

# Introduction and Instructions for the Nutrient Management Plan Form



## Who Needs to Submit a Plan?

- The owner of an open feedlot<sup>1</sup> operation which has an animal unit capacity of 1000 or more animal units.
- The owner of an animal feeding operation who is required to have a national pollutant discharge elimination system (NPDES) permit.
- An animal truck wash facility<sup>2</sup> that exceeds an average of 2,000 gallons per day as calculated on a monthly basis.

**NOTE:** A comprehensive nutrient management plan or CNMP can be substituted for the NMP if the producer is applying for federal cost-share under the Environmental Quality Incentives Program (EQIP). An existing manure management plan (MMP) may be used for the confinement<sup>3</sup> operation portion of a combined<sup>4</sup> operation.

## Instructions for Use of These Forms

- Make additional copies of pages 2 and 3 as needed.
  - Submit one copy of the plan and all the attachments to your local DNR field office (listed below) when submitting updates to existing NMPs.
- In addition to the required forms, the information indicated below must be maintained as part of the nutrient management plan.

## Supporting Information to be maintained and submitted with the current NMP (in addition to required forms):

- A plat map which shows the location of the animal feeding operation and of all fields being used for manure application;
- Aerial photos of all fields being used for manure application. For each field, mark the field boundaries, areas not available or unsuitable for manure application, and areas where specific restrictions on manure application apply. For an animal feeding operation that is required to have an NPDES permit, these restrictions include setback requirements for land application of manure, litter and process wastewater as set forth in endnote “cc” on page 9 of this form.
- Information documenting the optimum yields calculated for the manure application fields (if required – see endnote “f”);
- Manure and effluent sampling results, if sample results were used to determine the manure and effluent’s nutrient content for this plan;
- Operations using irrigation to apply manure must provide information indicating how they will comply with applicable restrictions and requirements, and any additional methods or practices that will be used to reduce potential odors;
- Written manure application agreements for all fields identified in the plan that are not owned or rented for crop production purposes by the owner of the animal feeding operation;
- Natural Resources Conservation Service (NRCS) P index “detailed report” from the Iowa P index calculator (available at <http://www.ia.nrcs.usda.gov/>) and a document (e.g., RUSLE2 profile erosion calculation record) indicating the inputs and results of RUSLE2 for each field in the plan.

## Plan Updates & Recordkeeping

- Prior to making changes in an operation’s nutrient management practices, the operation must update the plan to show the proposed changes. Updates should be maintained on site.
- Records of manure and effluent application must be maintained and be available for the DNR to inspect. For a list of record keeping requirements, see 65.209(10)“b”. Records must be maintained for five years after the year of manure application or for the length of the crop rotation, whichever is greater.

<sup>1</sup> Open Feedlot: Unroofed or partially roofed area where livestock or poultry are confined for more than 45 days out of any 12-month period.

<sup>2</sup> Animal truck wash facility: An operation engaged in washing single-unit definitions in items 1&2 above.

<sup>3</sup> Confinement: Totally roofed area where livestock or poultry are confined for more than 45 days out of any 12-month period.

<sup>4</sup> Combined: combined operation includes both of the other two definitions in items 1 & 2, above.

