

Appendix



P

Sample Nutrient Management Plan

This sample Nutrient Management Plan (NMP) is based on a hypothetical facility. The accompanying photograph does not portray a facility on which this sample NMP is based. Nor do the technical standards used to develop this sample NMP constitute a technical standard that the U.S. Environmental Protection Agency (EPA) has reviewed for consistency with the requirements of Title 40 of the *Code of Federal Regulations* (CFR) part 412.4(c)(2). EPA is using this sample NMP for the purpose of demonstrating how to identify terms of the NMP as required for a confined animal feeding operation (CAFO) permit pursuant to 40 CFR part 122.42(e)(5). Circulation of this sample NMP and the technical standards therein does not constitute an endorsement of the technical standards or the NMP's approach toward managing nutrients. This sample NMP is intended for educational purposes only and does not create or remove any legal rights or requirements on any member of the public, states, or any other federal agency.

The following output was generated by using the Manure Management Planner, which is at

<http://www.agry.purdue.edu/mmp/>

Nutrient Management Plan

Farm contact information: DEF Feedlot
 c/o John Doe
 xxx Ave.
 Anytownin, IA 55555
 515.555.5555

Latitude/Longitude:

Plan Period: Oct 2009 - Sep 2014

Conservation Planner

As a Conservation Planner, I certify that I have reviewed both the *Comprehensive Nutrient Management Plan* and *Producer Nutrient Management Activities* documents for technical adequacy and that the elements of the documents are technically compatible, reasonable and can be implemented.

Signature: _____ *SAMPLE* _____ Date: _____ *N/A* _____

Name:

Title:

Certification Credentials:

Conservation District

The Conservation District has reviewed the CNMP documents and concurs that the plan meets the District's goals.

Signature: _____ *SAMPLE* _____ Date: _____ *N/A* _____

Name:

Title:

Owner/Operator

As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all the necessary records associated with the implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

Signature: _____ *SAMPLE* _____ Date: _____ *N/A* _____

Name:

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Section 1. Background and Site Information

1.1. General Description of Operation

Management

DEF Feedlots have been farming and operating this facility since 1978. The operation employs a number of personnel on a full-time and seasonal basis driven by need. The cattle and crop operations are handled as integrated systems. The crop operation complements the feedlot's feed and bedding requirements, and the manure generated by the feedlots provide nutrients for the crops. At the time this plan was prepared, there are no plans for expansion during the period covered by the plan.

This NMP has been prepared and is being implemented in compliance with state permit: [Identified in Appendix O of this Manual]. This five-year plan will be updated as necessary and revised and resubmitted when the permit is renewed in 2015.

Manure is handled in both solid and liquid (irrigated) forms and is distributed to crop production areas. Manure generated by the feedlots in excess of crop production needs and land availability during the growing season will be stockpiled within the footprint of the production area in a manner that is compliant with all permit requirements. Collected and stored runoff from the feedlots is planned to be used to irrigate crops to address peak water needs.

Animals

The feedlot permit is for 5,000 head of beef cattle on an 80.9-acre open feedlot. This plan covers feeder cattle of all weights and sexes arriving to be fed to heavier weights (harvest).

Facilities

Open feedlot penning is employed in this feedlot, with baled cornstalk and soybean residue added as bedding during inclement weather. Fence line feeding systems are filled with daily formulated rations from a mixer/scale delivery vehicle. Stationary fountains provide fresh drinking water. A visual inspection of all water lines is conducted daily.

All solids settling basins have been designed by a licensed engineer and approved by IDNR. Design documentation is kept on file at the operation. Weekly operation and maintenance assessments and required repairs will be conducted on all pens, settling basins, and associated equipment. Weekly inspections are conducted and documented for all manure and process wastewater holding areas to monitor available capacity.

Crop Fields

All land areas in this plan is either owned or rented and under the control of DEF Feedlots. There are 1,237 tillable acres with planned continuous corn and corn/soybean rotations. Yield goals are developed in accordance with Appendix A9: Chapter 567-- 65.17(6) Rules for Animal Feeding Operations. In accordance with the technical standard, optimum crop yield determinations allow for a crop yield increase of 10 percent. For the location of DEF Feedlots the average plus a 10% yield for corn is 195 bushels/acre and for soybeans is 61 bushels/acre. The plan includes a cropping plan for each field along with soil test results. *(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)*

Land Application of Nutrients

The cropping pattern is a continuous corn and corn/soybean rotation. That allows for any residual nitrogen from the soybean crop to be accounted for in the corn year. Manure is planned to be applied at a rate that supplies two or four years of phosphorus depending on the outcome of the required field-specific Phosphorus Index Risk Assessment. It is planned to apply the manure on a priority basis to fields that have been harvested as corn, corn silage, baled residue or soybean stubble. Actual manure distribution will take into account soil test, crop yields and uptake, ambient weather conditions; manure stockpiled, soil moisture conditions, manure analyses and growing crop production. Management strategies that will continue to evolve over the planning period will include crop rotation, feed management, tillage practices, conservation practice and treatments, seed varieties, pest management, and water conservation. All management adjustments will comply with permit requirements and any applicable state and federal regulations.

1.2. Sampling and Equipment Calibration

Manure sampling and testing frequency

Manure is analyzed annually for nutrient content of total nitrogen, phosphorus, potassium, and percent moisture. An analysis is taken for each different source of manure being generated. Manure samples are collected according to ISU Publication PM-1558 *How to Sample Manure for Nutrient Analysis*. Samples are analyzed by AGSource Cooperative Services DBA AGSource Belmont Labs.

Soil sampling and testing frequency

The minimum frequency for soil testing will be once during a four-year period. All soil samples will be collected according to Iowa State University (ISU) for sampling methods based on soil maps, management zones, or grid sampling. See ISU PM 287 *Take a Good Sample to Help Make Good Decisions*. All soil tests will be analyzed by a soil test lab that is certified according to Iowa Department of Agriculture and Land Stewardship (IDALS) soil test lab certification standards. Before sampling, each field was broken into uniform sampling areas, as is determined by the types of soils present, past management and productivity, and goals desired for field management practices. In accordance with ISU PM 287, each of these sampling areas was 10 acres or less. A total of 10–12 cores or borings per sampling area were taken and combined to form a composite sample for each field.

Equipment calibration method and frequency

Equipment will be calibrated annually and records are maintained at the operation. For record keeping requirements necessary for application equipment, see section 7.

1.3. Identified Resource Concerns

Where surface water or other sensitive areas are present in a field, setbacks are maintained during manure and commercial nutrient distribution in accordance with permit requirements. The primary resource concern to be managed under this plan is surface water runoff. Depending on the specific needs of each field to address that concern, the plan identifies the specific practices to

be employed to control surface water runoff. Those practices include terraces, grassed waterways, contour farming, and residue management. Employee training is conducted regularly addressing manure storage, manure handling, and distribution. Documentation of all training activities is maintained at the operation. *(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)*

Section 2. Manure and Wastewater Handling and Storage

2.1. Map(s) of Production Area

To simplify publication of this sample plan, the production area map is not included. A production area map should be included with all NMPs developed and implemented as a condition of a National Pollutant Discharge Elimination System CAFO permit.

2.2. Production Area Conservation Practices

Clean water diversion

All clean rainwater is diverted away from the feedlot using grass covered swales and berms. Vegetation will remain established in the grassed swale and grass swales will be mowed as needed to ensure proper function. No clean water is collected. The production area will be checked weekly to insure that clean rainwater continues to flow away from the feedlot. See section 7 for record keeping requirements necessary for weekly inspections.

Measures to prevent direct contact of animals with water

Confined animals have no access to waters of the state in the production area.

2.3 Manure Storage

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected
E Lots Stack #1	Dry stack	2,199 Tons	4,375 Tons
E SetldSolidBasin #3	Dry stack	756 Tons	757 Tons
E Storage Pond #1	Earthen storage	16,502,043 Gal	10,575,180 Gal
W Lots Stack #2	Dry stack	879 Tons	1,750 Tons
W SetdSolidBasin#4	Dry stack	247 Tons	247 Tons
W Storage Pond #2	Earthen storage	3,112,645 Gal	5,876,413 Gal

Dry stacks are contained in the open feedlots. They are not covered and, therefore, are open to direct precipitation. The wastewater runoff that is generated from the feedlots is collected. Solids are settled in W SetdSolid Basin #4. The liquid is then diverted to W Storage Pond #2. W Storage Pond #2 is connected to E Storage Pond #1. Land application of liquid manure is applied directly from E Storage Pond #1.¹

¹For simplicity only Field 8 is illustrated in this plan. Field 8S does not receive manure application from E Storage Pond #1.

