

# Nutrient Balance Sheets

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**County of Origin**

Lancaster

## **Nutrient Balance Worksheet Appendices**

The following appendices need to accompany the Nutrient Balance Worksheets if applicable:

- Maps of fields where manure is to be applied including manure application setbacks.
- Completed P-Index spreadsheet (or other similar information summary) listing the source and transport factors and final Index result for each crop management unit (if applicable).

February 6, 2009

**Nutrient Balance Sheet Summary**

CMU/Field ID	Crop Group	Manure Group	Application Season	Application Management	Planned Manure Rate <sup>2</sup>	Starter/Other Fertilizer (lb/A)			Nutrient Balance @ Planned Rate (lb/A) <sup>1</sup>			See Notes
						N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub> <sup>2</sup>	K <sub>2</sub> O <sup>2</sup>	
2 - 8	Corn Grain after Alfalfa	Broiler Litter	Spring	Incorporation within 2-4 days	3 ton/A	15	30	30	2	-215	-163	See notes
2 - 8	Corn Grain after Corn	Broiler Litter	Spring	Incorporation within 2-4 days	4 ton/A	15	30	30	2	-277	-207	See notes
1, 9	Grass hay	Swine Liquid	Summer	Incorporation after 7 days or none	6000 gal/A	92	0		1	2		See notes
10, 11	Corn Grain after Soybeans	Broiler Litter	Spring	Incorporation within 2-4 days	3.5 ton/A	0	0	0	5	-216	-155	See notes

<sup>1</sup> Positive numbers = nutrient deficit;  
 Negative numbers = nutrient excess

<sup>2</sup> See NBS Summary Notes

February 6, 2009

**Nutrient Balance Sheet Summary Notes**

CMU/Field ID	Crop Group	Manure Group	Planned Manure Rate Notes	Nutrient Balance @ Planned Rate Notes	Other Notes
2 - 8	Corn Grain after Alfalfa	Broiler Litter	Planned rate can be applied annually	Nutrient balances for P2O5 and K2O are based Soil Test Recommendations.	Fields 4 – 8 have a 150' manure application setback from the stream. If manure will be stacked in the field, an area has been designated in field 3 for this stack. See the map for details. <i>The map is included with the Word/.pdf format example.</i>
2 - 8	Corn Grain after Corn	Broiler Litter	Planned rate can be applied annually	Nutrient balances for P2O5 and K2O are based Soil Test Recommendations.	Fields 4 – 8 have a 150' manure application setback from the stream. If manure will be stacked in the field, an area has been designated in field 3 for this stack. See the map for details. <i>The map is included with the Word/.pdf format example.</i>
1, 9	Grass hay	Swine Liquid	Apply planned rate once every 3 years	Nutrient balances for P2O5 and K2O are based on crop removal (Row A) and should not be used to determine additional fertilizer needs.	Nutrient balances for P2O5 and K2O are based on crop removal (Row A) and should not be used to determine additional fertilizer needs. The P banking option was used to develop the planned manure rate. No other phosphorus sources (manure and fertilizer) may be applied for the term of the multiple year rate (next 2 years). Field 9 has a 100' manure application setback from a well and 150' manure application setback along the stream. See the map for details. <i>The map is included with the Word/.pdf format example.</i>
10, 11	Corn Grain after Soybeans	Broiler Litter	Planned rate can be applied annually	Nutrient balances for P2O5 and K2O are based Soil Test Recommendations.	Field 11 has a 100' manure application setback from a sinkhole. If manure will be stacked in the field, an area has been designated in field 3 for this stack. See the map for details. <i>The map is included with the Word/.pdf format example.</i>

