Pennsylvania
Nutrient Management Act Program

Technical Manual
Addendum
(September 2006)

The purpose of this addendum to the 2003 Nutrient Management Act Program Technical Manual is to provide guidance on emerging technical issues made relevant by the 2006 revisions to the Nutrient Management Act Program regulations and the newly developed standardized nutrient management plan.

A complete, formal revision to the technical manual is under development and will be distributed upon its completion, expected in early 2007.

Please contact state program staff if further clarification is needed on the new program issues made relevant by the revised regulations and the standard plan.

Cover Page

Date of Plan Approval:
The date of plan or plan amendment approval will need to be left blank on plan (including plan amendment) submissions provided by the operator. The reviewing agency will fill in this portion of the cover page once the plan is approved. This will provide an easy reference to those involved in the program, of when the plan or plan amendment was approved and therefore when the implementation elements of the plan become relevant.

Plan amendments submitted due to significant changes in the operation (as outlined in the revised regulations), will be submitted with this line item blank, to be completed at the time of approval of the plan amendment. A plan amendment will use this same cover page as an original plan submission except this line would read "Date of plan amendment approval" instead of "Date of plan approval".

Along with the plan approval letter sent to the operator, the reviewing agency will provide a copy of this completed cover page (with the date of plan approval filled in) to both the operator and the planner for their files.

Date(s) of Plan Updates (not requiring board action):
Any plan updates submitted for inclusion with the operator's nutrient management plan will need to include a copy of the original cover page to ensure that the update is filed with the appropriate plan. The "Date(s) of Plan Updates (not requiring board action)" will need to be completed on the submitted cover page. This cover page will also have the "Date of Plan Approval" completed based on the cover page as provided to the operator and planner when the plan was formally approved.

The revised regulations outline the extent of operational revisions requiring an approval of a plan amendment. Other operational changes, such as changing the crops and application rates for a new cropping year, would be submitted as plan updates, not requiring formal plan approval.

Table of Contents:
The back of the cover page will include a table of contents that will provide the page numbers for the various plan elements. This plan element does not need to be provided back to the planner and reviewer once the plan is approved and the "Date of Plan Approval" is completed by the conservation district.

Nutrient Management Plan Agreement & Responsibilities

Indication of what programs this plan has been developed to support:
The planner will need to identify those programs for which the nutrient management plan is being developed. There may likely be more than one program that the plan is being developed to address and therefore more than one block checked. This issue is relevant because it establishes

what criteria the plan needs to be developed to address, and who the plan review may need to be coordinated with.

Verification of Existing Site Specific Emergency Response Plan:
The planner will need to check this box for farms where there is an existing Emergency Response Plan developed for the operation. The program has provided a format for these Emergency Response Plans which, when completed, will meet the regulatory requirement to develop an Emergency Response Plan. A farm must have an Emergency Response Plan on site, meeting the criteria of the regulations (as established in the standard Emergency Response Plan format provided), in order to get their nutrient management plan approved.

Verification that renters of land are aware of the nutrient management plan and that they have not expressed concerns relating to the plan:
The planner will need to verify that all owners of rented ground have been made aware that manure from the operation will be applied to their owned land, that a nutrient management plan has been developed outlining manure applications on their farm, and that these owners have not expressed any concerns about this application of manure.

When these owners are contacted by the planner or operator concerning manure application on their land, they shall be told they can see the proposed plan. The land owners do not have to view the plan; they just need to be told they can see it, and provided an opportunity to express their concerns to the operator or the district.

The owner of the rented land does not need to sign the nutrient management plan. This verification is merely to ensure that the owners have been contacted, they have been offered access to the plan, and that they have not expressed a concern with the manure applications to their land.

Operator's Title:
For operations that are corporations, partnerships, estates this line must be completed to determine the position of the individual signing the plan. For corporations, there will also need to be documentation provided to the reviewing agency indicating that the corporation has agreed that the signing individual has authority to sign for the corporation.

Nutrient Management Plan

This portion of the Standard Plan is being labeled as the "Nutrient Management Plan" to stress the point that the operator should be able to rely on this section alone (along with the plan maps) to carry out the plan. The remaining sections of the Standard Plan document the information that went into the development of this section of the plan.