The pumpable capacity represents the total design volume as calculated in the engineering and design construction plans. Engineering design and construction plans for both types of storage structures are not included as part of this NMP but are to be kept on-site. They include calculations for

- ▶ The volume of manure, process wastewater, and other wastes accumulated during the critical storage period.
- ▶ The volume of normal precipitation minus evaporation on the storage structure surface.
- ▶ The volume of runoff from the facility's drainage area from normal rainfall events, which includes runoff from mortality area described in section 2.5.
- ▶ The volume of precipitation from the 25-year, 24-hour rainfall event on the storage structure surface.
- ▶ The volume of runoff from the facility's drainage area from the 25-year, 24-hour rainfall event.
- ▶ The volume of any leachate from bunk silos or other silage storage areas.
- ▶ The volume of solids remaining in a storage structure after liquids are removed.

The 25-year, 24-hour storm for the location of the operation is 4.9 inches. The volume in E Storage Pond #1 attributed for this size storm is 2,405,282 gallons. The critical storage volume is 14,096,761 gallons. A depth marker will be placed in E Storage Pond #1 identifying 14,096,761 gallons as the upper pump down level. In addition, the storage pond contains an additional 2 feet of free board.

Operation and Maintenance

Manure will be land applied in accordance with this NMP, and solids will be removed at a frequency necessary to maintain the storage capacity as described above.

All visual inspections will be conducted as outlined in section 7.3 of this NMP. Fencing will be maintained around the perimeter of the ponds to prevent animal access.

2.4 Animal Inventory

Animal Group	Type or Production Phase	Number of Animals ⁽¹⁾	Average Weight (Lbs)	Confinement Period	Manure Collected (%) ⁽²⁾	Storage Where Manure Will Be Stored
Cattle #1 basin	Finishing steer (beef)	2,500	850	Jan Early–Dec Late	30	E. Lots Stack #1
Cattle #1 dry stack	Finishing steer (beef)	2,500	850	Jan Early–Dec Late	60	W. SetIdSolid Basin #4
Cattle #1 pond	Finishing steer (beef)	2,500	850	Jan Early–Dec Late	10	E. Storage Pond #1
Cattle #2 basin	Finishing steer (beef)	2,500	850	Jan Early–Dec Late	30	E. SetIdSolid Basin #3
Cattle #2 dry stack	Finishing steer (beef)	2,500	850	Jan Early–Dec Late	60	W. Storage Pond #2
Cattle #2 pond	Finishing steer (beef)	2,500	850	Jan Early–Dec Late	10	W. Lots Stack #2

(1) Number of Animals is the average number of animals that are present in the production facility at any one time.

(2) If Manure Collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or that the production facility is unoccupied one or more times during the confinement period.

2.5. Normal Mortality Management

To protect surface and groundwater resources, reduce the impact of odors that result from improperly handled animal mortality, and decrease the likelihood of the spread of disease or other pathogens, approved handling and utilization methods shall be implemented in the handling of normal mortality losses.

Plan for Proper Management of Dead Animals

NRCS IA Standard 316, Animal Mortality Facility, October 2007 will be followed for proper management of dead animals. Dead animals will be disposed of utilizing Valley Rendering Services. When rendering services are used, dead animals should be picked up within 24 hours. Dead animals will be stored in a separate bermed area adjacent to the production area to control runoff. Adequate space is available in the bermed area to hold normal animal mortality at the feedlot operation. Process wastewater that runs off that area is collected and transported to the waste storage ponds. The liquid storage calculations account for this additional volume of liquid. There are no additional operation and maintenance activities required with plan to be used to address normal animal mortality at the operation. Under no circumstances will the manure treatment systems be used to manage any mortality. Contact information for Valley Rendering is (555)-555-5555.

2.6. Planned Manure Exports off the Farm

Month-Year	Manure Source	Amount	Receiving Operation	Location
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During the period covered by the plan no manure is to be exported from the DEF Feedlots operation.

2.7. Planned Manure Imports onto the Farm

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location
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During the period covered by the plan, no manure is to be imported into the DEF Feedlots operation.

Section 3. Farmstead Safety and Security

3.1. Emergency Response Plan

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:

- a. Stop all other activities to address the spill.
- b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
- c. Call for help and excavator if needed.
- d. Complete the clean-up and repair the necessary components.
- e. Assess the extent of the emergency and request additional help if needed.

**In Case of an Emergency Spill, Leak or Failure during Transport
or Land Application**

Implement the following first containment steps:

- a. Stop all other activities to address the spill and stop the flow.
- b. Call for help if needed.
- c. If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
- d. Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
- e. If flow is coming from a tile, plug the tile with a tile plug immediately.
- f. Assess the extent of the emergency and request additional help if needed.

Emergency Contacts

Department / Agency	Phone Number
Fire	XXX-XXX-XXXX
Rescue services	XXX-XXX-XXXX
State veterinarian	XXX-XXX-XXXX
Sheriff or local police	XXX-XXX-XXXX

Nearest available excavation equipment/supplies for responding to emergency

Equipment Type	Contact Person	Phone Number
xxxxx	John Doe	xxx-xxx-xxxx

Contacts to be made by the owner or operator within 24 hours

Organization	Phone Number
EPA Emergency Spill Hotline	xxx-xxx-xxxx
County Health Department	xxx-xxx-xxxx
Other State Emergency Agency	xxx-xxx-xxxx

Be prepared to provide the following information:

- a. Your name and contact information.
- b. Farm location (driving directions) and other pertinent information.
- c. Description of emergency.
- d. Estimate of the amounts, area covered, and distance traveled.
- e. Whether manure has reached surface waters or major field drains.
- f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
- g. Current status of containment efforts.

3.2. Biosecurity Measures

Biosecurity is critical to protecting livestock and poultry operations. Standard operating procedures at DEF Feedlots require all visitors to check in with the facility manager before entering the operation or any production or storage facility. This procedure is included in the content of the training program given to all employees.

3.3. Catastrophic Mortality Management

In the case of catastrophic mortality on-farm disposal will be conducted if site conditions permit. On-farm methods typically include burial, composting, and incineration. The extent of mortality and specific state requirements will dictate the practice to be used. Catastrophic mortality will be addressed in a manner that is protective of surface and groundwater quality and human health. Activities will be conducted in accordance with all applicable state and local laws, regulations, and guidelines. Under no circumstances will the manure treatment systems be used to manage any mortalities.

Important! In the event of catastrophic animal mortality, contact the permitting authority before beginning carcass disposal.

3.4. Chemical Handling

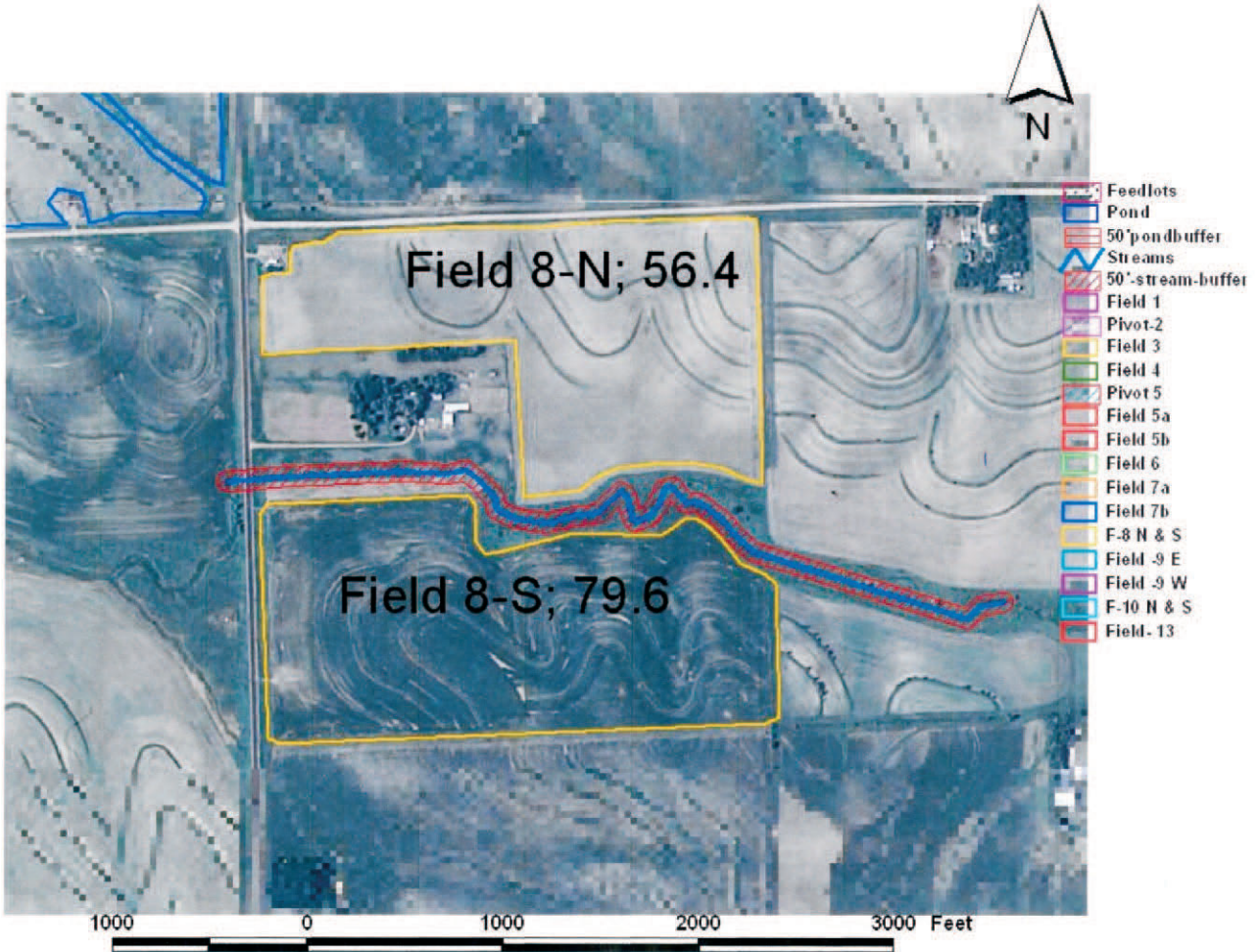
If checked, the indicated measures will be taken to prevent chemicals and other contaminants from contaminating process waste water or storm water storage and treatment systems.

