BEFORE THE
OHIO ENVIRONMENTAL PROTECTION AGENCY

In the matter of:

Campbell Soup Supply Company LLC :
12-773 State Route 110 :
Napoleon, Ohio 43545 :
:
Respondent :

Director's Final
Findings and Orders

By: M A Shapiro Date: 11/2/2012

PREAMBLE

It is agreed by the parties hereto as follows:

I. JURISDICTION

These Director's Final Findings and Orders ("Orders") are issued to the Campbell Soup Supply Company LLC ("Respondent") pursuant to the authority vested in the Director of the Ohio Environmental Protection Agency ("Ohio EPA") (collectively, the "parties") under Ohio Revised Code ("ORC") §§ 6111.03, 6109, and 3745.01.

II. PARTIES BOUND

These Orders shall apply to and be binding upon Respondent and its successors in interest liable under Ohio law. No change in ownership of Respondent or the Facility (as hereinafter defined) shall in any way alter Respondent's obligations under these Orders.

III. DEFINITIONS

Unless otherwise stated, all terms used in these Orders shall have the same meaning as defined in ORC Chapter 6111. and the rules promulgated thereunder.

IV. FINDINGS

The Director of the Ohio EPA has made the following findings:

1. Respondent is the owner and operator of a heat process canned food facility, which produces canned soups, sauces, and juices located at 12-773 State Route 110, Napoleon, Henry County, Ohio. Campbell Soup Supply Company LLC and its associated wastewater treatment plant ("WWTP") are hereinafter collectively referred to as "Facility". Wastewater

from the Facility receives treatment prior to discharge to the Maumee River through the use of a 10 million gallon per day trickling filter plant and a 440 acre overland flow, land treatment system.

2. The wastewater consists of process wastewater (vegetable washing/preparation, cookers, filling, blending), boiler house/refrigeration, storm water, and sanitary wastewater generated at offices and restrooms. The overland flow system, which consists of farm fields on which the wastewater is recycled as fertilizer, is utilized during the months of April to November. A portion of the Facility's process wastewater is treated on farm fields, utilizing the overland flow method.

3. Some solids generated in the WWTP process are processed in anaerobic digesters and accumulated in a 295,000-gallon biosolids holding tank. Contract haulers transport a very small portion of the biosolids directly from the digesters to agricultural fields for land application. Most of the biosolids from the digesters are stored in lagoons during the year where they are mixed with spent lime from Respondent's water treatment plant prior to land application. Hereinafter, these Orders shall refer to the mixture of biosolids and spent lime in the lagoons as "biolime" and shall use the term "biosolids" to refer only to the biosolids that are taken directly from the digesters to approved land application sites.

4. Respondent holds a National Pollutant Discharge Elimination System ("NPDES") permit, No. 2IH00021*HD (modification effective October 1, 2007, originally effective March 1, 2004). Respondent's NPDES permit expired on July 31, 2008, but because Respondent timely submitted an application for renewal of its NPDES permit on January 28, 2008, the provisions of NPDES permit No. 2IH00021*HD remain in effect.

5. The permit authorized Respondent to discharge "industrial waste" and/or "other waste" and/or "sewage," as defined in ORC § 6111.01, from the Facility to the Maumee River from the following outfalls:

   a. WWTP final effluent outfall 001;

   b. Storm water runoff (swale) near V-8 building outfall 002;

   c. Irrigation field outfalls 003-009; and

   d. Storm water runoff from area in front of warehouse building outfall 010.

6. The Maumee River constitutes "waters of the state" as defined by ORC § 6111.01.

7. Respondent, in operating a heat process canned food facility, is subject to Chapter 40 of the Code of Federal Regulations ("C.F.R."), Section 407.62.

8. Respondent, in operating a wastewater treatment plant, is subject to effluent limitations based on water quality standards contained in Ohio Administrative Code ("OAC") Chapter 3745-1 and wasteload allocation procedures contained in OAC Chapter 3745-2.

NPDES Permit Violations

9. Respondent was first given a monthly concentration and loading limit for final outfall 001 for ammonia nitrogen in NPDES 2IH00021*FD. A schedule of compliance was included in the permit and the limits became effective on November 11, 2000.

10. As set forth in Attachment I, the effluent from Respondent's operations exceeded effluent limits in its NPDES permit, including limits for ammonia nitrogen on the dates listed therein. Attachment I is incorporated by reference as if fully rewritten herein.

11. Respondent submitted documentation of and/or explanation for effluent limitation violations of its NPDES permit on December 8, 2003, June 22, 2005, February 22, 2006, June 7, 2007, July 6, 2007, November 30, 2007, June 10, 2008, July 16, 2008, October 13, 2008, January 12, 2009, February 11, 2009, June 11, 2009, July 9, 2009, September 18, 2009, December 18, 2009, December 22, 2009, January 6, 2010, May 25, 2010, June 7, 2010, July 19, 2010, August 11, 2010, August 21, 2010, October 13, 2010, November 10, 2010, April 19, 2011 and June 23, 2011.

12. Ohio EPA sent Respondent notices of violation ("NOVs") for violations of its NPDES permit effluent limitations on June 14, 2005, November 26, 2007, June 5, 2009, September 3, 2009, June 3, 2010, and April 8, 2011.

13. Reports from Ohio EPA's inspections of the Facility on June 9, 2005, December 15, 2005, May 8, 2007, February 25, 2008, August 27, 2008, March 30, 2009, May 24, 2010 and March 11, 2011 discuss Respondent's NPDES permit effluent limitation violations and efforts being taken by Respondent to address the violations. Respondent's efforts to identify and implement solutions to the exceedances of the effluent limitations included the rebuilding of two trickling filters to improve organic loading capacity, retaining outside contractors to clean the aerated lagoon, installing EDI aeration diffusers to increase dissolved oxygen capacity, feeding pure oxygen to increase dissolved oxygen levels, using nitrifiers to institute bio-augmentation, using sodium biocarbonate to adjust alkalinity levels,

increasing chlorine feed to form chloramines, adding aeration to the chlorine contact chamber, and blending trickling filter effluent with aerated lagoon effluent.

14. Respondent believes that the generation of additional solids in the trickling filters in the wastewater treatment plant, the die off of the filters' microbes on the weekends, and the die-off and decay of biological material in the aeration lagoon caused the ammonia exceedances at the plant.

15. Respondent started influent monitoring at the WWTP on August 24, 2011 and has collected influent data since that time.

16. On October 6, 2009, Respondent submitted Permit to Install ("PTI") application No. 728325 to upgrade the Facility's WWTP. Ohio EPA issued this PTI on December 22, 2009. The upgrades proposed in Respondent's application included the installation of two settling tanks, alum feed tank, and a waste sludge pump station, and the conversion of two DAF units into post-aeration basins.

17. On April 12, 2010, Respondent commenced construction in accordance with PTI No. 728325 for upgrade of its WWTP necessary to achieve compliance with NPDES permit No. 2IH00021. Respondent completed construction of the WWTP upgrades in November 2010. The wastewater treatment upgrades and improvements have included the addition of supplemental carbon on the weekends to sustain the microbes in the filters, the installation of clarifiers after the filters to settle and remove solids to decrease ammonia generation, and the replacement of the aeration lagoon with large tanks. The Facility's effluent has complied with the permit's effluent limitations for ammonia nitrogen since the completion of the WWTP upgrades.

18. Part II, A of Respondent's current NPDES permit requires the wastewater treatment works to be under the supervision of an operator possessing an Ohio EPA certificate with a classification of Class III or higher. Revisions to OAC rule 3745-7-02 will be incorporated into Respondent's NPDES permit renewal, which will include the reclassification of the WWTP to require a Class IV operator at the plant for 8 hours per day, 5 days per week. In 2006, Respondent's Class IV operator, Mike Maringer retired. Mr. Maringer oversaw operation of the Facility's WWTP, drinking water treatment plant, wastewater spray irrigation, sludge handling and management of maintenance staff. Mr. Maringer was retained as Respondent's Class IV operator through yearly contracts after his retirement for the following hours per week for both the WWTP and drinking water treatment plant:

August 2006 - August 2007 – 15 hours per week
August 2007 - August 2008 – 20 hours per week
August 2008 - August 2009 – 20 hours per week
August 2009 - August 2010 – 40 hours per week
August 2010 – June 2012 – 40 hours per week

Respondent did not have a Class IV operator for the drinking water treatment plant from July to mid-August 2012. Mr. Maringer and other Class IV operators have served as Respondent's Class IV operators for the drinking water treatment plant for 40 hours per week since mid-August 2012. Respondent has had a Class III wastewater operator on staff but this operator was not actually designated by Respondent nor identified to Ohio EPA as the operator of record for the wastewater treatment works.

19. On March 11, 2010, Ohio EPA sent an NOV to Respondent for failure to provide the minimum staffing hours as required for Respondent's drinking water treatment plant. Respondent is required by OAC 3745-7-03(C)(1) to have a Class IV operator overseeing the drinking water treatment plant for a minimum of 40 hours per week. To be in compliance, Ohio EPA informed Respondent that the WWTP and WTP must each be staffed by an appropriately certified operator for 40 hours per week. Respondent disputed Ohio EPA's conclusion, stating that Mr. Maringer has been supervising both the public water system and the wastewater treatment works for 40 hours per week.

20. Pursuant to ORC § 6111.04(C), no person to whom a permit has been issued shall place or discharge, or cause to be placed or discharged, in any waters of the state any sewage, sludge, sludge materials, industrial waste, or other wastes in excess of the permissive discharges specified under an existing permit.

21. Pursuant to ORC § 6111.07(A), no person shall violate or fail to perform any duty imposed by ORC §§ 6111.01 to 6111.08 or violate any order, rule, or term or condition of a permit issued or adopted by the Director of Ohio EPA pursuant to those sections. Each day of violation is a separate offense.

Biosolids Management Violations

22. Respondent holds a PTI (No. 03-15889) issued on October 7, 2003 that authorizes, among other things, the land application of biosolids from the Facility's WWTP holding tank to agricultural fields including those identified as Site ID# T1229 (57.0 acres) and T1014 (50.0 acres). The approved plan contains the following application and record keeping requirements.

a. The plan states that biosolids will be applied at an agronomic rate for the reasonably expected yield of the intended crop and will at no time exceed the nitrogen requirements for the crop. The plan estimates an application rate of 19,500 gallons per acre per crop season to meet nitrogen needs of a corn, soybean, or grass hay crop. However, the appropriate application rates will vary from time-to-time and from field-to-field, depending on the amount of nitrogen in the latest biosolids sample and the expected yield of the intended crop.

b. The plan states that Respondent shall post signs at sites where biosolids are land applied.

c. The plan states that biosolids will be surface applied and incorporated preferably within 6 hours but no later than 24 hours after application.

d. The plan states that soil samples shall be collected and analyzed from each application site so that the most recent results are not more than two years old at the time of biosolids land application. Representative soil samples shall be collected that represent twenty to twenty-five acres or less of the site being sampled.

e. The plan requires a monthly self-monitoring report that includes dates of biosolids application, the site(s) used, the number of acres applied per site(s), the total gallons applied per site(s), the gallons applied per acre, the application method and equipment used, and a biosolids analysis that reflects current status.

f. The plan requires the submittal of an annual report to Ohio EPA by January 31 of each year for the previous year's biosolids application.

g. The plan requires Respondent to provide a nutrient value report to the recipient and applicator of biosolids.

23. On August 21, 2009, Ohio EPA inspected Respondent's land application field T1014. This inspection is documented in a follow up letter to Respondent dated September 3, 2009. As a part of its investigation, Ohio EPA interviewed Respondent's contract hauler who informed Ohio EPA that it currently and historically only used the west 20 acres of the site for biosolids application due to typically wet conditions on the lower eastern side and the proximity to a residence. Ohio EPA noted in the follow up

letter that it appeared biosolids were being applied in excess of the amount authorized in Respondent's approved PTI and prohibited additional land application of biosolids to site T1014. The letter requested records regarding biosolids land application to be submitted to the Agency within three weeks.

24. On August 25, 2009, Respondent emailed Ohio EPA a number of biosolids land application records from April 2008 to July 2009 and weather records from February 2009 to July 2009.

25. On September 2, 2009, Respondent emailed Ohio EPA additional biosolids land application records from April 2004 to December 2008. The records indicate that site T1229 had not been used for land application since November 2006. Between November 2006 and September 2009, only site T1014 had been used for application.

26. On September 3, 2009, Ohio EPA requested all land application records documenting the monthly land application annual applicable loading rate calculations for biosolids (e.g. nitrogen and phosphorus) and cumulative loading rates for T1014 and all other sites associated with land application of biosolids.

27. Upon review of records Respondent submitted, Ohio EPA has determined the following:

    a. That the biosolids application records for April 2004 through January 2005 and April 2005 through December 2005 do not identify the days of application in violation of the land application plan approved pursuant to PTI No. 03-15889.

       Respondent's land application records indicate biosolids were applied on field T1014 during the entire growing season for the years of 2004, 2006, 2007, 2008 and through July 2009. This totaled 4,807,950 gallons of biosolids applied to Field T1014. Respondent's records do not indicate whether crops were grown on field T1014 for the years 2004 through 2009.

    b. Respondent's land application records do not contain a basis for loading rate calculations for biosolids (e.g. nitrogen and phosphorus) and cumulative loading rates.

    c. To the extent that there were no crops grown on this field during the years 2004-2009, land application of material would not provide any

agronomic benefit and therefore was a violation of Respondent's PTI.

28. A letter dated February 4, 2010 from Respondent's consultant Kevin Otte indicates soil sampling of land application site T1014 in 2008 consisted of only one sample per 50 acres. In accordance with the land application plan approved pursuant to PTI, No. 03-15889, a minimum of two soil samples should have been collected from the field.

29. Respondent's PTI states that "the entity shall perform the proposed land application operation in strict accordance with the conditions given in this approval and with the method of operation outlined in the application submitted for this approval." The over application/misapplication of biosolids to the approved field is a violation of the PTI.

30. On September 23, 2009, Ohio EPA received a letter from Respondent indicating that it had discontinued the land application of biosolids by Helberg Hauling LLC on Robert Schwab's permitted ground (Sites T1229 and T1014) and applications for additional land application sites would be submitted.

31. On October 5, 2009, Respondent submitted a site authorization request for biosolids application on two fields.

32. On April 19, 2010, Ohio EPA met with Respondent and Respondent's consultant to discuss future land application site approvals and enhancements to the procedures and record keeping for the land application of biosolids that Respondent planned to implement. Since that time, Respondent maintains that it has implemented these enhancements.

33. On May 5, 2010, Ohio EPA approved four sites for land application of digested biosolids from Respondent's Facility. The approval contains conditions outlined in some of the Orders below that incorporate enhancements to the procedures and record keeping for the land application of biosolids that Respondent proposed in April 2010.

34. The following Orders do not constitute authorization or approval of the construction of any physical structure or facilities, or the modification of any existing treatment works or sewer system. Any such construction or modification is subject to the Permit to Install requirements of ORC §§ 6111.44 and 6111.45 and OAC Chapter 3745-42.

35. This document does not modify NPDES Permit No. 2IH00021*HD. The purpose of this document is to address non compliance with NPDES Permit No. 2IH00021*HD and not to alter said permit.

36. Compliance with ORC Chapter 6111 is not contingent upon the availability or receipt of financial assistance.

37. The Director has given consideration to and based his determination on, evidence relating to the technical feasibility and economic reasonableness of complying with these Orders and to evidence relating to conditions calculated to result from compliance with these Orders, and its relation to the benefits to the people of the State to be derived from such compliance in accomplishing the purposes of ORC Chapter 6111.

V. ORDERS

The Director hereby issues the following Orders:

1. To obtain a year of influent monitoring data, Respondent collected and analyzed samples of the Facility's influent wastewater to the WWTP between August 23, 2011 and August 23, 2012 for the following parameters at the specified sampling frequency using the analysis methods set forth below:

   a. pH in S.U. – daily, using Standard Method (SM) 4500-H+ B.;

   b. Nitrogen, Ammonia in mg/l - 2/week, using Hach Method 10205;

   c. Phosphorus, Total in mg/l – 2/week, using SM 4500-P E.;

   d. Chemical Oxygen Demand in mg/l - 2/week, using Hach Method 10236;

   e. Total Suspended Solids in mg/l - 2/week, using SM 2540 D;

   f. Oil and grease in mg/l – monthly, using EPA 1664A; and

   g. Dissolved Oxygen in mg/l – daily, Hach Method 10360.

