

**FACT SHEET AND SUPPLEMENTARY INFORMATION
FOR GENERAL PERMIT NUMBER 0000-WG-WR**

LAND APPLICATION OF WATER TREATMENT RESIDUALS

Information in this part is organized as follows:

- 1. Background**
- 2. Major Changes from the Previous Permit**
- 3. Description of Permit Coverage**
- 4. Permit Limits and Basis**
- 5. Sources**

1. Background

The previous permit became effective on April 1, 2022, and will expire on March 31, 2027. The general permit number has been changed from 0000-WG-WR to ARN640000.

Pursuant to the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-203), the Arkansas Department of Energy and Environment - Division of Environmental Quality (DEQ) is authorized to issue permits “to prevent, control or abate pollution.” Therefore, any waste disposal system that does not discharge directly into waters of the state must be operated under the terms and conditions of a State Water Permit. To initially satisfy this requirement, DEQ issued individual permits for the land application of water treatment residuals (WTR). Because of the similarity in the physical and chemical properties of WTR, DEQ later determined it was appropriate to issue a general permit for the land application of WTR.

A violation of any condition of a general permit constitutes a violation of Ark. Code Ann. § 8-4-217 and may subject the permittee to penalties and revocation of coverage under the general permit. Upon issuance of the final general permit for the land application of WTR, operators who wish to request coverage under this general permit must submit a written Notice of Intent (NOI) to the Director to obtain coverage under the general permit.

2. Major Changes from the Previous Permit

- 2.1 Added Part 1.3 Exclusions to clarify what types of land application operations are not covered under this general permit.
- 2.2 Added and revised Part 1.4 to include all submission requirements in one part.
 - 2.2.1 Added clarification for deadlines on submission of the Notice of Intent (NOI) and Waste Management Plan/Nutrient Management Plan (WMP/NMP) for new and existing land application operations.
 - 2.2.2 Some requirements previously in the NOI section were moved to the WMP part, including plant and site identification, raw water sources, design capacities and production rates, estimated dry residuals generated, WTR storage components, maximum annual loading rate, and method of loading, transport, and application.
 - 2.2.3 The NOI and WMP/NMP must be submitted in SEEK, or any successor system.

- 2.3 Added Part 1.7 regarding termination of coverage.
- 2.4 Table I in Part 2.1 was revised to include a new requirement for facilities that use alum to monitor and report sulfate concentrations in water treatment residuals used for land application.
- 2.5 Part 4.4 was revised to reduce the allowable slope from 15% to 12%.
- 2.6 Part 4.6 was revised to indicate that more stringent setbacks (if required) will become effective upon the promulgation of any applicable final rule.
- 2.7 Revised Part 4.13 to define representative sampling zones based on soil and management uniformity, referencing USDA Soil Survey associations. The revised section clarifies that at least one composite soil sample, made up of a minimum of twenty (20) individual subsamples, must be collected per forty (40) acres and that multiple composite samples are required for sites exceeding this size.
- 2.8 Added Part 4.17 to provide clarification on specific soil pH action levels and corrective measures for land application sites. These provisions strengthen soil management requirements to maintain suitable pH levels and protect soil health.
- 2.9 Part 5 was revised to indicate that Annual Reports are due by March 1 of each year.
- 2.10 Part 5.5 was revised to indicate that Annual Reports shall be submitted to DEQ Permits Branch by email or by SEEK (or a successor system).
- 2.11 Part 6.13.3 was revised to indicate that any violation reports shall be submitted to DEQ's Enforcement Branch by email or by SEEK (or a successor system).

3. Description of Permit Coverage

- 3.1 **Authorization.** This general permit provides coverage for operators that dispose of WTR from potable water treatment plants through land application methods. This fact sheet explains DEQ's decisions regarding pollutant limits in WTR, loading rates, soil monitoring requirements, and the regulatory and technical basis for those decisions. These limits are established to prevent degradation of the soil at the land application site and to protect waters of the state from pollutant migration.
- 3.2 **Notification Requirements.** To obtain coverage under this general permit, a Recertification NOI or an NOI with a WMP/NMP must be submitted in accordance with Part 1.4. DEQ requires electronic submission of the NOI and WMP/NMP unless a waiver is requested, in accordance with Part 1.6.