	Measure
	This is not a regulatory-agency permitted facility. This section does not apply.
x	All chemicals are stored in proper containers. Expired chemicals and empty containers are properly disposed of in accordance with state and federal regulations. Pesticides and associated refuse are disposed of in accordance with the FIFRA label.
x	Chemical storage areas are self-contained with no drains or other pathways that will allow spilled chemicals to exit the storage area.
x	Chemical storage areas are covered to prevent chemical contact with rain or snow.
x	Emergency procedures and equipment are in place to contain and clean up chemical spills.
x	Chemical handling and equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.
	All chemicals are custom applied and no chemicals are stored at the operation. Equipment wash areas are designed and constructed to prevent contamination of surface waters and waste water and storm water storage and treatment systems.

Section 4. Land Treatment

4.1. Map(s) of Fields and Conservation Practices

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)



4.2. Conservation Practices

The following conservation practices have been integrated with crop production practices at the DEF feedlots to control runoff and protect water quality. The specific practices being utilized in each field incorporated into this plan are specified in the table below. The table includes the NRCS conservation practice standard that dictates the implementation and management protocols that are to be employed during the planning period. (Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Area	Conservation Practice	NRCS Iowa Conservation Practice Reference
Bob's Farm North – 8N	56.4 Acres	50' Stream Vegetated Buffer	Riparian Forest Buffer (Ac.) (391) (August 2007)
		Contour Farming	Contour Farming (Ac.) (330) (May 2005)
		Residue Management	Residue Management, Seasonal (Ac.) (344) (March 2007)
Bob's Farm South – 8S	79.6 Acres	50' Stream Vegetated Buffer	Riparian Forest Buffer (Ac.) (391) (August 2007)
		Contour Farming	Contour Farming (Ac.) (330) (May 2005)
		Residue Management	Residue Management, Seasonal (Ac.) (344) (March 2007)

Section 5. Soil and Risk Assessment Analysis

5.1. Soil Information

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Soil Survey	Map Unit	Soil Component Name	Surface Texture	Slope Range (%)	Drainage	Hydro-logic Group	Perm. Code	Subsoil P	Subsoil K	Texture	CSR
Bob's Farm North – 8N	167	1C3	Ida	SIL	5-9%	Well	B	50	Low	Low	Fine	44
Bob's Farm South – 8S	167	1C3	Ida	SIL	5-9%	Well	B	50	Low	Low	Fine	44

5.2. Predicted Soil Erosion

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Predominant Soil Type	Slope (%)	Wind (Ton/Ac/Yr)	Irrigation (Ton/Ac/Yr)	Gully (Ton/Ac/Yr)	Ephemeral (Ton/Ac/Yr)	Plan Avg. Soil Loss (Ton/Ac/Yr)
Bob's Farm North – 8N	1C3 (Ida SIL)	7.0					3.1
Bob's Farm South – 8S	1C3 (Ida SIL)	7.0					3.9

Field	Crop Year	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Soil Loss (Ton/Ac)	Primary Crop
Bob's Farm North – 8N	2010	10/23/2009	10/10/2010	2.0	Soybean
	2011	10/11/2010	10/22/2011	4.2	Corn
	2012	10/23/2011	10/10/2012	3.6	Soybean
	2013	10/11/2012	10/20/2013	2.9	Corn
	2014	10/21/2013	10/10/2014	2.6	Soybean
Bob's Farm South – 8S	2010	10/23/2009	10/10/2010	2.0	Soybean
	2011	10/11/2010	10/22/2011	3.7	Corn
	2012	10/23/2011	10/10/2012	3.6	Soybean
	2013	10/11/2012	10/20/2013	5.7	Corn
	2014	10/21/2013	10/10/2014	4.4	Soybean

5.3. Nitrogen and Phosphorus Risk Analysis – Iowa Phosphorus Index

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Crop Year	Erosion Component	Runoff Component	Drainage Component	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Bob's Farm North – 8N	2010	1.05	0.21	0.00	1.26	1.26	Low
Bob's Farm North – 8N	2011	2.21	0.21	0.00	2.42	2.42	Medium
Bob's Farm North – 8N	2012	1.90	0.22	0.00	2.10	2.11	Medium
Bob's Farm North – 8N	2013	1.53	0.22	0.00	1.73	1.74	Low
Bob's Farm North – 8N	2014	1.37	0.24	0.00	1.58	1.61	Low
Bob's Farm South – 8S	2010	1.07	0.23	0.00	1.29	1.29	Low
Bob's Farm South – 8S	2011	1.97	0.23	0.00	2.20	2.20	Medium
Bob's Farm South – 8S	2012	1.92	0.34	0.00	2.15	2.26	Medium
Bob's Farm South – 8S	2013	3.04	0.34	0.00	3.27	3.37	Medium
Bob's Farm South – 8S	2014	2.35	0.34	0.00	2.57	2.68	Medium

5.4. Additional Field Data Required by Risk Assessment Procedure

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Distance to Water (Feet)	Buffer Width (Feet)	Type of Artificial Drainage	Sediment Trap Conservation Practice	Landform Region	Residue Management	Land Use
Bob's Farm North – 8N	500	None	None	None	Northwest Iowa Plains	Tillage Used	Row crops - SR + CR, good
Bob's Farm South – 8S	500	None	None	None	Northwest Iowa Plains	Tillage Used	Row crops - SR + CR, good

Section 6. Nutrient Management

6.1. Field Information

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field ID	Sub-field ID	Total Acres	Spreadable Acres	FSA Farm	FSA Tract	FSA Field	County	Predominant Soil Type	Slope (%)
Bob's Farm North – 8N	8 N	56.4						1C3 (Ida SIL)	7.0
Bob's Farm South – 8S	8 S	79.6						1C3 (Ida SIL)	7.0

6.2. Manure Application Setback Distances

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Setback Distance
Bob's Farm North – 8N	There are no surface waters or other sensitive features present in this field that require manure application setback. A stream is present in the land area between field 8N and 8S, and a 50-foot vegetated buffer is maintained where there is no manure application
Bob's Farm South – 8S	There are no surface waters or other sensitive features present in this field that require manure application setback. A stream is present in the land area between field 8N and 8S, and a 50-foot vegetated buffer is maintained where there is no manure application

6.3. Soil Test Data

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/100g)
Bob's Farm North – 8N	2009	3.1	Bray P1	28	221	390	2,208	ppm	7.0	7.0	14.9
Bob's Farm South – 8S	2009	3.0	Bray P1	32	196	418	1,941	ppm	6.8	7.0	13.7

6.4. Manure Nutrient Analysis⁽¹⁾

Manure Source	Dry Matter (%)	Total N	NH ₄ -N	Total P ₂ O ₅	Total K ₂ O	Avail. P ₂ O ₅ ⁽²⁾	Avail. K ₂ O ⁽²⁾	Units	Analysis Source and Date
E Lots Stack #1		7.0	2.6	10.0	14.0	10.0	14.0	Lb/Ton	Mid West Labs
E SetIdSolidBasin #3		7.9	2.9	2.9	8.8	2.9	8.8	Lb/Ton	Mid West Labs
E Storage Pond #1		1.7	1.0	0.5	3.0	0.5	3.0	Lb/1000Gal	Mid West Labs
W Lots Stack #2		7.0	2.6	10.0	14.0	10.0	14.0	Lb/Ton	Mid West Labs
W SetdSolidBasin#4		7.9	2.9	2.9	8.8	2.9	8.8	Lb/Ton	Mid West Labs
W Storage Pond #2		1.7	1.0	0.5	3.0	0.5	3.0	Lb/1000Gal	Mid West Labs

(1) Entered analysis may be the average of several individual analyses.

(2) Iowa assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Iowa, see "Managing Manure Nutrients for Crop Production," Iowa State Extension, PM 1811, Nov. 2003.

