TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AGENDA ITEM REQUEST

for Proposed Rulemaking

AGENDA REQUESTED: February 8, 2012

DATE OF REQUEST: January 20, 2012

INDIVIDUAL TO CONTACT REGARDING CHANGES TO THIS REQUEST, IF NEEDED: Michael Parrish, (512) 239-2548

CAPTION: Docket No. 2011-2046-RUL. Consideration for publication of, and hearing on, amended Sections 331.2, 331.14, 331.17, 331.18, 331.42 - 331.47, 331.61, 331.121, 331.142, 331.161, 331.162, 331.165, 331.168, 331.170, 331.171, and 331.206 and the titles of Subchapters D and J; new Sections 331.241 - 331.251; and the repeal of Section 331.120 of 30 TAC Chapter 331, Underground Injection Control.

The proposed rulemaking would amend existing rules and add new rules pertaining to the use of a Class I well for disposal of nonhazardous drinking water treatment residuals (DWTR) into a salt cavern in horizontally bedded or non-domal salt. This includes disposal of nonhazardous DWTR that contain naturally occurring radioactive material (NORM). For commercial disposal of DWTR containing NORM, a Class I well permit would be accompanied by a radioactive materials license. The proposed rules would provide a disposal alternative within Texas for public water systems to dispose of their treatment residuals containing NORM in a manner that is protective of human health and safety and the environment. Currently, the only facilities licensed to dispose of these wastes are landfills located out-of-state. The proposed rules include repeal of an obsolete rule and editorial clarifications and corrections. (Kathryn Flegal, Diane Goss, Don Redmond) (Rule Project No. 2011-023-331-WS)

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Copy to CCC Secretary? NO X YES

Texas Commission on Environmental Quality
Interoffice Memorandum

To: Commissioners **Date:** January 20, 2012

Thru: Bridget Bohac, Chief Clerk
Mark R. Vickery, P.G., Executive Director

From: Brent Wade, Deputy Director
Office of Waste

Docket No.: 2011-2046-RUL

Subject: Commission Approval for Proposed Rulemaking
Chapter 331, Underground Injection Control
Use of a Class I Well for Disposal of Certain Wastes through Underground Injection into a Bedded Salt Formation
Rule Project No. 2011-023-331-OW

Background and reason(s) for the rulemaking:

The purpose of this rulemaking is to amend existing rules, add new rules and develop guidance pertaining to the use of a Class I well for disposal of nonhazardous drinking water treatment residuals (DWTR) into a salt cavern in horizontally bedded or non-domal salt. This includes disposal of nonhazardous DWTR that contain naturally occurring radioactive material (NORM). For commercial disposal of DWTR containing NORM, a Class I well permit would be accompanied by a radioactive materials license. The proposed rules would provide a disposal alternative within Texas for public water systems that dispose of their treatment residuals containing NORM in a manner that is protective of human health and safety and the environment. Currently, the only facilities licensed to dispose of these wastes are landfills located out-of-state. The proposed rules also include editorial clarifications and corrections.

Scope of the rulemaking:

A.) Summary of what the rulemaking will do:

This rulemaking would amend Chapter 331, Underground Injection Control:

- Subchapter A (General Provisions): Definitions pertinent to injection into bedded and domal salt formations are proposed to be added and amended. The prohibition on Class I well disposal in salt formations other than salt stocks of salt domes is proposed to be removed.

- Subchapter C (General Standards and Methods): Terminology in some subsections is proposed for revision to clarify provisions that pertain to caverns in domal salt and not bedded salt. Other corrections, updates and clarifications are also being proposed.

- Subchapter D (Standards for Class I Wells Other Than Salt Cavern Solid Waste Disposal Wells): Corrections, updates and clarifications of terminology are being proposed.

- Subchapter G (Consideration Prior to Permit Issuance): The proposed rules would repeal obsolete provisions and make clarifying editorial corrections.

- Subchapter I (Financial Responsibility): An obsolete requirement for liability coverage for hazardous waste Class I salt cavern disposal wells is proposed to be deleted, because disposal of hazardous waste in Class I salt cavern disposal wells is prohibited.

- Subchapter J (Standards for Class I Salt Cavern Solid Waste Disposal Wells): Clarifying editorial corrections are being proposed, and a reference to the prohibition of bedded salt cavern disposal wells is proposed for deletion because this rulemaking would remove that prohibition.

- Subchapter L (General Permit Authorizing Use of a Class I Injection Well to Inject Nonhazardous Desalination Concentrate or Nonhazardous Drinking Water Treatment Residuals): An editorial change is being proposed to revise an incorrect subchapter title.

- Subchapter N (Standards for Class I Bedded Salt Cavern Disposal Wells): Proposed new Subchapter N specifies standards for disposal of nonhazardous DWTR, including nonhazardous DWTR containing NORM, in bedded salt waste disposal wells. Proposed subchapter N is analogous to Subchapter J for salt dome cavern disposal wells, and Subchapter N is structured with sections titled similarly to Subchapter J.

B.) Scope required by federal regulations or state statutes:

None of the recommended rule changes are required by federal regulations.

C.) Additional staff recommendations that are not required by federal rule or state statute:

There are no additional recommendations.

Statutory authority:

Texas Water Code (TWC), §5.103, concerning Rules; TWC, §5.105, concerning General Policy, which authorizes the commission to adopt rules necessary to carry out its powers and duties under the TWC and other laws of the state; and TWC, §27.019, which requires

the commission to adopt rules reasonably required for the performance of duties and functions under the Injection Well Act.

Effect on the:

A.) Regulated community: For public water systems that treat water to comply with the radionuclide maximum contaminant levels established by the United States Environmental Protection Agency (EPA), currently the only disposal options for DWTR containing NORM are out of state landfills. The proposed rules would authorize an in-state disposal option for DWTR containing NORM, resulting in lower disposal costs and transportation costs for these public water systems.

B.) Public: The public benefit anticipated from the changes seen in the proposed rules will be a less expensive, safe disposal method for nonhazardous DWTR, especially if it contains NORM.

C.) Agency programs: By adoption of these rules, the state may pursue a program revision to its Underground Injection Control Program from the EPA.

No new full-time employees will be required as a result of these rule changes. This rule initiative will not create a special group of affected persons.

Stakeholder meetings:

A stakeholder advisory group has been formed consisting of the regulated community, consultants, water supply entities, environmental groups, attorneys and governmental entities. Stakeholder meetings were held at TCEQ headquarters on April 15, 2011, September 20, 2011, and December 8, 2011. Stakeholders expressed support for the project and emphasized their interest in expedited processing of applications for use of a Class I well for disposal of nonhazardous DWTR containing NORM. Stakeholders also requested TCEQ staff to identify potential efficiencies in the radioactive materials licensing process for Class I wells to dispose of nonhazardous DWTR containing NORM. A public hearing and public comment period will be held after publication of proposed rules and notice.

Potential controversial concerns and legislative interest:

Stakeholders have stated that the scope of the rulemaking should be expanded to include: 1) residuals from general surface and groundwater treatment, not just DWTR; and 2) disposal of naturally-occurring source material (primarily uranium), not just NORM, in a Class I bedded salt cavern disposal well. A stakeholder has also commented that the rule should allow the commission to examine existing financial assurance provided to another state regulatory agency to determine whether existing financial assurance is satisfactory.

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Will this rulemaking affect any current policies or require development of new policies?

No.

What are the consequences if this rulemaking does not go forward? Are there alternatives to rulemaking?

The agency could continue with the rules as they are; however, the current rules effectively prohibit Class I well injection into bedded salt. TCEQ is initiating this rulemaking in lieu of stakeholders' pursuit of legislative action. If this rulemaking does not go forward, stakeholders could pursue legislation or submit a petition for rulemaking to remove the prohibition on construction and operation of Class I bedded salt cavern disposal wells.

