WATER QUALITY AND ANIMAL FEEDING OPERATIONS IN ARIZONA: A PRODUCER’S NOTEBOOK
WATER QUALITY AND ANIMAL FEEDING OPERATIONS IN ARIZONA: A PRODUCER’S NOTEBOOK

PREPARED BY
THE CONCENTRATED ANIMAL FEEDING OPERATION EDUCATION GROUP

A PARTNERSHIP OF THE
ARIZONA DEPARTMENT OF AGRICULTURE, UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION, ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY, NATURAL RESOURCES CONSERVATION SERVICE, AND THE ARIZONA NATURAL RESOURCES CONSERVATION DISTRICTS
ENCLOSURES
(In Front Pocket of Binder)

1. Nitrogen Fertilizer Management in Arizona Handbook
2. What's a Crop Nutrient Management Plan Pamphlet
4. EPA Pamphlet: Concentrated Animal Feeding Operations, Clean Water Act Requirements, What Are the Federal Requirements for Dairy Cow and Heifer CAFOs?
5. EPA Pamphlet: Concentrated Animal Feeding Operations, Clean Water Act Requirements, What Are the Federal Requirements for Beef Cattle and Veal Calf CAFOs?
7. NRCS Pamphlet: Conservation Practices and Programs for Your Farm
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INTRODUCTION

This is an update of the Water Quality and Animal Feeding Operations in Arizona: A Producer’s Notebook, printed in 2001. The purpose of this Producer’s Notebook update is to provide producers in Arizona, a summary of the environmental regulations (including the revised Concentrated Animal Feeding Operation (CAFO) regulations), provide compliance and technical assistance information, and to provide resources and references to assist producers in compliance to water quality regulations and permits. We hope this update assists producers in their compliance efforts.

This update of the Producer’s Notebook, is a collaboration of efforts by CAFO Education Group members. The group includes individuals from Farm Bureau, Natural Resources Conservation Service, United Dairymen of Arizona, Arizona Cattle Feeders Association, University of Arizona Cooperative Extension Service, Arizona Department of Environmental Quality, Golder Associates, Kleinfelder Engineering, Aqua Fria-New River Natural Resource Conservation District, East Maricopa Natural Resource Conservation District, individual producers, and Arizona Department of Agriculture.

The Producer’s Notebook is available on-line in a downloadable format on the Animal Waste Website located at http://ag.arizona.edu.animalwaste
PRODUCER’S NOTEBOOK CONTENT SUMMARY

The notebook has the following sections:

1. Frequently Asked Questions
2. Water Quality Regulations and Permits
3. Technical Assistance
4. Financial Assistance
5. Nutrient Management
6. Glossary
7. Appendices (A, B, and C)

Section 1. Frequently Asked Questions
In Section 1, a series of questions and answers provide information on a variety of compliance issues.

Section 2. Water Quality Regulations and Permits
Section 2 provides summaries of the federal and state regulations and permits related to surface water contamination by CAFO wastewater. The Clean Water Act (CWA) and the Revised CAFO Regulations are summarized. The facilities that must apply for a NPDES/AZPDES CAFO permit is described in the Revised CAFO Regulation Summary. A fact sheet summarizing the requirements of the Revised CAFO Regulation is found in Section 2. State Agricultural General Permits and Water Quality standards are summarized. Appendix A and B show the specific requirements of the regulations and permits.

Section 3. Technical Assistance
Section 3 is provided to help producers locate and contact state and federal agencies to assist with facility-specific compliance needs. The section also has information on contacting Technical Service Providers (consultants) to receive assistance. The roles of agencies providing assistance to producers are summarized in the section. The assistance agencies and consultants may provide include; facility/structure design, help with Nutrient Management Plans, referral to technical standards and guidance materials, and answering questions about the regulations.

Section 4. Financial Assistance
Section 4 informs producers of cost-share opportunities and contact information to obtain financial assistance. Section 4 contains a summary of EQIP financial assistance program.
Section 5. Nutrient Management
Section 5 is intended to help producers manage manure and wastewater so that applications to cropland comply with regulations and permits. Section 5 contains the NRCS Nutrient Management Practice 590 and the Phosphorus Assessment Tool. These resources can help producers apply nutrients to cropland at a proper rate and can assist in the development of NMPs. Appendix C contains soil and manure nutrient sampling procedures, and sampling forms.

Section 6. Glossary
Section 6 contains the Glossary of Acronyms.

Section 7. Appendices
The Appendices are found in Section 7. Appendix A contains the NPDES CAFO General Permit, compliance worksheets (completion of the worksheets satisfy some of the requirements of the permit), how to obtain Latitude and Longitude readings for the NOI, contents of an emergency sampling kit, and discharge sampling procedure. Appendix B contains Arizona’s regulations and permits. Appendix C contains sampling procedures for manure and soil sampling, and sampling record sheets.
Q1. Where do I find information on the revised Federal CAFO regulations?
A1. Page 1.1 (Q2), 1.5 (Q18), 2.4-2.5

Q2. Where do I find information on financial assistance for my facility?
A2. Page 4.1-4.2

Q3. Where do I find information on whether I need to apply for a NPDES permit?
A3. Page 1.1 (Q4), 2.2, 2.4-2.5

Q4. Where do I find information on how to apply for the NPDES permit?
A4. Page 1.3 (Q7)

Q5. Where do I find a copy of the NPDES CAFO Permit?
A5. Page A.1-A40

Q6. Where do I find information to get help in determining if my facility has 25-year, 24-hour storm event containment?
A6. Page 29-32

Q7. Where do I find information on assistance with nutrient management plans?
A7. Page 29-32. 37

Q8. Where do I find information on how to collect soil, wastewater, or manure samples?
A8. Page 131-139
The University of Arizona provides a website on animal waste management. The address is [http://ag.arizona.edu/animalwaste](http://ag.arizona.edu/animalwaste). The website is an excellent source of information for producers. The website contains links to agency contact information and the NRCS Technical Service Provider list. The website also contains summaries of the water quality regulations and NRCS Environmental Quality Incentives Program, a copy of the NPDES permit, the Phosphorus Index and other nutrient management tools, announcements of training opportunities, a downloadable form of the Producer's Notebook, manure and wastewater sampling procedures, and other information.

*(Place hard copy 25-year, 24-hour map here)*
### ARI ZONA CAFO and AFO FACILITIES

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SECTION 1.
FREQUENTLY ASKED QUESTIONS

Q1: Are regulations regulating CAFOs new?

A1: CAFOs have been regulated nationally since 1972, when the Clean Water Act was enacted.

Q2: What are the Revised CAFO Rules?

A2: In April 2003, EPA changed the federal regulations that regulate CAFOs. EPA changed the NPDES definition of a CAFO by dropping the 25-year, 24-hour exemption from the definition. This means that facilities having 25-year, 24-hour storm event containment were no longer exempt from permit coverage and that all CAFOs containing the species-specific threshold number of animals for a Large CAFO, have a duty to apply for a National Pollutant Discharge Elimination System (NPDES) permit. Go to page ? for a listing of species-specific threshold numbers for Large and Medium CAFOs.

EPA also changed the Effluent Limitations Guidelines (ELGs), which means that new swine, poultry, and veal operations are prohibited from discharging under any condition or storm event amount. The new ELGs did not change the containment requirements for existing swine, poultry, and veal operations, which remain at the 25-year, 24-hour storm event. New dairy and beef operations will retain the 25-year, 24-hour storm event containment requirement.

Q3: Does ADEQ need to change the Arizona’s regulations or prepare a new NPDES permit to adopt the revised CAFO regulations?

A3: ADEQ is preparing new administrative code to bring state regulations into conformity with the federal revised CAFO regulations. In addition, ADEQ is preparing a new Arizona Pollutant Discharge Elimination System (AZPDES) CAFO permit. The AZPDES CAFO permit that ADEQ is preparing is a NPDES permit.

Q4: What is the significance of the revised federal CAFO regulations for my operation?

A4: All Large CAFOs and also Medium CAFOs that discharge to Waters of the U.S. are required to apply for a National Pollutant Discharge Elimination System (NPDES) or an AZPDES permit. ADEQ is writing a new AZPDES permit and rules to determine the deadline when existing, non-discharging Large CAFOs will be required to obtain an AZPDES permit. The revised federal regulations made nutrient management plans (NMPs) required for
CAFOs. NMPs must address nitrogen and phosphorus application to cropland in nutrient management planning. The regulations also increased the record keeping and reporting requirements for newly permitted facilities.

Q5: When do I need to apply for a NPDES CAFO permit?

A5: Non-discharging Large CAFOs may wait until ADEQ completes development of the new permit and rules. The new permit is expected to be issued during the fall or winter of 2004. However, if a facility (of any size) is discharging or has discharged in the past five years, prior to a 25-year, 24-hour storm event, the operator should contact ADEQ (602-771-4469) immediately to inquire regarding possible permit coverage.

Q6: What do I need to do now? What do I need to do prepare my facility for a permit?

A6: It would be wise for owners of Large CAFOs to begin preparations for permit coverage as soon as possible. Large CAFOs with cropland, should begin to prepare the records (water records, sampling results, etc.) needed for their Nutrient Management Plans (NMPs). Since NMPs take a significant amount of time to develop, CAFO owners should contact someone as soon as possible to prepare a NMP for their facility. NRCS, consultants (technical service providers), and the Arizona Department of Agriculture are certified to prepare NMPs at this time. If technical assistance from the NRCS or ADA is desired, plan ahead, assistance from the agencies may take some time to obtain due to waiting lists. If cost-share assistance through NRCS is desired, plan ahead, there is a priority and waiting list for financial assistance. The Revised CAFO regulations do not require AFOs to prepare a NMP, however owners of AFOs may want to have a NMP to show compliance to Arizona’s Nitrogen Fertilizers General Permit.

In addition, all CAFOs and AFOs should install new waste containment structures or adopt new management practices (if needed), to ensure containment of all process wastewater and storm runoff up to the 25-year storm event. Facilities of all sizes, whether permitted or not, must have containment of the 25-year, 24-hour storm event runoff and other manure-contaminated waters (barn water, tailwaters, etc.).
Q7: How do I apply for the NPDES or AZPDES permits?

A7: The NPDES permit, and the AZPDES permit when issued, are applied for by submitting a Notice of Intent (NOI) to ADEQ. The NOI is located in Appendix A of the NPDES CAFO general permit in Appendix A of the notebook and is available on the ADEQ website. NOIs are submitted to the address below. However, NOIs for non-discharging facilities are not being accepted by ADEQ until the new AZPDES permit and rule are issued.

ADEQ
Water Quality Compliance Section
CAFO/AFO Program Coordinator (Ken Johnson)
Mail Code 5415B-1
1110 W. Washington Street
Phoenix, AZ  85007

Q8: Can I submit an NOI for the current NPDES CAFO permit, even though the deadline for an existing facility to apply for the permit has expired?

A8: ADEQ is not accepting NOIs at this time for NPDES permit coverage unless a facility is discharging. When ADEQ issues the new AZPDES permit and rule, new deadlines for NOI submission will be established.

Q9: Am I required to submit an Environmental Information Document (EID) if I apply for an AZPDES Permit?

A9: Facilities in operation when the new AZPDES permit is issued, will not be required to submit an EID when applying for the new permit.

Q10: What are the no potential to discharge criteria provided in the federal revised CAFO regulations? If my operation meets the criteria, do I have to get a permit?

A10: The criteria for no potential to discharge will be incorporated into the AZPDES permit or rule ADEQ is currently preparing. Any operation that qualifies as having no potential to discharge, will not be required to obtain the AZPDES permit. However, according to ADEQ, it is unlikely that any facility will qualify as having no potential to discharge. The federal provision requires that facilities have no potential to discharge under any circumstance in order to qualify.
Q11: Are public notices or public hearings required when I apply for a NPDES or AZPDES CAFO permit?

A11: Only if an Environmental Information Document (EID) is required for a new facility applying for the existing NPDES permit issued in August 2001. Public notices or hearings will not be required for existing operations applying for the new AZPDES permit when issued later in 2004.

Q12: What is the difference between ADEQ’s BMP requirements and the NPDES CAFO permit’s BMP Plan?

A12: ADEQ’s BMPs are best management practices which have been incorporated into administrative code as part of the state’s CAFO and Nitrogen Fertilizers general permits. The NPDES CAFO permit’s BMP Plan, is a plan required by the permit to ensure proper design and wastewater management and containment.

Q13: What is the difference between a Natural Resources Conservation Service (NRCS) Comprehensive Nutrient Management Plan (CNMP) and the NPDES permit’s BMP Plan and NMP requirements?

A13: Facilities receiving technical assistance from NRCS will obtain a CNMP from NRCS. The NRCS CNMP meets the permit’s requirements for a BMP Plan and a NMP. A permitted facility may obtain compliance with the permit’s requirements for a BMP Plan and a NMP without obtaining a NRCS CNMP. In this case, the BMP Plan and NMP are developed as separate plans, not as part of a NRCS CNMP. The BMP Plan may developed by anyone the producer feels will develop a plan which will meet the permit requirements. The NMP under the NPDES CAFO permit (August, 2001) must be developed by a certified nutrient management planning specialist or a qualified technical service provider (TSP).

Q14: What is the difference between Waters of the State and Waters of the US?

A14: Waters of the U.S. is defined in section 502(7) of the Clean Water Act. For all practical purposes; a Water of the U.S., or a navigable water, means a surface water or conveyance to surface water in Arizona. This includes washes, dry washes, rivers, drainage canals to rivers, etc. A Water of the State is defined in A.R.S. 49-201.40. A Water of the State means all waters in Arizona and includes streams, washes, lakes, ponds, playas, reservoirs, wetlands, aquifers, wells, springs, irrigation systems, drainage systems, etc. A Water of the State is more encompassing than a Water of the U.S. The federal regulations prohibit
wastewater discharge to Waters of the U.S. while state regulations prohibit discharge to Waters of the State. Producers must prevent discharges to surface waters whether a Water of the U.S. or a Water of the State.

Q15: What will be the manure and wastewater testing requirements and how often will they need to be tested?

A15: According to the NPDES CAFO General permit, soil and wastewater sampling shall be conducted in accordance with the most current version of NRCS Conservation Practice Standard – Arizona Nutrient Management, Code 590. Sampling procedures were recently prepared by the Cooperative Extension Service and are found on pages ... Producers could follow these procedures when collecting samples.

Q16: Who do I contact if I have a discharge prior to a 25-year, 24-hour storm event?

A16: NPDES permitted facilities are required to report discharges by phone, within 24 hours of the commencement of the discharge. Permitted facilities are also required to report discharges in writing within five days of the discharge. Discharges are reported to ADEQ at (602) 771-4469. The address for written notification is located on page ...

Q17: What is the penalty if my facility discharges wastewater to a Water of the U.S or Water of the State?

A17: ADEQ can issue fines up to $25,000 per day, per violation, for discharges and $25,000 per day, per violation, for violations of water quality standards.

Q18: What are the National Effluent Limitation Guidelines (ELGs)?

A18: The ELGs are technology-based effluent limitations that establish a minimum standard of performance for certain categories and classes of point sources. These standards are incorporated into the NPDES permits. The ELGs were revised April 2003, by the EPA, which created a zero discharge standard for new poultry, swine, and veal operations. This means that new poultry, swine, and veal operations can not discharge from the production area under any storm event amount, even those storms exceeding the 25-year, 24-hour storm event amount. New poultry, swine, and veal operations must design lagoons for 100-year, 24-hour, storm event runoff containment.
FREQUENTLY ASKED QUESTIONS
Continued

Q19: How can the University of Arizona Cooperative Extension help livestock producers with compliance to the water quality regulations?

A19: The University’s Extension Service can help by putting producers in touch with Extension Service experts and can refer producers to Extension Service publications on specific topics. The extension service can help producers find answers to their questions. Experts in the University’s system can answer questions on animal waste, wastewater handling and agronomic considerations. In addition, the Extension Service has several publications that can be of assistance to producers, including the Nitrogen Fertilizer Management in Arizona Handbook located in the front pocket of the binder.

Q20: How do I receive help from NRCS?

A20: The Natural Resources Conservation Service (NRCS) in Arizona administer a board range of programs to assist operators of animal feeding operations, and other interested parties, with the conservation of natural resources on their property. All conservation programs are voluntary and offer both technical and cost-sharing assistance for the planning and installation of conservation systems. If you are interested in learning more about NRCS programs and how to apply, please contact your local USDA Service Center. The USDA Service Centers are listed in the telephone book under U.S. Government, Department of Agriculture and on pages... of the notebook. You may also wish to visit the NRCS programs website: www.nrcs.usda.gov/programs to obtain additional information.

Q21: If my operation receives a Notice of Opportunity to Correct (NOC) or a Notice of Violation (NOV) from ADEQ, can I receive assistance from NRCS?

A21: The issuance of a notice from a regulatory agency does not necessarily disqualify you from receiving NRCS technical or financial assistance. If you would like help with evaluating your conservation system, or need any other technical assistance, you are encouraged to contact NRCS at your local USDA Service Center.

Q22: How can I find a Technical Service Provider (TSP) to help me with my Nutrient Management Plan (NMP)?

A22: You can visit the TSP website: techreg.usda.gov to look up the names and contact information of TSPs who can provide this type of service.
Q23: How can I receive assistance from the Arizona Department of Agriculture?

A23: You can call (602) 542-0972 for help with medium and small-sized animal feeding operations or (602) 542-0873 for help in developing a nutrient management plan (NMP) or a comprehensive nutrient management plan (CNMP). Outside Maricopa County call (800) 294-0308.

Q24: How do I receive help from a NRCD?

A24: To locate the Natural Resource Conservation District office in your area, go to Page ... of the Notebook. The East Maricopa County NRCD has a program which can develop CNMPs for operations in the East Maricopa County NRCD area.
SECTION 2.
WATER QUALITY REGULATIONS AND PERMITS

The United States Environmental Protection Agency (USEPA) is the agency responsible for compliance to the nation’s water quality laws. However, in Arizona, the Arizona Department of Environmental Quality (ADEQ) has been authorized to administer some of the federal regulations. The Arizona legislature and ADEQ have established statutes, regulations, and permits to protect Arizona’s surface water and groundwater from animal waste contamination. The Arizona Department of Environmental Quality (ADEQ) is the agency responsible for compliance to the state rules and permits. ADEQ conducts inspections of animal feeding operations to determine compliance with state and federal regulations.

Section 2, is intended to inform producers on the federal and state water quality regulations. The NPDES CAFO permit is located in Appendix A. Arizona’s regulations are located in Appendix B. The following summaries are included in this section:

- Summary of the Clean Water Act
- Summary of revised CAFO regulations
- Fact Sheet: Summary of Revised NPDES Provisions and the Effluent Limitations Guidelines
- Summary of NPDES CAFO General Permit for Arizona
- Summary of AZPDES CAFO Permit and Rule Development by ADEQ
- Summary of Arizona’s Agricultural General Permits
- Summary of Arizona’s Water Quality Standards

Federal Regulations

Clean Water Act

The goal of the Clean Water Act (CWA) is to protect and restore the physical, chemical, and biological integrity of our nation’s waters. The CWA establishes the National Pollutant Discharge Elimination System (NPDES) program to regulate the discharge of pollutants from point sources into navigable waters. The CWA makes it unlawful for any person to discharge any pollutant from a point source into a Water of the U.S., unless they have and comply with a NPDES permit. Through the CWA, EPA sets effluent standards for different industries and sets water quality standards for all contaminants in surface waters. These standards determine permit requirements. The EPA and delegated state agencies may administer the NPDES permit program. In December, 2002, ADEQ received authority to administer the NPDES CAFO program and permit in Arizona.
WATER QUALITY REGULATIONS AND PERMITS
Continued

In August 2001 (expires August 2006), EPA issued a NPDES CAFO General permit in Arizona. The permit requires that CAFOs have wastewater retention facilities that contain all the wastewater generated from the operation and contain all rainwater that becomes contaminated by manure, up to a 25-year, 24-hour storm event. In addition, field applications of solid and liquid wastes can not exceed crop nutrient needs. A copy of the NPDES CAFO General permit can be found in Appendix A.

At this time, the NPDES permit is voluntary for non-discharging facilities. However, if you have a discharge, you may be required to obtain the NPDES permit and may be subject to penalties. The AZPDES permit will not be voluntary for Large CAFOs once issued by ADEQ.

In April 2003, EPA adopted changes to the effluent limitation guidelines and NPDES regulations for CAFOs. Pursuant to the CAFO regulation changes, livestock operations that meet the definition of a Large CAFO, or a Medium CAFO that discharges to a Water of the U.S., are required to obtain a NPDES permit. All Large CAFOs must apply for a permit even if they have capacity to contain a 25-year, 24-hour storm event.

For more information on the Clean Water Act, go to: http://www.epa.gov/compliance/

Revised CAFO Regulations and the NPDES Permit

The only provision for a Large CAFO to avoid permit coverage is to meet criteria for having “no potential to discharge”. However, according to ADEQ, it will be difficult for a CAFO to meet the criteria. ADEQ is developing the criteria and it will be included in the new state administrative code or AZPDES permit. Below is shown the number of animals required to be a Large or Medium CAFO for each animal type.

Large CAFOs are AFOs containing a minimum of:

- 1,000 beef
- 1,000 calves
- 1,000 heifers
- 700 cows
- 500 horses
- 2,500 swine
- 125,000 chickens
In addition, Medium CAFOs with a conveyance (ditch, pipe, etc.) to a water of the United States or direct animal contact with a Water of the U.S., must apply for a permit. Medium CAFOs are operations with a conveyance or direct contact and contain:

- 300-1,000 beef
- 300-1,000 calves
- 300-1,000 heifers
- 200-700 cows (milking and dry)
- 150-500 horses
- 750-2,500 swine
- 37,500-125,000 chickens
WATER QUALITY REGULATIONS AND PERMITS
Continued

FACT SHEET
SUMMARY OF REVISED NPDES PROVISIONS AND
THE EFFLUENT LIMITATIONS GUIDELINES
By The
ARIZONA DEPARTMENT OF AGRICULTURE
AGRICULTURAL CONSULTATION AND TRAINING PROGRAM

In April 2003, EPA enacted changes to the National Pollutant Discharge Elimination System (NPDES) Concentrated Animal Feeding Operations (CAFO) provisions and the Effluent Limitations Guidelines (ELG). Revision of the NPDES provisions changed the definition of a CAFO by eliminating the 25-year, 24-hour storm event exemption. The definition change means that all Large and discharging Medium CAFOs, must apply for a NPDES permit.