6.5. Planned Crops and Fertilizer Recommendations

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	Crop Year	Planned Crop	Yield Goal (per Acre)	N Rec (Lbs/A)	P ₂ O ₅ Rec (Lbs/A)	K ₂ O Rec (Lbs/A)	N Removed (Lbs/A)	P ₂ O ₅ Removed (Lbs/A)	K ₂ O Removed (Lbs/A)
Bob's Farm North – 8N	2010	Soybean	61.0 Bu	0	0	0	232	49	92
Bob's Farm North – 8N	2011	Corn	195.0 Bu	160	0	0		73	59
Bob's Farm North – 8N	2012	Soybean	61.0 Bu	0	0	0	232	49	92
Bob's Farm North – 8N	2013	Corn	195.0 Bu	160	0	0		73	59
Bob's Farm North – 8N	2014	Soybean	61.0 Bu	0	0	0	232	49	92
Bob's Farm South – 8S	2010	Soybean	61.0 Bu	0	0	0	232	49	92
Bob's Farm South – 8S	2011	Corn	195.0 Bu	160	0	0		73	59
Bob's Farm South – 8S	2012	Soybean	61.0 Bu	0	0	0	232	49	92
Bob's Farm South – 8S	2013	Corn	195.0 Bu	160	0	0		73	59
Bob's Farm South – 8S	2014	Soybean	61.0 Bu	0	0	0	232	49	92

* Unharvested cover crop or first crop in double-crop system.

^a Custom fertilizer recommendation.

6.6. Manure Application Planning Calendar

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

October 2009 through September 2010

Field	Total Acres	Spread. Acres	Pre-dominant Soil Type	Primary 2010 Crop (Prev. Primary Crop)	Oct '09	Nov '09	Dec '09	Jan '10	Feb '10	Mar '10	Apr '10	May '10	Jun '10	Jul '10	Aug '10	Sep '10
Bob's Farm North – 8N	56.4	56.4	Ida SIL (1C3 5-9%)	Soybean (Corn)												
Bob's Farm South – 8S	79.6	79.6	Ida SIL (1C3 5-9%)	Soybean (Corn)												

October 2010 through September 2011

Field	Total Acres	Spread. Acres	Pre-dominant Soil Type	Primary 2011 Crop (Prev. Primary Crop)	Oct '10	Nov '10	Dec '10	Jan '11	Feb '11	Mar '11	Apr '11	May '11	Jun '11	Jul '11	Aug '11	Sep '11
Bob's Farm North – 8N	56.4	56.4	Ida SIL (1C3 5-9%)	Corn (Soybean)		39.5										
Bob's Farm South – 8S	79.6	79.6	Ida SIL (1C3 5-9%)	Corn (Soybean)		100.9										

October 2011 through September 2012

Field	Total Acres	Spread. Acres	Pre-dominant Soil Type	Primary 2012 Crop (Prev. Primary Crop)	Oct '11	Nov '11	Dec '11	Jan '12	Feb '12	Mar '12	Apr '12	May '12	Jun '12	Jul '12	Aug '12	Sep '12
Bob's Farm North – 8N	56.4	56.4	Ida SIL (1C3 5-9%)	Soybean (Corn)												
Bob's Farm South – 8S	79.6	79.6	Ida SIL (1C3 5-9%)	Soybean (Corn)												

October 2012 through September 2013

Field	Total Acres	Spread. Acres	Pre-dominant Soil Type	Primary 2013 Crop (Prev. Primary Crop)	Oct '12	Nov '12	Dec '12	Jan '13	Feb '13	Mar '13	Apr '13	May '13	Jun '13	Jul '13	Aug '13	Sep '13
Bob's Farm North – 8N	56.4	56.4	Ida SIL (1C3 5-9%)	Corn (Soybean)								60.2				
Bob's Farm South – 8S	79.6	79.6	Ida SIL (1C3 5-9%)	Corn (Soybean)												

October 2013 through September 2014

Field	Total Acres	Spread. Acres	Pre-dominant Soil Type	Primary 2014 Crop (Prev. Primary Crop)	Oct '13	Nov '13	Dec '13	Jan '14	Feb '14	Mar '14	Apr '14	May '14	Jun '14	Jul '14	Aug '14	Sep '14
Bob's Farm North – 8N	56.4	56.4	Ida SIL (1C3 5-9%)	Soybean (Corn)							50.4	3.2				
Bob's Farm South – 8S	79.6	79.6	Ida SIL (1C3 5-9%)	Soybean (Corn)												

Slope > 10%	Slope > 5% (Winter only)⁽¹⁾	Crop in field	No. indicates total loads "X" indicates other manure apps
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¹⁾ Nutrients and organic nutrient sources shall not be surface applied to frozen, snow-covered ground, or saturated soil if a potential risk for runoff exists. A potential risk for runoff exists on slopes greater than 5% unless erosion is controlled to soil loss tolerance levels ("T") or less. Manure may be surface applied to frozen, snow-covered or saturated ground if a potential risk for runoff exists only under one of the following conditions.

- Where manure storage capacity is insufficient and failure to surface apply creates a risk of an uncontrolled release of manure.
- On an emergency basis.

Manure surface applied to frozen, snow covered, or saturated ground shall be based on a manure disposal plan. That plan shall include:

- Under what circumstances the manure may be applied to frozen, snow covered, or saturated ground. (Ex: storage capacity exceeded).
- Rates of application.
- Area of application.
- Other requirements such as runoff control as indicated through the use of the Iowa Phosphorus Index assessment tool.

6.7. Planned Nutrient Applications (Manure-spreadable Area)

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (Lbs/A)	Avail P ₂ O ₅ (Lbs/A)	Avail K ₂ O (Lbs/A)
Bob's Farm North – 8N	Nov 2010	Corn	E SetldSolidBasin #3	Dry Box Spreader, Not incorporated	2-yr P	10.5 Ton	28.4 Lds	426 Ton	40.6	20	30	92
Bob's Farm North – 8N	Nov 2010	Corn	W SetldSolidBasin #4	Dry Box Spreader, Not incorporated	2-yr P	10.5 Ton	11.1 Lds	166.5 Ton	15.9	20	30	92
Bob's Farm North – 8N	Apr 2011	Corn	28-0-0	Shallow subsurface band (<4")	Supp. N	47 Gal		2,651 Gal	56.4	140	0	0
Bob's Farm North – 8N	Apr 2013	Corn	28-0-0	Shallow subsurface band (<4")	1-yr N	41 Gal		2,312 Gal	56.4	122	0	0
Bob's Farm North – 8N	May 2013	Corn	E SetldSolidBasin #3	Dry Box Spreader, incorp. w/in 7 day(s)	1-yr P	16 Ton	60.2 Lds	903 Ton	56.4	35	46	141
Bob's Farm North – 8N	Apr 2014	Soy-bean	E SetldSolidBasin #3	Dry Box Spreader, incorp. w/in 7 day(s)	1-yr P	17 Ton	50.4 Lds	756 Ton	44.5	37	49	150
Bob's Farm North – 8N	May 2014	Soy-bean	W SetldSolidBasin #4	Dry Box Spreader, incorp. w/in 7 day(s)	1-yr P	17 Ton	3.2 Lds	48 Ton	2.8	37	49	150
Bob's Farm South – 8S	Nov 2010	Corn	E Lots Stack #1	Dry Box Spreader, Not incorporated	3-yr P	19 Ton	100.9 Lds	1,514 Ton	79.7	32	190	266
Bob's Farm South – 8S	Apr 2011	Corn	28-0-0	Shallow subsurface band (<4")	Supp. N	43 Gal		3,423 Gal	79.6	128	0	0
Bob's Farm South – 8S	Apr 2013	Corn	28-0-0	Shallow subsurface band (<4")	1-yr N	53 Gal		4,219 Gal	79.6	158	0	0
Bob's Farm South – 8S	Sep 2014	Corn	W Lots Stack #2	Dry Box Spreader, Not incorporated	Custom	20 Ton	100 Lds	1,500 Ton	75.0	34	200	280

6.8. Field Nutrient Balance (Manure-spreadable Area)

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Year	Field	Size Acres	Crop	Yield Goal/Acre	Fertilizer Recs ¹			Nutrients Applied ²			Balance After Recs ³			Balance After Removal ⁴	
					N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	N Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A	P ₂ O ₅ Lb/A	K ₂ O Lb/A
2010	Bob's Farm North – 8N	56.4	Soybean	61	0	0	0	0	0	0	0	0	0	-49	-92
2011	Bob's Farm North – 8N	56.4	Corn	195	160	0	0	160	30	92	0	30	92	-43	33
2012	Bob's Farm North – 8N	56.4	Soybean	61	0	0	0	0	0	0	0	30	92	-49	-59
2013	Bob's Farm North – 8N	56.4	Corn	195	160	0	0	157	46	141	0 [†]	76	233	-27	82
2014	Bob's Farm North – 8N	56.4	Soybean	61	0	0	0	31	41	126	0 [‡]	117	359	-8	116
Total	Bob's Farm North – 8N				320	0	0	348	117	359					
2010	Bob's Farm South – 8S	79.6	Soybean	61	0	0	0	0	0	0	0	0	0	-49	-92
2011	Bob's Farm South – 8S	79.6	Corn	195	160	0	0	160	190	266	0	190	266	117	207
2012	Bob's Farm South – 8S	79.6	Soybean	61	0	0	0	0	0	0	0	190	266	68	115
2013	Bob's Farm South – 8S	79.6	Corn	195	160	0	0	158	0	0	2 [‡]	190	266	-5	56
2014	Bob's Farm South – 8S	79.6	Soybean	61	0	0	0	0	0	0	0	190	266	-49	-36
Total	Bob's Farm South – 8S				320	0	0	318	190	266					

¹ Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

² Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

³ For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applications. For P₂O₅ and K₂O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative values indicate a potential need to apply additional nutrients.