## Assistance

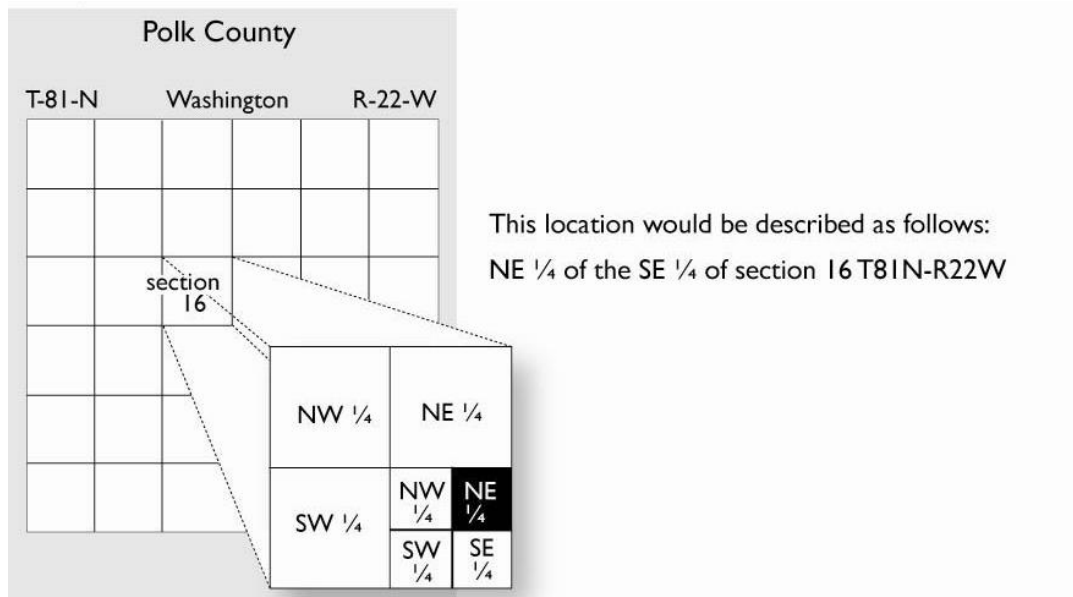
Assistance in developing a nutrient management plan may be available from a number of sources, including private consultants, Iowa State University Extension, and USDA's Natural Resources Conservation Service. Some of these sources will prepare a complete plan for an operation, while others will only provide general assistance. Contact your county Extension or NRCS office to determine the assistance they will provide, as well as to obtain a list of consultants who will prepare plans. If you have specific questions about the Nutrient Management Plan forms, contact your regional DNR Field Office. See attached map for contact information and to determine the appropriate office.

## Environmental Services Division Field Office Locations

Iowa DNR Environmental Field Office locations can be found at [www.iowaDNR.gov/FieldOffice](http://www.iowaDNR.gov/FieldOffice)

## Example of Legal Description for Facility

Please refer to the example below when describing the location of your operation on Page 1. This property is located in Washington Township, Polk County.



**Remember: Report all manure releases to the DNR's 24-hr. Spill Line at (515) 725-8694 within 6 hours of the onset or discovery of the spill.**

# Nutrient Management Plan Form

## Operation Information

**Instructions:** Complete this form for your animal feeding operation. Endnotes are provided on pages 11-14. The information within this form, and the attachments, describes my animal feeding operation, my manure storage and handling system, and my planned manure management system. I (we) will manage the manure, and the nutrients it contains, as described within this nutrient management plan and any revisions of the plan, individual field information, and field summary sheet, and in accordance with current rules and regulations. Deviations permitted by Iowa law will be documented and maintained in my records.

Date: \_\_\_\_\_

\_\_\_\_\_  
(Signature) (Print Name)

Name of operation: \_\_\_\_\_ Facility ID No.: \_\_\_\_\_

Location of the operation: \_\_\_\_\_  
(911 Address)

\_\_\_\_\_  
(City) \_\_\_\_\_ (State) \_\_\_\_\_ (Zip Code)

\_\_\_\_\_  
(1/4 1/4) ¼ of the \_\_\_\_\_ ¼ of Sec \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_  
(1/4) (Section) (Tier) (Range) (Township Name) (County)

### Owner and Contacts of the animal feeding operation:

Owner: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

Email (optional): \_\_\_\_\_ Cell phone (optional): \_\_\_\_\_

Contact person (if different than owner): \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

Email (optional): \_\_\_\_\_ Cell phone (optional): \_\_\_\_\_

This nutrient management plan is for: (check one)

- existing operation, not expanding       existing operation, expanding
- existing operation, new owner       new operation

Construction and Expansion Dates: \_\_\_\_\_ date of initial construction  
\_\_\_\_\_ and date(s) of all expansion(s)

**Table 1. Information about livestock production and nutrient management system**

| 1<br>Animal<br>Type <sup>a</sup> | 2<br>Description of Manure Storage/<br>Manure Type <sup>b</sup><br>(e.g. scraped solids from open lot , effluent from<br>runoff basin, bedded barn manure , liquid<br>manure from below building pit) | 3<br>Max.<br>Number of<br>Animals<br>Housed<br>(head) | 4                       | 5  | 6<br>gal/space/day<br>or<br>ton/space/yr <sup>d</sup> | 7<br>Annual Manure<br>Production <sup>e</sup><br>(gallons or tons) |
|----------------------------------|---|---|-------------------------|--|---|--|
|                                  |   |   | N <sup>c</sup>          | P <sub>2</sub> O <sub>5</sub> <sup>c</sup> |   |  |
|                                  |   |   | lb/1000 gal /<br>lb/ton |  |   |  |
|                                  |   |   |                         |  |   |  |
|                                  |   |   |                         |  |   |  |
|                                  |   |   |                         |  |   |  |
|                                  |   |   |                         |  |   |  |
| <b>Total Tons</b>                |   |   |                         |  |   |  |
| <b>Total Gallons</b>             |   |   |                         |  |   |  |