   Within 30 days after the effective date of these Orders, Respondent shall send the data described in this Order to Ohio EPA.

2. Respondent shall, upon the effective date of these Orders, attain an operational level at the WWTP and meet the final effluent limitations in NPDES permit No. 2IH00021. For three (3) years after the effective date

of these Orders, Respondent shall, within 30 days after Ohio EPA notification, submit a compliance plan that includes a compliance schedule for returning to compliance if any of the following occurs:

a. A 40% exceedance of specific pollutant limits listed in the attached Attachment II, Exhibit A, or a 20% exceedance of a specific pollutant limit from Attachment II, Exhibit B, at a given discharge point for any two or more months of two consecutive quarters; or

b. Violation of any monthly effluent limit at a given pipe by any amount for any four or more months of two consecutive quarters.

Upon Ohio EPA's approval of the compliance plan, Respondent shall implement the compliance plan in accordance with the approved schedule.

3. As soon as possible but not later than eight (8) months from the effective date of these Findings and Orders, Respondent shall submit to Ohio EPA, in accordance with Section X, for review and approval an operational plan addressing the critical operation controls that will be put in place to ensure that all biosolids, biolime, and digested biomass generated or received by Respondent's Facility receives adequate storage and treatment. This plan shall be designed to provide Respondent enough data, process control goals and target permitting dates for land application approvals to successfully manage biosolids, biolime and digested biomass as well as impacts on biosolids, biolime, and digested biomass from operational changes. The plan shall include the following information to the degree necessary to achieve the objectives of this Order No. 3:

a. An engineering estimate of the current volume capacity of each storage lagoon;

b. The installation of gauges in the lagoons that can be used to calculate the amount of freeboard (and thus, the remaining storage capacity) left in the lagoons;

c. An inspection log for Facility operators to use to document and log the amount of biosolids, biolime and digested biomass pumped to and removed from the lagoons;

d. Data collection necessary to enable management to recognize increases in biosolids, biolime and digested biomass generation rates and corresponding estimates for the increase in land application acreage needed during the summer months; and

e. Timelines necessary to ensure timely permitting for increasing any necessary acreage for land application.

4. Respondent shall apply digested biosolids and digested biomass in accordance with the best management practices from the United States Department of Agriculture, Natural Resources Conservation Service ("USDA-NRCS") Conservation Practice Standard for Nutrient Management (Code 590) included in Attachment III of these Orders (except for the redacted provisions in the attachment) in addition to requirements of Respondent's biosolids and digested biomass management plan approved pursuant to PTI No. 03-15889 and any modifications thereof. Respondent may follow recommendations labeled "Considerations" on pages 11 through 14 but they shall not be considered enforceable requirements under these Orders. In addition, whenever Code 590 identifies concentrations of phosphorus based on Bray P1 or Bray-Kurtz P1 testing, those concentrations may be multiplied by 1.1333 where Mehlich 3 testing is conducted. These requirements shall apply for the land application of biosolids and digested biomass generated by the Facility on current and future approved application sites, whether the Facility or a contractor conducts the application. In cases where the approved PTI requirement conflicts with Attachment III, the more stringent requirement shall be implemented. A suggested biosolids and digested biomass daily land application record keeping form is included in Attachment IV. A suggested biosolids site nutrient budget record keeping form is included in Attachment V. At a minimum, the information contained in Attachments III, IV, and V must be incorporated into Respondent's revised biosolids and digested biomass management systems. Respondent shall incorporate the practices in Attachment III into its land application procedures.

5. By January 31 of 2013 and each subsequent year, Respondent shall submit to Ohio EPA, in accordance with Section X, updated maps in a GIS shape file, detailing the fields that Respondent used for application of biosolids, biolime, and digested biomass (on its own or through contract) for the previous calendar year. Two GIS, as described herein, shape files will be maintained and submitted in electronic format annually.

The first GIS shape file will contain georeferenced polygons demarking the area within a field which has the same total land application volume of biosolids, biolime, and digested biomass applied prior to subsequent crop(s). Each polygon in the shape file shall not be added to the shape file until the subsequent crop is planted and land application for the season is complete. Each polygon shall contain the anticipated crop, actual crop planted, date planting began, calculated application rate (based on anticipated crop), basis for application rate determination (i.e.,

list limiting factor), application season start and end dates, actual volume of biosolids, biolime, and digested biomass applied, and if the phosphate application rate exceeded 250 pounds per acre.

The second GIS shape file will contain georeferenced polygons, corresponding to those submitted in the first GIS shape file required above, demarking the areas in the field where the crop(s) were grown. Each polygon in the shape file shall not be added to the shape file until crop harvest is complete.

Each polygon shall contain crop growing season start and end dates, anticipated crop, actual crop planted, actual crop yield, actual crop nutrients removed (N, P, K), next anticipated crop and next planned biosolids, biolime, and digested biomass application date.

6. Within six months from the effective date of these Orders, Respondent's enhanced oversight program detailed in its March 31, 2010 letter will be modified to incorporate any of the program enhancements that Respondent is required to meet under Order Nos. 4, 5 and 6. The enhanced oversight program shall include the following elements:

   a. Field verifications will be scheduled at least once per quarter for fields receiving digested biosolids and digested biomass during that quarter and at least once per year for a minimum of 10% of the fields receiving biolime during that year. Verifications will include documentation that the crops being grown are consistent with the agronomic rate of land application of material applied on the field in question. Copies of field verifications will be submitted to Ohio EPA in accordance with Order No. 8 below.

   b. Findings from the field verifications that are not in compliance with the management plan approved under PTI No. 03-15889, these Orders, or future site approvals shall result in the appropriate corrections in land application practices or enhancements to Respondent's land application program necessary to comply with these requirements. These corrections or enhancements shall take place prior to further land application practices.

   c. Respondent will include metrics to measure the success of its land application program. Failure to meet metric goals during field verifications shall trigger Respondent to increase the frequency of future field verifications.

7. Field T1014 shall not be used by Respondent without future approval from Ohio EPA.

8. By January 31 of each year, Respondent shall submit to Ohio EPA, in accordance with Section X, the documentation and records kept in compliance with Order No. 4 and the enhanced oversight reports required by Order No. 6 for the previous year's application. The records shall be correlated with the maps required in Order No. 5, above.

9. At least once every two years, starting in 2012, Respondent shall hold a training session on biosolids, biomass, and biolime land application requirements, record keeping, and reporting requirements for all employees and contractors involved in the handling and management of these materials. Written documentation of each such training session shall be submitted to Ohio EPA in the annual report that includes a list of attendees, topics covered and outline of staff/contractor responsibilities (including a flow chart of individual party responsibilities and reporting hierarchy) in regards to biosolids, biomass, and biolime management. Respondent shall provide a copy of its training program, including any annual updates, to contractors that land apply biosolids, biomass, or biolime received from Respondent.

10. Upon the effective date of these Orders, Respondent shall continue to have the capacity in its storage lagoons to hold the quantity of biosolids that the plant produces over a period of at least five years.

11. Within 30 days after the effective date of these Orders, Respondent shall fill out a form provided by Ohio EPA designating one or more operators with an Ohio EPA classification of at least Class III to be the operator(s) in charge of the wastewater treatment works and sewerage system. This operator shall spend a minimum of 40 hours per week supervising only the wastewater treatment works and sewerage system.

12. Upon renewal of Respondent's NPDES permit, the Director shall reclassify Respondent's WWTP as a Class IV facility but shall include a schedule for said designation to become effective at least two years after the effective date of these Orders. After such a reclassification, Respondent shall employ or contract with a licensed Class IV wastewater operator or operators to supervise the wastewater treatment works and sewerage system in accordance with any deadline provided for that action in the permit. The operator(s) shall spend a minimum of 40 hours per week supervising only the wastewater treatment works and sewerage system, unless Ohio EPA's rules no longer contain this requirement or unless Ohio EPA has authorized Respondent to reduce this requirement pursuant to OAC Rule 3745-7-04 or some other authority.

13. Starting on the effective date of these Orders, Respondent shall employ or contract with a licensed Class IV operator or operators to supervise the public water system pursuant to, and so long as required by, OAC Rule 3745-7-03. The operator(s) shall spend a minimum of 40 hours per week supervising only the public water system unless Ohio EPA's rules no longer contain this requirement or unless Ohio EPA has authorized Respondent to reduce this requirement pursuant to OAC Rule 3745-7-03 or some other authority.

14. Respondent shall report any noncompliance with these Orders in accordance with Part III, Paragraph 12 of NPDES permit No. 2IH00021.

15. Respondent shall pay the amount of $80,000.00 in settlement of Ohio EPA's claims for civil penalties, which may be assessed pursuant to ORC Chapter 6111. Within thirty (30) days after the effective date of these Orders, payment to Ohio EPA shall be made by an official check made payable to "Treasurer, State of Ohio" for $64,000.00 of the total amount. The official check shall be submitted to Akia Smith, or her successor, together with a letter identifying the Respondent, to:

    Office of Fiscal Administration
    Ohio Environmental Protection Agency
    P.O. Box 1049
    Columbus, Ohio 43216-1049

    A photocopy of the check shall be sent to Ohio EPA's Northwest District Office in accordance with Section X of these Orders.

16. In lieu of paying $16,000.00 of the civil penalty, Respondent shall, within thirty (30) days of the effective date of these Orders, fund a supplemental environmental project (SEP) by making a contribution in the amount of $16,000.00 to the Conservation Action Project for said amount.

    A copy of the check shall be sent to Mark Mann, Enforcement Manager, Storm Water and Enforcement Section, or his successor, at the following address:

    Ohio EPA
    Division of Surface Water
    P.O. Box 1049
    Columbus, Ohio 43216-1049

17. Should Respondent fail to fund the SEP within the required time frame set forth in Order No. 16, Respondent shall immediately pay to Ohio EPA the remaining $16,000.00 of the civil penalty in accordance with the procedures in Order No. 15.

VI. TERMINATION

Respondent's obligations under these Orders shall terminate when Respondent certifies in writing and demonstrates to the satisfaction of Ohio EPA that Respondent has performed all obligations set forth in these Orders (except for obligations that otherwise would be required later than three years after the effective date of these Orders) and the Chief of Ohio EPA's Division of Surface Water acknowledges, in writing, the termination of these Orders. Ohio EPA shall not unreasonably withhold its consent to termination. If Ohio EPA does not agree that all obligations have been performed or incorporated into an applicable permit, then Ohio EPA will notify Respondent of the deficiency in which case Respondent shall have an opportunity to address any such deficiencies and seek termination as described above.

The certification shall contain the following attestation: "I certify that the information contained in or accompanying this certification is true, accurate and complete."

This certification shall be submitted by Respondent to Ohio EPA and shall be signed by a responsible official of the Respondent. For purposes of these Orders, a responsible official is defined in OAC Rule 3745-33-03(F).

VII. OTHER CLAIMS

Nothing in these Orders shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person, firm, partnership or corporation, not a party to these Orders, for any liability arising from, or related to activities occurring on or at the site.

VIII. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to these Orders shall be undertaken in accordance with the requirements of all applicable local, state and federal laws and regulations. These Orders do not waive or compromise the applicability and enforcement of any other statutes or regulations applicable to Respondent.

IX. MODIFICATIONS

These Orders may be modified by agreement of the parties hereto. Modifications shall be in writing and shall be effective on the date entered in the journal of the Director of Ohio EPA.

X. NOTICE

All documents required to be submitted by Respondent shall be addressed to:

Ohio Environmental Protection Agency
Northwest District Office/Division of Surface Water
Attention: Enforcement Supervisor
347 North Dunbridge Road
P.O. Box 466
Bowling Green, Ohio 43402

XI. RESERVATION OF RIGHTS

Ohio EPA and Respondent each reserve all other rights, privileges and causes of action, except as specifically waived in Section XII of these Orders.

XII. WAIVER

In order to resolve disputed claims, without admission of fact, violation or liability, and in lieu of further enforcement action by Ohio EPA for only the violations specifically cited in these Orders, Respondent consents to the issuance of these Orders and agrees to comply with these Orders. Compliance with these Orders shall be a full accord and satisfaction for Respondent's liability for the violations specifically cited herein and any other violations of the effluent limitations and monitoring requirements of NPDES permit No. 2IH00021 that are revealed by Respondent's monthly operating reports submitted to Ohio EPA since January 1, 2001.

Respondent hereby waives the right to appeal the issuance, terms and conditions, and service of these Orders and Respondent hereby waives any and all rights Respondent may have to seek administrative or judicial review of these Orders either in law or equity.

Notwithstanding the preceding, Ohio EPA and Respondent agree that if these Orders are appealed by any other party to the Environmental Review Appeals Commission, or any court, Respondent retains the right to intervene and participate in such appeal. In such an event, Respondent shall continue to comply with these Orders notwithstanding such appeal and intervention unless these Orders are stayed, vacated or modified.

XIII. EFFECTIVE DATE

The effective date of these Orders is the date these Orders are entered into the Ohio EPA Director's journal.

XIV. SIGNATORY AUTHORITY

Each undersigned representative of a party to these Orders certifies that he or she is fully authorized to enter into these Orders and to legally bind such party to these Orders.

IT IS SO ORDERED AND AGREED:

Ohio Environmental Protection Agency

Scott J. Nally
Director

10/23/12
Date

IT IS SO AGREED:

Campbell Soup Supply Company LLC

Signature

10/31/12
Date

DAVID R WHITE
Printed or Typed Name

SR VP GLOBAL SUPPLY CHAIN
Title

Attachment I

2IH00021*ED						
Violation Date	Station	Reporting Code	Parameter	Limit Type	Limit	Reported Value
5/1/2001	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	4.6
5/1/2001	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	85.3139
10/1/2001	001	31616	Fecal Coliform	30D Conc	1000	1000.
10/31/2002	004	00400	pH	1D Conc	6.5	6.4
7/1/2003	006	80082	CBOD 5 day	30D Conc	25	25.5
8/1/2003	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.75
8/7/2003	003	80082	CBOD 5 day	1D Conc	40	52.
8/14/2003	006	80082	CBOD 5 day	1D Conc	40	42.
10/9/2003	007	00530	Total Suspended Solids	1D Conc	45	46.
7/1/2004	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	2.2
8/1/2004	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.62
8/19/2004	007	00530	Total Suspended Solids	1D Conc	45	55.
6/1/2005	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	2.14444
7/1/2005	001	31616	Fecal Coliform	30D Conc	1000	1000.
8/1/2005	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	2.0375
9/1/2005	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.61111
8/1/2006	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	2.35
9/1/2006	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.8875
6/1/2007	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	3.45
6/1/2007	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	94.9041
7/1/2007	001	31616	Fecal Coliform	30D Conc	1000	2377.56
7/2/2007	001	31616	Fecal Coliform	1D Conc	2000	14000.
7/17/2007	001	31616	Fecal Coliform	1D Conc	2000	12000.
8/1/2007	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	4.65
8/1/2007	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	112.211
8/1/2007	001	31616	Fecal Coliform	1D Conc	2000	9000.
8/8/2007	001	31616	Fecal Coliform	1D Conc	2000	4800.
10/1/2007	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.825
10/1/2007	001	31616	Fecal Coliform	1D Conc	2000	2100.
5/1/2008	001	31616	Fecal Coliform	30D Conc	1000	2900.
5/5/2008	001	31616	Fecal Coliform	1D Conc	2000	2900.
6/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	5.0875
6/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	120.940
7/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	3.85
7/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	89.6035
8/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	6.7375
8/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	156.708
8/19/2008	006	80082	CBOD 5 day	1D Conc	40	47.
9/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	4.0875
9/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	85.0300
10/1/2008	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.73333
12/1/2008	001	80082	CBOD 5 day	30D Conc	25	31.8888
12/8/2008	001	80082	CBOD 5 day	1D Conc	40	50.
12/10/2008	001	80082	CBOD 5 day	1D Conc	40	52.

