

Permit No. 5379-W
AFIN 35-01536

**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. Sec. 8-4-101 *et seq.*)

**Little Rock Water Reclamation Authority - Fourche Creek Water Reclamation Facility -
Tucker**

is authorized to land apply municipal biosolids on sites listed in Part II Condition 9 of the permit in Jefferson County, AR.

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

Effective Date: April 1, 2022

Expiration Date: March 31, 2027

03/30/2022

Alan J. York
Associate Director, Office of Water Quality
Division of Environmental Quality

Issue 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 Division of Environmental Quality (DEQ) for each respective parameter listed in the table heading.

TABLE I			
Biosolids Analysis, Reporting, and Record Keeping			
Parameter	Ceiling Concentrations (mg/kg) ¹	Cumulative Pollutant Loading Rate (lb/ac) ³	Monitoring Frequency
Arsenic	75	37	Once every sixty (60) days ⁴
Cadmium	85	35	
Copper	4300	1350	
Lead	840	270	
Mercury	57	15	
Molybdenum	75	Report	
Nickel	420	378	
Selenium	100	90	
Zinc	7500	2520	
Polychlorinated Biphenyls (PCB's)	50	N/A	
Parameter	Maximum Limit	Reporting Units	
Total Solids	Report	Percentage (%)	Annually, prior to the 1 st application of the calendar year
Electrical Conductivity		µmhos/cm	
pH		S.U.	
Nitrate Nitrogen		mg/kg ¹	
Nitrite Nitrogen			
Ammonia Nitrogen			
Total Kjeldahl Nitrogen			
Total Phosphorus			
Total Potassium		Unitless	
Sodium Absorption Ratio (SAR)		Dry tons/acre/year	
Total Volume of Biosolids Applied			
Nitrogen Application Rate	² Depends on Crop	Lbs N/acre/year	

¹ Dry-weight Basis

² Refer to Part II Condition 6 of the permit.

³ Refer to Part II Condition 8 of the permit.

⁴ The sixty (60) day monitoring period starts with the date that the sample results are received from the third party lab.

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 st application of the calendar year per application site ^{2,3}
Cation Exchange Capacity	Report (meq/100g)	
pH ¹	Report (s.u.)	
Sodium Adsorption Ratio (SAR)	12.0 (unitless)	
Nitrate-Nitrogen	Report (mg/kg)	Once every five (5) years per application site ^{2,3}
Phosphorus		
Potassium		
Arsenic		
Cadmium		
Copper		
Lead		
Mercury		
Molybdenum		
Nickel		
Selenium		
Zinc		

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

² One composite soil sample must be taken for every 40 acres.

³ Annual samples may be collected in December of the previous year prior to the start of the calendar year and then be used to comply with the annual sampling and annual report requirements for the subsequent year.

Part II
Specific Conditions

1. This permit is for the land application of municipal biosolids.
2. The land application operation shall be managed in accordance with the May, 2021, 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. The permittee shall provide annual training to any person that will be responsible for land applying biosolids or any person that will be overseeing the land application of biosolids before the permittee can land apply biosolids under this permit. The annual training shall consist of, at a minimum, training on all permit conditions and WMP. The permittee shall maintain written certification that any person that will be responsible for land applying waste or any person that will be overseeing the land application of waste is familiar with the permit and WMP requirements. The permittee shall provide DEQ with records of these annual trainings as part of the permittee's annual report. All certifications shall be made available to DEQ personnel on request and maintained for three (3) years.
4. Upon request from DEQ personnel, the permittee shall provide DEQ with a schedule of all planned land application events that are expected to occur within the next five (5) calendar days. The schedule shall be provided immediately (within 24 hours) upon the request from DEQ personnel. At the minimum, the schedule shall include:
 - A. Permit Information (Permit No. and AFIN);
 - B. Anticipated dates of application; and
 - C. Anticipated Field IDs.
5. For each land application event on any permitted site, the permittee shall create a contemporaneous record of that land application event. Note that records of all land application events must be maintained pursuant to Part III Condition 16. Each land application record shall include, at a minimum, the following information:
 - A. Permittee Information (Permit No., AFIN, Permittee);
 - B. Land Application Event Information (including week of the land application event, Field IDs, amount of waste applied, identify when land application ceased due to precipitation); and
 - C. Waste Information.