Confinement Animals Covered by MMP?  Yes  No (if yes, application rate calculations are not required in this plan)

Source of Nutrient Content Data (columns 4, 5): standard tables, analysis of manure samples, other: \_\_\_\_\_

## Determining Maximum Allowable Manure Application Rates

**Instructions:** Complete a worksheet for each unique combination of the following factors (crop rotation, optimum crop yield, manure nutrient concentration, remaining crop N need, and method of application) that occurs at this operation. Endnotes are given on pages 11-14.

Management Identification (Mgt ID<sup>f</sup>): \_\_\_\_\_  
 (Identify this application scenario by letter, refer to endnote e)

Method used to determine optimum yield<sup>g</sup>: \_\_\_\_\_ Timing of Application: \_\_\_\_\_

Method of Application<sup>h</sup>: \_\_\_\_\_ Application Loss Factor<sup>h</sup>: \_\_\_\_\_

If spray irrigation is used, identify method<sup>i</sup>: \_\_\_\_\_

**Table 2. Manure Nutrient Concentration**

|   |  |                                   |  |                                   |
|---|--|-----------------------------------|--|-----------------------------------|
| Manure Nutrient Content (lbs/1000gal or lbs/ton) <sup>j</sup> |  |                                   |  |                                   |
| Total N   |  | P <sub>2</sub> O <sub>5</sub>     |  |                                   |
| % TN available 1 <sup>st</sup> year <sup>k</sup>              |  | % 2 <sup>nd</sup> year            |  | % 3 <sup>rd</sup> year            |
| Available N 1 <sup>st</sup> year <sup>l</sup>                 |  | 2 <sup>nd</sup> year <sup>m</sup> |  | 3 <sup>rd</sup> year <sup>n</sup> |

**Table 3. Crop Usage Rates**

| (lbs/bu or lbs/ton) | N   | P <sub>2</sub> O <sub>5</sub> |
|---------------------|-----|-------------------------------|
| Corn                |     | 0.32                          |
| Soybean             | 3.8 | 0.72                          |
| Alfalfa             | 50  | 13                            |

\* Use blank space above to add crop not listed.

**Table 4. Calculations for rate based on nitrogen (always required)**

|           |  |                      |  |  |  |
|-----------|--|----------------------|--|--|--|
| <b>1</b>  | <b>Applying Manure For<sup>p</sup> (crop to be grown)</b>                  |                      |  |  |  |
| <b>2</b>  | <b>Optimum Crop Yield<sup>g</sup></b>                                      | bu or ton/acre       |  |  |  |
| <b>3</b>  | <b>P<sub>2</sub>O<sub>5</sub> removed with crop by harvest<sup>q</sup></b> | lb/acre              |  |  |  |
| <b>4</b>  | <b>Crop N utilization<sup>f</sup></b>                                      | lb/acre              |  |  |  |
| <b>5a</b> | <b>Legume N credit<sup>s</sup></b>   | lb/acre              |  |  |  |
| <b>5b</b> | <b>Commercial N planned<sup>t</sup></b>                                    | lb/acre              |  |  |  |
| <b>5c</b> | <b>Manure N carryover credit<sup>u</sup></b>                               | lb/acre              |  |  |  |
| <b>6</b>  | <b>Remaining crop N need<sup>v</sup></b>                                   | lb/acre              |  |  |  |
| <b>7</b>  | <b>Manure rate to supply remaining N<sup>w</sup></b>                       | gal/acre or ton/acre |  |  |  |
| <b>8</b>  | <b>P<sub>2</sub>O<sub>5</sub> applied with N-based rate<sup>x</sup></b>    | lb/acre              |  |  |  |