⁴ Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

‡ Indicates a custom fertilizer recommendation in the Fertilizer Recs column.

[‡] Indicates in the Balance After Recs N column that the legume crop is assumed to utilize some or all of the supplied N.

† Indicates in the Balance After Recs N column that the value includes residual N expected to become available that year from prior years' manure applications.

6.9. Field Nutrient Status

Field Nutrient Status Details

(Please note that for ease of publication, the sample plan provides this information for Field 8 only.)

Plan File: Sample
 Operation: DEF Feedlot

State: Iowa

Last Saved: 7/8/2010
 Init. File Rev: 8/13/2009

Year	Field ID	Sub ID	Nutrient Needs	Crop	Yield Goal	Acres	N	P ₂ O ₅	K ₂ O	
2010	Bob's Farm North	8 N	Crop Fertilizer Recs	Soybean	61 Bu	56.4	0	0	0	
2010	Bob's Farm North	8 N	Crop Nutrient Removal	Soybean	61 Bu	56.4	232	49	92	
Date	Field ID	Sub ID	Nutrient Activity	Source	Equipment/Method	Rate	Acres	N	P ₂ O ₅	K ₂ O
2010	Bob's Farm North	8 N	Total Nutrients Applied	Spreadable Area			56.4	0	0	0
2010	Bob's Farm North	8 N	Balance After Recs	Spreadable Area			56.4	0	0	0
2010	Bob's Farm North	8 N	Balance After Removal	Spreadable Area			56.4	-232	-49	-92
Year	Field ID	Sub ID	Nutrient Needs	Crop	Yield Goal	Acres	N	P ₂ O ₅	K ₂ O	
2011	Bob's Farm North	8 N	Crop Fertilizer Recs	Corn	195 Bu	56.4	160	0	0	
2011	Bob's Farm North	8 N	Crop Nutrient Removal	Corn	195 Bu	56.4		73	59	
Date	Field ID	Sub ID	Nutrient Activity	Source	Equipment/Method	Rate	Acres	N	P ₂ O ₅	K ₂ O
Nov 10	Bob's Farm North	8 N	Manure App (2-yr P)	W SetdSolidBasin#4	Dry Box Spreader	10.5 Ton	15.9	20	30	92
Nov 10	Bob's Farm North	8 N	Manure App (2-yr P)	E SetdSolidBasin #3	Dry Box Spreader	10.5 Ton	40.6	20	30	92
Apr 11	Bob's Farm North	8 N	Fertilizer App (1-yr N)	28-0-0	Shallow subsurface band(<4")	47 Gal	56.4	140	0	0
2011	Bob's Farm North	8 N	Total Nutrients Applied	Spreadable Area			56.4	160	30	92
2011	Bob's Farm North	8 N	Balance After Recs	Spreadable Area			56.4	0	30	92
2011	Bob's Farm North	8 N	Balance After Removal	Spreadable Area			56.4		-43	33
Year	Field ID	Sub ID	Nutrient Needs	Crop	Yield Goal	Acres	N	P ₂ O ₅	K ₂ O	
2012	Bob's Farm North	8 N	Crop Fertilizer Recs	Soybean	61 Bu	56.4	0	0	0	
2012	Bob's Farm North	8 N	Crop Nutrient Removal	Soybean	61 Bu	56.4	232	49	92	
Date	Field ID	Sub ID	Nutrient Activity	Source	Equipment/Method	Rate	Acres	N	P ₂ O ₅	K ₂ O
2012	Bob's Farm North	8 N	Residual Manure N				56.4	6		
2012	Bob's Farm North	8 N	Total Nutrients Applied	Spreadable Area			56.4	6	0	0
2012	Bob's Farm North	8 N	Balance After Recs	Spreadable Area			56.4	0	30	92
2012	Bob's Farm North	8 N	Balance After Removal	Spreadable Area			56.4	-226	-49	-59
Year	Field ID	Sub ID	Nutrient Needs	Crop	Yield Goal	Acres	N	P ₂ O ₅	K ₂ O	
2013	Bob's Farm North	8 N	Crop Fertilizer Recs	Corn	195 Bu	56.4	160	0	0	
2013	Bob's Farm North	8 N	Crop Nutrient Removal	Corn	195 Bu	56.4		73	59	
Date	Field ID	Sub ID	Nutrient Activity	Source	Equipment/Method	Rate	Acres	N	P ₂ O ₅	K ₂ O
2013	Bob's Farm North	8 N	Residual Manure N				56.4	3		
May 13	Bob's Farm North	8 N	Manure App (1-yr P)	E SetdSolidBasin #3	Dry Box Spreader	16 Ton	56.4	35	46	141
Apr 13	Bob's Farm North	8 N	Fertilizer App (1-yr N)	28-0-0	Shallow subsurface band(<4")	41 Gal	56.4	122	0	0
2013	Bob's Farm North	8 N	Total Nutrients Applied	Spreadable Area			56.4	160	46	141
2013	Bob's Farm North	8 N	Balance After Recs	Spreadable Area			56.4	0	76	233
2013	Bob's Farm North	8 N	Balance After Removal	Spreadable Area			56.4		-27	82
Year	Field ID	Sub ID	Nutrient Needs	Crop	Yield Goal	Acres	N	P ₂ O ₅	K ₂ O	
2014	Bob's Farm North	8 N	Crop Fertilizer Recs	Soybean	61 Bu	56.4	0	0	0	
2014	Bob's Farm North	8 N	Crop Nutrient Removal	Soybean	61 Bu	56.4	232	49	92	
Date	Field ID	Sub ID	Nutrient Activity	Source	Equipment/Method	Rate	Acres	N	P ₂ O ₅	K ₂ O
2014	Bob's Farm North	8 N	Residual Manure N				56.4	10		
Apr 14	Bob's Farm North	8 N	Manure App (1-yr P)	E SetdSolidBasin #3	Dry Box Spreader	17 Ton	44.5	37	49	150
May 14	Bob's Farm North	8 N	Manure App (1-yr P)	W SetdSolidBasin#4	Dry Box Spreader	17 Ton	2.8	37	49	150
2014	Bob's Farm North	8 N	Total Nutrients Applied	Spreadable Area			56.4	41	41	126
2014	Bob's Farm North	8 N	Balance After Recs	Spreadable Area			56.4	0 ^a	117	359
2014	Bob's Farm North	8 N	Balance After Removal	Spreadable Area			56.4	-191	-8	116

