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**Texas Commission on Environmental Quality**

**Application for Class V Underground Injection Control (UIC) Wells for an Aquifer Storage and Recovery (ASR) Project**

**Aquifer Storage and Recovery**

Any permit or authorization issued by the TCEQ for an ASR project must be for aquifer storage and recovery in accordance with the following definitions in Title 30 of the Texas Administrative Code (30 TAC), Chapter 331:

**Aquifer Storage and Recovery** [30 TAC §331.2(8)]: “The injection of water into a geologic formation, group of formations, or part of a formation that is capable of underground storage of water for later retrieval and beneficial use.”

**Aquifer Storage and Recovery Project** [30 TAC §331.2(11)]: A project involving the injection of water into a geologic formation for the purpose of subsequent recovery and beneficial use by the operator.

Conceptually, an ASR project consists of three components: The stored water zone, the buffer zone, and the native groundwater zone (see schematic on page 2). The stored water zone contains the injected water that has not mixed with the native groundwater. The buffer zone is the zone in which some mixing of the stored water and the native groundwater has occurred. The native groundwater zone is native groundwater unaffected by the buffer zone.

An ASR project should be designed and operated to isolate the injected water from native groundwater. By providing such isolation, the injected water can be stored underground for later retrieval and beneficial use without its quality being affected by the native groundwater, and without the quality of the injected water being affected by the injected water. Vertical containment of the injected water is achieved by confining layers above and below the stored water, and horizontal containment is achieved by maintaining a buffer zone. The “target storage volume” is that volume of water contained in the stored water zone and the buffer zone.

The purpose of ASR is the underground storage of water and the subsequent retrieval of that *same* water. ASR is not injection of a volume of water and the subsequent retrieval of a like volume of water with no regard as to the source of the recovered water.

**Schematic of a typical ASR project**

The below graphic shows a typical ASR injection well in relation to confining layers, stored water, buffer zone, and native groundwater.

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**Instructions**

Submit an original and one copy of the application form. The document should be formatted in Microsoft Office Word 2010 or a totally compatible format.

The application should be delivered to the TCEQ’s Underground Injection Control (UIC) Permits Section at the following mailing address or physical address:

**Mailing Address**

Texas Commission on Environmental Quality

Attn: UIC Permits Section

Radioactive Materials Division

Mail Code 233

P.O. Box 13087

Austin, Texas 78711-3087

**Physical Address**

Texas Commission on Environmental Quality

Attn: UIC Permits Section

Radioactive Materials Division

Mail Code 233

12100 Park 35 Circle Building F

Austin, Texas 78753

As stated in 30 TAC §331.21, “all geoscientific information submitted to the agency under this chapter shall be prepared by, or under the supervision of, a licensed professional geoscientist or a licensed professional engineer and shall be signed, sealed, and dated by the licensed professional geoscientist or a licensed professional engineer in accordance with the Texas Geoscience Practice Act and the Texas Engineering Practice Act.” Any application submitted shall be signed, sealed, and dated on the cover letter. In addition to the application form, the TCEQ requires that a Core Data Form (Form 10400) be submitted on all incoming applications. For more information regarding the [Core Data Form](https://www.tceq.texas.gov/assets/public/permitting/centralregistry/10400.docx)[[1]](#footnote-1), call (512) 239-5175 or go to the [Core Data Form Instructions](https://www.tceq.texas.gov/assets/public/permitting/centralregistry/10400-inst.pdf)[[2]](#footnote-2) on the TCEQ Web site.

The TCEQ has exclusive jurisdiction over the regulation and permitting of ASR injection wells (Texas Water Code, (TWC) §27.152), and may authorize the use of a Class V injection well as an ASR injection well by rule, under an individual permit, or under a general permit [TWC, §27.153(a)]. Although the TCEQ anticipates most applications for an ASR project will be for authorization by rule, the commission may require authorization of an ASR project by individual permit, if warranted.

Organize and label the submitted information consistent with the organization of this form. Number all pages. Once the application is submitted, any revised text, figures, or maps should be clearly marked as revisions and dated. Any new pages, tables, figures, or maps should be marked as additions and numbered or labeled appropriately for insertion into the application.

For an application for a new ASR project, please complete all sections of the application. For an application for amendment, transfer, an endorsement, complete Section I in its entirety, and complete all portions of Sections II through VIII that are affected by the application for amendment, transfer, an endorsement.

In accordance with the requirements of Title 30 of the Texas Administrative Code (30 TAC) §331.183(5), all ASR injection and production wells must be within a continuous perimeter boundary of one parcel of land or within two or more adjacent parcels of land under the common ownership, lease, joint operating agreement, or contract.