**Table 5. Calculations for rate based on phosphorus (required if P-based rates are planned)**

|           |  |                      |  |  |  |
|-----------|--|----------------------|--|--|--|
| <b>9</b>  | <b>Commercial P<sub>2</sub>O<sub>5</sub> planned<sup>y</sup></b> | lb/acre              |  |  |  |
| <b>10</b> | <b>Manure rate to supply P removal<sup>z</sup></b>               | gal/acre or ton/acre |  |  |  |
| <b>11</b> | <b>Manure rate for P based plan<sup>aa</sup></b>                 | gal/acre or ton/acre |  |  |  |
| <b>12</b> | <b>Manure N applied with P-based plan<sup>bb</sup></b>           | lb/acre              |  |  |  |

**Table 6. Application rates that will be carried over to page 3.**

|           |   |                      |  |  |  |
|-----------|---|----------------------|--|--|--|
| <b>13</b> | <b>Planned Manure Application Rate<sup>cc</sup></b> | gal/acre or ton/acre |  |  |  |
|-----------|---|----------------------|--|--|--|

When applicable, manure application rates must be based on the P index value as follows:

(0-2) N-based manure management.

(>2-5) N-based manure management but P application rate cannot exceed two times the P removal rate of the crop schedule.

(>5-15) No manure application until practices are adopted to reduce P index to 5 or below.

(>15) No manure application.

### Year by Year Nutrient Management Plan Summary

**Instructions:** Complete this form for each of the next five growing seasons, to demonstrate sufficient land base to apply manure over multiple crop years. If this page is identical for multiple years (e.g. every other year), submit only once for the identical years, and indicate which years the form represents. Endnotes are given on pages 11-14.

Crop Year(s): \_\_\_\_\_

| 1<br>Field<br>Designation <sup>dd</sup>             | 2<br>Field Location<br>____ ¼ of the ____ 1/4 Sec ____ T ____ R ____<br>Township Name _____<br>County Name _____ | 3<br>Mgt<br>ID <sup>ee</sup> | 4<br>Planned<br>Crop | 5<br>Acres<br>receiving<br>manure <sup>ff</sup> | 6<br>Own, rent, or<br>agreement (include<br>length of<br>agreement) <sup>gg</sup> | 7<br>P Index<br>Value <sup>hh</sup> | Planned Application <sup>ii</sup> |                          | 10<br>Correct<br>Soil Test<br>for P <sup>jj</sup> |
|---|--|------------------------------|----------------------|---|---|-------------------------------------|-----------------------------------|--------------------------|---|
|   |  |                              |                      |   |   |                                     | 8<br>Gal or<br>ton/acre           | 9<br>Gal or<br>ton/field |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
|   |  |                              |                      |   |   |                                     |                                   |                          |   |
| <b>Total acres available for manure application</b> |  |                              |                      |   | <b>Total Gallons that could be applied</b>  |                                     |                                   |                          |   |
| <b>Total Tons that could be applied</b>             |  |                              |                      |   | <b>Total Tons that could be applied</b>   |                                     |                                   |                          |   |

## Animal Mortalities

### NPDES requirement:

- Ensure proper management of mortalities (i.e., dead animals) to ensure that they are not disposed of in a liquid manure, storm water, or process wastewater storage or treatment system not specifically designed to treat animal mortalities. [[40 CFR 122.42\(e\)\(1\)\(II\)](#)]

### ELG Requirement:

- Mortalities must not be disposed of in any liquid manure or process wastewater system, and must be handled in such a way as to prevent the discharge of pollutants to surface water, unless alternative technologies pursuant to § [412.31\(a\)\(2\)](#) and approved by the Director are designed to handle mortalities. [[40 CFR 412.37\(a\)\(4\)](#)]

### A. Method of Animal Mortality Handling

Composting

Rendering

Burial

Other: \_\_\_\_\_

### B. Method of Mortality Storage Prior to Final Disposal

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### C. Recordkeeping – Animal Mortalities

The following records must be maintained on site at the permitted facility for at least five years from the date they are created. It is recommended that these records be kept with the NMP.

- Documentation of mortality handling practices.

## Clean Water Diversion

### NPDES Requirements:

- Ensure that clean water is diverted, as appropriate, from the production area. [[40 CFR 122.42\(e\)\(1\)\(iii\)](#)]
- There must be routine visual inspections of the CAFO production area. At a minimum, the following must be visually inspected:
  - Weekly inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater and manure storage structure; [[40 CFR 412.37\(a\)\(1\)\(i\)](#)]

### A. Diversion of Clean Water From the Production Area

Is clean water diverted from the production area?  Yes  No

a. If Yes, describe the clean water diversion system:

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b. If No, please ensure that the attached calculations for determining total storage capacity (question II.B.3) account for all runoff, including clean water that has not been diverted from the production area.

