

**AUTHORIZATION FOR A NO-DISCHARGE WATER PERMIT UNDER THE  
ARKANSAS WATER AND AIR POLLUTION CONTROL ACT**

In accordance with the provisions of the Arkansas Water and Air Pollution Control Act  
(Ark. Code Ann. § 8-4-101 *et seq.*)

**Pet Solutions Holdings, LLC**


is authorized to construct, store and land apply industrial waste, as defined in Part IV, on sites listed in Condition No. 8 of Part II of the permit at 10511 Gauge Rd. Danville, AR 72833 in Yell County, AR.

Operation shall be in accordance with all conditions set forth in this permit.

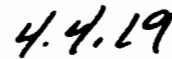
Effective Date: September 1, 2015

Modification Effective Date: May 1, 2019

Expiration Date: August 31, 2020



\_\_\_\_\_  
Caleb J. Osborne  
Assistant Director, Office of Water Quality  
Arkansas Department of Environmental Quality



\_\_\_\_\_  
Modification Date

**PART I  
 PERMIT REQUIREMENTS**

**LIMITATIONS AND MONITORING REQUIREMENTS:**

The following tables detail the constituent limits, monitoring frequencies, and the requirements for reporting results to ADEQ for each respective parameter listed in the table heading.

<b>TABLE I</b>							
<b>Waste Analysis and Record Keeping</b>							
Parameter	Ceiling Concentrations (mg/kg) <sup>1,5</sup>	Ceiling Concentrations (mg/l) <sup>2,5</sup>	Cumulative Pollutant Loading Rate (lb/ac) <sup>3</sup>	Monitoring Frequency			
Arsenic	75	Report	37	Annually, prior to 1 <sup>st</sup> application of the calendar year			
Cadmium	85		35				
Copper	4300		1350				
Lead	840		270				
Mercury	57		15				
Molybdenum	75		N/A				
Nickel	420		378				
Selenium	100		90				
Zinc	7500		2520				
Parameter	Maximum Limits		Reporting Units		Monitoring Frequency		
Total Solids	Report		Percentage (%)		Annually, prior to 1 <sup>st</sup> application of the calendar year		
Electrical Conductivity			µmhos/cm				
Nitrate Nitrogen			mg/kg	mg/l			
Nitrite Nitrogen							
Ammonia Nitrogen							
Total Kjeldahl Nitrogen							
Total Phosphorus							
Total Potassium							
pH			S.U.				
Sodium Absorption Ratio (SAR)			18	Unitless			
Debris	0.50	Inches					
Oil & Grease	Report	mg/kg	mg/l				
Total Volume of Waste Applied	<sup>4</sup> 243,300	gallons/acre/year		Daily			
Nitrogen Application Rate	<sup>4,5</sup> Depends On Crop		lbs N/acre/year		Calculate, prior to each application		

<sup>1</sup> Dry-weight basis for solids

<sup>2</sup> Liquid wastes

<sup>3</sup> Cumulative loading rates in dry weight basis include dry and liquid wastes. Please see Condition No. 5 of Part II.

<sup>4</sup> The land application of waste must not exceed the limits for Nitrogen Application Rate or Total Volume of Waste Applied, whichever is less. Under no circumstances shall any volume of waste being applied result in a violation of any permit conditions (i.e. Condition 10 of Part II).

<sup>5</sup> Refer to Condition No. 4 of Part II of the permit.

<sup>6</sup> A sample should be tested as a solid and reported in mg/kg when solids are present and only those samples that do not have enough solids to be tested as a solid should be tested as a liquid and reported in mg/l.

TABLE II		
Soils Analysis, Reporting, and Record Keeping		
Parameter	Limit (Reporting Units)	Monitoring Frequency
Electrical Conductivity	4.0 (mmhos/cm)	Annually, Prior to the 1 <sup>st</sup> application of the calendar year per land application site. <sup>2</sup>
Cation Exchange Capacity	Report (meq/100g)	
pH <sup>1</sup>	Report (S.U.)	
Sodium Adsorption Ratio (SAR)	12.0 (unitless)	
Nitrate-Nitrogen	Report (mg/kg)	
Phosphorus		
Potassium		
Parameter	Limit (Reporting Units)	Monitoring Frequency
Arsenic	Report (mg/kg)	Once every five (5) years per land application site. <sup>2</sup>
Cadmium		
Copper		
Lead		
Mercury		
Molybdenum		
Nickel		
Selenium		
Zinc		

<sup>1</sup> If the resulting pH is 5.7 or lower, lime must be applied in accordance with recommendations from the University of Arkansas Cooperative Extension Service.

<sup>2</sup> One composite sample must be taken for every 40 acres.

**Part II**  
**SPECIFIC CONDITIONS**

1. This permit is for the construction, storage and land application of wastewater and sludge generated from the processing and conversion of poultry byproducts into poultry meal and fat, blow-down boilers, by-pass condensate boilers, wash down of plant processing equipment, and spent air scrubber liquids.
2. The land application operation shall be managed in accordance with the November 2014 Waste Management Plan (WMP). If the WMP is inconsistent with this permit, the land application operation shall be managed in accordance with the terms of the permit and the WMP shall be revised to conform to the permit conditions.
3. Waste analyses shall be reported with the appropriate reporting units for solids or liquids show in Table I of Part I. If it is not specified whether the units are appropriate only for solids or liquids, the analysis is appropriate for either solids or liquids in the provided units. However, a sample should be tested as a solid and reported in mg/kg when solids are present and only those samples that do not have enough solids to be tested as a solid should be tested as a liquid and reported in mg/l.
4. Plant Available Nitrogen (PAN) shall be calculated using the following equations:

<b>PAN Equations</b>	
For Surface applied waste, PAN(ppm)	$0.3(\text{TKN} - \text{NH}_3) + 0.5\text{NH}_3 + \text{NO}_3 + \text{NO}_2$
For Subsurface applied or Incorporated waste, PAN(ppm)	$0.3(\text{TKN} - \text{NH}_3) + \text{NH}_3 + \text{NO}_3 + \text{NO}_2$
Conversion from PAN(ppm <sup>1</sup> ) to PAN(lbs/Dry Ton(DT))	$0.002 * \text{PAN}(\text{ppm}^1)$
Conversion from PAN(ppm <sup>2</sup> ) to PAN(lbs/1,000 gallons)	$0.00834 * \text{PAN}(\text{ppm}^2)$

<sup>1</sup>Dry Basis

<sup>2</sup>Wet Basis

The waste must be applied at a rate (calculated in units of DT/acre or 1,000 gallons/acre) that provides a quantity of PAN (lbs N/acre) that is equal to or less than the nitrogen uptake rate of the cover crop (lbs/acre). See the table below for a list of Nitrogen uptakes for crops authorized for land application under this permit. Any crop not listed in the following table may be added to the permit as a permit modification.

<b>Nitrogen Uptake of Cover Crops</b>	
Crop Name	Uptake (lbs/acre)
Ryegrass	167
Bermuda	300

5. The permittee shall not land apply waste in a manner that would exceed the Cumulative Pollutant Loading Rate in Table I of Part I of the permit. All records demonstrating compliance with this

condition shall remain on site and be made available to Department personal upon request. Pollutant Loading Rate shall be calculated per application event using the one of the following equations based on if the waste is analyzed as a solid or liquid waste, specified in Condition 3 of Part II. Cumulative Pollutant Loading Rate is determined by cumulative summation of the each application event.

$$\frac{\text{Pounds}}{\text{Acre}} = \frac{\text{Concentrations } \left(\frac{\text{mg}}{\text{l}}\right) * 8.34 * \text{Amount of waste Applied (gal)}}{\text{Acreage Applied}}$$

$$\frac{\text{Pounds}}{\text{Acre}} = \frac{\text{Concentrations } \left(\frac{\text{mg}}{\text{kg}}\right) * 0.002 * \text{Amount of waste applied (DT)}}{\text{Acreage Applied}}$$

6. Waste shall not be land applied that exceed the ceiling concentrations or maximum limits listed in Table I of Part I of the permit.
7. Land application sites shall maintain adequate vegetation to ensure the nitrogen uptake rate of the cover crop used to calculate the limit in Condition No. 4 is accurate. Land application sites containing forage crops shall maintain 100% coverage with a minimum of 80% density. Land application sites containing row crops must be planted in a manner to produce the typical yield.
8. Land application sites are as follows:

<b>Land Application Sites</b>							
<b>Owner</b>	<b>New/ Existing</b>	<b>Section(s)</b>	<b>Township</b>	<b>Range</b>	<b>Acreage</b>	<b>Latitude</b>	<b>Longitude</b>
Pet Solutions	Existing	11, 12	5N	21W	56.5	35°05'40"N	93°11'34"W
Pet Solutions	Existing	11	5N	21W	32.3	35°05'41"N	93°11'56"W
Pet Solutions	Existing	14	5N	21W	15.1	35°05'37"N	93°11'47"W
Pet Solutions	New	11	5N	21W	32.9	35°05'51"N	93°12'23"W

9. The permittee shall determine if the land application sites are currently permitted or in use by another user. In the event that the Department determines that any land application site under this permit is permitted for land application under another Water Division permit, the Department may void this permit and enforcement action may be taken.
10. Waste shall be land applied by subsoil injection or surface applied. Surface applied waste must be evenly distributed over the entire application area and shall occur only on land with vegetative cover.
11. Waste shall not be discharged from this operation to the waters of the State or onto the land in any manner that may result in runoff to the waters of the State or ponding on the surface of the land. Ponding caused by rainfall/stormwater must not have a visual sheen.
12. The allowable slope of land application site depends on waste application method. Wastes authorized by Condition 1 of Part II and application method authorized by Condition 9 of Part II shall not be applied to the land application site with slopes greater than allowed by the table below.

Maximum Slope %	Acceptable Application Methods
6	<ul style="list-style-type: none"> <li>• Surface application of liquid waste</li> <li>• Injection of liquid waste</li> <li>• Surface application of dewatered waste solids</li> <li>• Surface application of dewatered waste with immediate incorporation</li> </ul>
12	<ul style="list-style-type: none"> <li>• Injection of liquid waste</li> <li>• Surface application of dewatered waste solids</li> <li>• Surface application of dewatered waste with immediate incorporation</li> </ul>
15	<ul style="list-style-type: none"> <li>• No application of liquid wastes without extensive runoff control</li> <li>• Surface application of dewatered waste with immediate incorporation</li> </ul>