The Main Requirements of the New CAFO Regulations are:

- Establishes CAFO classification based on the number of animals, not animal units. Animal units have been eliminated from the regulations. A “three-tier” system is retained. The CAFO tiers are:
  - Large CAFO (beef >1,000, calves >1,000, dairy cows >700, heifers 1,000, chickens (dry) >125,000, horse >500, swine >2,500)
  - Medium CAFO (beef 300-1,000, calves 300-1,000, dairy cows 200-700, heifers 300-1,000, chickens 37,500-125,000, horse 150-500). In addition, medium CAFOs must have either a direct discharge to Water of the U.S through a man-made ditch, flushing system, pipe, or similar man-made device or confined animals must have direct contact with Water of the U.S.
  - Small CAFO (beef <300, calves <300, dairy <200, heifers <300, chickens <37,500, swine <750, horse <150). Small CAFOs must be designated a CAFO by ADEQ upon inspection. The facility must be a significant contributor of pollutants. Any discharging facility of any size can be designated a CAFO.
- A duty to apply for Large CAFOs
- State delegated agencies (ADEQ) are authorized to develop criteria for the no potential to discharge provision (25-year, 24-hour storm event containment does not necessarily qualify a facility has having no potential to discharge)
- Nutrient management plans (NMPs) are required for all CAFOs
- NMPs must address both nitrogen and phosphorus in land applications
- NMPs will be based on technical standards developed by ADEQ, NRCS, and other agencies
- NMPs are required for all land applications of manure and wastewater under the operational control of the facility, including land owned by the facility located off-site
- Manure and soil sampling are required
- Land application set backs of 100 feet from water of the U.S. or vegetative buffers of 35 feet from water of the U.S. are required
WATER QUALITY REGULATIONS AND PERMITS
Continued

- When mature animals are present, immature animals are not counted to determine the threshold number of a Large CAFO, however the immature animals must be accounted for in waste management planning.
- When mature animals are not present, immature animals are counted (heifer and beef calving operations).
- Mixed species facilities are not CAFOs unless one species-type meets the threshold number of a CAFO.
- Horse tracks and stables can be CAFOs and require a NPDES permit.
- All existing CAFOs (prior to revised rule enactment) retain the 25-year, 24-hour storm event containment requirement.
- All existing CAFOs retain 25-year, 24-hour storm event facility design standard.
- New swine, veal, and poultry CAFOs have a zero discharge standard from production areas (no discharge under any condition).
- New swine, veal, and poultry CAFOs have a 100-year, 24-hour storm event design requirement.
- New swine, veal, and poultry storage facilities must be protected from flood inundation during the 100-year, 24-hour storm event.
- New beef and dairy facilities have the 25-year, 24-hour storm event containment and design requirement.
- Individual permits can still be issued and must go through a public notice process.
- The regulation clarifies the grazing-denuding issue for pasture and rangeland animals. Corrals with open access to pasture or rangeland are not AFOs.
- Annual reports are required for all permitted CAFOs.
- Manure transfer records are required.

State Regulations

NPDES CAFO General Permit for Arizona

The NPDES CAFO permit issued in August 2001 has two main requirements; a Best Management Practices (BMP) Plan and a Nutrient Management Plan (NMP). The deadline for permitted facilities for a BMP Plan was August 27, 2002. The BMP plan includes facility design and management practices, which provide for 25-year, 24-hour storm event containment. BMP plans may be developed by producers, consultants, or NRCS. A copy of the NPDES permit can be found in Appendix A.

Nutrient Management Plans were due for permitted facilities on August 27, 2003. The NMP accounts for the manure and manure-water nutrients produced by an operation and how the nutrients are applied to cropland. NMPs must be developed by a Certified Nutrient Management Planning Specialist (CNMPS) or a Technical Service Provider (TSP). Producers can not develop their own NMP unless they are a CNMPS.
At the time of this Notebook update, only NRCS, several consultants (TSPs), and the Arizona Department of Agriculture’s Agricultural Consultation and Training Program were qualified as certified planners and can develop NMPs for compliance with the NPDES permit. In addition to BMP Plans and NMPs, other permit requirements include; record keeping, and monitoring and reporting of discharges.

**AZPDES CAFO Permit and Rule Development by ADEQ**

ADEQ is in the process of writing a new CAFO permit to incorporate the changes of the revised CAFO regulations. The new permit will be known as an Arizona Pollutant Discharge Elimination System (AZPDES) permit, rather than a NPDES permit. In addition to the new permit, ADEQ is in the process of developing new administrative code. Once the new permit and regulations are issued, producers will know the deadlines to apply for the new permit and to develop NMPs.

**Arizona Agricultural General Permits**

Arizona has two state agricultural general permits that regulate runoff and cropland applications at animal feeding operations (AFOs). These two permits are the Nitrogen Fertilizer and CAFO general permits. Coverage for these permits occurs simply by operating an AFO in Arizona.

The Nitrogen Fertilizers permit regulates nitrogen applications on AFOs with cropland. Common sources of nitrogen applications include manure, manure-water, and commercial fertilizers. The permit limits the rate of nitrogen application to the amount of nitrogen needed by the crop during production. The permit also limits nitrogen application so that leaching and runoff of nitrogen is minimized. Refer to Appendix B for a copy of the Nitrogen Fertilizer general permit.

The CAFO general permit regulates discharges of manure and wastewater from all AFOs in the state. The CAFO permit prohibits discharge of nitrogen-contaminated runoff from a storm preceding the 25-year, 24-hour storm event precipitation amount. The CAFO permit also prohibits runoff discharge from stockpiled manure and closed AFOs. The permit prohibits discharge of manure water to any location offsite, not just to Waters of the State. The CAFO general permit requirements can be found in Appendix B.
Arizona’s Water Quality Standards

If a facility discharges manure or wastewater to a surface water or groundwater, then the discharge would be regulated by surface water and aquifer water quality standards. If a discharge exceeds a water quality standard, then a violation may result. The standards most likely to be exceeded by a manure-water discharge are fecal coliform for the surface water quality standards and nitrate for the aquifer water quality standards. The water quality standards can be found in Appendix B.

Arizona Revised Statutes

A.R.S. 49-241.B.1. addresses discharges to the aquifer or vadose zone. AFOs cannot discharge to aquifers or vadose zones through lagoon/pond infiltration or discharges to surface water. A.R.S. 49-141.A.1. addresses environmental nuisances. AFOs are prohibited from causing environmental nuisance as defined in the statute.
SECTION 3.
TECHNICAL ASSISTANCE

Section 3 summarizes the roles and contact information of the agencies that provide compliance and technical assistance for producers.

The Natural Resource Conservation Districts (NRCDs), Natural Resources Conservation Service (NRCS), University of Arizona Cooperative Extension, and the Arizona Department of Agriculture (ADA) are available to provide compliance and technical assistance to producers upon request.

The East Maricopa County NRCD has a program that provides development of Nutrient Management plans for producers. The NRCS can provide technical assistance through developing facility specific Comprehensive Nutrient Management Plans (CNMPs). CNMPs can be used for compliance to state and CAFO permit requirements. The University of Arizona Cooperative Extension provides Extension bulletins and the Animal Waste website: http://ag.arizona.edu/animal waste for technical assistance. A New Agricultural Consultation and Training (ACT) program at ADA provides compliance assistance for small to medium-sized AFOs. In addition, ACT also has a program, in cooperation with NRCS, where free CNMPs can be developed for producers statewide.

The following are included in this section:

- Natural Resource Conservation District program summary and contact information
- Natural Resources Conservation Service program summary and contact information
- University of Arizona Cooperative Extension summary and contact information
- Arizona Department of Agriculture program summaries and contacts
Arizona’s Natural Resource Conservation Districts

Originally, Natural Resource Conservation Districts (NRCDs) were known as soil conservation districts. Soil conservation districts were established nationally in 1938. In Arizona, soil conservation districts began in 1941. Soil conservation districts were created so that local conservation districts would have control over local conservation efforts. Currently there are thirty-one NRCDs in Arizona. In addition, there are nine conservation districts on tribal lands. The local NRCDs work closely with NRCS to provide conservation programs to agricultural producers and to provide education in their communities. The NRCDs consist of locally elected citizens who set NRCS priorities. Below is a contact list of the NRCDs most likely to have AFOs or CAFOs in their district areas.

The East Maricopa NRCD has a program to assist producers in eastern Maricopa County with Comprehensive Nutrient Management Plans (CNMPs). Please contact Sandra Naylor (480) 988-1078 ext. 108, for more information.

**NRCD OFFICES**

**AACD NRCD**  
1196 Mill Iron Lane  
St. David, AZ  85630

**Big Sandy NRCD**  
1971 Jagerson Ave. Bg 104 Rm C.  
Kingman, AZ  86401

**Chino Winds NRCD**  
8841 Florentine, Ste. C.  
Prescott Valley, AZ  86314

**Aqua Fria-New River NRCD**  
16251 W. Glendale Avenue  
Litchfield Park, AZ  85340

**Buckeye-Roosevelt NRCD**  
220 N. 4th St.  
Buckeye, Arizona  85326

**East Maricopa NRCD**  
18256 E. Williams Field Rd., Ste. 1  
Higley, AZ  85236
Eloy/ West Pinal NRCD
115 E. First St., Ste. D.
Casa Grande, AZ 85222

Florence-Coolidge NRCD
115 E. First St., Ste. D.
Casa Grande, AZ 85222

Gila Bend NRCD
PO Box 544
Gila Bend, AZ 85337

Gila River NRCD
PO Box 1963
Coolidge, AZ 85228

Gila Valley NRCD
305 E. 4th St.
Safford, AZ 85546

Hereford NRCD
11411 Brown Ranch Rd.
Hereford, AZ 85615

Laguna-Yuma NRCD
2450 S. 4th Ave., Ste. 402
Yuma, AZ 85364

Navajo County NRCD
51 W. Vista, #3
Holbrook, AZ 85625

Parker Valley NRCD
25855 Mohave Rd.
Parker, AZ 85344

Pima NRCD
4650 N. Highway Dr.
Tucson, AZ 85705

Redington NRCD
4963 N. Cascabel Rd.
Benson, AZ 85602

Whitewater Draw NRCD
6842 N. Lee Station Rd.
Douglas, AZ 85607

Willcox-San Simone NRCD
656 N. Bisbee Ave.
Willcox, AZ 85643
Arizona’s Natural Resources Conservation Service

Originally, the Natural Resources Conservation Service (NRCS) was known as the Soil Conservation Service (SCS). The mission of the NRCS is to provide leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. NRCS puts nearly 70 years of experience to work in assisting landowners and others with conserving their soil, water, and other natural resources. NRCS in partnership with local conservation districts, delivers technical assistance based on sound science and the needs of the landowner. Cost-sharing and other financial incentives are available in some cases. Participation in NRCS programs is voluntary.

STATE OFFICE

3003 N. Central Avenue
Suite 800
Phoenix, AZ  85012
(602) 280-8801

FIELD OFFICES

Buckeye
220 N. 4th Street
Buckeye, AZ  85326
623) 386-4631

Chandler (Higley)
18256 E. Williamsfield Road
Suite 1
Higley, AZ  85236
(480) 988-1078 x3

Casa Grande
115 E. First Street
Suite D
Casa Grande, AZ  85222
(520) 836-2048 x3

Douglas
Leslie Canyon Road
Route 1, Box 226
Douglas, AZ  85607-9716
(520) 364-2001
TECHNICAL ASSISTANCE

Continued

**Holbrook**
51 W. Vista
Suite 3
Holbrook, AZ  86025-1844
(928) 524-2652

**Phoenix**
12409 W. Indian School Road
Suite 201
Avondale, AZ  85323
(623) 535-5505

**Tucson**
4650 N. Highway Drive
Tucson, AZ  85705
(520) 887-8520 x3

**Yuma**
2450 S. 4th Avenue
Suite 402
Yuma, AZ  85364-8573
(928) 786-5562

**Kingman**
101 E. Beale Street
Suite C
Kingman, AZ  86401-5827
(928) 753-6183

**Safford**
305 E. Fourth Street
Safford, AZ  85546-2024
(928) 428-5537

**Willcox**
656 N. Bisbee Avenue
Willcox, AZ  85643
(520) 384-2229 x3
U of A Cooperative Extension Service

Cooperative Extension is the outreach arm of the University of Arizona. The Extension Service is a statewide network of knowledgeable faculty and staff that provides educational outreach on a wide variety of topics, including animal waste-related topics. Cooperative Extension also conducts original research on AFO-related topics to learn and improve waste management at livestock facilities. The University’s Extension Service can help put producers in touch with those who can provide the answers and refer producers to pertinent Extension publications.

**COOPERATIVE EXTENSION OFFICES**

**Apache County**
845 W. 4th North
St. Johns, AZ 85936
928-337-2267

**Cochise County**
450 S. Haskell Avenue
Willcox, AZ 85643-2790
520-384-3594

**or**
1140 N. Colombo
Sierra Vista, AZ 85635-2390
520-458-8278 ext. 141

**Graham County**
4 S. Bowie
Solomon, AZ 85551-9999
(928) 428-2611

**Coconino County**
2304 N. 3rd Street
Flagstaff, AZ 86004-3605
928-774-868

**Gila County**
1177 Monroe Street
Globe, AZ 85501-1415
928-425-7179

**Greenlee County**
Fairgrounds Road
Duncan, AZ 85534
928-359-2261
La Paz County
2524 Mutahar
Parker, AZ 85344
928-669-9843

Mohave County
101 E. Beale Street
Suite A
Kingman, AZ 86401-5827
928-753-3788

Navajo Nation
Window Rock Office
Hwy 264-Bldg. 121D
St. Michaels, AZ 86511-1339
928-871-7406/7686

Pinal County
820 E. Cottonwood Lane
Building C
Casa Grande, AZ 85222-2726
520-836-5221

Yavapai County
500 S. Marina Street
Room 14
Prescott, AZ 86303
928-445-6590
or
2657 Village Drive
Cottonwood, AZ 86326-5875
928-646-9113
or
928-639-8176

Maricopa County
4341 E. Broadway Road
Phoenix, AZ 85040-8807
602-470-8086

Navajo County
402 E. Hopi Drive
Holbrook, AZ 86401-5827
928-524-6271

Pima County
4210 N. Campbell Avenue
Tucson, AZ 85719-1109
520-626-5161

Santa Cruz County
3241 N. Grand Avenue
Suite 6
Nogales, AZ 85621-1090
520-761-7849
or
520-761-7800 ext. 3084

Yuma County
2200 W. 28th Street
Suite 102
Yuma, AZ 85364-6928
928-726-3904
In 1994, the Arizona Department of Agriculture (ADA) created the ACT Program in order to fulfill the needs of producers looking for assistance regarding the regulations ADA enforced. Prior to the Program’s development, members of the agricultural community were reluctant to inquire with the Department about law and regulation concerns for fear of being penalized if an issue was discovered in the process. ACT is managed separately from the regulatory or enforcement divisions of the Department and provides a voluntary compliance point of contact within the Department while ensuring anonymity of those using the service. Since its inception, the ACT program has grown to be a respected and integral part of the agricultural community and is strongly supported by Arizona’s diverse agricultural interests.

The key to ACT’s success is customer satisfaction. Customer service provided by professionals in a responsive and supportive way is a permanent goal for ACT. ACT field consultants work to increase awareness of regulations and their requirements through on-site visits, technical assistance, training seminars, educational workshops, meetings, and conventions. Agricultural producers are provided timely and accurate assistance to increase understanding of changes to, or additions of applicable regulations, as well as information to implement compliance measures. Any violations observed by ACT are not made available to regulatory personnel except in cases of imminent danger where human health and welfare are concerned. ACT assistance is initiated by producer requests and is provided without regulatory pressure. Implementation of recommendations is strictly the producer’s decision.

Initially, ACT’s compliance assistance began by addressing the Federal Worker Protection Standards and has since expanded to include regulatory issues enforced by
organizations other than ADA. Such issues include water quality regulations affecting Animal Feeding Operations (AFOs), development of Comprehensive Nutrient Management Plans (CNMPs) for AFOs, and agricultural air quality best management practices. Agricultural producers interested in receiving compliance assistance or inquiring about relating laws and regulations can contact the ACT Program for support.

**ACT Contact:** Agricultural Consultation & Training Program
602-542-0137, Maricopa County
800-294-0308, outside Maricopa County

**Agricultural Activities Assistance Program (AAAP)**

Through an Interagency Service Agreement (ISA) with the Arizona Department of Environmental Quality (ADEQ), ACT has developed a new statewide compliance assistance program for AFOs similar to ACT's Concentrated Animal Feeding Operation (CAFO) program of the previous three years. The new Agricultural Activities Assistance Program (AAAP), aims to assist small and medium sized AFOs which include horse, dairy, beef, swine, and poultry facilities.

Under the new program, AFO owners will be able to request an on-site visit (OSV) by an ACT Field Consultant. During an OSV, ACT will access an AFO’s compliance to the water quality regulations by examining waste containment structures, utilization of manure and wastewater, and waste management practices. ACT will assess the same areas of compliance as ADEQ inspectors. If any problems are found during an OSV, recommendations are made to help bring a facility into compliance. In addition, if a violation has been issued by ADEQ, ACT can help bring an AFO into compliance.

**AAAP Contact:** Don Hall
602-542-0972, Maricopa County
800-294-0308, outside Maricopa County
[don.hall@agric.state.az.us](mailto:don.hall@agric.state.az.us)
Comprehensive Nutrient Management Plan Assistance Program

In April 2003, the Environmental Protection Agency revised the Clean Water Act regulations for Concentrated Animal Feeding Operations (CAFOs). In accordance with the recently published CAFO Final Rule, any Animal Feeding Operation (AFO) that qualifies as a CAFO will need to apply for a National Pollutant Discharge Elimination System (NPDES) CAFO General Permit by submitting a Notice of Intent to the Arizona Department of Environmental Quality. The NPDES permit requires CAFOs to properly manage pollutants and nutrients and prevent them from entering Waters of the U.S. The new rule applies regardless of whether or not discharges only occur during large storms, such as the 25-year, 24-hour storm event. In addition, the permit requires a facility to have a Nutrient Management Plan (NMP).

A Comprehensive Nutrient Management Plan (CNMP) fulfills the permit NMP requirements and meets United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) standards and specifications. Development of a CNMP involves the combination of management activities, conservation practices, and facility design which, when implemented, help to ensure that production and natural resource protection goals are achieved. The purpose of a CNMP is to reduce transport of excess nutrients like nitrogen and phosphorus to ground and surface water, while minimizing potential impact to the environment in a manner that benefits the operation.

All AFOs, regardless of size, are eligible for CNMP assistance. This includes permitted facilities, AFOs preparing for the Arizona Pollutant Discharge Elimination System (AZPDES) Permit currently being drafted by ADEQ, or AFOs interested in having a conservation plan in order to receive funding assistance through NRCS. In September 2002, the Arizona Department of Agriculture Agricultural Consultation and Training (ACT) Program entered into a Cooperative Agreement with the USDA NRCS to begin providing assistance to AFOs with the development of CNMPs. If you are interested in creating a CNMP for your operation, or have related questions, contact ACT Field Consultant, Leslie Pierson, for assistance. Leslie is available to assist AFO owner/operators with the development and maintenance of their CNMP and to answer questions regarding State and Federal regulations, including the new CAFO Rule.

In addition to the ACT Program, assistance requests for CNMP development can be directed to your local NRCS field office. NRCS is available to assist CAFOs with CNMPs
and may be able to provide funding assistance. Another option for assistance is through the NRCS Technical Service Provider (TSP) program. TSPs are private consulting companies that provide CNMP assistance for a fee; contact NRCS for an approved TSP list.

**CNMP Assistance Program Contact:** Leslie Pierson  
602-542-0873, Maricopa County  
800-294-0308, outside Maricopa County  
leslie.pierson@agric.state.az.us
 SECTION 4.  
FINANCIAL ASSISTANCE

Section 4 summarizes the financial assistance available to animal feeding operations. If financial assistance is desired, producers should contact the USDA Natural Resources Conservation Service as soon as possible. NRCS contact information is found page... There is a waiting and priority list to receive financial assistance from NRCS. The following is included in this section:

- EQIP Summary

**Environmental Quality Incentives Program (EQIP)**

**Overview**
The Environmental Quality Incentives Program (EQIP) is a voluntary program that provides assistance to farmers and ranchers who face threats to soil, water, air, and related natural resources on their land. Through EQIP, the Natural Resources Conservation Service (NRCS) provides assistance to agricultural producers in a manner that will promote agricultural production and environmental quality as compatible goals, optimize environmental benefits, and help farmers and ranchers meet Federal, State, Tribal, and local environmental requirements. EQIP is reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill). Funding for EQIP comes from the Commodity Credit Corporation.

**Key Provisions**
- Provides technical assistance, cost-sharing and incentive payments to eligible persons.
- Cost-sharing may pay up to 75 percent of the costs of certain conservation practices, such as manure management facilities, and other practices important to improving and maintaining the health of natural resources in the area. Cost-share rates for limited resource producers and beginning farmers and ranchers may be up to 90 percent.
- The total amount of cost-share and incentive payments paid to an individual or entity may not exceed $450,000 for all contracts entered into during fiscal years 2002 through 2007.

**Eligibility**
- Persons engaged in livestock or agricultural production are eligible for the program.
- Eligible land includes cropland, rangeland, pasture, private non-industrial forest land, and other farm or ranch lands.
- To be eligible to participate, applicants must develop an EQIP Plan of Operations. If an EQIP Plan of Operations includes an animal waste storage or treatment facility, the participant must provide for the development and implementation of a Comprehensive Nutrient Management Plan.
**How to Apply**

Applications may be obtained and filed at any time with your local USDA Service Center or conservation district office. Applications are accepted through a continuous sign-up process. NRCS will periodically announce a ranking date when applications received will be ranked. If you need more information about EQIP, please contact your local USDA Service Center, listed in the telephone book under U.S. Department of Agriculture, or your local conservation district. Information also is available on the World Wide Web at: [http://www.nrcs.usda.gov/programs/farmbill/2002/](http://www.nrcs.usda.gov/programs/farmbill/2002/)
SECTION 5.
NUTRIENT MANAGEMENT

Section 5 summarizes nutrient management at animal feeding operations and provides tools to assist producers in nutrient management. The information focuses on helping producers meet the nutrient management requirements for compliance to the NPDES permit and Arizona’s Nitrogen Fertilizer General permit. The following are included in this section:

- NRCS Practice Standard Nutrient Management, Code 590
- Phosphorus Assessment Tool

Nutrient management is required to develop and utilize a nutrient management plan. The Revised CAFO Rule require NMPs no later than December 31, 2006. Nutrient management is also required to comply with Arizona’s Nitrogen Fertilizers General Permit.
DEFINITION

Managing the amount, source, placement, form, and timing of the application of nutrients and soil amendments.

PURPOSES

- To budget and supply nutrients for optimum plant production.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To minimize agricultural nonpoint source contamination of surface and ground water resources.
- 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

Nutrient management plans shall be prepared in accordance with this standard and comply with all applicable Federal, state, and local laws and regulations.

Arizona law (Title 49-The Environment) contains provisions for the regulation of both the application and management of nitrogen sources in agricultural production.

To comply with the State of Arizona Rule R18-9-202 regarding the application of nitrogen fertilizer the following goal oriented Best Management Practices (BMP) are to be used:

- Application of nitrogen fertilizer shall be limited to that amount necessary to meet projected crop plant needs.
- Application of nitrogen fertilizer shall be timed to coincide as closely as feasible to the periods of maximum crop plant uptake.
- Nitrogen fertilizer shall be applied by a method designed to deliver nitrogen to the area of maximum crop plant uptake.
- Application of irrigation water shall be timed to meet crop plant needs and be managed to minimize loss by leaching and runoff.
- The application of irrigation water shall be timed to minimize losses by leaching and runoff.
- The operator shall use tillage practices that maximize water and nitrogen uptake by crop plants.

Plus:
- Other methods to minimize nitrogen losses from leaching, runoff, or backflow into irrigation wells must be specified.

A complete description of these BMPs with their guidance practices can be found in “Nitrogen Fertilizer Management in Arizona” (Doerge, 1991).

