewater Available N = (Organic * 49%) + (Ammonia * 75%); Manure Available N = (Organic * 53%) + (Ammonia * 75%)

(6) The amount of waste (ac-in for effluent and ton/ac for manure) to apply based on analysis of crop requirement, PI requirements, soil residuals.

(7) Calculated using the New Mexico Site Assessment Index-Phosphorus (1=Very Low, Low, Medium (N rate), 2=High (1.5 P removal), 3=Very High (P removal or less), 4=Excessive (no application))

(8) If P loss risk is 1 then application rate is at the N rate. If the remainder of crop N Required is less than zero, then no application is proposed. If P loss risk is greater than 1 then rates are according to PI rating class.

(9) Projected end of year ppm P based on the application rates established in this spreadsheet.

Table 5.2
Oppliger North
Curry County NM
Nutrient Management Budgets

2012

			Column A	B	C	D	E		F	G	H	I	J	K	L	M
Field ID	Crop	Yield	Crop N Req. lb/Ac (1)	Crop P2O5 Removal Rate lb/Ac (1)	0-24" Soil N Residual lb/Ac (2)	0-6" Soil P Residual ppm (2)	Remainder Crop N required lb/Ac (3)	Source	Effluent lb/Ac-in N (4)	Effluent lb/Ac-in N Adjusted for availability (5)	Ac-In/Ac effluent to apply (6)	P Loss Risk (7)	Com. Fert. Rate N lb/Ac	Effluent lb/Ac-in P2O5 (4)	PI Adjusted P2O5 (8)	End Of Year Soil ppm P (9)
Wastewater																
Field 1	Corn Silage-SG Silage	25/8	445	139	50	281	395	Lagoon	52	32	12.3	1	0	39	478	429
Field 1	Small Grain Silage	8 T	134	43	108	118	26	Lagoon	52	32	0.8	1	0	39	31	113
Field 1	Forage Sorghum	10 T	240	83	50	138	190	Lagoon	52	32	5.9	1	0	39	230	203
Field 1	Sorghum Silage-SG Silage	20/8	375	117	50	251	325	Lagoon	52	32	10.1	1	0	39	393	372
Field 3	Corn Silage-SG Silage	25/8	445	139	50	280	395	Lagoon	52	32	12.3	1	0	39	478	428
Field 3	Small Grain Silage	8 T	134	43	229	105	-95	Lagoon	52	32	0.0	1	0	39	0	87
Field 3	Forage Sorghum	10 T	240	83	17	71	223	Lagoon	52	32	6.9	1	0	39	270	152
Field 3	Sorghum Silage-SG Silage	20/8	375	117	50	174	325	Lagoon	52	32	10.1	1	0	39	393	295

Notes:
(1) Crop Nutrient Needs, lbs/ac and based on Crop Requirement tables utilized by the Texas Code 590. New Mexico specific information in non existant and cropping mechanisms are similar for west Texas and east NM.
(2) Taken from annual soil tests results.
(3) Column A-Column C-Column J = Remainder Crop N Required to be supplied by organic source. Negative value indicates residual is higher than requirement. No waste application planned.
(4) Wastewater values from site specific analysis.
(5) Availability of N is estimated utilizing the USDA Ag Waste Management Handbook, Chapter 11. Wastewater Available N = (Organic * 49%) + (Ammonia * 75%); Manure Available N = (Organic * 53%) + (Ammonia * 75%)
(6) The amount of waste (ac-in for effluent and ton/ac for manure) to apply based on analysis of crop requirement, PI requirements, soil residuals.
(7) Calculated using the New Mexico Site Assessment Index-Phosphorus (1=Very Low, Low, Medium (N rate), 2=High (1.5 P removal), 3=Very High (P removal or less), 4=Excessive (no application))
(8) If P loss risk is 1 then application rate is at the N rate. If the remainder of crop N Required is less than zero, then no application is proposed. If P loss risk is greater than 1 then rates are according to PI rating class.
(9) Projected end of year ppm P based on the application rates established in this spreadsheet.

Table 5.2
Oppliger North
Curry County NM
Nutrient Management Budgets

2013

			Column A	B	C	D	E		F	G	H	I	J	K	L	M
Field ID	Crop	Yield	Crop N Req. lb/Ac (1)	Crop P2O5 Removal Rate lb/Ac (1)	0-24" Soil N Residual lb/Ac (2)	0-6" Soil P Residual ppm (2)	Remainder Crop N required lb/Ac (3)	Source	Effluent lb/Ac-in N (4)	in N Adjusted for availability (5)	Ac-In/Ac effluent to apply (6)	P Loss Risk (7)	Com. Fert. Rate N lb/Ac	Effluent lb/Ac-in P2O5 (4)	PI Adjusted P2O5 (8)	End Of Year Soil ppm P (9)
Wastewater																
Field 1	Corn Silage-SG Silage	25/8	445	139	50	429	395	Lagoon	52	32	12.3	1	0	39	478	577
Field 1	Small Grain Silage	8 T	134	43	50	113	84	Lagoon	52	32	2.6	1	0	39	102	139
Field 1	Forage Sorghum	10 T	240	83	50	203	190	Lagoon	52	32	5.9	1	0	39	230	267
Field 1	Sorghum Silage-SG Silage	20/8	375	117	50	372	325	Lagoon	52	32	10.1	1	0	39	393	493
Field 3	Corn Silage-SG Silage	25/8	445	139	50	428	395	Lagoon	52	32	12.3	1	0	39	478	576
Field 3	Small Grain Silage	8 T	134	43	95	87	39	Lagoon	52	32	1.2	1	0	39	47	88
Field 3	Forage Sorghum	10 T	240	83	50	152	190	Lagoon	52	32	5.9	1	0	39	230	216
Field 3	Sorghum Silage-SG Silage	20/8	375	117	50	295	325	Lagoon	52	32	10.1	1	0	39	393	416

Notes:
(1) Crop Nutrient Needs, lbs/ac and based on Crop Requirement tables utilized by the Texas Code 590. New Mexico specific information in non existant and cropping mechanisms are similar for west Texas and east NM.
(2) Taken from annual soil tests results.
(3) Column A-Column C-Column J = Remainder Crop N Required to be supplied by organic source. Negative value indicates residual is higher than requirement. No waste application planned.
(4) Wastewater values from site specific analysis.
(5) Availability of N is estimated utilizing the USDA Ag Waste Management Handbook, Chapter 11. Wastewater Available N = (Organic * 49%) + (Ammonia * 75%); Manure Available N = (Organic * 53%) + (Ammonia * 75%)
(6) The amount of waste (ac-in for effluent and ton/ac for manure) to apply based on analysis of crop requirement, PI requirements, soil residuals.
(7) Calculated using the New Mexico Site Assessment Index-Phosphorus (1=Very Low, Low, Medium (N rate), 2=High (1.5 P removal), 3=Very High (P removal or less), 4=Excessive (no application))
(8) If P loss risk is 1 then application rate is at the N rate. If the remainder of crop N Required is less than zero, then no application is proposed. If P loss risk is greater than 1 then rates are according to PI rating class.
(9) Projected end of year ppm P based on the application rates established in this spreadsheet.

Table 5.2
Oppliger North
Curry County NM
Nutrient Management Budgets

2014

			Column A	B	C	D	E		F	G	H	I	J	K	L	M
Field ID	Crop	Yield	Crop N Req. lb/Ac (1)	Crop P2O5 Removal Rate lb/Ac (1)	0-24" Soil N Residual lb/Ac (2)	0-6" Soil P Residual ppm (2)	Remainder Crop N required lb/Ac (3)	Source	Effluent lb/Ac-in N (4)	Effluent lb/Ac-in N Adjusted for availability (5)	Ac-In/Ac effluent to apply (6)	P Loss Risk (7)	Com. Fert. Rate N lb/Ac	Effluent lb/Ac-in P2O5 (4)	PI Adjusted P2O5 (8)	End Of Year Soil ppm P (9)
Wastewater																
Field 1	Corn Silage-SG Silage	25/8	445	139	50	577	395	Lagoon	52	32	12.3	1	0	39	478	725
Field 1	Small Grain Silage	8 T	134	43	50	139	84	Lagoon	52	32	2.6	1	0	39	102	165
Field 1	Forage Sorghum	10 T	240	83	50	267	190	Lagoon	52	32	5.9	1	0	39	230	331
Field 1	Sorghum Silage-SG Silage	20/8	375	117	50	493	325	Lagoon	52	32	3.0	3	0	39	117	493
Field 3	Corn Silage-SG Silage	25/8	445	139	50	576	395	Lagoon	52	32	12.3	1	0	39	478	724
Field 3	Small Grain Silage	8 T	134	43	50	88	84	Lagoon	52	32	2.6	1	0	39	102	114
Field 3	Forage Sorghum	10 T	240	83	50	216	190	Lagoon	52	32	5.9	1	0	39	230	280
Field 3	Sorghum Silage-SG Silage	20/8	375	117	50	416	325	Lagoon	52	32	10.1	1	0	39	393	536