Crop year:
The Nutrient Management Plan needs to be developed for a given crop year. If more than one crop year is to be addressed in a given plan submission, different charts need to be provided for each crop year to be addressed in the plan submission.

CMU/Field ID:
The Nutrient Management Plan is to be written to address specific crop management units or fields on the farm. A crop management unit is defined in the regulations as: *"The portion of cropland, hayland and pasture, including a field, a portion of a field, or group of fields, on an agricultural operation that has a unique management history (same rotation and manure history), similar production capability, and that will be managed uniformly as a distinct unit."*

A simple way to determine if you have this correct is, can the farmer read this element of the plan and understand what is to be applied to any given field on that operation, for the given crop, and for the given crop year.

Nutrient Balance:
Please note that the nutrient balance now includes N, P2O5, and K2O. As the footnote states, positive numbers in these columns indicates a shortage of those nutrients; a negative number indicates an excess of the given nutrient.

Please note, if this is a large positive number, the planner will need to be able to defend how the farmer is expected to get the given yield with the significant deficiency in nutrients.

Notes:
Please list here any issues of interest relating to this field, such as making the farmer aware of any fields that will need to address a setback.

Winter Manure Spreading Procedures:
Please be aware that the plan must provide the specific details relating to the application of manure in the winter (applicable fields, field conditions, manure type, application procedures, etc as outlined in the standard plan format). The plan must be farm specific and cannot rely on providing general winter application criteria such as provided in the Manure Management Manual.

Winter is defined as any date between December 15 – February 28; or any day when the field is frozen more than 4 inches, or any day when the field has snow on it. Also remember that winter applied fields must have at least 25% cover, either from crop residue or a cover crop.

In-Field Manure Stacking Procedures:
This portion of the Nutrient Management Plan will need to list the fields where field stacking will take place and the practices that the farmer will follow to ensure that the stacking is done according to the provisions in the revised regulations. This would include a description of the proper shaping of the stacks, the rotation requirement for stacks and the proper location (setbacks and slope limitations).

Additional CAFO Requirements:
This is the area where any additional CAFO requirements would be listed. These would include issues such as additional setback requirements (including conduits to surface waters) and

additional field stacking requirements (such as a 14 day limit on uncovered manure stockpiles on CAFO sites).

Proposed Manure Storage Description:
The standard plan now contains an area to document the details pertaining to any proposed manure storage system. As before, the plan does not need to contain detailed engineering drawings, but it will need to contain a description of the type, dimensions, volume and freeboard for the proposed facility. This information will assist in documenting the rainwater additions credited to proposed outside manure storage facilities, as well as the expected volume of the proposed facility in order to support the manure application timings called for in the plan.

Description of Planned Alternative Manure Technology Practices:
For those operations that are proposing to implement manure treatment practices to address nutrient management concerns on the operation, this portion of the plan is where the planner would describe those alternative technologies, how much manure will be processed with this technology, and what the result is expected to be.

For example, for operations proposing to implement manure separation technologies in order to assist the farmer in addressing phosphorus issues, this portion of the plan would describe the type of separation system planned, what portion and volume of manure will be run through the unit, what manure types will result from the unit (such as 100 tons of solids and 500,000 gallons of low solids liquids), and the expected nutrient content of the treated manure types (such as the solid manure with a nutrient content of 25-40-40 lbs/ton and the liquid portion of the manure coming in at 10-4-25 lbs/1,000 gallons.

Appendix 1 - Operation Information

A Brief Description of the Operation Including:
Animal types and numbers included on the operation
Acreage of cropland, hayland and pastureland
The crop rotation planned to be used on the operation

Names and Addresses of Owners of Rented or Leased Land:
Rented or leased lands, under the management control of the operator of the facility, that are used for the application, treatment or storage of manure generated at the facility shall be included in the plan. *The plan must include the names and addresses of owners of the rented and leased lands*

Manure Storages & Capacity:
Type of storage description, dimensions, useable capacity (minus required freeboard and 25 year 24 hour storm event), description of top or bottom loading, dimensions and description of contributing run-off area, description of wastewater additions, and types and amount of bedding.