13. Land application is prohibited when the soils are saturated; frozen; covered with ice or snow; during precipitation events; or when precipitation is imminent (greater than a 50% chance of precipitation predicted by the nearest National Weather Service station).
14. Land application of waste in a flood plain shall not restrict the flow of the base flood, reduce the temporary storage capacity of the flood plain, or result in a washout of solid waste, so as to pose a hazard to human, wildlife or land and water uses.
15. Waste shall not be land applied within 100 feet of streams including intermittent streams, ponds, lakes, springs, sinkholes, rock outcrops, wells and water supplies; or 300 feet of extraordinary resource waters as defined by the Department's Regulation No. 2. Buffer distances for streams, ponds and lakes must be measured from the ordinary high water mark.
16. Waste shall not be land applied within 50 feet of property lines or 300 feet of neighboring occupied buildings existing as of the date of the permit. The restrictions regarding property lines or neighboring buildings may be waived if the adjoining property is also approved as a land application site under a permit issued by the Department or if the adjoining property owner consents in writing.
17. All boundaries, cited in Conditions 15 and 16 of Part II of the Permit, must be flagged prior to land applying.
18. The permittee shall not cause or contribute to the taking of any endangered or threatened species of plant, fish or wildlife. The facility shall not result in the destruction or adverse modification of the known critical habitat of endangered or threatened species as identified in 50 CFR Part 17.
19. The permittee must not land apply in a manner that will result in an exceedance of the Maximum Contaminant Levels promulgated under the Safe Drinking Water Act, as referenced in 40 C.F.R. Part 257, Appendix I. Land application must cease if evidence suggests that the facility is causing adverse impacts to groundwater.
20. Solid material accumulated in the waste storage dike, pits or vessels shall be removed as necessary to maintain the basin's design volume and to protect the storage system. Solids collected in the basin shall be disposed by methods approved by the Director.

21. The permittee must keep current records of the waste that is shipped from the facility. The outgoing waste records must include: volumes of the waste, the name of the entity receiving the waste, type of waste, and shipping date.
22. The permittee is required to maintain a freeboard of 12 inches in Pond #1 and Pond #2. The permittee is required to maintain a freeboard of 26 inches in Pond #3 until Pond #4 is in use. The permittee is required to maintain a freeboard of 24 inches in Pond #3 when Pond #4 is in use. The permittee is required to maintain a freeboard of 33 inches in Pond #4.
23. A staff gauge, liquid level board, or other appropriate device with a minimum 0.5 foot graduation shall be installed and maintained to monitor the elevation of the surface level and demonstrate compliance with the minimum freeboard limit in the ponds.
24. A minimum separation of 4 feet between the bottom of Pond #4 and the seasonal high water table shall be maintained.
25. Soil used in constructing Pond #4 bottom (not including the seal) shall be relatively incompressible, tight, and compact at or up to 4% above the optimum water content to at least 95% Standard Proctor Density.
26. Inner slopes for Pond #4 shall not be steeper than 1 vertical to 3 horizontal (1:3) or flatter than 1 vertical to 4 horizontal (1:4). Outer slopes shall be sufficient to prevent surface runoff from entering Pond #4.
27. Pond #4 liners shall be installed and maintained. Pond #4 shall be sealed such that seepage loss through the seal is low as practicably possible.
28. The depth of the sludge in the storage lagoons shall be measured once every five years and reported with the permit renewal application.
29. Should the facility under this permit cease operations, the permittee shall submit to the Department, for approval, a closure plan for the system storage structures within sixty (60) days of the final day of operation.
30. Annual reports are due by May 1<sup>st</sup> of each year for the previous permitted months from January to December (i.e. Annual report is due on May 1<sup>st</sup>, 2016 for the 2015 calendar year). The annual reports shall include the following:
  - A. land application dates;
  - B. land application locations;
  - C. quantities of waste applied in dry tons per acre per year and/or in gallons per acre per year;
  - D. methods of application;
  - E. amounts of nutrients applied;
  - F. total amount of PAN applied on each field (pounds/acre);
  - G. cover crop of each field;
  - H. total metals added (in that particular year) in lbs per acre;
  - I. total metals applied to date; and
  - J. copies of the waste and soil analyses.

The annual reports shall be submitted to the following address:

Arkansas Department of Environmental Quality  
Water Division, No-Discharge Section  
5301 Northshore Dr.  
North Little Rock, Arkansas 72118  
Fax (501) 682-0880

Or

[Water-permit-application@adeq.state.ar.us](mailto:Water-permit-application@adeq.state.ar.us)



**Part III**  
**STANDARD CONDITIONS**

**1. Duty to Comply**

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.) and is grounds for civil and administrative enforcement action; for permit termination, revocation and reissuance, or modification; or for rejection of a permit renewal application.

**2. Penalties for Violations of Permit Conditions**

The Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.) provides that any person who violates any provisions of a permit issued under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year, or a fine of not more than twenty-five thousand dollars (\$25,000) or both for each day of such violation. Any person who violates any provision of a permit issued under the Act may also be subject to a civil penalty not to exceed ten thousand dollars (\$10,000) for each day of such violation. The fact that any such violation may constitute a misdemeanor shall not be a bar to the maintenance of such civil action.

**3. Permit Actions**

- A. This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to the following:
- i. Violation of any terms or conditions of this permit;
  - ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts;
  - iii. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination; or
  - iv. Failure of the permittee to comply with the provisions of Arkansas Pollution Control and Ecology Commission (APC&EC) Regulation No. 9 (Permit fees).
- B. The filing of a request by the permittee for a permit modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance, does not suspend any permit condition.

**4. Civil and Criminal Liability**

Nothing in this permit shall 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 this permit or applicable state statutes or regulations which defeats the regulatory purposes of the permit may subject the permittee to criminal enforcement pursuant to the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.).

**5. Oil and Hazardous Substance Liability**

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act and Section 106 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

**6. State Laws**

Nothing in this permit shall 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 law or regulation.

**7. 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 exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

**8. Severability**

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

**9. Permit Fees**

The permittee shall comply with all applicable permit fee requirements (i.e., including annual permit fees following the initial permit fee that will be invoiced every year the permit is active) for wastewater discharge permits as described in APCEC Regulation No. 9 (Regulation for the Fee System for Environmental Permits). Failure to promptly remit all required fees shall be grounds for the Director to initiate action to terminate this permit under the provisions of 40 CFR Parts 122.64 and 124.5(d), as adopted in APCEC Regulation No. 6 and the provisions of APCEC Regulation No. 8.