Notes:
(1) Crop Nutrient Needs, lbs/ac and based on Crop Requirement tables utilized by the Texas Code 590. New Mexico specific information in non existant and cropping mechanisms are similar for west Texas and east NM.
(2) Taken from annual soil tests results.
(3) Column A-Column C-Column J = Remainder Crop N Required to be supplied by organic source. Negative value indicates residual is higher than requirement. No waste application planned.
(4) Wastewater values from site specific analysis.
(5) Availability of N is estimated utilizing the USDA Ag Waste Management Handbook, Chapter 11. Wastewater Available N = (Organic * 49%) + (Ammonia * 75%); Manure Available N = (Organic * 53%) + (Ammonia * 75%)
(6) The amount of waste (ac-in for effluent and ton/ac for manure) to apply based on analysis of crop requirement, PI requirements, soil residuals.
(7) Calculated using the New Mexico Site Assessment Index-Phosphorus (1=Very Low, Low, Medium (N rate), 2=High (1.5 P removal), 3=Very High (P removal or less), 4=Excessive (no application))
(8) If P loss risk is 1 then application rate is at the N rate. If the remainder of crop N Required is less than zero, then no application is proposed. If P loss risk is greater than 1 then rates are according to PI rating class.
(9) Projected end of year ppm P based on the application rates established in this spreadsheet.

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Oppliger North	Field(s):	3	Date:	3/5/2010
Planner:	EAE	Location:	Clovis NM	Crop:	Corn/wht
Soil Permeablity (in/hr):	2	Slope (%):	1.8	Planned/Exist.:	

Site Characteristic	Place an X in the appropriate box for each of the Site Characteristic listed below.					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
	X					0
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
			X			2
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
	X					0
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
					X	12

P Hazard Class:	Medium	Total Index Points:	23.0
Phosphorus Application Classification:	N Based		

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

PHOSPHORUS INDEX WORKSHEET for New Mexico

Client Name:	Oppliger North	Field(s):	1	Date:	3/5/2010
Planner:	EAE	Location:	Clovis NM	Crop:	Corn/wht
Soil Permeablity (in/hr):	2	Slope (%):	1.2	Planned/Exist.:	

Site Characteristic	Place an X in the approprate box for each of the Site Characteristic listed below.					Sub Total
Soil Test P Level	Very Low <8 ppm	Low 8-15 ppm	Moderate >15-23 ppm	High >23-30 ppm	Very High >30 ppm	
					X	8
Phosphorus (P_2O_5) Application Rate	None Applied	<30 lbs/ac P_2O_5	30-90 lbs/ac P_2O_5	>90-150 lbs/ac P_2O_5	>150 lbs/ac P_2O_5	
	X					0
Organic Phosphorus Source Application Method	None Applied	Injected Deeper than 2 inches	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
		X				1
Phosphorus Fertilizer Application Method	None Applied	Placed with Planter Deeper than 2 in.	Incorporated Immediately before Planting	Incorp. >3 Mo. Before Planting or Surface Applied <3 Mo. before Planting	Surface Applied >3 Months Before Planting	
	X					0
Proximity of Nearest Field Edge to Named Stream or Lake	Very Low >1000 feet	Low >500-1000 feet	Medium >200-500 feet	High 30-200 feet	Very High <30 feet	
	X					0
Soil Erosion (wind & water)	Very Low <1 t/ac	Low 1-3 t/ac	Medium >3-5 t/ac	High >5-15 t/ac	Very High >15 t/ac	
	X					0
Runoff Class (Runoff Class Table 2)	Very Low or Negligible	Low	Medium	High	Very High	
	X					0
Irrigation Erosion (See QS note)	Not Irrigated or No Furrow Irrigation	Tailwater Recovery or QS<6 for very erodible soils or QS<10 for resistant soils	QS>10 for erosion resistant soils	QS>10 for erodible soils	QS>6 for very erodible soils	
	X					0
Grazing Management	Not Grazed	Graze Crop Residues	Pasture <30% Dry Matter as Supplemental Feed	Pasture 30 to 80% Dry Matter as Supplemental Feed	Pasture 80 to 100% Dry Matter as Supplemental Feed	
			X			1
Vegetative Buffer	> 100 ft wide	>65-100 ft wide	20-65 feet wide	< 20 feet wide	No Buffer	
					X	12

P Hazard Class:	Medium	Total Index Points:	22.0
Phosphorus Application Classification:		N Based	

Notes:

This evaluation has a Medium P hazard class and the nutrient application can be based on N.

Comments:

5.3 Methodology

The methodology including formulas, sources of data and protocols for making determinations. Tables 5.3 and 5.4 are example budgets that provide a methodology for the narrative approach to calculating nitrogen or phosphorus based application rates.

Table 5.3: Wastewater Application Calculations

	Application Calculations (LMU 1 for example)	Rate
1	Determine nutrient component from soil (lbs-N/ac or lbs-P2O5): **Nitrogen = (lbs./ac-in from both 0-6 and 6-24 soil profiles shown on soil test)** **Phosphorus = (lbs./ac-in from the 0-6 soil profile shown on soil test)**	**N = 376** **P = 156ppm (714 lb/Ac)**
2	Determine annual nutrient requirement from cropping scheme, (lbs-N/ac or lbs-P2O5) **Crop Requirement = (from Planning Tools – S-Crops)** **For Phosphorus – Adjust for Phosphorus Index (PI). (refer to PI Sheets)**	**445 lb/Ac N** **155 lb/Ac P2O5**
3	Determine remaining nutrients needed for crop requirement, (lbs-N/ac or lbs-P2O5) **= (Line 2 -Line 1)**	**N = 69** **P = 0**
4	Determine nutrient concentration from effluent (lbs-N/ac-in) **Nitrogen = (lbs./ac-in value from effluent test)** **Phosphorus = (lbs./ac-in P2O5 value from effluent test)**	**N = 52** **P2O5 = 39**
5	Effluent Adjustment: Determine nutrient concentration assuming an estimated % available each year. **% Available N = ((Organic * 49%) + (Ammonia N * 75%))/TN; TN per ac-in * % available = adjusted** **Phosphorus = (lbs./ac-in of P2O5 in value from effluent test) @ 100% available**	**N = 32** **P2O5 = 39**
6	Enter acreage to be irrigated, (acres)	**120**
7	Determine volume of effluent needed to meet crop requirement, (ac-ft)* **=(Line 3 / Line 5) / 12**	**0.18**
8	Conversion to total gallons **=(Line 7 x 325,851)**	**58,551.35**
9	Conversion to acre-inches per acre **=(Line 3/ Line 5)**	**2.15**

Table 5.4: Manure (Solids) Application Calculations

	Application Calculations (Example)	Rate
1	Determine nutrient component from soil (lbs-N/ac or lbs-P2O5): **Nitrogen = (lbs./ac-in from both 0-6 and 6-24 soil profiles shown on soil test)** **Phosphorus = (lbs./ac-in from the 0-6 soil profile shown on soil test)**	**N = 376** **P = 156ppm (714 lb/Ac)**
2	Determine annual nutrient requirement from cropping scheme, (lbs-N/ac or lbs-P2O5) **Crop Requirement = (from Planning Tools – S-Crops)** **For Phosphorus – Adjust for Phosphorus Index (PI). (refer to PI Sheets)**	**445 lb/Ac N** **155 lb/Ac P2O5**
3	Determine remaining nutrients needed for crop requirement, (lbs-N/ac) **= (Line 2 -Line 1)**	**N = 69** **P = 0**
4	Determine nutrient component from solid manure (lbs-N/ton) **Nitrogen = (lbs./ton value from manure test)** **Phosphorus = (lbs./ton P2O5 value from manure test)**	**N=27.4 lb/T** **P2O5=21 lb/T**
5	Assume 50% of nitrogen available in first year **% Available N = ((Organic * 53%) + (Ammonia N * 75%))/TN; TN per ac-in * % available = adjusted** **Phosphorus = (lbs./ac-in of P2O5 in value from effluent test) @ 100% available**	**Available N=47.7%**
6	Total nitrogen available in first year, (lbs-N/ton) = **(Line 4) x (Line 5)**	**13.1 lb/T**
7	Enter the amount of solid manure to be applied, (tons)	**5.3 T/Ac**
8	Number of acres the manure will be applied to, (acres)	**120**
9	Determine application rate, (lbs/acre) **= (Line 7) x (Line 6)**	**69.0 lb/Ac** **8,331.6 lb/Field**

