



# Delaware Nutrient Management



## The Delaware Nutrient Management Commission Minutes of the Program & Education Meeting Held April 23, 2007

### In attendance:

<i>Committee Members Present</i>	<i>Others Present</i>
C. Solberg, Chair	G. Binford (via telephone)
T. Keen	B. Coleman
C. Larimore	P. Diehl
B. O'Neill	S. Hollenbeck
	J. Manchester
<i>Committee Members Absent</i>	
<i>Ex-Officios Present</i>	
W. Rohrer, Jr.	

*This meeting was properly notified and posted as required by law.*

### Call to Order/Welcome:

C. Solberg called the meeting to order at 7:12 p.m. and welcomed everyone in attendance.

### Approval of Minutes:

**C. Larimore moved to approve the minutes from the October 10, 2006 Program and Education Subcommittee Meeting. B. O'Neill seconded the motion which passed unanimously.**

### Discussion and Action Items:

#### *Review and Act on Research Proposals*

B. Rohrer explained current funding for Research and Demonstration Projects as follows:

\$160,000	Funding Available (as of 2005)
35,789	Temporary Storage – <i>Evaluation of Outdoor Storage Practices</i>
28,122	Mass Balancing – <i>Setting Goals to Achieve Optimum Nutrient Balance</i>
45,265	Evaluate Application Setbacks – <i>Dr. Guo to Report to Commission in June</i>
<u>23,748</u>	Evaluate Poultry Litter as a Carbonization Source – <i>As Alternative to Charcoal</i>
* \$27,076	Funding Available for New Research and Demonstration Projects

Approval process is set in place to extend funding into the next fiscal year.

*\$20,000 was allocated for a Litter Revitalization Project. However, the results were inconclusive and the Project was terminated, so there was no funding expenditure.*

G. Binford joined the meeting via telephone. B. Rohrer mentioned some projects that may have merit:

- Additional alternatives using outdoor storage
- Bagging processes used by pelletizing plants applied to raw litter
- Investigate other types of sprayable covers
- Explore the uses of filter fabrics similar to compost fleece used in mass mortality management

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- Evaluation of the use of vegetative buffers along sensitive areas and ditches
- Demonstration of biodegradable liners
- Increase Phosphorus soil remediation
- Demonstration focusing on remediation for outdoor poultry litter storage – in areas where salt levels are high – how can that be reclaimed so that it is back in the production process

G. Binford offered the following:

As far as temporary storage this is what has been done so far:

- spray on alternatives, standard no cover, poly cover, and tried three different spray on materials
  - spray on materials have been unsuccessful – end result is worse than using nothing at all
  - they seal well, but over time they start to crack
  - moisture enters when they crack
  - a lot of pile is still covered – there is little evaporation of moisture
- With bagging and liner projects, there are disease issues
- The buffer idea has been talked about for a few years now, and the challenge is in creating a cost-effective study that holds meaning.

J. Manchester stated that he would like to push the study of the remediation problem. High phosphorus soils, which account for approximately 15% of the soils, account for 60% of the phosphorus transmission into the waters. This would require a long-term study. This would require determining which materials to use, such as iron, alum sludge, or bauxite. It would be necessary to analyze the soil of 300, 400, 500 fiv soils at determined depths, to see how much Phosphorus has already transferred down toward the lower parts of the soil where roots will have a hard time getting it out of there.

G. Binford responded that Dr. Sims has done some work in this area already. J. Manchester said there is very little data for what the Phosphorus levels are at depth. B. Rohrer stated that he thought that it was concluded that Phosphorus is moving laterally at the surface. Research has been presented to the Commission showing that the only way to reduce Phosphorus it to rid it at the surface, as there is very little Phosphorus movement under the surface, unlike Nitrogen. J. Manchester stated that there is a significant solubility of Phosphorus in the high-Phosphorus soils. B. Rohrer said that he recalled that even with a high level of solubility, it was only in the top few inches of the till layer. J. Manchester said that is why the first thing we have to find out is how much Phosphorus has reached depth, and if iron and alum in the top layers are preventing it from going any further, in which case, there is no problem. T. Keen stated that years ago, he had pulled samples from 0-10”, and from 10-20”. He didn’t know if the data could be retrieved, but there is a possibility. What we found was that if there was 300 ppm in the top 2”, there would be 75 ppm present at 10-20”. J. Manchester stated that the 75 ppm was higher than he had calculated, at 42 ppm in some of the high Phosphorus soils at the second 8”. T. Keen said that if he had 75 ppm in the top 2”, and didn’t apply Phosphorus, there would be a substantial decrease in crop yields. J. Manchester stated that he believes the figure is higher, but he doesn’t have the data. He suggested that G. Binford go to a half-dozen locations, pull samples at 8, 16, and 24” increments, and see what the Phosphorus levels are. G. Binford stated that would be pretty easy to do, they are working this year on some sites that do have high Phosphorus soils.