All land application records shall be made available to DEQ personnel on request and maintained for at least three (3) years.

6. Plant Available Nitrogen (PAN) shall be calculated using the following equations:

PAN Equations	
For Surface applied biosolids, PAN(mg/kg)	$0.3(\text{TKN} - \text{NH}_3) + 0.5\text{NH}_3 + \text{NO}_3 + \text{NO}_2$
For Subsurface applied or Incorporated biosolids, PAN(mg/kg)	$0.3(\text{TKN} - \text{NH}_3) + \text{NH}_3 + \text{NO}_3 + \text{NO}_2$
Conversion from PAN(mg/kg) to PAN(lbs/Dry Ton(DT))	$0.002 * \text{PAN(mg/kg)}$

The biosolids must be applied at a rate (calculated in units of DT/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.

Nitrogen Uptake of Cover Crops	
Crop Name	Uptake (lbs/acre)
Bermuda	300

7. Land application sites possessing forage crops shall maintain adequate vegetation (100% coverage with minimum of 80% density) to ensure the nitrogen uptake rate of the cover crop used to calculate the limit in Part II Condition 6 is accurate.
8. The permittee shall not land apply biosolids in a manner that would exceed the Cumulative Pollutant Loading Rate in Part I Table I. All records demonstrating compliance with this condition shall remain on site and be made available to Office of Water Quality (OWQ) personnel upon request. Pollutant Loading Rate shall be calculated per application event using the following equations. Cumulative Pollutant Loading Rate is determined by cumulative summation of each application event.

$$\frac{\text{Pounds}}{\text{Acre}} = \text{Concentrations} \left(\frac{\text{mg}}{\text{kg}} \right) * 0.002 * \text{Application Rate} \left(\frac{\text{DT}}{\text{acre}} \right)$$

9. Land application sites are as follows:

Land Application Sites								
Owner	Field ID	New/ Existing	Section(s)	Township	Range	Acreage	Latitude	Longitude
Tucker SE Plantation, LLC	North	New	21	1N	11W	128.8	34°25'45.83"N	91°58'10.45"W
Tucker SE Plantation, LLC	South	New	27	3S	9W	108.4	34°25'19.96"N	91°57'51.01"W

10. Each land use agreement must be maintained in effect during the permit term. A copy of the signed land use agreement must be available to DEQ personal on request and maintained for the duration of the permit. If a land use agreement is terminated by the permittee or owner during the permit term, the permittee must notify DEQ promptly and request a permit modification. If the land application site changes ownership, a new land use agreement must be submitted to DEQ before any land application occurs on the corresponding site.

11. The permittee shall determine if the land application sites are currently permitted or in use by another user. In the event that DEQ or the permittee determines that any land application site under this permit is being used for land application from any other waste source, including manure and septage, not listed in the permit, the permittee shall cease using those sites immediately. Using a site that is permitted for the land application of other wastes may result in DEQ taking action to void this permit and pursuing a formal enforcement action.

12. Biosolids 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.

13. Biosolids shall be land applied by subsoil injection or surface applied in accordance with Part II Condition 14 and the WMP. Biosolids must be evenly distributed over the entire application area. If a land application event does not cover the entire permitted field, the next application event for the same field shall cover the remaining area prior to any waste application over the initial application area, unless field conditions prohibit the land application over the entire site. Incorporated biosolids shall be incorporated into the soil within 24-hours of application.

14. The allowable slope of land application site depends on biosolids application method. Biosolids shall not be applied to the land application site with slopes greater than allowed by the table below.