Crop	Crop N requirement	Crop P2O5 requirement	lbs DM or air dried produced per year	% N (in column D value)	% P (in column D value)	% K (in column D value)		Crop N Removal Rate	Crop P_2O_5 Removal Rate
Corn 111 - 130 bu	144	105	7280	1.61%	0.28%	0.40%		117	47
Corn 131 - 150 bu	164	105	8400	1.61%	0.28%	0.40%		135	54
Corn 151 - 170 bu	180	130	9520	1.61%	0.28%	0.40%		153	61
Corn 171 - 190 bu	210	130	10604	1.61%	0.28%	0.40%		171	68
Corn 191 - 210 bu	250	130	11760	1.61%	0.28%	0.40%		189	75
Corn 211 - 230 bu	280	130	12880	1.61%	0.28%	0.40%		207	83
Corn 231 - 250 bu	300	130	14000	1.61%	0.28%	0.40%		225	90
Corn 250 - 275 bu	325	130	15120	1.61%	0.28%	0.40%		243	97
Corn 276 - 300 bu	350	130	16240	1.61%	0.28%	0.40%		261	104
Corn 301 - 350 bu	375	130	17360	1.61%	0.28%	0.40%		279	111
Corn 50 - 70 bu	70	80	3920	1.61%	0.28%	0.40%		63	25
Corn 71 - 90 bu	90	80	5040	1.61%	0.28%	0.40%		81	32
Corn 91 - 110 bu	120	105	6160	1.61%	0.28%	0.40%		99	39
Grain Sorg. 1000 #	20	30	1000	1.67%	0.36%	0.42%		17	8
Grain Sorg. 10000 #	200	130	10000	1.67%	0.36%	0.42%		167	82
Grain Sorg. 1500 #	30	30	1500	1.67%	0.36%	0.42%		25	12
Grain Sorg. 2000 #	40	30	2000	1.67%	0.36%	0.42%		33	16
Grain Sorg. 3000 #	60	55	3000	1.67%	0.36%	0.42%		50	25
Grain Sorg. 4000 #	80	55	4000	1.67%	0.36%	0.42%		67	33
Grain Sorg. 5000 #	100	80	5000	1.67%	0.36%	0.42%		84	41
Grain Sorg. 6000 #	120	80	6000	1.67%	0.36%	0.42%		100	49
Grain Sorg. 7000 #	140	130	7000	1.67%	0.36%	0.42%		117	58
Grain Sorg. 8000 #	160	130	8000	1.67%	0.36%	0.42%		134	66
Grain Sorg. 9000 #	180	130	9000	1.67%	0.36%	0.42%		150	74
Grain Sorg. 2000#, SG Moderate Graze	200	135	7800	1.66%	0.30%	1.82%		129	54
Grain Sorg. 3000#, SG Moderate Graze	220	160	8800	1.67%	0.31%	1.82%		147	62
Grain Sorg. 4000#, SG Moderate Graze	240	165	9800	1.67%	0.31%	1.82%		164	70
Grain Sorg. 5000#, SG Moderate Graze	260	185	10800	1.67%	0.32%	1.82%		180	79
Grain Sorg. 6000#, SG Moderate Graze	280	185	11800	1.67%	0.32%	1.82%		197	86
SG Silage(35% DM) 12 to 14 tons	160	90	9800	1.31%	0.30%	0.94%	Stephenville published values 1997-98	128	67
SG Silage(35% DM) 10 to 11 tons	120	70	7700	1.31%	0.30%	0.94%	Stephenville published values 1997-98	101	53
SG Silage(35% DM) 8 to 9 tons	95	40	6300	1.31%	0.30%	0.94%	Stephenville published values 1997-98	83	43
SG Silage(35% DM) 5 to 7 tons	70	30	4900	1.31%	0.30%	0.94%	Stephenville published values 1997-98	64	34
Silage - Corn(35% DM) 11 - 15 Ton	140	80	10500	1.13%	0.24%	1.09%	Stephenville published values 1997-98	119	58
Silage - Corn(35% DM) 16 - 20 Ton	240	100	14000	1.31%	0.24%	1.09%	Stephenville published values 1997-98	183	77
Silage - Corn(35% DM) 21 - 25 Ton	350	105	17500	1.50%	0.24%	1.09%	Stephenville published values 1997-98	263	96
Silage - Corn(35% DM) 26 - 30 Ton	420	135	21000	1.50%	0.24%	1.09%	Stephenville published values 1997-98	315	115
Silage - Corn(35% DM) 7 - 10 Ton	85	60	7000	1.13%	0.24%	1.09%	Stephenville published values 1997-98	79	38