Nutrient Balance Worksheet February 6, 2009	2 - 8			2 - 8			1, 9		
CMU/Field ID(s)									
Manure Plan Basis	Option 2 - N Requirement			Option 2 - N Requirement			Option 1 - P Removal		
Option 1 - P Removal 1. Will P banking be used?	<input type="checkbox"/>			<input type="checkbox"/>			<input checked="" type="checkbox"/> Yes - P Banking 3 years		
Option 2 - N Requirement 1. Calculate P Balance? 2. Enter Soil test Value(s) (ppm Mehlich-3 P)	<input checked="" type="checkbox"/> Yes 154, 154, 125, 137, 118, 142, 133			<input checked="" type="checkbox"/> Yes 154, 154, 125, 137, 118, 142, 133			<input type="checkbox"/>		
Option 3 - P Index evaluation must be completed.	<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>		
Acres	90			90			25		
Crop Group - To enter a Crop Group use the "Select" button.	Corn Grain after Alfalfa			Corn Grain after Corn			Grass hay		
Yield	150 bu/A			150 bu/A			3 ton/A		
Manure Group - To enter a Manure Group use the "Select" button.	Broiler Litter			Broiler Litter			Swine Liquid		
Manure Type	Poultry			Poultry			Swine		
G) Manure Nutrient Content (lb/ton or lb/1000 gal)	lb/ton			lb/ton			lb/1000 gal		
Total N	54.3			54.3			30.4		
P <sub>2</sub> O <sub>5</sub>	61.8			61.8			22.1		
K <sub>2</sub> O	44.3			44.3			16.1		
Application Timing and Method - To enter a Manure Application Timing and Method, use the "Select" button.	Spring      Incorporation within 2-4 days			Spring      Incorporation within 2-4 days			Summer      Incorporation after 7 days or none		
1. Soil Test N Recommendation (lb N/A) <sup>1</sup>	150			150					
2. Soil Test P Recommendation (lb P <sub>2</sub> O <sub>5</sub> /A) <sup>1</sup>	0			0					
3. Soil Test K <sub>2</sub> O Recommendation (lb K <sub>2</sub> O/A) <sup>1</sup>	0			0					
4. Calculate K <sub>2</sub> O balance?	Yes			Yes			No		
	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
A) Recommendation or Removal (lb/A) - Tables 1, 2 & 3	150	0	0	150	0	0	150	135	
B) Fertilizer Applied (lb/A)	15	30	30	15	30	30	92	0	
C) Other Organic Sources Applied (lb/A)	0	0	0	0	0	0	0	0	
D) Residual Manure N Management Residual Manure N Value (lb/A) - Table 4 (AG Table 1.2-14B)	Frequent 20			Continuous 35			Frequent 20		
E) Previous Legume N Management - To enter a previous legume N management, use the "Select" button.  Previous Legume N Value (lb/A) - Table 5 (AG Table 1.2-7)	1st yr. after alfalfa <25% stand 40			No Previous Year Legume 0			No Previous Year Legume 0		
F) Net Nutrient Requirement (lb/A)	75	-30	-30	100	-30	-30	38	135	
H) N Availability Factor - Table 6 (AG Table 1.2-14A)	0.45			0.45			0.20		
I) Available Nitrogen (lb/ton, lb/1000 gal)	24.4			24.4			6.1		
J) Balanced Manure Rate (ton/A, gal/A)	3.1			4.1				6109	
K) Planned Manure Rate      Enter Rate →	3 ton/A			4 ton/A			6000 gal/A Apply the planned rate once every 3 years.		
L) Nutrients Applied at Planned Rate (lb/A)	73	185	133	98	247	177	37	133	
M) Nutrient Balance at Planned Rate (lb/A)	2	-215	-163	2	-277	-207	1	2	
	Short	Excess	Excess	Short	Excess	Excess	Short	Short	
Note: Nutrient balances for P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O based on crop removal (Row A) should not be used to determine additional fertilizer needs. Only recommendations based on soil tests should be used for this purpose.	Nutrient balances for P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O are based on soil test recommendations.			Nutrient balances for P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O are based on soil test recommendations.			Nutrient balances for P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O are based on crop removal (Row A).		