**10. Proper Operation and Maintenance**

A. 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 also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

B. The permittee shall provide an adequate and trained operating staff which is duly qualified to carry out operation, maintenance and testing functions required to insure compliance with the conditions of this permit.

**11. Duty to Mitigate**

The permittee shall take all reasonable steps to prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health, the environment, or the water receiving the discharge.

**12. Removed Substances**

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be discarded in a manner such as to prevent any pollutant from such materials from entering the waters of the State.

**13. Reporting of Violations and Unauthorized Discharges**

A. Any violations to this permit must be reported to the Enforcement Branch of the Department immediately. Any leaks or seeps shall be reported to the Department and appropriately corrected. Any discharge from the fluids storage system such as an overflow, broken pipe, etc., shall be immediately reported to the Department.

B. The operator shall visually monitor and report immediately (within 24 hours) to the Enforcement Branch any unauthorized discharge from any facility caused by dike or structural failure, equipment breakdown, human error, etc., and shall follow up with a written report within five (5) days of such occurrence. The written report shall contain the following:

- i. A description of the permit violation and its cause;
- ii. The period of the violation, including exact times and dates;
- iii. If the violation has not been corrected, the anticipated time expected to correct the violation; and
- iv. Steps taken or planned to reduce, eliminate, and prevent the recurrence of the violation.

C. Reports shall be submitted to the Enforcement Branch at the following address:

Arkansas Department of Environmental Quality  
Water Division, Enforcement Branch  
5301 Northshore Dr.  
North Little Rock, Arkansas 72118  
Fax (501) 682-0880

Or

[Water-enforcement-report@adeq.state.ar.us](mailto:Water-enforcement-report@adeq.state.ar.us)

**14. Penalties for Tampering**

The Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.) provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under the Act shall be guilty of a misdemeanor and upon conviction thereof shall be subject to imprisonment for not more than one (1) year or a fine of not more than ten thousand dollars (\$10,000) or by both such fine and imprisonment.

**15. Laboratory Analysis**

All laboratory analyses submitted to the Department shall be completed by a laboratory certified by the Department under Ark. Code Ann. § 8-2-201 *et seq.* Analyses for the permittee's internal quality control or process control do not need to be performed by an ADEQ certified laboratory.

**16. Retention of Records**

The permittee shall retain records of all monitoring information, 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.

**17. Record Contents**

Records and monitoring information shall include:

- A. The date, exact place, time, and methods of sampling or measurements, and preservatives used, if any;
- B. The individuals(s) who performed the sampling or measurements;
- C. The date(s) the analyses were performed;
- D. The individual(s) who performed the analyses;
- E. The analytical techniques or methods used; and
- F. The measurements and results of such analyses.

**18. 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 upon 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, inspect, or monitor at reasonable times, for the purposes of assuring permit compliance any substances or parameters at any location.

**19. Planned Changes**

The permittee shall give notice and provide the necessary information to the Director for review and approval prior to any planned physical alterations or additions to the permitted facility.

**20. Anticipated Noncompliance**

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

**21. Transfers**

The permit is nontransferable 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 Act.

**22. 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. Information shall be submitted in the form, manner and time frame requested by the Director.

**23. Duty to reapply**

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The complete application shall be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date. Conditions of this permit will continue in effect past the expiration date pending issuance of a new permit, if:

- A. The permittee has submitted a timely and complete application; and
- B. The Director, through no fault of the permittee, does not issue a new permit prior to the expiration date of the previous permit.

**24. Signatory Requirements**

- A. All applications, reports or information submitted to the Director shall be signed and certified. All permit applications shall be signed as follows:
  - i. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
    - a. 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
    - b. The manager of one or more manufacturing, production, or operation 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.
  - ii. For a partnership or sole proprietorship: by a general partner or proprietor, respectively; or
  - iii. For a municipality, State, Federal, or other public agency; by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:
    - a. The chief executive officer of the agency, or

- b. A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.
- B. 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:
  - i. The authorization is made in writing by a person described above.
  - ii. The authorization specified 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. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
  - iii. The written authorization is submitted to the Director.
- C. 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 fine and imprisonment for knowing violations.”

**25. Availability of Reports**

Except for data determined to be confidential under the Arkansas Trade Secrets Act (Ark. Code Ann. § 4-75-601 *et seq.*), all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Department of Environmental Quality. The name and address of any permit applicant or permittee, permit applications, permits, and waste data shall not be considered confidential.

**26. Penalties for Falsification of Reports**

The Arkansas Air and Water Pollution Control Act provides that any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this permit shall be subject to civil penalties and/or criminal penalties under the authority of the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 *et seq.*).

**27. Applicable Federal, State, or Local Requirements**

Permittees are responsible for compliance with all applicable terms and conditions of this permit. Receipt of this permit does not relieve any operator of the responsibility to comply with any other applicable Federal, State, or local statute, ordinance policy, or regulation.

**Part IV**  
**DEFINITIONS**

“**Act**” means the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.).

“**APC&EC**” means the Arkansas Pollution Control and Ecology Commission.

“**Available Acreage**” means total acreage minus buffer zones.

“**Department**” means the Arkansas Department of Environmental Quality (ADEQ).

“**Director**” means the Director of the Arkansas Department of Environmental Quality.

“**Industrial Waste**” means wastewater and sludge generated from the processing and conversion of poultry byproducts into poultry meal and fat, blow-down boilers, by-pass condensate boilers, wash down of plant processing equipment, and spent air scrubber liquids.

“**s.u.**” means standard units.

“**Visual sheen**” means a presence of a film or sheen or a discoloration of the surface of the sample fluids.