Silage - Corn16-20T;SG GreenChop-6-7T	440	180	17500	1.95%	0.33%	1.02%	see above	341	132
Silage - Corn16-20T;SG GreenChop-8-9T	500	190	18500	2.09%	0.35%	1.02%	see above	387	148
Silage - Corn21-25T;SG GreenChop-6-7T	550	185	21000	2.00%	0.32%	1.02%	see above	420	154
Silage - Corn21-25T;SG GreenChop-8-9T	610	195	22000	2.10%	0.33%	1.02%	see above	462	166
Silage - Corn16-20T;SG Silage-5-7T	310	140	18900	1.30%	0.25%	1.02%	see above	246	108
Silage - Corn16-20T;SG Silage-8-9T	335	150	20800	1.30%	0.25%	1.02%	see above	270	119
Silage - Corn21-25T;SG Silage-5-7T	420	145	19300	1.70%	0.29%	1.02%	see above	328	128
Silage - Corn21-25T;SG Silage-8-9T	445	155	23800	1.45%	0.25%	1.02%	see above	345	136
Silage - Sorg(35% DM) 11 - 15 Ton	200	75	10500	1.70%	0.23%	1.02%	2003 Bushland values	179	55
Silage - Sorg(35% DM) 16 - 20 Ton	280	95	14000	1.70%	0.23%	1.02%	2003 Bushland values	238	74
Silage - Sorg(35% DM) 21 - 25 Ton	360	115	17500	1.70%	0.23%	1.02%	2003 Bushland values	298	92
Silage - Sorg(35% DM) 26 - 30 Ton	380	130	21000	1.50%	0.23%	1.02%	2003 Bushland values	315	111
Silage - Sorg(35% DM) 31 - 40 Ton	450	155	28000	1.30%	0.21%	1.02%	2003 Bushland values	364	135
Silage - Sorg(35% DM) 41 - 50 Ton	580	190	35000	1.30%	0.21%	1.02%	2003 Bushland values	455	168
Silage - Sorg(35% DM) 51 - 60 Ton	700	220	42000	1.31%	0.21%	1.02%		550	202
Silage - Sorg(35% DM) 7 - 10 Ton	125	60	7000	1.70%	0.23%	1.02%	2003 Bushland values	119	37
Silage - Sorg21-25T;SG Silage-12-14T	520	205	27300	1.56%	0.25%	1.02%	see above	426	156
Silage - Sorg26-30T;SG Silage-12-14T	540	220	30800	1.43%	0.25%	1.02%	see above	440	176
Silage - Sorg31-40T;SG Silage-12-14T	610	245	37800	1.30%	0.24%	1.02%	see above	491	208
Silage - Sorg41-50T;SG Silage-12-14T	740	280	44800	1.30%	0.23%	1.02%	see above	582	236
Silage - Sorg51-60T;SG Silage-12-14T	860	310	51800	1.31%	0.23%	1.02%	see above	679	273
Silage - Sorg21-25T;SG Silage-10-11T	480	185	25200	1.58%	0.25%	1.02%	see above	398	144
Silage - Sorg26-30T;SG Silage-10-11T	500	200	28700	1.45%	0.25%	1.02%	see above	416	164
Silage - Sorg31-40T;SG Silage-10-11T	570	225	35700	1.30%	0.23%	1.02%	see above	464	188
Silage - Sorg41-50T;SG Silage-10-11T	700	260	42700	1.30%	0.23%	1.02%	see above	555	225
Silage - Sorg51-60T;SG Silage-10-11T	820	290	49700	1.31%	0.23%	1.02%	see above	651	262
Small Grain Heavy Grazing	240	105	6700	1.67%	0.27%	1.42%		112	41
Small Grain Light Grazing	60	80	4500	1.67%	0.27%	1.42%		75	28
Small Grain Moderate Grazing	160	105	5800	1.67%	0.27%	1.42%		97	36
Sorg. - Sudan Hay/Graze 11000 #	240	105	11000	1.99%	0.33%	2.43%		219	83
Sorg. - Sudan Hay/Graze 11000 #, SG mod graze	400	210	16800	1.88%	0.31%	2.09%		316	119
Sorg. - Sudan Hay/Graze 7500 #	160	55	7500	1.99%	0.33%	2.43%		149	57
Sorg. - Sudan Hay/Graze 7500 #, SG mod graze	320	160	13300	1.88%	0.31%	2.09%		250	94
Sorg Forage Hay/Graze 11000 #	240	105	11000	1.99%	0.33%	2.43%		219	83
Sorg Forage Hay/Graze 11000 #, SG mod graze	400	210	16800	1.88%	0.31%	2.09%		316	119
Sorg Forage Hay/Graze 7500 #	160	55	7600	1.99%	0.33%	2.43%		151	57
Sorg Forage Hay/Graze 7500 #, SG mod graze	320	160	13300	1.88%	0.31%	2.09%		250	94
Wheat Forage 4000 #	160	105	4000	1.67%	0.27%	1.42%		67	25
Wheat Forage 6000 #	240	105	6000	1.67%	0.27%	1.42%		100	37
Wheat Grain 20 - 30 bu + Grazing	60	55	2800	2.08%	0.62%	0.52%		58	40
Wheat Grain 20 - 30 bu	45	55	1800	2.08%	0.62%	0.52%		37	26
Wheat Grain 31 - 40 bu + Grazing	80	75	3400	2.08%	0.62%	0.52%		71	48
Wheat Grain 31 - 40 bu	60	75	2400	2.08%	0.62%	0.52%		50	34
Wheat Grain 41 - 50 bu + Grazing	100	75	4000	2.08%	0.62%	0.52%		83	57
Wheat Grain 41 - 50 bu	75	75	3000	2.08%	0.62%	0.52%		62	43
Wheat Grain 51 - 60 bu + Grazing	120	90	4600	2.08%	0.62%	0.52%		96	65
Wheat Grain 51 - 60 bu	90	90	3600	2.08%	0.62%	0.52%		75	51
Wheat Grain 61 - 70 bu + Grazing	140	90	5200	2.08%	0.62%	0.52%		108	74
Wheat Grain 61 - 70 bu	105	90	4200	2.08%	0.62%	0.52%		87	60
Wheat Grain 71 - 80 bu + Grazing	160	95	5800	2.08%	0.62%	0.52%		121	82
Wheat Grain 71 - 80 bu	120	95	4800	2.08%	0.62%	0.52%		100	68
Wheat Grain 81 - 90 bu + Grazing	180	95	6400	2.08%	0.62%	0.52%		133	91
Wheat Grain 81 - 90 bu	135	95	5400	2.08%	0.62%	0.52%		112	77
Wheat Grain 91 - 100 bu + Grazing	200	95	7000	2.08%	0.62%	0.52%		146	99
Wheat Grain 91 - 100 bu	150	95	6000	2.08%	0.62%	0.52%		125	85
Wheat Heavy Grazing	240	105	6800	1.67%	0.27%	1.42%		114	42
Wheat Light Grazing	60	80	4500	1.67%	0.27%	1.42%		75	28
Wheat Moderate Grazing	160	105	5800	1.67%	0.27%	1.42%		97	36

Last Revised - 8/31/09 - Downloaded from http://nmp.tamu.edu/ on 3/12/10.

Crop	Crop N requirement	Crop P2O5 requirement	lbs DM or air dried produced per year	% N (in column D value)	% P (in column D value)	% K (in column D value)		Crop N Removal Rate	Crop P_2O_5 Removal Rate
Corn 111 - 130 bu	144	105	7280	1.61%	0.28%	0.40%		117	47
Corn 131 - 150 bu	164	105	8400	1.61%	0.28%	0.40%		135	54
Corn 151 - 170 bu	180	130	9520	1.61%	0.28%	0.40%		153	61
Corn 171 - 190 bu	210	130	10604	1.61%	0.28%	0.40%		171	68
Corn 191 - 210 bu	250	130	11760	1.61%	0.28%	0.40%		189	75
Corn 211 - 230 bu	280	130	12880	1.61%	0.28%	0.40%		207	83
Corn 231 - 250 bu	300	130	14000	1.61%	0.28%	0.40%		225	90
Corn 250 - 275 bu	325	130	15120	1.61%	0.28%	0.40%		243	97
Corn 276 - 300 bu	350	130	16240	1.61%	0.28%	0.40%		261	104
Corn 301 - 350 bu	375	130	17360	1.61%	0.28%	0.40%		279	111
Corn 50 - 70 bu	70	80	3920	1.61%	0.28%	0.40%		63	25
Corn 71 - 90 bu	90	80	5040	1.61%	0.28%	0.40%		81	32
Corn 91 - 110 bu	120	105	6160	1.61%	0.28%	0.40%		99	39
Grain Sorg. 1000 #	20	30	1000	1.67%	0.36%	0.42%		17	8
Grain Sorg. 10000 #	200	130	10000	1.67%	0.36%	0.42%		167	82
Grain Sorg. 1500 #	30	30	1500	1.67%	0.36%	0.42%		25	12
Grain Sorg. 2000 #	40	30	2000	1.67%	0.36%	0.42%		33	16
Grain Sorg. 3000 #	60	55	3000	1.67%	0.36%	0.42%		50	25
Grain Sorg. 4000 #	80	55	4000	1.67%	0.36%	0.42%		67	33
Grain Sorg. 5000 #	100	80	5000	1.67%	0.36%	0.42%		84	41
Grain Sorg. 6000 #	120	80	6000	1.67%	0.36%	0.42%		100	49
Grain Sorg. 7000 #	140	130	7000	1.67%	0.36%	0.42%		117	58
Grain Sorg. 8000 #	160	130	8000	1.67%	0.36%	0.42%		134	66
Grain Sorg. 9000 #	180	130	9000	1.67%	0.36%	0.42%		150	74
Grain Sorg. 2000#; SG Moderate Graze	200	135	7800	1.66%	0.30%	1.82%		129	54
Grain Sorg. 3000#; SG Moderate Graze	220	160	8800	1.67%	0.31%	1.82%		147	62
Grain Sorg. 4000#; SG Moderate Graze	240	165	9800	1.67%	0.31%	1.82%		164	70
Grain Sorg. 5000#; SG Moderate Graze	260	185	10800	1.67%	0.32%	1.82%		180	79
Grain Sorg. 6000#; SG Moderate Graze	280	185	11800	1.67%	0.32%	1.82%		197	86
SG Silage(35% DM) 12 to 14 tons	160	90	9800	1.31%	0.30%	0.94%	Stephenville published values 1997-98	128	67
SG Silage(35% DM) 10 to 11 tons	120	70	7700	1.31%	0.30%	0.94%	Stephenville published values 1997-98	101	53
SG Silage(35% DM) 8 to 9 tons	95	40	6300	1.31%	0.30%	0.94%	Stephenville published values 1997-98	83	43
SG Silage(35% DM) 5 to 7 tons	70	30	4900	1.31%	0.30%	0.94%	Stephenville published values 1997-98	64	34
Silage - Corn(35% DM) 11 - 15 Ton	140	80	10500	1.13%	0.24%	1.09%	Stephenville published values 1997-98	119	58
Silage - Corn(35% DM) 16 - 20 Ton	240	100	14000	1.31%	0.24%	1.09%	Stephenville published values 1997-98	183	77
Silage - Corn(35% DM) 21 - 25 Ton	350	105	17500	1.50%	0.24%	1.09%	Stephenville published values 1997-98	263	96
Silage - Corn(35% DM) 26 - 30 Ton	420	135	21000	1.50%	0.24%	1.09%	Stephenville published values 1997-98	315	115
Silage - Corn(35% DM) 7 - 10 Ton	85	60	7000	1.13%	0.24%	1.09%	Stephenville published values 1997-98	79	38