<i>Year</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Needs</i>	<i>Crop</i>	<i>Yield Goal</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>	
2010	Bob's Farm South	8 S	Crop Fertilizer Recs	Soybean	61 Bu	79.6	0	0	0	
2010	Bob's Farm South	8 S	Crop Nutrient Removal	Soybean	61 Bu	79.6	232	49	92	
<i>Date</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Activity</i>	<i>Source</i>	<i>Equipment/Method</i>	<i>Rate</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>
2010	Bob's Farm South	8 S	Total Nutrients Applied	Spreadable Area		79.6	0	0	0	
2010	Bob's Farm South	8 S	Balance After Recs	Spreadable Area		79.6	0	0	0	
2010	Bob's Farm South	8 S	Balance After Removal	Spreadable Area		79.6	-232	-49	-92	
<i>Year</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Needs</i>	<i>Crop</i>	<i>Yield Goal</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>	
2011	Bob's Farm South	8 S	Crop Fertilizer Recs	Corn	195 Bu	79.6	160	0	0	
2011	Bob's Farm South	8 S	Crop Nutrient Removal	Corn	195 Bu	79.6		73	59	
<i>Date</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Activity</i>	<i>Source</i>	<i>Equipment/Method</i>	<i>Rate</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>
Nov 10	Bob's Farm South	8 S	Manure App (3-yr P)	E Lots Stack #1	Dry Box Spreader	19 Ton	79.7	32	190	266
Apr 11	Bob's Farm South	8 S	Fertilizer App (1-yr N)	28-0-0	Shallow subsurface band(<4")	43 Gal	79.6	128	0	0
2011	Bob's Farm South	8 S	Total Nutrients Applied	Spreadable Area		79.6	160	190	266	
2011	Bob's Farm South	8 S	Balance After Recs	Spreadable Area		79.6	0	190	266	
2011	Bob's Farm South	8 S	Balance After Removal	Spreadable Area		79.6		117	207	
<i>Year</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Needs</i>	<i>Crop</i>	<i>Yield Goal</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>	
2012	Bob's Farm South	8 S	Crop Fertilizer Recs	Soybean	61 Bu	79.6	0	0	0	
2012	Bob's Farm South	8 S	Crop Nutrient Removal	Soybean	61 Bu	79.6	232	49	92	
<i>Date</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Activity</i>	<i>Source</i>	<i>Equipment/Method</i>	<i>Rate</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>
2012	Bob's Farm South	8 S	Residual Manure N				79.6	10		
2012	Bob's Farm South	8 S	Total Nutrients Applied	Spreadable Area		79.6	10	0	0	
2012	Bob's Farm South	8 S	Balance After Recs	Spreadable Area		79.6	0	190	266	
2012	Bob's Farm South	8 S	Balance After Removal	Spreadable Area		79.6	-222	68	115	
<i>Year</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Needs</i>	<i>Crop</i>	<i>Yield Goal</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>	
2013	Bob's Farm South	8 S	Crop Fertilizer Recs	Corn	195 Bu	79.6	160	0	0	
2013	Bob's Farm South	8 S	Crop Nutrient Removal	Corn	195 Bu	79.6		73	59	
<i>Date</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Activity</i>	<i>Source</i>	<i>Equipment/Method</i>	<i>Rate</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>
2013	Bob's Farm South	8 S	Residual Manure N				79.6	4		
Apr 13	Bob's Farm South	8 S	Fertilizer App (1-yr N)	28-0-0	Shallow subsurface band(<4")	53 Gal	79.6	158	0	0
2013	Bob's Farm South	8 S	Total Nutrients Applied	Spreadable Area		79.6	162	0	0	
2013	Bob's Farm South	8 S	Balance After Recs	Spreadable Area		79.6	2	190	266	
2013	Bob's Farm South	8 S	Balance After Removal	Spreadable Area		79.6		-5	56	
<i>Year</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Needs</i>	<i>Crop</i>	<i>Yield Goal</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>	
2014	Bob's Farm South	8 S	Crop Fertilizer Recs	Soybean	61 Bu	79.6	0	0	0	
2014	Bob's Farm South	8 S	Crop Nutrient Removal	Soybean	61 Bu	79.6	232	49	92	
<i>Date</i>	<i>Field ID</i>	<i>Sub ID</i>	<i>Nutrient Activity</i>	<i>Source</i>	<i>Equipment/Method</i>	<i>Rate</i>	<i>Acres</i>	<i>N</i>	<i>P₂O₅</i>	<i>K₂O</i>
2014	Bob's Farm South	8 S	Total Nutrients Applied	Spreadable Area		79.6	0	0	0	
2014	Bob's Farm South	8 S	Balance After Recs	Spreadable Area		79.6	0	190	266	
2014	Bob's Farm South	8 S	Balance After Removal	Spreadable Area		79.6	-232	-49	-36	

Notes

- (1) If a field has a non-spreadable area, it is listed in a separate section following the field's spreadable area.
- (2) Yield Goal, Rate, N, P₂O₅ and K₂O values are all per acre.
- (3) The crop's N fertilizer rec accounts for any N credit from a previous legume crop.
- (4) If a field has more than one manure application in the same crop year, or if the total area covered that year is less than or greater than the field's area, a field average is used in calculating balances. This field average is the sum of each manure application's area times its per-acre amount of nutrient applied, divided by the field's area.
- (5) Any positive P₂O₅ or K₂O balance is carried over to the next year. Available N not utilized in the current crop year is assumed lost.
- Indicates a custom fertilizer recommendation in the Crop Fertilizer Recs columns.
- ª Indicates in the Balance After Recs N column that the legume crop is assumed to utilize some or all of the supplied

6.10. Manure Inventory Annual Summary

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Im-ported	Total Trans-ferred In	Total Applied	Total Ex-ported	Total Trans-ferred Out	On Hand at End of Period	Units
E Lots Stack #1	Oct '09–Sep '10	200	4,375	0	0	2,385	0	0	2,190	Ton
E SetIdSolidBasin #3	Oct '09–Sep '10	100	757	0	0	477	0	0	380	Ton
E Storage Pond #1	Oct '09–Sep '10	750,000	10,575,180	0	0	11,182,050	0	0	143,130	Gal
W Lots Stack #2	Oct '09–Sep '10	100	1,750	0	0	975	0	0	875	Ton
W SetdSolidBasin#4	Oct '09–Sep '10	75	247	0	0	195	0	0	127	Ton
W Storage Pond #2	Oct '09–Sep '10	400,000	5,876,413	0	0	5,182,199	0	0	1,094,214	Gal
All Sources (liquid)	Oct '09–Sep '10	1,150,000	16,451,593	0	0	16,364,249	0	0	1,237,344	Gal
All Sources (solid)	Oct '09–Sep '10	475	7,129	0	0	4,032	0	0	3,572	Ton
E Lots Stack #1	Oct '10–Sep '11	2,190	4,375	0	0	3,888	0	0	2,677	Ton
E SetIdSolidBasin #3	Oct '10–Sep '11	380	757	0	0	678	0	0	459	Ton
E Storage Pond #1	Oct '10–Sep '11	143,130	10,575,180	0	0	10,165,500	0	0	552,810	Gal
W Lots Stack #2	Oct '10–Sep '11	875	1,750	0	0	1,752	0	0	873	Ton
W SetdSolidBasin#4	Oct '10–Sep '11	127	247	0	0	249	0	0	125	Ton
W Storage Pond #2	Oct '10–Sep '11	1,094,214	5,876,413	0	0	5,842,899	0	0	1,127,728	Gal
All Sources (liquid)	Oct '10–Sep '11	1,237,344	16,451,593	0	0	16,008,399	0	0	1,680,538	Gal
All Sources (solid)	Oct '10–Sep '11	3,572	7,129	0	0	6,567	0	0	4,134	Ton
E Lots Stack #1	Oct '11–Sep '12	2,677	4,375	0	0	4,157	0	0	2,896	Ton
E SetIdSolidBasin #3	Oct '11–Sep '12	459	757	0	0	716	0	0	501	Ton
E Storage Pond #1	Oct '11–Sep '12	552,810	10,575,180	0	0	9,148,950	0	0	1,979,040	Gal
W Lots Stack #2	Oct '11–Sep '12	873	1,750	0	0	1,833	0	0	790	Ton
W SetdSolidBasin#4	Oct '11–Sep '12	125	247	0	0	144	0	0	228	Ton
W Storage Pond #2	Oct '11–Sep '12	1,127,728	5,876,413	0	0	5,842,899	0	0	1,161,242	Gal
All Sources (liquid)	Oct '11–Sep '12	1,680,538	16,451,593	0	0	14,991,849	0	0	3,140,282	Gal
All Sources (solid)	Oct '11–Sep '12	4,134	7,129	0	0	6,849	0	0	4,414	Ton
E Lots Stack #1	Oct '12–Sep '13	2,896	4,375	0	0	4,622	0	0	2,649	Ton
E SetIdSolidBasin #3	Oct '12–Sep '13	501	757	0	0	903	0	0	355	Ton
E Storage Pond #1	Oct '12–Sep '13	1,979,040	10,575,180	0	0	10,165,500	0	0	2,388,720	Gal
W Lots Stack #2	Oct '12–Sep '13	790	1,750	0	0	1,332	0	0	1,208	Ton
W SetdSolidBasin#4	Oct '12–Sep '13	228	247	0	0	240	0	0	235	Ton
W Storage Pond #2	Oct '12–Sep '13	1,161,242	5,876,413	0	0	6,032,982	0	0	1,004,673	Gal
All Sources (liquid)	Oct '12–Sep '13	3,140,282	16,451,593	0	0	16,198,482	0	0	3,393,393	Gal
All Sources (solid)	Oct '12–Sep '13	4,414	7,129	0	0	7,097	0	0	4,447	Ton
E Lots Stack #1	Oct '13–Sep '14	2,649	4,375	0	0	2,714	0	0	4,311	Ton
E SetIdSolidBasin #3	Oct '13–Sep '14	355	757	0	0	756	0	0	356	Ton
E Storage Pond #1	Oct '13–Sep '14	2,388,720	10,575,180	0	0	8,132,400	0	0	4,831,500	Gal
W Lots Stack #2	Oct '13–Sep '14	1,208	1,750	0	0	2,699	0	0	260	Ton
W SetdSolidBasin#4	Oct '13–Sep '14	235	247	0	0	273	0	0	209	Ton
W Storage Pond #2	Oct '13–Sep '14	1,004,673	5,876,413	0	0	6,881,019	0	0	67	Gal
All Sources (liquid)	Oct '13–Sep '14	3,393,393	16,451,593	0	0	15,013,419	0	0	4,831,567	Gal
All Sources (solid)	Oct '13–Sep '14	4,447	7,129	0	0	6,441	0	0	5,135	Ton