### B. Recordkeeping – Diversion of Clean Water

The following records must be maintained on site at the permitted facility for at least five years from the date they are created. It is recommended that these records be kept with the NMP.

- Records of weekly visual inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater and manure storage structure.

## Prevention of Direct Contact with Waters of the United States

### NPDES Requirement:

- Prevent direct contact of confined animals with waters of the United States. [[40 CFR 122.42\(e\)\(1\)\(iv\)](#)]

### A. Prevention of Direct Contact

Do the animals have access to waters of the United States within the production area?  Yes  No

### B. Measures to Prevent Direct Contact

List the measures used to prevent direct contact (e.g. fencing) of animals with waters of the United States within the production area:

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## Chemical Handling

### NPDES requirement:

- 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 and other contaminants. [[40 CFR 122.42\(e\)\(1\)\(v\)](#)]

### A. Measures for Chemical Handling

Check the appropriate boxes below to indicate the measures taken to prevent pesticides, commercial fertilizers, hazardous and toxic chemicals, and petroleum by-products from contaminating process wastewater or storm water storage and treatment systems:

1. Chemicals are stored in proper containers. Please describe:
2. Chemicals are properly disposed of that have expired or will not be used. Please describe:
3. Chemical containers are properly disposed. Please describe:
4. Chemical storage areas are self-contained (no drains or other pathways for spilled chemicals to exit the storage area). Please describe:
5. Chemical storage areas are covered to prevent contact with rain and snow. Please describe:
6. Emergency procedures and equipment are in place to contain and clean up chemical spills. Please describe:

7. Chemical handling and equipment wash areas are designed and constructed to prevent contamination of surface waters and wastewater and storm water storage and treatment systems. Please describe:

8. Chemicals are handled according to the label. Please describe:

### **B. Recordkeeping – Chemical Handling**

The following records must be maintained on site at the permitted facility for at least five years from the date they are created. It is recommended that these records be kept with the NMP.

- Records of inspections and maintenance activities conducted to ensure that chemical and other contaminants do not enter any manure, litter, process wastewater, or storm water storage or treatment system not specifically designed to treat such chemicals **and other contaminants**.

### **Manure and Effluent Storage**

#### **NPDES requirement:**

- Ensure adequate storage of manure, litter, and process wastewater, including procedures to ensure proper operation and maintenance of the facilities. [[40 CFR 122.42\(e\)\(1\)\(i\)](#)]

#### **ELG requirements:**

- The production area [must be] designed, constructed, operated and maintained to contain all manure, litter, and process wastewater including the runoff and the direct precipitation from a 25-year, 24-hour rainfall event. [[40 CFR 412.31\(a\)\(1\)\(i\)](#)] OR the facility has requested and the DNR Director has approved Voluntary Alternative Performance Standards in accordance with [40 CFR 412.31\(a\)\(2\)](#).
- There must be routine visual inspections of the CAFO production area. At a minimum, the following must be visually inspected:
  - Weekly inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater and manure storage structure;
  - Daily inspection of water lines, including drinking water or cooling water lines;
  - Weekly inspections of the manure, litter, and process wastewater impoundments; the inspection will note the level in liquid impoundments as indicated by the depth marker in paragraph (a)(2) of this section. [[40 CFR 412.37\(a\)\(1\)](#)]
- All open surface liquid impoundments must have a depth marker which clearly indicates the minimum capacity necessary to contain the runoff and direct precipitation of the 25-year, 24-hour rainfall event. [[40 CFR 412.37\(a\)\(2\)](#)]

### **A. Storage Structure Operation and Maintenance**

Describe procedures to operate and maintain storage structures to hold all wastes accumulated during the storage period, the direct precipitation and runoff from a 25-year, 24-hour storm, including visual inspections, as appropriate. Attach additional sheets if needed.



## B. Recordkeeping- Storage

The following records must be maintained on site at the permitted facility for at least five years from the date they are created. It is recommended that these records be kept with the NMP.