5/11/2009	001	31616	Fecal Coliform	1D Conc	2000	10075.
6/22/2009	001	80082	CBOD 5 day	1D Conc	40	41.
6/24/2009	001	00530	Total Suspended Solids	1D Conc	45	56.
6/24/2009	001	80082	CBOD 5 day	1D Conc	40	53.
7/1/2009	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	3.07143
8/1/2009	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	3.125
8/1/2009	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	64.2456
8/1/2009	008	80082	CBOD 5 day	30D Conc	25	32.6
8/3/2009	001	80082	CBOD 5 day	1D Conc	40	42.
8/13/2009	008	00530	Total Suspended Solids	1D Conc	45	52.
8/13/2009	008	80082	CBOD 5 day	1D Conc	40	73.
8/25/2009	008	80082	CBOD 5 day	1D Conc	40	76.
9/1/2009	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	4.475
9/1/2009	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	85.0442
10/6/2009	008	80082	CBOD 5 day	1D Conc	40	52.
12/1/2009	001	80082	CBOD 5 day	30D Conc	25	36.8888
12/7/2009	001	80082	CBOD 5 day	1D Conc	40	62.
12/9/2009	001	80082	CBOD 5 day	1D Conc	40	47.
12/14/2009	001	80082	CBOD 5 day	1D Conc	40	54.
7/1/2010	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	3.1
7/1/2010	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	66.2469
7/1/2010	001	80082	CBOD 5 day	30D Conc	25	30.25
8/1/2010	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	4.3
8/1/2010	001	00610	Nitrogen, Ammonia (NH3	30D Qty	60.56	82.2943
9/1/2010	001	00610	Nitrogen, Ammonia (NH3	30D Conc	1.6	1.6625
10/26/2010	009	00530	Total Suspended Solids	1D Conc	45	58.
10/26/2010	009	80082	CBOD 5 day	1D Conc	40	78.
5/2/2011	001	34044	Oxidants, Total Residu	1D Conc	0.01	.08
5/2/2011	001	34044	Oxidants, Total Residu	1D Qty	0.379	1.24148
5/4/2011	001	34044	Oxidants, Total Residu	1D Conc	0.01	.06
5/4/2011	001	34044	Oxidants, Total Residu	1D Qty	0.379	.93111
6/22/2011	001	00530	Total Suspended Solids	1D Conc	45	50.
6/22/2011	001	80082	CBOD 5 day	1D Conc	40	60.
7/1/2011	001	80082	CBOD 5 day	30D Conc	25	27.625
7/13/2011	001	80082	CBOD 5 day	1D Conc	40	55.
11/1/2011	005	80082	CBOD 5 day	30D Conc	25	37.
11/8/2011	007	80082	CBOD 5 day	1D Conc	40	58.
11/15/2011	005	80082	CBOD 5 day	1D Conc	40	58.
12/14/2011	001	80082	CBOD 5 day	1D Conc	40	50.
2/8/2012	001	80082	CBOD 5 day	1D Conc	40	44.
5/16/2012	001	34044	Oxidants, Total Residu	1D Conc	0.01	.2
5/16/2012	001	34044	Oxidants, Total Residu	1D Qty	0.379	3.3308
8/1/2012	001	00530	Total Suspended Solids	1D Conc	45	66.
8/1/2012	001	00530	Total Suspended Solids	30D Conc	30	37.6666
8/1/2012	001	80082	CBOD 5 day	1D Conc	40	49.
8/1/2012	001	80082	CBOD 5 day	30D Conc	25	29.5555
8/13/2012	001	00530	Total Suspended Solids	1D Conc	45	48.

8/13/2012	001	80082	CBOD 5 day	1D Conc	40	42.
8/15/2012	001	00530	Total Suspended Solids	1D Conc	45	52.
8/15/2012	001	80082	CBOD 5 day	1D Conc	40	44.
8/22/2012	006	80082	CBOD 5 day	1D Conc	40	49.
9/5/2012	001	31616	Fecal Coliform	1D Conc	2000	5800.
9/11/2012	008	00530	Total Suspended Solids	1D Conc	45	124.
9/27/2012	001	31616	Fecal Coliform	1D Conc	2000	2700.

2IH00021*ED						
Violation Date	Station	Reporting Code	Parameter	Sample Frequency	Expected	Reported
05/01/2001	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
05/08/2001	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
05/15/2001	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
05/22/2001	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
07/01/2003	008	00530	Total Suspended Solids	2/Week	2	0
07/01/2003	008	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
07/01/2003	008	80082	CBOD 5 day	2/Week	2	0
07/01/2003	008	00400	pH	1/Week	1	0
08/01/2002	008	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	008	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
08/01/2002	008	80082	CBOD 5 day	2/Week	2	1
10/01/2003	001	00530	Total Suspended Solids	2/Week	2	1
10/01/2003	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
10/01/2003	001	80082	CBOD 5 day	2/Week	2	1
10/01/2003	001	50060	Chlorine, Total Residu	2/Week	2	1
07/01/2003	009	00530	Total Suspended Solids	2/Week	2	0
07/01/2003	009	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
07/01/2003	009	80082	CBOD 5 day	2/Week	2	0
07/01/2003	009	00400	pH	1/Week	1	0
08/01/2002	009	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	009	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
08/01/2002	009	80082	CBOD 5 day	2/Week	2	1
07/01/2003	007	00530	Total Suspended Solids	2/Week	2	0
07/01/2003	007	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
07/01/2003	007	80082	CBOD 5 day	2/Week	2	0
07/01/2003	007	00400	pH	1/Week	1	0
08/01/2002	007	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	007	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
08/01/2002	007	80082	CBOD 5 day	2/Week	2	1
07/01/2003	006	00530	Total Suspended Solids	2/Week	2	0
07/01/2003	006	00610	Nitrogen, Ammonia (NH3	2/Week	2	0
07/01/2003	006	80082	CBOD 5 day	2/Week	2	0
07/01/2003	006	00400	pH	1/Week	1	0
08/01/2002	006	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	006	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
08/01/2002	006	80082	CBOD 5 day	2/Week	2	1
08/01/2002	005	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	005	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
08/01/2002	005	80082	CBOD 5 day	2/Week	2	1
08/01/2002	004	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	004	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
08/01/2002	004	80082	CBOD 5 day	2/Week	2	1
08/22/2003	003	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	003	00530	Total Suspended Solids	2/Week	2	1
08/01/2002	003	00610	Nitrogen, Ammonia (NH3	2/Week	2	1

08/01/2002	003	80082	CBOD 5 day	2/Week	2	1
08/01/2005	008	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	008	00665	Phosphorus, Total (P)	1/Quarter	1	0
08/01/2005	005	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	005	00665	Phosphorus, Total (P)	1/Quarter	1	0
09/08/2005	005	00530	Total Suspended Solids	2/Week	2	1
09/08/2005	005	80082	CBOD 5 day	2/Week	2	1
06/01/2004	003	00530	Total Suspended Solids	2/Week	2	0
06/08/2004	003	00530	Total Suspended Solids	2/Week	2	0
06/15/2004	003	00530	Total Suspended Solids	2/Week	2	0
06/22/2004	003	00530	Total Suspended Solids	2/Week	2	1
06/01/2004	003	50050	Flow Rate	1/Day	1	0
06/02/2004	003	50050	Flow Rate	1/Day	1	0
06/03/2004	003	50050	Flow Rate	1/Day	1	0
06/04/2004	003	50050	Flow Rate	1/Day	1	0
06/05/2004	003	50050	Flow Rate	1/Day	1	0
06/06/2004	003	50050	Flow Rate	1/Day	1	0
06/07/2004	003	50050	Flow Rate	1/Day	1	0
06/08/2004	003	50050	Flow Rate	1/Day	1	0
06/09/2004	003	50050	Flow Rate	1/Day	1	0
06/10/2004	003	50050	Flow Rate	1/Day	1	0
06/11/2004	003	50050	Flow Rate	1/Day	1	0
06/12/2004	003	50050	Flow Rate	1/Day	1	0
06/13/2004	003	50050	Flow Rate	1/Day	1	0
06/14/2004	003	50050	Flow Rate	1/Day	1	0
06/15/2004	003	50050	Flow Rate	1/Day	1	0
06/16/2004	003	50050	Flow Rate	1/Day	1	0
06/17/2004	003	50050	Flow Rate	1/Day	1	0
06/18/2004	003	50050	Flow Rate	1/Day	1	0
06/19/2004	003	50050	Flow Rate	1/Day	1	0
06/20/2004	003	50050	Flow Rate	1/Day	1	0
06/21/2004	003	50050	Flow Rate	1/Day	1	0
06/22/2004	003	50050	Flow Rate	1/Day	1	0
06/23/2004	003	50050	Flow Rate	1/Day	1	0
06/24/2004	003	50050	Flow Rate	1/Day	1	0
06/25/2004	003	50050	Flow Rate	1/Day	1	0
06/26/2004	003	50050	Flow Rate	1/Day	1	0
06/27/2004	003	50050	Flow Rate	1/Day	1	0
06/01/2004	003	80082	CBOD 5 day	2/Week	2	0
06/08/2004	003	80082	CBOD 5 day	2/Week	2	0
06/15/2004	003	80082	CBOD 5 day	2/Week	2	0
06/22/2004	003	80082	CBOD 5 day	2/Week	2	1
06/01/2004	003	00400	pH	1/Week	1	0
06/08/2004	003	00400	pH	1/Week	1	0
06/15/2004	003	00400	pH	1/Week	1	0
08/01/2005	003	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	003	00665	Phosphorus, Total (P)	1/Quarter	1	0

09/08/2005	003	00530	Total Suspended Solids	2/Week	2	1
09/08/2005	003	80082	CBOD 5 day	2/Week	2	1
10/08/2004	004	00530	Total Suspended Solids	2/Week	2	1
10/08/2004	004	80082	CBOD 5 day	2/Week	2	1
08/01/2005	004	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	004	00665	Phosphorus, Total (P)	1/Quarter	1	0
09/08/2005	004	00530	Total Suspended Solids	2/Week	2	1
09/08/2005	004	80082	CBOD 5 day	2/Week	2	1
08/01/2005	006	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	006	00665	Phosphorus, Total (P)	1/Quarter	1	0
08/01/2005	007	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	007	00665	Phosphorus, Total (P)	1/Quarter	1	0
08/08/2004	009	80082	CBOD 5 day	2/Week	2	1
08/01/2005	009	00610	Nitrogen, Ammonia (NH3	1/Quarter	1	0
08/01/2005	009	00665	Phosphorus, Total (P)	1/Quarter	1	0
06/22/2004	001	00530	Total Suspended Solids	2/Week	2	1
06/22/2004	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
06/22/2004	001	80082	CBOD 5 day	2/Week	2	1
06/22/2004	001	50060	Chlorine, Total Residu	2/Week	2	1
08/22/2004	001	50060	Chlorine, Total Residu	2/Week	2	1
11/22/2004	001	00530	Total Suspended Solids	2/Week	2	1
11/22/2004	001	00530	Total Suspended Solids	2/Week	2	1
11/22/2004	001	00530	Total Suspended Solids	2/Week	2	1
11/22/2004	001	00530	Total Suspended Solids	2/Week	2	1
11/22/2004	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
11/22/2004	001	80082	CBOD 5 day	2/Week	2	1
11/22/2004	001	80082	CBOD 5 day	2/Week	2	1
11/22/2004	001	80082	CBOD 5 day	2/Week	2	1
11/22/2004	001	80082	CBOD 5 day	2/Week	2	1
02/22/2005	001	00530	Total Suspended Solids	2/Week	2	1
02/22/2005	001	00530	Total Suspended Solids	2/Week	2	1
02/22/2005	001	00530	Total Suspended Solids	2/Week	2	1
02/22/2005	001	00530	Total Suspended Solids	2/Week	2	1
02/22/2005	001	00610	Nitrogen, Ammonia (NH3	2/Week	2	1
02/22/2005	001	80082	CBOD 5 day	2/Week	2	1
02/22/2005	001	80082	CBOD 5 day	2/Week	2	1
02/22/2005	001	80082	CBOD 5 day	2/Week	2	1
02/22/2005	001	80082	CBOD 5 day	2/Week	2	1
03/01/2005	001	01220	Chromium, Dissolved He	1/Quarter	1	0
03/01/2005	001	00515	Residue, Total Dissolv	1/Quarter	1	0
03/01/2005	001	01082	Strontium, Total (Sr)	1/Quarter	1	0
07/01/2005	001	01330	Odor, Severity	1/Day	1	0
07/02/2005	001	01330	Odor, Severity	1/Day	1	0
07/03/2005	001	01330	Odor, Severity	1/Day	1	0
07/04/2005	001	01330	Odor, Severity	1/Day	1	0
07/05/2005	001	01330	Odor, Severity	1/Day	1	0
07/06/2005	001	01330	Odor, Severity	1/Day	1	0

07/07/2005	001	01330	Odor, Severity	1/Day	1	0
07/08/2005	001	01330	Odor, Severity	1/Day	1	0
07/09/2005	001	01330	Odor, Severity	1/Day	1	0
07/10/2005	001	01330	Odor, Severity	1/Day	1	0
07/01/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/02/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/03/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/04/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/05/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/06/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/07/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/08/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/09/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/10/2005	001	01350	Turbidity, Severity	1/Day	1	0
07/01/2005	001	50060	Chlorine, Total Residu	2/Week	2	0
05/01/2006	001	00719	Cyanide, Free	1/Month	1	0
01/01/2007	001	01330	Odor, Severity	1/Day	1	0
03/01/2007	001	01220	Chromium, Dissolved He	1/Quarter	1	0
03/01/2007	001	00515	Residue, Total Dissolv	1/Quarter	1	0
03/01/2007	001	01082	Strontium, Total (Sr)	1/Quarter	1	0
07/01/2007	001	00719	Cyanide, Free	1/Month	1	0
11/30/2007	003	50050	Flow Rate	1/Day	1	0
11/01/2007	009	00400	pH	1/Week	1	0
11/08/2007	009	00400	pH	1/Week	1	0
11/15/2007	009	00400	pH	1/Week	1	0

Attachment II

Exhibit A
SNC Conventional Pollutants
(40% exceedance of limit)

Group I Pollutants-TRC=1.4

Oxygen Demand
Biochemical Oxygen Demand
Chemical Oxygen Demand
Total Oxygen Demands
Total Organic Carbon
Other

Solids
Total Suspended Solids (Residues)
Total Dissolved Solids (Residues)
Other

Nutrients
Inorganic Phosphorus Compounds
Inorganic Nitrogen Compounds
Other

Detergents and Oils
MBAS
NTA
Oil and Grease
Other detergents or algicides

Minerals
Calcium
Chloride
Fluoride
Magnesium
Sodium
Potassium
Sulfur
Sulfate
Total Alkalinity
Total Hardness
Other Minerals

Metals
Aluminum
Cobalt
Iron
Vanadium

Exhibit B
SNC Toxic Pollutants
(20% exceedance of limit)

Group II Pollutants-TRC=1.2

Metals (all forms)
Other metals not specifically listed under Group I

Inorganic
Cyanide
Total Residual Chlorine

Organics
All organics are Group II except those specifically listed under Group I.3

Attachment III

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Ac.)

CODE 590

DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

PURPOSE

- To budget, supply, and conserve nutrients for plant production.
- To minimize agricultural nonpoint source pollution of surface and groundwater resources.
- To properly utilize ~~commercial fertilizer, manure and/or~~ organic by-products as a plant nutrient resource or soil amendment.
- ~~To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.~~
- To maintain or improve the physical, chemical, and biological condition of soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied.

CRITERIA

General Criteria Applicable to All Purposes

All Nutrients:

~~Plans for nutrient management are to comply with all applicable Federal, state, and local laws and regulations.~~ A nutrient budget for nitrogen, phosphorus, ~~and potassium~~ must be developed that considers all potential sources of nutrients including, but not limited to, green manure, legumes, crop residues, compost, animal manure, organic by-products, biosolids, waste water, organic matter, soil biological activity, commercial fertilizer, and irrigation water.

~~For nutrient risk assessment policy and procedures see Title 190, General Manual (GM), Part 402, Nutrient Management, and Title 190, National Instruction (NI), Part 302, Nutrient Management Policy Implementation. The Nitrogen and Phosphorous Transport Risk Assessment Procedures is attached as Appendix I.~~

~~To avoid salt damage, the rate and placement of applied nitrogen and potassium in starter fertilizer must be consistent with the Tri-State Fertility Guide recommendations, or industry practice.~~

~~The NRCS-approved nutrient risk assessment for nitrogen must be completed on all sites unless the State NRCS, with the concurrence of State water quality control authorities, has determined specific conditions where nitrogen leaching is not a risk to water quality, including drinking water.~~

The Phosphorous Index Risk Assessment Procedure (P-Risk Index) or Soil Test Risk Assessment Procedure (STRAP) must be completed when:

- Soil Test Phosphorus (STP) levels exceed the maintenance limit in the Tri-State Fertility Guide (Extension Bulletin E-2567) for the planned crop and/or the planned phosphorus application rate exceeds recommended rates. (There is no agronomic reason to apply nutrients when soil tests are above the maintenance plateau level)

See Appendix I at the end of this standard for an explanation of the Ohio NRCS Risk Assessment Procedures.