Maximum Slope %	Acceptable Application
6	<ul style="list-style-type: none"> • Surface application of liquid biosolids • Injection of liquid biosolids • Surface application of dewatered biosolids • Surface application of dewatered biosolids with immediate incorporation
12	<ul style="list-style-type: none"> • Injection of liquid biosolids • Surface application of dewatered biosolids • Surface application of dewatered biosolids with immediate incorporation

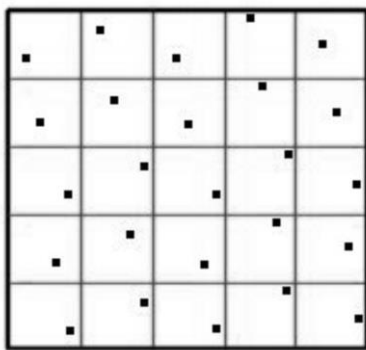
15. Land application of biosolids shall not be undertaken when the soils are:
- A. saturated;
 - B. frozen;
 - C. covered with ice or snow;
 - D. during precipitation events; or
 - E. when precipitation is reasonably anticipated (as defined in Part IV) in the next 24-hour period following any planned land application activity.

The permittee shall maintain field logs demonstrating compliance with this condition, including documents demonstrating that precipitation chances were reviewed and precipitation was not reasonably anticipated in the 24-hour period following any planned land application activity. The field logs shall be recorded on forms provided or approved by DEQ. The field logs shall include documentation that the permittee commenced or suspended the land application activity in compliance with this condition. The records shall be made available to DEQ personnel upon request. The Responsible Official or Cognizant Official shall attest to all field logs in the annual report.

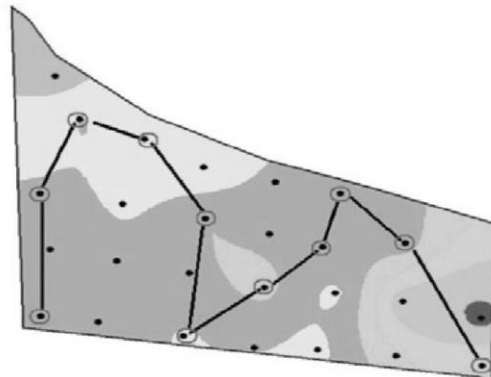
16. Land application of biosolids in a floodplain shall not result in a washout of biosolids, so as to pose a hazard to human, wildlife, or land and water uses. Land application events are prohibited when a flood event would result in biosolids entering waters of the state. Compliance shall be demonstrated through records maintained in accordance with Part II Condition 15.
17. Biosolids 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 Arkansas Pollution Control and Ecology Commission (APC&EC) Rule 2. Buffer distances for streams, ponds and lakes must be measured from the ordinary high water mark.
18. Biosolids shall not be land applied within 50 feet of property lines or 500 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 OWQ or if the adjoining property owner consents in writing.
19. All boundaries, cited in Part II Conditions 17 and 18, must be flagged prior to and present during any land application event for all land application sites.
20. 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 C.F.R. Part 17.
21. The biosolids generator must issue a signed certification stating that the Pathogen Reduction, Vector Attraction Reduction, and Pollutant Concentration Limits have been met. The State

requirements on Pathogen Reduction, Vector Attraction Reduction, and Pollutant Concentration Limits are the same as those listed in 40 C.F.R. Part 503.32, 40 C.F.R. Part 503.33 and 40 C.F.R. Part 503.13. All the above information must be made available to the land-applicator before the biosolids materials are delivered. Concurrently, a signed copy of each certification must be also submitted to the OWQ with the annual reports.

