

Nutrient Management Advisory Board Meeting – August 16, 2018

# **NUTRIENT BALANCE SHEET (NBS)**

# **MANURE PLAN BASIS ISSUES**

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Penn State **Extension**

# Act 38 Nutrient Balance Sheets

- Nutrient Balance Sheets (NBS) are developed for manure exported from CAOs (or CAFOs) for agricultural land application
  - To known agricultural operations
  - Through manure brokers
- NBSs for export to known agricultural operations for agricultural land application
  - Written by Act 38 Nutrient Management Specialists
  - Written for each importing operation receiving the exported manure
    - Exception: Importing operation has an Act 38 nutrient management plan
  - Included in the exporting operation's NMP
  - Provided to each importing operation

# Act 38 Nutrient Balance Sheets

- NBSs for export through manure brokers for agricultural land application
  - Brokers must be certified under Act 49
    - Assume ownership of the manure
    - Must ensure that NBSs are developed for each importing operation
      - Exception: Importing operation has an Act 38 nutrient management plan
  - Written by:
    - Act 49 Broker 2s
    - Act 38 Nutrient Management Specialists
  - Provided to:
    - Importing operation
    - County conservation district where manure produced
    - County conservation district where manure applied

# NBS Manure Plan Basis

Manure Plan Basis (check planning option)	OPTION 1 P Removal		OPTION 2 N Requirement		OPTION 3 P Index	
	<ul style="list-style-type: none"> <li>• P removal rates</li> <li>• 150' application setback from streams, lakes or ponds</li> <li>• No winter application</li> </ul>		<ul style="list-style-type: none"> <li>• N requirement rates</li> <li>• 150' application setback from streams, lakes or ponds</li> <li>• Soil test &lt; 200 ppm Mehlich 3 P</li> <li>• No winter application</li> </ul>		<ul style="list-style-type: none"> <li>• P Index evaluation of fields</li> <li>• P Index and Winter Matrix required for winter application</li> </ul>	
	Will P banking be used?		Soil Test Mehlich 3 P (ppm)			
	No					
	Yes, for _____ years.					
(Use the P <sub>2</sub> O <sub>5</sub> column to determine acceptable rate)		(Use the N column to determine acceptable rate)		(Use appropriate column based on the P Index to determine acceptable rate)		

- Importers select which of 3 options they will use to determine imported manure application rates
  - Based on either N Requirement or P Removal
- All rates may not exceed N requirements (NMPs and NBSs)
  - Based on Penn State Recommendations (soil test results and recommendations)
- Some fields may be required to base rates on P removal (NMPs and NBSs)
  - Based on P Index Evaluation (P Index Value Score)

# Two NBS Planning Basis Issues

Manure Plan Basis (check planning option)	OPTION 1 P Removal		OPTION 2 N Requirement		OPTION 3 P Index	
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(Use the P <sub>2</sub> O <sub>5</sub> column to determine acceptable rate)		(Use the N column to determine acceptable rate)		(Use appropriate column based on the P Index to determine acceptable rate)		

- Issue 1
  - Option 1: P Banking
- Issue 2
  - Option 3: P Index

# Manure Plan Basis

- Option 1 – P removal
  - Rates based on crop removal of phosphorus
  - Manure applied on all acreage except:
    - Within 150' setback from streams, lakes or ponds
  - Phosphorus banking up to 3 years permitted
  - No winter application
- Option 2 – N Requirement
  - Rates based on net nitrogen requirement
  - Manure applied on all acreage except:
    - Within 150' setback from streams, lakes or ponds
    - Fields with soil test levels of >200 ppm P
      - Must list soil test levels of Mehlich 3 ppm p
  - No winter application
- Option 3 – P Index
  - P Index evaluation of fields
  - P Index and Winter Matrix required for winter application

# Manure Plan Basis (Regs & Policy)

- Option 1 – P removal
  - Rates based on crop removal of phosphorus
  - Manure applied on all acreage except:
    - Within 150' setback from streams, lakes or ponds
  - Phosphorus banking up to 3 years permitted
  - No winter application
- Option 2 – N Requirement
  - Rates based on net nitrogen requirement
  - Manure applied on all acreage except:
    - Within 150' setback from streams, lakes or ponds
    - Fields with soil test levels of >200 ppm P
      - Must list soil test levels of Mehlich 3 ppm p
  - No winter application
- Option 3 – P Index
  - P Index evaluation of fields
  - P Index and Winter Matrix required for winter application

# P Banking: Why, What & When

- Act 38 regulations became effective October 1, 2006
- Option 1 – P Removal Issues
  - Majority of exported manure – swine and poultry
    - High P content
  - Extremely low P removal balanced rates
    - Mechanically impossible to apply
- Commission initiated a P Banking option
  - NM Tech Manual – November 2007
  - NBS 2.0 – October 2008

# P Banking: Specifics

NM Tech Manual – November 2007

For the **initial phase** of implementing the revised regulations (**until December 31, 2010**), importers will be permitted to use this option to implement a “phosphorus banking” scenario for their farm. This means an importer can apply up to 3 years of phosphorus removal for their various crop rotations, without having to run soil tests for the fields being addressed in this fashion.