Key points in the proposal rulemaking schedule:

Anticipated proposal date: February 8, 2012
Anticipated *Texas Register* publication date: February 24, 2012
Public hearing date: March 20, 2012
Public comment period: February 24, 2012 to March 27, 2012
Anticipated adoption date: July 18, 2012

Agency contacts:

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The Texas Commission on Environmental Quality (TCEQ, agency, or commission) proposes amendments to §§331.2, 331.14, 331.17, 331.18, 331.42 - 331.47, 331.61, 331.121, 331.142, 331.161, 331.162, 331.165, 331.168, 331.170, 331.171, and 331.206. The commission also proposes new §§331.241 - 331.251, and the repeal of §331.120.

Background and Summary of the Factual Basis for the Proposed Rules

The purpose of this rulemaking is to amend existing rules, add new rules, and develop guidance pertaining to the use of a Class I well for disposal of nonhazardous drinking water treatment residuals (DWTR) into a salt cavern in horizontally bedded or non-domal salt. This includes disposal of nonhazardous DWTR that contain naturally occurring radioactive material (NORM). For commercial disposal of DWTR containing NORM, a Class I well permit would be accompanied by a radioactive materials license. These proposed rules will provide an alternative for disposal of nonhazardous DWTR containing NORM within Texas. Currently, the only facilities licensed to dispose of these wastes are landfills located out-of-state.

The proposed rules include repeal of an obsolete rule requiring a comprehensive compliance summary for injection well permit applications submitted or pending on or after May 26, 2001 and before September 1, 2002. In addition, some editorial corrections are being proposed to provide for disposal of DWTR into a bedded salt formation.

The United States Environmental Protection Agency (EPA) has adopted federal standards for radionuclides in drinking water. These standards are applicable to approximately 50 community public water systems in Texas which may be in violation of the standards. These public water systems have or will have an agreement or order with the TCEQ or the EPA. The enforcement action requires a public water system to determine fiscally feasible methods to return to compliance. The public water systems using treatment to remove the excess radionuclides will need to manage and dispose of their treatment residuals containing NORM in a manner that is protective of human health and safety and the environment. "NORM waste" means solid, liquid, or gaseous material or combination of materials, excluding source material, special nuclear material, and by-product material, that, in its natural physical state spontaneously emits radiation; is discarded or unwanted; and is not exempt by Texas Department of State Health Services rule adopted under Texas Health and Safety Code, §401.106.

One option for disposal of nonhazardous DWTR containing NORM could be the use of an injection well authorized to dispose of such waste into a bedded salt formation. In past years, the regulated community has discussed with TCEQ the possibility of submitting a petition for rulemaking to remove the prohibition in §331.14 on construction and operation of Class I salt cavern solid waste disposal wells and associated caverns in formations other than salt stocks of salt domes, which effectively

prohibits waste disposal in a Class I well by injection into a bedded salt formation. However, a rulemaking petition for this purpose has not been submitted. During the 82nd Legislature, 2011, legislation was filed, but not passed, to address the management and disposal of certain nonhazardous DWTR containing NORM through underground injection into a bedded salt formation. The objective of the new and amended rules is to remove the prohibition on the construction and operation of a Class I salt cavern disposal well in geologic structures or formations other than salt stocks of salt domes, and to provide authorization and technical standards for use of a Class I well for disposal of nonhazardous DWTR (including NORM) into a bedded salt formation. Under these proposed rules, an existing salt cavern well permitted as a Class II well by the Railroad Commission of Texas (RRC) may be converted and permitted for use as a Class I bedded salt cavern disposal well if the requirements of these proposed rules are met.

Salt cavern disposal wells are injection wells that dispose of waste within voids or caverns created within geologic formations composed of salt (such as the mineral halite). The injection wells and caverns are specifically designed, constructed, operated, and closed to contain the waste and prevent the lateral and vertical migration of the waste outside of the cavern. In Texas, geologic salt formations include salt domes and bedded salt. Salt domes are located primarily in East Texas and are dome-shaped formations created from the buoyant properties of salt, which causes the deformation of the salt stock and surrounding strata as the salt moves slowly upwards over geologic time. Bedded salt formations in West Texas are relatively horizontal layers of thick salt

that may be interspersed with other non-salt sedimentary materials, such as anhydrite, shale, dolomite, or limestone. The TCEQ has had existing rules that authorize injection wells and caverns in salt domes but has not had rules addressing injection wells and caverns in bedded salt. Because of different geological and geophysical properties of salt domes and bedded salt formations, the commission is proposing new and different technical requirements specific to injection wells and salt caverns in bedded salt.

Because of the pressing need of public water systems to manage DWTR, the commission is exploring options for expedited processing of applications for use of a Class I well for disposal of nonhazardous DWTR containing NORM. One option to provide expedited application processing may be authorizing disposal of these wastes under the Underground Injection Control (UIC) general permit (WDWG010000) which authorizes the use of a Class I well to inject nonhazardous DWTR. The UIC general permit would need to be amended to incorporate standards for waste disposal into a bedded salt formation. In addition, an application for an individual Class I injection well permit for the disposal of brine from a desalination operation or disposal of DWTRs is not subject to the opportunity for a contested case hearing on the application under Texas Water Code, §27.021.

The commercial receipt, storage, processing, or disposal of nonhazardous industrial solid waste requires a TCEQ permit in accordance with the requirements of 30 TAC

Chapter 335 and Texas Health and Safety Code, Chapter 361. This rulemaking project is not intending to revise any of the existing requirements for a commercial industrial waste facility.

Stakeholders also requested TCEQ staff to identify potential efficiencies in the radioactive materials licensing process for Class I wells to dispose of nonhazardous DWTR containing NORM. Concurrent with this rulemaking, TCEQ is initiating guidance related to the current radioactive materials licensing requirements in 30 TAC Chapter 336, Subchapter K.

Section by Section Discussion

Subchapter A: General Provisions

The commission proposes to amend §331.2 by adding three definitions. These definitions are necessary to characterize new terminology pertaining to bedded salt cavern disposal wells that does not currently appear in Chapter 331. "Bedded salt," "bedded salt cavern disposal well," and "blanket material or blanket pad," are proposed to be added as paragraphs (14), (15), and (16), respectively. The commission is renumbering the definitions in §331.2 as a result of the added definitions.

An editorial change is being proposed in paragraph (88) which defines "public water system" in the context of Chapter 331. Paragraph (88) references the definition of

"public water system" in 30 TAC §290.38(47); however, (47) is no longer the paragraph number associated with "public water system." This unnecessary level of detail in citing the §290.38 definition is proposed to be omitted, leaving "§290.38 of this title" as the citation in proposed §331.2(88).