22. Biosolids can only be stored in accordance with the permit and the approved waste management plan, if provisions are made in the plan for that purpose.
23. The containers used for the transportation of the biosolids must be of the closed type. Transportation equipment must be leak-proof and kept in sanitary condition at all times. Biosolids must be enclosed or covered as to prevent littering, vector attraction, or any other nuisances. Transportation of the biosolids must be such that will prevent the attraction, harborage or breeding of insects or rodents.
24. The land application sites shall have the soils tested for the parameters listed in Part I Table II. Soil samples shall be collected according to the following method:
 - A. One composite soil sample shall be representative of ≤ 40 acres.
 - B. Identify representative sampling areas/zones that are uniform in soil and previous management history. Soils that are contained within the same soil association according to the USDA Soil Survey are considered uniform for the purposes of this permit. These areas shall be identified on a site map. The areas shall remain the same between each sampling event.
 - C. Using a clean soil probe, soil auger, or spade, collect a minimum of twenty (20) individual subsamples to a 4-inch depth per sample area in a random zigzag or grid pattern (see Fig 1 below) in accordance with the sampling locations on the site map. If using a spade, avoid wedge shaped samples. One composite sample must be taken for every land application site identified in Part II Condition 9.
 - D. Combine individual subsamples in a clean plastic bucket and mix thoroughly. Place a subsample of the mixed composite in a clean soil box and label with the field ID name, and permittee information. Subsamples shall be representative of each land application site.



Grid Pattern



Zig Zag

Figure 1. Representative Soil Sampling of Land Application Area Patterns

25. Annual reports shall be submitted with the cover page provided by DEQ and certified by the responsible official or cognizant official. If no land application occurs on any permitted land application site, the permittee is still required to submit an annual report for all permitted land application sites. Annual reports are due by May 1st of each year for the previous permitted months from January to December (i.e. Annual report is due on May 1st, 2022 for the 2021 calendar year). The permittee shall send a copy of the annual report to the owner of the land receiving biosolids within ninety (90) days following submittal to DEQ. The permit may send a hard copy, link to DEQ website, or other equivalent transmittal. Annual reports shall be sent to the OWQ and shall include the following:

- A. land application dates;
- B. land application locations;
- C. quantities of biosolids applied in dry tons per acre per year and in gallons per acre per year;
- D. methods of application;
- E. cover crop grown on each field;
- F. amounts of nitrogen applied;
- G. total elements added in lbs per acre per year;
- H. total elements applied to date;
- I. any violations of permit conditions;
- J. copies of the biosolids analysis, soil analyses and the biosolids certification;
- K. map of locations of soil subsamples;
- L. a statement attesting to the field logs recording the site conditions and chance of precipitation records; and
- M. a statement attesting that the land owner was notified within ninety (90) days after the previous year annual report was submitted.

The annual reports shall be submitted to the following address:

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

Or

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 denial 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 civil penalty in such amount as the court shall find appropriate, 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) Rule No. 9 (Fee Rule).

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 stay 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 rules that 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 rule.

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 rules.

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 no-discharge permits as described in APC&EC Rule No. 9 (Fee Rule). Failure to promptly remit all required fees shall be grounds for the Director to initiate action to revoke this permit.

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) that 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 that 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 disposed of in an approved 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 Office of Water Quality (OWQ) immediately (within 24 hours). Any leaks or seeps shall be reported to the OWQ and appropriately corrected. Any discharge from the fluids storage system such as an overflow, a broken pipe, etc., shall be immediately reported to the OWQ.
- 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:

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

Or

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 OWQ shall be completed by a laboratory accredited by Arkansas Department of Energy and Environment (ADEE) 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 ADEE accredited 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,
- 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 that 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 that the Director may request to determine whether cause exists for modifying; revoking and reissuing; 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 rules; 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 Division of Environmental Quality. The name and address of any permit applicant or permittee, permit applications, and permits 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 rule.

Part IV
Definitions

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

“**Annual Pollutant Loading Rate**” means the maximum amount of a pollutant (dry-weight basis) that can be applied to a unit area of land during a 365-day period.

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

“**Application Site or Land Application Site**” means all contiguous areas of a users' property intended for sludge application.

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

“**Biosolids**” means any sludge or material derived from sludge that can be beneficially used. Beneficial use includes, but is not limited to, land application to agricultural land, forest land, a reclamation site or sale or give away to the public for home lawn and garden use.

“**Cumulative Pollutant Loading Rate**” means the maximum of an inorganic pollutant (dry-weight basis) that is applied to a unit area of land.