Manure Application Equipment Capacity & Practical Application Rates:
Application rates and procedures in the plan must be consistent with the capacity and calibration range of available application equipment. Existing operations must include information indicating that the equipment can meet the proposed application rates. Proposed operations shall calibrate the spreading equipment prior to the first application of manure. Supporting documentation shall be maintained on the operation.

Appendix 2 - Operation Maps

Maps and Aerial Photographs:
The plan must include a topographic map drawn to scale identifying the lands included in the agricultural operation NMP. The maps are to include the owned, rented and leased lands of the operation and must include maps or aerial photographs of sufficient scale which clearly identify:

1. The location and boundaries of the agricultural operation.
2. Individual field boundaries under the plan.
3. Field number and acreage of each field.
4. The identification of all soil types and slopes on the agricultural operation. An NRCS survey map with the soil identification legend will be sufficient to satisfy this requirement. These soil survey maps may be available at the county NRCS office or Conservation District office.
5. The location of areas where manure application is restricted, as listed below:

    a. Year round 100 ft. setback from streams, lakes, ponds, and open sinkholes unless there is at least a 35 ft. permanent vegetated buffer next to the stream etc., in which case manure may not be applied within 35 ft of the stream, lake, pond or sinkhole.

    b. Year round 100 ft. setback from active drinking water source (wells, springs).

    c. Additional “winter” setbacks are 100 ft. from wetlands delineated on the National Wetlands Inventory Map adjacent to EV streams; or 100 ft. from intakes to agricultural drainage systems.

6. The location of proposed or existing structural BMPs including manure storage facilities on the operation.
7. The location of proposed or existing emergency manure stacking areas, or in-field stacking locations.
8. The names of the roads adjacent to or within the agricultural operation.

Appendix 3 - Manure Generation Calculations

The program has developed a standardized form to record all manure generation factors. Both the plan writer and the plan reviewer will now be looking at the same information. Almost all the information in this table was necessary to write NMPs under the old Act-6 standards, however, not all was *required to be listed in* the plan. Now all the inputs necessary to calculate manure generation will need to be listed here in Appendix #3. Calculations for bedding used are to be shown in Appendix #11. The one exception to listing all the manure generation factors is when actual manure production records are available from the farm operator. In those instances, actual manure production records are thought to be more accurate for the individual farm operation, and need to be used in place of calculating the estimated amount of manure generated and collected. The following items are changes or additions to information that had been required under Act-6:

Manure Group Identification / and / Animal Group:
A manure group is a distinct portion of manure. It is handled and managed the same, most likely has its own unique nutrient content, and will have a distinct application window. The manure group may or may not be the same as an Animal Group, depending on how (where) the manure is stored and managed. The Manure Group is critical for determining manure allocations, and needs to be a grouping that matches the way the farm operator manages the manure. The NMP also needs to clearly show what Animal Groups make up each respective manure group.

Manure Group AEUs:
AEUs will now be listed for each manure group. If manure groups are broken down into periods of the year (such as spring and fall manure) the AEU number will need to be representative of the time period it represents.

Daily Manure Production / Total Bedding / Total Rainfall & Runoff / Total Washwater/ Total Manure Produced:
These inputs need not be calculated or listed if actual manure production records are available. Whenever possible, actual manure production records must be used. If no manure production records are available, manure volume needs to be calculated using the PSU Agronomy Guide manure production values. Estimated amounts of bedding and wash water need to be obtained from the farm operator. Rainfall (both directly on the manure storage, and that which is *directed to* the manure storage) needs to be listed and calculated on the Rainfall Additions Worksheet. This worksheet follows directly after the Manure Generation Calculations table, and is both county and site specific. If actual manure production records are available, they must be used in place of the rainfall table. However, even if actual numbers are used, storage(s) dimensions still need to be listed in the NMP.

***Days on Pasture / Hours per day on Pasture*:**
Both days on pasture, as well as hours per day on pasture are required to determine how much manure is being deposited on pasture by grazing animals. This is the part of the total manure volume produced that is not being collected.

Appendix 4 - Manure Analysis Results Summary

Regulations starting at 83.291 3 ii.
A manure analysis is now required for each manure group each year with the exception of uncollected manure and any animal groups of less than 5 AEUs.