A phosphorus risk assessment will not be required for fields that have a documented agronomic need for phosphorus based on soil test phosphorus (STP) level and the Tri-State Fertility Guide (Extension Bulletin E-2567) nutrient recommendations. On organic operations, the nutrient sources and management must be consistent with the USDA's National Organic Program and meet the requirements of this practice standard.

Areas contained within minimum application setbacks (e.g., sinkholes, wellheads, gullies, ditches, or surface inlets) must receive nutrients consistent with the setback restrictions. (See Table 4 Minimum Setback Distances for the Application of Manure and other Organic By-Products at the end of this standard for setback).

Applications of irrigation water must minimize the risk of nutrient loss to surface and groundwater.

Soil pH must be maintained in a range that enhances an adequate level for crop nutrient availability and utilization. Refer to the Tri-State Fertility Guide or the Ohio Agronomy Guide for guidance.

~~**Commercial Fertilizer:**~~

~~Enhanced-efficiency fertilizers, used in the State must be defined by the Association of American Plant Food Control Officials (AAPFCO) and be accepted for use by the State fertilizer control official, or similar authority, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition) and label claims.~~

~~To avoid salt damage, the rate and placement of applied nitrogen and potassium in starter fertilizer must be consistent with The Ohio State University guidelines, or industry practice recognized by the university.~~

Soil, ~~Manure,~~ and Tissue Sampling and Laboratory Analyses (Testing):

All Nutrients:

Nutrient planning must be based on current soil, ~~manure,~~ and (where used as supplemental information) tissue test results developed in accordance with The Ohio State University guidance, or industry practice, if recognized by the university.

Current soil tests are those that are no older than 3 years or as required by State code or at shorter intervals if nutrient applications and crop yields are sufficiently variable to make nutrient status levels difficult to predict.

Soil samples for soil tests should represent 25 acres or less. Soil sampling depth for P and K shall be 6-8 inches. Under no till conditions pH should be tested at a depth of 4 inches or less.

~~For precision nutrient management plans, soil samples for soil tests should represent 12 acres or less for a zone management system and 6 acres or less for grid sampling. When a zone precision nutrient management plan is being developed, soil fertility, soil types, cropping history, and crop management practices should be taken into consideration when delineating the zones.~~

Soil tests taken soon after nutrient application may produce high (inaccurate) nutrient results.

The soil and tissue tests must include analyses pertinent to monitoring or amending the annual nutrient budget, e.g., pH, electrical conductivity (EC) and sodicity (where salts are a concern), soil organic matter, phosphorus, potassium, calcium, magnesium, and CEC and other nutrients where they are known to be crop limiting and test for nitrogen where applicable. Follow The Ohio State University guidelines regarding required sampling procedures and test methodology.

Soil samples shall be collected and prepared according to The Ohio State University guidance or standard industry practice. Soil test analyses shall be performed by laboratories that can provide the North Central Region 13 (NCR 13) method of testing. (NCR 13 specifies extraction methods appropriate for the Midwest conditions). Laboratories must successfully meet the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP) under the auspices of the Soil Science Society of America (SSSA) and NRCS.

Manure:

Nutrient values of ~~manure,~~ organic by-products and biosolids must be determined prior to land application.

~~Manure,~~ organic by-products and bio-solids analyses must include, at minimum, total nitrogen (N), ammonium N, nitrate N, total phosphorus (P) as P_2O_5, total potassium (K) as K_2O, and percent solids, or follow The Ohio State University guidance regarding required analyses.

~~The use of manure as a nutrient source is to be based on at least~~ one annual ~~analysis of the material in storage prior to application. Manure, organic by-products, and biosolids samples must be collected and analyzed at least annually from each separate storage facility, or more frequently if needed to account for operational changes (feed management, animal type, manure handling strategy, etc.) impacting manure nutrient concentrations. If no operational changes occur, less frequent manure testing is allowable where operations can document a stable level of nutrient concentrations for the preceding three consecutive years, unless federal, State, or local regulations require more frequent testing. Samples must be collected, prepared, stored, and shipped, following testing lab sampling requirements, The Ohio State University guidance or industry practice.~~

~~When planning for new or modified livestock operations manure nutrient values can be obtained from acceptable "book values" recognized by the NRCS (e.g., NRCS Agricultural Waste Management Field Handbook), the Ohio Livestock Manure Management Guide (Bulletin 604-06), or the Midwest Plan Service if manure from the existing operation is not available. Analyses from similar operations in the geographical area may be used if they accurately represent nutrient output storage and treatment methods of the proposed operation.~~

~~Manure testing analyses must be performed by laboratories successfully meeting the requirements and performance standards of the Manure Testing Laboratory Certification program (MTLCP) under the auspices of the Minnesota Department of Agriculture, or other NRCS approved program that considers laboratory performance and proficiency to assure accurate manure test results.~~

Nutrient Application Rates:

All Nutrients:

At a minimum, determination of nutrient application rate must be based on current soil test results, a cropping sequence, and realistic yield goals utilizing the recommendations from the Tri-State Fertility Guide. ~~If nutrients from manure are applied in excess of agronomic need, an NRCS-approved nutrient risk assessments must be completed.~~

Realistic yield goals must be established based on a combination of the following… historical yield data (specific farm or county data if specific farm data is not available), soil productivity information, climatic conditions, nutrient test results, level of management, future management considerations, and local research results considering comparable production conditions as available. Applications of all sources of nutrients, including biosolids, starter fertilizers, or pop-up fertilizers must be accounted for in the nutrient budget.

Estimates of yield response must consider factors such as poor soil quality, drainage, pH, salinity, etc., before recommendations of adequate levels of nitrogen and/or phosphorus can be established.

For new crops or varieties, other land grant universities, industry- demonstrated yield, and nutrient utilization information may be used until The Ohio State University information is available.

Develop nutrient draw-down strategies when the phosphorus risk assessment procedures indicate a very high risk of transport. In addition to not applying additional nutrients, draw-down strategies may include changing the rotation to crops having higher nutrient demands, removal of crop biomass (e.g. straw or hay), and utilizing harvested cover crops to remove nutrients from the system.

Lower-than-recommended nutrient application rates are permissible if the grower's objectives are met. Participation in an Adaptive Nutrient Management on-farm trial is a good way to help achieve yield goals while minimizing nutrient application.

Maximum Allowable Nutrient Application Rates:

The maximum allowable rate of nutrient application are to be determined based on the following:

Phosphate (P_2O_5), and potash (K_2O) application rates are to follow the recommended rates in the Tri-State Fertility Guide (Extension Bulletin E-2567. ~~[See "Manure" section below in for livestock operations that produce more nutrients (manure) than can be utilized by crops].~~ Excess potash is not to be applied in situations in which it causes unacceptable nutrient imbalances in crops or forages.

Nitrogen rates will be based on the economic threshold models developed by Purdue University or The Ohio State University. Adjust N rates for contributions from previous crops (legumes or forages), and soil organic matter.

Applications of phosphate (P_2O_5), and potash (K_2O) via fertilizer, manure, or other organic by-products can be made for multiple years of the rotation as long as

- no more than 500 Lbs/ac of potash (K_2O) are applied in any one year.
- no more than 250 Lbs/ac of (P_2O_5) are applied in any one year.

NOTE: In cases where liquid manure exceeds 60 Lbs P2O5 per 1000 gallons or solid manure exceeds 80 Lbs P_2O_5 per ton the P_2O_5 rates can be increased up to a maximum of 500 Lbs P_2O_5 /acre as long as nitrogen rates for the next crop are not exceeded nor the annual limit for K_2O of 500 Lbs/acre.

~~Commercial Fertilizer:~~

~~Planned nutrient application rates for phosphorus and potassium must not exceed the Tri-State Fertility Guide recommendations. Nitrogen rates will be based on the economic threshold models developed by Purdue University or The Ohio State University.~~

~~When applying fertilizer, the phosphorus application rate can account for multiple years in the crop rotation in one application. When such applications are made, the rate must not exceed:~~

- ~~the acceptable phosphorus risk assessment criteria~~
- ~~and no additional phosphorus may be applied in the current year or any additional years for which the single application of phosphorus is supplying nutrients.~~

~~Manure:~~

~~Application rates for manure are to be based on the most limiting factor of nutrient content, volume/weight limitation of the material.~~

~~When applying manure, the phosphorus application rate can account for multiple years in the crop rotation in one application. When such applications are made, the rate must not exceed:~~

- ~~the acceptable phosphorus risk assessment criteria~~
- ~~the recommended nitrogen application rate for the current crop.~~
- ~~and no additional phosphorus may be applied in the current year or any additional years for which the single application of phosphorus is supplying nutrients.~~

~~Planned nutrient application rates for phosphorus and potassium should not exceed the Tri-State Fertility Guide recommendations. For livestock operations that produce more nutrients (manure) than can be utilized by crops and nutrient planned application rates exceed Tri-State Fertility Guide recommendations, an NRCS- approved nutrient risk assessment must be completed prior to nutrient application. Nutrient application beyond agronomic need should be viewed as a short term solution and other alternatives such as reducing nutrients in the manure and/or developing manure marketing strategies should be strongly considered.~~

~~For fields receiving manure, where phosphorus risk assessment results equate to:~~

~~LOW RISK:~~

~~Additional phosphorus can be applied at rates greater than crop requirement not to exceed the nitrogen requirement for the succeeding crop~~

~~MODERATE RISK:~~

~~Additional phosphorus may be applied at a phosphorus crop requirement rate for the planned crops in the rotation.~~

~~HIGH RISK:~~

~~Additional phosphorus may be applied at phosphorus crop removal rates if the following requirements are met:~~

- ~~there is less than a 50% chance of rainfall of more than ½ inch within 24 hours.~~
- ~~a long term soil phosphorus drawdown strategy has been implemented, and~~
- ~~a site assessment for nutrients and soil loss has been conducted to determine if mitigation practices are required to protect water quality.~~

~~Any deviation from these high risk requirements must have the approval of the Chief of the NRCS.~~

~~Nitrogen rates will be based on the economic threshold models developed by Purdue University or The Ohio State University. Manure or organic by-products may be applied on legumes at rates equal to the estimated removal of nitrogen in harvested plant biomass or not to exceed 150 lbs/acre of N, whichever is less.~~

~~Additional Criteria for Liquid Manure:~~
~~For liquid manure, the application rate is to be adjusted to the most limiting factor to avoid ponding, surface runoff, subsurface drainage (tile) discharge, the nutrient needs of the field, or the nitrogen or phosphorus risks for the field. The total application is not to exceed the field capacity of the upper 8 inches of soil. See Table 1, of this standard (Available Water Capacity (AWC) Practical Soil Moisture Interpretations for Various Soils Textures and Conditions to Determine Liquid Manure Volume Applications not to exceed AWC) to determine AWC and the amount (volume) that can be applied to reach the AWC. The actual application rate shall be adjusted during application to avoid ponding or runoff. Bare/Crusted soils may require some tillage to improve infiltration. See Table 3, of this standard, (Determining The Most Limiting Manure Application Rates) to determine the most limiting application rate factor base on the field condition and site limitations.~~

Additional Criteria for Nitrogen Application via ~~Manure,~~ Organic By-Products, and Biosolids (during Summer and Fall Periods):
On fields with a "High Nitrogen Leaching Potential" (rating more than 10) and with no growing crop, manure and other organic by-products application is to be limited to 50 Lbs/ac of Nitrogen (Ammonium N + 1/3 of the Organic N) calculated at the time of application from June to October 1st to limit nitrogen leaching. When a grass or legume cover crop is growing or established immediately after manure application, ~~manure or other~~ organic by-products can be applied prior to October 1st at the recommended Nitrogen rate for the next non-legume crop or the nitrogen removal rate for the next legume (maximum 150 Lbs/ac) crop.

Nutrient Sources:

All Nutrients:

Nutrient sources utilized must be compatible with the application timing, tillage and planting system, soil properties, crop, crop rotation, soil organic content, and local climate to minimize risk to the environment.

Nutrient Application Timing and Placement:

All Nutrients:

Timing and placement of all nutrients must correspond as closely as practical with plant nutrient uptake (utilization by crops or cover crops), and consider nutrient source, cropping system limitations, soil properties, weather conditions, drainage system, soil biology, and nutrient risk assessment results.

Nutrients from any source must not be surface-applied if nutrient losses offsite are likely. This precludes spreading on:

- Frozen and/or snow-covered soils
  and not
- When the top 2 inches of soil are saturated from rainfall or snow melt.
- When there is a greater than 50% chance of rainfall of more than ½ inch within 24 hours.

~~Manure:~~

~~Where manure is to be spread on land not owned or controlled by the producer, the nutrient management plan, as a minimum, shall document the amount of manure to be transferred and who will be responsible for the environmentally acceptable use of the manure.~~

~~Additional Criteria for Fields Prone to Flooding:~~
~~Agricultural manure is not to be land applied on soils that are frequently flooded, as defined by the National Cooperative Soil Survey (or in the Flooding Frequency Soil List posted in Section II eFOTG), during the period when flooding is expected unless incorporated immediately.~~

~~Additional Criteria for Subsurface (tile) Drained Fields:~~
~~Fields or areas of fields that are subsurface (tile) drained require additional precautions. When liquid manure is applied to fields with subsurface drains, the liquid can follow soil macropores directly to the tile drains creating a surface water pollution hazard from direct tile discharge. A field is considered subsurface drained if 1/3 or more of the field is subsurface drained; however, even a field with one subsurface drainage line may present a risk of manure/wastewater movement to subsurface drains and cause a direct discharge.~~

1. ~~Do not apply application rates (volume) that would exceed the lesser of the AWC in the upper 8 inches or ½ in per acre or approximately 13,500 gallons/acre per application.~~
2. ~~Manure is applied to a growing cover crop or cover crop. If the field is not established in a growing cover crop or cover crop, prior to manure application:~~
   a. ~~Use a vertical tillage tool that can disrupt/close (using horizontal fracturing) the preferential flow paths (worm holes, cracks, root channels) in the soil, or till the surface of the soil 3-5 inches deep to a condition that will absorb the liquid manure. The purpose is to have the surface soil act as a sponge to soak up the liquid manure and keep it out of preferential flow channels. This is especially important if shallow tile are present (< 2 feet deep). Any pre-application tillage should leave as much residue as possible on the soil surface. The adsorption of liquid manure by the soil in the root zone will minimize nitrogen loss and the manure/nutrient runoff potential. For perennial crops (hay or pasture), or continuous no till fields where tillage is not an option, all tile outlets from the application area are to be plugged prior to application. This criteria may be waived if the producer can verify there is no prior history of manure discharge via subsurface drains. However, if there is a discharge the producer is liable for damages.~~
   b. ~~If injection is used, inject only deep enough to cover the manure with soil. Till the soil at least 3 inches below the depth of injection prior to application, or all tile outlets from the application area are to be plugged prior to application. This criteria may be waived if the producer can verify there is no prior history of manure discharge via subsurface drains. However, if there is a discharge the producer is liable for damages.~~
   c. ~~In addition to tillage prior to surface liquid manure application or injection, install in-line tile flow control structures or inflatable tile plugs that can mechanically stop or regulate tile flow either prior to application, or have on site if needed to stop tile flow. Use caution not to back tile water where it may impair the functioning of an offsite subsurface drainage system. This criteria may be waived if the producer can verify there is no prior history of manure discharge via subsurface drains. However, if there is a discharge the producer is liable for damages.~~
3. ~~Repair broken tile or blow holes prior to application.~~

~~Additional Criteria for Surface Drained Fields:~~

~~Fields or areas of fields that have systematic "surface drainage" systems (e.g. shallow surface drains spaced 100 – 200 feet apart – NRCS Practice Code 607). These "internal" surface drains are considered concentrated flow areas. However, if special precautions are taken, manure can be applied in the surface drains with minimal risk of surface runoff. THIS DOES NOT APPLY TO THE COLLECTOR SURFACE DRAINS (mains) OR DRAINS BORDERING THE FIELDS. The following special manure application techniques shall be used:~~

~~a. Limit LIQUID application rates to 13,000 gallons per acre or less per application.~~

~~b. Manure is applied to a growing cover crop.~~

~~c. If the field is not established in a growing cover crop, till the surface at least 3 to 5 inches deep prior to liquid manure surface application. For SOLID manure incorporate within 24 hours. This can be done with a heavy disk, chisel plow, plow, field cultivator, AERWAY tool, or similar tool that can provide "full width" soil disturbance to a depth of 3-5 inches.~~

~~d. Surface apply the liquid manure uniformly over the entire soil surface on a growing cover crop or a freshly tilled soil.~~

~~e. For fields that have no subsurface (tile) drainage, the liquid manure can be injected directly with no prior tillage.~~

~~Additional Criteria for Highly Sloping Fields:~~

~~Organic nutrients applied to cropland over 15% slope or to pastures/hayland over 20% slope unless one of the following precautions is taken:~~

~~a. Manure is applied to a growing cover crop.~~

~~b. If there is not a growing cover crop, immediate incorporation, banding, or injection with operations done on the contour, UNLESS the field has 80% ground cover (residue and/or canopy).~~

~~c. Applications are timed during periods of lower runoff and/or rainfall (Late May to Mid-October).~~

~~d. Apply low rates through split applications (separated by rainfall events). Apply no more than 10 wet tons/acre for solid manure/wastes; or 5000 gallons/acre for liquid manure/wastes.~~

~~e. The field is established in a no-till cropping system with alternate strips in grass or legume.~~

Setback Distances:

No application of ~~manure or~~ organic by-products shall be made within a minimum distances shown in Table 4 Minimum Setback Distances for the Application of Manure and Other Organic By Products. ~~These distances may need to be increased due to local conditions e.g. pond or lake used for a water supply or recreation area, or a stream that is already impaired by excess nutrients, etc.~~ Setback distances from water and drainageways etc. is measured from the top of the edge of the bank at field level.