“**Annual**” or “**Yearly**” is defined as a fixed calendar year or any portion of the fixed calendar year for a waste characteristic or parameter with a measurement frequency of once/year. A calendar year is January through December, or any portion thereof.

## STATEMENT OF BASIS

This Statement of Basis is for information and justification of the permit limits only and is not enforceable. This permit decision is for modification of a No-Discharge operation under permit number 3778-WR-7 and AFIN 75-00051.

### 1. Permitting Authority

Arkansas Department of Environmental Quality  
Water Division, Permits Branch  
5301 Northshore Dr.  
North Little Rock, Arkansas 72118-5317

### 2. Applicant

Pet Solutions, LLC - Pet Solutions, LLC  
10511 Gauge Rd.  
Danville, AR 72833

### 3. Facility Description

Pet Solutions, LLC is a company that performs the service of collecting and land applying industrial wastes as defined in Part IV of the permit. The permittee must analyze the waste in accordance with Table I of Part I of the permit. The annual application rates will be governed by the nitrogen contents of the waste and the nitrogen uptake of the cover crop at the land application site.

### 4. Consultant for this Facility

Billy Staton, P.E.  
Harbor Environmental & Safety  
8114 Cantrell Road, Suite 350  
Little Rock, AR 72227

### 5. Waterbody Evaluation

The land application sites are located in Stream Segment 3G of the Arkansas River basin, which is not in the Nutrient Surplus Area. Surrounding areas were evaluated to determine if any Extraordinary Resource Waters (ERWs), Ecologically Sensitive Waterbodies (ESWs), Natural and Scenic Waterways (NSWs), or impaired streams in the 2008 ADEQ 303(d) List of Impaired Waterbodies in the State of Arkansas are near the land application sites. The waterbody evaluation determined that the land application sites are more than 10 miles from any impacted waterbodies; therefore, no additional permit requirements are necessary.

### 6. Permit History

- A. Permit No. 3778-W was issued to J & B Farms, Inc. and effective 12/30/1989 for a new permit.
- B. Permit No. 3778-WR-1 was issued to J & B Farms, Inc. and effective 04/28/1999.
- C. Permit No. 3778-WR-2 was issued to J & B Farms, Inc. and effective 09/22/2004 for a renewal.
- D. Permit No. 3778-WR-3 was not issued.



- E. Permit No. 3778-WR-4 was issued to Pet Solutions, LLC and effective 06/01/2010 for renewal.
- F. Permit No. 3778-WR-5 was issued to Pet Solutions, LLC and effective 08/01/2012 for modification.
- G. *Permit 3778-WR-6 was issued to Pet Solutions, LLC and effective 9/1/2015 for renewal.*

**7. Permit Activity**

Previous Permit No.: *3778-WR-6*  
Effective Date: *09/01/2015*  
Expiration Date: *08/31/2020*

The permittee submitted a *permit modification application* for a No-Discharge permit, which was received on *9/4/2015*, with *additional information received on 1/6/2016*. *The permit is being modified to increase the acreage by 32.9 acres.*

Legal Order Review:

There are currently no active Consent Administrative Orders (CAOs) or Notice of Violations (NOVs) for this facility.

**8. Changes from the Previously Issued Permit**

- a. *Removed Schedule of Compliance. See Condition 19 of Part II of the permit, Statement of Basis 14.A.ii.m and Statement of Basis 14.B.xiii.*
- b. *Revised Condition No. 8 of Part II of the permit for the addition of 32.9 acres.*

**9. Applicant Activity**

Under the standard industrial classification (SIC) code 2077 or North American Industry Classification System (NAICS) code 311613, the applicant activities are for a refuse system. This permit is for the land application of industrial waste.

**10. Storage and Waste Application Method**

Pet Solutions, LLC owns and operates a protein conversion facility in Centerville, AR. The facility processes incoming raw materials (feedstock) to poultry meal. Wastewater is drained from feedstock as well as during the processing of feedstock. Wastewaters are also generated from the two gas-fired steam boilers, wash down of plant processing equipment, and spent air scrubber materials. All wastewater streams enter an equalization tank, mechanical solids separator, and dissolved air floatation unit to remove fat/oils and suspended solids. Then the wastewater flows through a series of settling/holding ponds.

Pond #1 is an anaerobic lagoon that serves a receiving, settling, and separation pond. The dimensions of Pond #1 are 185 feet by 225 feet by 11 feet (2,430,745 gallon capacity) with a 12 inch freeboard and 2:1 (H:V) side slopes. Pond #2 is an aerated lagoon. The dimensions of Pond #2 are 130 feet by 150 feet by 21 feet (1,443,641 gallon capacity) with 12 inch freeboard and 2:1 (H:V) side slopes. Settled water from Pond # 2 flows through a pipe structure to the next pond. Pond #3 is a holding pond with surface aerators utilized for mixing. The dimensions of Pond #3 are 560 feet by 140 feet by 13 feet with a current freeboard of 26 inches and 2:1 (H:V) side slopes. The maximum holding

capacity for Pond #3 is currently 4,701,929 gallons. With Pond #4, the freeboard is be 24 inches and the maximum capacity would be 4,810,534 gallons. Wastewater in Pond #3 is reused as wash water in the facility.

Pond #4 is an additional holding pond with surface aerators for mixing. The dimensions of Pond #4 are 520 feet by 160 feet by 14 feet with a 33 inch freeboard and 3:1 (H:V) side slopes. The maximum holding capacity will be 4,565,586 gallons.

The facility will land apply liquid wastewater using a combination of center pivot irrigation systems, traveling reel guns, mobile boom sprinklers, and honey wagons pulled by farm tractors to top-spread wastewater. When land application is not feasible, the facility will contract with an independent sludge hauler to remove wastewater to maintain the required freeboard.