“**Department**” means the Department of Energy and Environment.

“**Director**” means the Director of the Division of Environmental Quality.

“**Division or DEQ**” means the Division of Environmental Quality.

“**Dry weight-basis**” means 100 percent solids (i.e., percent moisture).

“**Floodplain**” means the lowland and relatively flat areas adjoining waterbodies, which are inundated by a flood that has a 1 percent or greater chance of recurring in any year or a flood of magnitude equal or exceeded once in 100 years on the average over a significantly long period.

“**Land application**” means the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the land so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil. Land application includes distribution and marketing (i.e. the selling or giving away of the sludge).

“**Land Application Event**” means an event where the permittee land applies waste to a specific permitted land application site on a calendar day.

“**Ordinary High Water Mark**” means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a cleat, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

“**OWQ**” means the Division of Environmental Quality - Office of Water Quality.

“**Pathogen**” means an organism that is capable of producing an infection or disease in a susceptible host.

“Pollutant Limit” means a numerical value that describes the maximum amount of a pollutant allowed per unit amount of sewage sludge (e.g., milligrams per kilogram of total solids); the maximum amount of a pollutant that can be applied to a unit area of land (e.g., pounds per acre); the maximum density of a microorganism per unit amount of sewage sludge (e.g., Most Probable Number per gram of total solids); the maximum volume of a material that can be applied to a unit area of land (e.g., gallons per acre); or the maximum amount of pollutant allowed in plant tissue (e.g., parts per million).

“Reasonably Anticipated” means greater than a 50% chance of precipitation of 0.25 inches or more on the zone area forecast for the county that represents the land application site using the National Weather Service station website: www.weather.gov.

“Runoff” means rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off of the land surface.

“Sewage sludge” means solid, semi-solid, or liquid residue generated during the treatment of domestic sewage and/or a combination of domestic sewage and industrial waste of a liquid nature in a Treatment Works. Sewage sludge includes, but is not limited to, domestic septage, scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the incineration of sewage sludge or grit and screenings generated during preliminary treatment of domestic sewage in a Treatment Works. These must be disposed of in accordance with 40 CFR Part 258.

“Total solids” means the materials in the sewage sludge that remain as residue if the sludge is dried at 103 to 105 degrees Celsius.

“Vector Attraction” means the characteristic of sewage sludge that attracts rodents, flies, mosquitoes or other organisms capable of transporting infectious agents.

“Volatile Solids” means the amount of the total solids in sewage sludge lost when the sludge is combusted at 550 degrees Celsius for 15-20 minutes in the presence of excess air.

“mg/kg” means milligram per kilogram.

“NH₃” means Ammonia Nitrogen.

“NO₃ + NO₂” means Nitrate + Nitrite Nitrogen.

“PAN” means Plant Available Nitrogen.

“TKN” means Total Kjeldahl Nitrogen.

“s.u.” shall mean standard units.

QUARTERLY:

(1) is defined as a fixed calendar quarter or any part of the fixed calendar quarter for a non-seasonal effluent characteristic with a measurement frequency of once/quarter. Fixed calendar quarters are: January through March, April through June, July through September, and October through December; or

(2) is defined as a fixed three-month period (or any part of the fixed three-month period) of or dependent upon the seasons specified in the permit for a seasonal effluent characteristic with a monitoring requirement frequency of once/quarter that does not coincide with the fixed calendar

quarter. Seasonal calendar quarters May through July, August through October, November through January, and February through April.

SEMI-ANNUAL:

is defined as the fixed time periods January through June, and July through December (or any portion thereof) for an effluent characteristic with a measurement frequency of once/6 months or twice/year.

ANNUAL or YEARLY:

is defined as a fixed calendar year or any portion of the fixed calendar year for an effluent 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 provided by the Arkansas Department of Energy and Environment – Division of Environmental Quality (DEQ). This document provides information and justification of the permit limits only and is not enforceable. This permit decision is for issuance of a No-Discharge operation under permit number 5379-W and AFIN 35-01536.