~~Emergency application of manure to frozen and /or snow covered soil:~~

~~Application on frozen and snow covered soil is not acceptable. However, in an emergency, if manure application becomes necessary on frozen or snow covered soils, only limited quantities of manure shall be applied to address manure storage limitations until non frozen soils are available for manure application. These situations need to be documented in the Comprehensive Nutrient Management Plan (CNMP) and in the producer records. If winter application becomes necessary, applications are to be applied only if ALL the following criteria are met:~~

~~a. Application rate is limited to 10 wet tons/acre for solid manure more than 50% moisture is and 5 wet tons for manure less than 50% moisture. For Liquid manure the application rate limited to 5000 gallons/acre.~~

~~b. Applications are to be made on land with at least 90% surface residue cover (e.g. growing cover crop, good quality hay or pasture field, all corn grain residue remaining after harvest, all wheat residue cover remaining after harvest).~~

c. ~~Manure shall not be applied on more than 20 contiguous acres. Contiguous areas for application are to be separated by a break of at least 200 feet. Utilize those areas for manure application that are furthest from streams, ditches, waterways, surface water, etc (areas that present the least runoff potential and are furthest from surface water).~~

d. ~~Increase the application setback distance to 200 feet "minimum" from all grassed waterways, surface drainage ditches, streams, surface inlets, water bodies. This distance may need to be further increased due to local conditions.~~

e. ~~The rate of application shall not exceed the rates specified in Table 3 – Determining The Most Limiting Manure Application Rates for winter application.~~

f. ~~Additional winter application criteria for fields with significant slopes more than 6% (fields exceeding 6% are to be identified in the CNMP). Manure shall be applied in alternating strips 60 to 200 feet wide generally on the contour, or in the case of contour strips on the alternating strips.~~

~~**Additional Criteria to Minimize Agricultural Nonpoint Source Pollution of Surface and Groundwater**~~

~~All Nutrients:~~

~~All the additional criteria will be met by developing the plan under Purdue Manure Management Planner (MMP) using the Ohio MMP Templates including.~~

~~(1) RUSLEII~~
~~(2) Nitrogen Leaching Index~~
~~(3) Phosphorus Risk Index~~

~~When there is a high risk of transport of nutrients, conservation practices must be coordinated to avoid, control, or trap manure and nutrients before they can leave the field by surface or subsurface drainage (e.g., tile). The number of applications and the application rates must also be considered to limit the transport of nutrients to tile. Erosion, runoff, and water management controls are to be installed, as needed, on fields where nutrients are applied. Sheet and rill erosion shall be managed within the tolerable soil loss for the field (using current NRCS Sheet and Rill Erosion Prediction Technology found in Section I, eFOTG, Ohio NRCS) and ephemeral and gully erosion shall meet minimum quality criteria state in Section III, eFOTG, Ohio – NRCS.~~

~~Nutrients must be applied with the right placement, in the right amount, at the right time, and from the right source to minimize nutrient losses to surface and groundwater. The following nutrient use efficiency strategies or technologies must be considered:~~

- ~~slow and controlled release fertilizers~~
- ~~nitrification and urease inhibitors~~
- ~~enhanced efficiency fertilizers~~
- ~~incorporation or injection~~
- ~~timing and number of applications~~
- ~~soil residual N testing~~
- ~~coordinate nutrient applications with optimum crop nutrient uptake~~
- ~~Corn Stalk Nitrate Test (CSNT for post-mortem nitrogen status evaluation), Pre-Sidedress Nitrate Test (PSNT), and Pre-Plant Soil Nitrate Test (PPSN)) and other residual N testing that can be used to predict nitrogen availability in the soil~~
- ~~tissue testing, chlorophyll meters, and spectral analysis technologies~~
- ~~other Ohio State University recommended technologies that improve nutrient use efficiency and minimize surface or groundwater resource concerns.~~

~~Additional Criteria Applicable to Properly Utilize Manure or Organic By-Products as a Plant Nutrient Source~~

~~**Manure:**~~

~~Crop production activities and nutrient use efficiency technologies must be coordinated to take advantage of mineralized plant available nitrogen to minimize the potential for nitrogen losses due to denitrification or ammonia volatilization.~~

~~**Additional Criteria to Protect Air Quality by Reducing Odors, Nitrogen Emissions and the Formation of Atmospheric Particulates**~~

~~**All Nutrients:**~~

~~To address air quality concerns caused by odor, nitrogen, sulfur, and/or particulate emissions; the source, timing, amount, and placement of nutrients must be adjusted to minimize the negative impact of these emissions on the environment and human health. One or more of the following may be used:~~

- ~~slow or controlled release fertilizers~~
- ~~nitrification inhibitors~~
- ~~urease inhibitors~~
- ~~nutrient enhancement technologies~~
- ~~incorporation~~
- ~~injection~~
- ~~stabilized nitrogen fertilizers~~
- ~~residue and tillage management~~
- ~~no till or strip till~~
- ~~other technologies that minimize the impact of these emissions~~

~~**Manure:**~~

~~Do not apply poultry litter, manure, or organic by products of similar dryness/density when there is a high probability that wind will blow the material offsite.~~

~~Ways to minimize the impact of odors of land applied manure include:~~

- ~~Making application at times when temperatures are cool and when wind direction is away from neighbors.~~
- ~~If manure is spread on warm days, do so in the morning.~~
- ~~On windy days, odors travel shorter distances before being mixed in the atmosphere to the point that odor is not detected.~~
- ~~Do not spread on calm, humid days unless the field is isolated.~~
- ~~Communicate with neighbors to plan applications that do not interfere with holidays or outdoor social functions.~~
- ~~Injection or immediate incorporation will minimize odors.~~

~~Special Criteria for Manure Irrigation to Minimize Odors:~~

- ~~Use lower pressure nozzles (less than 80 psi) to reduce the aerosol effects of fine droplets.~~
- ~~Use low trajectory nozzles to reduce drift..~~
- ~~Use "Pulse Irrigation Technology" to improve infiltration.~~

~~Additional Criteria to Improve or Maintain the Physical, Chemical, and Biological Condition of the Soil to Enhance Soil Quality for Crop Production and Environmental Protection~~

~~All Nutrients:~~

~~Incorporate cover crops into the rotation~~

~~Utilized reduced tillage systems such as no tillage or strip tillage.~~

~~Time the application of nutrients to avoid periods when field activities will result in soil compaction or the creation of ruts.~~

~~In areas where salinity is a concern, select nutrient sources that minimize the buildup of soil salts.~~

CONSIDERATIONS

All Nutrients:

Use a system of practices to sequester nutrients, increase soil organic matter, increase aggregate stability, reduce compaction, improve infiltration, and enhance soil biological activity to improve nutrient use efficiency.

These include:

- Precision Nutrient Management (590)
- Conservation Crop Rotation (328)
- Residue and Tillage Management (329, 345, or 346)
- Controlled Traffic Farming (720)
- Cover Crop (340)
- Critical Area Planting (342)
- Grassed Waterway (412)
- Filter Strips/Areas (393)
- Conservation Cover (327) / Filter Recharge Areas (FSA CP1 and CP2)
- Diversion (362)
- Riparian Herbaceous Cover (390)
- Riparian Forest Buffer (391)
- Constructed Wetlands (656) / Wetland Restoration (657) / Wetland Creation (658)
- Drainage Water Management (554)
- Structure for Water Control (587)
- Bio-Reactors and Tile Discharge Filters

Consider application methods and timing that reduce the risk of nutrients being transported to ground and surface waters, or into the atmosphere. Suggestions include:

a. Split applications of nitrogen to provide nutrients at the times of maximum crop utilization.
b. Greater nitrogen efficiency for crop production and reduced leaching potential can be obtained by applying the most of the recommended nitrogen rate for full season spring planted crops as a sidedress application.
c. Maintain adequate levels of potassium and a balance of all crop nutrients to optimize nutrient efficiencies including nitrogen
d. Avoiding winter nutrient application for spring seeded crops.
e. Band applications of phosphorus near the seed row.
f. Inject or incorporate nutrients with good erosion control practices to reduce surface runoff of nutrients, especially Phosphorus.
g. Applying nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques.

Use cover crops (i.e., wheat, rye, ryegrass, oats) to recycle nutrients, improve soil health and reduce soil erosion. It is critical to establish cover crops in the early fall to achieve the desired results.

~~Consider using nitrification inhibitors for early spring N applications especially on poorly and somewhat poorly drained soils.~~

Keep good field records of soil test results, yields achieved, and nutrients applied (time, form, rate, and method of application).

~~Consider annual reviews to determine if changes in the nutrient budget are desirable (or needed) for the next planned crop.~~

Perform periodic inspections of tile systems to repair blow holes, broken tile, and inlets.

~~On sites on which there are special environmental concerns, consider other sampling techniques. (For example: Soil profile sampling for nitrogen, Pre-Sidedress Nitrogen Test (PSNT), Pre-Plant Soil Nitrate Test (PPSN) or soil surface sampling for phosphorus accumulation or pH changes.)~~

~~Use legume crops and cover crops to provide nitrogen through biological fixation and nutrient recycling.~~

~~Consider a balance of crop nutrients for maximum efficiency. For example: excessive levels of some nutrients can cause induced deficiencies of other nutrients, e.g., high soil test phosphorus levels can result in zinc deficiency in corn.~~

~~Workers should be protected from and avoid unnecessary contact with plant nutrient sources. Extra caution must be taken when handling anhydrous ammonia or when dealing with organic manure stored in unventilated enclosures.~~

~~Use the adaptive nutrient management learning process to improve nutrient use efficiency on farms as outlined in the NRCS' National Nutrient Policy in GM 190, Part 402, Nutrient Management.~~

~~Material generated from cleaning nutrient application equipment should be utilized in an environmentally safe manner. Excess material should be collected and stored for approved disposal method or field applied in an appropriate manner.~~

~~Nutrient containers should be recycled in compliance with State and local guidelines or regulations.~~

~~**Manure:**~~

~~Apply a minimum of 1-2 dry tons/acre/year of manure, organic by-products, or biosolids to supplement low biomass producing crops (soybeans, corn silage, canola, sunflowers, etc.) or enhance soil tilth after high biomass crops.~~

~~If injection is desired consider using straight points and spaced closer (< 30 inches, 10-15 inches would be better) to reduce the volume of liquid manure coming out of each knife point (or a disk type implement with a distribution manifold for even distribution across the swath). This helps to reduce the volume that can reach the preferential flow channels. If injection is used, it should only be deep enough to cover the manure with soil.~~

~~The pathogens and other pathogenic organisms may be contained in manure and should be utilized in a manner that minimizes their exposure to animals and humans.~~

~~It is preferable to apply manure on pastures and hayland soon after cutting or grazing before re-growth has occurred. Also, limit the application rate to avoid salt damage and/or coverage to the pasture and hayland.~~

~~When fields are not suited for manure application due to weather, crop, or soil conditions, field stock piling of manure may provide an option to move manure to fields for later application when the manure can be applied under more suitable and lower risk situations. Utilize the Ohio NRCS 634 Waste Transfer - Manure Stockpiling Job Sheet for further information.~~

~~The Ohio Livestock Waste Management Guide (OSU Bulletin 604); the Ohio Irrigation Guide; and OSU AEX 704 and 705; and EPA CAFO Rules on manure application provide additional guidelines and procedures for land application of animal manure.~~

~~A planned grazing system can substantially reduce manure to be mechanically handled and spread to reduce cost and environmental hazards.~~

~~Avoid applying lime stabilized biosolids on soils with a pH > 7.5.~~

~~Immediate incorporation of land applied manure, biosolids, or organic by-products.~~
~~If fields have a history of liquid manure entering the subsurface drainage system, the subsurface drainage outlets should be closed or plugged **prior** to application.~~

~~Avoid applications through surface waterways and by methods that would cause nutrients to be applied into ditches and streams through fringe particle spreading patterns.~~

Consider additional application setback distances from neighbors, environmentally sensitive areas, such as sinkholes, wells, gullies, ditches, surface inlets or rapidly permeable soil areas.

Consider the potential problems from odors associated with the land application of animal manure or other organic by-products especially when applied near or upwind of residences.

~~Consider nitrogen volatilization losses associated with the land application of animal manure. Volatilization losses can become significant, if manure or other organic by-products are not immediately incorporated into the soil after application.~~

~~Where manure nutrients are produced in excess of farm needs, develop alternate manure management systems such as transporting to fields or farms needing additional nutrients or brokering the manure to others in need of the nutrients from the manure.~~

~~Consider ways to modify the chemical/physical properties of the manure such as adding amendments to the manure that flocculate phosphorus from the liquid faction and solid /liquid separators that will concentrate nutrients and reduce transportation costs.~~

~~Apply manure at a rate that will result in an "improving" Soil Conditioning Index (SCI) without exceeding acceptable risk of nitrogen or phosphorus loss.~~

~~Modify animal feed diets to reduce the nutrient content of manure following guidance contained in Conservation Practice Standard (CPS) Code 592, Feed Management.~~

~~Additional Considerations for Precision Nutrient Management:~~

~~Soil test information should be no older than 1 year when developing new plans.~~

~~Use soil tests, plant tissue analyses, and field observations to check for secondary plant nutrient deficiencies or toxicity that may impact plant growth or availability of the primary nutrients.~~

~~Use variable-rate nitrogen application based on expected crop yields, soil variability, soil nitrate or organic N supply levels, or plant tissue chlorophyll concentration.~~

~~Use variable-rate nitrogen, phosphorus, and potassium application rates based on site-specific variability in crop yield, soil characteristics, soil test values, and other soil productivity factors.~~

~~Develop site-specific yield maps using a yield monitoring system. Use the data to further diagnose low- and high- yield areas, or zones, and make the necessary management changes. See Title 190, Agronomy Technical Note (TN) 190.AGR.3, Precision Nutrient Management Planning.~~

Considerations to Minimize Agricultural Nonpoint Source Pollution of Surface and Groundwater.

Use conservation practices that slow runoff, reduce erosion, and increase infiltration, e.g., filter strip, contour farming, or contour buffer strips. These practices can also reduce the loss of nitrates or soluble phosphorus.

Use application methods and timing strategies that reduce the risk of nutrient transport by ground and surface waters, such as:

- split applications of nitrogen to deliver nutrients during periods of maximum crop utilization,
- banded applications of nitrogen and/or phosphorus to improve nutrient availability,
- drainage water management to reduce nutrient discharge through drainage systems, and
- incorporation of surface-applied manure or organic by-products if precipitation capable of producing runoff or erosion is forecast within the time of planned application.
- Use the agricultural chemical storage facility conservation practice to protect air, soil, and water quality.
- Use bioreactors, tile discharge filters and multistage drainage strategies .