Waste solids accumulated in the wastewater holding ponds will be removed and land applied as necessary. Solids will be land applied with a liquid manure spreader.

**11. Total Available Acreage**

There are *136.76 acres* covered under this permit. The annual application of wastes is limited by the plant available nitrogen (PAN) equation and the nitrogen uptake rate of the cover crop, Condition No. 4 of Part II of the permit.

**12. Additional Site Information**

The facility maintains Industrial General NPDES Permit ARR00B915 and Air Permit No. 2058-AR-9. The facility also has applied for pending No-Discharge permit 5213-W for additional offsite land application areas.

**13. List of All Land Application Sites**

See Permit Condition No. 8 of Part II.

**14. Basis for Permit Conditions**

The Arkansas Department of Environmental Quality has made a determination to issue a permit for the no-discharge facility as described in the application and waste management plan. Permit requirements and conditions are authorized pursuant to the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq. and Ark. Code Ann. § 8-4-201 et seq.) and regulations promulgated thereunder.

Permit conditions, limits, reporting requirements, and justifications are listed as follows:

A. Part I—Permit Requirements

i. Monitoring Frequency

The monitoring frequency of once annually prior to the first land application is to ensure that a representative sample of what is being applied to the land is measured and recorded. The parameters that must be measured at this frequency can be compared to the soil parameters if a problem arises to determine if the land application is the pollutant source.

Total volume of waste applied and the nitrogen application rate must be measured and recorded prior to each land application to prevent the over application of nutrients to the land.

Some soil parameters only need to be measured once every 5 years because annual measurements do not show a significant accumulation.

ii. Waste Limits and Reporting

a. Reporting units difference for solid and liquid waste parameters

Solid and liquid wastes authorized in Condition No. 1 of Part II will both be applied to land application sites. Solid waste parameters will be reported in dry-weight mg/kg. Liquid waste parameters will be reported in mg/l. Appropriate reporting units are required to determine if limits are reached. Incorrect reporting units for both solid and liquid wastes can result in incorrect interpretation of the analyses such as exceedance of limits or increased soil concentrations because the waste parameter was reported with the wrong reporting units. A sample should be tested as a solid and reported in mg/kg when solids are present and only those samples that do not have enough solids to be tested as a solid should be tested as a liquid and reported in mg/l.

b. Limits and reporting requirements for arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc in the waste

The associated limits and Cumulative Pollutant Loading Rates (CPLRs) are adapted from EPA's risk assessment Title 40 of the Federal code of Regulations Part 503 rule that governs the land application of sewage sludge. This assessment considered 14 different pathways of exposure to highly exposed individuals, including humans, animals (including small organisms) and plants. Industrial wastes, as defined in Part IV, have been known to contain trace amounts of these compounds. These limits minimize the potential for the accumulation of metals in soils to concentrations that could have adverse effects on the environment.

c. Reporting requirements for percent total solids in the waste

This parameter is required to convert effluent analysis values between a wet and dry basis.

- d. Reporting requirements for the electrical conductivity of the waste and reporting of the waste volume

The analysis of electrical conductivity is the measurement of the salinity of the waste. Over application of salt could affect plant growth. According to *Wastewater Engineering Treatment and Reuse, 4<sup>th</sup> Edition*, salts tend to concentrate in the root zone. With an increase in soil salinity in the root zone, plants expend more of their available energy on adjusting the salt concentration within the tissue to obtain needed water from the soil. Consequently, less energy is available for plant growth.

- e. Reporting requirements for all nitrogen compounds in the waste

These concentrations are required to calculate the plant available nitrogen to comply with Condition No. 4 of Part II of the permit.

- f. Reporting requirements for total phosphorus and total potassium in the waste

These constituents are required for plant growth and are monitored to ensure crop nutrients are provided. Also, phosphorus may be the limiting nutrient in the Nutrient Surplus Area as delineated by the Arkansas Natural Resource Commission.

- g. Reporting requirements for pH of the waste

The pH of the waste must be reported to ensure that it will not negatively impact the pH of the soil.

- h. Reporting requirements for Oil & Grease in the waste

The permitted waste is known to contain high levels of Oil & Grease. Excessive application of Oil & Grease has the potential to kill or prevent the growth of crops, as well as become a source of pollutants in groundwater and surface water. The Department may require a limit for this parameter in future permits.

- i. Limit for Total Volume of Waste Applied

Excessive application of waste has the potential to kill or prevent the growth of crops, as well as become a source of pollutants in groundwater and surface water. The waste could also contain other potential pollutant of concerns, such as chlorides and nitrogen. Therefore this conservative limit of 243,300 gallons per acre per year based on the soil report for the facility is protective of crops, groundwater, and surface water.

- j. Monitoring Requirement for Sodium Adsorption Ratio (SAR) in the waste

SAR is a measure of sodicity hazard commonly used to evaluate irrigation water and soils for agricultural use. Because the waste will be land applied, the SAR needs to be evaluated to show the waste is acceptable for use. According to the *Practical Handbook of Disturbed Land Revegetation* (Munshower, 1994), when the SAR rises above 18 in the waste, serious physical soil problems arise and plants have difficulty absorbing water.