Silage - Corn16-20T;SG GreenChop-6-7T	440	180	17500	1.95%	0.33%	1.02%	see above	341	132
Silage - Corn16-20T;SG GreenChop-8-9T	500	190	18500	2.09%	0.35%	1.02%	see above	387	148
Silage - Corn21-25T;SG GreenChop-6-7T	550	185	21000	2.00%	0.32%	1.02%	see above	420	154
Silage - Corn21-25T;SG GreenChop-8-9T	610	195	22000	2.10%	0.33%	1.02%	see above	462	166
Silage - Corn16-20T;SG Silage-5-7T	310	140	18900	1.30%	0.25%	1.02%	see above	246	108
Silage - Corn16-20T;SG Silage-8-9T	335	150	20800	1.30%	0.25%	1.02%	see above	270	119
Silage - Corn21-25T;SG Silage-5-7T	420	145	19300	1.70%	0.29%	1.02%	see above	328	128
Silage - Corn21-25T;SG Silage-8-9T	445	155	23800	1.45%	0.25%	1.02%	see above	345	136
Silage - Sorg(35% DM) 11 - 15 Ton	200	75	10500	1.70%	0.23%	1.02%	2003 Bushland values	179	55
Silage - Sorg(35% DM) 16 - 20 Ton	280	95	14000	1.70%	0.23%	1.02%	2003 Bushland values	238	74
Silage - Sorg(35% DM) 21 - 25 Ton	360	115	17500	1.70%	0.23%	1.02%	2003 Bushland values	298	92
Silage - Sorg(35% DM) 26 - 30 Ton	380	130	21000	1.50%	0.23%	1.02%	2003 Bushland values	315	111
Silage - Sorg(35% DM) 31 - 40 Ton	450	155	28000	1.30%	0.21%	1.02%	2003 Bushland values	364	135
Silage - Sorg(35% DM) 41 - 50 Ton	580	190	35000	1.30%	0.21%	1.02%	2003 Bushland values	455	168
Silage - Sorg(35% DM) 51 - 60 Ton	700	220	42000	1.31%	0.21%	1.02%		550	202
Silage - Sorg(35% DM) 7 - 10 Ton	125	60	7000	1.70%	0.23%	1.02%	2003 Bushland values	119	37
Silage - Sorg21-25T;SG Silage-12-14T	520	205	27300	1.56%	0.25%	1.02%	see above	426	156
Silage - Sorg26-30T;SG Silage-12-14T	540	220	30800	1.43%	0.25%	1.02%	see above	440	176
Silage - Sorg31-40T;SG Silage-12-14T	610	245	37800	1.30%	0.24%	1.02%	see above	491	208
Silage - Sorg41-50T;SG Silage-12-14T	740	280	44800	1.30%	0.23%	1.02%	see above	582	236
Silage - Sorg51-60T;SG Silage-12-14T	860	310	51800	1.31%	0.23%	1.02%	see above	679	273
Silage - Sorg21-25T;SG Silage-10-11T	480	185	25200	1.58%	0.25%	1.02%	see above	398	144
Silage - Sorg26-30T;SG Silage-10-11T	500	200	28700	1.45%	0.25%	1.02%	see above	416	164
Silage - Sorg31-40T;SG Silage-10-11T	570	225	35700	1.30%	0.23%	1.02%	see above	464	188
Silage - Sorg41-50T;SG Silage-10-11T	700	260	42700	1.30%	0.23%	1.02%	see above	555	225
Silage - Sorg51-60T;SG Silage-10-11T	820	290	49700	1.31%	0.23%	1.02%	see above	651	262
Small Grain Heavy Grazing	240	105	6700	1.67%	0.27%	1.42%		112	41
Small Grain Light Grazing	60	80	4500	1.67%	0.27%	1.42%		75	28
Small Grain Moderate Grazing	160	105	5800	1.67%	0.27%	1.42%		97	36
Sorg. - Sudan Hay/Graze 11000 #	240	105	11000	1.99%	0.33%	2.43%		219	83
Sorg. - Sudan Hay/Graze 11000 #, SG mod graze	400	210	16800	1.88%	0.31%	2.09%		316	119
Sorg. - Sudan Hay/Graze 7500 #	160	55	7500	1.99%	0.33%	2.43%		149	57
Sorg. - Sudan Hay/Graze 7500 #, SG mod graze	320	160	13300	1.88%	0.31%	2.09%		250	94
Sorg Forage Hay/Graze 11000 #	240	105	11000	1.99%	0.33%	2.43%		219	83
Sorg Forage Hay/Graze 11000 #, SG mod graze	400	210	16800	1.88%	0.31%	2.09%		316	119
Sorg Forage Hay/Graze 7500 #	160	55	7600	1.99%	0.33%	2.43%		151	57
Sorg Forage Hay/Graze 7500 #, SG mod graze	320	160	13300	1.88%	0.31%	2.09%		250	94
Wheat Forage 4000 #	160	105	4000	1.67%	0.27%	1.42%		67	25
Wheat Forage 6000 #	240	105	6000	1.67%	0.27%	1.42%		100	37
Wheat Grain 20 - 30 bu + Grazing	60	55	2800	2.08%	0.62%	0.52%		58	40
Wheat Grain 20 - 30 bu	45	55	1800	2.08%	0.62%	0.52%		37	26
Wheat Grain 31 - 40 bu + Grazing	80	75	3400	2.08%	0.62%	0.52%		71	48
Wheat Grain 31 - 40 bu	60	75	2400	2.08%	0.62%	0.52%		50	34
Wheat Grain 41 - 50 bu + Grazing	100	75	4000	2.08%	0.62%	0.52%		83	57
Wheat Grain 41 - 50 bu	75	75	3000	2.08%	0.62%	0.52%		62	43
Wheat Grain 51 - 60 bu + Grazing	120	90	4600	2.08%	0.62%	0.52%		96	65
Wheat Grain 51 - 60 bu	90	90	3600	2.08%	0.62%	0.52%		75	51
Wheat Grain 61 - 70 bu + Grazing	140	90	5200	2.08%	0.62%	0.52%		108	74
Wheat Grain 61 - 70 bu	105	90	4200	2.08%	0.62%	0.52%		87	60
Wheat Grain 71 - 80 bu + Grazing	160	95	5800	2.08%	0.62%	0.52%		121	82
Wheat Grain 71 - 80 bu	120	95	4800	2.08%	0.62%	0.52%		100	68
Wheat Grain 81 - 90 bu + Grazing	180	95	6400	2.08%	0.62%	0.52%		133	91
Wheat Grain 81 - 90 bu	135	95	5400	2.08%	0.62%	0.52%		112	77
Wheat Grain 91 - 100 bu + Grazing	200	95	7000	2.08%	0.62%	0.52%		146	99
Wheat Grain 91 - 100 bu	150	95	6000	2.08%	0.62%	0.52%		125	85
Wheat Heavy Grazing	240	105	6800	1.67%	0.27%	1.42%		114	42
Wheat Light Grazing	60	80	4500	1.67%	0.27%	1.42%		75	28
Wheat Moderate Grazing	160	105	5800	1.67%	0.27%	1.42%		97	36

SECTION 6 GENERAL INSPECTION, MONITOR, RECORD KEEPING AND REPORTING

6.1 General Inspection and Record Keeping

The permittee shall inspect, monitor, and record the results of such inspection and monitoring in accordance with Table 6.1:

Table 6.1: Record Keeping Required & Schedule

Parameter	Units	Frequency
Permit and Nutrient Management Plan		
The CAFO must maintain on-site a copy of the current NPDES permit, including the permit authorization notice.	N/A	Maintain at all times
The CAFO must maintain on-site a current site specific NMP that reflects existing operational characteristics. The operation must also maintain on-site all necessary records to document that the NMP is being properly implemented with respect to manure and wastewater generation, storage and handling, and land application. In addition records must be maintained that the development and implementation of the NMP is in accordance with the minimum practices defined in 40 CFR 122.42(e).	N/A	Maintain at all times
Soil and Manure/Wastewater Nutrient Analysis		
Analysis of manure, litter, and process wastewater to determine nitrogen and phosphorus content.[1]	ppm Pounds/ton	At least annually after initial sampling
Analysis of soil in all fields where land application activities are conducted to determine phosphorus content.[1]	ppm	At least once every 5 years after initial sampling
Operation and Maintenance		
Visual inspection of all water lines		Daily[2]
Documentation of depth of manure and process wastewater in all liquid impoundments	Feet	Weekly
Documentation of all corrective actions taken. Deficiencies not corrected within 30 days must be accompanied by an explanation of the factors preventing immediate correction.	N/A	As necessary
Documentation of animal mortality handling practices	N/A	As necessary
Design documentation for all manure, litter, and wastewater storage structures including the following information: • Volume for solids accumulation • Design treatment volume • Total design storage volume[3] • Days of storage capacity	N/A	Once in the permit term unless revised