~~Considerations to Protect Air Quality by Reducing Nitrogen and/or Particulate Emissions to the Atmosphere.~~

~~Avoid applying manure and other by-products upwind of inhabited areas.~~

~~Use high efficiency irrigation technologies (e.g., reduced pressure drop nozzles for center pivots) to reduce the potential for nutrient losses.~~

PLANS AND SPECIFICATIONS

1. Plans and specifications shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s), using nutrients to achieve production goals and to prevent or minimize water quality impairment. The Purdue MMP software is the official software to be used to develop the nutrient management plan or CNMP. The Purdue MMP in conjunction with the Ohio MMP templates will generate a nutrient management plan with all the required components. For nutrient management plans that involve only commercial fertilizer additional plan formats are available in: Section I – Software and Plan Formats of the EFOTG - http://www.oh.nrcs.usda.gov/fotg/Ohio_eFOTG.htm . See references at the end of this standard for software to assist in planning and documenting specifications.

   The following components must be included in the nutrient management plan:

   - aerial site photograph(s)/imagery or site map(s), and a soil survey map of the site,
   - soil information including: soil type surface texture, pH, drainage class, permeability, available water capacity, depth to water table, restrictive features, and flooding and/or ponding frequency,
   - location of designated sensitive areas and the associated nutrient application restrictions and setbacks,
   - for manure applications, location of nearby residences, or other locations where humans may be present on a regular basis, and any identified meteorological (e.g., prevailing winds at different times of the year), or topographical influences that may affect the transport of odors to those locations,
   - results of approved risk assessment tools for nitrogen, phosphorus, and erosion losses,
   - documentation establishing that the application site presents low risk for phosphorus transport to local water when phosphorus is applied in excess of crop nutrient needs.
   - current and/or planned plant production sequence or crop rotation,
   - soil, water, compost, manure, organic by product, and plant tissue sample analyses applicable to the plan,
   - when soil phosphorus levels are increasing, include a discussion of the risk associated with phosphorus accumulation and a proposed phosphorus draw down strategy,
   - realistic yield goals for the crops,
   - complete nutrient budget for nitrogen, phosphorus, and potassium for the plant production sequence or crop rotation,
   - listing and quantification of all nutrient sources and form,
   - all enhanced efficiency fertilizer products that are planned for use,
   - in accordance with the Tri State Fertility Guide or the nitrogen and phosphorus risk assessment tool(s), specify the recommended nutrient application source, timing, amount (except for precision/variable rate applications specify method used to determine rate), and placement of plant nutrients for each field or management unit, and
   - guidance for implementation, operation and maintenance, and recordkeeping.

If increases in soil phosphorus levels are expected (i.e., when N-based rates are used), the nutrient management plan must document:

- the soil phosphorus levels at which it is desirable to convert to phosphorus based planning,
- the potential plan for soil test phosphorus drawdown from the production and harvesting of crops, and
- management activities or techniques used to reduce the potential for phosphorus transport and loss
- for AFOs, a quantification of manure produced in excess of crop nutrient requirements, and
- a long term strategy and proposed implementation timeline for reducing soil P to levels that protect water quality,

Additional Considerations for Precision Nutrient Management:

In addition, the following components must be included in a precision/variable rate nutrient management plan:

- Document the geo-referenced field boundary and data collected that was processed and analyzed as a GIS layer or layers to generate nutrient or soil amendment recommendations.
- Document the nutrient recommendation guidance and recommendation equations used to convert the GIS base data layer or layers to a nutrient source material recommendation GIS layer or layers.
- Document if a variable rate nutrient or soil amendment application was made.
- Provide application records per management zone or as applied map within individual field boundaries (or electronic records) documenting source, timing, method, and rate of all applications that resulted from use of the precision agriculture process for nutrient or soil amendment applications.
- Maintain the electronic records of the GIS data layers and nutrient applications for at least 5 years.

~~OPERATION AND MAINTENANCE~~

~~1. The owner/client is responsible for safe operation and maintenance of this practice including all equipment. Operation and maintenance addresses the following:~~

~~a. Periodic plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed and revised with each soil test cycle.~~

~~b. Protection of fertilizer and organic by-product storage facilities from weather and accidental leakage or spillage.~~

~~c. Calibration of application equipment to ensure uniform distribution of material at planned rates. If custom applied, the applicator should provide appropriate records to owner.~~

~~d. Documentation of the actual rate at which nutrients were applied. When the actual rates used differ from or exceed the recommended and planned rates, records will indicate the reasons for the differences.~~

~~e. Maintaining records to document plan implementation. As applicable, records include:~~

~~(1) The last 3 soil test results and recommendations for nutrient application for each field.~~

~~(2) Quantities, analyses and sources of nutrients applied.~~

~~(3) Dates and methods of nutrient applications.~~

~~(4) Crops planted, planting and harvest dates, yields, and crop residues removed.~~

~~(5) Results of water, plant, and organic by-product analyses.~~

~~(6) Dates of review and person performing the review, and recommendations that resulted from the review.~~

~~1. Records shall be kept for a period of five years or longer (heavy metals analyses for biosolids and associated application rates and locations are to be maintained permanently) , and include when applicable:~~

~~a. Quantity of manure produced, and its appropriate analysis.~~

~~b. The last 3 soil test results.~~

~~c. Dates, analysis, and amounts of manure that is land applied.~~

~~d. The dates and amounts of manure removed from the system due to feeding, energy production, or export from the operation.~~

~~e. Organic nutrients application methods.~~

~~f. Crops grown and yields (both yield goals and measured yield).~~

~~g. Other tests, such as determining the nutrient content of the harvested product.~~

~~h. Calibration of application equipment (Refer to Ohio State University Fact Sheet AEX 707).~~

~~i. A record of the soil moisture conditions and weather conditions (temperature and wind direction) at the time of application.~~

~~j. Monitor fields during and after application for runoff or subsurface drainage discharge.~~

~~2. The operation and maintenance plan is to include the dates of periodic inspections and maintenance of equipment and facilities used in manure utilization. The plan should include what is to be inspected or maintained, and a general time frame for making necessary repairs.~~

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Appendix I

Nitrogen and Phosphorous Transport Risk Assessment Procedures

Introduction - Nitrogen and Phosphorous Transport - Risk Assessment Procedures

Nitrogen and Phosphorous are the two nutrients most often associated with the impairment of the quality of our groundwater and surface water. Nitrogen leaching out the root zone may enter a tile and be transported to surface water or it may leach to the groundwater. The EPA Drinking Water Maximum Contaminant Level (MCL) for Nitrates is 10 mg/L. Phosphorous leachate, or runoff entering the surface water may contribute to excessive algae growth which may cause low oxygen levels in surface water. This in turn may impair aquatic live and adversely effect the taste of the water.

To supply the needed nutrients to achieve realistic yield goals and minimize the transport of nitrogen and phosphorous to ground and surface water the Nitrogen and Phosphorous Risk Assessment Procedures have been developed.

The Nitrogen and Phosphorous Risk Assessment Procedures are designed to assist the planner and the producer to identify fields or areas of a field that have varying risks of nutrient transport and assist in the planning the land treatment and management to minimize nutrient transport and achieve production goals.

NRCS, Ohio

August 2012

Nitrogen Leaching Risk Assessment

The Nitrogen Leaching Index evaluates a site's risk of nitrogen leaching out of the plant root zone into tile flow or to groundwater.

The Nitrogen Leaching Index classifies soils as having a high, medium, or low nitrogen leaching potential with relative index ratings from 0-10+ for their potential to leach nitrates below the root zone. The leaching potential is rated as high, medium, or low by combining the soil's hydrologic soil grouping (A, B, C, or D), the local county's annual rainfall, and the local county's season rainfall (Oct. 1 to March 1).

Phosphorous Transport Risk Assessments

Two phosphorous risk assessment options are available in Ohio for planners and producers to use to plan land treatment and management to minimize phosphorous transport and achieve production goals. The two options are (1) The Phosphorous Index and (2) the Soil Test Risk Assessment Procedure. It is the decision of the planner and the producer as to which method is most appropriate to meet the resource concerns and producer objectives.

(1) Phosphorous Index (P Index) Risk Assessment Procedure
The P Index is a procedure that combines well established factors that influence the transport of phosphorous to surface waters. Each of the factors is evaluated based on site specific data and weighted according to its overall effect on phosphorous transport. Each of the site subvalues are added together to establish an overall site rating of Low, Moderate, High, or Very High risk.

In most cases the use of the P Index will allow higher rates of phosphorous application than the Soil Test Risk Assessment Procedure. The use of the P Index should be viewed as a temporary measure until other alternatives can be developed to utilize excess phosphorous produced on the farm.

(2) Soil Test Risk Assessment Procedure
The Soil Test Risk Assessment Procedure establishes risk based on the soil test phosphorous level of the soil. As soil test phosphorous levels increase, water passing over the surface more easily absorbs phosphorous and transports it in the runoff. The Soil Test Risk Assessment Procedure establishes increasing levels of phosphorous application management as the soil test phosphorous levels increase. When soil test values for phosphorous reach Bray P1 of 150 ppm or more no additional phosphorous application is recommended.

The Soil Test Risk Assessment Procedure allows a more sustainable soil and water resource system because it establishes a maximum of 150 ppm Bray P1. By keeping soil test levels below 150 ppm Bray P1 the producer keeps more options open for future land use and treatment options. The use of the P Index, although it may allow additional phosphorous application in the short term, will require more restrictive land treatment and management in the future to minimize the risk of phosphorous transport.

Ohio - Nitrogen Leaching Assessment Procedure

Soils are classified as having a high, medium, or low nitrogen leaching potential with relative index ratings from 0-10+ for their potential to leach nitrates below the root zone. The leaching potential is rated as high, medium, or low by combining the soil's hydrologic soil grouping (A, B, C, or D), the local county's annual rainfall, and the local county's season rainfall (Oct. 1 to March 1).

To determine the soil's nitrogen leaching potential use the following procedure.

1st , determine the soils hydrological soil grouping (Found in Section II of the FOTG) - A, B, C, or D.

2nd , Refer to the Table (next page) - **Ohio (By County) Leaching Index Ratings for Soils by Hydrologic Groups (A, B, C, D)** for the respective county to determine the soils relative leaching index rating.

(a) Soils with a rating of 0-2 have a low potential to leach nitrates below the root zone.
(b) Soils with a rating of 3-10 have a medium potential to leach nitrates below the root zone.
(c) Soils with a rating of 10+ have a high potential to leach nitrates below the root zone.
(d) All soils with systematic subsurface drains (tile) are rated high potential. A field is considered subsurface (tile) drained if 1/3 or more of the field is subsurface (tiled) drained.

Ohio (By County) Leaching Index Ratings for Soils by Hydrologic Groups (A, B, C, D)

County	A	B	C	D	County	A	B	C	D
1. Adams	15	10	6	4	45. Licking	15	8	6	4
2. Allen	10	6	4	2	46. Logan	15	8	4	4
3. Ashland	15	8	4	4	47. Lorain	15	8	4	2
4. Ashtabula	15	10	4	4	48. Lucas	10	6	4	2
5. Athens	15	10	6	4	49. Madison	15	8	6	4
6. Auglaize	10	8	4	2	50. Mahoning	15	8	4	4
7. Belmont	15	10	6	4	51. Marion	15	8	4	4
8. Brown	15	10	6	4	52. Medina	15	8	4	4
9. Butler	15	10	6	4	53. Meigs	15	10	6	4
10. Carroll	15	8	4	4	54. Mercer	10	8	4	2
11. Champaign	15	8	4	4	55. Miami	15	8	4	4
12. Clark	15	8	6	4	56. Monroe	15	10	6	4
13. Clermont	15	10	6	4	57. Montgomery	15	10	6	4
14. Clinton	15	10	6	4	58. Morgan	15	8	6	4
15. Columbiana	15	8	4	4	59. Morrow	15	8	4	4
16. Coshocton	15	8	4	4	60. Muskingum	15	8	6	4
17. Crawford	15	8	4	2	61. Noble	15	8	6	4
18. Cuyahoga	15	8	4	4	62. Ottawa	10	6	4	2
19. Darke	15	8	4	4	63. Paulding	10	6	4	2
20. Defiance	10	6	4	2	64. Perry	15	8	6	4
21. Delaware	15	8	4	4	65. Pickaway	15	8	6	4
22. Erie	10	8	4	2	66. Pike	15	10	6	4
23. Fairfield	15	8	6	4	67. Portage	15	8	4	4
24. Fayette	15	10	6	4	68. Preble	15	10	6	4
25. Franklin	15	8	6	4	69. Putnam	10	6	4	2
26. Fulton	10	6	4	2	70. Richland	15	8	4	4
27. Gallia	15	10	6	4	71. Ross	15	10	6	4
28. Geauga	15	10	4	4	72. Sandusky	10	6	4	2
29. Greene	15	10	6	4	73. Scioto	15	10	6	4
30. Guernsey	15	8	6	4	74. Seneca	10	6	4	2
31. Hamilton	15	10	6	4	75. Shelby	15	8	4	4
32. Hancock	10	6	4	2	76. Stark	15	8	4	4
33. Hardin	10	8	4	2	77. Summit	15	8	4	4
34. Harrison	15	8	6	4	78. Trumbull	15	8	4	4
35. Henry	10	6	4	2	79. Tuscarawas	15	8	4	4
36. Highland	15	10	6	4	80. Union	15	8	4	4
37. Hocking	15	10	6	4	81. Van Wert	10	6	4	2
38. Holmes	15	8	4	4	82. Vinton	15	10	6	4
39. Huron	10	8	4	2	83. Warren	15	10	6	4
40. Jackson	15	10	6	4	84. Washington	15	10	6	4
41. Jefferson	15	8	6	4	85. Wayne	15	8	4	4
42. Knox	15	8	4	4	86. Williams	10	6	4	2
43. Lake	15	10	4	4	87. Wood	10	6	4	2
44. Lawrence	15	10	6	4	88. Wyandot	10	8	4	2

NRCS, Ohio

August 2012

Phosphorous Index (P Index) Assessment Procedure

Purpose:

The P Index is a planning tool designed to help identify fields or areas of fields on a farm that have a higher or lower risk of phosphorous runoff from the application of commercial P fertilizers or from manure or other organic materials. Based on the risk assessment the appropriate land treatment and nutrient application treatments can be planned to minimize phosphorous transport from the site.

Procedure:

Use the P Index Assessment Procedure Worksheet to determine the site's overall P Index. Use the following guidance to determine each of the site's subvalues. The subvalues are added together to determine the overall site P Index. The worksheet can be photocopied as needed. A "Field Summary Worksheet" is also available with this procedure to record a series of site/field values for a given farm. It can be photocopied as needed.

1. **SOIL EROSION** – Sheet and rill erosion as measured by the most current version of the Revised Universal Soil Loss Equation (RUSLE) or Wind Erosion Prediction Procedure (where wind erosion is the primary concern) in Section I of the NRCS FOTG. Determine the predicted soil loss and multiply by (1) to determine the "soil loss" site subvalue.

2. **RUNOFF CLASS** – This represents the effect of the Hydrologic Soil Group (A, B, C, D) combined with the effect of slope. This factor represents the site's runoff vulnerability. Use the table below to determine the runoff class. The runoff class is the site's subvalue.

Runoff Class Matrix - Phosphorous Index Values

	Hydrologic Soil Group			
Slope Range	**A**	**B**	**C**	**D**
<1 %	0	1	3	6
1-3%	1	2	4	7
4-6%	2	3	5	8
7-10%	3	5	7	10
11-15%	4	6	9	12
>15%	6	8	11	15

3. **CONNECTIVITY TO WATER** – Defines the vulnerability of P to be transferred from the site to a perennial stream or water body. The more closely connected the runoff is from the field via concentrated flow (from a defined grassed waterway or surface drain) to a perennial stream or water body the higher the vulnerability of P transport. To determine the "connectivity to water" site subfactor ask the question: Does concentrated flow (via a defined waterway, tile inlet, or surface drain) leave the site? Read the value definitions to determine the site's "connectivity to water" subvalue.

4. **SOIL "P" TEST (BRAY-KURTZ P1)** – The soil test procedure using the Bray P1 extraction, or other extraction test calibrated to Bray P1, that provides an index of plant available P expressed in either ppm or lbs/ac (ppm X 2 = lbs/ac). Determine the Bray P1 value in PPM and multiply the PPM by (0.07) to determine the "soil P test site subvalue.

5. **FERTILIZER P2O5 APPLICATION RATE** - The amount of manufactured (commercial) phosphate fertilizer applied expressed in lbs/ac of P2O5. To determine the site's subvalue multiply the year's P fertilizer application rate by (0.05).