A qualified person, as defined in the General Manual, shall review and/or approve all nutrient management plans. Those qualified (certified) to develop nutrient management plans are conservation planners with USDA-NRCS, agronomists certified by the American Society of Agronomy (ASA), Certified Crop Advisors certified by the ASA through its Certified Crop Advisor (CCA) program, or planners certified by the State of Arizona Nutrient Management Planning Certification Program.

Nutrient management plans that are elements of a more comprehensive conservation plan shall include all requirements of the conservation plan.

A nutrient balance table for nitrogen, phosphorus, and potassium shall be developed that considers all potential sources of nutrients including, but not limited to, animal manure and organic by-products, waste water, sewage sludge, commercial fertilizer, soil, crop residues, legume credits, and irrigation water.

Realistic yield goals shall be established based on soil productivity information, historical yield data, climatic conditions, level of management and/or local research on similar soil, cropping
systems, and soil and manure/organic by-products tests. A realistic yield goal is the crop yield that the producer expects to achieve 50% of the time. For new crops or varieties, industry yield recommendations may be used until sufficient yield information is available.

Nutrient management plans (NMP) shall specify the form, source, amount, timing, and method of application of nutrients on each field to achieve realistic production goals, while minimizing nitrogen and/or phosphorus movement to surface and/or ground waters.

Fields having similar soil test results and crop recommendations may be grouped.

Erosion, runoff, and water management controls shall be installed, as needed, on fields that receive nutrients.

**Soil Sampling and Laboratory Analysis (Testing)**

Nutrient planning shall be based on current soil test results. Current soil tests shall not be older than five years. Annually cropped fields will have a soil test taken the first year of a new plan or rotation, thereafter once in 5 years as a minimum. Hayland and pasture can be tested once in five years. If organic sources of fertilizers are used two or more consecutive years, annual soil testing is required.

Soil samples shall be collected, prepared, and tested according to the University of Arizona guidance or standard industry practice recognized by the University of Arizona. A partial list of testing laboratories using approved procedures can be found at the University of Arizona website (http://www.ag.arizona.edu/pubs/garden/az1111).

Soil testing shall include analysis for any nutrients for which specific information is needed to develop the nutrient management plan. Request analyses pertinent to monitoring or amending the annual nutrient budget: i.e., nitrogen, phosphorus, and potassium; additional useful information would be: pH, cation exchange capacity (CEC), electrical conductivity (EC), and soil organic matter.

**Plant Tissue Testing**

Tissue sampling and testing shall be done in accordance with University of Arizona standards or recommendations.

**Nutrient Application Rates**

Soil amendments used to adjust soil pH or other soil conditions, should be applied for optimum availability and utilization of nutrients.

Nutrient application rates shall be based on University of Arizona recommendations or accepted industry practice. Current soil test results, management capabilities, and realistic yield goals shall be considered. If the University of Arizona recommended rates are not available, application rates shall be based on realistic yield goals and associated plant nutrient uptake rates.

The planned rates of nutrient application, as documented in the nutrient budget, shall be determined based on the following guidance:

- **Nitrogen Application** – Planned nitrogen application rates shall meet the recommended rates, except when manure or other organic by-products are a source of nutrients. When manure or other organic by-products are a source of nutrients, see “Additional Criteria” below.

- **Phosphorus Application** – Planned phosphorus application rates shall meet the recommended rates, except when manure or other organic by-products are a source of nutrients. When manure or other organic by-products are a source of nutrients, see “Additional Criteria” below.
• **Potassium Application** – Excess potassium shall not be applied to the extent that growth and quality in crops or forages are adversely affected. University of Arizona recommendations shall be followed.

• **Other Plant Nutrients** – The planned rates of application of other plant nutrients shall be consistent with University of Arizona guidance or industry practice recognized by the University of Arizona.

• **Starter Fertilizers** – Starter fertilizers containing nitrogen, phosphorus and potassium may be applied in accordance with University of Arizona recommendations or industry practice recognized by the University of Arizona. When starter fertilizers are used, they shall be included in the nutrient budget.

**Nutrient Application Timing and Methods**

Timing and method of nutrient application shall consider plant nutrient uptake characteristics, cropping system limitations, weather and climatic conditions, irrigation system, and field accessibility. Also, in addition to application of nutrients corresponding to crop uptake, consideration must be given to fertilizer efficiency (formulation or availability).

Preplant fertilizer and/or manure shall not be applied until after any deep irrigation for salt leaching has been completed.

Nutrients shall not be applied to soils if the potential for runoff exists.

Commercial fertilizer may be applied as broadcast, knifed into the soil, banding with the planter, or surface banded. Any one method may have advantages under a given set of circumstances.

Nutrient applications associated with irrigation systems shall be applied in accordance with the requirements of Irrigation Water Management (Code 449). The application rate (in/hr) and application amounts for material applied through sprinkler irrigation systems shall not be at rates that result in runoff. Nutrients applied through surface irrigation systems shall have tailwater ponds and/or delivery systems to capture and reuse all runoff. Consult the Soil Survey or the Arizona Irrigation Guide for available water holding capacity and infiltration/permeability rates for the soil(s) receiving the application. Limit application to the volume of liquid that can be stored in the root zone.

**Additional Criteria Applicable to Manure or Organic By-Products Applied as a Plant Nutrient Source.**

Nutrient Management Plan Reviews

NMPs should be reviewed and updated by the owner/operator or their designate at least once each year.

For required NMPs, a whole farm budget for nitrogen and phosphorus shall be developed that includes the amount of manure produced on the farm and the amount of nutrients needed for the crops grown on the farm. The budget shall be in enough detail to determine if more nutrients will need to be brought onto the farm to grow crops or if excess manure is being generated and will need to be exported.

Nutrient values of manure and organic by-products shall be determined prior to land application based on laboratory analysis. Manure and on-farm generated waste shall be analyzed for nutrient content by laboratories that meet University of Arizona approved testing methods. Manure analyses will be conducted once a year for each manure source until a reliable trend of nutrient contents has been established for that source. Manure testing will be at least once every 5 years after that or whenever a significant management change will affect manure nutrient values (for example, major changes in the feed program).
Manure must, at a minimum, be analyzed for nitrogen, phosphorus, potassium, and moisture content. In those cases where manure analysis cannot be readily obtained, acceptable NRCS and/or University of Arizona “book values” may be used for planning purposes. Acceptable values may be found in the Agricultural Waste Management Field Handbook (AWMFH), Chapter 4 – Agricultural Waste Characteristics.

**Nutrient Application Rates**

All NMPs will require that the N and P application rates be determined. The “P” assessment tool will be used to determine if the critical element is either nitrogen or phosphorous. If the assessment tool indicates that phosphorous is critical, then the nutrient plan will be phosphorous based. All other plans will be nitrogen based.

The planned rates of nitrogen and phosphorus application recorded in the plan for each field shall be determined based on the following guidance:

**Phosphorus Application** – When manure or other organic by-products are used, the planned rates of phosphorus application for each field shall be determined using a current soil test.

If phosphorus is determined to be the limiting nutrient for determining nutrient application rates (Phosphorous Assessment Tool), then the phosphorus application will be limited to phosphorus crop removal. Use P crop removal values recommended by the University of Arizona. If values are not available for a specific crop, use values given in AWMFH, Chapter 6.

**Nitrogen Application** - Planned nitrogen application rates for each field shall match the recommended rates. If phosphorus is determined to be the limiting nutrient for determining nutrient application rates, then an additional nitrogen application, from non-organic sources, may be required to supply the recommended amounts of nitrogen.

Manure or other organic by-products may be applied on legumes at rates equal to the estimated removal of nitrogen in harvested plant biomass.

Animal manure and organic nutrients shall be injected or incorporated as soon as possible on annual crops or reseeded perennial crops to capture available N.

Manure may be applied without incorporating if surface runoff control measures such as a grass or legume crop, heavy crop residue cover, stripcropping, or diversions have been applied. However, losses of N by NH₃, N₂ and N₂O volatilization are likely, thereby reducing available N from manure.

**Field-Specific Risk Assessment and Resources of Concern**

When animal manure or other organic by-products are applied, a field-specific assessment of the potential for nitrogen and phosphorus transport from the field shall be completed.

This field specific assessment is done using the Phosphorous Assessment Tool, field landscape and soil properties, and locations of sensitive areas.

Identify sensitive areas adjacent to or near the fields to receive animal manure and locate them on plan maps:

- Wells and other potable water supplies
- Vegetated drainage ways or waterways
- Streams, rivers, lakes, and ponds
- Property lines.
Setbacks for spreading of manure shall be a minimum of 100 feet from drinking wells and non-community water supplies and a minimum of 300 feet from community water supplies. Greater site specific setbacks need to be considered where water supplies are located downslope from spreading sites.

Site specific setbacks or buffers will be identified and prescribed to protect sensitive areas other than drinking wells from potential pollution from animal manure applications. In lieu of using site specific setbacks or buffers to protect sensitive areas, the following are recommended setbacks:

- 25 feet from any waterway, drainage ditch, wash, arroyo, irrigation ditch, or property line.
- 100 feet from all surfaces waters including streams, canals, springs, ponds, and lakes.

The locations of sensitive areas and the setbacks or buffers to protect them shall be discussed with the producer during the development of the plan.

**Heavy Metals**

When sewage sludge is applied, the accumulation of potential pollutants (including arsenic, cadmium, copper, lead, mercury, selenium, and zinc) in the soil shall be monitored in accordance with US Code, Reference 40 CFR, Parts 403 and 503, and/or any applicable state or local laws or regulations.

**Additional Criteria to Minimize Agricultural Non-point Source Pollution of Surface and Ground Water Resources**

In areas with an identified or designated nutrient-related water quality impairment, assessments shall be completed of the potential for nitrogen and/or phosphorus transport from the field. The Phosphorous Assessment Tool may be used to help with these assessments. The results of these assessments and recommendations shall be discussed with the producer and included in the plan.

Plans developed to minimize agricultural nonpoint source pollution of surface or ground water resources shall include practices and/or management activities that can reduce the risk of nitrogen or phosphorus movement from the field.

**Additional Criteria to Improve the Physical, Chemical, and Biological Condition of the Soil.**

Nutrients shall be applied in such a manner as not to degrade the soil’s structure, chemical properties, or biological condition. Use of nutrient sources with high undesirable salt content will be minimized unless provisions are used to leach these salts below the crop root zone.

Nutrients shall not be applied to flooded or saturated soils when the potential for soil compaction is high.

**Cultural Resources.**

If this practice involves soil disturbance, the area of potential effect for each undertaking must be investigated for cultural resources under section 106 of the National Historical Preservation Act of 1966, as amended, before soil disturbance occurs. See the NRCS Arizona Handbook of Cultural Resources Procedures - Applicability and Exceptions Section - for identification of practices that are exempt from, or that require cultural resources surveys.

**Endangered Species**

Determine if installation of this practice with any others proposed practice will affect any federal, tribal, or state listed Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species or at least not have any adverse effect on a listed species. If the
Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects.

Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the U.S. Fish and Wildlife Service. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

CONSIDERATIONS
Consider other practices such as: Waste Management System (312); Waste Storage Facility (313); and Waste Utilization (633) to properly handle, store, and utilize manure and other wastes to minimize pollution of surface and ground water resources.

Consider additional practices such as Conservation Cover (327), Filter Strips (393), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover and Green Manure (340), and Residue Management (329A, 329B, or 329C, and 344) to improve soil nutrient and water storage, infiltration, aeration, tilth, diversity of soil organisms, and to protect or improve water quality.

Consider induced deficiencies of nutrients due to excessive levels of other nutrients.
Consider cover crops, whenever possible, to utilize and recycle residual nitrogen.
Consider application methods and timing that reduce the risk of nutrients being transported to ground and surface waters, or into the atmosphere. Suggestions include:
- split applications of nitrogen to provide nutrients at the times of maximum crop utilization,
- band applications of phosphorus near the seed row,
- applying nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques,
- timely incorporation of land applied manure or organic by-products,
- delaying field application of animal manure or other organic by-products if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Consider minimum application setback distances from other environmentally sensitive areas, such as bedrock outcrops, gullies, ditches, surface inlets, or rapidly permeable soil areas.
Consider the potential problems from odors associated with the storage and land application of animal manure, especially when applied near or upwind of residences.
Consider the potential problems from vectors (insects, rats, etc.) in associated with manure storage and application.
Consider nitrogen volatilization losses associated with the land application of animal manure. Volatilization losses can become significant, if manure is not immediately incorporated into the soil after application.
Consider the potential to affect National Register listed or eligible cultural resources.
Consider using soil test information no older than one year when developing new plans, particularly if animal manure is to be a nutrient source.
Consider annual reviews to determine, if changes in the nutrient budget are desirable (or needed) for the next planned crop.

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.)

Consider recommendations from animal nutritionists regarding modification of the animal’s diet to reduce the manure nutrient content and to enhance the producer’s ability to manage manure effectively.

**Water Quantity**

This practice is considered to have no effect on the amount of water.

**Water Quality**

This practice principally reduces the availability of nutrients that could pollute surface or ground water by limiting the amount applied to the soil to that needed to produce an optimum crop yield.

Major reductions are expected in the amount of nitrate Nitrogen that reaches ground water and a corresponding reduction in the contamination of private wells and domestic wells. Contamination of wells will be avoided in many areas.

Streams and lakes and other surface water bodies will receive less Phosphorus resulting in a decreased rate of eutrophication.

**PLANS AND SPECIFICATIONS**

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 following components shall be included in the nutrient management plan:

- aerial photograph or map and a soil map of the site,
- current and/or planned plant production sequence or crop rotation,
- results of soil, plant, irrigation water, manure and organic by-product sample analyses, and wastewater as applicable,
- realistic yield goals for the crops in the rotation,
- quantification of all nutrient sources,
- recommended nutrient rates, timing, form, and method of application and incorporation,
- location of designated sensitive areas or resources and the associated nutrient management restriction, or setbacks to protect them,
- guidance for implementation, operation, maintenance, and record keeping and,
- complete nutrient budget for nitrogen, phosphorous, and potassium for the rotation or crop sequence.

If increases in soil phosphorus levels are expected, plans shall document:

- the soil phosphorus levels at which it may be desirable to convert to phosphorus based implementation,
• the relationship between soil phosphorus levels and potential for phosphorus transport from the field, and
• the potential for soil phosphorus drawdown from the production and harvesting of crops.

When applicable, plans shall include other practices or management activities as determined by specific regulation, program requirements, or producer goals.

In addition to the requirements described above, plans for nutrient management shall also include:

• Discussion about the relationship between nitrogen and phosphorus transport and water quality impairment. The discussion about nitrogen should include information about nitrogen leaching into shallow ground water and potential health impacts. The discussion about phosphorus should include information about phosphorus accumulation in the soil, the increased potential for phosphorus transport in soluble form, and the types of water quality impairment that could result from phosphorus movement into surface water bodies.
• Discussion about how the plan is intended to prevent the nutrients (nitrogen and phosphorus) supplied for production purposes from contributing to water quality impairment.
• A statement that the plan was developed based on the requirements of the current standard and any applicable Federal, state, or local regulations or policies; and that changes in any of these requirements may necessitate a revision of the plan.

All NMPs shall be approved and bear the signature of a qualified person to certified that the plans have met this standard and all applicable Federal, state, and local regulations.

OPERATION AND MAINTENANCE

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

• Periodic plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed and revised, if necessary, with each soil test cycle.
• Protection of fertilizer and organic by-product storage facilities from weather and accidental leakage or spillage.
• Calibration of application equipment to ensure uniform distribution of material at planned rates.
• 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.
• Maintaining records to document plan implementation. As applicable, records include:
  a) soil test results and recommendations for nutrient application,
  b) quantities, analyses, and sources of nutrients applied,
  c) dates, duration, and method of nutrient applications,
  d) volume of irrigation water applied,
  e) crops planted, planting and harvest dates, yields, and crop residues removed, and
  f) dates of review, person performing the review, and recommendations that resulted from the review.
Records should be maintained for five years; or for a period longer than five years if required by other Federal, state, or local ordinances, or program or contract requirements.

Workers should be protected from and avoid unnecessary contact with chemical fertilizers and organic by-products. Protection should include the use of protective clothing when working with plant nutrients. Extra caution must be taken when handling ammonia sources of nutrients, or when dealing with organic wastes stored in unventilated enclosures.

When cleaning nutrient application equipment, dispose of the wash water properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching.

The disposal or recycling of nutrient containers should be done according to state and local guidelines or regulations.

REFERENCES

Policy:
USDA, NRCS General Manual Title 450, Part 401.03 (Technical Guides, Policy and Responsibilities)
USDA, NRCS General Manual Title 190, Part 402 (Ecological Sciences, Nutrient Management, Policy)

Technical:
USDA, NRCS Field Office Technical Guide (FOTG)

Procedures:
USDA, NRCS, National Planning Procedures Handbook (NPPH)
USDA, NRCS National Agronomy Manual (NAM) Section 503
PHOSPHORUS ASSESSMENT TOOL
For Arizona

BACKGROUND

Water quality problems associated with phosphorus are generally confined to surface water. Phosphorus (P) in most Arizona soils is tightly held to soil particles and does not leach. However, the P held in organic phases from residues such as manure can dissolve in water and be lost if improperly managed. Adsorbed P on soil particles can cause surface water contamination as P containing sediments move off the land in agricultural runoff.

P is the second major element utilized by actively growing plants but differs considerably from nitrate in its water solubility and mobility. Soil solution P levels are typically less than 0.01 ppm in most soils, and ground water levels seldom exceed 0.05 ppm. Between 20 and 80% of the total P in soils is held in organically combined forms with a large amount of the organic-P held by the active microbial biomass. Much P fertilizer applied to soils is retained in the near-surface layer in various inorganic precipitates and organically combined forms that prevent it from leaching. Sandy soils may not retain or bind P to the same extent as previously discussed, but P migration downward to ground water is still generally minimal. The highly calcareous nature of our soils causes P to be very unavailable.

While the risk of ground water contamination by P from crop production systems can be assumed to be limited, the solid forms of P that accumulate in surface soil are subject to loss via erosion. Runoff losses to surface waters are the major water quality risk from P. Increased public and regulatory concern over the use and application of P to agricultural lands is based mainly upon the fact that increased P loading to surface waters can cause eutrophication. Algal and
aquatic weed growth in most inland surface water systems is P-limited and elevated P loading leads to algal blooms and mats, heavy growth of aquatic plants and weeds, deoxygenation, and occasional problems with drinking water taste and odor.

P runoff from permanently vegetated areas such as hayland, pasture, rangeland or forest can be significant, and largely occurs as traces of orthophosphate ions in solution. Organic P additions from riparian leaf and stem inputs are also possible. Where erosion risk increases, such as for annual crops with conventional tillage, the total-P loss increases greatly as the P is moved in solid particulate form from the eroding soil. Water-soluble P is immediately available for biological uptake when the sediment-bound or particulate P forms are released over longer periods and it is referred to as "bioavailable particulate P". The overall impact of a given production system on P loadings to local surface waters will therefore be primarily dependent upon relative rates of sediment loss and the system's influence on P levels in eroding soil surfaces.

P can easily enter surface water through dislocation and erosion of soil particles that maintain this tightly bound nutrient. Surface erosion can remove soil particles containing P. Surface soils, which are the most susceptible to erosion, generally have much higher P levels than deeper soil horizons due to applications of fertilizers, manure, roots, residue and sludge that contain this nutrient. The higher the P content of the soil, the more P will erode per ton of soil lost. Once into the surface water system, P is a major contributor to excessive algae growth which can have detrimental environmental and aesthetic consequences. Little P is lost by leaching, though it moves more freely in sandy than in clay soils. Erosion and crop removal are the primary pathways for P removal for most soils in Arizona. Phosphorus dissolved in runoff water may be an additional P loss pathway for very high P amended soils and surface-applied organic material.

The interaction between the particulate and dissolved P in the runoff is very dynamic and the mechanism of transport is complex. Therefore, it is difficult to predict the transformation and ultimate fate of P as it moves through the landscape.

**PURPOSE**

The purpose of the Phosphorus Index is to provide field staffs, watershed planners, and land users with a tool to assess the various landforms and management practices for potential risk of phosphorus movement to water bodies. The Phosphorus Index ranks sites where the risk of phosphorus movement may be relatively higher than that of other sites. When the parameters of the index are analyzed, it is apparent that an individual parameter or parameters may be influencing the index disproportionately. These identified
parameters are the basis for planning corrective soil and water conservation practices and management techniques.

This index is used as a tool for understanding the relative contribution that individual landform and management parameters have toward risk of phosphorus movement and will provide a method for developing management guidelines for phosphorus at the site to lessen their impact on water quality.

SITE CHARACTERISTICS

A number of soil, hydrology, and land management site characteristics describe the landform. The Phosphorus Index Rating for Arizona (Table 1) uses parameters that can have an influence on phosphorus availability, retention, management, and movement. These include:

1. Available phosphorus soil test levels, given in soil laboratory test units. (Usually the Olsen-P method (NaHCO₃ extraction) for Arizona soils, neutral to calcareous soils).
2. Phosphorus fertilizer (both organic and inorganic) application rates, in pounds available phosphate (P₂O₅) per acre.
3. Organic phosphorus source application methods.
4. Phosphorus fertilizer application methods.
5. Proximity of nearest field edge to named stream or lake measured in feet.
6. The erosion rate, in tons per acre per year.
7. Potential Runoff using permeability and slope.
8. Irrigation erosion potential, based on slope (S) in percent and flow rate (Q) in gallons/min.
9. Grazing management, including imported feeds.
10. Field edge buffers.

Field specific data for the ten site characteristics of the Phosphorus Index are readily available at the field level. Some analytic testing of the soil and organic material is required to determine the rating levels. This soil and material analysis is considered essential as a basis for the assessment.

The P Index is a simple 10 by 5 matrix that relates site characteristics with a range of value categories. The ten characteristics are:

1) Soil Test P Level
2) P Application Rate
3) Organic P Source Application Method
4) Fertilizer P Application Method
5) Proximity of Nearest Field Edge to Named Stream or Lake
6) Soil Erosion
The five value categories are:

- Very low
- Low
- Medium
- High
- Very high

Each site characteristic is rated VERY LOW, LOW, MEDIUM, HIGH, or VERY HIGH, by determining the range rating for each value category. For example:

Soil test P ranges of <8 ppm for very low, 8-14 ppm for low, 15-22 ppm for medium, 23-30 ppm for high, and >30 ppm for very high were assigned to each of the value categories.

**DEFINITIONS**

**Soil Test P**

Arizona soils are usually low in plant available phosphorus because phosphorus is quickly tied up in calcareous soils. The bicarbonate P soils test (also known as Olsen-P soil test or Sodium bicarbonate-P test), it measures water soluble P, highly soluble calcium P, and organic P. This type of test should be specified for most soils in Arizona, except if the soil is on the acid side (pH < 7). Low pH soils should use a Bray test for P.

For cropland, take soil samples from the top 12 inches to assess the level of "available P" in the surface layer of the soil. For pasture or hayland, the sample should be 4 to 6 inches. At least 10 subs-samples should be taken in the field of concern. The “available P” is the level customarily given in a soil test interpretation by the Cooperative Extension Service or commercial soil test laboratories. The soil test P range in each value category are: Very Low, <8 ppm; Low, 8-15 ppm; Medium, 15-23 ppm; High, 23-30 ppm; and Very High, >30 ppm.

