Determining Aquifer Storage & Recovery Project Recoverability: A Texas Regulatory Perspective

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Aquifer Storage & Recovery (ASR) Stored Water Recoverability: National & Texas Perspectives

- Nationally, ASR recoverability is often described from a practical or operational standpoint, using terms such as:
  - Total Storage Volume (TSV), where TSV = stored water + buffer zone water
- In Texas, ASR recoverability recognizes the underlying "Rule of Capture" basis of Texas groundwater rights and the role Groundwater Conservation Districts (GCDs) have with the authority to regulate withdrawal of groundwater within their district
- Regulatory references don't prescribe a specific method for determining recoverability – in practice recoverability is often expressed as a % of water injected (mature projects) or limited # of gallons (testing phase)

ASR Recoverability: Statutory Basis

- Texas Water Code (TWC) Chapter 27 Subchapter G – TWC §27.154(b)
  - Applicable for ASR projects located within a GCD
  - TCEQ determines recoverable amount of stored water, not to exceed amount of water injected
  - Recognizes that the ASR operation could result in a loss of injected water or native groundwater
- TWC §27.153(b)(2)
  - TCEQ must consider the extent to which cumulative volume of water injected can be successfully recovered (also considering commingling with native groundwater)

ASR Recoverability: TCEQ Rules

Texas Administrative Code (TAC) Ch. 331 Subchapter K - TAC §331.184(g):

- Subsection applies only to ASR projects located within a GCD
- TCEQ authorization or permit may not authorize a volume of water to be recovered:
  - that exceeds the volume of water injected, or
  - the volume that TCEQ determines can be recovered (whichever is less)
- Requirements of TWC, Chapter 36, Subchapter N apply when the volume of water recovered from an ASR project exceeds the volume of water that TCEQ determines can be recovered
- TCEQ doesn't "limit" the volume of water recovered from an ASR, rather it determines the recoverable amount (stated in the ASR authorization or permit)
- Reconciliation for water pumped in excess of the recoverable amount is handled at the local level by the GCD, in coordination with the ASR project operator (reference to TWC §36.453. Registration and Reporting of Wells)

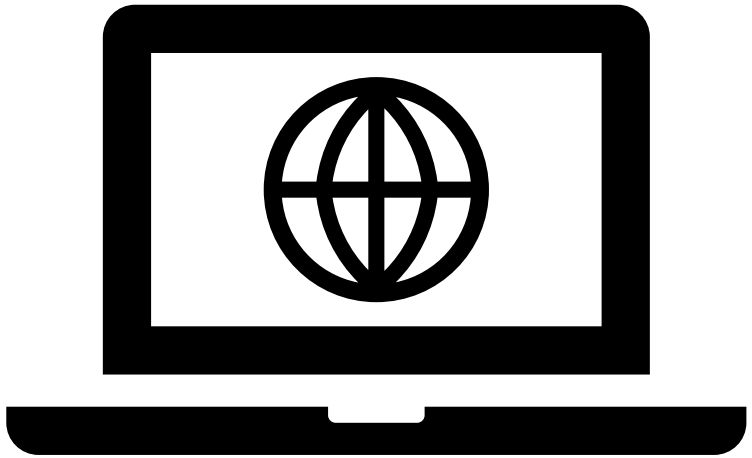
How to Determine ASR Recoverability?

- Every proposed ASR project is unique, with site specific: geology, aquifer matrix mineralogy, native groundwater chemistry, source water chemistry, proposed operation, use of buffer zone, etc.
- To date, each ASR applicant has approached evaluation of ASR recoverability from a different standpoint and used different tools, such as groundwater flow modeling, particle tracking models, geochemistry models
- TCEQ needed a basis from which to determine recoverability for ASR projects that was technically defensible and that could be used to verify and validate recoverability estimates submitted by applicants

TCEQ Approach to Determining ASR Recoverability

- TCEQ's focus is on evaluating the **potential of an aquifer to store and transmit water**, given the site-specific proposed ASR project
- TCEQ, in collaboration with Dr. Charlie Werth and the University of Texas at Austin, Center for Water and the Environment, developed a **simple, analytical evaluation tool**, based on the mathematical equation by Bear and Jacobs (1965)
- ASR Applet is not intended to be a substitute for use of a numerical model to evaluate recoverability in complex situations, such as multi-well ASR well fields or interference from nearby large water production wells
- Nor is it a substitute for use of monitoring wells in the testing and operation of an ASR project