6. **FERTILIZER P2O5 APPLICATION METHOD** – Defines if the phosphate (P2O5) fertilizer is actually incorporated into the soil and the time interval between application and incorporation or if the fertilizer is applied over a given amount of crop residue. Incorporation is either through direct injection with the fertilizer application equipment or using a tillage tool operated a minimum of 3-4 inches deep to incorporate the P2O5 fertilizer. To determine the site's subvalue select the description that most closely describes the method of application. The value with that description is the site's subvalue.

7. **ORGANIC P2O5 APPLICATION RATE** - The amount of phosphate applied (expressed in lbs/ac of P2O5) from manure, sludge, or other bio-solids. To determine the site's subvalue multiply the year's P fertilizer application rate by (0.06).

8. **ORGANIC P2O5 APPLICATION METHOD** - Defines if the phosphate (P2O5) from the manure, sludge, or other bio-solids is actually incorporated into the soil, the time interval between application and incorporation, or if the manure/bio-solids are applied over a given amount of crop residue. Incorporation is either through direct injection with the application equipment or by using a tillage tool operated a minimum of 3-4 inches deep to incorporate the manure, sludge, or other bio-solids. To determine the site's subvalue select the description that most closely describes the method of application. The value with that description is the site's subvalue.

9. **FILTER STRIP** - Deduct 2 points if field runoff flows via sheet flow through a designed filter strip - minimum 33 feet wide. The filter strip must meet the NRCS FOTG Filter Strip (393) Standard criteria. It is critical that sheet flow crosses the filter strip, not concentrated flow, to credit a 2 point deduction.

Phosphorous Index Risk Assessment Procedure Worksheet

Site Characteristic	Phosphorous Vulnerability Values					Sub - Value
1.Soil Erosion	Soil Loss (Tons/Acre/Year) X 1.0					
2. Connectivity to Water. Does concentrated flow (via a defined waterway, tile inlet, or surface drain) leave the site?	NO, and the site is not adjacent to an intermittent or perennial stream. **Value = 0**	NO, but the site is adjacent to an intermittent or perennial stream. **Value = 4.0**	Yes, but the site is not adjacent to an intermittent or perennial stream. **Value = 8.0**	Yes, and the site is adjacent to and/or the concentrated flow outlets into an intermittent stream or through a tile inlet. **Value = 12.0**	Yes, and the site is adjacent to and/or the concentrated flow outlets into a perennial stream or through a tile inlet; OR Outlets to a pond or lake within 1 mile. **Value = 16.0**	
Runoff Class	See Runoff Class Matrix					
4. Soil Test Bray-Kurtz P1 PPM	Bray – Kurtz P1 (PPM) X (0.07)					
5. Fertilizer P2O5 Application Rate	Fertilizer P2O5 Applied (Lbs/Acre) X (0.05)					
6. Fertilizer P2O5 Application Method	0 Applied **Value = 0**	Immediate Incorporation Or Applied on 80% Cover **Value = 0.75**	Incorporation < 1 Week Or Applied on 50-80% Cover **Value = 1.5**	Incorporation > 1 Week & < 3 Months Or Applied on 30-49% Cover **Value = 3.0**	No Incorporation Or Incorporation > 3 Months Or Applied on < 30% Cover **Value = 6.0**	
7. Organic P2O5 Application Rate	Available - Manure / Biosolids P2O5 Applied (Lbs/Ac) X (0.06)					
8. Organic P2O5 Application Method	0 Applied **Value = 0**	Immediate Incorporation Or, Applied on 80% Cover **Value = 0.5**	Incorporation < 1 Week Or, Applied on 50-80% Cover **Value = 1.0**	Incorporation > 1 Week & < 3 Months Or, Applied on 30-49% Cover **Value = 2.0**	No Incorporation Or Incorporation > 3 Months Or , Applied on < 30% Cover **Value = 4.0**	
Filter Strip Factor (Deduct 2 points if field runoff flows through a designed filter strip - minimum 33 feet wide)						
Total Site Index Value						

P Index Field Summary

Name: **Farm:**

	Fields										
Site Characteristic											
1.Erosion (Value)											
2.Connectivity to Water (Value)											
3. Runoff Class (Value)											
4. STP (Value)											
5. P2O5 Fertilizer Rate (Value)											
6. P2O5 Fertilizer Method (Value)											
7. Manure Rate (Value)											
8.Manure Application Method (Value)											
9. Filter Strip (-2)											
Total Field Score											
Field Rating											

Field Vulnerability for Phosphorous Loss to Surface Water	
Phosphorous Index for Field	Generalized Interpretation of Phosphorous Index & Management
LOW **< 15**	LOW potential for P movement from the field. If farming practices are maintained at the current level there is a low probability of an adverse impact to surface waters from P loss. Manure or other bio-solids can be applied to meet the recommended nitrogen for the next grass crop or nitrogen removal of the next legume crop.
MEDIUM **15-30**	MEDIUM potential for P movement from the field. The chance of organic material and nutrients getting into surface water exists. Runoff reduction practices such as buffers, setbacks, lower manure/bio-solid rates, cover crops, and crop residue practices alone or in combination should be considered to reduce P loss impacts. Manure or other bio-solids can be applied to meet the recommended nitrogen for the next grass crop or nitrogen removal of the next legume crop. Applications of P at the crop removal rate should be considered.
HIGH **31-45**	HIGH potential for P movement from the field and for an adverse impact on surface waters unless remedial action is taken. Runoff reduction practices such as buffers, setbacks, lower manure/bio-solid rates, cover crops, and crop residue practices alone or in combination should be considered to reduce P loss impacts. Limit application of P to crop removal rates.
VERY HIGH **> 45**	VERY HIGH potential for P movement from the field and an adverse impact on surface water. Remedial action is required to reduce the risk of P loss. A complete soil and water conservation system is needed. Apply no additional P.

Phosphorous Soil Test Risk Assessment Procedure

Nitrogen and Phosphorous Application Criteria for Manure, Organic By-Products, and Biosolids

Criteria Applicable to All Soil Test Levels:

1. Nitrogen application rates from manure, other organic by-products, or biosolids shall be based on Total Ammonium Nitrogen Content plus 1/3 of the Organic Nitrogen calculated at time of application when applied during the summer, fall, or winter for spring planted crops. When applied in the spring for spring planted crops the nitrogen application rate can be adjusted to apply the recommended nitrogen within the P2O5, K2O, and other limitations.
2. Nitrogen rates are not to exceed the succeeding crop's recommended Nitrogen for non-legume crops or the Nitrogen removal in the crop's biomass for legume crops.
3. All applications are based on current soil test results (not more than 3-5 years old).
4. No manufactured P2O5 applied above 40 ppm Bray P1 or equivalent test, unless recommended by appropriate industry standards or the land grant universities for specialty crops, vegetable crops, etc.

"P" Soil Test Level	Application Criteria
Bray P1 < 40 ppm (< 80 Lbs/Ac) OR Other Equivalents (e.g. Mehlich 3) ***LOW POTENTIAL***	**Recommended N or P2O5.** **Manure or other Organic By-Products can be applied to meet the succeeding crop's recommended NITROGEN requirements for non-legume crops or the NITROGEN removal for legume crops; OR the recommended P2O5 but not to exceed the NITROGEN needs of the succeeding crop.**
Bray P1 40-100 ppm (80 – 200 Lbs/Ac) OR Other Equivalents (e.g. Mehlich 3) ***MODERATE POTENTIAL***	**Recommended N or P2O5 Removal whichever is less.** The field shall have > 30% ground cover at the time of application or the manure or other organic by-products shall be incorporated within one week. The manure or other organic by-products can be applied to meet the succeeding crop's recommended NITROGEN requirements for non-legume crops or the NITROGEN removal for legume crops; OR P2O5 removal (annual or multiple year applications) whichever is less.
Bray P1 100-150 ppm (200-300 Lbs/Ac) OR Other Equivalents (e.g. Mehlich 3) ***HIGH POTENTIAL***	**Recommended N or P2O5 Removal whichever is less PLUS additional distance criteria from drainageway/water source or other sensitive area, OR Filter Strips.** Manure or other organic by-products can be applied to meet the succeeding crop's recommended NITROGEN requirements for non-legume crops or the NITROGEN removal for legume crops; OR P2O5 removal (annual or multiple year applications) whichever is less **IF:** 1. The field has > 50% ground cover at the time of application or the material is incorporated within 7 days on areas with < 50% cover. AND 2. Unless the manure or other organic by-products are incorporated within 24 hours, no manure or other organic by-products are to be applied within 100 feet of a drainageway, water source or other sensitive area; OR, the width of a vegetative filter strip (minimum width 33 feet) maintained adjacent to the drainageway, water source, or sensitive area.
Bray P1 > 150 ppm (> 300 Lbs/Ac) OR, Other Equivalents (e.g. Mehlich 3) *VERY HIGH POTENTIAL*	No additional P2O5 – Use P2O5 Draw-down Strategies

~~Table 1. Available Water Capacity (AWC) Practical Soil Moisture Interpretations for Various Soils Textures and Conditions to Determine Liquid Manure Volume Applications not to exceed AWC.~~

~~This table shall be used to determine the AWC at the time of application and the liquid volume in gallons that can be applied not to exceed the AWC. To determine the AWC in the upper 8 inches use a soil probe or similar device to evaluate the soil to a depth of 8 inches.~~

~~Available Moisture in the Soil~~	~~Sands and Loamy Sands~~	~~Sandy Loam and Fine Sandy Loam~~	~~Very Fine Sandy Loam, Loam, Silt Loam, Silty Clay Loam, Clay Loam, Sandy Clay Loam~~	~~Sandy Clay, Silty Clay, Clay~~
~~< 25% Soil Moisture~~	~~Dry, loose and single grained; flows through fingers.~~	~~Dry and loose; flows through fingers.~~	~~Powdery dry; in some places slightly crusted but breaks down easily into powder.~~	~~Hard, baked and cracked; has loose crumbs on surface in some places.~~
~~Amount to Reach AWC~~	~~20,000 gallons/ac~~	~~27,000 gallons/ac~~	~~40,000 gallons/ac~~	~~27,000 gallons/ac~~
~~25-50% or Less Soil Moisture~~	~~Appears to be dry; does not form a ball under pressure.~~	~~Appears to be dry; does not form a ball under pressure.~~	~~Somewhat crumbly but holds together under pressure.~~	~~Somewhat pliable; balls under pressure.~~
~~Amount to Reach AWC~~	~~15,000 gallons/ac~~	~~20,000 gallons/ac~~	~~30,000 gallons/ac~~	~~20,000 gallons/ac~~
~~50 - 75 % Soil Moisture~~	~~Appears to be dry; does not form a ball under pressure.~~	~~Balls under pressure but seldom holds together.~~	~~Forms a ball under pressure; somewhat plastic; slicks slightly under pressure.~~	~~Forms a ball; ribbons out between thumb and forefinger.~~
~~Amount to Reach AWC~~	~~10,000 gallons/ac~~	~~13,000 gallons/ac~~	~~20,000 gallons/ac~~	~~13,000 gallons/ac~~
~~75% to Field Capacity~~	~~Sticks together slightly; may form a weak ball under pressure.~~	~~Forms a weak ball that breaks easily, does not stick.~~	~~Forms ball; very pliable; slicks readily if relatively high in clay.~~	~~Ribbons out between fingers easily; has a slick feeling.~~
~~Amount to Reach AWC~~	~~5,000 gallons/ac~~	~~7,000 gallons/ac~~	~~11,000 gallons/ac~~	~~7,000 gallons/ac~~
~~100% Field Capacity~~	~~On squeezing, no free water appears on soil, but wet outline of ball on hand.~~	~~On squeezing, no free water appears on soil, but wet outline of ball on hand.~~	~~On squeezing, no free water appears on soil, but wet outline of ball on hand.~~	~~On squeezing, no free water appears on soil, but wet outline of ball on hand.~~
~~Above Field Capacity~~	~~Free water appears when soil is bounced in hand.~~	~~Free water is released with kneading.~~	~~Free water can be squeezed out.~~	~~Puddles; free water forms on surface~~

~~Table 2. APPLICATION RATES ON IDLED CROPLAND WITH A GROWING COVER, SET-ASIDE OR LAND IN GOVERNMENT PROGRAMS.~~

~~The following criteria shall be followed if land users desire to apply manure on idled cropland with a growing cover, set aside or on land in government programs (CRP, WRP, Other Government Easement Type Land).~~

1. ~~Use the original soil test that was used to make the fertilizer determinations when the land went under set aside or obtain a new soil test if one is not available.~~
2. ~~Obtain an analysis of the manure before application to determine nutrient content.~~
3. ~~Manure may be applied up to the rates specified below based on the manure analysis and the soil test values for Bray P1 or equivalent.~~
4. ~~FOR IDLED CROPLAND WITH A GROWING COVER, SET ASIDE LAND (CRP, ETC) WITH SOIL TEST VALUES LESS THAN A BRAY P1 OF 45 PPM OR EQUIVALENT. Manure may be applied on an ANNUAL BASIS not to exceed the most limiting of the N or P rates specified below:~~

	~~Phosphorus (P)~~	~~Nitrogen (N)~~
~~Bray P1 or equivalent Value~~ ~~Or Equivalent~~	~~Annual Application Rate (Lbs/Ac of P2O5)~~ ~~(Maximum of 10 years of Application)~~	~~Based on Available N at the Time of Application~~
~~< 5 ppm~~	~~105~~	~~125~~
~~5-10 ppm~~	~~90~~	~~125~~
~~10-15 ppm~~	~~80~~	~~125~~
~~15-20 ppm~~	~~70~~	~~125~~
~~20-25 ppm~~	~~55~~	~~125~~
~~25-45 ppm~~	~~50~~	~~125~~

5. ~~FOR IDLED CROPLAND WITH A GROWING COVER, SET ASIDE LAND (CRP, ETC) WITH SOIL TEST VALUES BETWEEN 45 PPM AND 150 PPM BRAY P1 OR EQUIVALENT. Limit manure application to the most limiting of 50 Lbs/Ac of P2O5 or 125 Lbs/Ac of available N once during a 10 year period.~~

6. ~~FOR IDLED CROPLAND WITH A GROWING COVER, SET ASIDE LAND (CRP, ETC) WITH SOIL TEST VALUES MORE THAN 150 PPM OR EQUIVALENT. No application of manure.~~

Table 3. Determining the Most Limiting Manure Application Rates

Select the Most Limiting Application Rate Based on the Following Criteria					
Field Situation & Time of Year	Limiting Application Rate Criteria				
	Nitrogen	P_2O_5 4/	K_2O	Tons/Ac Gallons/Ac	AWC Table
Part 1. Subsurface Drained (Tiled) Fields					
(April - June) Subsurface Drained or High N Leaching Potential	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	13,000 gal.	Upper 8"
(April - June) Pasture > 20% or Cropland > 15% Subsurfaced Drained or High N Leaching Potential	Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons 5,000 gal. - unless contoured strips or incorporated immediately	Upper 8"
(July - Sept.) No Growing Crop Subsurface Drained or High N Leaching Potential	2/ 50 lbs/ac as applied N	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	13,000 gal.	Upper 8"
(July - Sept.) With a Growing Cover Crop Subsurface Drained or High N Leaching Potential	3/ Next year's crop needs as applied N	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	13,000 gal.	Upper 8"
(July - Sept.) No Growing Crop Cropland > 15% Subsurfaced Drained or High N Leaching Potential	2/ 50 lbs/ac as applied N	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons or, 13,000 gal.	Upper 8"
(Oct. - March) Subsurface Drained or High N Leaching Potential	3/ Next year's crop needs as applied N	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	13,000 gal.	Upper 8"
(Oct. - March) Pasture > 20% or Cropland > 15% Subsurfaced Drained or High N Leaching Potential	3/ Next year's crop needs as applied N	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons 5,000 gal. - unless contoured strips or incorporated immediately	Upper 8"
Frozen or Snow Cover Subsurface Drained or High N Leaching Potential	3/ Next year's crop needs as applied N	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons < 50% Solids; 5 wet tons > 50% solids; Liquid Manure 5000 gallons/acre	

Select the Most Limiting Application Rate Based on the Following Criteria					
Field Situation & Time of Year	Limiting Application Rate Criteria				
	Nitrogen	P2O5 4/	K2O	Tons/Ac Gallons/Ac	AWC Table
Part 2. Fields NOT Subsurface Drained (Tiled)					
(April - June) Not Subsurface Drained	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac		Upper 8"
(July - Sept.) Not Subsurface Drained	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac		Upper 8"
(Oct. - March) Not Subsurface Drained	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac		Upper 8"
(April - June) Not Subsurfaced Drained Pasture > 20% or Cropland > 15%	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons 5,000 gal. - unless contoured strips or incorporate immediately	Upper 8"
(July - Sept.) Not Subsurfaced Drained Pasture > 20% or Cropland > 15%	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac		Upper 8"
Frozen or Snow Cover Not Subsurface Drained	1/ Next year's crop needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons < 50% Solids; 5 wet tons > 50% solids; Liquid Manure 5000 gallons/acre	
(Oct. - March) Not Subsurfaced Drained Pasture > 20% or Cropland > 15%	1/ Crop Needs factoring N losses	Crop Needs or Crop Removal < 250 Lbs/ac	Crop Needs or Crop Removal < 500 Lbs/ac	5/ 10 wet tons 5,000 gal. - unless contoured strips or incorporate immediately	Upper 8"
1/ Crop Needs factoring N losses - Maximum total nitrogen applied to meet the succeeding crop's recommended NITROGEN requirements for non-legume crops or 150 lbs/ac NITROGEN for the succeeding legume crop. Considers loss of N through application method and time of year.					
2/ 50 lbs/ac as applied N - Nitrogen application limited to 50 lbs/ac based on the addition of the NH4 or NH3 (ammonium/ammonia) content of the manure + 1/3 of the organic nitrogen content the manure as applied. Considers no losses due to application method or time of year.					
3/ Next year's crop needs as applied N - Maximum total nitrogen applied to meet the succeeding crop's recommended NITROGEN requirements for non-legume crops or 150 lbs/ac NITROGEN for the succeeding legume crop. Considers no losses due to application method or time of year.					
4/ Under special conditions and criteria the rate of P2O5 application can be increased to 500 lbs./acre see (Nutrient Management Standard 590).					
5/ Wet tons refers to the weight of the manure as it is applied - include solids and moisture weight.					