The soil test level for "available P" does not ascertain the total P in the surface soil. It does however, give an indication of the amount of total P that may be present because of the general relationship between the forms of P (organic, adsorbed, and labile P) and the solution P available for crop uptake.
P Application Rate

The P application rate is the amount, in pounds per acre (lbs/ac), of phosphate (P₂O₅) from all sources that is applied to the soil. The rate ranges in each value category are: Very Low, none applied; Low, 1-30 lbs/ac; Medium, 31-90 lbs/ac; High, 91-150 lbs/ac; and Very High, >150 lbs/ac.

Organic P Source Application Method

The manner in which organic P material is applied to the soil and the time that the organic material is exposed on the soil surface until crop utilization can determine potential P movement. Incorporation implies that the organic P material is buried below the soil surface at a minimum of three to six inches. The value categories of increasing severity, ranging from no application to surface applied more than 3 months before planting, and depicts the longer surface exposure time between organic P material application, incorporation, and crop utilization. The longer the material sits on the soil surface the greater the chance for surface runoff.

Fertilizer P Application Method

The manner in which P fertilizer is applied to the soil and the amount of time that the fertilizer is exposed on the soil surface until crop utilization effects potential P movement. Incorporation implies that the fertilizer P is buried below the soil surface at 3 to 6 inches. The value categories of increasing severity, ranging from no application to surface applied more than 3 months before planting, depict the longer surface exposure time between fertilizer application, incorporation, and crop utilization. The longer the material sits on the surface the greater the potential for surface runoff.

Nearest Field Edge to Named Stream or Lake

This factor considers the potential flow distance from the edge of the field closest to the water body to the water body. The closer the water body to the edge of the field, the higher the parameter category value. These values should consider the local topography, existing setback, and buffer regulations for application of nutrient sources. Local or state guidelines should be used where available.

Soil Erosion

Soil erosion is defined as the loss of soil along the slope or unsheltered distance caused by the processes of water and wind. Soil erosion is estimated from erosion prediction models including the Revised Universal Soil Loss Equation (RUSLE), for water erosion and Wind Erosion Equation (WEQ), for wind erosion. Erosion induced by irrigation is calculated by other convenient methods. The
value category is given in tons of soil loss per acre per year (ton/acre/year). These soil loss prediction models do not predict sediment transport and delivery to a water body. The prediction models are used in this index to indicate a movement of soil, thus potential for sediment and attached phosphorus movement across the slope or unsheltered distance and toward a water body.

**Runoff Class**

The runoff class is the runoff potential of soluble P moving from locations of placement. The runoff class of the site can be determined from soil survey data and slope measurements in the field. Guidance in determining the runoff class is based on soil permeability classes and the percent slope of the site (Table 2 – Adapted from the USDA-NRCS National Soil Survey Handbook). The result of using the matrix relating soil permeability class and slope provides the value categories: NEGLIGIBLE, VERY LOW, LOW, MEDIUM, HIGH, and VERY HIGH. Note NEGLIBLE and VERY LOW are combine so that a 5 factor rating for the matrix can be maintained.

**Surface Irrigation Erosion**

Potential P loss resulting from furrow irrigation-induced erosion is considered by inclusion of a rating system based on soil susceptibility to particle detachment by hydraulic shear and flow rate of water in the furrow. The susceptibility to detachment is given by a relative ranking of soil erodibility classes under furrow irrigation (Table 3). These classes are an initial attempt at a relative ranking based on inherent stable and static soil properties (i.e., texture and clay mineralogy). There are temporal variations in the relative erodibility and actual amount of erosion with furrow erosion. These changes in erodibility are a function of soil properties and management. However, no attempt is made to consider temporal soil properties or management factors in the rating. The introduced flow rate in the furrow (Q) is given by the irrigation water management plan and recorded as gallons per minute (gal/min). The furrow slope (S) of the site is given as a percentage (feet per 100 feet). (See USDA-NRCS National Engineering Handbook 15, chapter 5). The product of flow rate (Q) and slope (S) is used to determine the value category.

**Grazing Management**

Grazing management relates to the recycling of phosphorus nutrients by grazing fields that are also manure application fields. Supplemental feeding in the application field imports additional P with feed and concentrates in animals, increasing the rating. There are 5 value categories based on how grazing is done. They are Not Grazed, Grazed Crop Residues, Pasture with less than 30%
of the feed needed brought in, Pasture with 30 to 80% of the feed needed brought in, and Pasture with 80 to 100% of the feed needed brought in.

**Conservation Buffers**

Conservation buffers are areas or strips of land maintained in permanent vegetation to help control pollutants and manage other environmental problems. Contour Buffer Strips, Field Borders, Filter Strips, Grass Waterways with Vegetated Filters, and Riparian Forest Buffers are examples of conservation buffers. Conservation buffers clean runoff, by helping stop sediment, and adsorb P. With buffers, wider is better. Points are assigned based on the buffer width.

**PROCEDURES FOR MAKING AN ASSESSMENT**

Each site characteristic has been assigned a weighting value based on reasoning that one particular site characteristic may be more prominent than another at allowing potential phosphorus movement from the site. There is scientific basis for concluding that these relative differences exist; however, the absolute weighting factors given are currently based on professional judgment. The site characteristic weighting factors are:

<table>
<thead>
<tr>
<th>Site Characteristics</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Test P Level</td>
<td>1</td>
</tr>
<tr>
<td>Phosphorus Application Rate</td>
<td>1</td>
</tr>
<tr>
<td>Organic Phosphorus Source Application Method</td>
<td>1</td>
</tr>
<tr>
<td>Phosphorus Fertilizer Application Method</td>
<td>1</td>
</tr>
<tr>
<td>Proximity of Field Edge to Named Stream or Lake</td>
<td>1.5</td>
</tr>
<tr>
<td>Soil Erosion</td>
<td>1.5</td>
</tr>
<tr>
<td>Runoff Class</td>
<td>1.5</td>
</tr>
<tr>
<td>Irrigation Erosion</td>
<td>1.5</td>
</tr>
<tr>
<td>Grazing Management</td>
<td>0.5</td>
</tr>
<tr>
<td>Conservation Buffers</td>
<td>1.5</td>
</tr>
</tbody>
</table>

The value categories are rated using a log base of 2. The greater the ratings, the proportionally higher are the values. The higher the value, the higher potential for significant problems related to phosphorus movement.
The value ratings are:

- None or very low: 0
- Low: 1
- Medium: 2
- High: 4
- Very high: 8

The P Index Worksheet for Arizona can be used to record the values from the index for a specific field. To make an assessment using the P Index, use Table 1 (P Index Worksheet for Arizona), select a rating value for each site characteristic using the categories NONE or VERY LOW, LOW, MEDIUM, HIGH, or VERY HIGH. The value in the table is the result of multiplying the site characteristic weighting factor by the rating value to get the weighted value for that characteristic (see index value). Proceed to rate and factor each characteristic of the index. Sum the values for all ten characteristics, and compare the total using the Phosphorus Index Rating for Arizona, Weighted Factor Chart (Table 4). A description of site vulnerability by the Hazard Class Rating is given to describe the potential loss of P for a given field.

A Microsoft Excel spreadsheet is available (PI-ARIZONA.xls) to automate the evaluation. The file is posted on the NRCS ARIZONA web site. The file name is PI-ARIZONA.xls. The location of the file on the web is www.Arizona.usda.gov/techserv/techres1.htm. If unable to download, contact the state agronomist.

**INTERPRETATIONS OF SITE VULNERABILITY RATINGS (P HAZARD CLASS) FOR THE P INDEX**

**P Hazard Class Rating Described**

**VERY LOW OR LOW** – A field that has a VERY LOW OR LOW potential for P movement offsite. If farming practices were maintained at current levels, the probability of an adverse impact to surface water resources from P losses from the field would be very low or low. **Nutrient application can be based on nitrogen for all sources.**

**MEDIUM** – A field that has a MEDIUM potential for P movement offsite. The probability for an adverse impact to surface water resources is greater than that from a LOW vulnerability rated site. Some remedial action should be taken to lessen the probability of P movement. **Nutrient application can be based on nitrogen for all sources.**
HIGH - This site has a HIGH potential for P movement from the site. There is a high probability for an adverse impact to surface water resources unless remedial action is taken. Soil and water conservation as well as phosphorus management practices are necessary to reduce the risk of P movement and probable water quality degradation. **Nutrient application must be P based at 1.5 times crop removal when manure or other organic by-products are applied.** When inorganic fertilizer is applied, its rate must follow the Land Grant University’s P recommendation for crop production.

VERY HIGH - This site has a VERY HIGH potential for P movement from the site. The probability for an adverse impact to surface water resources is very high. Remedial action is required to reduce the risk of P movement. All necessary soil and water conservation practices plus a phosphorus management plan must be put in place to reduce the potential of water quality degradation. **Nutrient application must be P based at crop removal when manure or other organic by-products are applied.**

EXCESSIVE - This site has a VERY, VERY HIGH potential for P movement from the site. The probability for an adverse impact to surface water resources is extreme. Remedial action is required to reduce the risk of P movement. All necessary soil and water conservation practices plus a phosphorus management plan must be put in place to reduce the potential of water quality degradation. **No application of P is permitted.**

**PRECAUTIONS IN THE USE OF THE PHOSPHORUS INDEX**

The Phosphorus Index is an assessment tool intended to be used by planners and land users to assess the risk that exists for phosphorus leaving the landform site and travelling toward a water body. It also can be used to identify the critical parameters of soil, topography, and management that most influence the movement. Using these parameters, the index can then help select in the selection of management alternatives that would significantly address the potential impact and reduce the risk. The index is intended to be part of the planning process that takes place between the land user and resource planner. It can be used to communicate the concept, process, and results that can be expected if various alternatives are used in the management of the natural resources at the site. **THE PHOSPHORUS INDEX IS NOT INTENDED TO BE AN EVALUATION SCALE FOR DETERMINING WHETHER LANDUSERS ARE ABIDING WITHIN WATER QUALITY OR NUTRIENT MANAGEMENT STANDARDS THAT HAVE BEEN ESTABLISHED BY LOCAL, STATE, OR FEDERAL AGENCIES.** Any attempt to use this index as a regulatory scale would be grossly beyond the intent of the assessment tool and the concept and philosophy of the working group that developed it. As discussed in this technical note, this Phosphorus Index has been adapted to local conditions by a process of...
regional adaptations of the site characteristic parameters. This local development involves those local and state agencies and resource groups that are concerned with the management of phosphorus. After this index was adapted to this locality, it was tested by the development group to assure that the assessments are giving valid and reasonable results for the region. Field testing of the index was used to assess the value of the index.

Developed by:
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Mike Sporcic
State Agronomist
USDA-NRCS
Albuquerque, New Mexico

Linda Scheffe
Water Quality Specialist
USDA-NRCS
Albuquerque, New Mexico

Adapted for use in Arizona by:
Donald Walther
Cropland Specialist
USDA-NRCS
Tucson, Arizona
# TABLE 1. PHOSPHORUS INDEX WORKSHEET FOR ARIZONA

**PHOSPHORUS INDEX WORKSHEET for Arizona**

<table>
<thead>
<tr>
<th>Client Name:</th>
<th>Field(s):</th>
<th>Date:</th>
<th>Planner:</th>
<th>Location:</th>
<th>Crop:</th>
<th>Permeability (in/hr):</th>
<th>Slope (%):</th>
<th>Planned/Exist.:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Site Characteristic</th>
<th>Place an X in the appropriate box for each of the Site Characteristic listed below.</th>
<th>Sub Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Test P Level</td>
<td>Very Low &lt;8 ppm</td>
<td>Low 8-15 ppm</td>
</tr>
<tr>
<td>Phosphorus (P₂O₅) Application Rate</td>
<td>None Applied</td>
<td>1-30 lbs/ac P₂O₅</td>
</tr>
<tr>
<td>Organic Phosphorus Source Application Method</td>
<td>None Applied</td>
<td>Placed with Planter Deeper than 2 in.</td>
</tr>
<tr>
<td>Phosphorus Fertilizer Application Method</td>
<td>None Applied</td>
<td>Placed with Planter Deeper than 2 in.</td>
</tr>
<tr>
<td>Proximity of Nearest Field Edge to Named Stream or Lake</td>
<td>Very Low &gt;1000 feet</td>
<td>Low 500-1000 feet</td>
</tr>
<tr>
<td>Soil Erosion (WEQ &amp; RUSLE)</td>
<td>Very Low &lt;1 t/ac</td>
<td>Low 1-3 t/ac</td>
</tr>
<tr>
<td>Runoff Class (Runoff Class Table 2)</td>
<td>Very Low</td>
<td>Low</td>
</tr>
<tr>
<td>Irrigation Erosion (furrow)</td>
<td>Not Irrigated or No Furrow Irrigation</td>
<td>Tailwater Recover or QS&lt;6 for very erodible soils or QS&lt;10 for resistant soils</td>
</tr>
<tr>
<td>Grazing Management</td>
<td>Not Grazed</td>
<td>Graze Crop Residues</td>
</tr>
<tr>
<td>Vegetative Buffers</td>
<td>&gt;100 ft wide</td>
<td>65-100 ft wide</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>P Hazard Class:</th>
<th>Total Index Points:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus Application Classification:</td>
<td></td>
</tr>
<tr>
<td>Index Pts.</td>
<td>P Haz. Class</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>0-10</td>
<td>Very Low</td>
</tr>
<tr>
<td>10-17</td>
<td>Low</td>
</tr>
<tr>
<td>17-27</td>
<td>Medium</td>
</tr>
<tr>
<td>27-37</td>
<td>High</td>
</tr>
<tr>
<td>37-47</td>
<td>Very High</td>
</tr>
<tr>
<td>&gt;47</td>
<td>Excessive</td>
</tr>
</tbody>
</table>
TABLE 2. RUNOFF CLASS BASED ON FIELD SLOPE AND PERMEABILITY CLASS

Runoff Class Based on Field Slope and Permeability Class¹

<table>
<thead>
<tr>
<th>Slope %</th>
<th>Very Rapid &gt;20</th>
<th>Rapid 20-6</th>
<th>Moderately Rapid 6-2</th>
<th>Moderate 2-0.6</th>
<th>Moderately Slow 0.6-0.2</th>
<th>Slow 0.2-0.06</th>
<th>Very Slow 0.06-0.0015</th>
<th>Imperm. &lt;0.0015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(in/hr)</td>
<td>(in/hr)</td>
<td>(in/hr)</td>
<td>(in/hr)</td>
<td>(in/hr)</td>
<td>(in/hr)</td>
<td>(in/hr)</td>
<td>(in/hr)</td>
</tr>
<tr>
<td>Level or Concave</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>VH</td>
</tr>
<tr>
<td>&gt;0 to 1</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>VH</td>
</tr>
<tr>
<td>1 to &lt;5</td>
<td>N</td>
<td>N</td>
<td>VL</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>VH</td>
<td>VH</td>
</tr>
<tr>
<td>5-&lt;10</td>
<td>VL</td>
<td>VL</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>VH</td>
<td>VH</td>
<td>VH</td>
</tr>
<tr>
<td>10-&lt;20</td>
<td>VL</td>
<td>VL</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>VH</td>
<td>VH</td>
<td>VH</td>
</tr>
<tr>
<td>&gt;20</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>VH</td>
<td>VH</td>
<td>VH</td>
<td>VH</td>
</tr>
</tbody>
</table>

Note: Adapted from the National Soil Survey Handbook.

¹Based on the most restrictive horizon above 20 inches. If the most restrictive horizon is between 20 and 40 inches, the runoff estimate should be reduced by one class (e.g., medium to low). If the most restrictive layer in the soil is below 40 inches, use the lowers class that occurs above 40 inches.

Runoff Classes: N-negligible, VL-very low, L-low, M-medium, H-high, VH-very high

Special Rule 1 - A soil horizon that has a seasonal water table is assumed to have very slow permeability.

Special Rule 2 – Runoff is rated as “negligible” (N) if the soil is in a depression, regardless of the permeability.

Assumptions:
1. Bare soil surface.
2. Low water retention due to ground surface irregularities.
3. Steady ponded infiltration rate.
4. Bulk density of upper 10” is within normal range for the soil.

TABLE 3. FURROW IRRIGATION EROSION SITE CHARACTERISTICS

I. QS value

\[ Q = \text{flow rate of water introduced into the furrow (in gallons per minute, GPM)}. \]

\[ S = \text{furrow slope (in feet per 100 feet, percent)}. \]

Example: For a 5 gpm flow rate and a 2% furrow grade:

\[ QS = 5 \text{ gpm} \times 2\% \text{ grade} = 10 \]

II. Relative ranking of soil erodibility under furrow irrigation

Use local criteria to determine the relative erodibility of the soil in question. If no local criteria are established, use the following for guidance:

A. Very Erodible Soils
Soils in which the surface layer texture is silt, or silt loam with < 15% nonmontmorillonitic clay, or fine and very fine sandy loam with < 15% nonmontmorillonitic clay, or loamy fine sand, or loamy very fine sand. Contact a soil scientist for clay content and mineralogy.

B. Erosion-Resistant Soils
Soils that have the following characteristics in the upper 5 cm of the surface layer:
silty clay, clay, or sandy clay texture, weak or massive structure, and mixed or montmorillonitic clay mineralogy.

other soils that have medium or coarse blocky structure or coarse granular structure (i.e. natural aggregates > 10 mm) and very firm or firmer rupture resistance class in the moist state (i.e. requires at least strong force between thumb and forefinger to cause failure of a moist soil aggregate).

See the Soil Survey Manual (1993), chapter 3 for description of soil structural aggregates (peds), and table 3-14 for soil rupture-resistance classes.

C. Erodible Soils
Soils that have a surface layer not fitting any of the above criteria.
### TABLE 4. PHOSPHORUS INDEX RATING FOR ARIZONA: WEIGHTING FACTOR CHART

#### Phosphorus Index Rating for Arizona

<table>
<thead>
<tr>
<th>Site Characteristic</th>
<th>Wt. Factor</th>
<th>None or Very Low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Test P Level</td>
<td>1</td>
<td>None Applied</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very Low &lt;8 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low 8-15 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate 15-23 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High 23-30 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very High &gt;30 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phosphorus (P₂O₅) Application Rate</td>
<td>1</td>
<td>None</td>
<td>1-30 lbs/ac P₂O₅</td>
<td>30-90 lbs/ac P₂O₅</td>
<td>90-150 lbs/ac P₂O₅</td>
<td>&gt;150 lbs/ac P₂O₅</td>
</tr>
<tr>
<td>Organic Phosphorus Source Application Method</td>
<td>1</td>
<td>None Applied</td>
<td>Injected 3-6 inch below surface</td>
<td>Incorporated Immediately before Planting</td>
<td>Incorporated &gt;3 Months Before Planting or Surface Applied &lt;3 Months before Planting</td>
<td>Surface Applied</td>
</tr>
<tr>
<td>Phosphorus Fertilizer Application Method</td>
<td>1</td>
<td>None Applied</td>
<td>Placed with Planter Deeper than 2 in.</td>
<td>Incorporated Immediately before Planting</td>
<td>Incorporated &gt;3 Months Before Planting or Surface Applied &lt;3 Months before Planting</td>
<td>Surface Applied</td>
</tr>
<tr>
<td>Proximity of Nearest Field Edge to Named Stream or Lake</td>
<td>1.5</td>
<td>Very Low &gt;1000 feet</td>
<td>Low 500-1000 feet</td>
<td>Medium 200-500 feet</td>
<td>High 30-200 feet</td>
<td>Very High &lt;30 feet</td>
</tr>
<tr>
<td>Soil Erosion (WEQ &amp; RUSLE)</td>
<td>1.5</td>
<td>Very Low &lt;1 t/ac</td>
<td>Low 1-3 t/ac</td>
<td>Medium 3-5 t/ac</td>
<td>High 5-15 t/ac</td>
<td>Very High &gt;15 t/ac</td>
</tr>
<tr>
<td>Runoff Class (Runoff Class Table 2)</td>
<td>1.5</td>
<td>Negligible &amp; Very Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Very High</td>
</tr>
<tr>
<td>Irrigation Erosion</td>
<td>1.5</td>
<td>Not Irrigated or No Furrow Irrigation</td>
<td>Tailwater Recover or QS&lt;6 for very erodible soils or QS&lt;10 for other soils</td>
<td>QS&gt;10 for erosion resistant soils</td>
<td>QS&gt;10 for erodible soils</td>
<td>QS&gt;6 for very erodible soils</td>
</tr>
<tr>
<td>Grazing Management</td>
<td>0.5</td>
<td>Not Grazed</td>
<td>Only Graze Crop Residues</td>
<td>Pasture &lt;30% Dry Matter as Supp. Feed</td>
<td>Pasture 30 to 80% Dry Matter as Supplemental Feed</td>
<td>Pasture 80 to 100% Dry Matter as Supp. Feed</td>
</tr>
<tr>
<td>Vegetative Buffer</td>
<td>1.5</td>
<td>&gt;100 ft wide</td>
<td>65-100 ft wide</td>
<td>20-65 ft wide</td>
<td>&lt;20 ft wide</td>
<td>No Buffer</td>
</tr>
</tbody>
</table>

#### Phosphorus Index Classification

<table>
<thead>
<tr>
<th>Index Pts.</th>
<th>P Hazard Class</th>
<th>P Application Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>Very Low</td>
<td>N Based</td>
</tr>
<tr>
<td>10-17</td>
<td>Low</td>
<td>N Based</td>
</tr>
<tr>
<td>17-27</td>
<td>Medium</td>
<td>N Based</td>
</tr>
<tr>
<td>27-37</td>
<td>High</td>
<td>P Based (1.5 x crop removal)</td>
</tr>
<tr>
<td>37-47</td>
<td>Very High</td>
<td>P Based (at crop removal)</td>
</tr>
<tr>
<td>&gt;47</td>
<td>Excessive</td>
<td>No P application allowed</td>
</tr>
</tbody>
</table>
SECTION 6.
GLOSSARY

ACRONYMS

AACD: Arizona Association of Conservation Districts
AAAP: Agricultural Activities Assistance Program
ACT: Agricultural Consultation and Training
ADA: Arizona Department of Agriculture
ADEQ: Arizona Department of Environmental Quality
AF-NR: Aqua Fria-New River
AFO: Animal Feeding Operation
AZPDES: Arizona Pollutant Discharge Elimination System
BMP: Best Management Practice
CAFO: Concentrated Animal Feeding Operation
CNMP: Certified Nutrient Management Plan
CNMPS: Certified Nutrient Management Planning Specialist
CWA: Clean Water Act
EID: Environmental Information Document
ELG: Effluent Limitations Guidelines
EM: East Maricopa
EPA: Environmental Protection Agency
EQIP: Environmental Quality Incentives Program
N: Nitrogen
NOC: Notice of Opportunity to Correct
NOI: Notice of Intent
NOV: Notice of Violation
NMP: Nutrient Management Plan
NPDES: National Pollutant Discharge Elimination System
NRCD: Natural Resource Conservation District
NRCS: Natural Resources Conservation Service
OSV: On-site Visit
P: Phosphorus
SCS: Soil Conservation Service
TSP: Technical Service Provider
UDA: United Dairymen of Arizona
USDA: United States Department of Agriculture
USEPA: United States Environmental Protection Agency
APPENDIX A:
NPDES General CAFO Permit, Permit Worksheets, and Other Permit Compliance Aids

US ENVIRONMENTAL PROTECTION AGENCY
REGION 9

CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

GENERAL PERMIT NO. AZG800000

FOR

THE STATE OF ARIZONA
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PART I. AUTHORITY

This permit is issued pursuant to Clean Water Act, section 402.