Signatures on the application must be in accordance with 30 TAC §305.44. The application must be signed by the applicant and verified before a notary public. An application submitted for a corporation must be signed by a responsible corporate officer of at least the level of vice president. A responsible corporate officer may assign or delegate authority to sign the application to a manager meeting the criteria in 30 TAC §305.44(a)(1). Signing authority may be delegated to a manager position rather than to a specific individual. For a partnership or sole proprietorship, the application must be signed by a general partner or the proprietor, respectively. For a municipal, state, federal, or other public facility, the application must be signed by either a principal executive officer or ranking elected official.

It is the responsibility of the applicant to ensure that he or she possesses a right to any appropriated water that will be managed in the proposed ASR project. The Texas Commission on Environmental Quality assumes that the applicant is a water right holder or a person who has contracted for the use of the water under a contract that does not prohibit the use of the water in an ASR project [TWC, §27.153(b)]. An applicant must ensure that all applicable requirements of 30 TAC Chapter 295 and Chapter 297 are met with respect to water rights. Questions regarding water rights should be directed to:

Water Rights Permitting and Availability Section

Water Availability Division

TCEQ

512-239-4691

wrap@tceq.texas.gov

An application will not be processed until Commission staff receives all information required to consider the application. When an application is severely lacking in detail or the applicant fails to submit additional requested information in a timely manner, the application will not be considered to be “filed in accordance with the rules and regulations of the Commission” and may be returned. When an application is returned, one copy will be retained to comply with state record laws.

Comprehensive consideration should be given to ensure that the facility is designed in accordance with good public health and water management practices. UIC staff will evaluate the application primarily for aspects of design and operation covered by regulations. Nothing in any approval is intended to relieve the ASR project owner or operator of any liabilities or responsibilities with respect to the design, construction, or operation of the project.

Any questions regarding this application should be directed to:

Underground Injection Control Permits Section

Radioactive Materials Division

TCEQ

512-239-6466

uic@tceq.texas.gov

**For TCEQ Use only**

Authorization/Permit No. \_\_\_\_\_\_\_\_\_\_\_\_\_

Date Received\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date Authorized\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Section I. General Information**

1. Type of Application
	1. Initial\_\_\_\_\_
	2. Amendment\_\_\_\_\_\_
2. For an application for amendment of an authorized or permitted ASR, please provide a brief description of the requested revisions. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Type of authorization requested
	1. Individual permit\_\_\_\_
	2. Authorization by rule\_\_\_\_
	3. General permit\_\_\_\_\_\_
4. Operator
5. Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Telephone Number\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Email Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. If the application is submitted on behalf of a corporation or other business organization with filing requirements, please identify the Charter Filing Number as recorded with the Office of the Secretary of the State of Texas.

Charter Number\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If the application is submitted by a business organization that is required to designate and maintain a registered agent, the applicant must provide the name and address of the registered agent.

Registered Agent\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

City, State and Zip Code\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Site Owner (if different from Permittee)

If the ASR operator is different from the site owner, please provide verification that the site owner has granted the permittee permission to construct and operate an ASR project on the proposed site. The application must include a completed application signature page from both the ASR operator and the site owner.

1. Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. City, State, and Zip Code\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Telephone Number\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Email Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Status of the facility
	1. Private
		1. Corporation\_\_\_
		2. Partnership\_\_\_
		3. Proprietorship\_\_\_
		4. Nonprofit Organization\_\_\_
	2. Public
		1. Military\_\_\_
		2. State\_\_\_
		3. Regional\_\_\_
		4. County\_\_\_
		5. Municipal\_\_\_
		6. Federal\_\_\_
7. Facility
8. Name of Facility\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Street Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. City (if applicable)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. County\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Give a description of the location of the facility site with respect to known or easily-identifiable landmarks. Detail the access routes from the nearest U.S. or State Highway to the facility.

Description\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Provide the location of the facility relative to established surveys

Location\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Provide the geographical coordinates of the centroid of the facility
	1. Latitude\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Longitude\_\_\_\_\_\_\_\_\_\_\_\_\_
2. List those persons or firms authorized to act for the applicant during the processing of the permit application. Indicate the capacity in which each person may represent the applicant (engineering, legal, geology, for example). The person listed first will be the primary recipient of correspondence regarding this application. Include complete mailing addresses, telephone numbers, and email addresses.