This will only be allowed to the extent that:

- 1) the multiple year application does not exceed the one year nitrogen removal rate, and
- 2) no other phosphorus sources can be applied to that fields where this has been implemented, until the time frame of the phosphorus bank has elapsed, and
- 3) no field on the importing site can have manure applied to it a second time under this balance sheet until there are soil tests run for that field (**in other words, this is a one time allowance for the fields covered under this scenario**). **In NM Tech Manual – October 2009 the Commission removed item 3.**

# P Banking Proposal

- Eliminate the P Banking option as a sub-option in Manure Plan Basis – Option 1
- Discussion Points:
  - Misuse of P Banking
  - Tracking of Compliance
    - Are operations not applying any of form of P for 2 years (1 year)?
  - Equipment Improvements
    - Since 2006 there have been equipment improvements to achieve lower rates
  - Adequate time to obtain soil tests

# P Banking Recommendations

- Would the NMAB like to make any recommendation to the SCC?
- We can revisit this discussion in October
  - Will still allow time for the next edition of the Technical Manual

# Option 3 Issues

- Release of NBS 4.0 – October 2017 has generated multiple Option 3 planning issues
- Combination of multiple factors
  - Conflict between two different planning approaches
    - Options 1 & 2 are based on crop groups
      - Not linked to a specific crop year
    - Option 3 is based on field by field P Index evaluation
      - Crop year specific
  - Format changes in NBS 4.0 from prior versions
    - Begins planning process with crop groups rather fields
    - P Index is no longer a stand alone tool but linked to determination of rates
  - Revealed that Option 3 is being used more extensively than expected
  - Confirmed the reality that is difficult to teach “old dogs (planners)” new tricks (correct ways)

# NBS Planning Approach

- Current nutrient management planning addresses both nitrogen and phosphorus
  - P Index is used to address phosphorus
    - Site (or field) based
  - Current approach is “field by field”
    - Crop rotations require an annual update for each crop year
- Historic nutrient management planning addressed only nitrogen
  - Planning approached used “crop groups”
  - Not tied to a field or crop year

# NBS Planning Approach

- Options 1 and 2 can use the “crop group” approach
  - Include all the fields that will have that crop over the crop rotation
  - Not tied to a particular crop year
    - Will be valid for a period of crop years
    - Until there is a change in management
- Option 3 requires the P Index
  - The planning basis must be annual and “field by field”



**The crops and crop rotation for Broker's Delight Farm are:**

- **Fields 1 and 9 on the home farm are permanent grass hay. A 3-year corn grain/3-year alfalfa rotation is used on Fields 2-8.**
- **The fields on the rental farm alternate corn grain and soybeans.**

**Step 1: List Crops**

- Grass Hay
- Corn Grain
- Alfalfa
- Soybeans

**Step 2: Eliminate Crops**

- Grass Hay
- Corn Grain
- Alf~~al~~fa
- Soyb~~soy~~beans

**Step 3: Add Crops Following Legumes**

- Corn Grain After Alfalfa
- Corn Grain After Soybeans
- Corn Grain After Corn
- Grass Hay

# NBS 4.0 Format Changes

- P Index is no longer a stand alone page within the planning tool
  - Linked the development of application rates
  - Prior to NBS 4.0 planners could be “creative”
    - Complete Option 3 using a combination of crop groups and the P Index
    - Avoided having to do annual NBSs
    - Correctly or Incorrectly???
- Planners are now forced complete Option 3 on a field by field basis and linked to a crop year
- Source of issues
  - Planners
    - Resisting the requirement to complete Option 3 correctly
  - Microsoft Excel
    - Challenge of combining the two planning approaches within limits of the software
    - Creates legitimate confusion for planners

# Brought To Light

- Option 3 is being used much more extensively than previously expected
- Several reasons for this:
  - **Significant amount of imported manure is going on fields with P levels greater than 200 ppm**
  - NBS 4.0 added the requirement that Option 3 be used for winter application
  - Policy that prevents using Option 1 for fields with P levels greater than 200 ppm

# Option 3 - Possible Solutions

- Possible Approaches
  - Develop separate NBS planning tools
    - NBS – Options 1 & 2
    - NBS – Option 3
  - Develop separate Input & NBS Summary pages within the NBS planning tool
    - NBS Input – Options 1 & 2; NBS Summary Options 1 & 2
    - NBS Input – Option 3; NBS Summary Option 3
  - Eliminate Option 3 from the NBS planning tool
    - Require that importers needing to use Option 3 complete a VAO NMP

# Option 3 Proposal

- Eliminate Option 3 from the NBS planning tool
  - Require that importers needing to use Option 3 complete a VAO NMP
- Discussion Points:
  - Intent of Act 38 phosphorous management
  - Phosphorous issues on importing farms
    - Increasing soil test issues
  - Misuse of proper planning with the P Index NBS
  - Tracking of compliance with P Index NBS versus tracking compliance with VAO NMPs

# Option 3 (P Index) Recommendations

- Would the NMAB like to make any recommendation to the SCC?
- We can revisit this discussion in October
  - Will still allow time for the next edition of the Technical Manual

**QUESTIONS???**