TCEQ Approach to Determining ASR Recoverability



- The ASR Applet provides a user-friendly interface with interactive features to assess the feasibility of water recharge, storage, and recovery
- The ASR Applet is available on TCEQ's Underground Injection Control (UIC) Internet pages: https://txasr.tceq.texas.gov/
- TCEQ's Dan Hannah will provide a live demonstration of how to use the ASR Applet on the Internet

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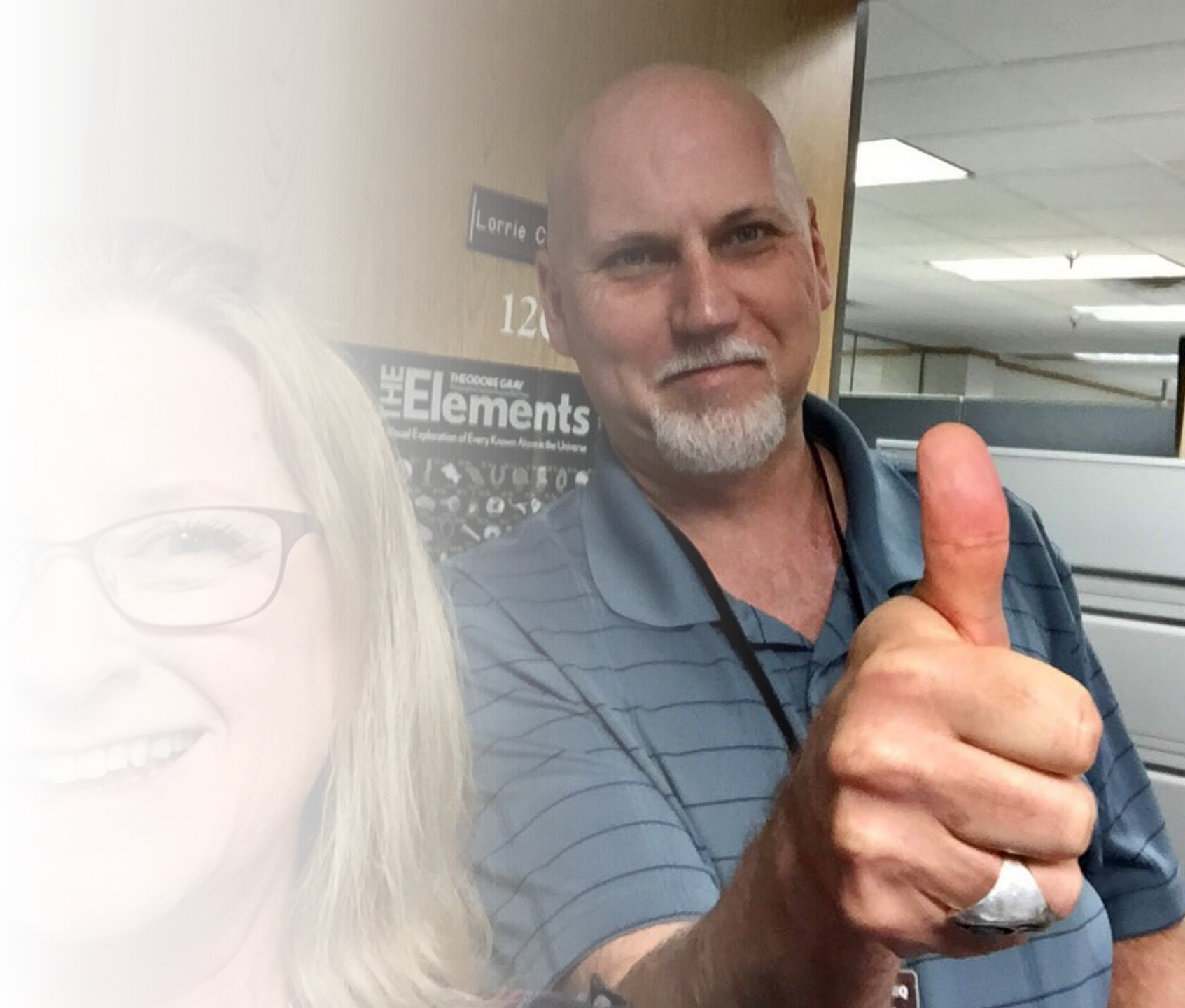