PART II. PERMIT COVERAGE

A. Area

The permit covers the State of Arizona and Indian Country in Arizona subject to the jurisdiction of the following Indian Tribes: Ak-Chin, Cocopah, Colorado River, Fort McDowell Mohave-Apache, Fort Mohave, Fort Yuma-Quechan, Gila River, Havasupai, Hopi, Hualapai, Kaibab Paiute, Navajo, Pascua Yaqui, Salt River Pima-Maricopa, San Carlos, San Juan Southern Paiute, Tohono O’odham, Tonto Apache, White Mountain Apache, Yavapai-Apache (Camp Verde), and Yavapai-Prescott.

B. Sources

The permit covers concentrated animal feeding operations (CAFOs*) in the permit area, except any CAFO* that:

1. has been notified by the Director to apply for an individual permit pursuant to 40 CFR 122.28(b)(3);

2. is likely to adversely affect a listed or proposed to be listed endangered or threatened species or its critical habitat;

3. is likely to adversely affect properties listed or eligible to be listed in the National Register of Historic Places; or

4. becomes a CAFO* after the effective date of this permit* and meets any of the following conditions: (a) discharges* to a water quality limited segment* listed for: total nitrogen, nitrogen species, total phosphorus, turbidity, fecal coliform or E.Coli, (b) discharges* to a ‘Unique Water’ identified in Arizona Administrative Code R18-11-112, or (c) is located within the 100 year floodplain.

C. Reopener Clause for Endangered Species Protection

This permit may be modified or revoked and reissued based on the results of Endangered Species Act section 7 consultation with the U.S. Fish and Wildlife Service.
PART III. APPLICATION FOR COVERAGE

A. Notice of Intent

An owner or operator of a CAFO* seeking coverage under this permit must submit a completed ‘Notice of Intent to be Covered by General Permit No. AZG800000 for Concentrated Animal Feeding Operations’ (NOI), attached as Appendix A, to:

(NOIs go to the ADEQ address below, as of December 2002)

US EPA, Region 9
Attn.: AZG800000/NOI, WTR-7
75 Hawthorne St.
San Francisco, CA 94105

An owner or operator seeking coverage for a CAFO* not in Indian Country subject to the jurisdiction of an Indian Tribe identified in Part II.A. must submit a copy of the completed NOI to:

(NEW ADDRESS)
Arizona Department of Environmental Quality
Water Quality Compliance Section
CAFO/AFO Coordinator
1110 W. Washington Street
Phoenix, AZ 85007

Arizona Department of Environmental Quality
Water Quality Compliance Section
Mail Code M0501
3033 N. Central Avenue
Phoenix, AZ 85012

An owner or operator seeking coverage for a CAFO* in Indian Country subject to the jurisdiction of an Indian Tribe identified in Part II.A. must submit a copy of the completed NOI to the appropriate Indian Tribe. See, Appendix D, Contact Names and Addresses.
B. Deadline for Notice of Intent

The deadline for submitting a completed NOI is:

1. For an operation which is a CAFO* on the effective date of the permit*, 180 days after the effective date of the permit*;
2. For an operation designated as a CAFO* pursuant to 40 CFR 122.23(c), 90 days after designation as a CAFO*; and
3. For an operation which becomes a CAFO* after the effective date of the permit*, 90 days before the operation becomes a CAFO*.

C. Additional Information Regarding New CAFOs

A person seeking coverage under this permit for an operation which becomes a CAFO* after the effective date of the permit* and which meets the definition of a “new source” as provided in Part VII.S of this permit, must also submit to EPA, and to the State or Indian Tribe, as appropriate, an ‘Environmental Information Document’ (EID), containing the information identified in Appendix C, no later than 90 days before the operation becomes a CAFO*. For assistance in determining whether an operation which becomes a CAFO* after the effective date of the permit meets the definition of new source*, please contact Shirin Tolle at (415) 744-1898 or Jacques Landy at (415) 744-1922. (DISREGARD the two contacts, Ken Johnson at the ADEQ should be contacted instead at (602) 771-4469.

D. Commencement of Authorization to Discharge

Authorization to discharge* from an eligible CAFO* in accordance with the permit begins:

1. For an operation which is a CAFO* on the effective date of the permit*, or designated as a CAFO* pursuant to 40 CFR 122.23(c), 24 hours after a complete and timely NOI is mailed to EPA; and
2. for an operation which becomes a CAFO* after the effective date of the permit*, 90 days after a complete and timely NOI and EID is mailed to EPA, unless the CAFO* is notified by EPA during the 90-day period following mailing of the NOI and EID, that more than 90 days are required to process the NOI and conduct the National Environmental Policy Act review required by 40 CFR 122.29(c).
E. Expiration, Termination or Revocation of Coverage

This permit expires five years after its effective date*. If this permit is not reissued prior to its expiration date, it will be administratively continued in accordance with the Administrative Procedures Act and any discharger authorized by this permit prior to the expiration date will remain authorized under this permit until (i) the permit is reissued or (ii) EPA publishes a determination not to reissue this permit. In accordance with 40 CFR 122.28(b)(3), EPA may require any discharger authorized by the permit to apply for and obtain an individual NPDES permit, and terminate or revoke coverage under this general permit. In accordance with 40 CFR 122.28(b)(3), any owner or operator authorized by the permit may request to be excluded from coverage of the general permit by applying for an individual permit.

PART IV. PERMIT REQUIREMENTS

A. Effluent Limitations and Discharge Prohibitions

1. There shall be no discharge* of waste, process waste water*, or process waste water pollutants to waters of the United States* except when storm events, either chronic* or catastrophic*, cause an overflow of process waste water from a facility properly designed, constructed, maintained, and operated to contain:

   a. All process generated waste waters* resulting from the operation of the CAFO* (such as wash water, parlor water, watering system overflow); plus
   b. All contaminated runoff from a 25-year, 24-hour storm event*.

2. Except for discharges* which are

   a. composed entirely of storm water runoff, snow melt runoff and/or
   b. return flows from irrigated agriculture,

   originating from a land area upon which manure* and/or waste water* from a CAFO* has been applied in accordance with a Best Management Practices* Plan (BMP Plan) under Part IV.B.1 and with a Nutrient Management Plan* (NMP) under Part IV.B.3.a, there shall be no discharge* which causes or contributes to a violation of a State or, if appropriate, tribal water quality standard*.

3. Discharges* of manure* or process waste water* from waste water control or retention structures* to waters of the United States* by means of a hydrologic connection* are prohibited.
B. Special Conditions


a. Deadlines for developing and implementing a BMP Plan.

A permittee must develop and implement a BMP Plan for the CAFO covered by this permit:

i. For an operation which is a CAFO on the effective date of the permit, by one year after the effective date of the permit;

ii. For an operation designated as a CAFO pursuant to 40 CFR 122.23(c), by one year after designation as a CAFO;

and

iii. For an operation which becomes a CAFO after the effective date of the permit, by the date on which the NOI for the CAFO is submitted.

b. Submission of BMP Plans for New CAFOs

A permittee for an operation which becomes a CAFO after the effective date of the permit must submit the BMP Plan with the original and the copy of the NOI for that CAFO to the agencies listed in Part III.A, as appropriate.

c. Content of BMP Plan

A BMP Plan must:

i. be developed in accordance with standard engineering practices as defined by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook available at ftp://ftp.ftw.nrcs.usda.gov/pub/awmfh, or any subsequent NRCS revision of Part 651 which the permittee references in the BMP Plan;

ii. describe the BMPs and Minimum Standards which the permittee will implement to assure compliance with the permit;
iii. demonstrate that the waste water control or retention structures* are adequately designed (in accordance with NRCS Conservation Practice Standard Code 313 - Waste Storage Facilities or any subsequent NRCS revision of Standard 313 which the permittee references in the BMP* Plan) and can achieve the effluent limitations and discharge prohibitions of Part IV.A. above;

iv. identify the persons responsible for developing, implementing, and revising the BMP* Plan (including its inspection and record keeping procedures), and describe their respective activities and responsibilities;

v. include a map showing the drainage pattern, surface water bodies, and existing waste water control or retention structures*;

vi. list the significant chemicals and/or hazardous substances* that are used, stored or disposed of at the CAFO*, and describe any significant spills* of these chemicals and/or hazardous substances* at the CAFO* after the effective date of this permit*;

vii. describe activities and chemicals and/or hazardous substances* which may be a potential pollutant* source, including sources which may reasonably be expected to add pollutants* to runoff from the facility;

viii. include all existing sampling data obtained pursuant to Part V.B;

ix. describe the inspection and record keeping procedures which the permittee will implement pursuant to Part IV.B.4;

x. describe an appropriate schedule for preventive maintenance and good housekeeping;

xi. identify areas which have a high potential for significant soil erosion and describe measures to limit erosion and pollutant* runoff;

xii. describe an employee training program pertaining to permit compliance;

xiii. be signed in accordance with Part VI.E.; and
xiv. be updated as appropriate.

2. **Minimum Standards**

Minimum Standards are applicable to the CAFO operation upon issuance of the permit and are to be incorporated into the CAFO's BMP Plan.

a. **Diversion of Run-on**

The permittee shall isolate feedlots and associated wastes from outside surface drainage by ditches, dikes, berms, terraces or other waste water control or retention structures, designed to carry, store or contain peak flows during the 25-year, 24-hour storm event. The permittee must protect any waste water control or retention structure by berms or other appropriate structures to prevent inundation that may occur during a 25-year, 24-hour flood event. The permittee should consult with the County Flood Control District in order to ensure that any measures taken to comply with this requirement are consistent with Arizona law.

b. **Waste Water Control or Retention Structure Freeboard**

To maintain adequate capacity in waste water control or retention structures, the permittee shall establish and maintain a minimum freeboard for all waste water control or retention structures adequate to prevent berm failure and overflow during normal operating conditions and to ensure compliance with the permit conditions.

c. **CAFO Expansion**

The permittee shall not expand its CAFO, either in size or number of animals, before making a determination and ensuring that wastes generated by the expansion will not exceed the design capacity of the waste water control or retention structures.

d. **Land Application of Manure**

Manure or process waste water must not be applied on land that is flooded, saturated with water, frozen or snow covered, where such conditions could reasonably be expected to result in a discharge of manure or process waste water to waters of the United States.
e. **Buffers and Equivalent Practices**

   The permittee shall maintain buffer strips or other equivalent practices near feedlots*, manure storage areas, and land application areas that are sufficient to minimize discharge of pollutants* to waters of the United States*.

f. **Chemical Handling**

   The permittee shall ensure that wastes* from facility activities such as dipping and/or pest/parasite control and hazardous substances* or toxic pollutants* do not enter any waters of the United States*.

g. **Disposal of Material into Waste Water Control or Retention Structures**

   The disposal of any hazardous substances* or toxic pollutants*, other than discharges* associated with proper operation and maintenance of the CAFO*, into waste water control or retention structures* is prohibited.

h. **Dead Animals**

   The permittee must dispose of dead animals in a manner that prevents contamination of waters of the United States*.

i. **Spills**

   The permittee must take appropriate measures to prevent and clean up spills* of any pollutants*, and to report spills* as required by Part VI.D.3.

j. **Facility Closure**

   The permittee shall close all waste water control or retention structures* in accordance with NRCS Conservation Practice Standard Code 360 - Closure of Waste Impoundments or any subsequent NRCS revision of Conservation Practice Standard Code 360 which the permittee references in the BMP* Plan.

l. **Liner Requirements for New Waste Water Control or Retention Structures**

   Waste water control or retention structures* constructed after the effective date* of this permit shall incorporate either a synthetic or

3. **Nutrient Management**

   a. **Nutrient Management Plan* (NMP)**

      If manure* or process waste water* is applied to land under the operational control of the permittee, the permittee shall, no later than (i) two years after the effective date of the permit* or (ii) thirty (30) days before beginning land application*, whichever is later, develop a Nutrient Management Plan* (NMP) approved by Arizona NRCS or a Certified Nutrient Management Planning Specialist*. The NMP* must provide that waste*, process waste water* and soil sampling shall be conducted in accordance with the most current version of NRCS Conservation Practice Standard - Arizona Nutrient Management, Code 590.

   b. **On-site Land Application of Manure or Process Waste Water**

      The permittee shall not land apply manure* or process waste water* unless the permittee has completed an NMP* and determined a site-specific, quantified land application* rate that does not exceed the capacity of the soil and the planned crops to assimilate nutrients based on the most limiting nutrient in the soil (e.g., phosphorus or nitrogen), type of crop, realistic crop yields, soil type, and all nutrient inputs in addition to those from the manure* or process waste water*. The permittee shall not land apply manure* or process waste water* in excess of the land application* rate which it has determined under the NMP*.

   c. **Land Application Monitoring**

      On each day during which manure* or process waste water* is land applied by the permittee, the permittee shall record the following information to determine compliance with the land application* rate:

      i. quantity of manure* or process waste water* applied (in gallons/day, cubic feet/day, or acre-inches/day),
ii. land application\(^*\) rate (in tons/acre or lbs/acre of process waste water\(^*\) or manure\(^*\)), and

iii. application area (in acres).

d. **Off-site Land Application of Manure or Process Waste Water**

If the permittee provides manure\(^*\) or process waste water\(^*\) generated at the CAFO\(^*\) to another person for off-site land application\(^*\), the permittee must:

i. provide to the applier the nutrient values expected to be found in the manure\(^*\) or process waste water\(^*\);

ii. inform the applier of the requirements of Arizona Administrative Code Title 18, Chapter 9, Article 4, pertaining to Agricultural General Permits (reproduced in Appendix E);

iii. record the amount of manure\(^*\) or process waste water\(^*\) that leaves the permitted operation; and

iv. for quantities greater than 100 tons provided to a single recipient per week, record the name and address of the recipient.

4. **Inspections and Record Keeping**

a. The permittee shall retain a copy of the NOI, permit, BMP\(^*\) Plan, NMP\(^*\) and other records required to be maintained under the permit at the CAFO\(^*\).

b. The permittee shall ensure each year that the person or persons identified pursuant to Part IV.B.1.c.iv as responsible for implementing the BMP\(^*\) Plan’s inspection and record keeping procedures completely inspects the CAFO\(^*\) and completes a report of the findings of the inspection. The report must state:

i. whether the BMP\(^*\) Plan’s description of potential pollutant\(^*\) sources is accurate,

ii. if the drainage map shows current conditions or must be updated,
iii. what pollutants* have entered the waste water control or retention structures*, and

iv. whether the minimum standards are being implemented and are adequate.

c. Waste Water Control or Retention Structure* Inspection and Monitoring

i. Monthly (and in any event within five days of each chronic rainfall* or catastrophic storm event*), the permittee shall inspect the waste water control or retention structures for berm integrity, cracking, slumping, excess vegetation, burrowing animals and seepage.

ii. Quarterly (and in any event within five days of each chronic rainfall* or catastrophic storm event*), waste water control or retention structure* freeboard* (in feet) shall be monitored and recorded. Freeboard* records shall be kept with the BMP plan.

PART V. DISCHARGE NOTIFICATION AND MONITORING

A. Discharge Notification

ADEQ must be notified at (602) 771-4469, instead of EPA

The permittee must report any discharge*: within 24 hours, by verbal notification to EPA at (415) 744-1905; and, within five (5) days of the discharge*, by written notification to EPA and to the State or Indian tribe, as appropriate. The notification must include:

1. a description of the discharge* and cause, whether excess precipitation, snow melt, or other specified causes;

2. the date and time of the discharge*, its duration and, if not corrected, the anticipated time the discharge* is expected to continue;

3. a description of the path to the receiving water and the name of the receiving stream;

4. an estimate of the flow and volume discharged;

5. if the discharge* was caused by a precipitation event, information concerning the size of the precipitation event from the National Weather Service or on-site rain gauge;
6. the name of the person recording the discharge*; and

7. a description of steps being taken to reduce, eliminate and prevent recurrence of the discharge*.

B. Discharge Monitoring

The permittee must sample and analyze grab samples from all overflows or discharges* from the waste water control or retention structures* for the following analytes:

1. fecal coliform bacteria;
2. 5-day Biochemical Oxygen Demand (BOD$_5$);
3. Total Suspended Solids (TSS);
4. ammonia (NH$_3$-N); nitrite (as N), nitrates (as N), total Kjeldahl nitrogen (TKN as N); and
5. total phosphorus (as P);

The permittee shall: (a) collect the sample within 30 minutes of commencement of the discharge*; or (b) if sampling in that period is inappropriate due to dangerous weather, flooding or other conditions, collect the sample as soon as possible after suitable conditions occur, and document the reason for the delay.

C. Sampling Methods and Procedures

Within 60 days of commencement of authorization to discharge* as provided by Part III.D of this permit, the permittee shall select a licensed Arizona laboratory and inform the laboratory of the analytes to be sampled. The permittee shall obtain the following polyethylene sampling bottles from the laboratory: one 250 ml bottle for bacterial analysis, one 500 ml bottle for BOD$_5$ and TSS, and one 500 ml bottle for nutrients. These bottles shall be kept ready on-site along with an ice-chest. An on-site source of ice shall be identified for sample preservation. Samples shall be taken as grab samples directly from the end of pipes or from ditches or surface waters. Sample bottles shall not touch solid surfaces during sampling. Sample bottles shall be filled completely, and shall be packed in ice in the ice-chest and delivered to the identified laboratory within six hours of sampling. At the laboratory, the sampler or a designee identified by the sampler in the field log shall sign the 'relinquished by' box on a form which shall be provided by the laboratory. On this form, the sampler or designee shall note date and time when the samples are delivered. The sampler or designee shall inform laboratory of sample type (waste water) and analyses to be performed.
D. Sample Documentation and Transport

The permittee shall record the following information at the time of the sampling event and shall include the information with the facility's BMP Plan pursuant to Part IV.B.1.c.viii of this permit:

1. Sample location and description of discharge;
2. Sampler’s name(s);
3. Date and time of sample collection;
4. Date and time that sample arrived at laboratory; and
5. Name of person delivering sample to laboratory.

PART VI. STANDARD PERMIT CONDITIONS

A. General Conditions

1. Introduction:
   In accordance with the provisions of 40 CFR 122.41, et seq., this permit incorporates by reference ALL conditions and requirements applicable to NPDES Permits set forth in the Clean Water Act, as amended, (hereinafter known as the "Act") as well as ALL applicable regulations.

2. Duty to Comply:
   The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement action; for permit termination, revocation, and reissuance; for denial of a permit renewal application; and/or for requiring a permittee to apply for and obtain an individual NPDES permit.

3. Toxic Pollutants:
   The permittee shall comply with effluent standards and prohibitions established under section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

4. Permit actions: This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Property rights:
   The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private
property or any invasion of personal rights, nor any infringement of Federal, State/Tribal or local laws or regulations.

6. Duty to provide information:
The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

7. Criminal and Civil Liability:
Nothing in this permit will be construed to relieve the permittee from civil or criminal penalties for noncompliance. Any false or materially misleading representation or concealment of information required to be reported by the provisions of the permit, the Act*, or applicable regulations which avoids or effectively defeats the regulatory purpose of the permit may subject the permittee to criminal enforcement pursuant to 18 U.S.C. Section 1001.

8. State/Tribal Laws:
Nothing in this permit will be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State/Indian Tribe law or regulation under authority preserved by section 510 of the Act*.

9. Severability:
The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, will not be affected thereby.

B. Proper Operation and Maintenance

1. Need to halt or reduce activity not a defense:
It will not be a defense for a permittee in an enforcement action to plead that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Duty to mitigate:
The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.
3. Proper operation and maintenance:
The permittee shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

C. Monitoring and Records

1. Inspection and entry:
The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:
   a. enter the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
   b. have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
   c. inspect, at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
   d. sample or monitor, at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act*, any substances or parameters at any location.

2. Representative sampling:
Samples and measurements taken for the purpose of monitoring will be representative of the monitored activity.

3. Retention of records:
The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time.
4. Record content:
Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses

5. Monitoring procedures:
Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit or approved by the Regional Administrator. The requirements at 40 CFR Part 136 may be accessed at the following website: http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1

D. Reporting Requirements

1. Anticipated Noncompliance:
The permittee shall give advance notice to the Director of any planned physical alterations or additions or changes in activity which may result in noncompliance with permit requirements.

2. Transfers:
This permit is not transferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act (CWA). (See 40 CFR 122.61; in some cases, modification or revocation and reissuance is mandatory.)

3. Twenty-four hour reporting:
The permittee shall report any noncompliance which may endanger human health or the environment. Any information must be provided orally to the EPA Region IX, via its 24-hour voice mail system, telephone number 415/744-1905 within 24 hours from the time the permittee becomes aware of the noncompliance circumstances. Notice will also be provided to ADEQ or the Tribal Authority, as appropriate. A written submission shall
also be provided within 5 days of the time the permittee becomes aware of the circumstances. The report must contain the following information:

a. a description of the noncompliance and its cause;

b. the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and,

c. steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

4. Other information:
Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit such facts or information to the Director.

E. Signatory requirements

All applications, reports, or information submitted to the Director will be signed and certified consistent with 40 CFR § 122.22:

1. All permit applications will be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

i. A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation; or,

ii. The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where
authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures; or

b. For a partnership or sole proprietorship: By a general partner or the proprietor, respectively,

By the co-permittee (if determined to be operator).

2. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. the authorization is made in writing by a person described above;

b. the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. A duly authorized representative may thus be either a named individual or an individual occupying a named position; and,

c. the written authorization is submitted to the Director.

F. Certification

Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."
G. Availability of Reports

Any information submitted pursuant to this permit may be claimed as confidential by the submitter. If no claim is made at the time of submission, information may be made available to the public without further notice.

H. Penalties for Violations of Permit Conditions

1. Criminal Penalties

   a. Negligent violations: The Act* provides that any person who negligently violates Section 301, 302, 306, 307, 308, 318, or 405 of the Act* or any condition or limitation implementing those provisions in a permit issued under Section 402 is subject to a fine of not less than $2,750 nor more than $27,500 per day of violation, or by imprisonment for not more than one year, or both.

   b. Knowing violations: The Act* provides that any person who knowingly violates Section 301, 302, 306, 307, 308, 318 or 405 of the Act* or permit conditions implementing those provisions and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $275,000, or by imprisonment for not more than 15 years, or both.

   c. Knowing endangerment: The Act* provides that any person who knowingly violates Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act* or permit conditions implementing those provisions and who knows at that time that he is placing another person in imminent danger of death or serious bodily injury is subject to a fine of not more than $275,000, or by imprisonment for not more than 15 years, or both.

   d. False statements: The Act* provides that any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under the Act* or who knowingly falsifies, tampers with, or renders inaccurate, any monitoring devise or method required to maintained under the Act*, shall upon conviction, be punished by a fine of not more than $11,000, or by imprisonment for not more than two years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than $22,000 per day of violation, or
by imprisonment of not more than four years, or by both. [See Section 309(c)4 of the Clean Water Act]

2. **Civil Penalties**

The Act* provides that any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act* is subject to a civil penalty not to exceed $27,500 per day for each violation. [See Section 309(d)]

3. **Administrative Penalties**

The Act* provides that the Administrator may assess a Class I or Class II administrative penalty if the Administrator finds that a person has violated Sections 301, 302, 306, 307, 308, 318, or 405 of the Act* or a permit condition or limitation implementing these provisions, as follows [See Section 309(g)]:

a. **Class I penalty:** Not to exceed $11,000 per violation nor shall the maximum amount exceed $27,500.

e. **Class II penalty:** Not to exceed $11,000 per day for each day during which the violation continues nor shall the maximum amount exceed $137,500.