The commission also proposes to revise definitions in §331.2 to clarify the applicability of certain definitions to caverns in domal salt versus bedded salt formations. In proposed paragraphs (36) and (96) - (98), each occurrence of "salt cavern" is being amended by inserting "dome" between "salt" and "cavern," forming the phrase "salt dome cavern," to clarify that these definitions pertain to caverns in domal salt and not bedded salt. With the insertion of "dome" as previously mentioned, paragraphs (91) - (93) now define "salt *dome* cavern confining zone," "salt *dome* cavern injection interval" and "salt *dome* cavern injection zone," respectively. To maintain the alphabetical order of the definitions, existing paragraphs (91) - (93) are being renumbered as proposed paragraphs (96) - (98), respectively. Paragraph (90), which defines salt cavern, is being broadened to apply to bedded salt as well as domal salt by replacing the word "stock" with "formation." Paragraph (94), which gives the same definition for two alternative variations of terminology, "salt cavern solid waste disposal well" or "salt cavern disposal well," is being clarified by deleting the first variation, "Salt cavern solid waste disposal well." This leaves the less-confusing term "salt cavern disposal well." The deleted term is a source of confusion between the context of solid waste as defined in §335.1 and the

state of matter (solid, liquid, gas). In paragraph (94)(B), "hazardous" is being replaced with "nonhazardous" because hazardous waste disposal in salt caverns is prohibited in §331.14(b). In paragraph (110)(B), a typographical correction is being made to replace the lower-case letter "l" in "l0,000" with the number "1" for "10,000." The definition of "Well stimulation" in paragraph (116) is being clarified by replacing the confusing phrase "interval to be injected" with the defined term "injection interval." Also, the word "wastewater," is being replaced with "fluid" because well stimulation makes it possible for fluids, not limited to wastewater, to move more readily into the formation. Lastly, the terms "blasting" and "hydraulic fracturing" are being deleted from the list of processes typically used in well stimulation.

The proposed rule would amend the title of §331.14 to remove the phrase "Prohibition of Class I Salt Cavern Solid Waste Disposal Wells and Associated Caverns in Geologic Structures or Formations Other Than Salt Stocks of Salt Domes" and because the proposed rule would make that part of the title obsolete by providing standards for disposal of DWTR into formations other than salt stocks of salt domes. Additionally, existing subsection (a), which prohibits Class I salt cavern solid waste disposal wells and associated caverns in geologic structures or formations other than salt stocks of salt domes, is being deleted because the proposed rule also makes existing subsection (a) obsolete. Existing Subsection (b) is amended by adding "bedded salt cavern" to the list of structures into which hazardous waste disposal is prohibited, and relettered as

subsection (a). Proposed subsection (b) is added to prohibit waste streams, other than nonhazardous DWTRs, from injection into a Class I salt cavern disposal well located in horizontally bedded or non-domal salt and its associated salt cavern.

The commission proposes to amend §331.17(d)(3) and §331.18(b)(6). Both of these subsections cite the applicable technical requirements of Chapter 317 as standards for pre-injection units used for storage or processing of waste to be injected, or in conjunction with an injection operation. However, Chapter 317 was repealed, and its provisions were incorporated into 30 TAC Chapter 217, in rules effective August 28, 2008 (33 TexReg 6843). Chapter 217 brought the standards and criteria for wastewater treatment systems up to date with current engineering practices and technology, and it is necessary to cite these current standards as technical requirements for pre-injection units in §331.17(d)(3) and §331.18(b)(6).

Subchapter C: General Standards and Methods

The commission proposes to amend occurrences of "salt cavern" in §§331.42(a)(3) and (3)(B); 331.45(1), (3), (3)(E), and (G); and 331.46(a) and (p) by inserting "dome" between "salt" and "cavern," forming the phrase "salt dome cavern," to clarify that these phrases pertain to caverns in domal salt and not bedded salt. Section 331.42(b), which contains a mathematical equation, is revised by making a typographical correction in the equation to remove an extraneous lower-case "h." In §331.43(b)(2), the extraneous

phrase "outside the salt stock" is being deleted to expand the applicability of this subsection to bedded salt caverns as well as salt dome caverns. In §331.44(b)(7), the incomplete rule reference, §331.62(5) is corrected to §331.62(a)(5). In §331.46, proposed subsection (q) is added to provide that bedded salt caverns must be closed according to §331.250, and existing subsection (q) is relettered as subsection (r). Consequently, §331.46(a) is being revised to specify the subsections in §331.46 that are applicable to various types of Class I wells. For Class I wells except for salt cavern disposal wells and those Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous DWTRs, proposed §331.46(a) lists subsections (b) - (i), (k) - (n), and (r) as applicable to those wells instead of subsections (b) - (n) and (q) as listed previously. Subsection (j), which was previously listed as applicable to these wells, is being omitted because subsection (j) applies to Class III wells. The list of subsections applicable to salt cavern disposal wells is being described in separate sentences for domal and bedded salt. As defined in §331.2, the term "salt cavern disposal well" currently used in §331.46(a) includes both domal and bedded salt cavern disposal wells; however, the applicable closure standards are different for domal and bedded salt. The list of subsections applicable to salt dome cavern disposal wells includes subsections (c), (e) - (i), (k) - (l), (n) - (p), and (r) instead of subsections (c) and (e) - (q). The added list of subsections applicable to bedded salt cavern disposal wells includes subsections (e) - (h), (k) - (l), (n) - (0), and (q) - (r). For both domal and bedded salt cavern disposal wells, the revised lists omit subsection (j) which applies to

Class III wells and subsection (m) which applies to hazardous waste disposal wells. Disposal of hazardous waste in salt cavern disposal wells is prohibited. Subsection (c) does not apply to bedded salt cavern disposal wells because demonstration of mechanical integrity prior to closure of these wells is provided in proposed §331.246(f)(1)(D). Existing subsection (p) applies only to salt *dome* cavern disposal wells, and proposed subsection (q) applies only to *bedded* salt cavern disposal wells. Subsection (r), formerly identified as subsection (q), also applies to both domal and bedded salt cavern disposal wells. Further, in §331.46(a), the list of subsections applicable to Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous DWTRs is being revised to cite subsection (n), which is applicable to all Class I wells, and proposed subsection (r). In §331.46(c), "all" is removed between "For" and "Class" because the requirement for mechanical integrity testing prior to well closure as stated in subsection (c) does not apply to Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous DWTRs.

The commission proposes to amend §331.47(b). This subsection cites the applicable technical requirements of Chapter 317 as standards for all surface impoundments for nonhazardous, noncommercial Class 1 industrial waste associated with Class I nonhazardous, noncommercial injection wells, or Class V injection wells permitted for the disposal of nonhazardous waste. However, Chapter 317 was repealed, and its

provisions were incorporated into Chapter 217, in rules effective August 28, 2008, (33 TexReg 6843). Chapter 217 brought the standards and criteria for wastewater treatment systems up to date with current engineering practices and technology, and it is necessary to cite these current standards as technical requirements for surface impoundments in §331.47(b).

Subchapter D: Standards for Class I Wells Other Than Salt Cavern Solid Waste Disposal Wells

The proposed amendment would modify the title of Subchapter D by deleting the words "solid waste" because those words are extraneous and a source of confusion between the context of solid waste as defined in §335.1 and the state of matter (solid, liquid, gas). Also, deleting the words "solid waste" leaves the term "salt cavern disposal wells" which provides consistent terminology defined in §331.2. Section 331.61 is being amended by inserting "disposal" between "cavern" and "wells," forming the phrase "salt cavern disposal wells." This revision provides consistent terminology defined in §331.2 to specify the applicability of Subchapter D.

Subchapter G: Consideration Prior to Permit Issuance

Section 331.120 pertains to compliance history and denial of permit. The commission proposes to repeal §331.120 because it applies to applications for UIC permits submitted or pending on or after May 26, 2001, and before September 1, 2002, and the

commission has no applications submitted or pending within this time frame.