Book values for manure may be used only for new operations since there will be no manure to analyze. However once manure production starts on the operation the manure must be analyzed and the NMP amended if needed.

Two or more manure groups may be consolidated if they are on the same operation, produced by the same animal type and managed in a similar manner.

The manure analysis must include these factors:

- Date of test
- Percent of solids
- Total nitrogen
- Ammonium nitrogen
- Total phosphate
- Total potash

Appendix 5 - Soil Test Results Summary

The program has developed a standardized table to record all soil tests taken for the farm operation. With the inclusion of the P-Index, and the need to address phosphorus as per the new Act-38 standards, soil tests have become a critical component to all Nutrient Management Plans. Soil samples are now required for each crop management unit. The P-Index requires the Mehlick-3 testing method for determining phosphorus levels, and those levels need to be reported in parts per million of phosphorus (ppm P). Soil samples are now needed to be taken every 3 years. The Farm Operator may choose to attach copies of their soil sample reports to their NMP in place of this table.

CMU / Field ID:
Traditionally NMPs had been written per crop groups. NMPs now need to be written according to specific fields, or crop management units. Individual fields (most likely strips) are permitted to be grouped as long as they are treated and managed alike, with like crops and nutrient inputs being the same for each field. This grouping would be referred to as the farm operator's crop management unit (CMU). The CMU (or individual field ID) needs to correspond to fields clearly shown on the NMPs maps. Any "unit" needs to make logical sense to the farm operator, and be easily recognized.

Lab:
The name of the reporting lab needs to be listed on the form.

Sample Date:
The date sampled needs to be recorded. Test results need to be within the last three years.

Soil Test Levels /OR/ Soil Test Report Levels:
The soil pH, P-levels (in ppm), and K-levels (in ppm) need to be recorded in this summary table. In most cases this information will come straight off of the soil sample report. If a lab is used that reports Phosphorus and Potassium in any form other than ppm, then the last two columns (soil Test Report Levels) need to be completed. Record a sample of your conversion calculation in Appendix #11 if this conversion was necessary.

Appendix 6 - Nutrient Application Calculations

Following are the key planning considerations and guidelines regarding nutrient application related to changes in the regulations and the use of the standard plan format.

Table I – Field Information and P Index Part A

- Note the crop year for the nutrient application calculations. The plan is for one year.
- Crop management unit is defined as "The portion of cropland, hayland and pasture, including a field, a portion of a field, or group of fields, on an agricultural operation that has a unique management history (same rotation and manure history), similar production capability, and that will be managed uniformly as a distinct unit."
- Crop management units or fields identification must be consistent with the operation maps and the P Index.
- Use this table to record Part A of the P Index for all CMUs. Appendix 7 need only include the CMUs requiring Part B.
- Use the current version of the "The Pennsylvania Phosphorus Index: Version 2, User Guide" for guidance on Pennsylvania P Index questions.
- "Planning Consideration Notes" is provided for the plan writer. There are nothing required to be provided in this column.

Table II – Determining Other Nutrient Contributions

- Soil test recommendations must be come from a current soil test.
- Use the "Soil Test Recommendations Handbook For Agronomic Crops" to develop recommendations for crops not listed on the soil test report or to adjust recommendations from labs whose recommendations are not consistent with Pennsylvania conditions (Spectrum Analytic, Inc.).
- Use the following residual manure N values:
  - Rarely received manure (< 2 out of 5 years) – 0 lbs.
  - Frequently received manure (2-3 out of 5 years) – 20 lbs.
  - Continuously received manure (4-5 out of 5 years) – 35 lbs.

Table III – Calculating N-Balanced Manure Rate

- Use this table to calculate N-balanced manure rates for all CMUs.

Table IV – Calculating P-Based Manure Rate for Fields Requiring Part B of the P Index

- Use this table to address phosphorus considerations only on CMUs requiring Part B of the P Index.
- Initially complete the first three columns.
- Select a desired planned rate based on the N-balanced manure rate and enter the manure P rate in the P Index. If the CMU P Index rating is Low or Medium, the rest of the table does not need to be completed for that CMU.
- If the P Index rating is High or Very High complete the remainder of the table to calculate a P removal rate or a P manure rate for PI <80.