The Department has decided to require the limit of 18 for the liquid organic residuals and dewatered residuals being repeatedly applied.

k. Debris limit of 0.5 inches in the waste

Solid material larger than 0.5 inches is not allowed to be land applied under this permit, since this material could not be conveyed through the allowable application methods.

l. Nitrogen Application Rate

Land application of the waste covered under this permit is restricted by the nitrogen application rate. The nitrogen application rate is the amount of nitrogen applied to the land in pounds/acre/year. Using the nitrogen components of the waste analysis and the volume of the waste applied, the nitrogen application rate shall be calculated using the equations provided in Condition No. 4 of Part II of the permit. In order to ensure the application of waste will not exceed the Plant Available Nitrogen (PAN) limit for the cover crop identified in Condition No. 4 of Part II of the permit, the nitrogen application rate must be calculated prior to each application.

iii. Soil Limits and Reporting

a. Limit for the electrical conductivity of the soil

The measurement of the electrical conductivity (EC) of the soil is used to determine the salinity or the amount of salts in the soil. In *Soils: an Introduction to Soils and Plant Growth*, an EC of 4 mmhos/cm or less is considered normal. Once the EC exceeds 4 mmhos/cm, the soil becomes Saline. Saline soils are known to reduce plant growth and affect soil permeability.

b. Reporting requirements for pH of the soil

Soil pH must be monitored to ensure compliance with Table II of Part I of the permit. The acidic limit of 5.7 was adapted from the University of Arkansas Cooperative Extension Service (UAEX) Self-study Guide 8: Soil Fertility Management in Pastures Essential Nutrient for Plant Growth to maintain an optimal pH for plant growth. Also when the pH becomes too low, heavy metals are more soluble and therefore more susceptible to leaching to the groundwater.

c. Sodium Adsorption Ratio (SAR) and reporting requirements for magnesium, calcium, and sodium in the soil

In addition to evaluating SAR in the effluent, the SAR should also be regularly monitored in the soils of the application sites. According to the *Practical Handbook of Disturbed Land Revegetation* (Munshower, 1994), when the SAR rises above 12 to 15 in the soil serious physical soil problems arise and plants have difficulty absorbing water. According to the 2009 ADEQ Landfarm Study, University of Arkansas soil scientist, Dr. Kristofor Brye, recommends that the SAR in soil be less than 12. SAR values above this range are considered undesirable conditions for plant growth. High sodium content disperses the soil and causes it to crust. Sodium also negatively influences the ability of

water to infiltrate the soil. If results indicate that soil concentrations have increased, the Department may require cessation of land application activities, further testing, or remediation activities.

d. Reporting requirements for cation exchange capacity, nitrate-nitrogen, phosphorus, and potassium in soils

These parameters are indicators of soil quality. The chemical condition of soil affects soil-plant relations, water quality, buffering capacities, availability of nutrients and water to plants and other organisms, mobility of contaminants, and some physical conditions. (USDA Natural Resources Conservation Service “Indicators for Soil Quality Evaluation” April 1996.) Reporting requirements are included to verify that problems from over-application of wastes or other sources are not occurring. If results indicate that soil concentrations have increased, the Department may require cessation of land application activities, further testing, or remediation activities.

e. Reporting requirements for arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc in soils

The list of metal cations was adapted from 40 C.F.R. Part 503 for the land application of sewage sludge. Limits were not established due to the variability of analyzing the concentrations of these metals. Reporting requirements are included to verify that metals from land application of waste or other sources are not being applied at a rate that causes accumulation of metals to levels that could have adverse effects on the environment. If results indicate that soil concentrations have increased, the Department may require cessation of land application activities, further testing, or remediation activities.

*B. Part II—Specific Conditions*

i. Reporting requirements for all nitrogen compounds in the treated waste, Plant Available Nitrogen (PAN) application limit and vegetation cover requirement

The Department has provided the proper Plant Available Nitrogen (PAN) equation in order to ensure the permittee does not exceed the nitrogen uptake of the cover crop. Any land application of industrial waste is limited by the nitrogen uptake of the cover crop and the PAN. The application rate is designed to provide the amount of nitrogen needed by the crop or vegetation and reduce the risk of nutrients running off into the waters of the State.

ii. Vegetation Cover Requirement

In order to ensure proper uptake of nitrogen, the land application site shall maintain 100% vegetative coverage with a minimum of 80% density. Furthermore, the vegetative coverage and density is also used for stabilization purposes to reduce the risk of soil erosion and runoff.

iii. Cumulative Pollutant Loading Rate

The Department has provided the equation to calculate the Cumulative Pollutant Loading Rates in order to ensure the permittee does not over apply metals to the land application site.

Once the permittee reaches the Cumulative Pollutant Loading Rate, land application must cease.

iv. Permit termination if the land application site is currently permitted under a previously issued permit

A site covered in more than one permit is at risk of over application of nutrients and metals. This condition encourages the applicant to confirm with the landowner that the site is not currently covered under another active permit before permitting the site.

i. No runoff or discharge requirement

A discharge from this site may result in pollutants entering the waters of the State in violation of Ark. Code Ann. § 8-4-217. Specific land application method requirements including even surface application or subsoil injection and precipitation and moisture limitations, are to ensure that no runoff containing potential pollutants will enter the waters of the State. These conditions are adaptations of APC&EC Regulation 5.406 (A) & (B) and 40 C.F.R. Part 257.

ii. Maximum allowable slope for the land application area

In order to protect waters of the State, additional measures must be taken to ensure contamination via runoff is prevented. Topography of the land application area affects the potential for runoff and erosion. The limits listed in Condition 12 of Part II of the permit were adapted from the *Wastewater Engineering: Treatment and Reuse, 4th Edition*, Table 14-51 as an acceptable maximum slope for the acceptable application of wastes.

iii. Land Application of waste to a flood plain

Land application of waste to a flood plain shall not increase the level of the base flood by one foot or more, to avoid increasing the velocity of the flow downstream of the site, reducing the temporary storage capacity of the flood plain, or increasing the levels of the flood waters, which was adapted from 40 C.F.R. Part 257.3-1.