B. Rohrer suggested another good Research and Demonstration Project might be a pilot Preside Soil Nitrate Test (PSNT) reimbursement program. It would be fairly easy to administer a pilot program for either incentives or reimbursements for the usage of PSNTs. G. Binford added that a good study would examine the relationship between weather and PSNT values, as rainfall amounts can be a strong influence. It is a study that would need to be created over several years, and several environments. People are easily discouraged with results of this particular test because they can receive very high levels one year, and very low levels the next. The same critical value is used every year; in reality, it should be adjusted, but data does not exist to show how to adjust the value. B. Rohrer asked if this

project could be started this summer. G. Binford responded that data would need to be collected over several years and several different environments to determine what the rainfall to Nitrogen relationship is. T. Keen suggested that consultants obtain permission to release current available end-test data (anonymously) to speed data collection. G. Binford responded that he thought that was a great idea. He said that he had tried to do that, he had talked to K. Foskey. The Districts have been collecting data for several years, and data was pulled from the University soil testing lab (this was not a lot of data given that the University doesn't do many PSNTs). His thought was to collect all of this data and compare it to recorded rainfall data, which is collected at several locations throughout the State. T. Keen offered that he has 15-years of archived data. G. Binford stated that Iowa has already done this study, and already adjusts their critical level value for rainfall totals. He went on to say that he could look at data that is available and compare it to field applications and rainfall histories. T. Keen stressed that previous manure application histories would have impact as well. C. Solberg asked if G. Binford could assemble some type of protocol as to how you would break out the cost to mine existing data, speaking to some consultants and working with the Districts, looking at rainfall gauges and other rainfall data? And you could draft a proposal based on the kinds of information that was just discussed? G. Binford responded that he could do that. C. Solberg asked if other Subcommittee members were interested in having this type of study. The Subcommittee agreed that this would be a good Research and Demonstration Project. C. Solberg told G. Binford to get to work.

J. Manchester asked about Phosphorus remediation. G. Binford stated that if we just want an idea of what the distribution within the soils are, that is an easy project. J. Manchester said that is the first step. But, assuming fairly high Phosphorus levels are discovered as depths are reached, a program has to be worked up to transmit that into a full scale use. That would be a five-year program, but you should be allocated some money now to work it up, not to actually do the work. He offered his assistance in creation of the study. C. Solberg questioned the degree of uncertainty, with respect to the information about concentrations of soluble Phosphorus, and its movements both horizontally and vertically. We know that there is concentration at the tilled horizon, and the horizons below that vary. We know that vertical movement, based on the grain sizes vary greatly. And, we know that movements horizontally vary greatly. With all those moving targets, can we characterize how soil Phosphorus moves; surface flow, sub-surface flow, and vertical flow? G. Binford answered that Phosphorus movement depends a lot on the saturation of the soils, as well as iron and aluminum content. If the soil is saturated, the Phosphorus is going to move downward. In well-drained soils, the sub-surface flow is not nearly the issue that it is in poorly-drained soils. A characterization would have to include soil samples, as well as physical analysis of the soils (to be included in the database).

