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# Water Quality Enhancement Activity – *WQL08 –Apply Split Applications of Nitrogen Based on a Pre-Sidedress Nitrogen Test on Cropland*

## New Jersey Addendum

**Enhancement Description**
The use of a Pre-Sidedress Nitrogen Test (PSNT) to determine the need and/or rate of additional nitrogen to be applied during a sidedress application.

**Land Use Applicability**
This enhancement is applicable on corn grown on cropland.

**Benefits**
Sidedress applications of ammonia-N based on a PSNT may lower the total amount of ammonia fertilizers applied, therefore controlling the conversion of ammonia to nitrate and ultimately to nitrogen gas through nitric oxide (an ozone precursor) and nitrous oxide (a greenhouse gas). Nitrate, while taken up by plants as a nutrient, is also unstable in soil and can move with water through the soil into surface and ground water. Also, the above conversion processes produce nitrous oxide as a byproduct. Nitrous oxide is a potent greenhouse gas which has 310 times the global warming potential of carbon dioxide on a molecular basis. Using split applications of ammonia-N based on a PSNT will help to reduce nitrate contamination of surface and ground water, and reduce an enterprise's nitrous oxide emissions, improving its overall greenhouse gas footprint.

The PSNT is primarily used to test if side-dress N fertilizer is needed on fields with a history of manure application. PSNT attempts to:

- Gauge the pool of potentially mineralizable organic N in the soil, and
- Link that pool with a likelihood of a yield response from additional N fertilizer at sidedressing time.

**Criteria for Applying Split Applications of Nitrogen Based on a Pre-Sidedress Nitrogen Test on Crop Land (for guidelines on this test, see Cornell University Factsheet at *http://nmsp.css.cornell.edu/publications/factsheets/factsheet3.pdf* or Penn State Agronomy Factsheet #17 at *http://cropsoil.psu.edu/extension/facts/agfact17.pdf*.**

**Where to use the PSNT:**

- Corn fields, 2 years or more after a sod where the manure rate or mineralization rate is uncertain.
- Where calculations indicate that the full complement of manure was not applied to meet the expected N needs of the crop.
- Cases where N mineralization rates are expected to be higher than average.
- When there is uncertainty as to whether enough manure was actually applied to meet expected corn crop N requirements.

**Where not to use the PSNT:**

1. Corn fields that had pre-plant / early post-plant broadcast fertilizer N applications (other than <40 lbs starter N/acre in the band).
2. Corn fields that are first year corn after modest amount of alfalfa with grass. No yield response is expected from side-dress N, therefore there is no need to conduct PSNT.

**Additional Criteria:**

1. Producer must currently apply ammonia-based nitrogen fertilizer as part of the cropping system.
2. Producer must have a current soil test (no more than 5 years old).
3. Producer must have a Pre Side-dress Nitrogen Test (PSNT)
4. Nutrient application rates are within the "Land Grant University" recommendations based on soil tests and established yield goals considering all nutrient sources.
5. For full implementation of this enhancement, the producer shall apply crop nutrients using two or more separate applications during each cropping season in a rotation following the recommendations of the PSNT for all annual corn crops. If the PSNT indicates that no additional nitrogen fertilizer is needed, no additional nitrogen shall be applied.
6. Soil surface disturbance shall be minimized. Refer to and follow NJ NRCS Nutrient Management (590) standard. Seek assistance from NRCS in proper management.

**Documentation Requirements for Applying Split Applications of Nitrogen Based on a Pre-Sidedress Nitrogen Test on crop land**

1. Written documentation for each year of this enhancement describing the following items:
    - Recommendations from the PSNT
    - Dates of application of nutrient applications to provide evidence of split applications
    - Type(s) of nutrients (fertilizer and organic) applied
    - Treatment area(s)
    - Soil test results
    - Crops grown and yields (both yield goals and measured yield)
    - Calibration of application equipment
2. A map showing where the enhancement is applied.