iv. Buffer distances

Minimum buffer distances are required between land application areas and areas that may be vulnerable to water pollution in order to minimize the risk of nutrients or pollutants from leaving the field and reaching surface waters. Buffer distances were adapted from APC&EC Regulation 5.406(D), the Arkansas Department of Health's *Rules and Regulations Pertaining to Onsite Wastewater Systems* Section 10.5.7.2, and generally accepted scientific knowledge and engineering practices.

v. Flagged Buffer distances

In order to be protective of surface waters, minimum buffer distances have been established. In order to verify that the permittee will be applying waste within all of the required boundaries of the land application sites, the Department will require all boundaries to be flagged prior to and be present during any land application events.

vi. Freeboard Requirement

To ensure that the facility does not have a discharge by overflowing the ponds, they will be required to maintain a minimum freeboard of 12 inches in Pond #1 and Pond #2. The permittee will be required to maintain a freeboard of 26 inches in Pond#3 until Pond #4 is constructed and in operation, after which the freeboard for Pond #3 will be reduced to 24 inches. The freeboard requirement of Pond #4 is 33 inches. The freeboard requirement for the last pond in the system is due to the design of the system. At this facility, Pond #1 flows into Pond #2, which flows into Pond #3. Pond #3 will flow into Pond #4 once Pond #4 is constructed and in operation. This means that the last pond in the system will need to be able to receive the total volume of rainfall from a 25y-24hr storm event from all ponds in the system. The total volume for the current system (Ponds #1-#3) to be received is approximately 85,111 cubic feet of water which equates to 1.09 foot depth in Pond #3. In order to maintain the 12 inch freeboard and receive the 25yr-24hr storm event, Pond #3 will need to have a 2.09 foot freeboard, which is approximately 26 inches. The total volume for the proposed system (Ponds #1-#4) to be received is approximately 135,863 cubic feet of water which equates to 1.64 foot depth in Pond #4. In order to maintain the 12 inch freeboard and receive the 25yr-24hr storm event, Pond #4 will need to have a 2.64 foot freeboard which is approximately 33 inches.

vii. Depth of Sludge

Measuring the depth of the sludge in the storage pond(s) are required to ensure that the facility's treatment plant is operating properly. If the results show that the facility cannot properly operate the treatment plant, the facility may be required to remove the sludge to an adequate depth.

viii. Pond Level Gauge

The ponds level gauge is required to ensure the holding pond has adequate storage available to prevent the waters overflowing the embankments during rainfall events and to monitor the ponds' freeboard level. The facility has discharged from Pond #3 previously. Also, the pond level gauge is required to determine the volume of fluids in the ponds at any point in time. This requirement was adapted from the Recommended Standards for Wastewater Facilities: 2004 Edition (Ten State Standards) Section 93.56.

ix. Separation and Standard Proctor Density

This requirement was adapted from Recommended Standards for Wastewater Facilities: 2004 Edition (Ten State Standards) Section 93.421.

x. Liner Installation

This requirement was adapted from Recommended Standards for Wastewater Facilities: 2004 Edition (Ten State Standards) Section 93.422.



xi. Pond Slopes

This requirement was adapted from Recommended Standards for Wastewater Facilities: 2004 Edition (Ten State Standards) Section 93.413 and 414.

xii. Habitat protection

This condition is adapted from 40 C.F.R. Part 257 and is included to ensure that endangered or threatened species are considered and protected during land application.

xiii. Title 40 C.F.R. Part 257 compliance requirement

The Department has adapted the maximum contaminant level from 40 C.F.R. Part 257 Appendix I. Complying with these maximum contaminant levels ensures that harmful levels of pollutants will not enter the groundwater through contamination from the land application of industrial waste.

C. Part III—Standard Conditions

Standard Conditions have been included in this permit based on generally accepted scientific knowledge, engineering practices and the authority of the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-101 et seq.).

D. Part IV—Definitions

All definitions in Part IV of the permit are self-explanatory.

**15. Point of Contact**

The following staff contributed to the preparation of this permit:

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**16. Sources**

The following Sources were used to draft the permit:

- A. APC&EC Regulation No. 5, Liquid Animal Waste Management Systems, as amended.
- B. APC&EC Regulation No. 8, Administrative Procedures, as amended.
- C. APC&EC Regulation No. 9, Fee System for Environmental Permits, as amended.
- D. 40 C.F.R. Part 503 for land application of sewage sludge.
- E. 40 C.F.R. Part 257 for solid waste disposal facilities and practices.
- F. Ark. Code Ann. § 8-4-101 et seq., Arkansas Water and Air Pollution Control Act.
- G. Ark. Code Ann. § 4-75-601 et seq., Arkansas Trade Secrets Act.
- H. Arkansas Department of Health (2014). Rules and Regulations Pertaining to Onsite Wastewater Systems.
- I. Integrated Water Quality and Assessment Report (305(b) Report).
- J. 2009 ADEQ Landfarm Study.
- K. Practical Handbook of Disturbed Land Revegetation, Munshower, 1994.
- L. Wastewater Engineering: Treatment and Reuse: 4th Edition Table 14-51.
- M. UAEX Self-Study Guide 8: Soil Fertility Management in Pastures essential Nutrient for Plant Growth
- N. Soils: An Introduction to Soils and Plant Growth: 4<sup>th</sup> Edition; Donahue, Miller, & Shickluna; 1977.
- O. USDA Natural Resource Conservation Service, Indicators for Soil Quality Evaluation, April 1996.
- P. *Application for Permit No. 3778-WR-7 was received on 9/4/2015*
- Q. *Additional information submitted 1/6/2016.*