Table V – Nutrients Applied in Manure and Balance

- Enter the final planned rate for each CMU and note the Planned Rate Basis N or P and the P Index Value if Part B is required.
- The P Index manure and fertilizer values must agree with the information in this Appendix.

Table VI – Supplemental Fertilizer

Appendix 7 - Phosphorus Index

Version 1 Revisions

Modification 1

Since initial publication of Phosphorus (P) Index Version 1, a water extractable P test for organic P sources has become commercially available and a Mid-Atlantic P source coefficient (PSC) book value table has been developed. Additionally, the current terminology P source availability coefficient or P source availability has been replaced with P source coefficient or PSC. The current PSC book value table or Table 1 in the P Index Version 1 factsheet has been replaced with the Mid-Atlantic book value table (shown below). Any organic P source not listed in the revised table must be analyzed or use a default PSC value of 1.0. In addition to book values, the option exists to determine a PSC using the water extractable P analysis.

Mid-Atlantic Phosphorus source coefficients (PSC) book values[1]

Swine Manure	1.0
Broiler, Layer, Turkey, Duck, Dairy – Liquid, Dairy – Bedded Pack, Beef	0.8
Alum Treated Manure	0.5
BPR and BNR Biosolids	0.8
All Biosolids (except BPR and BNR)	0.4

Modification 2

Field staff and nutrient management specialists have raised concern about the use of index surface runoff class values as an indicator of runoff potential. Specifically in some counties, a disproportionate number of soils and soils located far from water are being designated as having a Very High runoff potential. Drainage class will replace index surface runoff class as an

indicator of runoff potential. The drainage class is listed on the currently used index surface runoff class tables found at http://panutrientmgmt.cas.psu.edu/rp_runnoff_tables.htm

Modification 3

Field staff and nutrient management specialists noted that in P Index Version 1, fields within 150 ft. of water with a qualifying buffer (50 ft. wide) received lower transport factors than fields up to 350 ft. away from water. Additionally ACRE and the CAFO program, introduced 35 ft. wide buffer requirements. The following modifications account for 35 ft. as well as 50 ft. wide buffers and correct the discrepancy in transport factor calculations.

1. The top three distance categories are redefined. The weighting factors are now 9, 6, 4, 2, and 0. The corresponding distances are now <100 ft., 100 to 199 ft., 200 to 349 ft., 350 to 500 ft. and > 500 ft.
2. Transport Factor calculation has been revised from Transport Sum/22 to Transport Sum/24.
3. The Modified Connectivity factor for Riparian buffer is revised from 0.70 to 0.85.
4. Guidance to account for both 35 ft. and 50 ft. wide buffers is as follows. Fields within 100 ft. of a receiving water body with a 35 ft. buffer receive a reduced Contributing Distance factor of 6. Fields within 100 ft. of a receiving water body with a 50 ft. buffer receive a reduced Contributing Distance factor of 6 and a Modified Connectivity factor of 0.85.

Modification 4

To clarify the use of Part A, the questions – 1. Is there a significant change in farm management as defined by the following Act 38? and 2. Is this farm in a special protection watershed? - must be answered as "Yes" or "No" before beginning a P Index evaluation. If the answer is "Yes" to either question, P Index Part B must be used. The following Act 38 criteria determine when a farm is undergoing a significant change in farm management:

- a net increase of greater than 10% in AEUs per acre
- a change in crop management that results in a farmwide reduction of greater than 20% in nitrogen necessary for realistic expected crop yields
- alternative organic sources will replace all or some of the nutrient sources listed in the plan
- additional lands are brought into the operation (purchased or rented)

Appendix 8 - Manure Management

Review Existing Practices:

In the preparation of the plan, the nutrient management specialist shall perform a site visit to conduct a review of the adequacy of existing manure management practices to prevent surface water or groundwater pollution from storm events up to and including a 25 year, 24 hour storm intensity. This review shall be documented in the plan.

As part of a plan certification under Section 83.261(8), the nutrient management specialist shall ensure that the review required was undertaken in the preparation of the plan.