**I. Upset**

1. **Definition:**
   “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with Part IV.A.1 of this permit because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

2. **Effect of an upset:**
   An upset constitutes an affirmative defense to an action brought for noncompliance with Part IV.A.1 of this permit if the requirements of Part VI.I.3 of this permit are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
3. Conditions necessary for a demonstration of upset:
A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(i) An upset occurred and that the permittee can identify the cause(s) of the upset;

(ii) The permitted facility was at the time being properly operated;

(iii) The permittee submitted notice of the upset as required in Part V.A of this permit (24-hour notice); and

(iv) The permittee complied with any remedial measures required under Part VI.B.2 of this permit.

4. Burden of proof:
In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

PART VII. DEFINITIONS

A. 25-Year, 24-Hour Storm Event
means the maximum 24-hour precipitation event with a probable recurrence interval of once in 25 years, as defined by the National Weather Service in Technical Paper Number 40, "Rainfall Frequency Atlas of the United States", May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom. A current map showing the 25-year, 24-hour precipitation event may be viewed at the following website: http://www.wrcc.dri.edu/pcpnfreq/az25y24.gif, which is maintained by the Western Regional Climate Center, accessible through the Home Page for the Hydrometeorological Design Studies Center, part of the National Weather Service's Office of Hydrology.

B. Animal Feeding Operation
is defined at 40 CFR 122.23(b) as: “(1)... a lot or facility (other than an aquatic animal production facility) where the following conditions are met: (i) Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and (ii) Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility. (2) Two or more animal feeding operations under common ownership are considered, for the purposes of these regulations, to be a single animal feeding operation if they adjoin each other or if they use a common area or system for the disposal of wastes.”
C. **Application**
   means a written "notice of intent" pursuant to 40 CFR 122.28.

D. **Best Management Practices ("BMPs")**
   Means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. Best Management Practices also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

E. **Catastrophic Storm Event**
   is equivalent to a 25-year, 24-hour storm event. Catastrophic events include tornadoes, hurricanes or other catastrophic conditions that would cause an overflow from a waste water control or retention structure that is designed, constructed, operated and maintained to meet all the requirements of this permit.

F. **Certified Nutrient Management Planning Specialist**
   is a person, including a CAFO operator or other third party vendor, who has completed the following training and who has received approval by the Natural Resources Conservation Service (NRCS) as a "Certified Nutrient Management Planning Specialist." A Certified Nutrient Management Planning Specialist has the authority to plan or approve Nutrient Management Plans (NMPs) under this permit.

1. The following NRCS web-based classes, located at http://www.ftw.nrcs.usda.gov/nedc/homepage.html, must have been completed and passed by a person training to be a Certified Nutrient Management Planning Specialist prior to that person undertaking the training described in subsection 2 below:
   a. "Introduction to Water Quality",
   b. "Nutrient Management Considerations in Conservation Planning",
   and
   c. "Agricultural Waste Management Systems - A Primer".

2. The following NRCS-Arizona 1-day Nutrient Management Training Course must have been completed and passed by a person training to be a Certified Nutrient Management Planning Specialist prior to that person being eligible to obtain approval by the NRCS as a Certified Nutrient Management Planning Specialist:
   a. Conservation Planning Course Modules 1-5,
   b. Federal Regulations,
   c. Arizona Regulations, and
d. "Arizona Nutrient Management Considerations in Conservation Planning".

G. **Chronic Rainfall**
is a series of wet weather conditions that preclude de-watering of properly maintained waste water control or retention structures*.

H. **Concentrated Animal Feeding Operation (CAFO)**
is defined at 40 CFR 122.23(b) to mean an animal feeding operation* which meets the criteria in appendix B of 40 CFR 122, or which the Director so designates. Appendix B to Part 122-Criteria for Determining a Concentrated Animal Feeding Operation (122.23) states that: “An animal feeding operation is a concentrated animal feeding operation for purposes of 122.23 if either of the following criteria are met.

(a) More than the numbers of animals specified in any of the following categories are confined:
   (1) 1,000 slaughter and feeder cattle,
   (2) 700 mature dairy cattle (whether milked or dry cows),
   (3) 2,500 swine each weighing over 25 kilograms (approximately 55 pounds),
   (4) 500 horses,
   (5) 10,000 sheep or lambs,
   (6) 55,000 turkeys,
   (7) 100,000 laying hens or broilers (if the facility has continuous overflow watering),
   (8) 30,000 laying hens or broilers (if the facility has a liquid manure system),
   (9) 5,000 ducks, or
   (10) 1,000 animal units; or

(b) More than the following number and types of animals are confined:
   (1) 300 slaughter and feeder cattle,
   (2) 200 mature dairy cattle (whether milked or dry cows),
   (3) 750 swine each weighing over 25 kilograms (approximately 55 pounds),
   (4) 150 horses,
   (5) 3,000 sheep or lambs,
   (6) 16,500 turkeys,
   (7) 30,000 laying hens or broilers (if the facility has continuous overflow watering),
   (8) 9,000 laying hens or broilers (if the facility has a liquid manure system),
   (9) 1,500 ducks, or
(10) 300 animal units;

and either one of the following conditions are met: pollutants are discharged into navigable waters through a manmade ditch, flushing system or other similar man-made device; or pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation. Provided, however, that no animal feeding operation is a concentrated animal feeding operation as defined above if such animal feeding operation discharges only in the event of a 25 year, 24-hour storm event.”

I. Discharge
means the “discharge of a pollutant”.

J. Discharge of a Pollutant
means any addition of any pollutant or combination of pollutants to waters of the United States from any point source. This definition includes additions of pollutants into waters of the United States from: surface water runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works. [See, 40 CFR 122.2.]

K. Effective Date of the Permit
is August 27, 2001.

L. Feedlot
means a concentrated, confined animal or poultry growing operation for meat, milk, or egg production, or stabling, in pens or houses wherein the animals or poultry are fed at the place of confinement and crop or forage growth or production is not sustained in the area of confinement.

M. Freeboard
means the linear distance in feet from the structural top of a berm (usually defined by a road or access path) to the operational level of waste water in a retention structure.

N. Ground Water
means any subsurface waters.

O. Hazardous Substance
means any substance designated under 40 CFR 116 pursuant to section 311 of the Act*. A list of currently designated hazardous substances is included in 40 CFR 116.4, Table 116.4A. 40 CFR 116.4 may be obtained at the following web-site:
http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1, by entering the following numbers: Title 40, Part 116, and Section 4 for the “most recent available” revision year. Alternatively, a paper copy of 40 CFR 116.4, Table 116.4A may be obtained by contacting U.S. EPA Region 9’s CWA Standards and Permits Office at (415) 744-1898 or (415) 744-1922.

P. **Hydrologic Connection**
means a discrete connection between groundwater and surface water, e.g. percolation from a waste impoundment or improper land application* resulting in down-gradient seepage into waters of the United States*.

Q. **Land Application**
means the application of process waste water or waste onto or incorporation into the soil.

R. **Manure**
means animal waste.

S. **New Source**
means the following as defined under 40 CFR 122.29 (b)(1): “(i) It is constructed at a site at which no other source is located; or (ii) It totally replaces the process or production equipment that causes the discharge of pollutants at an existing source; or (iii) Its processes are substantially independent of an existing source at the same site. In determining whether these processes are substantially independent, the Director shall consider such factors as the extent to which the new facility is integrated with the existing plant; and the extent to which the new facility is engaged in the same general type of activity as the existing source.”

T. **Nutrient Management Plan (NMP)**
means a plan, approved by Natural Resources Conservation Service (NRCS) or a Certified Nutrient Management Planning Specialist*, which, among other elements, establishes the rates at which manure or process waste water can be land applied so as to meet crop nutrient needs while minimizing the amount of pollutants discharged in agricultural return flows. The requirements for NMPs have been established by NRCS under the NRCS Conservation Practice Standard - Arizona Nutrient Management, Code 590. An NMP must contain the following minimum information: a Field Map, Soil Test Results, Crop Sequence, Realistic Yield Goals, Manure and Waste Water Nutrient Values, Recommended Application Rates, Recommended Application Methods, and Guidance for implementation, operation, maintenance and record keeping.

U. **Pollutant**
means the following as defined under 40 CFR 122.2: “dredged spoil, solid waste, incinerator residue, filter back-wash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials,
radioactive materials..., heat, wrecked or discarded equipment, rock, sand, cellar
dirt and industrial, municipal, and agricultural waste* discharged into water.”

V. **Process Waste Water**
means any process generated waste water*; and any precipitation (e.g., rain or
snow) which comes into contact with any manure, litter or bedding, or any other
raw material or intermediate or final material or product used in or resulting from
the production of animals or poultry or direct products (e.g., milk, eggs).

W. **Process Generated Waste Water**
means water directly or indirectly used in the operation of a feedlot for any or all
of the following: spillage or overflow from animal or poultry watering systems;
washing, cleaning or flushing pens, barns, manure* pits or other feedlot facilities;
direct contact swimming, washing or spray cooling of animals; and dust control.

X. **Spill**
means discharge*, usually (but not exclusively) a small, inadvertent discharge* of
a toxic pollutant* or hazardous substance*.

Y. **The Act**
means Federal Water Pollution Control Act as amended, also known as the Clean
Water Act, found at 33 USC 1251 et seq.

Z. **Toxic Pollutants**
means any pollutant* listed as toxic under Section 307(a)(1) of the Act*. Toxic
pollutants are listed in 40 CFR 401.15, which may be obtained at the following
web-site: http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1 by entering
the following numbers: Title 40, Part 401, and Section 15 for the “most recent
available” revision year. Alternatively, a paper copy of 40 CFR 401.15 may be
obtained by contacting U.S. EPA Region 9’s CWA Standards and Permits Office
at (415) 744-1898 or (415) 744-1922.

AA. **Waste**
means manure* as well as bedding, feed and other by-products of an animal
feeding operation.

BB. **Waste Water Control or Retention Structure**
means any structure such as a pond, impoundment or lagoon used for the retention
of liquid wastes* or sludges (including manure*, liquid waste, and runoff from the
feedlot area) on the premises until their ultimate disposal. This includes all
collection ditches, conduits and swales for the collection of runoff and waste
water.
CC. **Water Quality Limited Segment**
means a water body identified as Water Quality Limited Segment pursuant to 40CFR 130.7. At the time of permit issuance the most recent list of water limited waters in Arizona may be found in: “Arizona’s 1998 Water Quality Limited Waters List,” ADEQ, July 1998, EQR-98-8.

DD. **Water Quality Standard**
is defined at 40 CFR 130.2(d) as: “Provisions of State or Federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act.” The State of Arizona’s water quality standards are contained in Arizona Administrative Code Title 18 (Environmental Quality) Chapter 11 (Department of Environmental Quality Water Quality Standards) Article 1 (Water Quality Standards for Surface Waters). The website where they may be found is: http://www.sosaz.com/public_services/Title_18/18-11.htm.

EE. **Waters of the United States**
is defined at 40 CFR 122.2 as: “(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands;" (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition; (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial sea; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States. ....”

**PART VIII. AVAILABILITY OF TECHNICAL AND LEGAL REFERENCES**

Hard copies or electronic versions of all citations and technical or other documents referenced in this permit may be obtained by contacting Shirin Tolle at (415) 744-1898 or Jacques Landy at (415) 744-1922. *(Contact Ken Johnson at (602) 771-4469).*
## APPENDIX A

### NOTICE OF INTENT TO BE COVERED BY GENERAL NPDES PERMIT NO. AZG800000 FOR CONCENTRATED ANIMAL FEEDING OPERATIONS

<table>
<thead>
<tr>
<th>Facility Owner:</th>
<th>Facility Operator: (if different from Owner)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Name:</td>
</tr>
<tr>
<td>Address:</td>
<td>Address:</td>
</tr>
<tr>
<td>City, State, Zip:</td>
<td>City, State, Zip:</td>
</tr>
<tr>
<td>Phone:</td>
<td>Phone:</td>
</tr>
</tbody>
</table>

### Facility/Site Location Information:

<table>
<thead>
<tr>
<th>Facility Name:</th>
<th>Address:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(If no street address is available, describe the location. Example: west side of Greenfield Lane, ½ mile south of Milkbarn Road)</td>
</tr>
<tr>
<td>City, State, Zip:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility:</th>
<th>Latitude:</th>
<th>Longitude:</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

*Facility: (Approximately the center of the facility)*

<table>
<thead>
<tr>
<th>Discharge 001:</th>
<th>Latitude:</th>
<th>Longitude:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

*Discharge 001: (List additional discharge locations on reverse side if applicable)*

<table>
<thead>
<tr>
<th>County:</th>
<th>Receiving Stream:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*County: |

<table>
<thead>
<tr>
<th>Total acreage occupied by the facility:</th>
<th>Is the facility on Indian Lands? (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
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</table>

*Total acreage occupied by the facility: *

<table>
<thead>
<tr>
<th>Number and Types(s) of animals confined at the facility (e.g. dairy cattle, feeder cattle, swine, poultry, etc.):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Number and Types(s) of animals confined at the facility (e.g. dairy cattle, feeder cattle, swine, poultry, etc.)*

<table>
<thead>
<tr>
<th>Address Where Pollution Prevention Plan can be reviewed:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

*Address Where Pollution Prevention Plan can be reviewed:*

---

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
</table>
# APPENDIX B

## NOTICE OF TERMINATION

**GENERAL NPDES PERMIT NO. AZG800000**

FOR CONCENTRATED ANIMAL FEEDING OPERATIONS

<table>
<thead>
<tr>
<th>Facility Owner:</th>
<th>Facility Operator: (if different Owner)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
<td><strong>Name:</strong></td>
</tr>
<tr>
<td><strong>Address:</strong></td>
<td><strong>Address:</strong></td>
</tr>
<tr>
<td><strong>City, State, Zip:</strong></td>
<td><strong>City, State, Zip:</strong></td>
</tr>
<tr>
<td><strong>Phone:</strong></td>
<td><strong>Phone:</strong></td>
</tr>
</tbody>
</table>

**Facility/Site Location Information:**

- **Facility Name:** ______________________________________________________
- **Address:** __________________________________________________________
  (If no street address is available, describe the location. Example: west side of Greenfield Lane, ½ mile south of Milkbarn Road)
- **City, State, Zip:** ________________________________________________
- **Facility:** ______________________  **Latitude:** ____________________  **Longitude:** ____________________
  (Approximately the center of the facility)
- **Discharge 001:** ______________________  **Latitude:** ____________________  **Longitude:** ____________________
  (List additional discharge locations on reverse side if applicable)
- **County:** ______________________  **Receiving Stream:** ____________________
- **Total acreage occupied by the facility:** __________  **Is the facility on Indian Lands? (Y/N)** __
- **Number and Types(s) of animals confined at the facility (e.g. dairy cattle, feeder cattle, swine, poultry, etc.)**
  __________________________________________________________
  (List additional animal types and numbers on reverse side if applicable)

**Date NOI was submitted:** _________________________________________

**Reason for termination of permit coverage:** _____________________________

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

<table>
<thead>
<tr>
<th><strong>Signature</strong></th>
<th><strong>Date</strong></th>
</tr>
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<tbody>
<tr>
<td>______________</td>
<td>__________</td>
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</tbody>
</table>
APPENDIX C

ENVIRONMENTAL INFORMATION DOCUMENT

If a proposed CAFO facility meets the definition of a “new source” as provided in Part VII.S of this permit, any person seeking coverage under this permit for an operation which becomes a CAFO* after the effective date of the permit* must submit the following information along with an application for a new source determination pursuant to 40 CFR 122.29(b) in order to be covered under the General NPDES Permit for Concentrated Animal Feeding Operations. Comprehensive information should be provided for those items or issues that are affected: the greater the impact, the more detailed information required. The Environmental Information Document (EID) should contain a brief statement addressing each item, even if the item is not applicable, in which case, explain why the item is not applicable.

A. General Information
   1. Name of applicant
   2. Type of facility
   3. Location of facility

B. Description of Facility, Environment, and Alternatives Considered
   1. Describe the proposed facility and construction activity, and ancillary or related facilities. Please include type, size and configuration of structures which constitute the facility (a site map or drawings may be provided, if available); the anticipated duration of construction and lifetime of the facility itself; typical operating conditions such as the nature and frequency of feeding and waste and waste water management measures; any changes in facility size and processes being considered during its operational lifetime; and relevant information concerning supporting facilities or infrastructure that would reasonably be associated with the proposed facility.
   2. Describe briefly the waste and waste water handling procedures, processes, and the waste water control or retention structures, including design capacities.
   3. Describe alternatives considered. Please include other sites or types of activities considered, including alternative waste and waste water handling procedures.
   4. General environmental information on the proposed facility site. Please provide information concerning the existing environment, including relevant recent and anticipated future changes in land use.
C. Environmental Concerns

1. Historical and Archeological Sites
   • Will the proposed facility affect any historical or archeological sites, structures or artifacts?
   • Please contact the AZ State Historical Preservation Officer (SHPO) to determine whether there are any historical or archeological matters of concern for your proposed facility (see Appendix D for contacts).

2. Wetlands Protection and 100-year Flood Plain Management
   • Is your proposed facility located within the 100 year flood plain?
   • Does you proposed facility include, or will your planned activity affect, any wetland?
   • Please contact the U.S. Army Corps of Engineers for assistance in answering these questions (see Appendix D for contacts).

3. Wild and Scenic Rivers
   • Will your planned activity affect any wild and scenic river or any Unique Water?
   • Please contact the AZ Department of Environmental Quality for a listing of Unique Waters (see Appendix D for contacts).

4. Endangered Species Protection
   • Will your planned activity affect any listed or proposed to be listed threatened or endangered species or its critical habitat, as identified by the U.S. Fish & Wildlife Service (USFWS)
   • Please contact the USFWS for assistance in identifying any listed or proposed to be listed threatened or endangered species or its critical habitat that may be found in the area of your proposed facility, and provide an assessment of your proposed facility’s impact on the species or habitat identified by USFWS, if any (see Appendix D for contacts).
   • You may also contact the AZ Game and Fish Department for assistance regarding threatened and endangered species (see Appendix D for contacts).

5. Air, water and land issues
   • Provide an assessment of your proposed facility with respect to its effect on:
     a) local or municipal services,
     b) discharges and emissions,
     c) runoff and waste water control,
     d) geology and soils involved,
     e) land use compatibility,
     f) solid and hazardous waste disposal, and
     g) natural and man-made hazards involved.

6. Biota concerns:
   • Provide an assessment of your proposed facility with respect to floral, faunal, and aquatic resources.
7. Community infrastructure available and resulting effects:
   • Provide an assessment of your proposed facility with respect to the
     following resources: social, economic, health, safety, educational,
     recreational, housing, transportation and road resources.
APPENDIX D

CONTACT NAMES AND ADDRESSES

STATE AGENCY CONTACTS:
Arizona State Land Department
Environmental Resources
1616 W. Adams Street
Phoenix, AZ 85007
(602) 542-2119

Arizona State Parks Department
Historic Preservation Office
1300 W. Washington Street
Phoenix, AZ 85007
(602) 542-4009

Arizona Game and Fish Department
2221 W. Greenway Road
Phoenix, AZ 85007
(602)942-3000

Arizona Department of Water Resource
500 N. Third Street
Phoenix, AZ 85004
(602)417-2400

Arizona Department of Environmental Quality
Water Quality Division
[Section] [Mail Code]
3033 N. Central Avenue
Phoenix, AZ 85012

Notice Of Intent (NOI) Submittal: Water Quality Compliance Section
Data Entry Unit Mail Code: M0501
(602)207-4620

Notice of Spills, Violations, etc... Water Quality Compliance Section
Enforcement Unit Mail Code: M0501
(602)207-4620

General APP Permits for CAFOs Water Quality Compliance Section
Nonpoint Source Unit Mail Code: M0501
(602)207-4616

General NPDES Permit for CAFOs Water Permits Section
Federal Permits Unit Mail Code: M0401A
(602)207-4665

FEDERAL CONTACTS:
U.S. Environmental Protection Agency, Region IX
CWA Standards & Permits Office (WTR-5)
75 Hawthorne Street
San Francisco, CA 94105
(415) 744-1898

U.S. Fish & Wildlife Service
Ecological Programs
2321 W. Royal Palms Road #103
Phoenix, AZ 85021-951
(602) 640-2720
U.S. Army Corps of Engineers
Phoenix Project Office
3636 N. Central Avenue
Suite 760
Phoenix AZ, 85012

TRIBAL CONTACTS:

Ak-Chin Indian Community
42507 W. Peters & Nall Road
Maricopa, AZ 85239
(520)568-2618

Cocopah Tribe
Environmental Protection
Avenue G & County 15th
Somerton, AZ 85350
(520)627-2061

Colorado River Indian Tribes
Environmental Agriculture
Route 1, Box 23-B
Parker, AZ 85344
(520)669-9211

Fort McDowell Mohave-Apache
Indian Community
P.O. Box 17779
Fountain Hills, AZ 85269
(602)837-5121

Fort Mohave Indian Tribe
Environmental Protection
500 Merriman Avenue
Needles, CA 92363
(619)326-4591

Fort Yuma-Quechan Tribe
Environmental Health
P.O. Box 11352
Yuma, AZ 85366
(619)572-0213

Gila River Indian Community
Department of Environmental Quality
P.O. Box 10
Sacaton, AZ 85247
(520)562-3311

Havasupai Tribe
P.O. Box 10
Supai, AZ 86435
(520)448-2731

Hopi Tribe
Water Resources Program
P.O. Box 123
Kykotsmovi, AZ 86039
(520)734-2441

Hualapai Tribe
Water Resources Program
P.O. Box 179
Peach Springs, AZ 86434-0179
(520)769-2216

Kaibab Paiute Tribe
HC 85, Box 2
Fredonia, AZ 86022
(520)643-7245

Navajo Nation
Environmental Protection Agency
P.O. Drawer 9000
Window Rock, AZ 86515
(520)871-6352

Pasqua Yaqui Tribe
Natural Resources Program
7474 South Camino De Oeste
Tucson, AZ 85746
(520) 883-5000

Salt River Pima-Maricopa
Environmental & Cultural Resources Office
Route 1, Box 216
Scottsdale, AZ 85256
(602) 941-7277
San Carlos Apache Tribe
Natural Resources Program
P.O. Box 0
San Carlos, AZ 85550
(520)475-2361

San Juan Southern Paiute Tribe
Environmental Programs
P.O. Box 1989
Tuba City, AZ 86045
(520) 283-4587

Tohono O’odham Nation
Water Resources Program
P.O. Box 837
Sells, AZ 85634
(520) 383-2221

Tonto Apache Tribe
Water Resources Program
#30 Tonto Apache Reservation
Payson, AZ 85541
(520)474-5000

White Mountain Apache Tribe
Fort Apache Indian Reservation
P.O. Box 700
Whiteriver, AZ 85941
(520)338-4346

Yavapai-Apache Tribe
Water Resources Program
3435 Shaw Avenue
P.O. Box 1188
Camp Verde, AZ 86322
(520)567-3649

Yavapai-Prescott Indian Tribe
Water Resources Program
530 E. Merritt
Prescott, AZ 86301
(520)445-8790
APPENDIX E

AGRICULTURAL GENERAL PERMIT REQUIREMENTS
ARIZONA ADMINISTRATIVE CODE
TITLE 18, CHAPTER 9, ARTICLE 4
R18-9-401. Definitions
In addition to the definitions established in A.R.S. 49-101 and 49-201, the following terms apply to this Article:

1. Application of nitrogen fertilizer means any use of a substance containing nitrogen for the commercial production of crop plants. The commercial production of crop plants includes commercial sod farms and nurseries.
2. Crop plant needs means the amount of water and nitrogen required to meet the physiological demands of the crop plant to achieve a defined yield.
3. Crop plant uptake means the amount of water and nitrogen that can be physiologically absorbed by the roots and vegetative parts of a crop plant following the application of water.