Overflows/Discharges		
Date and time of overflow	Month/day/year	Per event
Estimated volume of overflow	Total gallons	Per event
Analysis of overflow (as required by the Permitting Authority)	ppm	Per event
Land Application		
Each application event where manure, litter, or process wastewater is applied, documentation of the following by field:		
Date of application	Month/day/year	Daily
Method of application	N/A	Daily
Weather conditions at the time of application and for 24 hours prior to and following application	N/A	Daily
Total amount of nitrogen and phosphorus applied[4]	Pounds/acre	Daily
Documentation of the crop and expected yield for each field	Bushel/acre	Seasonally
Documentation of the actual crop planted and actual yield for each field	N/A	As necessary
Documentation of test methods and sampling protocols used to sample and analyze manure, litter, and wastewater and soil.	N/A	Once in the permit term unless revised
Documentation of the basis for the application rates used for each field where manure, litter, or wastewater is applied.	N/A	Once in the permit term unless revised
Documentation showing the total nitrogen and phosphorus to be applied to each field including nutrients from the application of manure, litter, and wastewater and other sources	Pounds/acre	Once in the permit term unless revised
Documentation of manure application equipment inspection	N/A	Seasonally
Manure Transfer		
Date of transfer	N/A	As necessary
Name and address of recipient	N/A	As necessary
Approximate amount of manure, litter, or wastewater transferred	Tons/gallons	As necessary
Other		
Employee Training Employees responsible for permit compliance must be regularly trained or informed of any information pertinent to the proper operation and maintenance of the facility and waste disposal. Training shall include topics such as land application of wastes, proper operation and maintenance of the facility, good housekeeping and material management practices, necessary record-keeping requirements, and spill response and clean up.	N/A	The permittee is responsible for determining the appropriate training frequency for different levels of personnel and the NMP shall identify periodic dates for such training; however, employee training must occur at least once annually. *Revised 3/11/10*
Liner Maintenance The permittee must maintain the liner to inhibit infiltration of wastewaters. Liners shall be protected from animals by fences or other		Within thirty (30) days of the damage

protective devices. No trees shall be allowed to grow within the potential distance of the root zone. Any mechanical or structural damage to the liner must be evaluated by a Professional Engineer within thirty (30) days of the damage. Documentation of liner maintenance shall be kept with the Nutrient Management Plan (NMP). The permittee shall have a Professional Engineer or qualified groundwater scientist review the documentation and do a site evaluation a minimum of once every five (5) years.		Minimum of once every five (5) years

[1] Refer to the state nutrient management technical standard for the specific analyses to be used.

[2] Visual inspections should take place daily during the course of normal operations. The completion of such inspection should be documented in a manner appropriate to the operation. Some operations may wish to maintain a daily log. Other operations may choose to make a weekly entry, then they update other weekly records, that required daily inspections have been completed.

[3] Total design volumes includes normal precipitation less evaporation on the surface of the structure for the storage period, normal runoff from the production area for the storage period, 25-year, 24-hour precipitation on the surface of the structure, 25-year, 24-hour runoff from the production area, and residual solids.

[4] Including quantity/volume of manure, litter, or process wastewater applied and the basis for the rate of phosphorus application.

6.2 Monitoring

6.2.1 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least five (5) years from the date of the sample, measurement, report, or application.

6.2.2 Monitor Records

Records of monitoring information shall include:

- The date, exact place, and time of sampling or measurements;
- The individual(s) who performed the sampling or measurements;
- The date(s) analyses were performed;
- The individual(s) who performed the analyses;
- The analytical techniques or methods used; and
- The results of such analyses.

6.2.3 Monitor Procedures

The permittee shall follow the following monitoring procedures:

- Any required monitoring must be conducted according to test procedures approved in 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator.
- The permittee shall calibrate and perform maintenance procedures on all monitoring and analytical instruments at intervals frequent enough to insure accuracy of measurements and shall maintain appropriate records of such activities.
- An adequate analytical quality control program (QA/QC), including the analyses of sufficient standards, spikes, and duplicate samples to insure the accuracy of all required analytical results shall be maintained by the permittee or designated commercial laboratory.

6.3 Reporting

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

a. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in § 122.29.

(b); or
The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under § 122.42(a) (1).

c. The alteration or addition results in a significant change in the permittee's manure use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit., including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to a NMP.

6.3.1 Annual Report

The annual report shall be submitted to EPA and NMED at the addresses listed below. The first annual report shall be submitted on the 28th day of the 12th month after the permittee's NOI was submitted for coverage under this general permit, and every twelve (12) months, thereafter.

Addresses for submitting required reports:

EPA Region 6: Compliance Assurance and Enforcement Division
Water Enforcement Branch (6EN-W)
U.S. EPA, Region 6
P.O. Box 50625
Dallas, TX 75250

NMED: Program Manager
Surface Water Quality Bureau
New Mexico Environment Department
P.O. Box 5469
1190 Saint Francis Drive
Santa Fe, NM 87502

2. The annual report must include the following information:

a. The number and type of animals, whether in open confinement or housed under roof;

b. Estimated amount of total manure, litter and process wastewater generated by the CAFO in the previous twelve (12) months (tons/gallons);

c. Estimated amount of total manure, litter and process wastewater transferred to other person by the CAFO in the previous twelve (12) months (tons/gallons);

d. Total number of acres for land application covered by the NMP:

e. Total number of acres under control of the CAFO that were used for land application of manure, litter and process wastewater in the previous twelve (12) months;

f. Summary of all manure, litter and process wastewater discharges from the production area that have occurred in the previous twelve (12) months, including date, time, and approximate volume; and

g. A statement indicating whether the current version of the CAFO's NMP was developed or approved by a certified nutrient management planner.

h. Actual crops planted and actual yields for each field for the preceding twelve (12) months.

i. Results of all samples of manure, litter or process wastewater for nitrogen and phosphorus content for manure, litter and process wastewater that was land applied.

j. Results of calculations conducted in accordance with Parts III.A.3.g.i (B) (for the Linear Approach) and III.A.3.g.ii (for the Narrative Rate Approach).

k. Amount of manure, litter, and process wastewater applied to each field during the preceding twelve (12) months.

l. For CAFOs using the Narrative Rate Approach to address rates of application:

i. The results of any soil testing for nitrogen and phosphorus conducted during the preceding twelve (12) months.

ii. The data used in calculations conducted in accordance with Part III.A.3.h.ii.

iii. The amount of any supplemental fertilizer applied during the preceding twelve (12) months.

SECTION 7 TESTING PROTOCOLS

7.1 Waste Sampling and Analysis Procedures

A representative wastewater, slurry and manure sample will be analyzed annually. Separate samples shall be taken from each manure storage site that represents a different animal type, size, age, diet, management practice, type of manure storage and handling, production period, or other factors that could affect nutrient values. The facility shall analyze according with Table 7.1:

Table 7.1: Waste Analysis Parameters

Parameter	Units	Liquid (Wastewater)	Solids (Sludge & Manure)
Total N (TKN or N)	%; lb	✓	✓
Total Phosphorus (P or P2O5)	%; lb	✓	✓
Total Potassium (K or K2O)	%; lb	✓	✓
Dry Matter or Moisture Content	%	✓	✓
pH		✓	

Recommended method(s) found in Manure Management Publications/Manure Characteristics: Section 1 Second Edition MWPS-18-S1; http://www.mwps.org/.

Other (describe):

_____

_____

7.2 Soil Sampling and Analysis Procedures

Fields shall be sampled according to the NMP (narrative approach). A representative wastewater, slurry and manure sample will be analyzed annually. The facility shall analyze according with Table 7.2:

Table 7.2: Soil Analysis Parameters

Method	Analyses
Saturation Extract (Saturation Extract)	pH
Saturation Extract (Saturation Extract)	Electrical Conductivity (EC)
-	Soil Organic Matter (OM)
-	Nitrate-Nitrogen (N)
Bray P-Test (soils with pH of <7) Olsen (Sodium Bicarbonate) (soils with pH of >7)	Phosphorus (P)
Water extraction or Ammonium acetate extractable K	Potassium (K)
Salinity Assessment	Magnesium (Mg)
Salinity Assessment	Calcium (Ca)

Salinity Assessment	Sodium (SAR)
-	Sulfates (S)

Samples shall be collected and prepared according to New Mexico State University (NMSU) Extension Guide A-114; http://aces.nmsu.edu/pubs/howto/howto.html. Soil test analysis shall be performed according to NMSU Extension Guide A-122.