1. Records of weekly visual inspections of all storm water diversion devices, runoff diversion structures, and devices channeling contaminated storm water to the wastewater and manure storage structure.
2. Records of daily inspections of water lines, including drinking water or cooling water lines;
3. Records of weekly inspections of the manure, litter, and process wastewater impoundments
4. Weekly records of depth of manure and wastewater in all liquid impoundments as indicated by the depth marker.
5. Design documentation for all manure, litter, and wastewater storage structures.
6. Documentation of all overflows from manure

## Inspection of Land Application Equipment

### ELG Requirement:

- Inspect land application equipment for leaks. The operator must periodically inspect equipment used for land application of manure, litter, and other process wastewater. [\[40 CFR 412.4\(c\)\(4\)\]](#)

### A. Equipment Inspection Procedures.

Describe procedures to periodically inspect land application equipment for leaks, including the frequency and timing of inspections:

## B. Recordkeeping- Equipment Inspection.

The following records must be maintained on site at the permitted facility for at least five years from the date they are created. It is recommended that these records be kept with the NMP.

- Records of periodic land application equipment inspections, including date and description of each inspection.

## Nutrient Management Plan Endnotes

<sup>a</sup> For example: Mature dairy cattle, whether milked or dry are one type. Veal calves are another type. All other cattle, including finisher beef cattle, dairy heifers, feeder calves, etc... are a third type of cattle and should be added together.

<sup>b</sup> Settled solids, scraped solids, feedlot effluent, animal truck wash water, etc....

<sup>c</sup> From Iowa State University Extension Publication Pm 1003 Using Manure Nutrients for Crop Production, or other sources- identify source in space provided below Table 1 on page 1. If no lab analysis is available for animal truck wash facility, assume 2 lbs. N/1000 gallon and 1lb. P<sub>2</sub>O<sub>5</sub>/1000 gallon.

<sup>d</sup> If actual volumes or weights are used, DNR may require submittal of supporting data. If actual manure N and P<sub>2</sub>O<sub>5</sub> concentrations are used in the plan, measured volume or weight must also be used. If no water usage records are available for animal truck wash facility, assume 600 gallons/truck.

<sup>e</sup> Column 7 = Column 3 \* Column 6. If using gal/space/day in Column 6, you must convert units to gal/space/year by multiplying by 365.

<sup>f</sup> Use the management ID to identify each unique combination of the following factors (crop rotation, optimum crop yields, manure nutrient concentration, remaining crop N need, method of application) that occur. The idea behind the management ID is to

group fields with identical management on the same page 2, to avoid the redundancy of doing the exact same calculations for multiple fields.

For example, if 8 fields in the plan are in a corn/bean rotation with yields of 160 and 50 bu/acre and all will receive injected manure with the same nutrient concentration and availability, then page two would only need to be filled out once for the 8 fields and the management ID (e.g. "A") would represent all 8 fields. The same management ID could be used to describe these fields even if they were in different phases of the crop rotation (i.e. some are in corn and some in beans each year).

<sup>e</sup> Yields can be used from any of the following:

- USDA Iowa Ag statistics county yield averages
- Multi-peril insurance proven yields
- USDA Farm Service Agency proven yields
- Individual farm proven yields
- Soil survey interpretation records

Documentation of the information used to determine optimum yields must be kept with the plan (DNR may require submittal of yield documentation). Documentation may include copies of historical farm yield records, soil survey maps and average yields for the soils found, FSA yield data, etc... If Iowa Ag Statistics county average yields, Appendix A8, are used, documentation is not required to determine optimum yields for corn and soybean crops. The optimum yield for each crop may be set equal to either the average of the last 5-year county yields plus 10 percent or the average of the highest 4 out of the last 5-year county average. If crops other than corn or soybeans are grown, Iowa Ag Statistics yield data for those crops will need to be obtained and optimum yield levels calculated (both the yield data and the calculations should be kept with the plan). If proven yield methods are used to determine optimum yields, the Appendix B2 Worksheet should be used to calculate the optimum yields.

<sup>h</sup> Use list of application methods and application loss factors provided in Appendix A7. If methods other than those listed in Appendix A7 are used, identify the methods and the nitrogen loss factors for those methods.

<sup>i</sup> Center pivot irrigation, traveling guns, low-pressure drop nozzle systems, etc...

<sup>j</sup> From standard tables (Appendix A1), your own samples, or other sources.

<sup>k</sup> A nutrient management plan may be developed based on the assumption that less than 100 percent of the nitrogen remaining in the manure after deducting application losses will be available for plant use in the first crop year after manure application. See Iowa State University Extension Publication PMR 1003 Using Manure Nutrients for Crop Production for suggested availability values.