6.11. Fertilizer Material Annual Summary

Product Analysis	Plan Period	Product Needed Oct–Dec	Product Needed Jan–Sep	Total Product Needed	Units
28-0-0	Oct '09–Sep '10	0	54,461	54,461	Gal
28-0-0	Oct '10–Sep '11	0	46,909	46,909	Gal
28-0-0	Oct '11–Sep '12	0	51,098	51,098	Gal
28-0-0	Oct '12–Sep '13	0	43,833	43,833	Gal
28-0-0	Oct '13–Sep '14	0	59,803	59,803	Gal

6.12. Whole-farm Nutrient Balance (Manure-spreadable Area)

	N (Lbs)	P ₂ O ₅ (Lbs)	K ₂ O (Lbs)
Total Manure Nutrients on Hand at Start of Plan ¹	5,438	4,082	9,190
Total Manure Nutrients Collected ²	393,872	361,937	719,700
Total Manure Nutrients Imported ³	0	0	0
Total Manure Nutrients Exported ⁴	0	0	0
Total Manure Nutrients on Hand at End of Plan ⁵	44,663	49,753	83,442
Total Manure Nutrients Applied ⁶	354,897	317,506	646,223
Available Manure Nutrients Applied ⁷	118,283	317,506	646,223
Commercial Fertilizer Nutrients Applied ⁸	763,771	0	0
Available Nutrients Applied ⁹	882,054	317,506	646,223
Nutrient Utilization Potential ¹⁰	1,243,599	409,494	422,760
Nutrient Balance of Spreadable Acres ^{11*}	-361,545	-91,988	223,463
Average Nutrient Balance per Spreadable Acre per Year ^{12*}	-58	-15	36

1. Values indicate total manure nutrients present in storage(s) at the beginning of the plan.
2. Values indicate total manure nutrients collected on the farm.
3. Values indicate total manure nutrients imported onto the farm.
4. Values indicate total manure nutrients exported from the farm to an external operation.
5. Values indicate total manure nutrients present in storage(s) at the end of plan.
6. Values indicate total nutrients present in land-applied manure. Losses due to rate, timing and method of application are not included in these values.
7. Values indicate available manure nutrients applied on the farm based on rate, time and method of application. These values are based on the total manure nutrients applied (row 6) after accounting for state-specific nutrient losses due to rate, time and method of application.
8. Values indicate nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
9. Values are the sum of available manure nutrients applied (row 7) and commercial fertilizer nutrients applied (row 8).
10. Values indicate nutrient utilization potential of crops grown. For N the value generally is based on crop N recommendation for non-legume crops and crop N uptake or other state-imposed limit for N application rates for legumes. P₂O₅ and K₂O values generally are based on fertilizer recommendations or crop removal (whichever is greatest).
11. Values indicate available nutrients applied (row 9) minus crop nutrient utilization potential (row 10). Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
12. Values indicate average per acre nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres (row 11) by the number of spreadable acres in plan and by the length of the plan in years. Negative values indicate additional average per acre nutrient utilization potential and positive values indicate average per acre over-application.

* Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. For example, plans that include legume crops often will not utilize the full N utilization potential for legume crops if manure can be applied to non-legume crops that require N for optimum yield. Positive values for P₂O₅ and/or K₂O do not necessarily indicate that the plan was not developed properly. For example, producers may be allowed to apply N-based application rates of manure to fields with low soil test P values or fields with a low potential P-loss risk based on the risk assessment tool used by the state. Negative values for P₂O₅ and K₂O indicate that planned applications to some fields are less than crop removal rates.

Section 7. Record Keeping

7.1. Land Application Equipment Inspections

The equipment identified in the table below is used to apply manure, litter, and process wastewater. This equipment will be inspected at least once annually, within one month before use. Inspection dates will be recorded in the table below.

Equipment	Inspection Date				
	2010	2011	2012	2013	2014
Dry Box Spreader					
Injector					

7.2. Record Keeping Forms

The records identified below will be maintained at the indicated frequencies using the forms identified. [Note: the referenced forms are included in Appendix D.]

Record	Frequency	Form
Visual inspections of structures used to store, contain, or treat manure, litter, and process wastewater, including wastewater levels as indicated on depth markers and actions taken to correct deficiencies	Weekly	AFO Weekly Storage, Containment, and Treatment Structure Inspections Log Sheet (a separate form will be completed for each structure)
Visual inspections of storm water diversion structures and channels including actions taken to correct deficiencies	Weekly	CAFO Weekly Storm Water Diversion and Channel Inspections Log Sheet
Land application records, including <ul style="list-style-type: none"> • Date of application • Source of manure, litter, or process wastewater applied • Method of application • Weather conditions during and for 24 hours before and after application • Amount of manure, litter, or process wastewater applied • Total N and P applied, including calculations 	Per application event	CAFO Nutrient Land Application Log Sheet (a separate form will be completed for each field)
Water line inspections, including drinking and cooling water lines	Daily	Daily Water Line Inspection Log Sheet
Off-site transfers of manure, litter, and process wastewater, including recipient name and address, date of transfer, and amount transferred	Per transfer event (if any)	Manure, Litter, and Process Wastewater Transfer Record Form

7.3. Records Maintained in NMP

In addition, the following records will be maintained as indicated below.

Record	Frequency	Documentation Method/Location
Expected crop yield	Once per permit/ NMP cycle unless NMP revised	NMP Section 6.5
Test methods used to sample and analyze manure, litter, soil, and process wastewater	Per sampling event	Methods identified on laboratory reports
Results from manure, litter, process wastewater, and soil sampling	Per sampling event	Laboratory reports of analytical results maintained with NMP
Basis for determining manure application rates in accordance with the technical standards for nutrient management identified in the permit	Once per permit/ NMP cycle unless NMP revised	NMP outlines basis for rate determination
Calculations showing the total amount of N and P to be applied to each field	Once per permit/ NMP cycle unless NMP revised	Calculations are performed within MMP software; data inputs and results are included in NMP

Section 8. Publications and References

8.1. Publications

Crop Fertilizer Recommendations

“Crop Nutrient Recommendations,” PM 1688, Sept 2008

<http://www.extension.iastate.edu/Publications/PM1688.pdf>

Manure Nutrient Availability

“Managing Manure Nutrients for Crop Production,” Iowa State Extension, PM 1811, Nov. 2003

This document no longer exists on Iowa State Extension’s web site. Similar technical information can be found in “Using Manure Nutrients for Crop Production,” Iowa State Extension, PMR 1003, September 2008.

<http://www.extension.iastate.edu/Publications/PMR1003.pdf>

Phosphorus Assessment

“Technical Note No. 25, Iowa Phosphorus Index,” Iowa NRCS, August 2004

<ftp://ftp-fc.sc.egov.usda.gov/IA/technical/Technot25Aug04.pdf>

Practice Standards

Iowa NRCS Nutrient Management Standard (590), December 2008

<http://efotg.sc.egov.usda.gov//references/public/IA/IA590Dec08.pdf>

8.2. Software and Data Sources

MMP Version	MMP 0.2.9.0
MMP Plan File	Sample
MMP Initialization File for Iowa	8/13/2009
MMP Soils File for Iowa	11/17/2009
Phosphorus Assessment Tool	2007.06.29
NRCS Conservation Plan(s)	n/a
RUSLE2 Library	Version: 1.32.3.0 Build: Dec 17 2007 Science: 20061020
RUSLE2 Database	moses1.gdb

8.3. Initialization Files

Initialization File Summary

Init. File: ia.mmi

State: Iowa

Revision: 8/13/2009

Crops

Name	Yield Units	N Removed (Lb/YldUnit)	P ₂ O ₅ Removed (Lb/YldUnit)	K ₂ O Removed (Lb/YldUnit)	Source of Fertilizer Recommendations
Alfalfa hay	Ton	50	12.5	40.0	"Crop Nutrient Recommendations," PM 1688, Sept 2008
Alfalfa seeding	Ton	50	12.5	40.0	"Crop Nutrient Recommendations," PM 1688, Sept 2008
Alfalfa-grass hay	Ton	50	12.5	40.0	"Crop Nutrient Recommendations," PM 1688, Sept 2008
Alfalfa-grass pasture	Ton	50	8.3	20.0	"Crop Nutrient Recommendations," PM 1688, Sept 2008
Bluegrass pasture	Ton		9	30	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Bromegrass hay	Ton	40	9	47	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Bromegrass pasture	Ton	40	6	23.5	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Clover/trefoil-grass hay	Ton	43	12	35	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Clover/trefoil-grass past	Ton	43	8	17.5	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Corn	Bu		0.375	0.30	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Managing Manure Nutrients," PM 1811, Nov 03
Corn silage	Ton		3.5	8	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Managing Manure Nutrients," PM 1811, Nov 03
CRP					
Fallow					
Legume cover					
Oat	Bu	0.75	0.4	1.0	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Managing Manure Nutrients," PM 1811, Nov 03
Oat + forage seeding	Bu	0.75	0.4	1.0	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Managing Manure Nutrients," PM 1811, Nov 03
Orchardgrass hay	Ton	38	14	68	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Orchardgrass pasture	Ton	38	9.3	34	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Other					
Perennial ryegrass hay	Ton	24	12	34	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Perennial ryegrass past	Ton	24	8	17	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Reed canarygrass hay	Ton		9	47	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Reed canarygrass pasture	Ton		6	23.5	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997