Section 331.121 pertains to Class I wells. The commission proposes to amend subsections (a)(2)(B), (G)(v) - (vi), (d), (d)(1)(A)(ii) and (E) by inserting "dome" between "salt" and "cavern," forming the phrase "salt dome cavern" to clarify that these rules pertain to caverns in domal salt and not bedded salt. In subsections (a)(2), (3), (5), and (c), inappropriate capitalization of "Wells" is being corrected to lower-case "wells." The commission proposes to amend subsection (a)(2)(R) which cites the applicable technical requirements of Chapter 317 as standards for pre-injection units associated with Class I nonhazardous, noncommercial injection wells. However, Chapter 317 was repealed, and its provisions were incorporated into Chapter 217, in rules effective August 28, 2008 (33 TexReg 6843). Chapter 217 brought the standards and criteria for wastewater treatment systems up to date with current engineering practices and technology, and it is necessary to cite these current standards as technical requirements for pre-injection units associated with Class I nonhazardous, noncommercial injection wells in subsection (a)(2)(R).

In subsection (b)(1) the missing word "applicant" is being inserted between "the" and "in" consistent with terminology used in the cited statute and rule, Texas Water Code, §27.051(e) and §281.21(d), respectively. The commission proposes to delete subsection (g) because it relates to the disposal of hazardous waste in a solution-mined salt dome

cavern which is prohibited in §331.14.

Subchapter I: Financial Responsibility

Although no changes are being proposed to the financial assurance requirements as stated in §331.142(a), for wells permitted by both the RRC and TCEQ, the executive director may consider options for meeting these requirements that are consistent with the terms of the Memorandum of Understanding between the RRC and the TCEQ (30 TAC §7.117). The commission proposes to revise §331.142(b), which pertains to the requirement for liability coverage for Class I hazardous waste injection wells, by deleting the obsolete phrase "or Class I salt cavern disposal well and associated salt cavern." The liability coverage required in subsection (b) is not applicable to Class I salt cavern disposal wells because disposal of hazardous waste in a solution-mined salt dome cavern is prohibited in §331.14.

Subchapter J: Standards for Class I Salt Cavern Solid Waste Disposal Wells

The commission proposes to revise the title of Subchapter J by inserting "dome" between "salt" and "cavern," forming the phrase "salt dome cavern." Using the phrase "salt dome cavern" clarifies the applicability of Subchapter J to caverns in domal salt and not bedded salt. Also, the words "solid waste" are being deleted from Subchapter J, §331.161 and §331.162. Deleting "solid waste" clarifies terminology because the words "solid waste" are extraneous and a source of confusion between the context of solid

waste as defined in §335.1 and the state of matter (solid, liquid, gas). Section 331.161 is also being revised to delete the reference to the prohibition of salt cavern solid waste disposal wells and associated caverns in geologic structures or formations other than salt stocks of salt domes stated in §331.14 because this rulemaking proposes to remove that prohibition. Section 331.162 is proposed for further revision to delete the words "hazardous constituents" and substitute the word "waste" for "hazardous constituents," forming the phrase, "no escape of waste from the salt cavern injection zone." The sentence, "Demonstration of attainment of this standard may be shown by modeling waste transport over a period of at least 15,000 years" is also being deleted. These references related to hazardous waste are obsolete because §331.14 prohibits the disposal of hazardous waste in salt cavern disposal wells. For this reason also, the words "hazardous" and "or hazardous waste constituents" are deleted in §331.165(a)(10)(B), and "hazardous" is deleted in §331.165(a)(15). A typographical correction is being made in §331.165(a)(11) to replace the incorrect word "or" with "of" in the phrase "a release of injected wastes." In §331.165(a)(14), the phrase "solid waste disposal cavern" is proposed for deletion and replacement with "salt cavern disposal well" to provide consistent terminology which is defined in §331.2. Applying this same rationale, §§331.165(c)(1), 331.168(a) and (5), 331.170(a), and 331.171(a) are being revised to delete "solid waste," resulting in the phrase "salt cavern disposal well." A grammatical correction is being made in §331.170(a)(3)(iii) to replace the word "effect" with "affect."

Subchapter L: General Permit Authorizing Use of a Class I Injection Well to Inject Nonhazardous Desalination Concentrate or Nonhazardous Drinking Water Treatment Residuals

The commission proposes to revise §331.206 to cite the correct title for Chapter 335, Subchapter J. The correct title is "Hazardous Waste Generation, Facility and Disposal Fee System," instead of the incorrect title which is the title for Subchapter J in Chapter 305, not Chapter 335.

Subchapter N: Standards for Class I Bedded Salt Cavern Disposal Wells

Proposed new Subchapter N, titled "Standards for Class I Bedded Salt Cavern Disposal Wells," specifies standards for disposal of nonhazardous, including nonhazardous DWTR containing NORM, in bedded salt cavern disposal wells. Proposed subchapter N is analogous to Subchapter J for salt dome cavern disposal wells, and Subchapter N is structured with sections titled similarly to Subchapter J.

Proposed new §331.241, states that Subchapter N applies to all Class I disposal wells located in horizontally bedded or non-domal salt and their associated salt caverns, and not to such facilities located in the salt stocks of salt domes. Section 331.241 also states that the receipt, processing, or disposal of radioactive material under Subchapter N is subject to the applicable requirements of Chapter 336.

Proposed new §331.242 provides the performance standard and siting requirements for bedded salt cavern disposal wells and their associated caverns. Subsection (a) provides that, for all stages in the life of the well and cavern(s), from construction through post-closure care, the owner or operator must attain a performance standard to prevent the movement of fluids that would result in the pollution of an underground source of drinking water (USDW). Subsection (b) requires that, to qualify for a permit or to continue operations, applicants and facility operators must demonstrate that this performance standard will be satisfied even if it is necessary to go beyond the minimum operating requirements. The siting requirements under subsection (c) state that bedded salt cavern disposal wells must comply with the minimum siting criteria for Class I disposal wells. In addition, each permit applicant for a Class I bedded salt cavern disposal well and associated cavern must identify potential risks to the waste disposal operation within the area of review.

Proposed new §331.243 pertains to construction standards for bedded salt cavern disposal wells. Subsection (a) requires these wells to be sited so that they inject into a formation which is beneath the lowermost formation containing, within one quarter mile of the well bore, a USDW. Subsection (b) requires drilling and completion of the well to be done according to plans and specifications as stated in the permit application. Subsection (c) specifies that any changes to the plans and specifications must be approved in writing by the executive director that said changes provide protection

standards equivalent to or greater than the original design criteria (as stated in §331.62(a)(3)). Detailed casing and cementing requirements are provided in subsection (d). Paragraph (1) states a performance standard requiring wells to be cased and cemented to prevent the movement of fluids into or between USDWs, and the casing and cement used in the construction of each newly drilled well must be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, 11 factors are to be considered under subparagraphs (A) - (K), including the depth of the lowermost USDW or freshwater aquifer; depth to the injection zone; injection pressure, external pressure, internal pressure, and axial loading; hole size; size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material); maximum burst and collapse pressures, and tensile stresses which may be experienced at any point along the length of the casings at any time during the construction, operation, and closure of the well; corrosive effects of injected materials, formation fluids, and temperatures; lithology of injection and confining zones; types and grades of cement; quantity and chemical composition of the injected fluid; and cement and cement additives which must, at a minimum, be of sufficient quality and quantity to maintain integrity over the design life of the well. Paragraph (2) requires surface casing set to a minimum subsurface depth which extends into a confining bed below the lowest formation containing a USDW or freshwater aquifer. Paragraphs (3) and (4) require long string casing set into the salt formation using a sufficient number of centralizers, and that cement prepared with a salt-saturated