Table 4.
Minimum Setback Distances for the Application of Manure and Other Organic By Products 5/, 6/

Type of Sensitive - Setback Area	Setbacks Based on Methods of Manure Application		
	Surface Application	Winter Application Frozen or Snow Covered Soils 7/	Surface Incorporation W/I 24 Hours OR Direct Injection
Residences / Private Wells down slope from the application area.	100 ft.	200 ft.	100 ft.
- Sinkholes	300 ft.		100 ft.
- Pond or Lake	- 35ft. Vegetative Barrier 1/, with the remaining 100 ft. setback in non-vegetative Setback 2/	- 35ft. Vegetative Barrier 1/, with the remaining 200 ft. setback in non-vegetative Setback 2/	- 35ft. Vegetative Barrier 1/
- Streams - Ditches - Surface Inlets	- 35ft. Vegetative Barrier 1/, OR - 100 ft. setback in non-vegetative Setback, OR - 35 ft. in non-vegetative setback 3/	200 ft.	None
Grassed Waterway	35 ft.	200 ft.	None
Field Surface Drains	35 ft. 4/	200 ft.	None
Public Wells	300 ft.	300 ft.	100 ft.
Developed Springs	300 ft. upslope	300 ft. upslope	300 ft. upslope
Public Surface Drinking Water Intake	300 ft.	300 ft.	300 ft.

1/ Permanent vegetation consisting of grass, grass/legume mix, trees/shrubs, or trees/shrubs and grass/legumes. Measured from top of bank.
2/ Includes 100 ft. total setback. The setback must include a minimum of 35 ft. of vegetative cover from top of bank with the remainder of the 100 feet with no vegetative requirement. The setback is measured from the top of bank.
3/ Applies if the manure application area has at least 50% vegetation/residue cover at the time of application.

4/ No setback required for field surface drains if the Additional Criteria to Protect Water Quality, Item 5 is applied from this standard.

5/ CAFO's must follow the setbacks defined in the Ohio Department of Agriculture (ODA) rules regarding manure application. See **Table 5 – ODA Setbacks - Appendix A Table 1 of rule 901:10-1-14: Land Application Restrictions and Setbacks**
6/ Excludes sludge that is regulated by the Ohio Environmental Protection Agency (OEPA) and septage regulated by the Ohio Department of Health.

7/ See Additional Criteria to Protect Water Quality, Item 7, for the special manure application criteria on frozen and snow covered fields.

Table 5 – Ohio Department of Agriculture Setbacks Source: USDA-NRCS (2003). Field Office Technical Guide-Conservation Practice Standard, 633, Columbus, Ohio.

Appendix A Table 1 of rule 901:10-1-14: Land Application Restrictions and Setbacks

Land Application Restrictions	1	2	3	4
	Stockpiles	**Surface Application**	**Winter Applications Frozen or Snow Covered Ground (1)**	**Surface Incorporation w/I 24 Hours OR Direct Injection**
Class V wells, sinkholes	300'	300'	300'	100'
Perennial Streams	300'	35' veg cover, 100' (2)	35' veg. cover, 100' (2)	35' veg. cover
Seasonal salmonid and cold water habitat:	300'	35' veg.cover or 100'(2)	35' veg. cover, 100' (2)	35' veg. Cover
Intermittent Stream / Ditch or Surface Inlet	300'	35' veg.cover or 100'(2)	35' veg. cover, 100' (2)	None
Drainageways, grassed waterways	300'	35'	100'	None
Pond or Lake	300'	35'	100'	35'
Private or Public Well	300'	300'	300'	100'
Public Surface Drinking Water Intake	1500'	300'	300'	300'
Springs	300'	300'	300'	100'
Neighboring residences:	500'	300'	300'	100'
Flooding/flood plains/floodways (3):	do not stockpile	do not apply	do not apply	permissible
Slope (4):	0-6%	>15% see note 5	If > 6% see note 6	>15% see note 5
Maximum Application Rate:	Liquid Manure - Based on Appendix B (AWC Chart) & Appendix F (Most Limiting Nutrient Chart) Solid Manure - Based on Appendix F (Most Limiting Nutrient Chart)			

Note (1): For surface applications without snow there must be > 80% ground and/or canopy cover. For snow or ice covered fields, only 10% or 2 acres, whichever is greater can be used for application. All winter surface applications must have prior approval from the Ohio Department of Agriculture.

Note (2): The first setback refers to a vegetative cover setback that must be maintained while the second refers to the total setback distance. Permanent vegetation consisting of grass, grass/legume mix, trees/shrubs, or trees/shrubs and grass/legumes, measured from top of bank. Can use a 35' non vegetative buffer for intermittent stream / ditches or surface inlets if the manure application area has at least 50% vegetation/residue cover at the time of application.

Note (3): No applications during expected flooding season as reported in Appendix A, Table 2

Note (4): Must have < 5 ton/ac yearly average soil loss to perform surface manure applications

Note (5): Manure is not to be applied to cropland over 15% slope or to pastures/hayland over 20% slope unless ONE of the following precautions are taken:

a. Immediate incorporation or injection with operations done on the contour, UNLESS the field has 80% ground cover (residue or canopy).

b. Applications are timed during periods of lower runoff and/or rainfall (May 20th - October 15th)

c. Split applications are made (separated by rainfall events) with single applications not exceeding 10 wet tons/ac or 5000 gal/ac.

d. The field is established and managed in contour strips with alternated strips in grass or legume.

Note (6): Manure is not to be applied in the winter to fields with over 6% slope unless one of the following precautions are taken:

a. The field is established in grass or legume with 90% cover, or the fields has 90% or more residue cover, or the land is managed in contour strips.

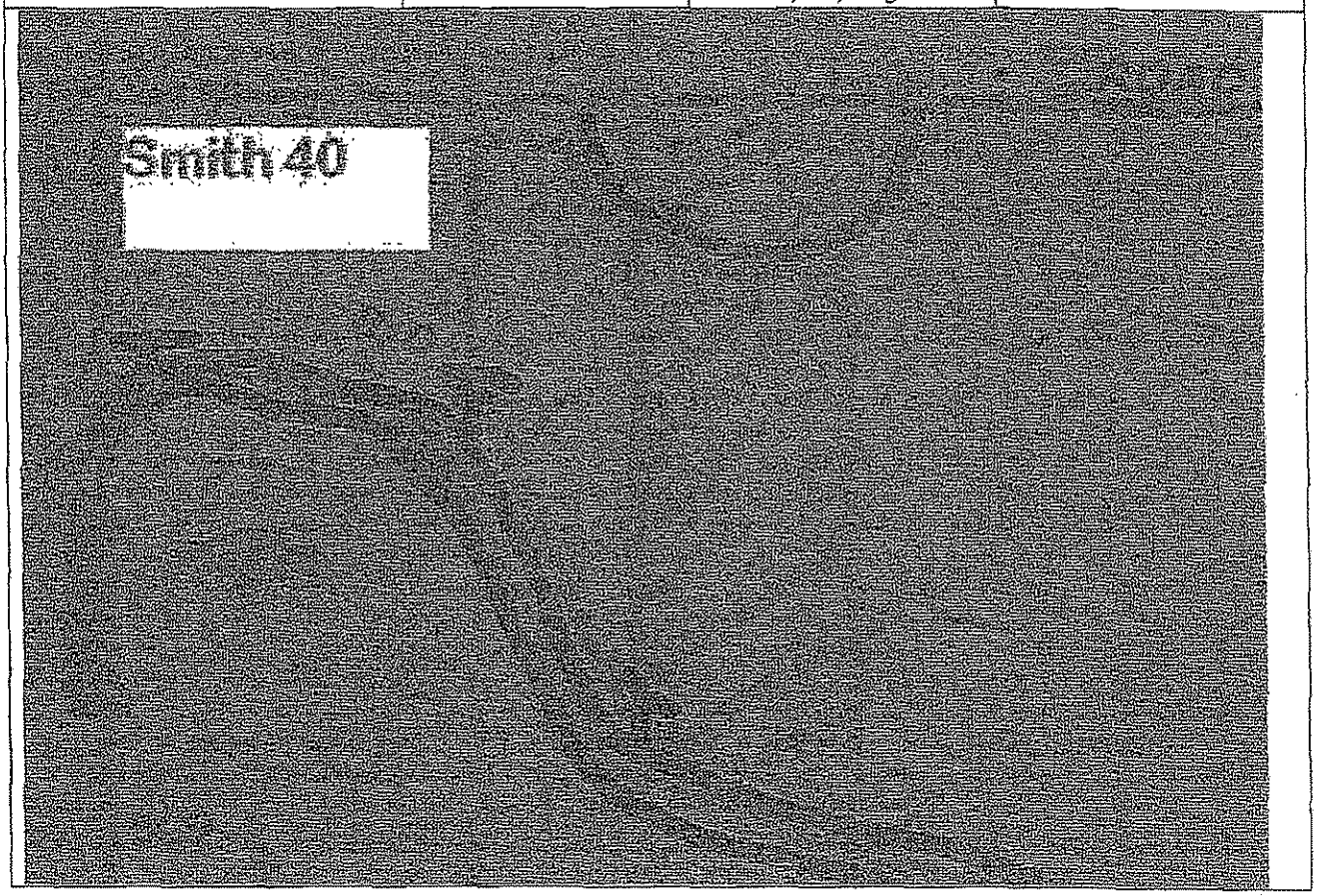
b. The fields has 90% or more residue cover.

c. Contour strips are used with alternate strips in grass or legume and manure is applied on alternate strips only.

Attachment IV

Campbell Soup Supply Company LLC - Attachment IV

Date: 8-2-06	Time Start: 0900 hrs	Time Stop: 1400 hrs	Gal or tons/load: N/A
Manure source: Agitated manure pond	Applicator name: V. Van Gogh	Acres manure applied upon today: *~26 acres of 40 (shaded area)*	
Method of Application: Dragline, w/ soil fracture implement	Date and time of most recent forecast check (attach forecast document): 2200hrs. 8-1	Spreader capacity/load N/A	Load Count (e.g: IIII) N/A
Date of Incorporation (if applicable): immediate		Calculated Rate (gal/ac or tons/acre): 11,000 gal/acre	



Current or next crop: Corn Silage	Tile Checks –time/condition Each tile checked–No tile flow at 600 hrs. No tile flow during the duration of land application Checked again 1 hour after shut down— no flow present.
Residue type and % cover: *wheat stubble*	
Soil Saturation (AWC): very dry	
Soil Cracks: present (horizontal fracture implement used	

Comments/problems: 70% chance Rain is forecast for morning of 8-3-06. *Rate is base on hydraulic limitations, and P-Index.* ~286,000 gallons applied before shutdown

Most recent Soil Test Values (provide units)	N (Total) N/A	P 68 lbs/acre	K –N/A
Most recent Manure analysis (provide units):	13.6 lbs/1000 gal	4.7 lb/1000gallons	–N/A

Actual precipitation in inches	Day 1 (manure application day)	Day 2 Date:	Day 3 Date:	Day 4 Date:	Day 5 Date:
	0	~0.35	0	0	~0.21

Be sure to attach at least one print out of forecast to this record form.

Attachment V

FORM 3900-PTO-005, PART 11: MANURE MANAGEMENT PLAN

ANNUAL CROP REMOVAL

The following chart was developed by ODA to assist the applicant with calculating nutrient budgets. An applicant may substitute an MMP using similar software or other forms if they address all items covered in the following forms and ODA rules. This plan must be developed as a starting point for manure planning purposes. Changes (i.e., differing crops, manure applications, addition of land, etc.) to the MMP must be recorded in the Operating Record and are considered operational changes by ODA rules. ODA has prepared a form that is included in the Operating Record to record such changes. As an alternative to using this form, a copy of the MMP with changes noted is also acceptable or any other method of recording pre-approved by ODA.

				Total lbs of Nutrients Removed		
	Crop	Yield Goal bu/ac or ton/ac	Acres	Nitrogen	P_2O_5	K_2O
Grains/ Grasses	Corn Grain (after grain)					
	Corn Grain (after legumes)					
	Corn Silage					
	Corn Silage (after legumes)					
	Wheat (grain only)					
	Wheat (grain and straw)					
	Grasses (Cool season- or Tall-)					
	Rye (double cropped)[1]					
Legumes	Soybeans (double cropped)[1]					
	Soybeans					
	Alfalfa					
	All Crops	———				

Avg. Nutrients Removed per acre per year			
Avg. Nutrients Removed per acre/year (at only 150lbs N/acre for legumes)[2]			
Total Manure Nutrients Available (lbs) per year			
Total Annual Nutrient Balance (Supplied by manure - Crop needs) (lbs)			
Ave. Acres required to utilize manure N at crop removal =		acres	
Avg. Acres required to utilize manure N at crop removal (only 150 lbs N/ac for legumes)[2] =		acres	
Ave. Acres required to utilize manure P_2O_5 at crop removal =		acres	
Average Annual P_2O_5 balance (per acre)[3] =		lbs P_2O_5/ac	

Footnotes:

1. The acreage of double-cropped fields is only counted once towards the total available for application.
2. ODA Rules limit application rate of N on legume crops to 150 lbs./acre.
3. Average annual P_2O_5 balance is positive value if nutrients applied per acre exceed crop removal rate. It is negative value if crop removal rate exceeds nutrients applied per acre.

FORM 7A: CROPPING SCHEDULE: TARGET AND ACTUAL YIELDS

LAND APPLICATION CROPPING SCHEDULE

Soil Sample Taken*		Last Year's Crop:		This Year's Crop:		2nd Year's Crop:		3rd Year's Crop:	
Field ID/Year	Acres	Projected Yield	Actual Yield	Projected Yield	Actual Yield	Projected Yield	Actual Yield	Projected Yield	Actual Yield

1. The projected crop yield for each crop in each land application area shall be based on (a) soil productivity information; (b) historical yield data; (c) potential yield; or (d) combinations of yield data.

2. An additional 10 percent may be added to the potential and/or historical yields to account for improvements in management and technology.

3. When historical yield data is not available a realistic yield may be based on local research or on yields from similar soils and/or cropping systems in the area.

4. For new or potential crops or varieties, industry yield estimates may be used until actual yields are available for documentation in the operating record.

5. Attach the soil tests to this section of the Operating Record. **Be sure to identify each field per each sample taken. Identify the laboratory method used to analyze the manure, which must be Publication 221, "Recommended Chemical Soil Test Procedures for the North Central Region; Published by the North Central Regional Committee on Soil Testing and Plant Analysis (NCR-13), North Dakota Agricultural Experiment Station."**