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Title\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

City, State, and Zip Code\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Telephone Number\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Email Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Confidential Material

The designation of material as confidential is frequently carried to excess. The Commission has a responsibility to provide a copy of each application to other review agencies and to interested persons upon request and to safeguard confidential material from becoming public knowledge. Thus, the Commission requests that the applicant (1) be prudent in the designation of material as confidential, and (2) submit this material only when it might be essential to the staff in their development of a recommendation.

The commission suggests that the applicant **not** submit confidential information as part of the permit application. However, if this cannot be avoided, the confidential information should be described in non-confidential terms throughout the application, submitted as a document or binder with each page conspicuously marked “**Confidential**”.

1. All chemical analyses submitted with this application shall be performed by a laboratory accredited in accordance with the requirements of Title 30 of the Texas Administrative Code (TAC) Chapter 25.
2. The TCEQ is not authorized to issue an individual permit, general permit, or authorization-by-rule for an ASR project on Indian Lands in the State of Texas. Contact the Environmental Protection Agency, Region 6 for ASR requirements for ASR projects on Indian Lands.
3. Please indicate if the groundwater in the proposed injection zone contains greater than 3,000 milligrams per liter total dissolved solids (TDS):

Proposed injection zone contains groundwater with:

Greater than 3,000 milligram per liter (mg/l) TDS\_\_\_\_\_

Less than or equal to 3,000 mg/l TDS\_\_\_\_\_

If the groundwater in the proposed injection zone contains greater than 3,000 mg/l TDS, contact:

Groundwater Advisory Group

Texas Railroad Commission

1701 North Congress Avenue

Austin, Texas 78701

512-463-2741

1. TCEQ Core Data Form

The TCEQ requires that a Core Data Form (Form TCEQ-10400) be submitted with all new applications. For all other applications, if a Regulated Entity Number (RN) and Customer Reference Number (CN) have been issued by the TCEQ and core data information has not changed, a core data form is not required. If a core data form is not submitted, please provide the RN and CN for your facility.

1. Legal Description

Submit as “Attachment A” a legal description of the tract or tracts of land upon which the ASR project referenced in this application will be located. Although a legal description is required, a metes and bounds description is not necessary for urban sites with appropriate “lot” descriptions. In accordance with the Texas Water Code (TWC), §27.153(c), all wells associated with a single ASR project must be located within a continuous perimeter boundary of one parcel of land, or two or more adjacent parcels of land under the common ownership, lease, joint operating agreement, or contract.

1. Indicate if the location of the proposed ASR project is within the areas identified in the following legislation:
	1. Chapter 626, Acts of the 73rd Legislature, Regular Session, 1993, for the Edwards Aquifer Authority;
	2. Chapter 8801, Special District Local Laws Code, for the Harris-Galveston Subsidence District;
	3. Chapter 8834, Special District Local Laws Code, for the Fort Bend Subsidence District;
	4. Chapter 8802, Special District Local Laws Code, for the Barton Springs-Edwards Aquifer Conservation District; or
	5. Chapter 8811, Special District Local Laws Code, for the Corpus Christi Aquifer Storage and Recovery Conservation District.

Signature Page

I (Signatory Name) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Title) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Company) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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 there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

See 30 TAC §305.44 for signatory authority.

Hazardous waste permit applications must be signed by both the owner (facility owner and landowner) and operator of the facility. Duplicate this page for additional signatories.

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**To Be Completed by the Applicant if the Applicant Is a Corporation and the Responsible Corporate Officer Is Assigning or Delegating Signature Authority to a Manager in Accordance with 30 TAC §305.44(a)(1)**

I (Signatory Name) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Title) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Company) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ hereby designate (Agent Name and/or Title) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as my agent and hereby authorize said agent to sign any application, submit additional information as may be requested by the Commission, and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Water Code or Texas Solid Waste Disposal Act permit. I further understand that I am responsible for the contents of this application, for oral statements given by my agent in support of the application, and for compliance with the terms and conditions of any permit which might be issued based upon this application.

Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Note: Application Must Bear Signature and Seal of Notary Public)**

SUBSCRIBED AND SWORN to before me by the said \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

on this \_\_\_\_\_\_\_\_\_\_\_\_ day of\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

My commission expires on the \_\_\_\_\_\_\_\_\_\_\_ day of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notary Public

**Section II. Information Required to Provide Notice**

If the ASR project is proposed to be located within the jurisdictional boundary of a groundwater conservation district, provide the following information:

Name of District\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Contact Person\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

City, State, Zip Code\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Email address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For an application for an individual ASR permit, the applicant is required to provide notice of the application by first class mail to any groundwater conservation district in which the wells associated with the ASR project will be located and by publishing notice in a newspaper of general circulation in county in which the wells will be located [(Texas Water Code, §27.153(d)]. Notice must meet the requirements in 30 TAC §39.651(h). Please identify the person who will be responsible for causing notice to be published in the newspaper [30 TAC §39.405(f)(2)]. Include the complete mailing address, telephone number, fax number and email address for the contact person.