Other (describe):

Test Your Soil

Cooperative Extension Service
College of Agriculture and Home Economics

Guide A-114

Revised by C.R. Glover, Extension Agronomist and R.D. Baker, Area Extension Agronomist

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Soil tests provide a scientific basis for regulating available plant nutrients. Recommendations on kinds and amounts of fertilizer to apply and soil management practices are based on test results. Tests on a sample that does not accurately represent the area are likely to be misleading. The following directions can help you take a representative sample of the area you want tested.

Supplies

A soil auger, a soil tube, or a shovel and knife.

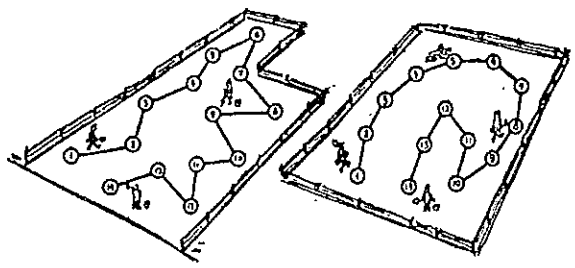
A clean bucket or other suitable container. Do not use a container made of metal.

A sample box and an information sheet, which you can get from your county agent or by writing to the Soil and Water Testing Laboratory, Box 3Q, New Mexico State University, Las Cruces, New Mexico 88003.

Where to Sample

Take a composite sample from each area or field, but as a rule, try to limit the sample area to no more than 40 acres. If you have large trouble spots or areas that differ extremely in appearance, slope, soil structure, productivity, drainage, or soil treatment, put a composite sample from each of these areas in separate sample boxes.

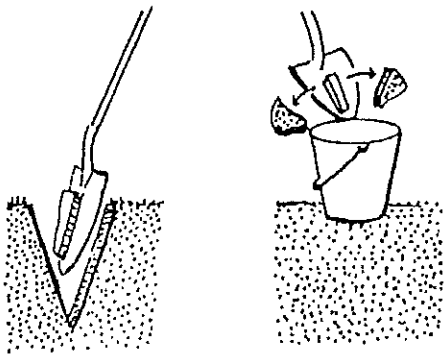
For a composite sample, take soil from at least five sites in a garden or lawn and up to 15 sites in a large field (as illustrated in the diagram). Avoid areas near a road, fence row, compost pile, fertilizer band, or other non-typical areas. *(Image not available. Please contact NMSU Agricultural Communications for a hard copy.)*



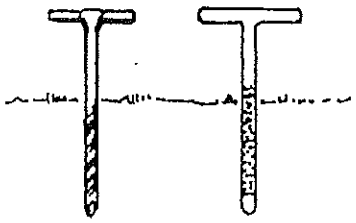
How to Sample

At each site remove any surface litter such as straw, leaves, and old stalks.

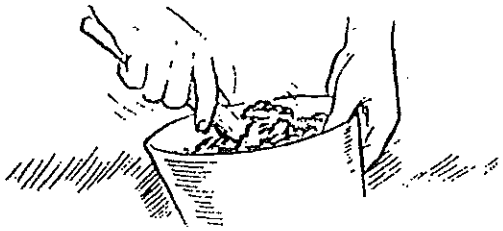
If you use a shovel and a knife, dig a hole about six inches deep. Take a slice of soil one-half inch thick and six inches deep and keep it on the shovel. From the center of this slice, cut a strip one-half inch wide from top to bottom and put it in the bucket. Repeat this at each site in the field.

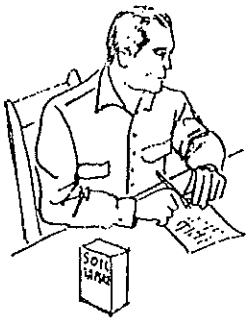


If you use a soil auger or soil tube, take soil cores about six inches deep at each site and put in the bucket.



Mix the soil from all the sites in the same area. Place soil on a newspaper. Break any clods or lumps and let the sample dry at room temperature. Do not use heat for drying. Fill the sample box with the dry soil.





Label each sample with your name and a number keyed to a map of the area represented by each sample, so you will know where the sample was taken.

Complete the information sheet. Enclose it and the soil-testing fee in the package containing the soil sample so that all reach the laboratory together. If you send only one sample, place the information sheet and the soil-testing fee in the sample box with the soil.

The more information you can supply about the soil, the better the recommendations will be. Specify the crops that are to be grown. Fertilizer recommendations cannot be made if the crop to be grown is not specified.

Mailing the Sample

Take the soil sample box and the information sheet to your county agent, or mail them directly to the Soil and Water Testing Laboratory.

Note on Dying Plants

Grasses, vegetables, flowers, and other crops seldom die from lack of fertility. Water management, disease, and insects are some factors that can cause damage or death to plants. Check with your county agent, for *soil analysis is of little value in diagnosing these problems.*

Revised April 2000

Las Cruces, NM
1.5M

Soil Test Interpretations

Cooperative Extension Service
College of Agriculture and Home Economics

Guide A-122

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A soil test can be an important management tool in developing an efficient soil fertility program, as well as monitoring a field for potential soil and water management problems. A soil test provides basic information on the nutrient supplying capacity of the soil. However, a test is not reliable if the soil sample is taken incorrectly or is improperly handled after collection. If you need help taking a soil sample properly, see your county Extension agent for publications on the proper soil sampling methods, and for a soil sampling kit.

Because analytical techniques vary among laboratories, the number values reported may vary from lab to lab. Numbers used by each have specific meanings for the laboratory. The interpretations discussed here are for the Soil, Plant and Water Testing Lab at New Mexico State University.

Fertilizer and soil management recommendations shown on the soil test report are based on the soil test and information provided on the information sheet which accompanies the soil sample to the lab. Items on the information sheet include cropping history, previous yields, fertilizer used, depth of soil and water table, water quality, and irrigation practices. Additional comments made on the information sheet can include general appearance of the crop, yield practices, or problems that may have a bearing on the crop. Fertilization requirements can vary with overall crop management program. Complete and accurate information is essential to get a fertilizer recommendation that will ensure the maximum yield for the least cost.

Individual Soil Tests

The following classifications are used for the standard soil test conducted by NMSU Soil, Plant and Water Testing Lab. Analyses for other factors are available upon request and require additional fees. Except for pH, the classifications are categorized as very low, low, moderate, high, and very high. For fertility factors (N, P, K, micronutrients) very low and low classifications indicate a high probability for obtaining a fertilizer response; moderate classifications indicate a fertilizer response may or may not occur; high and very high classifications indicate a fertilizer response is not likely to occur.

pH. Most crops will grow satisfactorily on soils with a pH ranging from 6.2 to 8.3. Crops susceptible to iron and zinc deficiencies may be affected at pH levels above 7.5.

Soils with a pH of 8.3 or higher usually have a high sodium content. Applications of sulfuric acid usually lower the pH for only a short period due to the high buffering capacity of the soils.

pH	*Classification*
> 8.5	strongly alkaline
7.9–8.5	moderately alkaline
7.3–7.9	slightly alkaline
6.7–7.3	neutral
6.2–6.7	slightly acid
5.6–6.2	moderately acid
3.0–5.6	strongly acid

Salts, Electrical Conductivity (E.C. x 10^3). When the electrical conductivity is less than 2, few salinity problems are evident. Problems may become evident in highly sensitive crops when the E.C. x 10^3 is from 2 to 4, although problems are usually minor. When the E.C. x 10^3 is from 4 to 8, problems usually are evident. When the E.C. x 10^3 is greater than 8, crops with moderate salt tolerance will usually show signs of reduced growth, foliage burn or chlorosis. Leaching can decrease the salinity hazard if soil permeability is adequate. Tables 1 and 2 list the salt tolerances of some crops and ornamental plants.

E.C. x 10^3	*Classification*
< 2	very low
2–4	low
4–8	moderate
8–16	high
> 16	very high

Table 1. Relative salt tolerance of selected crops, in order of decreasing tolerance within each group.