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Nutrient Balance Worksheet			
February 6, 2009		10, 11	
CMU/Field ID(s)			
<b>Manure Plan Basis</b>		<b>Option 3 - P Index evaluation required</b>	
<b>Option 1 - P Removal</b> 1. Will P banking be used?		<input type="checkbox"/>	
<b>Option 2 - N Requirement</b> 1. Calculate P Balance? 2. Enter Soil test Value(s) (ppm Mehlich-3 P)		<input type="checkbox"/>	
<b>Option 3 - P Index evaluation must be completed.</b>		<input checked="" type="checkbox"/>	
<b>Acres</b>		24	
<b>Crop Group</b> - To enter a Crop Group use the "Select" button.		Corn Grain after Soybeans	
<b>Yield</b>		175 bu/A	
<b>Manure Group</b> - To enter a Manure Group use the "Select" button.		Broiler Litter	
<b>Manure Type</b>		Poultry	
<b>G) Manure Nutrient Content (lb/ton or lb/1000 gal)</b>		lb/ton	
Total N		54.3	
P <sub>2</sub> O <sub>5</sub>		61.8	
K <sub>2</sub> O		44.3	
<b>Application Timing and Method -</b> To enter a Manure Application Timing and Method, use the "Select" button.		Spring      Incorporation within 2-4 days	
1. Soil Test N Recommendation (lb N/A) <sup>1</sup>		175	
2. Soil Test P Recommendation (lb P <sub>2</sub> O <sub>5</sub> /A) <sup>1</sup>		0	
3. Soil Test K <sub>2</sub> O Recommendation (lb K <sub>2</sub> O/A) <sup>1</sup>		0	
4. Calculate K <sub>2</sub> O balance?		Yes	
		N	P <sub>2</sub> O <sub>5</sub>
A) Recommendation or Removal (lb/A) - Tables 1, 2 & 3		175	0
B) Fertilizer Applied (lb/A)		0	0
C) Other Organic Sources Applied (lb/A)		0	0
D) Residual Manure N Management		Continuous	
Residual Manure N Value (lb/A) - Table 4 (AG Table 1.2-14B)		35	
E) Previous Legume N Management - To enter a previous legume N management, use the "Select" button.		Soybeans, 50 bu/A	
Previous Legume N Value (lb/A) - Table 5 (AG Table 1.2-7)		50	
F) Net Nutrient Requirement (lb/A)		90	0
H) N Availability Factor - Table 6 (AG Table 1.2-14A)		0.45	
I) Available Nitrogen (lb/ton, lb/1000 gal)		24.4	
J) Balanced Manure Rate (ton/A, gal/A)		3.7	0
K) Planned Manure Rate      Enter Rate →		<b>3.5 ton/A</b>	
		Planned rate and P Index must be consistent.	
L) Nutrients Applied at Planned Rate (lb/A)		85	216
M) Nutrient Balance at Planned Rate (lb/A)		5	-216
		Short	Excess
Note: Nutrient balances for P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O based on crop removal (Row A) should not be used to determine additional fertilizer needs. Only recommendations based on soil tests should be used for this purpose.		Nutrient balances for P <sub>2</sub> O <sub>5</sub> and K <sub>2</sub> O are based on soil test recommendations.	

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Appendix 1  
**Operation Maps**

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Maps (or aerial photographs) required to accompany Nutrient Balance Sheets must identify:

1. Crop management unit (field)
2. Acreage and boundaries
3. Manure application setback areas and buffers and associated landscape features
4. Location of in-field manure stacking areas (including each site in stacking rotation)

**See the Word/.pdf format example for an example map.**

Appendix 2

**Phosphorus Index**

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Include the current Pennsylvania Phosphorus Index Spreadsheet or paper worksheet for each field that required Part B of the P Index when using Manure Plan Basis Option 3.