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Title\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Company\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

City, State, and Zip Code\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Telephone Number\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Email address\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For an application for an authorization by rule for Class V wells associated with an ASR project, the TCEQ will notify a groundwater conservation district of an ASR project that is proposed to be located within the jurisdictional boundary of that groundwater conservation district [30 TAC §331.7(h)].

**Section III. ASR Project Area**

Please provide a map for the ASR project area that includes the following information:

1. The property boundary for the proposed ASR project;
2. Main cultural features, including highways and roads, railroads, cities and towns; and
3. Surface water bodies, rivers and streams.

**Section IV. Area of Review**

Please provide a map of the area of review (AOR), as determined in accordance with the requirements in 30 TAC §331.182. This map must include the following information:

1. The proposed ASR project area, including
2. The extent of the ASR area described in Attachment A;
3. The boundary of the AOR; and
4. The location of all artificial penetrations with the AOR.
5. For all artificial penetrations identified in Section III.A.3 above, provide the following information:
6. Whether the artificial penetration intersects or transects the injection zone of the proposed ASR;
7. For artificial penetrations that intersect or transect the injection zone of the proposed ASR, provide a well schematic with the following information
	1. Depth;
	2. Completion information (casing, screens); and
	3. Use of well (domestic, irrigation, disposal, oil and gas production, other injection).

**Section V. Well Construction and Closure Standards**

1. Please provide a map with the locations of all proposed ASR injection wells, ASR production wells, and all monitor wells.
2. Please provide the number of ASR injection that are being requested in this application.
3. Please provide a discussion of how each ASR injection well and each well that will serve both as an ASR injection well and an ASR recovery well will be constructed to meet the requirements of 30 TAC §331.183. With regards to the design of each ASR injection well, the discussion must include, but is not limited, to the following information:
4. Well schematic;
5. Depth of the well;
6. Borehole diameter
7. Casing material and diameter;
8. Casing setting depth(s);
9. Cement type, volume, and top of cement;
10. Screen interval; and
11. Surface completion (30 TAC §331.132(c) through (f)).
12. For each existing wells that will serve as an ASR injection well and each well that will serve both as an ASR injection well and an ASR recovery well, provide all information, as available, required in Section V.C.
13. Please provide a discussion of how each ASR production well and each ASR production well that also serve as an ASR injection well that provides water to a public water system will comply with the applicable requirements in 30 TAC §290.41 (relating to water sources).
14. Please provide a discussion of how each ASR injection well and each well that will serve both as an ASR injection well and an ASR recovery well will be closed to meet the requirements of 30 TAC §331.183.
15. If monitor wells are required, please provide the information in Section V.C for each proposed monitor well, and the number of monitor wells that will be installed.

Please note that ASR production wells are not authorized under a Class V individual permit, general permit, or authorization by rule. However, please provide the number of ASR production wells that will be associated with this ASR project.

**Section VI. Injection Well Operation**

1. Please provide a discussion of the methods by which the proposed ASR injection wells will be operated to ensure that injection will not endanger drinking water sources, as required under 30 TAC §331.184(a). This discussion must include, but it not limited to the following:
2. Calculation of maximum injection pressure to ensure movement of injected water from the injection zone does not occur [30 TAC §331.184(b)];
3. Notification to the TCEQ within 30 days when an ASR injection well has not been used for more than two years [30 TAC §331.184(c)];
4. Maintenance of mechanical integrity [30 TAC §331.184(d)];
5. Water quality requirements [30 TAC §331.184(e)]; and
6. Installation of flow meters [30 TAC §331.184(f)].
7. Provide a discussion of ASR project operations with regards to:
8. Maximum volume of water injected;
9. Residence time of injected water;
10. Maximum horizontal and vertical extent of injected water; and
11. Maximum horizontal and vertical extent of buffer zone.
12. Provide a discussion on the effect injection of water will have on native groundwater, including:
13. The effect of the ASR project on existing offsite water wells;
14. The effect of injection of will have on native groundwater with respect to the considerations in 30 TAC §331.186(a)(4); and
15. Whether the injected water will comply with the standards set forth under the federal Safe Drinking Water Act (42 United States Code, §§300f, et seq). Describe any mitigating measures (such as monitoring wells and a groundwater monitoring program that will be employed to ensure compliance with this standard.