cementing material must be used to cement that part of the casing opposite a salt formation. Except for circulation of drilling fluids during well construction, subsection (e) requires all injection activities for bedded salt cavern construction and waste disposal to be performed using removable injection tubing(s) suspended from the wellhead. During bedded salt cavern construction, paragraph (1) states that the annulus between the tubing and long string casing must be filled with a noncorrosive fluid sufficient to protect the long string casing seat. Paragraph (2) requires waste injection to be performed through tubing with a packer to seal the annulus between the tubing and casing near the bottom of the casing, or tubing with an approved fluid seal as an alternative. The tubing, packer, and fluid seal must be designed for the expected service. Subsection (f) lists factors that must be considered and addressed in determining and specifying requirements for a tubing and packer system or tubing with a fluid seal. As stated in paragraphs (1) - (7), these factors include depth of setting; characteristics of injection fluid and waste; injection pressure; annular pressure; rate, temperature, and volume of injected waste; size of casing; and tensile, burst, and collapse strengths of the tubing. Subsection (g)(1) pertains to geophysical logging and requires appropriate logs and other tests to be conducted during the drilling and construction phases of the well including drilling into the salt. Logs and tests must be interpreted by the service company which processed the logs or conducted the test, or by other qualified persons. Subparagraphs (A) - (C) specify that, at a minimum, the following logs and tests are to be conducted: deviation checks on all holes; a spontaneous potential and resistivity log;

a natural gamma ray log; compensated density and neutron porosity logs; acoustic or sonic log; inclination (directional) survey; and a caliper log (open hole). From the ground surface or from the base of conductor casing to the lowermost casing seat, subparagraph (D) specifies a cement bond with variable density log; temperature log (cased hole); and casing inspection log. Subparagraph (E) requires a fracture detector log from the base of the surface casing to the total investigated depth including all core hole or pilot hole. Consistent with federal regulations, the availability of similar data from logs and tests in the area of the drilling site may be taken into account. Subsection (g)(2) relates to pressure tests. Subparagraph (A) requires that, after installation and cementing of casings, and before drilling out the cemented casing shoe, surface casing must be pressure tested at mill test pressure or 80% of the calculated internal pressure at minimum yield strength, and the intermediate and long string casing must be tested to 1,500 pounds per square inch (psi) for 30 minutes, unless otherwise specified by the executive director. After drilling out the cemented long string casing shoe, and before drilling more than 100 feet of core hole or pilot hole below the long string casing shoe, subparagraph (B) requires the bond between the salt, cement, and casing to be tested at a pressure of 0.8 psi per foot of depth. Subparagraph (C) requires that the pilot hole and/or core hole must be tested between the long string casing shoe and the total investigated depth, at a casing seat pressure of 0.8 psi per foot of depth. Subsection (g)(3) pertains to coring, and subparagraph (A) requires that full-hole cores must be taken from selected intervals of the injection zone and lowermost overlying confining

zone; or, if full-hole coring is not feasible or adequate core recovery is not achieved, sidewall cores must be taken at sufficient intervals to yield representative data for selected parts of the injection zone and lowermost overlying confining zone. Core analysis must include a determination of permeability, porosity and bulk density. Consistent with federal regulations, the availability of similar data in the area of the drilling site may be taken into account. In the core hole for the salt, within the cavern injection interval, subparagraph (B) requires determination of in situ permeability, lithostatic gradients, and fracture pressure gradients. Subsection (g)(4) requires any portion of the pilot hole or core hole that extends beyond the intended wall of the cavern to be filled with salt-saturated cement from total investigated depth back to the designed cavern boundary before commencement of injection for cavern construction. Subsection (g)(5) requires that the mechanical integrity of a well must be demonstrated before initiation of injection activities. Subparagraphs (A) - (D) provide that mechanical integrity testing must consist of a pressure test with liquid or gas; a temperature, noise log, or oxygen activation log; a casing inspection log, if required by the executive director; and any other test required by the executive director. Material compatibility is covered in subsection (h), including the requirement that all well materials must be compatible with formations and fluids with which the materials may be expected to come into contact. A well will be deemed to have compatibility as long as the materials used in the construction of the well meet or exceed standards developed for such materials by the American Petroleum Institute (API), the American Society for Testing

Materials (ASTM), or comparable standards acceptable to the executive director. Subsection (i) relates to pre-injection units. Paragraph (1) requires the injection pump to be designed to assure that the surface injection pressure limitations authorized by the well permit will not be exceeded. For the purpose of detecting well malfunctions, paragraph (2) provides instrumentation to be installed to continuously monitor changes in annulus pressure and annulus fluid volume. Paragraph (3) states that pre-injection units must be designed to prevent the release of unauthorized cavern contents to the atmosphere. Paragraph (4) requires secondary containment of the wellhead to protect the ground surface from spills and releases. Subsection (j) requires all phases of well construction and workovers to be supervised by a Texas licensed professional engineer or licensed professional geoscientist, as appropriate. Before beginning cavern construction and operation, subsection (k) requires the permittee to obtain written approval from the executive director stating that the well construction complies with the applicable provisions of the permit. Within 90 days of completion of well construction, the permittee must submit reports to the executive director that have been prepared and sealed by a Texas licensed professional engineer or licensed professional geoscientist, as appropriate. Details of the required reports are given in paragraphs (1) - (3) to include final construction, "as-built" plans and specifications, reservoir data, and an evaluation of the considerations set out in §331.45(3); certification that construction of the well has been completed in accordance with the provisions of the disposal well permit and with the design and construction specifications of the permittee's application; and

certification that actual reservoir data obtained will not result in the need for a change in the operating parameters specified in the permit.

Proposed new §331.244 pertains to bedded salt cavern construction standards. Subsection (a) states that construction of the cavern must be done in accordance with all permit application plans and specifications, and any proposed changes to the plans and specifications must be certified by the executive director that said changes provide protection standards equivalent to or greater than the original design criteria. Subsection (b) covers standards for bedded salt cavern construction. Paragraph (1) specifies that bedded salt caverns are to be created by the controlled dissolution of the sidewalls of the well bore to a specified maximum diameter, between selected elevations specified in the permit as the top and bottom of the injection interval. Paragraph (2) requires that creation of the cavern must be done according to the cavern construction plans submitted in the permit application. Subparagraphs (A) - (G) list demonstrations that must be made in the construction plans, including separation between adjacent caverns by a minimum pillar to cavern diameter ratio of 2.0 to ensure a sufficient amount of separation for cavern safety and stability; design of cavern dimensions by a qualified professional engineer and geologist, to ensure the structural integrity of the cavern; a plan for the controlled expansion of the cavern if an applicant proposes to conduct solution-mining activities concurrent with waste disposal; plans for continual monitoring of the volumes of materials injected and produced during cavern

development and waste injection; plans for cavern pressure tests and sonar surveys to determine the cavern dimensions, volume, geometric shape, and characterization of anomalies; supervision of the cavern construction process by a qualified Texas professional engineer; and management and/or disposal of all brines displaced from the cavern in facilities authorized for such purpose. Except for circulation of drilling fluids during well construction, subsection (c) specifies that all injection activities for bedded salt cavern construction and waste disposal in a bedded salt cavern must be performed through removable injection tubing(s) installed inside the cemented long string casing and extending from the wellhead at ground surface to the bedded salt cavern below the long string casing seat. Subsection (d) pertains to logs and tests. Paragraph (1)(A) and (B) requires the construction plan submitted by the applicant to identify the tests to be used to verify cavern dimensions, including a description of surveys, logs, and tests to be run and analyzed; and the frequency of such surveys or logs. Before waste disposal, paragraph (2) requires testing of the integrity of the cavern in accordance with §331.43(b). Subsection (e) relates to workovers of a bedded salt cavern disposal well. Paragraph (1) requires the permittee to notify the executive director, submit plans for the proposed work, and obtain approval before commencing any workover operation or corrective maintenance which involves taking the disposal well out of service. When immediate action is required, the executive director may grant an exception of the prior written notification. Pressure control equipment must be installed and maintained during workovers which involve the removal of tubing. Paragraph (2) requires a

demonstration of well mechanical integrity following any major operations which involve removal of the injection tubing, recompletions, unseating of the packer, or in instances where the integrity of the casing seat or cavern may be compromised. Subsection (f) lists reports and approvals required after completion of cavern construction. Within 30 days of completion of bedded salt cavern construction, paragraph (1) requires an initial cavern integrity report including the results of all tests regarding cavern integrity. Within 90 days of completion of cavern construction, paragraph (2)(A) and (D) require the permittee to notify the executive director that the cavern construction is in compliance with provisions of the permit and submit reports and certifications, prepared and sealed by a Texas professional engineer, including final construction, "as-built" plans and specifications, injection and confining zone data, and an evaluation of the considerations under §331.45(3); certification that the construction of the cavern has been completed in accordance with the provisions of the disposal well permit and with the design and construction specifications of the permittee's application; certification that actual confining and injection zone data obtained will not result in need for a change in the operating parameters specified in the permit; and certification that the bedded salt cavern injection zone will not be in or above a formation which within 1/4 mile of the bedded salt cavern injection zone contains a USDW.