Historical Note

R18-9-402. Agricultural General Permits: Nitrogen Fertilizers
A person who engages in the application of a nitrogen fertilizer and is issued an agricultural general permit shall comply with the following agricultural best management practices:

1. Limit application of the fertilizer so that it meets projected crop plant needs;
2. Time application of the fertilizer to coincide to maximum crop plant uptake;
3. Apply the fertilizer by a method designed to deliver nitrogen to the area of maximum crop plant uptake;
4. Manage and time application of irrigation water to minimize nitrogen loss by leaching and runoff; and
5. Use tillage practices that maximize water and nitrogen uptake by crop plants.

Historical Note

R18-9-403. Agricultural General Permits: Concentrated Animal Feeding Operations
A person who engages in or operates a concentrated animal feeding operation and is issued an agricultural general permit shall comply with the following agricultural best management practices:

1. Harvest, stockpile, and dispose of animal manure from a concentrated animal feeding operation to minimize discharge of any nitrogen pollutant by leaching and runoff;
2. Control and dispose of nitrogen contaminated water resulting from an activity associated with a concentrated animal feeding operation, up to a 25-year, 24-hour storm event equivalent, to minimize the discharge of any nitrogen pollutant; and
3. Close facilities in a manner that will minimize the discharge of any nitrogen pollutant.

Historical Note
Worksheet #1: BMP Plan Responsibility

If completed, the BMP worksheets can be used to complete IV.B.1.c.iv – xiii, except v.
To complete the BMP plan, producers can use worksheets 1- 6 and include the following two items:
   1. a map that shows drainage patterns, surface water bodies, and manure containment structures
   2. the animal waste management system engineering plan OR a description of how the minimum Standards (part IV.B.2.) will be addressed.

Person(s) responsible for the BMP plan (see part IV. B. 1. C. iv. of Arizona General NPDES permit)

1. Is the owner responsible for the following
   - Developing the BMP plan? YES NO*
   - Implementing the BMP plan? YES NO*
   - Monitoring the facility? YES NO*
   - Recording monitoring results? YES NO*

* If no, go to worksheet #1 table, below

Worksheet #1 Table

<table>
<thead>
<tr>
<th>Name of Person(s) responsible</th>
<th>BMP Plan</th>
<th>Implementing</th>
<th>Monitoring</th>
<th>Record keeping</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

This worksheet was developed by the Arizona Department of Agriculture, Agricultural Consultation and Training Program, in collaboration with Natural Resources Conservation Service, University of Arizona, & AZ Conservation Districts, for use in record keeping requirements for the Arizona NPDES General Permit.
Worksheet #2: Toxic Pollutants and Hazardous Substances

(see part IV. B. 1. c. vi. of Arizona General NPDES permit)

Name of hazardous or toxic substances that are used/stored/disposed of at the CAFO.

**Hazardous Substance** means any substance designated under 40 CFR 116 pursuant to section 311 of the CWA. A list of currently designated hazardous substances is included in 40 CFR 116.4, Table 116.4A. 40 CFR 116.4 may be obtained at the following website: [Http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1](http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1), by entering the following numbers: Title 40, Part 116, and Section 4 for the “most recent available” revision year. Alternatively, a paper copy of 40 CFR 116.4, Table 116.4A may be obtained by contacting U.S. EPA Region 9’s CWA Standards and Permits Office at (415) 744-1898 or (415) 744-1922.

**Toxic Pollutants** means any pollutant listed as toxic under Section 307(a)(1) of the CWA. Toxic Pollutants are listed in 40 CFR 401.15, which may be obtained at the following website: [Http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1](http://www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1) by entering the following numbers: Title 40, Part 401, and Section 15 for the “most recent available” revision year. Alternatively, a paper copy of 40 CFR 401.15 may be obtained by contacting U.S. EPA Region 9’s CWA Standards and Permits Office at (415) 744-1898 or (415) 744-1922.

Include seasonal substances. Update list as new chemicals are brought in.

1

2

3

4

5

6

7

8

9

10

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Worksheet #3: Potential Pollutant Sources
(see part IV. B. 1. c. vii. of Arizona General NPDES permit)

Potential Pollutant Sources:
Describe activities, chemicals, &/or hazardous substances that may be a potential pollutant source, Including sources which may reasonably be expected to add pollutants to runoff from the facility.

Check here if the Activity is applicable at this operation

<table>
<thead>
<tr>
<th>Description of activity that may be a potential source of pollution.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticide Applications (includes herbicides, rodenticides, fungicides, insecticides)</td>
</tr>
<tr>
<td>If so, attach a list of chemicals used.</td>
</tr>
<tr>
<td>Producers should carefully follow directions on the labels to reduce Environmental or human health risks.</td>
</tr>
<tr>
<td>Fuel Storage (for instance petroleum storage tanks or barrels)</td>
</tr>
<tr>
<td>Producers should ensure that all petroleum storage containers are properly sealed To prevent leakage.</td>
</tr>
<tr>
<td>Vehicle Maintenance facilities</td>
</tr>
<tr>
<td>Producers should ensure that all liquid and solid wastes are disposed of in a manner That reduces pollution to potential to surface and groundwater and prevents spillage into Manure containment structures.</td>
</tr>
<tr>
<td>Animal Pharmaceuticals</td>
</tr>
<tr>
<td>Producers should ensure that all refuse products derived from animal health activities Are collected and disposed of in a manner that prevents them from entering any surface Water or manure containment structure.</td>
</tr>
<tr>
<td>Fertilizer Applications (chemical or organic)</td>
</tr>
<tr>
<td>Producers should ensure that fertilizers are stored in sealed containers that prevent Leakage to manure containment structures, groundwater or surface water.</td>
</tr>
<tr>
<td>Producers should also keep the Material Safety Data Sheet (MSDS) on site and follow Requirements for use to reduce environmental or human health risks.</td>
</tr>
<tr>
<td>Producers must land apply chemical and organic fertilizers according to plant uptake Needs. A nutrient management plan is required by permittees and must be developed By a certified nutrient management planner.</td>
</tr>
</tbody>
</table>

Other: List any other activities which might be potential pollutant sources

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Worksheet # 4: Maintenance Schedule  
(see part IV. B. 1. c. x. of Arizona General NPDES permit)  

Mark, with an X on the left, those activities that are part of the maintenance schedule and indicate the Frequency of activity on the right (D = Daily, W = Weekly, M = Monthly, B = Bimonthly, Q = Quarterly S = Semi-annual, A = Annual, O = Other (describe frequency)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
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</thead>
<tbody>
<tr>
<td>Monitor walls of containment structure (required)</td>
<td>M</td>
</tr>
<tr>
<td>Make repairs based on findings of monthly monitoring (required)</td>
<td>M</td>
</tr>
<tr>
<td>Monitor freeboard of containment structure (required)</td>
<td>Q</td>
</tr>
<tr>
<td>Reduce the level of water in containment structure if needed and appropriate (required)</td>
<td>Q</td>
</tr>
<tr>
<td>Monitor BMP plan for effectiveness and adherence to regulations (required)</td>
<td>A</td>
</tr>
<tr>
<td>Make changes to BMP plan based on finding of annual monitoring (required)</td>
<td>A</td>
</tr>
<tr>
<td>Monitor pumps, motors, and conveyances are working properly and regularly maintained</td>
<td></td>
</tr>
<tr>
<td>Monitor fences, gates, and/or warning signs</td>
<td></td>
</tr>
<tr>
<td>Monitor for rodent and fly activity</td>
<td></td>
</tr>
<tr>
<td>Scrape/Flush alley</td>
<td></td>
</tr>
<tr>
<td>Scrape Corrals</td>
<td></td>
</tr>
<tr>
<td>Empty and scrape containment structure(s)</td>
<td></td>
</tr>
</tbody>
</table>

This worksheet was developed by the Arizona Department of Agriculture, Agricultural Consultation and Training Program, in collaboration with Natural Resources Conservation Service, University of Arizona, & AZ Conservation Districts, for use in record keeping requirements for the Arizona NPDES General Permit.  

Worksheet #5: Erosion  
Control
(see part IV. B. 1. c. xi. of Arizona General NPDES permit)

Is there a high potential for soil erosion anywhere on the operation? YES
If no, skip to the next worksheet.
If yes, identify area(s) (either describe areas below or attach a map of the facility with Areas highlighted):

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Identify the conservation practices taken to address soil erosion. You may include a certified conservation Plan that outlines those practices or list the practices below:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

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Worksheet #6: Employee Training
(see part IV. B. 1. c. xii. of Arizona General NPDES permit)

**Note:** There is no requirement for employee training. However, EPA *recommends* that when outlining Responsibilities for BMPs (Worksheet #1), operators should consider training employees on their tasks.

Has the owner, operator, or employees had any training related to this permit (i.e., nutrient management Training, sampling training, permit application training…)?

YES  NO

If yes, list the individual who was trained and the name of the training program. Attach the agenda for the training to this sheet or describe the training below.

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>Title of training class or description of instruction</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

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BMP Inspection Report

Is the BMP plan's description of potential pollutant sources accurate? YES NO* (refer to permit worksheets 2 and 3)

Does the drainage map show current conditions? YES NO*

Have any pollutants entered the wastewater control or retention structures? YES NO* (If yes, refer to permit worksheet 2, page 2 for details)

Are the minimum standards required by the permit being implemented? YES NO* (refer to Arizona NPDES general permit for CAFOs, Part IV.B. 2. Or Animal Waste Management System Checklist)

If so, are the minimum standards adequate? YES NO*  

*If no, document changes to the original BMP plan:

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

________________________________________________________________________________

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Worksheet #8: Monthly Monitoring
(see part IV. B. 1. c. ix. of Arizona General NPDES permit)
Inspection and record keeping procedures (see Part IV.B.4.c. of the Arizona General NPDES permit)

Wastewater Control or Retention Structure Inspection and Monitoring

Each month (and in any event within five days of each chronic rainfall or catastrophic storm event) the permittee shall inspect the wastewater control or retention structures for berm integrity, cracking, slumping, excess vegetation, burrowing animals, and seepage.

Facility Name (one sheet per facility):
For 12 month period, ending: 

<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Were the conveyance and retention Structures inspected?</th>
<th>If yes, did you observe any Cracks, slumping, excess Vegetation, signs of Seepage or animal activity?</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
</tr>
<tr>
<td>February</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
</tr>
<tr>
<td>March</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>April</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
</tr>
<tr>
<td>May</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>June</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>July</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>August</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>September</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>October</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
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<tr>
<td>November</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
</tr>
<tr>
<td>December</td>
<td></td>
<td>YES          NO</td>
<td>YES          NO</td>
</tr>
</tbody>
</table>

For Chronic or Catastrophic Rain events:
<table>
<thead>
<tr>
<th></th>
<th>YES</th>
<th>NO</th>
<th>YES</th>
<th>NO</th>
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<td>YES</td>
<td>NO</td>
<td>YES</td>
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</tbody>
</table>

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Worksheet #9: Quarterly Monitoring
Wastewater Control or Retention Structure Inspection and Monitoring

Quarterly (and in any event within five days of each chronic rainfall or catastrophic storm event), Wastewater control or retention structure freeboard (in feet) shall be monitored and recorded. Freeboard records should be kept with the BMP plan.

Facility Name (one sheet per facility):
For 12 month period, ending: ________________________________

<table>
<thead>
<tr>
<th>Date</th>
<th>Containment #1</th>
<th>Containment #2</th>
<th>Containment #3</th>
<th>Container</th>
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</table>

Describe actions taken to reduce potential for discharge

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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Worksheet #10: On Site Land Application
(see Part IV. B. 3. b. of the Arizona General NPDES permit)

Application Record
This sheet is to be used to record land applications of manure. Applications are to be based on certified NMP.

<table>
<thead>
<tr>
<th>Date</th>
<th>Type (circle one)</th>
<th>Liquid Applied</th>
<th>Solid Applied</th>
<th>Application Area</th>
<th>Field ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liquid Solid</td>
<td>Circle Measurement: Gallons/day</td>
<td>Circle Measurement: Tons/acre</td>
<td>(acres)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liquid Solid</td>
<td>cubic feet/day</td>
<td>Pounds/acre</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Liquid Solid</td>
<td>Acre inches/day</td>
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<td>Liquid Solid</td>
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</tbody>
</table>

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Worksheet #11: Land Application, Off Site (Page 1)
(see part IV. B. 3. d. of Arizona General NPDES permit)

<table>
<thead>
<tr>
<th>Date</th>
<th>Name and Address of recipient(s) that receive more than 100 tons per week</th>
<th>Signature confirming receipt of AZ Administrative Code R18-9-402</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
NOTE: Per part IV. B. 3. d. ii. of the Arizona General Permit, Permittees must inform manure or wastewater recipient R18-9-402. In addition, according to part IV. B. 3. d. i., permittees must provide to the recipient the nutrient values expected to be in the manure or process wastewater. Complete this sheet and give to manure recipients to comply with these rules.

R18-9-402. Agricultural general permits: nitrogen fertilizers

All persons who engage in the application of nitrogen fertilizers are issued an agricultural general permit and shall comply with the agricultural best management practices listed in the Section. A person who engages in the application of nitrogen fertilizer pursuant to an agricultural general permit shall comply with all of the following:

1. Limit application of the fertilizer so that it meets projected crop plant needs.
2. Time application of the fertilizer to coincide with maximum crop plant uptake.
3. Apply the fertilizer by a method designed to deliver nitrogen to the area of maximum crop plant uptake.
4. Manage and time application of irrigation water to minimize nitrogen loss by leaching and runoff.
5. Use tillage practices that maximize water and nitrogen uptake by plants.

<table>
<thead>
<tr>
<th>Date</th>
<th>Estimated Nutrient Values*</th>
<th>Amount of Manure Received</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nutrient Value (circle units)</td>
<td>(circle measurement)</td>
</tr>
<tr>
<td></td>
<td>%, lbs/ton, lbs/gal, ppm</td>
<td>Tons acre-inches gallons</td>
</tr>
</tbody>
</table>

* Nutrient values are based on averages for this facility and may not necessarily reflect the true value.

This worksheet was developed by the Arizona Department of Agriculture, Agricultural Consultation and Training Program collaboration with Natural Resources Conservation Service, University of Arizona, & AZ Conservation Districts for record keeping requirements for the Arizona NPDES General Permit.

Worksheet #12: Reporting Discharges
(Page 1)
(see part IV. B. 1. c. viii. of Arizona General NPDES permit)
Give ADEQ verbal notification of a discharge within 24 hours at (602) 771-4469. A written notification is Required within 5 days of discharge to the address at the bottom of Worksheet 12, page 2. This worksheet is designed to be used for a single discharge event and Satisfies the requirements for Discharge Notification and Monitoring, Parts V.A. and V.B. of the permit.

Cause of Discharge:

Description of Discharge:

Date and Time of Discharge (start and end):

Start Date and Time:

End Date and Time:

In what water body did discharged manure water go and how did it get there from the containment structure?

An estimate of the flow and volume discharge:

If the discharge was caused by a precipitation event, specify amount and type of event: (information from http://www.nws.noaa.gov/, http://ag.arizona.edu/azmet/ or an on-site weather gauge)

Name of person recording the discharge:

Steps being taken to reduce, eliminate, and prevent recurrence:

**Worksheet #12: Reporting Discharges (page 2)**
Discharge Monitoring (Parts V.B., V.C. and V.D.)
Time and Date of Discharge:
Time and Date of Sampling: 

Reason for Sampling Delay, if any: 

Sample taken by: 

Request a copy of the *Chain of Custody* sheet from the laboratory and attach to this report.

<table>
<thead>
<tr>
<th>Parameters to be tested</th>
<th>Results: attach laboratory results or fill in this table (include units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fecal Coliform Bacteria</td>
<td></td>
</tr>
<tr>
<td>5-day Biochemical Oxygen Demand (BOD$_5$)</td>
<td></td>
</tr>
<tr>
<td>Total Suspended Solids (TSS)</td>
<td></td>
</tr>
<tr>
<td>Ammonia (NH$_3$)</td>
<td></td>
</tr>
<tr>
<td>Nitrites (as N)</td>
<td></td>
</tr>
<tr>
<td>Nitrates (as N)</td>
<td></td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen (TKN as N)</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus (P)</td>
<td></td>
</tr>
</tbody>
</table>

Send written notification of discharge to: ADEQ  
Water Quality Compliance Section  
CAFO/AFO Program Coordinator  
Mail Code: 5415B-1  
1110 W. Washington Street  
Phoenix, AZ 85007

**Worksheet #13: Reporting Spills** (discharges of toxic pollutants or hazardous substances)

Date and Description of any spills of toxic or hazardous substances.  
(for clarification of spills, see the following sections in the permit: IV.B.2.f., IV.B.2.g., and IV.B.2.i.)

According to the Arizona NPDES general permit, Part IV. B. 2. i., "The permittee must take appropriate Measures to prevent and clean up spills of any pollutants and to report spills according to part VI. D. 3."
Part VI. D. 3. Requires reporting of any noncompliance which may endanger human health or the environment within 24 hours of the permittee becoming aware of the situation. To report a spill, call 415-744-1905. A written report must be provided within 5 days. The information required on the written report follows:

Date and Time Spill began:

Date and Time Spill ended (if the spill has not ended, indicate estimate of when it will end):

Cause of Discharge:

Description of Discharge (location, water body involved, substance spilled):

Steps being taken to reduce, eliminate, and prevent recurrence:

This worksheet was developed by the Arizona Department of Agriculture, Agricultural Consultation and Training Program, in collaboration with Natural Resources Conservation Service, University of Arizona, & AZ Conservation Districts, for use in record keeping requirements for the Arizona NPDES General Permit.

OBTAINING LATITUDE AND LONGITUDE READINGS FOR NOI SUBMITTANCE

For any AFO operator which submits a NOI, their facility’s latitude and longitude is required to be included on the NOI form. The latitude and longitude (lat/long) reading is to be recorded in degrees, minutes, and seconds. There are three methods of obtaining
the lat/long; the [http://www.topozone.com](http://www.topozone.com) website, a GPS unit, or GPS readings previously obtained by the Arizona Department of Environmental Quality. If using GPS to determine lat/long or the Topozone.com website, use the center your facility’s production area (not cropland) as the location for obtaining the lat/long reading. ADEQ has previously collected GPS readings at about half of the animal feeding operations in the state. You may contact ADEQ at (602) 771-4469, to determine whether or not GPS readings have been taken at your facility and then obtain that reading if previously collected.

**Procedure to Obtain Lat/Long Reading from Topozone Website**

1. Go to Topozone website.
2. Scroll down to “place name search”.
3. Enter your nearest town in “place name”.
4. Move mouse to “state”, scroll down the state codes to “AZ”.
5. After your nearest town and “AZ” are shown in the boxes, hit “search” with the mouse.
6. Hit with the mouse, the name of the nearest town you entered under the green “place” box. A map of the area should come up after the town is hit. If a map of your area doesn’t come up, try entering a natural landmark in your area, such as a mountain or river, in the “place search”. You can use the green arrows on the perimeter of the map to see if your facility is located on the map.
7. Go to the top left side of the screen, hit 1/50,000.
8. Scroll down to the bottom of the page to hit “D/M/S” with the mouse. The degrees, minutes, and seconds (lat/long) should be displayed in the upper left corner of the screen. The D/M/S will be display for wherever the mouse is hit on the map. A red cross will indicate the location of the DMS reading shown.
9. You’ll need to know your Township, Range, Section or be able to locate your facility’s by landmarks on the map. Look at the map, if your facility is not shown, use the green arrows on the perimeter of the map to move the map such that the location of your facility is shown. If greater definition is needed, hit 1/25,000 in the top left corner of the screen.
10. Hit the curser on the center of your production area on the map. Make sure a red cross indicates the area you hit with the mouse.
11. Look in the upper left corner of the screen to obtain the lat/long reading for the center of your property.
12. Record the lat/long reading on the NOI form.

**EMERGENCY DISCHARGE SAMPLING KIT**

Put together your emergency discharge sampling kit BEFORE you have a discharge. Decide what laboratory you will use and discuss the procedures, required equipment, and sample containers with the lab BEFORE you have a discharge.
The following materials/equipment will make up your emergency discharge sampling kit. Make sure that this kit is in an easily accessible place and that employees know how to use it.

1. Ice Chest - Store empty sample bottles in the ice chest. Have at least two sets of sample containers in case containers become contaminated or lost during sampling.
2. Gloves - plastic or latex gloves (kitchen latex gloves will work)
3. Goggles or Glasses if using whirlpac bags
4. Sampling Bottles or Whirlpac bags - store in an ice chest in a known location. Replace containers before container expiration dates expire or preservatives evaporate from containers. (the number of bottles, volumes collected, and preservatives used may vary lab to lab). **Obtain sample bottles from the laboratory prior to a discharge.**
5. Ice
6. Marker - with indelible ink
7. Lab Submission and Chain of Custody Forms - obtain from laboratory
8. Soap
9. Dustpan - use a clean (new) plastic dustpan
10. Bucket - use a clean (new) 1 or 2 gallon plastic bucket with wire handle
11. Rope
12. Rubber boots
13. Funnel - use a clean (new) plastic funnel

**EMERGENCY DISCHARGE SAMPLING PROCEDURE**

**Sample Collection Location**

1. Select a safe location. Sample from a safe location with good footing, no electrical hazards, etc. If discharge occurs under hazardous
conditions, the permit allows the discharge to sampled later when conditions are safe.

2. Collect a representative sample. Select a location where dilution of wastewater from “clean water” is minimal.

3. Collect the sample from the discharge. Collect samples from the discharge stream (flowing wastewater) or pooled wastewater. Never collect a sample from a lagoon. Try to collect samples prior to entering a water of the U.S. or prior to entering a conveyance to water of the U.S. If your only option is to sample a conveyance, conveyances can be sampled if the only water in the conveyance is water from the discharging facility. Samples can be collected from pipes, ditches, sheet flows, or tailwaters containing runoff or other wastewater.

4. Sample by hand, if possible. Select a location which can be sampled by hand (not having to use a dustpan, bucket, or other sampling device). The preferred method of sampling is by hand without having to use any water collection devices. However, use sampling aids if needed.

**Sampling Order**

1. Fill preservative-containing sample bottles
2. Fill unpreserved bottles
3. Fill fecal coliform containers (Whirlpac Bags)

**Sampling Order Exception:** If sampling from a ditch or deep sheet flow which can be sampled by hand by submerging the bottle in the wastewater, use the unpreserved bottle to fill the preserved containers, any sampling bags, and lastly fill the unpreserved bottle which had been used for filling the previously filled sample containers. Do not submerse bottles or bags containing preservative into the water. Chances are high that some preservative will get out of the container.