1. Permitting Authority

Division of Environmental Quality (DEQ)
Office of Water Quality (OWQ)
5301 Northshore Dr.
North Little Rock, Arkansas 72118-5317

2. Applicant

Little Rock Water Reclamation Authority
9500 Birdwood Dr
Little Rock, AR 72206

3. Facility Location

The land application sites are located south of Tucker on Hwy 15 in Jefferson County, Arkansas. The land application sites are located at the following coordinates:

Latitude: 34° 25' 45.83" N
Longitude: 91° 58' 10.45" W

4. Consultant for this Facility

Brad Wingfield
PMI
3512 S Shackleford Rd
Little Rock, AR 72205

5. Waterbody Evaluation

The land application sites are located in Stream Segment 3C 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 (NSW), or waterbodies in the 2018 OWQ 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 ten (10) miles away from any waterway with these designations. The land application sites meet the required setbacks; therefore, no additional permit requirements are necessary.

6. Permit Activity

The permittee submitted a permit application for a No-Discharge permit, which was received on June 17, 2021 with additional information submitted on August 9, 2021. It is proposed that the water no-discharge permit be issued for a 5-year term.

7. Applicant Activity

Under the standard industrial classification (SIC) code 4941 or North American Industry Classification System (NAICS) code 221310, the applicant's activities are the operation of a sewerage system. This permit is for the land application of municipal biosolids.

8. Biosolids Application Method

The biosolids will be pumped from the lagoon to a sealed tanker truck that will transport biosolids to the land application sites. At the sites, the biosolids will be land applied by a surface spreader.

9. Total Available Acreage

The permittee has 237.2 acres available to land apply the biosolids. The application of biosolids is limited by 40 C.F.R Part 503 ceiling concentration limits, 40 C.F.R. Part 503 cumulative pollutant loading, plant available nitrogen (PAN) equation and the nitrogen uptake rate of the cover crop, refer to Condition No. 6 of Part II of the permit.

10. Basis for Permit Conditions

The DEQ-OWQ has made a tentative 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 rules promulgated thereunder.

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

A. Part I—Permit Requirements

i. Monitoring Frequency

This facility proposes to land apply 2,942 tons of biosolids annually; therefore, in accordance with Table 1 of 40 C.F.R. Part 503.16, the frequency of monitoring is once per sixty (60) days. The monitoring frequency of once per sixty (60) days prior to the land application is to ensure that a representative sample of what is being applied to the land is measured and recorded. In order to ensure over application of nutrients does not occur, the total volume of biosolids and nitrogen application rate must be measured and

recorded daily. The loading rates and application rates shall be calculated using biosolids analysis and the volume of biosolids applied. 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.

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

ii. Biosolids Monitoring and Reporting Requirements

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

The associated limits and Cumulative Pollutant Loading Rates (CPLRs) are adapted from EPA's risk assessment Title 40 of the Code of Federal Rules (C.F.R.) 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. These limits minimize the potential for the accumulation of metals in soils to concentrations that could have adverse effects on the environment.

b. Limit for polychlorinated biphenyls (PCBs) concentration in the biosolids

Biosolids can contain trace amounts of PCBs. The content of PCBs in biosolids to be land applied is limited to a maximum of 50 mg/kg under 40 C.F.R. Part 761. Annual reporting requirements for PCBs were included to verify compliance with the permit.

c. Reporting requirements for percent total solids in the biosolids

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

d. Reporting requirements for pH of the biosolids

The pH of the biosolids must be reported to ensure that it will not negatively impact the pH of the soil. While a limit has not been implemented in the permit cycle, the OWQ will review this information and may implement limits on pH in the future, if deemed necessary.

e. Reporting requirements for all nitrogen compounds in the biosolids

These concentrations are required to calculate the plant available nitrogen to comply with Condition No. 3 of Part II of the permit.

f. Reporting requirements for total phosphorus and potassium in the biosolids

These constituents are required for plant growth and are monitored to ensure crop nutrients are provided.