Proposed new §331.245 pertains to bedded salt cavern disposal well operating

requirements. Subsection (a) specifies general operating requirements, and paragraph (1) specifies 0.8 psi per foot of depth as the maximum allowable operating pressure and test pressure, but in no case is the pressure allowed to disrupt the bond between the salt, cement, and the casing seat, initiate or propagate fractures in the cavern or the confining zone, or cause movement of fluid or waste out of the injection zone. Paragraphs (2) and (3) state that the minimum operating pressure must be protective of bedded salt cavern integrity, and injection between the outermost casing protecting USDWs, and fresh or surface water and the wellbore is prohibited. Paragraph (4) requires the annulus between the tubing and long string casing to be filled with a noncorrosive fluid, unless an alternative to a packer has been approved under §331.243(d). To detect malfunctions, at all times that the well is in service the annulus pressure must be at least 100 psi greater than the injection tubing pressure, unless this requirement might harm the integrity of the well. Compatibility is addressed in paragraph (5) which requires the chemical and physical characteristics of all injected materials and cavern contents to protect and be compatible with the disposal well, associated facilities, and injection zone, and ensure proper operation of the facility to meet the performance standard of §331.242. Paragraph (6) specifies that, to inject waste into a bedded salt cavern, removable tubing(s) with a packer or fluid seal near the bottom of the long string casing must be used. Paragraph (7) prohibits unauthorized releases of cavern contents to the atmosphere. Paragraph (8)(A) and (D) provides that before beginning waste disposal operations, a blanket material must be placed into the salt cavern to prevent unwanted

leaching of the cavern roof; consisting of crude oil, mineral oil, or other fluid possessing similar noncorrosive, nonsoluble, low-density properties; be sufficient to protect the integrity of the cement and formation bond at the long string casing seat; and be of sufficient volume to contact the entire cavern roof. Paragraph (9) requires monitoring of the cavern roof and level of the blanket material at least once every five years by running a density interface survey or using an alternative method. If an automatic alarm or shutdown is triggered, paragraph (10)(A) - (C) requires the owner or operator to immediately investigate and identify the cause of the alarm or shutoff, and if the well or cavern appears to be lacking integrity, the owner or operator must immediately cease injection of waste unless authorized by the executive director to continue or resume injection; take all necessary steps to determine the presence or absence of a leak; and notify the executive director within 24 hours after the alarm or shutdown. If the loss of integrity is discovered, or if unauthorized communication is established between bedded salt caverns, paragraph (11)(A) - (E) requires the owner or operator to immediately cease injection of waste; take all steps required to determine whether there may have been a release of wastes into any unauthorized zone; notify the executive director within 24 hours after loss of mechanical integrity is discovered; notify the executive director when injection can be expected to resume; and restore and demonstrate well mechanical integrity and/or cavern integrity before resuming injection of waste. Whenever the owner or operator obtains evidence that there may have been a release of injected wastes or brine into an unauthorized zone, paragraph (12)(A) requires the owner or operator to

immediately cease injection of waste; notify the executive director within 24 hours of obtaining such evidence; take all necessary steps to identify and characterize the extent of any release; propose a remediation plan for executive director review and approval; comply with any remediation plan specified by the executive director; implement any remediation plan approved by the executive director; and where such release is into a USDW or freshwater aquifer currently serving as a water supply, within 24 hours notify the local health department, place a notice in a newspaper of general circulation and notify by mail the adjacent landowners. Paragraph (12)(B) provides that the executive director may allow the operator to resume injection before completing cleanup action if the owner or operator demonstrates that the injection operation will not endanger USDWs or freshwater aquifers. Paragraph (13) requires all fluids displaced from the cavern after injection of any waste to be managed under applicable state and federal regulations. Subsection (b) pertains to workovers. Unless immediate action is required, paragraph (1) requires the permittee to notify and obtain approval from the executive director before commencing any workover operation or corrective maintenance which involves taking the disposal well out of service, including plans for the proposed work. Pressure control equipment must be installed and maintained during workovers which involve the removal of tubing. Paragraph (2) requires mechanical integrity of the well to be demonstrated following any major operations which involve removal of the injection tubing, recompletions, or unseating of the packer.

Proposed new §331.246 pertains to bedded salt cavern and well monitoring and testing requirements. The requirement for a waste analysis plan is provided in subsection (a), which includes sampling and analyzing all material injected into or produced from the cavern. Subsection (b) requires pressure gauges to be installed and maintained in proper operating conditions at all times on the tubing string(s) and on any annulus extending to the wellhead. Subsection (c)(1) - (5) requires continuous recording devices and instruments to be installed in weatherproof enclosures, used, and maintained in proper operating condition at all times to record tubing string pressures; the pressure and volume of any annular space that extends to the wellhead; injection and production fluid flow rates, volume, and density; the volume and composition of displaced gases; and any other data specified by the permit. Subsection (d)(1) and (2) pertains to automatic alarms and requires the owner or operator to install and use automatic alarm and automatic shutoff systems, designed to sound and shut-in the well when pressures and flow rates or other parameters approved by the executive director exceed a range and/or gradient specified in the permit; or automatic alarms designed to sound when the pressures, flow rates, or other parameters approved by the executive director exceed a rate and/or gradient specified in the permit, in cases where the owner or operator certifies that a trained operator will be on location and able to immediately respond to alarms at all times when the well is operating. Subsection (e) provides that all gauges, and pressure sensing and recording devices must be tested and calibrated semi-annually. Subsection (f) relates to mechanical integrity and requires the owner or

operator to maintain mechanical integrity of the disposal well and bedded salt cavern at all times that the well and cavern are in service. Paragraph (1)(A) - (D) states that mechanical integrity of the well must be demonstrated before the well is initially placed in service; within five-year intervals during the operating life of the well to test for fluid movement along the borehole; after each workover which involves removal of the injection tubing, recompletions, or unseating of the packer; and before the well is plugged, unless the mechanical integrity test has been performed in the last five years. Paragraph (2)(A) - (C) requires demonstration of cavern mechanical integrity before the cavern is initially placed in service; within five-year intervals during the operating life of the cavern; and in instances where the integrity of the casing seat or cavern may be compromised. Paragraph (3) lists mechanical integrity test methods for each bedded salt cavern disposal well and cavern. In subparagraphs (A) - (D) these methods include a nitrogen-brine interface test on each well, a hydrostatic brine test and sonar survey, or other test approved by the executive director, for each cavern, and pressure testing on each well and cavern. Paragraph (4) provides that the owner or operator may use an alternative cavern integrity test if the alternative integrity test is substantially equivalent to the integrity tests specified in paragraph (3). Paragraph (4)(A) - (D) requires the owner or operator to submit, for the executive director's consideration, a description of the test method and the theory of operation, including the test sensitivities, a justification for the test parameters, and the pass and fail criteria for the test; a description of the well and cavern conditions under which the test can be conducted; the

