

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

THE LAND-APPLICATION OF WATER TREATMENT RESIDUALS

Information in this part is organized as follows:

1. Background
2. Major Changes from the Previous Permit
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1. Background

The previous permit became effective on April 1, 2012 and will expire on March 31, 2017.

Pursuant to the Arkansas Water and Air Pollution Control Act (Ark. Code Ann. § 8-4-203), the Arkansas Department of Environmental Quality (ADEQ) has the power 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. Initially to satisfy the permit requirement, ADEQ issued individual permits for the land application of water treatment residuals (WTR). The Department determined that because of the similarity of the physical and chemical properties in WTR to issue a General Permit for the land application of WTR.

The 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 that are considered qualified for coverage under this general permit must submit a written Notice of Intent (NOI) to the Director for coverage under the general permit.

2. Major Changes from the Previous Permit

- 2.1 Added the requirement for a Nutrient Management Plan for the Nutrient Surplus Area in accordance with Ark. Code Ann. §15-20-1106.
- 2.2 Removed conductivity, sodium absorption ratio, sodium, calcium, and magnesium from the soil and WTR analysis.
- 2.3 Added the monitoring requirement for molybdenum to the land application site analysis.

3. Description of Permit Coverage

- 3.1 Authorization. The general permit provides coverage for operators that dispose of WTR, from potable water treatment plants, through land application methods. This fact sheet explains the Department’s decisions on limits for the pollutant levels in WTR, loading rates, the requirements for soil monitoring, and the regulatory and technical bases for those decisions. The limits are imposed to protect the soil from degradation 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 a NOI and waste management (WMP) plan/ nutrient management plan (NMP) must be submitted in accordance with Part I.B.

4. Permit Limits and Basis

ADEQ has made a determination to reissue a general permit for the disposal of WTR via land application. 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 regulations promulgated there to.

Specific permit conditions and limits' rationalization and sources are listed as follows:

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 Federal Part 503 rule that governs the land application of biosolids. This assessment considered 14 different pathways of exposure to highly exposed individuals, including humans, animals (including small organisms), and plants. Although these limits were designed for biosolids, they provide general guidelines for minimizing the potential for accumulation of metals in soils to concentrations that could have adverse effects on the environment caused by land application of WTR.

Reporting requirements for aluminum and iron in the WTR and soils

Alum and ferric flocculants are commonly used in the drinking water treatment process. As a result, WTR may contain high concentrations of aluminum and iron. The EPA currently does not have data concerning the application rates of aluminum and iron in WTR. However, because the application of WTR has the potential to considerably alter the soil's concentrations of these elements, the Department requires that concentrations and total mass of the elements applied be monitored. A review of previous permit records has shown that aluminum concentrations in the soil are not increasing at a rate that requires annual monitoring, therefore the Department has reduced the monitoring frequency to once every five (5) years. In order to ensure that the aluminum and iron concentrations are not increasing, the Department will require the permittee to sample the WTR and test for these parameters on an annual basis.

Limit of the total mass of WTR applied

Annual nutrient loading rates are usually the limiting application rate in land application operations. However, because WTR often contain trace amounts of nutrients the total mass of WTR applied is limited in order to prevent excessive concentrated disposal. Concentrated disposal will inhibit timely drying of the residuals. Excessive loading of WTR can also bind up nutrients in the soil impeding plant growth. A 1991 article from the American Water Works Association Journal titled "Agronomic Effects of Land Application of Water Treatment Sludges" states application rate of 10 dry tons per acre is still protective of the environment. Based on this info, the Department has set the limit of 10 dry tons per acre per year.

Reporting requirements for percent total solids of the WTR

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

Reporting requirements for nitrates, total phosphorus, and total potassium in the WTR

These constituents are required for plant growth and monitoring is used to measure the quantities provided through land application of the WTR.

Removal of the sodium adsorption ratio (SAR), magnesium, calcium, and sodium of the WTR

The Department included these monitoring parameters in the previous permit in order to obtain data and to assess the environmental impact of these parameters. Based on the analysis submitted during the previous permit cycle, the water treatment residuals had an average SAR of 1.85 and the highest reported SAR of 5.4. In accordance with Natural Resources Conservation Service Code 521A, the SAR of 6 is considered to be a low sodium hazard. Since both the average and highest SAR for the WTR came back below 6, the Department has removed the SAR, magnesium, calcium, and sodium monitoring requirement from the permit.

Removal of conductivity of the soils

The Department included these monitoring parameters in the previous permit in order to obtain data and to assess the environmental impact of these parameters. Based on the analysis submitted during the previous permit cycle, the soil analyses had an average conductivity of 92.3 $\mu\text{mhos/cm}$ and the highest report conductivity of 250 $\mu\text{mhos/cm}$. In accordance with *Soils: an Introduction to Soils and Plant Growth*, a conductivity of 4,000 $\mu\text{mhos/cm}$ or less is considered normal. Since both the average and highest conductivity for the soil came back below 4,000 $\mu\text{mhos/cm}$, the Department has removed the conductivity monitoring requirement from the permit.

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

The list of metal cations was adopted from 40 CFR Part 503 for the land application of biosolids. Limits were not established due to the variability in analyzing the concentrations of these metals. Reporting conditions are required as verification that metals from land application of WTR 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. The reporting frequency has been reduced to once every five years after a review of lab analysis indicated that the metals in the soil are not increasing, or are not increasing at a rate that requires annual monitoring. If results indicate that soil concentrations have increased, the Department may require cessation of land application activities, further testing, and/or remediation activities.

Reporting requirements for cation exchange capacity, nitrate nitrogen, phosphorus, and potassium in the soil

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 conditions are required as verification that problems from over-application of biosolids or other sources are not occurring. If results indicate that soil concentrations have increased to levels that have an adverse effect on the environment, the Department may require cessation of land application activities, further testing, and/or remediation activities.

Reporting requirements for pH of the soil

Soil pH must be monitored to ensure compliance with Part II, Table II of the permit. The acidic limit of 5.7 s.u. was adopted from University of Arkansas Cooperative Extension Service 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.

Maximum slopes of 15% for application of WTR

Topography of the land application area affects the potential for runoff and erosion. The maximum slope limit of 15% was adopted from American Water Works Association's "Land Application of Water Treatment Sludges: Impact and Management."

Buffer distances

Minimum buffer distances are required between land application areas and areas that may be vulnerable to water pollution and to minimize the risk of nutrients or pollutants from leaving the field and reaching surface waters. Buffer distances were adopted from APC&EC Regulation 5.406 and best engineering judgment.

Standard Conditions

The conditions applicable to all no-discharge permits have been included in this permit based on best engineering judgment and 40 CFR Part 122.

5. Sources

The following Sources were used to write the permit:

- a. Regulation No. 8, Administrative Procedures, as amended.
- b. Regulation No. 9, Fee System for Environmental Permits, as amended.
- c. Regulation No. 5, Liquid Animal Waste Management Systems, as amended.
- d. 40 CFR Parts 122 and 503.
- e. Arkansas Water and Air Pollution Control Act, Ark. Code Ann. § 8-4-101, et seq.
- f. Arkansas Trade Secret Act, Ark. Code Ann. § 4-75-601, et seq.
- g. USDA Natural Resources Conservation Service "Indicators for Soil Quality Evaluation," April 1996
- h. American Water Works Association (AWWA) "Land Application of Water Treatment Sludges: Impact and Management"
- i. EPA Technology Transfer Handbook "Management of Water Treatment Plant Residuals"