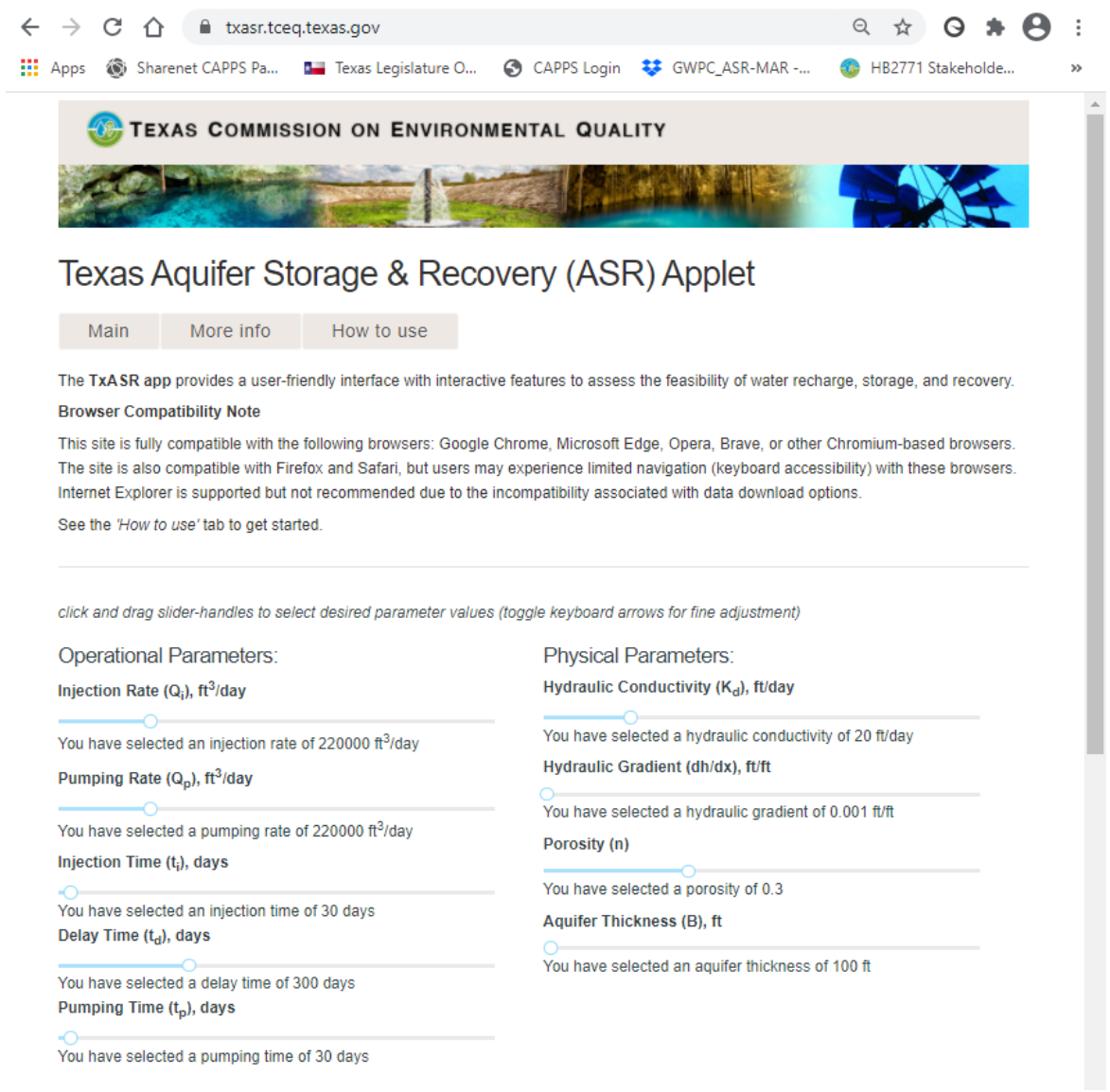

Live Demonstration of ASR Applet on the Internet Site