<sup>l</sup> 1<sup>st</sup> year available N = Total N x Application loss factor x Percentage of TN available in the first year (e.g. for 95% N available in first year multiply by 0.95).

<sup>m</sup> 2<sup>nd</sup> year available N = Total N x Application loss factor x Percentage of TN available in the second year.

<sup>n</sup> 3<sup>rd</sup> year available N = Total N x Application loss factor x Percentage of TN available in the third year.

<sup>o</sup> Appendices A5 and A6 list crop nitrogen and phosphorus requirements for various crops. These values, or crop use requirements from other credible sources, may be used to determine the crop nitrogen needs and phosphorus removal rates for the crops included in the crop schedule for the fields. For non-legume crops such as corn or grasses, the crop N need value represents the amount of nitrogen required to produce the optimum yield for that crop, and is determined by multiplying the crop nitrogen requirement (in lb/bu or lb/ton of yield) times the optimum crop yield. For legume crops such as soybeans or alfalfa, the crop utilization value represents the amount of nitrogen these legumes will utilize from the soil in producing the optimum crop yield, provided nitrogen is available at these levels in the soil. Again, this amount is determined by multiplying the crop utilization rate (in lb/bu or lb/ton of yield) times the optimum crop yield.

<sup>p</sup> As a minimum, Table 4 should indicate the full crop rotation for the management ID (i.e., for a corn, corn, soybean rotation, Table 4 should cover a minimum of three crop years).

<sup>q</sup>  $P_2O_5$  removed with crop by harvest =  $P_2O_5$  crop usage rate (Table 3) x Optimum crop yield (row 2)

<sup>r</sup> Crop N utilization = N crop usage rate (Table 3) x Optimum crop yield (row 2)

<sup>s</sup> Credit for nitrogen carryover from prior year legume crops should be determined as follows:

- last year's soybean crop: 1 lb nitrogen per bushel of yield, maximum of 50 lb nitrogen per acre credit
- legume forage crop:
  - last year's crop with 50 to 100% alfalfa or other legume in stand: 100 to 140 lb nitrogen per acre
  - last year's crop with 20 to 50% alfalfa or other legume in legume/grass mixture: 50 to 80 lb nitrogen per acre
  - two years ago crop with 50 to 100% alfalfa or other legume in stand: 30 lb nitrogen per acre
- last year's legume green manure crop: 100 lb nitrogen per acre

<sup>t</sup> Amount of N applied with commercial fertilizer (e.g. starter, with herbicide carrier, etc...).

<sup>u</sup> Manure N carryover credit represents the amount of nitrogen available for crop use due to manure applications made in prior crop years. The carryover N credit is determined by:

1. multiplying the amount of manure (in 1000 gal/acre or ton/acre) applied to the field in the previous crop by the 2<sup>nd</sup> Year Available N concentration for the applicable manure storage source and method of application;

2. multiplying the amount of manure (in 1000 gal/acre or ton/acre) applied to the field two crop years ago by the 3<sup>rd</sup> Year Available N concentration for the applicable manure storage source and method of application; adding the resulting N carryover credit values together.

<sup>v</sup> Remaining crop N need = Crop N utilization (row 4) minus (–) Legume N credit (row 5a) – Commercial N planned (row 5b) – Manure N carryover credit (row 5c)

<sup>w</sup> Manure rate to supply remaining N = Remaining crop N need (row 6) divided by (/) 1<sup>st</sup> year available N (Table 2) (x 1000 for liquid manure)

<sup>x</sup> P<sub>2</sub>O<sub>5</sub> applied with N-based rate = Manure rate to supply remaining N need (row 7) x P<sub>2</sub>O<sub>5</sub> concentration (Table 2) (Divide by 1000 for liquid manure)

<sup>y</sup> Amount of P<sub>2</sub>O<sub>5</sub> applied with commercial fertilizers.

<sup>z</sup> Manure rate to supply P removal = (P<sub>2</sub>O<sub>5</sub> removed with crop by harvest (row 3) – Commercial P<sub>2</sub>O<sub>5</sub> planned (row 9))/ Manure P<sub>2</sub>O<sub>5</sub> content (Table 2) (x 1000 for liquid manure).