C. Solberg mentioned that in 1999, Sims and Andrus characterized critical flow paths from saturated soils in sandy regions in Sussex County. It assessed the impacts of drainage on nutrient transport, particularly looking at Phosphorus. G. Binford stated that he did not remember this particular study. In a meeting with the Commission, Andrus said that some of the short critical flow paths, edge of field Phosphorus movement was confusing in soil units that were sandier, because surface flow couldn't be separated from sub-surface flow, because they were expressed in the ditch at the same place at the same time. It was very ambiguous, except that a heck of a lot of Phosphorus was moving over short distances, both superficially and below grade. Which is why they crafted an experimental period to collect data of water quality and soil tests. I think you might want to look at that. J. Manchester pointed out that another variable is where the water table is in relation to some of the sub-soils. In some areas, the water table approaches the ground level and that's going to probably be a different Phosphorus extraction process than just trickling water down through it. He suggested a lab analysis where high Phosphorus soil is allowed to sit for several months, and then see how much Phosphorus it extracts. C. Solberg stated that it is important to eliminate uncertainty and ambivalence. He would like to see study relative to Phosphorus saturation and movement, horizontally and vertically.

C. Solberg stated that no matter how the money is invested, it needs to produce a Best Management Practice or Program that can be manipulated to increase the use of the Best Management Practices. J. Manchester again stressed the importance of a Phosphorus remediation study. B. O'Neill asked if G. Binford had a way to come up with a cost figure and a timeline for collection of data. G. Binford asked (if it was meant) to do the preliminary work of looking at Phosphorus distribution in soils. J. Manchester stated that eventually we would have to do an entire cost estimate and timeline for five years of research. G. Binford stated that he could do a preliminary cost estimate and timeline pretty easily.

C. Solberg asked what the data source is, in T. Sims work, that tells us that the vast majority of our nutrient transmission is coming from a very small subset of high Phosphorus soils as opposed to locations where we have field runoff and other phenomenon. J. Manchester stated that he got it from T. Sims' report. C. Solberg asked if that was a conclusion drawn from T. Sims' work that we paid for. J. Manchester answered, no, this is way back. This is work that Tom and Karen and several others did three or four years ago. He added that the interpretation of the data is his. The relationship of Phosphorus in the soil to concentration in the leachate and the runoff is Tom's work.

C. Solberg stated that (the Commission) should be making future investments based on what we have learned from our prior investments. T. Keen suggested that the Commission should go to the consultants for soil samples from areas where P205 is above 3,000 lbs. per acre (750 fiv), above 2,000 lbs. per acre (500 fiv), above 1,000 lbs. per acre (250 fiv), and (the Commission) will pay to pull those subsoil samples. J. Manchester replied that if that is the cheapest way to do it, that's fine. T. Keen stated that they have the data where those numbers are, and if they are already pulling soil samples, and it is cost-effective to pull a second sample, they would do it. J. Manchester stated that sampling would have to come from 24 inches. G. Binford said that he thought this could work. However, he feels that the depth would have to be to 36 inches. T. Keen replied that a depth of 36 inches would no longer be cost-effective for the consultants, and would have to be done by the University. There was a small debate about soil depths, and it was decided that it would be beneficial to have the 36 inch sample in case it is needed. J. Manchester asked how soon data collected from samples pulled at six locations could be reported. G. Binford replied that the biggest hold-up is running the samples through the lab. He mentioned that they have a pretty good database of fields, so choosing locations is relatively easy. Timing is an issue in pulling samples, it is best to do them in the fall or the early part of the summer, before the crops get too big.

C. Solberg stated that there are two things on the table for G. Binford to work up a protocol and proposal for – 1) mining existing PSNT data, rainfall and calibration about how you interpret those results, and 2) it would be useful to understand what you think would be sufficient, experimentally, to eliminate ambivalence and lack of confidence in the question of characterizing vertical and horizontal soluble Phosphorus movement by characterizing a sufficient number of soil tests in a sufficient number of fields. G. Binford requested a timeline. B. Rohrer stated that the worst case scenario would be to make a decision on the next project within the next twelve months. But, the Commission would like to make a decision before the next crop year. However, the project would need to be complete, from start to finish, within the next twelve months. G. Binford stated that it would be feasible to begin in the early part of the summer, and also to be complete by June 30, 2008. B. Rohrer explained that the Commission is limited by budget.

**Public Comments:** NONE

**Next Meeting:** NONE

**Adjournment:** Chairman Solberg adjourned the meeting at 8:15 p.m.

Approved,

C. Solberg, Chair  
Programs and Education Subcommittee

BRR/psd