

FACT SHEET

Limited Scale Aquifer Storage and Recovery (LSASR) Pilot Project

City of Ada

231 S. Townsend Street,

Ada, Oklahoma 74820

The Department of Environmental Quality (DEQ) is authorized to issue permits for limited-scale aquifer storage and recovery pilot projects pursuant to its authority under, the Oklahoma Environmental Quality Act (27A O.S. §1-3-101), the Oklahoma Environmental Quality Code (27A O.S. §2-1-101 *et seq.* and 27A O.S. §2-6-110), the federal Safe Drinking Water Act (42 U.S.C. 300f), and rules promulgated thereunder at 40 Code of Federal Regulations 144, 145 and 146 and Oklahoma Administrative Code (OAC) Title 252, Chapters 4, 652, and 653. The DEQ shall determine pilot project criteria and issue a permit following the Tier II process that shall include any conditions the DEQ deems necessary or appropriate for protection of the aquifer quality.

The Oklahoma Department of Environmental Quality (DEQ) has approved a draft operations permit for the City of Ada Limited-Scale Aquifer Storage and Recovery (LSASR) pilot project located in the SE1/4 NW1/4 of Section 4-T1N-R6E, Pontotoc County, Oklahoma. The draft permit addresses the operation of a LSASR pilot project allowing the City of Ada (the permittee) to inject a tracer into the Arbuckle Simpson Aquifer (ASA), a karstic dolomite formation with minor sandstone beds, through a natural recharge feature (sinkhole) at the ground surface on the permittee's LSASR Pilot Project site. The basic design involves adding a tracer into an existing sinkhole at the site and tracking its short-term movement in groundwater; and assessing the effects on the ASA by recording and sampling changes in groundwater conditions at nearby monitoring wells. The overall objective is to acquire geohydrologic characterization information of the ASA required for eventual future full-scale aquifer storage and recovery (ASR) applications. The future ASR applications (Phase2), which will require new Tier III applications, would entail construction of retention structures on ephemeral drainages to convert stormwater run-off into aquifer recharge, thus allowing enhanced spring flow and aquifer baseflow.

The LSASR pilot project is composed of four (4) tracer tests (LSASR sub-test 1-4), each conveying a 5,000-gallon slug of raw municipal supply water from Byrd's Mill Spring (BMS), with tracer added in two 2,500-gallon storage tanks next to the sinkhole, and pumping the tracer slug at a rate of 250 gallons per minute (gpm) into the sinkhole. The raw water from Byrd's Mill Spring, a short distance to the northeast, is from the ASA and is the same as groundwater at the site. Once emplaced, the groundwater will be monitored at on-site wells and at the BMS for various tracer components over the short-term (6 months) for the sub-tests, and for 6 months following the final sub-test. The tracer appearance / impact at nearby monitor wells will be determined through data collection using continuous logging devices, groundwater sampling and analyses for tracers, and utilizing real-time electrical resistivity imaging technology. The results will allow for evaluation of groundwater movement and determinations of aquifer properties; groundwater flow paths and

preferential particulate flow paths in the aquifer; local hydrogeologic gradients and groundwater velocities/fluxes in the aquifer; hydrologic parameters of ASA formation; attenuation rates for chemical and biological stressors; evaluation of particulate transport in fractured rock aquifers; as well as, identify solute/particle travel times from recharge areas in the BMS capture zone to the spring itself. Groundwater will be conducted in 5 shallow monitor wells, 3 intermediate depth monitor wells, and three (3) deep monitor wells, as they are available.

Sub-test 1 was approved by DEQ for deployment and has been completed. It evaluated the system's operational components and determined that the conveyance rate of the slug delivery system (250 gallons per minute) could be accommodated by the sinkhole for the duration of the tracer release. Sub-test 2 will be a slug deployment into the sinkhole of a non-reactive NaCl saline tracer (not to exceed 250 mg/L Cl⁻ concentration meeting drinking water quality standards) and thermally distinct BMS water. Sub-test 3 will be implemented after all traces of Sub-test 2 have dissipated and will be of the same composition as Sub-test 2; but will contain an addition of no more than 22 pounds of groundwater tracing particles (GTPs). The GTPs are artificially created sand-sized particles consisting of degradable low toxicity risk mixture of sodium alginate reacted with calcium chloride dihydrate (to produce a food grade gel carrier for the particles); a common fluorescent groundwater tracer (uranine dye); borosilicate glass bubbles (to provide neutral buoyancy); and powdered magnetite (to allow magnetic capture of particles). Sub-test 4 is the same makeup as Sub-test 3. Tracking of the GTPs will be used to evaluate risks associated with particulate contaminants such as bacteria and viruses that may travel through preferential flow paths in fractures.

The City of Ada submitted a Statement of Interest (SOI) for a Limited-Scale Aquifer Storage and Recovery Pilot project received at DEQ September 28, 2017. The SOI contained the project goals and objective, purpose and scope, proposed source water, intended use of recovered water, proposed method of recharge, topographic map, information on existing wells, springs, seeps and wetlands, and a demonstration of sufficient legal rights for the land in the NW/4 and the NE/4 of section 4-1N-6E, including warranty deeds of property ownership by the City of Ada. The City of Ada submitted the LSASR Tier II permit application by email on May 16, 2022.

DEQ reviewed the statement of interest, the permit application and all supplemental information for administrative and technical suitability, and established permit conditions to assure it complies with regulatory requirements. The DEQ has tentatively found that the application meets the requirements of the Environmental Quality Code, Title 27A of the Oklahoma Statutes, Sections 2-06-110, *et seq.*, and the rules of the DEQ, Oklahoma Administrative Code, Title 252, Chapters 4, 652 and 653. This project is also subject to the federal requirements for its underground injection control program incorporated by reference at OAC 252:652-1-3. Consequently, DEQ has prepared a draft permit for public review.

The City of Ada LSASR pilot project is considered a Class V injection facility. The draft permit establishes site specific conditions, including: a maximum tracer injection rate of 250 gallons permit minute for a series of slug injections of 5,000 gallons each; the composition of the tracers described above; the raw water (source water) characteristics; and groundwater monitoring and reporting requirements. Permit conditions in Section A of the draft permit are specific to this

facility and address the prohibitions in 40 CFR 144.12 to prevent injection of contaminants exceeding primary drinking water quality standards into underground sources of drinking water (USDWs). The site specific operational, monitoring and reporting conditions are required by 40 CFR 144.52. Permit conditions in Section B are required in all Underground Injection Control permits (40 CFR 144.51). The duration of the permit will be 3 years.

The contact for the LSASR pilot project facility is:

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DEQ will not make a final decision on this permit until the public has had an opportunity to comment and/or request a public meeting. Any person may request a public meeting and/or provide comments to DEQ at the address below within thirty (30) days after the date of the newspaper publication.

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