<sup>aa</sup> Manure rates for a P based plan can apply up to the amount of P<sub>2</sub>O<sub>5</sub> removed with harvest by the next 4 anticipated crops in a single application if the application rate doesn't exceed the N-based rate (row 7) and no additional P is applied for the period covered by the application. For example, in a corn/soybean rotation if the "manure rate to supply P removal" (row 10) was 4 ton/acre for the corn crop and 3 ton/acre for the bean crop, then 7 ton/acre could be applied in a single application if the nitrogen rate was not exceeded. Phosphorus in addition to crop removal may be applied if soil tests are very low or low in phosphorus and additional phosphorus is recommended by Pm-1688 "General Guide to Crop Nutrient and Limestone Recommendations in Iowa."

<sup>bb</sup> Manure N applied with P-based plan = Manure rate for P based plan (row 11) x 1<sup>st</sup> year available N (Table 2) (divided by 1000 for liquid manure)

<sup>cc</sup> Manure application rate that is planned. Use these values for page 3 of the form.

<sup>dd</sup> Field designation may be by Farm Services Agency (FSA) field number, landowner's name, or other suitable designation. A plat map showing the animal feeding operation and all application fields should be kept in the plan. In addition, aerial photos (e.g. FSA section photos) of the fields receiving manure should be in the plan with the boundaries of the individual application fields marked. Also marked on aerial photos should be areas of the fields that are unavailable or unsuitable for manure application, and areas where specific restrictions on manure application apply. DNR may require submittal of plat maps and aerial photos. Areas with specific restrictions on manure application include:

- within 200 feet of a designated area: A designated area means a known sinkhole, or a cistern, abandoned well, unplugged agricultural drainage well, agricultural drainage well surface tile inlet, drinking water well, lake, or a farm pond or a privately owned lake as defined in Iowa Code Section 462A.2. A designated area does not include a terrace tile inlet or surface tile inlet other than an agricultural drainage well surface tile inlet. Iowa law requires manure from an animal feeding operation be injected or incorporated within the same day of application if applied within 200 feet of a designated area. However, this restriction does not apply if a 50-foot buffer of permanent vegetation surrounds the designated area and no manure is applied within the 50-foot buffer.
- Setback requirements for an animal feeding operation that is required to have an NPDES permit. As provided in 40 CFR 412.4(c)(5), "Unless the CAFO exercises one of the compliance alternatives provided for in paragraph (c)(5)(i) or (c)(5)(ii) of this section, manure, litter, and process wastewater may not be applied closer than 100 feet to any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface waters.
  - i. Vegetated buffer compliance alternative. As a compliance alternative, the CAFO may substitute the 100-foot setback with a 35-foot wide vegetated buffer where applications of manure, litter, or process wastewater are prohibited.
  - ii. Alternative practices compliance alternative. As a compliance alternative, the CAFO may demonstrate that a setback 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."
- areas where liquid manure is applied through spray irrigation systems: see endnote "i" for page 2.

<sup>ee</sup> Identify how the field will be managed using management IDs from page 2.

<sup>ff</sup> The number of acres of the field that will receive manure. Acres not available for manure application include areas where topography, soils, or other factors make manure application impossible; areas where manure will not be applied; areas where application is prohibited under a manure disposal agreement; and areas where Iowa law or DNR rules prohibit manure application. It may also include areas where Iowa law or DNR rules restrict manure application to methods different than those being used by the operation.

<sup>gg</sup> A copy of all written manure application agreements for all fields identified in the plan that are not owned or rented for crop production purposes by the owner of the animal feeding operation must be kept with the plan (agreements must be signed by the landowner or renter). DNR requires submittal of manure application agreements. If manure is applied based on an agreement, also indicate in column 6 the length of the agreement (e.g. annual, 3-yr, 10-yr).

- <sup>hh</sup> Submit an NRCS P index detailed report containing a P index for each field in the NMP. Additionally, when the P index is required, the plan must include a document (e.g. NRCS RUSLE2 profile erosion calculation record) indicating the inputs and results of RUSLE2 for each field in the plan (These documents must be submitted to the DNR).
- <sup>ii</sup> Gallons or tons per acre from Page 2. Gallons or tons per field = gallons or tons per acre (column 8) x acres receiving manure (column 5).
- <sup>jj</sup> Soil sampling must meet minimum requirements. Refer to Rule 65.209 in the Iowa Administrative Code for minimum soil sampling requirements.