4. Permit Limits and Basis

DEQ has made a determination to reissue a general permit for the disposal of WTR through land application. The permit requirements and conditions are based on 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 the rules promulgated thereunder.

Specific permit conditions, limits, and their rationales are as follows:

- 4.1 **Limits and Reporting Requirements for Arsenic, Cadmium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc in the WTR.** The associated limits and cumulative pollutant loading rates are adopted from EPA's risk assessment under Title 40 of the Code of Federal Regulations (C.F.R.) Part 503 governing the land application of biosolids. This assessment considered 14 exposure pathways affecting highly exposed individuals, including humans, animals (both large and small organisms), and plants. While these limits were originally designed for biosolids, they serve as general guidelines to minimize the potential accumulation of metals in soils to concentrations that could adversely affect the environment when WTR are land-applied.
- 4.2 **Reporting Requirements for Sulfates in the WTR.** The land application of alum-based water treatment residuals can introduce sulfate to the soil as a by-product of aluminum sulfate use. This new monitoring and reporting requirement is necessary to characterize sulfate loading to the land application site, assess the potential for sulfate to leach to groundwater, and verify that land application practices remain protective of the environment. This requirement only applies to facilities using aluminum sulfate (alum) in their water treatment processes.
- 4.3 **Reporting Requirements for Aluminum and Iron in WTR and Soils.** Alum and ferric flocculants are commonly used in potable water treatment. As a result, WTR may contain elevated concentrations of aluminum and iron. EPA has not established data concerning application rates of these elements in WTR. However, because their application has the potential to significantly alter soil concentrations, DEQ requires monitoring of both concentrations and total mass applied. To ensure concentrations of aluminum and iron are not increasing, DEQ will continue to require annual sampling of WTR for these parameters.
- 4.4 **Limit on the Total Mass of WTR Applied.** In land application operations, annual nutrient loading rates are typically the limiting factor. However, because WTR often contain trace amounts of nutrients, the total mass of WTR applied is limited to prevent excessive, concentrated disposal. Concentrated disposal can delay drying of the residuals and may bind nutrients in the soil, inhibiting plant growth. A 1991 article in the *American Water Works Association Journal* titled *Agronomic Effects of Land Application of Water Treatment Sludges* reported that an application rate of 10 dry tons per acre is protective of the environment, though certain plants may begin to exhibit phosphorus deficiency at that rate. A review of annual reports submitted during the last permitting cycle indicates that most permittees applied an average of three (3) dry tons per acre per year, with only one annual report since 2015 documenting an application rate near the 10 dry tons per acre limit. Based on this information, DEQ has decided to maintain the limit of 10 dry tons per acre per year.
- 4.5 **Reporting Requirements for Percent Total Solids of WTR.** This parameter is required to convert values between a wet-weight and dry-weight basis.
- 4.6 **Reporting Requirements for Nitrates, Total Phosphorus, and Total Potassium in WTR.** These constituents are essential for plant growth, and monitoring is required to measure the quantities provided through land application of WTR.