Good salt tolerance	Moderate salt tolerance	Poor salt tolerance
	Field Crops	
barley (grain)	rye (grain)	vetch
sugar beet	wheat (grain)	
rape	oats (grain)	
cotton	alfalfa	
	sorghum (grain)	
	corn (grain)	
	foxtail millet	
	sunflower	
	Forage Crops	
alkali sacaton	white sweetclover	white Dutch clover
saltgrass	yellow sweetclover	meadow foxtail
bermudagrass	perennial ryegrass	alsike clover
Canada wild rye	mountain bromegrass	red clover
western wheatgrass	barley (hay)	ladino clover
	birdsfoot trefoil	
	strawberry clover	
	dallisgrass	
	sudangrass	
	hubam clover	
	alfalfa	
	tall fescue	
	rye (hay)	
	wheat (hay)	
	oats (hay)	
	Truck Crops	
garden beet	tomato	radish
kale	broccoli	spinach
asparagus	cabbage	celery
	cauliflower	green beans
	lettuce	
	potatoes (White Rose)	
	sweetcorn	
	carrot	
	peas	
	onion	
	squash	
	canteloupe	
	cucumber	
	Fruit and Nut Crops	
pistachio	grape	pear
palm		apple
		prune
		plum
		apricot
		peach
		strawberry
		pecan

Table 2. Tolerance of selected ornamental plants to soil salinity.

Tolerance and range at which plants are affected	Ornamental plant
Extremely sensitive	Southern yew
E.C. x 10^3 = <2	Glossy abelia
	Photinia
	Rose
	Chinese holly
	Star jasmine
	Pyrenees cotoneaster
Sensitive	Laurustinus
E.C. x 10^3 = 2–3 or 4	Chinese hibiscus
	Heavenly bamboo
	Japanese pittosporoum
	Algerian ivy
Moderatley tolerant	Spreading juniper
E.C. x 10^3 = 4–5 or 6	Pyracantha
	Thorny elaeagnus
	Oriental arborvitae
	Indian hawthorn
	Japanese black pine
	Japanese boxwood
	Yellow sage
Moderately tolerant (con't)	Glossy privet
Tolerant	Aleppo pine
E.C. x 10^3 = 6–8	European fan palm
	Rosemary
	Spindle tree
	Blue dracaena
	Oleander
Most tolerant	Croceum iceplant
E.C. x 10^3 = 8–10	Purple iceplant
	Rosea iceplant
	White iceplant
	Ceniza
	Bougainvillea
	Natal plum

Exchangeable Sodium. Sodium problems arise when the exchangeable sodium is 20% or more. High sodium soils (sodic soils) can be reclaimed if the sodium can be replaced by another element, usually calcium. Applications of gypsum, elemental sulfur, or sulfuric acid have successfully reclaimed calcareous soils which are high in sodium, providing good permeability is present. Notations are made on the soil test report if either a sodium or salinity hazard exists. Table 3 lists the exchangeable sodium tolerances of some crops.

Sodium %	*Classification*
< 10	low
10–20	moderate
20–30	high
> 30	very high

Table 3. Tolerance of various crops to exchangeable-sodium-percentage.

Tolerance to ESP[1] and range at which crop is affected	Growth response under field conditions
Extremely sensitive (ESP = 2–10)	Sodium toxicity symptoms
Deciduous fruits	
Nuts	
Citrus	
Avocado	
Sensitive (ESP = 10–20)	Stunted growth at low ESP values even though the physical condition of the soil may be good
Beans	
Moderately tolerant (ESP = 20–40)	Stunted growth due to both nutritional factors and adverse soil conditions
Clover	
Oats	
Tall fescue	
Rice	
Dallisgrass	
Tolerant (ESP = 40–60)	Stunted growth usually due to adverse physical condition of soil
Wheat	
Cotton	
Alfalfa	
Barley	
Tomatoes	
Beets	
Most tolerant (ESP = more than 60)	Stunted growth usually due to adverse physical condition of soil
Crested wheatgrass	
Fairway wheatgrass	
Tall wheatgrass	
Rhodesgrass	

[1]ESP = exchangeable-sodium-percentage.

Organic Matter. Percentage of organic matter can be used toestimate nitrogen in the soil. This method alone is not always a dependable measure of available nitrogen, but is used with nitrate nitrogen to make nitrogen fertilizer recommendations on many crops.

Sand %	*Clay %*	*Classification*
< .5	< 1.0	very low
.5–1.0	1.0–2.0	low
1.0–1.5	2.0–3.0	moderate
> 1.5	> 3.0	high

Texture. Coarse-textured soils lack both nutrient and water holding capacities. Fine-textured soils often have structural and infiltration problems.

Material	*Texture*
Sand, loamy sand	coarse
Sandy loam, fine sandy loam	moderately coarse
Very fine sandy loam, loam, silt loam, silt	medium
Sandy clay, silty clay, clay	fine

Nitrate Nitrogen. Nitrate nitrogen is the measure of readily available nitrogen in the soil and is used with percentage of organic matter to make a nitrogen fertilizer recommendation. Because nitrate-N is highly soluble, it is subject to leaching in all soils, especially in coarse to medium textured soils. A fertilizer recommendation for nitrogen is more accurate if the subsoil is sampled 18 to 36 inches deep and tested for nitrate-N. Split applications of nitrogen fertilizer help reduce the potential for leaching. This practice is particularly important for sandy soils.

Parts per million	*Classification*
< 10	low
10–30	moderate
> 30	high

Bicarbonate Phosphorus. Soils in New Mexico are usually low in available phosphorus because phosphorus is quickly tied up in calcareous soils. Bicarbonate phosphorus, also known as $NaHCO_3$-P or Olsen-P, measures water soluble P, highly soluble calcium P, and organic P.

Parts per million	*Classification*
< 7	very low
8–14	low
15–22	moderate
23–30	high
> 31	very high

Soluble Potassium. Adequate potassium is usually available in the strongly weathered soils of New Mexico which have not been leached by high rainfall. Potassium does not readily tie up in calcareous soils and may be found at elevated levels in some saline soils. Potassium fertilizer responses may sometimes be observed on sandy soils with low cation-exchange capacities.

Parts per million	*Classification*
< 30	low
30–60	moderate
< 60	high

DTPA Extractable Iron. Iron deficiency is often a problem with sensitive crops grown in soils with pH values over 7.5. Although the critical level of iron in soils is 4.5 ppm, iron-sensitive crops often can be grown satisfactorily down to levels of 2.5 ppm if rooting is not restricted by caliche or gypsum, and care is taken not to over-irrigate. Some crop varieties are more susceptible to iron deficiency than other varieties.

Parts per million	*Classification*
< 2.5	low
2.5–4.5	moderate
> 4.5	high

DPTA Extractable Zinc. Zinc deficiency is an important problem in some crops, especially corn and grain sorghum. It is especially a problem in soils with pH values over 7.5 or soils that have a long history of heavy P fertilization. Some crop varieties may be more sensitive to zinc deficiency than other varieties.

Parts per million	*Classification*
< 0.5	low
0.5–1.0	moderate
> 1.0	high

DPTA Extractable Copper. Copper deficiencies have not been verified in New Mexico. Factors contributing to copper deficiencies include high organic matter, sandy texture, and high pH.

Parts per million	*Classification*
< 0.3	low
0.3–1.0	moderate
> 1.0	high

DTPA Extractable Manganese. Manganese deficiencies have not been verified in New Mexico. They usually occur under conditions similar to those in which iron and zinc deficiencies occur. Manganese

levels in the soil can also vary with the soil moisture content.

Parts per million	*Classification*
< 1.0	low
1.0–2.5	moderate
> 2.5	high

Conversion Factors

Soil test results can be converted from parts per million (ppm) to pounds per acre by multiplying ppm by a conversion factor based on the depth to which the soil was sampled. Because a slice of soil 1 acre in area and 3 inches deep weighs approximately 1 million pounds, the following conversion factors can be used:

Soil sample depth inches	*Multiply ppm by*
3	1
6	2
7	2.33
8	2.66
9	3
10	3.33
12	4

Fertility Considerations

A good soil sample and an accurate soil test interpretation are not the only considerations for good yields and maximum profit in crop production. Although the appropriate amounts of fertilizer based on a soil test are recommended and applied, other factors override the effects of fertilizer by limiting the yield potential of a crop. These factors include 1) the soil type in the field, 2) proper insect and disease control, 3) irrigation water quality, and 4) irrigation water management. Of these factors, the soil type and irrigation water quality are difficult for the grower to control. However, insect and disease control and water management are under the direct control of the grower and his management skills. Favorable fertilizer response is usually related to how well a crop is managed.

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