g. Reporting requirements for Sodium Adsorption Ratio (SAR) in the biosolids

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

h. Reporting requirements for the electrical conductivity in the biosolids

The analysis of electrical conductivity is the measurement of the salinity of the biosolids. Over application of salt could affect plant growth. According to *Wastewater Engineering Treatment and Reuse, 4th 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. While a limit has not been implemented in the permit cycle, the OWQ will review this information along with the electrical conductivity of the soil and may implement limits on electrical conductivity in the future, if deemed necessary.

i. Total Volume of Biosolids Applied

The total volume of biosolids applied is also needed to calculate the loading of metals and nutrients to the land application site.

j. Nitrogen Application Rate

Land application of the biosolids 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 biosolids analysis and the volume of biosolids applied, the nitrogen application rate shall be calculated using the equations provided in Part II Condition 6 of the permit. In order to ensure the application of biosolids will not exceed the Plant Available Nitrogen (PAN) limit for the cover crop identified in Part II Condition 6 of the permit, the nitrogen application rate must be calculated prior to each application.

iii. Soil monitoring and reporting requirements

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 4.0 mmhos/cm or less is considered normal. Once the EC exceeds 4.0 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 Part I Table II 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. Reporting requirements for Sodium Adsorption Ratio (SAR) in the soil

In addition to evaluating SAR in the biosolids, it should also be monitored in the soils of the application site. 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 OWQ 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.

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 Division "Indicators for Soil Quality Evaluation" April 1996.) Reporting requirements are included to verify that problems from over-application of biosolids or waste sources are not occurring. If results indicate that soil concentrations have increased, the OWQ 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 biosolids or waste 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 OWQ may require cessation of land application activities, further testing, or remediation activities.

B. Part II—Specific Conditions

- i. Training and Training Certifications

Due to non-compliance issues and documented complaints with land application operations throughout the State, DEQ will require the permittee to conduct annual training for any person that will be responsible for land applying waste or any person that will be overseeing the land application. The permittee shall certify that any person that will be responsible for land applying waste or any person that will be overseeing the land application of waste has knowledge and understanding of the permit conditions and WMP. These personnel shall be adequately trained prior to any person conducting land application operations. The permittee will be required to keep records and certification to document of the annual training. The permittee will be required to maintain the training records for a period of at least three (3) years.

- ii. Land application notification

Due to non-compliance issues and documented complaints with land application operations throughout the State and pursuant to Ark. Code Ann. § 8-4-216(a)–(b), DEQ may request all planned land event records at any point in time to review the land application operations under this permit. Pursuant Ark. Code Ann. § 8-1-107(a), DEQ has the authority to conduct inspections of any site.

- iii. Contemporaneous records

Due to non-compliance issues and documented complaints with land application operations throughout the State, DEQ will require the permittee to maintain contemporaneous records of all land application events. This will ensure that all land application records are current, complete, and accurate.

iv. Plant Available Nitrogen (PAN) application limit

DEQ 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. The land application of biosolids outside of the Nutrient Surplus Area 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.

v. 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.

vi. Cumulative Loading Rate

DEQ has provided the proper Cumulative Pollutant Loading Rate equation in order to ensure the permittee does not exceed the metal loading rate. Land application of biosolids is limited by the metal loading on the soils. The application rate is designed to be protective of the environment and has been adapted from 40 C.F.R. Part 503.

vii. Land Use Agreement

The permittee shall maintain a land use agreement with each land owner, in order to prevent over application of nutrients from multiple sources land applying biosolids or waste sources to the same site. 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.

viii. 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.

ix. Even Application

In order to avoid over application to one area of the land application site, the biosolids shall be distributed evenly over the entire land application site. If the biosolids is over applied to one portion of the application site, there is potential for concentration on that portion of the site and the biosolids to runoff to the waters of the State.

x. 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 Rule 5.406 (A) & (B).