The plan must address any existing inadequate manure management practices.

When *emergency* manure stacking areas may be the necessary, the plan must identify those areas available for the storage of the manure and managed using an appropriate BMP. **The operator shall notify the county conservation district at least 24 hours in advance.** Manure shall be removed from emergency stacking areas for utilization on cropland or other acceptable uses within 60 days unless extended by the Commission or a delegated conservation district.

The *in-field stacking* of dry manure is permissible for a NMP operation and any importing lands if the following requirements are met:

The manure shall be land applied within 120 days of stacking, or prior to the beginning of the next growing season.

The stacks shall be constructed using appropriate BMPs

If stacking occurs for a longer period than 120 days, the stacks shall either be covered to keep rainwater from entering the stacks or a waste stacking and handling pad shall be used. Other BMPs shall be approved by the Commission.

Appendix 9 - Stormwater Control

Stormwater Control Agricultural Erosion and Sedimentation Control Plans

Regulations starting at 83.321.

New operations as of October 1, 2006 must document the existence of a current Ag E&S plan prior to any NMP approval.

Existing operations before October 1, 2006 must document a current Ag E&S plan by October 1, 2009.

Ag E&S plans must include:

Plan maps which show field ID and identify surface waters as well as the direction of flow.

Soil maps showing soil delineations.

Specific crop rotations and sequences that have been calculated for soil loss to meet “T”.

A list of BMP descriptions along with an implementation schedule.

Appendix 10 - Importer/Broker Agreements & Nutrient Balance Sheets

Importer/Broker Agreements:
The program has developed standardized agreements for use in developing Act 38 nutrient management plans. These agreements are to be used for documenting the acceptance of an importer to receive manure from the exporting operation, as well as documenting in general, the overall nutrient need and availability of manure (including on-farm manure and other imported manures) on the importing operation.

Any other agreement format must be reviewed and approved by the State Conservation Commission before it will be accepted for use with Act 38 Nutrient Management Plans.

These agreements are to be attached to the submitted nutrient management plan for all importers or brokers that will be directly receiving manure from the planned operation. These agreements are not needed for situations where manure is marketed using an open market system, nor for importers who will be receiving less than 5 tons of poultry manure, 25 tons of non-poultry manure, or 10,000 gallons of liquid manure.

Nutrient Balance Sheets:
The program has developed standardized Nutrient Balance Sheets for use in documenting nutrient applications on importing sites.

Nutrient Balance Sheets are not expected to be field-by-field nor year specific, but more general in nature for the importing site combining fields whenever it is possible. Maps do not need to be drawn to scale or even use any particular base as the background. Maps only need to provide a location for the importing fields (by indicating nearby roads), field delineation, and setback areas in fields. These maps can be hand drawn. The test of whether or not a map is sufficient is, could a commercial manure applicator hired to apply manure on the importing site be able to find the specific field you told them to apply manure to based on the map, and would the map alert them to any setback issues associated with the given field. These maps need merely identify for the commercial applicator, where the specific fields are that they have been instructed to apply manure to, and if they need to be concerned about setbacks on the particular field.

Any other balance sheet format must be reviewed and approved by the State Conservation Commission before it will be accepted for use with Act 38 Nutrient Management Plans.

These Nutrient Balance Sheets are to be attached to the submitted nutrient management plan for all importers that will be directly receiving manure from the planned operation. These Balance Sheets are not needed for situations where manure is marketed using an open market system, nor for importers who will be receiving less than 5 tons of poultry manure, 25 tons of non-poultry manure, or 10,000 gallons of liquid manure.

Appendix 11 - Supporting Information & Documentation

Attach information and documentation necessary to support plan content not included elsewhere in the plan or appendices.

Examples include, but are not limited to:

- documentation of animal weights if Agronomy Facts 54 is not used,
- calculations for irrigation rates, Penn State Fact Sheets F254 through F257,
- calculations for manure residual N if using Table 1.2-15,
- manure storage volume calculations,
- bedding volume added to the storage, and
- sample soil test conversion equation when adjusting soil test result P2O5 results to Mehlich P ppm (same with K).

This is an important section to use to show your work that is not already shown in the plan. This will help speed up review of plan submissions.