procedure for interpreting the test results; and an interpretation of the test upon completion of the test. Paragraph (5) requires the well and cavern integrity testing to be conducted at the maximum allowable operating pressure. Corrosion monitoring is addressed in §331.246(g). Subsection (g)(1) requires quarterly corrosion monitoring of the well materials used in the injection tubing, packer, and long string casing, and the test materials must be continuously exposed to the waste with the exception of when the well is taken out of service. Corrosion monitoring may be waived as provided in subsection (g)(2) if the disposal well owner or operator demonstrates that the waste will not be corrosive to the well materials with which the waste is expected to come into contact throughout the life of the well. Subsection (h) pertains to ambient monitoring, and paragraph (1) requires the owner or operator to comply with ambient monitoring requirements in accordance with §331.64(h). Paragraph (2) requires the owner or operator to conduct subsidence monitoring (elevation surveys) over the area of review and any other type of ambient monitoring necessary to comply with the performance standard stated in §331.242. Elevation surveys must be conducted by a licensed professional land surveyor. These requirements under subsection (h)(2) are necessary for equivalency with federal rules for Class I nonhazardous waste wells. Subsection (i) requires the owner or operator to submit information demonstrating that the waste stream and its anticipated reaction products will not alter the permeability, thickness, or other relevant characteristics of the bedded salt cavern confining zone or bedded salt cavern injection zone such that they would no longer meet the requirements specified in

§331.121. Subsection (j) requires the owner or operator to conduct any other monitoring and testing requirements, including determination of the composition and volume of leachate. Subsection (k) states that all testing and monitoring of the bedded salt disposal cavern and well must be planned and supervised, and test results reviewed by qualified individuals acting under the responsible charge of a Texas licensed professional engineer or licensed professional geoscientist, as appropriate. Subsection (l) requires the owner or operator to submit a written schedule of all logging and testing to the executive director at least seven days before conducting the testing, and provide the executive director the opportunity to witness the testing.

Proposed new §331.247 provides reporting requirements for bedded salt cavern disposal wells. Subsection (a) relates to pre-operation reports, and paragraph (1) requires the permittee to notify the executive director in writing of the anticipated well construction and cavern construction start-up dates at least 24 hours before beginning drilling and cavern construction operations. Before beginning injection operations, compliance with all pre-operation terms of the permit must occur. Paragraph (2) requires the permittee to submit notice of completion of construction to the executive director as specified in §331.65(e)(1). Within 90 days after the completion of the well, paragraph (3) requires the permittee to submit a Well Completion Report to the executive director addressing the considerations and standards in §331.45(3) and §331.243. The Well Completion Report must include the commission's Well Data Form; a surveyor's plat showing the

exact location and giving the latitude and longitude of the well; and a certification that a notation on the deed to the facility property or on some other instrument which is normally examined during title search stating the property legal description, the surveyed location of the well, and the well permit number, has been filed in the real property records in the county in which the facility is located. Within 90 days after the completion of the cavern, paragraph (4) requires the permittee to submit a Cavern Completion Report to the executive director addressing the considerations and standards in §331.45(3) and §331.244. The Cavern Completion Report must include a surveyor's plat showing the exact location and giving the latitude and longitude of the cavern and a certification that a notation on the deed to the facility property or on some other instrument which is normally examined during title search has been made stating the surveyed location of the cavern, the well permit number, the depth of the cavern floor and ceiling, the cavern diameter, the dates of operation, and its permitted waste streams. Paragraph (5) requires the permittee to provide written notice to the executive director that a copy of the permit has been properly filed with the health and pollution control authorities of the county, city, and town where the well is located. Subsection (b) relates to operating reports. For noncommercial facilities, paragraph (1)(A) requires the permittee to submit to the executive director a quarterly report of injection operation on forms supplied by the executive director within 20 days after the last day of the months of March, June, September, and December. These forms will comply with the reporting requirements of 40 Code of Federal Regulations §146.69(a). Paragraph

(1)(B) requires the owner or operator to submit inventory balance data measuring the volume of waste and brine injected into or withdrawn from each bedded salt cavern well, including methods for measuring and verifying volume. Under paragraph (1)(C), the executive director may require more frequent reporting. For all facilities, paragraph (2) requires the permittee to submit annually with the December report of injection operation an updated graphic or other acceptable report and description of the effects of the well and cavern on the area of review, including a report on monitoring required by §331.246(j). The report must also include locations of newly constructed or newly discovered wells within the area of review if such wells were not included in the technical report accompanying the permit application or in later reports; a tabulation of data as required by §331.121(a)(2)(B) for all such wells within the area of review that penetrate the injection zone or confining zone; and for noncommercial facilities only, a current injection fluid analysis. Within 30 days after the completion of a workover on a well, paragraph (3) requires a report to be filed with the executive director including the reason for well workover and the details of all work performed. Within 30 days after completion of periodic testing of well mechanical integrity, cavern integrity, and any other testing required by the executive director, paragraph (4) requires the permittee to submit a report, including both data and interpretation, on the test results. Subsection (b)(5) requires the permittee to notify UIC staff of the Austin office and the local district office of the commission, within 24 hours of any significant change in monitoring parameters or of any other observations which could reasonably be attributed to a leak

or other failure of the well equipment or cavern integrity.

Proposed new §331.248 contains additional requirements and conditions for bedded salt cavern disposal wells. Subsection (a)(1) - (5) lists the following conditions that a permit for a Class I bedded salt cavern disposal well must include: a sign posted at the well site (in English with legible letters at least one inch high) which shows the name of the company, company well number, and commission permit number; an all-weather road installed and maintained to allow access to the disposal well and related facilities; the wellhead and associated facilities painted, if appropriate, and maintained in good working order without detectable leaks; secondary containment of the wellhead consisting of a diked, impermeable pad or sump; and any other requirements prescribed by the executive director for Class I bedded salt cavern disposal wells in order to protect USDW, and fresh or surface water from pollution. Subsection (a)(6) states that the obligation to implement the plugging and abandonment plan and the post-closure plan survives the termination of a permit or the cessation of injection activities, and the requirement to maintain an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. Subsection (b) requires pressure control equipment to be installed and maintained in proper operating condition at certain times as specified in this subsection.

Proposed new §331.249 provides record-keeping requirements for bedded salt cavern

disposal wells. Subsection (a)(1) states that the permittee must keep complete and accurate records of all required monitoring, including continuous records of tubing string pressures; the pressure and volume of any annular space that extends to the wellhead; injection and production fluid flow rates, volume and density; the volume and composition of displaced gases; and any other data specified by the permit. Subsection (a)(2) - (4) requires the permittee to keep complete and accurate records of all periodic well tests, including analyses of injected and produced materials; cavern integrity; well mechanical integrity; casing inspection surveys; all shut-in periods and times that emergency measures were used for handling injection fluid or waste; and any additional information on conditions that might reasonably affect the operation of the disposal well. Subsection (b) states that all records must be made available promptly on location for review upon request from a representative of the commission. Subsection (c) requires the permittee to retain on location, for a period of three years following abandonment, records of all information resulting from monitoring activities, including the chemical and physical characteristics of injected waste, or other records required by the permit. The executive director may require a permittee to submit copies of the records at any time before conclusion of the retention period.