xi. 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 Part II Condition 14 were adapted from the *Wastewater Engineering: Treatment and Reuse, 4th Edition*, Table 14-51 as an acceptable maximum slope for the acceptable application of biosolids. DEQ will not allow land application of biosolids on slopes greater than 12%. Any land application of biosolids on slopes greater than 12% increases the chance of the biosolids runoff the site and discharging to waters of the State.

xii. Land application during precipitation and saturated conditions

In order to protect waters of the State, additional measures must be taken to ensure contamination via runoff is prevented. Therefore, OWQ adapted the associated conditions from APC&EC Rule 5.406(B) that governs the liquid animal waste management systems. Land application of industrial waste is prohibited during a precipitation event or when significant precipitation is reasonably anticipated. When land applying industrial waste there is a critical time to prevent runoff to the waters of the State, which is during land application and right after land application before the industrial waste has had time to absorb into the soil. Pursuant Ark. Code Ann. § 8-4-216(a)–(b), DEQ has the authority to require the permittee to keep records to demonstrate compliance with permit conditions.

xiii. Land application of biosolids to a floodplain

In order to protect waters of the State, land application of waste to a floodplain shall not cause any waste to reach waters of the State during a flood event.

xiv. Habitat protection

This condition is adapted from 40 C.F.R. Part 503 and is included to ensure that endangered or threatened species are considered and protected during land application.

xv. 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 Rule No. 5.406(D) and generally accepted scientific knowledge and engineering practices.

xvi. Flagged Boundaries

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

xvii. Soil Sampling

The sampling requirements were included in the permit to ensure the samples of the soils are collected in an appropriate manner and to ensure representative samples are collected.

xviii. Annual Reports

In order to ensure the permittee is land applying in accordance with all of the requirements of the permit and the annual application rates, the permittee will be required to submit an annual report. In order to ensure the permittee submits the proper information and records, DEQ will require the permittee to use DEQ's form.

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.

11. Point of Contact

For additional information, contact

Colby Ungerank
Engineer
Permits Branch, Office of Water Quality

5301 Northshore Drive
North Little Rock, AR 72118-5317
501-682-0047
E-mail: ungerank@adeq.state.ar.us

Technical review

Jamal Solaimanian Ph.D., PE
Engineer Supervisor, No Discharge Section
Permits Branch, Office of Water Quality
5301 Northshore Drive
North Little Rock, AR 72118-5317
501-682-0620
E-mail: jamal@adeq.state.ar.us

12. Annual Fee

In accordance with APC&EC Rule 9, the annual fee for this permit is \$500.

13. Sources

The following Sources were used to draft the permit:

- A. APC&EC Rule 2, Rule Establishing Water Quality Standards for Surface Waters of the State of Arkansas, as amended.
- B. APC&EC Rule 5, Liquid Animal Waste Management Systems, as amended.
- C. APC&EC Rule 8, Administrative Procedures, as amended.
- D. APC&EC Rule 9, Fee Rule, as amended.
- E. 40 C.F.R. Part 503 for land application of sewage sludge.
- 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. Department of Health (2014). *Rules and Regulations Pertaining to Onsite Wastewater Systems*.
- I. Integrated Water Quality and Assessment Report (305(b) Report).
- J. US Army Corps of Engineers Regulatory Guidance Letter No. 05-05.
- K. 2009 OWQ Landfarm Study.
- L. *Practical Handbook of Disturbed Land Revegetation*, Munshower, 1994.
- M. *Wastewater Engineering: Treatment and Reuse, 4th Edition*.
- N. UAEX Self-Study Guide 8: Soil Fertility Management in Pastures essential Nutrient for Plant Growth.
- O. *Soils: An Introduction to Soils and Plant Growth*: 4th Edition; Donahue, Miller, & Shickluna; 1977.
- P. USDA Natural Resource Division, *Indicators for Soil Quality Evaluation*, April 1996.
- Q. Application No. 5379-W received June 17, 2021.
- R. Additional information submitted August 9, 2021.

14. Public Notice

The draft permit was public noticed on February 20, 2022. No comments were received during the comment period.