**Section** **VII. Project Geology, Hydrogeology, and Geochemistry**

1. Geology Report
2. Describe the regional geology and hydrogeology of the proposed ASR project area, including regional stratigraphy, structure, lithology, and hydrogeology. Regional geology should be rendered on a scale capable of accurately depicting the geology of the region. Maps and cross-sections from commercial mapping companies may be used, provided they adequately characterize the geology (including faulting) of the region. Major aquifers, stratigraphic units, general lithology, confining zones and the injection zone should be indicated on all cross-sections. Cross-sections should be constructed with well logs and to scale. The injection well location(s) should be indicated on all maps and cross-sections. Maps and figures should be referenced in the description, where applicable.
3. Describe the geology and hydrogeology of the proposed ASR project site, including local stratigraphy, structure, lithology, and hydrogeology pertinent to the proposed ASR project site (include potentiometric maps for the injection zone and for any aquifers that may be affected by injection). Information must be integrated into a coherent and complete summary, not merely listed. Maps should cover the area of review (AOR). Maps should conform to a uniform system of identification numbers for wells that will key the wells to tables, cross-sections and other figures. The injection well location should be indicated on all maps and cross-sections. Maps and figures should be referenced in the description, where applicable. Well locations, major aquifers, USDW base, confining bed below the USDW, stratigraphic units, general lithology, confining zones, injection zone, and injection interval should be indicated on all cross-sections. Cross-sections should be on a scale necessary to depict the local geology and hydrogeology. Cross-sections should be constructed with well logs and to scale. Sufficient well data must be used to accurately depict the local geology. When necessary to accurately portray the geology of the area, maps or cross-sections should extend beyond the AOR. The data must be of sufficient quality and quantity to accurately delineate the faulting in the area.
4. Provide a description of the zone into which water will be injected and produced for this ASR project. Include the following in this description:
	1. Name of aquifer;
		1. Depth below ground level to the top and base of the injection zone;
		2. Geology of the injection zone, including:
			1. Lithology;
			2. Pertinent stratigraphic features, such as sedimentary facies, channels, pinch-outs, and overall continuity of the injection zone over the ASR project area;
			3. Pertinent structural elements, such as faults;
		3. Porosity and permeability of the injection zone;
		4. Potentiometric map for the injection zone;
	2. Water chemistry within the injection zone;
		1. Total dissolved solids concentration;
		2. Concentration of other dissolved constituents;
		3. Biological constituents; and
		4. Radiological constituents.
5. Provide a discussion of the source and characteristics of the water to be injected in this proposed ASR project. This discussion must include the following:
	1. Source of injected water
		1. Groundwater (identify source aquifer)
		2. Surface water (identify source, such as river, lake, creek, stormwater, or reservoir)
		3. Reclaimed water (identify source facility)
	2. Chemistry of injected water
		1. Total dissolved solids concentration;
		2. Concentration of other dissolved constituents;
		3. Biological constituents; and
		4. Radiological constituents.
6. Provide a discussion on the Injected Water/Aquifer Water/Well Material Compatibility.
	* 1. Injected water/formation water compatibility
		2. Injected water/formation compatibility
		3. Injected water/well material compatibility
		4. Formation water/well material compatibility
7. Identify the volume of water that will be injected as part of the ASR Project.
8. Provide any available aquifer test data and a discussion of these data.
9. Provide any available geophysical logs of wells within the ASR project area.

**Section** **VIII. Demonstration of Recoverability**

In order for the commission to make a determination as to whether injection of water into a geologic formation will result in a loss of injected water or native groundwater, as required under TWC, §27.154(b), please provide an analysis of the volume of injected water that will be recovered. This analysis should consider the geologic, hydrogeologic, and hydrochemistry of the injection zone, the quality of the injected water, and the operational conditions proposed for the project. The commission anticipates that this analysis will require groundwater modeling. Please provide a detailed discussion of how the applicant estimated the percentage of injected water that will be recovered. If this estimated percentage of the injected water volume that is estimated is based on groundwater modeling, please describe the modeling performed, with justification for all assumptions and input parameter values.

1. https://www.tceq.texas.gov/assets/public/permitting/centralregistry/10400.docx [↑](#footnote-ref-1)
2. <https://www.tceq.texas.gov/assets/public/permitting/centralregistry/10400-inst.pdf> [↑](#footnote-ref-2)