- 4.7 **Reporting Requirements for Arsenic, Cadmium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, and Zinc in Soils.** This list of metal cations was adopted from 40 C.F.R. Part 503 governing biosolids land application. Limits were not established due to variability in concentration data. Reporting is required to verify that metals from WTR are not accumulating in soils at levels that could adversely affect the environment. If results indicate an increase, DEQ may require cessation of land application activities, additional testing, and/or remediation activities.
- 4.8 **Reporting Requirements for Cation Exchange Capacity, Nitrate, Nitrogen, Phosphorus, and Potassium in Soils.** These parameters serve as indicators of soil quality. Soil chemistry affects plant growth, water quality, buffering capacity, nutrient availability, contaminant mobility, and physical soil conditions (USDA Natural Resources Conservation Service, *Indicators for Soil Quality Evaluation*, April 1996). Reporting is required to confirm that over-application of WTR, is not occurring. If results indicate concentrations have reached levels harmful to the environment, DEQ may require cessation of land application activities, additional testing, and/or remediation.
- 4.9 **Reporting Requirements for Soil pH.** Soil pH must be monitored to ensure compliance with Part 2 Table II. The pH limit of 5.7 s.u. was adopted from the University of Arkansas Cooperative Extension Service to maintain optimal conditions for plant growth. If soil pH becomes too low, heavy metals become more soluble and more susceptible to leaching into groundwater.
- 4.10 **Maximum Slopes of 12% for Application of WTR.** The topography of land application areas directly influences runoff and erosion potential. The maximum allowable slope of 12% was adapted from the *Wastewater Engineering: Treatment and Reuse, 4th Edition*, Table 14-51 as an acceptable maximum slope for the acceptable application of WTR. DEQ will not allow land application of WTR on slopes greater than 12%. Any land application of WTR on slopes greater than 12% increases the chance of the WTR runoff from the site and discharging to waters of the state.
- 4.11 **Land Application During Precipitation and Saturated Conditions.** To protect waters of the state, additional measures must be taken to ensure contamination via runoff is prevented. Land application of WTR is prohibited during precipitation events or when significant precipitation is reasonably anticipated. The most critical time to prevent runoff is during and immediately after land application, before WTR has been absorbed into the soil. Pursuant Ark. Code Ann. § 8-4-216(a)–(b), DEQ has the authority to require permittees to maintain records demonstrating compliance.
- 4.12 **Buffer Distances.** Minimum buffer distances are required between land application areas and locations vulnerable to water pollution. These distances minimize the risk of nutrients or pollutants migrating offsite and entering surface waters. Buffer requirements were adapted from generally accepted scientific knowledge and best engineering judgment.
- 4.13 **Training and Training Certifications.** The permittee must conduct annual training for all personnel responsible for land application of WTR or overseeing such operations. The permittee shall certify that these personnel have adequate knowledge and understanding of permit conditions and the WMP. Training must occur before individuals conduct application activities. The permittee must retain training certifications and records for a minimum of three (3) years.

- 4.14 **Land Application Notification.** Due to non-compliance issues and documented complaints related to land application throughout the State, and pursuant to Ark. Code Ann. § 8-4-216(a)–(b), DEQ may request records of all planned land application events at any time for review. Pursuant to Ark. Code Ann. § 8-1-107(a), DEQ also has the authority to inspect any site covered under this permit.
- 4.15 **Contemporaneous Records.** In response to non-compliance issues and complaints, DEQ requires permittees to maintain contemporaneous records of all land application events. This ensures that records remain current, complete, and accurate.
- 4.16 **Lime application.** Part 2 Table 2 requires the permittee to maintain a soil pH of greater than 5.7 for a land application site. If soil pH is below the action level of 5.7, the permittee is required to land apply lime to adjust soil pH. If soil pH remains below 5.7 after the first year, then the permittee shall manage soil pH as required in Part 4.17. If soil pH falls below 5.5 in the third year or a subsequent year, the permittee shall evaluate the site to determine appropriate practices required for continued land application.
- 4.17 **Standard Conditions.** Standard conditions applicable to all no-discharge permits have been incorporated into this permit based on best engineering judgment and 40 C.F.R. Part 122.

5. Sources

The following Sources were used to write the permit:

- 5.1 PC&EC Rule 8, now codified at 8 CAR Part 11.
- 5.2 PC&EC Rule 9, now codified at 8 CAR Part 12.
- 5.3 40 C.F.R. Parts 122 and 503.
- 5.4 Arkansas Water and Air Pollution Control Act, Ark. Code Ann. § 8-4-101, *et seq.*
- 5.5 Arkansas Trade Secret Act, Ark. Code Ann. § 4-75-601, *et seq.*
- 5.6 USDA Natural Resources Conservation Service “Indicators for Soil Quality Evaluation,” April 1996.
- 5.7 American Water Works Association (AWWA) “Land Application of Water Treatment Sludges: Impact and Management.”
- 5.8 EPA Technology Transfer Handbook “Management of Water Treatment Plant Residuals.”

6. Economic Impact

There will be incremental costs associated with sulfate benchmark monitoring associated with water treatment residuals analysis requirements. An additional benchmark test for sulfate can be performed by an accredited laboratory for less than \$50, with overall testing costs varying by provider but generally remaining relatively inexpensive.

Most of the requirements in this general permit were in the previous permit. The changes listed in Part 2 of this Fact Sheet will not have an economic impact. Therefore, this permit does not place any additional undue burden on any private business entity, large or small. It does not restrict any opportunities that are available to any small businesses.