	A	B	C	D	E	F	G	H
1	<b>Pennsylvania P Index Version 2</b> (October 2009; Penn State, Dept. Crop & Soil Sciences & USDA-ARS, Pasture Systems & Watershed Mgmt. Research Unit)							
2	February 6, 2009							
3	<b>FARM IDENTIFICATION</b>		<b>PART A: SCREENING TOOL</b>			<b>CMU/Field ID</b>	<b>10</b>	<b>11</b>
4	Act 38 Technical Manual	Is the CMU in a Special Protection watershed?			If the answer is Yes to any of these questions, Part B must be used.	No	No	
5	Supplement 4 - NBS Example	Is there a significant farm management change as defined by Act 38? (see below)				No	No	
6	P Index Example	Is the Soil Test Mehlich 3 P greater than 200 ppm P? (enter soil test value in ppm)				315	334	
7		Is the Contributing Distance from this CMU to receiving water less than 150 ft.?			No	No		
8	The following Act 38 criteria determine when there is a significant farm management change:					<b>Part B</b>	<b>Part B</b>	
9	1. net increase of greater than 10% in AEU's per acre							
10	2. a change in crop management that results in a farmwide reduction of greater than 20% in nitrogen necessary for realistic expected crop							
11	3. alternative organic sources will replace all or some of the nutrient sources listed in the plan							
12	4. additional lands are brought into the operation (purchased or rented)							
13	<b>PART B: SOURCE FACTORS</b>					<b>CMU/Field ID</b>	<b>10</b>	<b>11</b>
14	SOIL TEST	Mehlich 3 Soil Test P (ppm P)				315	334	
15	<b>Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)</b>					63	67	
16	FERTILIZER P RATE	Fertilizer P (lb P <sub>2</sub> O <sub>5</sub> /acre)				0	0	
17	P Applied from multiple fertilizer applications, if any (From Multiple Applications Calculator)					0	0	
18	FERTILIZER APPLICATION METHOD	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil		
19	<b>Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method</b>					0	0	
20	MANURE P RATE	Manure P (lb P <sub>2</sub> O <sub>5</sub> /acre)				216	216	
21	P Applied from multiple manure applications, if any (From Multiple Applications Calculator)					0	0	
22	MANURE APPLICATION METHOD	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	0.4	0.4
23	P SOURCE COEFFICIENT	Refer to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Table 1				0.8	0.8	
24	<b>Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient</b>					69	69	
25	<b>Source Factor Sum</b>					132	136	
26	<b>PART B: TRANSPORT FACTORS</b>					<b>CMU/Field ID</b>	<b>10</b>	<b>11</b>
27	EROSION	Soil Loss (ton/acre/yr)				2	2	
28	RUNOFF POTENTIAL	0 Drainage Class is Excessively	2 Drainage Class is Somewhat Excessively	4 Drainage Class is Well/Moderately Well	6 Drainage Class is Somewhat Poorly	8 Drainage Class is Poorly/Very Poorly	4	4
29	SUBSURFACE DRAINAGE	0 None or No direct outlet to receiving water	1 Random Drainage - Outlets directly to receiving water	2 Patterned drainage - Outlets directly to receiving water	3 Patterned drainage - Outlets directly to receiving water	4 Patterned drainage - Outlets directly to receiving water	0	0
30	CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with 35 ft. buffer	9 <sup>‡</sup> < 100 ft.	0	0
31	<b>Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance</b>					6	6	
32	MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST < 100 FT	1.0 Grassed Waterway or None	1.1 Direct Connection APPLIES TO DIST > 100 FT	1.2 Direct Connection APPLIES TO DIST > 100 FT	1.3 Direct Connection APPLIES TO DIST > 100 FT	1.0	1.0
33	<b>Transport Sum x Modified Connectivity / 24</b>					0.25	0.25	
34	<b>P Index Value = 2 x Source x Transport</b>					66	68	
35	<b>MANAGEMENT GUIDANCE</b>					<b>Optional Calculators</b>		
36	P Index Rating: Values	Nutrient Application Guidance			<b>User Inputs 1. Manure Units (gal/A or T/A)</b>	gal/A	gal/A	
37	Low: 59 or less	Nitrogen based management			2. N plan manure rate (units above)	3.7	3.7	
38	Medium: 60 to 79	Nitrogen based management			3. Manure P analysis (units above lb P <sub>2</sub> O <sub>5</sub> )	61.8	61.8	
39	High: 80 to 99	Phosphorus limited to crop removal			P Applied at N Rate listed above in (2) (lb P <sub>2</sub> O <sub>5</sub> /A)	0	0	
40	Very High: 100 or greater	No Phosphorus applied						
41	<b>User Input 4. Planned crop - P removal (lb P<sub>2</sub>O<sub>5</sub>/A)</b>					0.4	0.4	
42	Actual total P applied based on values in PI above					216	216	
43	<b>User Input 5. Actual Planned Rate (units above)</b>					3.5	3.5	
44	P Applied at Planned Rate (lb P <sub>2</sub> O <sub>5</sub> /A) Enter in MANURE P RATE above					0	0	
45	Calculated Maximum Manure Rate (units above) (‡)					3.7	3.7	
46	P Applied at Calculated Maximum Rate (lb P <sub>2</sub> O <sub>5</sub> /A) (‡)					0	0	
47	‡ Missing data = Rate calculator requires all Manure Rating data be entered into the P Index.							
48	NBS Rate calculation can determine a maximum rate with multiple manure applications.							
49								
50								