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Name	Yield Units	N Removed (Lb/YldUnit)	P ₂ O ₅ Removed (Lb/YldUnit)	K ₂ O Removed (Lb/YldUnit)	Source of Fertilizer Recommendations
Small grain cover					
Sorg-sudan hay	Ton	40	12	38	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Sorg-sudan pasture	Ton	40	8	19	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Soybean	Bu	3.8	0.8	1.5	"Crop Nutrient Recommendations," PM 1688, Sept 2008
Sunflower	CWT	3.5	0.8	0.7	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Managing Manure Nutrients," PM 1811, Nov 03
Switchgrass hay	Ton	21	12	66	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Switchgrass pasture	Ton	21	8	33	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Tall fescue hay	Ton	38	12	66	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Tall fescue pasture	Ton	38	8	33	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Timothy hay	Ton	25	9	32	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Timothy pasture	Ton	25	6	16	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Fertilizing Pasture," PM 869, June 1997
Wheat	Bu	1.3	0.6	0.3	"Crop Nutrient Recommendations," PM 1688, Sept 2008 and "Managing Manure Nutrients," PM 1811, Nov 03

Initialization File Summary

Init. File: ia.mmi

State: Iowa

Revision: 8/13/2009

Storage Types

Name	% N Lost in Handling & Storage	% Org. N Mineralized First Year	Water Dilution Factor	Source of Storage N Data
Manure pack	30	25	1	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Open lot	50	35	1	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Dry stack	25	45	1	Adapted from "Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Underfloor dry storage	35	60	1	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Litter	35	60	1	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Daily scrape & haul (liquid)	25	25	1	Adapted from "Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Underfloor liquid storage	20	35	1	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993

Initialization File Summary

Init. File: ia.mmi**State:** Iowa**Revision:** 8/13/2009

Name	% N Lost in Handling & Storage	% Org. N Mineralized First Year	Water Dilution Factor	Source of Storage N Data
Outside prefab liquid storage	20	30	1.2	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Earthen storage	30	30	1.4	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Lagoon, 1 stage	75	30	2.5	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Lagoon, 2 stage	80	30	2.5	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Lagoon, 3 stage	80	30	2.5	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993
Washwater	75	30	6	"Livestock Waste Facilities Handbook," MWPS-18, Third Edition, 1993

Initialization File Summary

Init. File: ia.mmi**State:** Iowa**Revision:** 8/13/2009

Animal Types

Name	Daily Manure (Lb/AU)	Daily Manure (Gal/AU)	Daily Total N (Lb/AU)	Daily P ₂ O ₅ (Lb/AU)	Daily K ₂ O (Lb/AU)	Water Dilution Factor	Source of Daily Excretion Data
Sow & litter	59	7.3	0.45	0.30	0.34	1.4	AWMFH Chapter 4, Table 4-10(c), March 2008
Nursery pig	88	10.5	0.92	0.34	0.42	1.5	AWMFH Chapter 4, Table 4-10(d), March 2008
Grow-finish pig	65	8.2	0.54	0.21	0.29	1.25	AWMFH Chapter 4, Table 4-10(d), March 2008
Wean-to-finish pig	71	8.8	0.64	0.23	0.32	1.3	AWMFH Chapter 4, Table 4-10(d), March 2008
Gestating sow	25	3.1	0.16	0.11	0.13	1.3	AWMFH Chapter 4, Table 4-10(c), March 2008
Boar	19	2.2	0.14	0.11	0.11	1.2	AWMFH Chapter 4, Table 4-10(c), March 2008
Calf (dairy)	83	9.7	0.42	0.11	0.13	1.05	AWMFH Chapter 4, Table 4-5(b), March 2008
Weaned heifer/steer (dairy)	56	6.7	0.27	0.11	0.14	1.05	AWMFH Chapter 4, Table 4-5(b), March 2008
Growing heifer/steer (dairy)	56	6.7	0.27	0.11	0.14	1.05	AWMFH Chapter 4, Table 4-5(b), March 2008
Breeding heifer (dairy)	56	6.7	0.27	0.11	0.14	1.05	AWMFH Chapter 4, Table 4-5(b), March 2008
Milk cow (dairy)	108	12.7	0.71	0.27	0.40	1.05	AWMFH Chapter 4, Table 4-5(b), March 2008
Dry cow (dairy)	51	6.3	0.30	0.10	0.12	1.05	AWMFH Chapter 4, Table 4-5(b), March 2008

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Name	Daily Manure (Lb/AU)	Daily Manure (Gal/AU)	Daily Total N (Lb/AU)	Daily P ₂ O ₅ (Lb/AU)	Daily K ₂ O (Lb/AU)	Water Dilution Factor	SSource of Daily Excretion Data
Veal calf	60	7.2	0.20	0.07	0.30	1.05	AWMFH Chapter 4, Table 4-12, March 2008
Suckling calf (beef)	77	9.0	0.45	0.18	0.35	1.05	AWMFH Chapter 4, Table 4-8(b), March 2008
Weaned calf (beef)	77	9.0	0.45	0.18	0.35	1.05	AWMFH Chapter 4, Table 4-8(b), March 2008
Growing steer (beef)	77	9.0	0.45	0.18	0.35	1.05	AWMFH Chapter 4, Table 4-8(b), March 2008
Finishing steer (beef)	65	8.2	0.36	0.10	0.30	1.05	AWMFH Chapter 4, Table 4-8(d), March 2008
Brood cow/heifer (beef)	104	12.7	0.35	0.18	0.30	1.05	AWMFH Chapter 4, Table 4-8(b), March 2008
Sheep	40	4.7	0.45	0.16	0.36	1.0	AWMFH Chapter 4, Table 4-13, March 2008
Horse	51	6.1	0.18	0.06	0.06	1.0	AWMFH Chapter 4, Table 4-14(b), March 2008
Broiler	88	10.5	0.96	0.64	0.65	1.0	AWMFH Chapter 4, Table 4-11(d), March 2008
Layer	57	7.0	1.10	0.76	0.47	1.0	AWMFH Chapter 4, Table 4-11(b), March 2008
Turkey tom	34	4.3	0.53	0.37	0.30	1.0	AWMFH Chapter 4, Table 4-11(d), March 2008
Turkey hen	48	5.8	0.72	0.46	0.37	1.0	AWMFH Chapter 4, Table 4-11(d), March 2008
Duck	102	12.7	1.00	0.80	0.60	1.0	AWMFH Chapter 4, Table 4-11(d), March 2008

Initialization File Summary

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Ration Amendments

Name	Water Dilution % Reduced	Total N Production % Reduced	P ₂ O ₅ Production % Reduced	K ₂ O Production % Reduced	Storage N Loss % Reduced
Wet/Dry Feeding	50				
Phased Feeding		10	10	10	
Phytase			20		
Alum					25
HAP Corn			20		
HAP Soybean			20		

Initialization File Summary

Init. File: ia.mmi**State:** Iowa**Revision:** 8/13/2009

Equipment Types

Name	Is Liquid	Is Injected	Is Irrigated	Has Aerial N Loss	Capacity Units	Application Units
Solid spreader	<input type="checkbox"/>				Ton	Feet
Liquid spreader, injected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Gal	Feet
Liquid spreader, surface spray	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	Gal	Feet
Liquid spreader, knives up	<input checked="" type="checkbox"/>				Gal	Feet
Hose pull, injected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			Gal/Min	Feet
Hose pull, knives up	<input checked="" type="checkbox"/>				Gal/Min	Feet
Traveling gun	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gal/Min	Feet
Standing pipe	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gal/Min	Acres
Center pivot	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Gal/Min	Acres

Initialization File Summary

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Misc.

% Total P Manure Available	100
% Total K Manure Available	100
CEC Estimation	$K/390 + Ca/200 + Mg/120 + 12*(7 - \text{Min}(\text{BufferpH}, 7))$
Soil Test P Change	$\text{Round}(\text{NetP2O5}/20)$
Soil Test K Change	$\text{Round}((\text{NetK2O} - \text{NumYears}*20) / (4 + 0.2*\text{CEC}))$
Source of Manure N Availability Data	"Managing Manure Nutrients for Crop Production," Iowa State Extension, PM 1811, Nov. 2003