**Sampling Procedure**

**Sampling Information.** If the duration or volume of the discharge is limited, write sampling information on containers after sampling, otherwise write the following information on all bottles and bags prior to sampling:
1. facility name
2. sampler name
3. location collected
4. date of sampling
5. time of sampling

Fill Sample Containers

1. Put gloves, and goggles, and rubber boots on prior to filling containers.

For wastewater that can flow or be poured directly into the sample containers (from a pipe, off an edge, out of a dustpan, or out of a bucket)

2. Fill preserved bottles first, then unpreserved bottles, and lastly any bags.
3. Fill containers nearly to the top, but do not over fill preserved containers so as to cause an overflow of water.
4. Do not place sample lids on the ground.
5. Fasten lids tightly.
6. Place bottles upright in ice chest.
7. Try to keep soil and other contaminants out of sample containers.

For samples which are collected by submerging a bottle into a flow or pool (sheet flow, ditch, etc.), submerse and fill an unpreserved bottle.

2. Use the unpreserved bottle to fill the bottles containing preservative and then fill any bags. Lastly, fill the unpreserved bottle with sample water.
3. Fill containers nearly to the top, but do not over fill preserved containers so as to cause the bottle to overflow.
4. Do not place sample lids on the ground.
5. Fasten lids tightly.
6. Place bottles upright in ice chest.
7. Try to keep soil and other contaminants out of sample containers.

Whirlpac Bag Sampling

2. Fill bag to the fill-line
3. Squeeze the air out of the bag
4. Hold the bag by the tabs
5. Spin the bag 3 or 4 times (don’t let wastewater flip into your eyes
while spinning the bag)
6. Fold tabs down toward the bag to seal bag
7. Keep bags out of sunlight
8. Place bags upright in ice chest.

Sample Documentation

1. Fill out sample submittal form
2. Fill out the chain-of-custody
3. Place chain-of-custody seals over sample bottle lids or over the bags

Keep copies of lab forms and sample results with the best management practices plan records at your facility.

Sample Transport

1. Call the laboratory to let them know samples are coming in
2. Samples must be delivered to the lab within 6 hours
3. Samples must be stored in ice until delivered to the laboratory

Fecal Coliform Holding Time. All samples must be delivered to the laboratory within six hours of sampling or sooner if required by the lab.

APPENDIX B:
State Water Quality Regulations and Permits

Water Quality Regulations for Arizona
Arizona Administrative Code (A.A.C)

A.A.C. R18-9-401. Agricultural General Permits: Definitions

In addition to the definitions in A.R.S. §49-101 and §49-201, the terms of this Article shall have the following meanings:

1. “Application of nitrogen fertilizer” means any use of a substance containing nitrogen for the commercial production of crop plants. The commercial production of crop plants includes commercial sod farms and nurseries.
2. “Crop plant needs” means the amount of water and nitrogen required to meet the physiological demands of the crop plant to achieve a defined yield.
3. “Crop plant uptake” means the amount of water and nitrogen which can be physiologically absorbed by the roots and vegetative parts of a crop plant following the application of water.

A.A.C. R18-9-402. Agricultural General Permit: Nitrogen Fertilizers

A person who engages in the application of nitrogen fertilizer and is issued an agricultural general permit shall comply with the following agricultural best management practices:

1. Limit application of the fertilizer so that it meets projected crop plant needs.
2. Time application of the fertilizer to coincide to maximum crop plant uptake.
3. Apply the fertilizer by a method designed to deliver nitrogen to the area of maximum crop plant uptake.
4. Manage and time application of irrigation water to minimize nitrogen loss by leaching and runoff.
5. Use tillage practices that maximize water and nitrogen uptake by crop plants.
A.A.C. R18-9-403. Agricultural General Permit: Concentrated Animal Feeding Operations

A person who engages in or operates a concentrated animal feeding operation and is issued an agricultural general permit shall comply with the following agricultural best management practices:

1. Harvest, stockpile and dispose of animal manure from a concentrated animal feeding operation to minimize discharge of any nitrogen pollutant by leaching and runoff.
2. Control and dispose of nitrogen contaminated water resulting from an activity associated with a concentrated animal feeding operation, up to a 25-year, 24-hour storm event equivalent, to minimize the discharge of any nitrogen pollutant.
3. Close facilities in a manner that will minimize the discharge of any nitrogen pollutant.

Water Quality Standards
A.A.C. R18-11-108. Narrative Water Quality Standards

A. A surface water shall be free from pollutants in amounts or combinations that:

1. Settle to form bottom deposits that inhibit or prohibit the habitation, growth, or propagation of aquatic life or that impair recreational uses;
2. Cause objectionable odor in the area in which the surface water is located;
3. Cause off-taste or odor in drinking water;
4. Cause off-flavor in aquatic organisms or waterfowl;
5. Are toxic to humans, animals, plants, or other organisms;
6. Cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth, or propagation of other aquatic life or that impair recreational uses;
7. Cause or contribute to a violation of an aquifer water quality standard prescribed in R18-11-405 or R18-11-406; or
8. Change the color of the surface water from natural background levels of color.
WATER QUALITY REGULATIONS AND PERMITS
Continued

B. A surface water shall be free from oil, grease, and other pollutants that float as debris, foam, or scum; or that cause a film or iridescent appearance on the surface of the water; or that cause a deposit on a shoreline, bank, or aquatic vegetation. The discharge of lubricating oil or gasoline associated with the normal operation of a recreational watercraft shall not be considered a violation of this narrative standard.

A.A.C. R18-11-109. Numeric Water Quality Standards

A. The water quality standards prescribed in this Section and in Appendix A apply to surface waters listed in Appendix B and their tributaries. Additional numeric water quality standards for unique waters are prescribed in R18-11-112.

To see the entire Numeric Water Quality Standard rule see: http://www.sosaz.com/public_services/.

Note: the Numeric Water Quality Standard most likely to be violated by an animal waste surface water discharge is fecal coliform.

A.A.C. R18-11-401-408. Aquifer Water Quality Standards

To see the narrative and numeric Aquifer Water Quality Standards see: http://www.sosaz.com/public_services/.

Note: the numeric aquifer standard most likely to be violated by animal feeding operations are nitrate and nitrite.

Arizona Revised Statutes (A.R.S.)

A.R.S. 49-203.B.1

Gives authority for ADEQ to conduct inspections at livestock operations.

A.R.S. 49-247

Gives authority to ADEQ to develop state general permits.
WATER QUALITY REGULATIONS AND PERMITS

Continued

A.R.S. 49-241.B.1. (Addresses discharges to the aquifer or vadose zone)

B. Unless exempted under section 49-250, or unless the director determines that the facility will be designed, constructed and operated so that there will be no migration of pollutants directly to the aquifer or to the vadose zone, the following are considered to be discharging facilities and shall be operated pursuant to either an individual permit or a general permit, including agricultural general permits, under this article:

1. Surface impoundments including holding, storage settling, treatment or disposal pits, ponds and lagoons.

9. Point source discharges to navigable waters.

Note: Points 2-8 and 10-11 address discharges through mining and wastewater treatment plant activities.

A.R.S. 49-141.A.1. (Addresses environmental nuisances)

A. The director may take action under this section to abate environmental nuisances. As used in this section, an environmental nuisance is the creation or maintenance of a condition in the soil, air or water that causes or threatens to cause harm to the public health or the environment and that is not otherwise subject to regulation under this title. Subject to this limitation, the following conditions may constitute environmental nuisances:

1. A condition or place in populous areas which constitutes a breeding place for flies, rodents, mosquitoes and other insects which are capable of carrying and transmitting disease-causing organisms to any person or persons.
APPENDIX C:
Sampling Procedures for Manure and Soils, and Sampling Record Sheets

Manure Sampling (Draft, 7/29/03)

Introduction
Among 11 million head of cattle and caves on feed in the USA 80% are housed in feedlot of more 1000 head capacity (Eghball and Power, 1994). According to research report from Cornell University 75% N, 60%P and 80 % K fed to dairy is excreted in manure. Total estimated waste generated annually by livestock in the United States is about 2.2 billion tons of manure that contains 7.5 million tons of nitrogen and 2.3 million tons of phosphorus. Synthetic fertilizer used annually in the United States contains 10 million tons of N and 2 million tons of P (El Ahraf and Willis, 1996). If all collected and utilized, manure would provide 112, 100 pounds per acre of nitrogen and phosphorus, respectively (Eghball and Power, 1994). Nutrients generated from manure could potentially supply an equivalent of 461 million dollars worth of nutrients if purchased as synthetic fertilizer (ElAhraf and Willis, 1996; Eghball and Power, 1994). The added value of manure is even greater if additional benefits were assigned to organic matter, micronutrients and soil qualities (Wang and Sparking 1995).

Total head of cattle in the state of Arizona is estimated at 840,000 (Arizona Ag Statistics, 2002). Daily manure production by a single animal varies greatly with age, size, kind of livestock and growth rate. On the average, a 1000-pound cow produces 50 pounds of waste per day. Manure produced in a year by a 1000-pound cow contains about 124 pounds of nitrogen and 35 pounds of phosphorus (Sander et al, 1995) Manure from animals on feed (high protein) diet tend to have high analysis as compared to animal feed on hay and green forage. The manure analysis is also influenced by animal age categories. In Arizona manure production in CAFO is concentrated in Maricopa, Pinal and Yuma counties (table 1).

Table 1. Livestock in Maricopa, Pinal, Yuma, other counties, and state of Arizona *

<table>
<thead>
<tr>
<th>Counties</th>
<th>Maricopa</th>
<th>Pinal</th>
<th>Yuma</th>
<th>Other counties</th>
<th>Arizona</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milking cow</td>
<td>119000</td>
<td>14000</td>
<td>3000</td>
<td>4000</td>
<td>140000</td>
</tr>
<tr>
<td>Beef cattle</td>
<td>6000</td>
<td>15000</td>
<td>na</td>
<td>Na</td>
<td>185000</td>
</tr>
<tr>
<td>Cattle on feed</td>
<td>6000</td>
<td>20200</td>
<td>97000</td>
<td>0</td>
<td>305000</td>
</tr>
<tr>
<td>Sheep</td>
<td>14000</td>
<td>24000</td>
<td>23000</td>
<td>73000</td>
<td>134000</td>
</tr>
<tr>
<td>Goat</td>
<td>Na</td>
<td>Na</td>
<td>na</td>
<td>Na</td>
<td>32000</td>
</tr>
<tr>
<td>Hogs</td>
<td>Na</td>
<td>Na</td>
<td>na</td>
<td>Na</td>
<td>133000</td>
</tr>
<tr>
<td>Pigs</td>
<td>Na</td>
<td>Na</td>
<td>na</td>
<td>Na</td>
<td>99473</td>
</tr>
</tbody>
</table>

* Source: Arizona Agricultural Statistics, 2002
Table 2. Manure production per animal unit

<table>
<thead>
<tr>
<th>Type of livestock</th>
<th>Raw manure production per 1000 lb animal weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solid (ton/year)</td>
</tr>
<tr>
<td>Milking cow</td>
<td>15.0</td>
</tr>
<tr>
<td>Beef cattle</td>
<td>11.0</td>
</tr>
<tr>
<td>Sheep</td>
<td>7.5</td>
</tr>
<tr>
<td>Goat</td>
<td>7.5</td>
</tr>
<tr>
<td>Poultry layer</td>
<td>13</td>
</tr>
<tr>
<td>Poultry broiler</td>
<td>11</td>
</tr>
</tbody>
</table>

Historically, manure has been recognized as an excellent soil amendment used to improve soil tilth, soil structure, and to provide nutrients for crop production. It is also used to offset the cost of man made fertilizer (Wang and Sparding, 1995). Contemporary agricultural production system in the USA relies on high input fertilizer, pesticide and energy to provide the world with highly efficient food and fiber production. Grain and vegetable producers rely on increasingly high commercial fertilizer application to maximize yield and became dependent on external source of nutrients purchased outside the farm. Agricultural fields are losing sustainability with a decline in soil quality as results of lack of agriculture and livestock integration.

Similarly, livestock is managed in large confined animal feeding operation (CAFO) where large volume of waste produced may not be absorbed by the surrounding farm land. CAFO’s managers have to handle manure as waste product with an increasing potential of pollution. Manure is often disposed on the agricultural fields at the rate greater than the plant uptake and the capacity of soil to absorb all nutrients without the excess of nutrient leaching below the root zone or eroded from the soil surface contaminating lakes and streams.

The over disposal of animal waste in recent years has created an environmental concern. If the rate of manure derived nitrogen is greater than crop nitrogen uptake, N can leach into groundwater (Chang and Janzen, 1996; Daliparthy et al., 1994.). They found that nitrate nitrogen leaching was more substantial on irrigated than dry land forage. Manure has also created a discomfort among people living nearby due to odors and fly problems. A proper manure management is needed to prevent the adverse effect on the environment while meeting fertility requirement. Animal waste is valuable soil amendment when it is properly managed.

Randal et al. (1987) reported that based on seven experimental sites manure application effected corn yield more when it was applied prior corn planting than when applied several months before planting. However in practice the timing of solid manure application is determined by a management decision, it is usually applied before planting season begins and out the peak season. Liquid manure application is managed differently, often applied in mixture with fresh water. It can be applied at ounce or split applications. Research work of Schmitt et al., (1998) suggested that one time early spring liquid application of dairy manure effect on canarygrass (*Phalaris arundinacea* L) yield was superior to split applications.

In Arizona, agricultural crops are irrigated and the manure derived nutrient of concern for water quality is nitrogen. Phosphorus poses less concern for surface water and in most of Arizona farm
land phosphorus leaching is low and P contamination in lake and streams due to erosion is a minimum. For this reason Nutrient management plan for Arizona should focus on nitrogen. Manure application to the land is a most common practice used for centuries because of its nutrient and organic matter value. Although manure is valued for nitrogen, phosphorus and potassium content as potential substitutes for synthetic fertilizer, manure is also good source of micronutrients and soil conditioner.

Manure samples submitted for laboratory analysis should reflect the average composition of manure to be applied to the field. For an accurate representation of manure composition, specific sampling strategies and proper sample handling should be designed for each type of manure and manure management.

When to take samples?
The composition of manure with regard to nitrogen goes through drastic changes over time. The greatest change is due to ammonia volatilization that is influenced by manure manipulations, temperature, wind and the duration of storage. The other factor to consider is the manure water content which varies from 20% in open feedlot to 80 % in dairy, higher in some cases. In order to have close estimate of manure derived nutrients added to the field manure must be sampled as close as possible to manure spreading. Ideally samples must be collected from the spreader at the time manure is applied. But this approach is impractical since analytical process takes time due samples travel time and laboratory turn around.

Should historical data be used?
The answer is yes. Manure composition variation is more influenced by manure management than by collected 10 15 samples However, poorly

**Sampling solid manure**

Solid manure is stored in various forms including windrows, piles, or left on feedlot. Manure in windrow is thoroughly mixed tend to be more uniform than other forms of storage. Manure is also stored as a pile made of several layers. Manure scraped from the feedlot or dairy farm is piled up not mixed. Sampling within a pile is similar to sampling a windrow, the difference is that within a windrow manure is somehow mixed one or several times.

**Tools needed:**
- 5-gallons bucket to collect and mix samples
- Spade or shovel to collect samples
- Sealable plastic bags laboratory provide shipping samples
- Permanent marker to label the samples

**Collecting samples**
Collect 10 to 15 manure samples from various locations in the manure pile. It is better to cut sections in the pile and use a spade to take a thin slice of manure from top to bottom. Ovoid collecting manure from the upper surface of manure pile exposed to ambient temperatures and sun light. Mix well all manure in 5 gallon bucket then take a sub-sample in a sealable plastic bag or shipping bags provided by a commercial laboratory. Label the samples and ship it in the same day to laboratory for the analysis. It is recommended not to send sample to the laboratory the end of the week taking the risk of having sample waiting
over the week end before they are analyzed. In case samples are taken at the end of the week it is better to freeze them until shipped the following week.

Figure 1 Manure pile disposed next the field for future application.

Is it good to collect samples from the feed lot?
Sampling manure directly from the feedlot or dairy pen is not recommended because manure goes through various changes between manure scrapping and spreading. There is high variability within feedlot. Animals tend to regroup in designated areas such dry elevated ground or shaded areas where high concentration of urine is found.

Figure 2 shows animals regrouping in specific areas.
Fig 2. Shows on the left manure spread to the field based on 5 ton/acre; on the right shows a tarp used to collect spread manure for spreader calibration

Often animals are housed on a paved or compacted soil ground for the purpose of minimizing nutrient infiltration and easing periodical manure scrapping. The other advantage of paved ground is to minimize ash content due mixture of manure and soil. Manure is scrapped and hauled directly to the field or hauled to a storage area until manure is applied to the field between two consecutive crops.

In southwest areas manure is scraped from the feed lot has low moisture content and hard to spread with manure spreader. It is often laid in windrows watered with a water truck or sprinkler and brook down with a compost turner before it is hauled to agricultural fields. Adding water to manure was two purposes, one is to ease the break down of hard manure and easy to spread. For practical purposes sampling manure nutrient evaluation should be made just before one is ready to spread it. Moisture content can change dramatically with time. The application rate may be erroneous if calculated ahead of time. All other nutrients calculated based on the previous biomass can change. Fresh or non-decomposed manure is subject to rapid change such as ammonia volatilization and mineralization both modify the nitrogen status in manure.

When to sample manure: because of changes affecting chemical composition of manure during storage and handling operation, manure sampling and analysis should be made preferably at the time manure is applied. Collecting manure samples from the manure spreader yields more accurate results. However, manure analysis from the laboratory requires travel time and laboratory turnaround. Therefore, collecting samples 15 to 30 days prior manure application will give sufficient time to have results back from laboratory. There are some who suggest even using boo

Sampling liquid manure
There are various designs of waste water storage including lagoons, tanks, and pits. Figure 3 shows a lagoon holding liquid manure. Similar to liquid manure, sample collection must reflect the manure composition. Sampling method must be designed so that errors due to sampling remain minimal.

![Figure 3. lagoon storage water](image)

**Procedure**

Figure 4 Shows steps of liquid manure sample collection: 10 samples are collected 8 to 10 feet away from edge of the lagoon put in 5 gallon bucket then sub-sample is transferred to sample container.

**Tools needed**
- Bucket 5 gallon capacity
- 12-foot pipe
- 1-gallon bucket
- 1 pint sample container

**Procedure**
Decide depth from which liquid manure is withdrawn. Make sure to collect samples from the material intended to use. Solid particles in liquid manure settle in the lagoon and nutrient have tendency to stratify during the storage. Samples should not be collected from the surface because the presence of oxygen near the surface alters the chemistry of liquid manure. Liquid manure should be pumped from sampled layer. Use one-gallon bucket or bottle attached to 12 foot pip to collect samples from 10 to 15 locations 6 to 8 feet from the lagoon border as shown in figure 4.

If all settled manure must be cleared and applied to the land then all layers should be agitated prior sampling. Ten to fifteen samples are drawn mixed in a bucket and sub-sample is transferred into a clean sealed and labeled plastic container filled no more than 2/3 capacity room for gas released from manure material during travel and shipped immediately to laboratory for analysis.

The amount of manure to apply should be based on the chemical properties of manure, soil chemical and plant nutrient harvest estimated from expected crop yield goal. However, this approach is unrealistic because of travel time and analytical procedures requires sometimes. In order to calculate the amount of nutrient in manure applied to the field manure samples should calculate at the time manure is applied. The laboratory results become available for the next year application.

**Selecting laboratory**

**Seasonal changes in chemical compositions**

Ask questions to laboratory before sending your samples?

Do you run manure analysis as a routine procedure? If any laboratory does not run the analysis as routine procedure, laboratory technician will have to proceed with a special laboratory set up, including instrument calibration, no appreciation to results obtained.

A- How much does it cost to run the analysis?
B- Do you have any test package? If yes, the test package includes what elements?
C- Do you provide sample container?
D- How long it takes to get the results back?
E- Do you provide a calibration and recommendation, based on the results of manure analysis and yield goals?
F- How much of the sample I need to send?

The answer to these questions allows to find the least expensive laboratory analysis, information gathered provides an indication if the laboratory has some experience in running the analysis. The cost of the analysis varies considerably with laboratories, it is important to shop around. Call your county cooperative extension to help you find the best and least expensive laboratory in the county, state or neighboring states. Most of the professional laboratories providing information how to collect manure sample, provide sample containers at no cost, but cooperative extension will provide information at no cost.

**Shipping manure to laboratory**
Sample integrity between sample collection and laboratory must be preserved during the shipment. It is better to ship samples during the beginning of the week rather than the end of the week. This will account for travel time and increase the chances the samples will be analyzed before the week end.

Place one pint of liquid manure in a clean and sealed plastic container, ¾ full to leave room for gas released from manure material during travel. Ship immediately the collected samples to laboratory for analysis. The use of inexpensive and disposable ice chest placed in cardboard box with packing materials is appropriate for preserving intact materials during the shipment. Freezing samples for the sake of increasing the routing laboratory accuracy is necessary if the samples are not shipped within few days. Samples should not be exposed to extreme heat during summer period.

**Meaning of laboratory results?**

The laboratory results without interpretation are meaningless if they are not properly interpreted. Laboratory should clearly indicate whether results are determined on dry or wet basis. When laboratory analysis is reported in dry basis, the value must be converted to wet since manure is usually applied to the field as wet.

The units used are important, laboratories sometimes report their analysis in percent (%) of dry or wet material submitted. Values are also reported as ppm (part per million, or mg/L or mg/kg and as ppb part per billion or µg/L or µg/kg.

The laboratories report the results as P₂O₅ or P; K₂O or K; NO₃ or N. The unit used in manure laboratory testing should match units used in soil testing and nutrient recommendation. The rate of manure application is expressed as ton per acre or metric ton per hectare. Thus, the amount of nutrient per ton should be expressed as lb per ton.

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<td>----------</td>
<td>-------------</td>
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</tr>
<tr>
<td>20 ---------------</td>
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<tr>
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<tr>
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**How manure is measured?**

The application of manure on cropland is made with two objectives in mind: to maximize manure derived nutrients for crops and minimize the risk of contaminating surface and groundwater. To achieve these objectives we need to determine manure nutrient content, the rate of manure application, and the additional nutrients required for optimum crop production. Therefore manure sampling is a key component in the nutrient management plan.
Sampling manure is similar to Sampling for manure. It consists of collecting sub-samples that are reflecting the values of the entire masse of manure particularly determining the nutrient values in manure so that no excess of nutrient be added to the soil. Manure and sampling allows keep balance between manure derived nutrient, plant nutrient requirement. The difference is between what in the amount of soil and what is added as fertilizer would determine the complementally amount of manure needed and other source of fertilizer.

References


Sampling Record Sheets

Part IV. B. 3. A. requires that solid and liquid waste be applied to fields based on a Nutrient Management Plan (NMP). The sampling record sheets are presented to help permittees determine what data will be needed in order to develop an NMP.

*These sheets do not directly address the requirements of a Nutrient Management Plan. It is recommended that a certified nutrient management planner assist permittees in developing an NMP. It is strongly recommended that the permittee consult a sampling guide before taking samples.*

At least three samples should be taken to determine the average nutrient content. After the median has been established, sampling should occur again no less than every five years. However, if animal feeding practices or waste storage processes change, then sampling should occur at that time to detect the effect of the changes on nutrient content.

### Solid

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<th>Date</th>
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<tr>
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| Total | # of Samples | Average |          |          |

### Liquid

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<td></td>
<td>Phosphorus</td>
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</table>

| Total | # of Samples | Average |         |         |