Proposed new §331.250 pertains to bedded salt cavern closure. Subsection (a) lists the minimum requirements for a plan for a cavern closure plan that the owner or operator must prepare, maintain, and comply with. Paragraph (1) requires the owner or operator

to submit the plan as a part of the permit application, and such a plan must be a condition of any permit issued. Paragraph (2) requires the owner or operator to submit all proposed revisions to the plan and obtain any necessary permit amendments over the life of the well and cavern. Paragraph (3) lists the required information to be contained in the plan. Subparagraph (A) lists activities the operator must perform upon cessation of waste disposal, and before cavern sealing. Clause (i) requires the operator to conduct a gamma-density log to determine the cavern top, salt top, and to check for fluid behind the casing. To determine cavern configuration and measure cavern capacity, clause (ii) requires the permittee to conduct a sonar caliper survey (or other similar proven technology) on the storage cavern if no sonar has been run within the past five years. Subparagraph (B) provides that all brine displaced from the well or flushed from waste lines during the plugging operation must be managed and disposed of under applicable state and federal regulations. Subsection (b) requires the well to be closed in accordance with §331.46 of this title.

Proposed new §331.251 relates to post-closure care for bedded salt cavern disposal wells and requires the owner or operator of a Class I bedded salt cavern disposal well to prepare, maintain, and comply with a plan for post-closure care that meets the requirements of §331.68(b).

Fiscal Note: Costs to State and Local Government

Nina Chamness, Analyst, Strategic Planning and Assessment, has determined that, for the first five-year period the proposed rules are in effect, no significant fiscal implications are anticipated for the agency or other units of state government as a result of administration or enforcement of the proposed rules. Units of local government that own or operate public water systems using treatment to remove the excess radionuclides will need to manage and dispose of their treatment residuals containing NORM in a manner that is protective of human health and safety and the environment.

The purpose of this rulemaking is to amend existing rules, add new rules, repeal a rule, and develop guidance pertaining to the use of a Class I well for disposal of nonhazardous DWTR into a salt cavern in horizontally bedded or non-domal salt. The proposed rules would provide alternative disposal options for these wastes. Specifically, the proposed rules will allow disposal of nonhazardous DWTR into commercial and non-commercial Class I bedded salt cavern disposal wells within the state and provide the technical standards for doing so. For commercial disposal of DWTR containing NORM, Class I permitting under the proposed rules would be accompanied by a radioactive materials license. Authorization for disposal in a Class I well would be under an individual Class I UIC permit or authorized under General Permit Number WDWG010000. The proposed rulemaking will also repeal §331.120 which is no longer applicable since the agency does not have any UIC applications submitted or pending on or after May 26, 2001 and

before September 1, 2002.

Some DWTR contain NORM, and currently the only facilities that can dispose of DWTR containing NORM generated in Texas are in the states of Idaho, Utah, and Washington. Units of local government that own or operate public water systems producing NORM as part of DWTR may have a less expensive alternative under the proposed rules to dispose of this waste rather than transporting it out of state. Out of state disposal cost for NORM is estimated to be ten times more expensive than disposal costs would be in an in-state facility with a Class I well within a bedded salt formation. Out-of-state transportation costs are estimated to be three to four times higher than transportation costs would be to transport waste to an authorized in-state Class I well bedded salt facility. Out-of-state disposal fees for DWTR containing radium NORM range from $25 to $30 per cubic foot for low levels of radium to $75 to $150 per cubic foot of waste for higher levels of radium. Out-of-state disposal fees for uranium NORM range from $200 to $250 per cubic foot. For a public water system in south Texas (Jim Wells County), transportation costs could be as much as $3.00 per mile for a distance of 1,620 miles from south Texas to Utah to 2,210 miles from south Texas to Washington.

Owners of Class I Bedded Salt Cavern Disposal Wells

Currently one entity in the state in Andrews County is known to be interested in offering disposal for DWTR in a Class I bedded salt formation. No fees for in-state disposal

services have been set at this time, and fees are expected to vary with market conditions. However, in-state costs are expected to be less, perhaps ten times lower, than the rates for out-of-state disposal. Construction of a Class I bedded salt cavern disposal well and required monitoring systems may be as much as $1 million or more. Annual monitoring and testing costs could range from $40,000 to $100,000, and the cost to obtain a radioactive materials license would be $50,000 for the application fee and $25,000 for an annual license fee if the DWTR contain NORM.

Public Water Systems Using Class I Wells Owned by Third Parties

There may be as many as 50 public water systems struggling with the radionuclide maximum contaminant levels (MCLs) established by the EPA. Of these systems, the agency does not know how many local government public water systems would choose to treat water for radionuclides versus other methods of complying with the MCLs. In drought conditions, however, public water systems may need to treat water more often as other compliance options become less available and they are forced to use non-compliant water sources. Under the proposed rules, disposal of DWTR becomes more economically feasible since in-state disposal would be allowed. If a public water system chooses to dispose of DWTR in a well owned by another entity, it could pay lower disposal fees, and it is expected to save on transportation costs. The amount of disposal fees is not known at this time, and they are expected to vary with market conditions. However, in-state disposal fees could be ten times less than those charged by out-of-

state facilities. Savings for in-state transportation costs will vary depending on the location of the public water system, but transportation of DWTR from south Texas to Andrews County could be approximately 510 miles. The shorter distance to a facility within the state could produce savings from over $3,000 to over $5,000.

Public Benefits and Costs

Nina Chamness also determined that for each year of the first five years the proposed rules are in effect, the public benefit anticipated from the changes seen in the proposed rules will be a less expensive, safe disposal method for nonhazardous DWTR, especially if it contains NORM.

The proposed rules may save individuals and businesses money if public drinking water systems are able to pass along the savings of a less expensive disposal method for nonhazardous DWTR to their customers. In-state disposal of this waste at a Texas facility is expected to cost public drinking water systems ten times less in disposal fees and three to four times less in transportation costs if this option is chosen as a method of complying with radionuclide MCLs. The amount of savings that could be available to pass on to customers will depend on the operating circumstances of each public drinking water system.

The agency knows of one business in Andrews County that is interested in providing a

disposal facility of a Class I well in a bedded salt formation. The cost of constructing a Class I bedded salt disposal well and required monitoring systems is estimated to be $1 million or more; required annual monitoring and testing costs could range from $40,000 to $100,000; and the cost to obtain a radioactive materials license if the DWTRs contain NORM is estimated to cost $50,000 for the application fee and $25,000 for an annual license fee. No fees for in-state disposal services have been set at this time, and fees are expected to vary with market conditions.

Businesses that own a public water system will have a less expensive option of disposing of DWTR, especially if they contain NORM, under the proposed rules. Business-owned public water systems could expect to experience the same types of cost savings for disposal and transportation as those experienced by public water systems owned or operated by a local government.

Small Business and Micro-Business Assessment

No adverse fiscal implications are anticipated for small or micro-businesses as a result of the proposed rules. Small businesses that own a public water system may have a less expensive option of disposing of DWTR, especially if they contain NORM, under the proposed rules, and they could expect to experience the same types of cost savings for disposal and transportation as those experienced by public water systems owned or operated by a local government.

If a small business decides it would be economically advantageous to offer disposal services to public water systems for disposal of nonhazardous DWTR in a Class I well within a bedded salt formation, it could expect to incur the same costs as that incurred by a large business to obtain a permit, construct the proper underground injection well, and comply with the required monitoring and testing requirements.

Small Business Regulatory Flexibility Analysis

The commission has reviewed this proposed rulemaking and determined that a small business regulatory flexibility analysis is not required because the proposed rules do not adversely affect a small or micro-business in a material way for the first five years that the proposed rules are in effect.

Local Employment Impact Statement

The commission has reviewed this proposed rulemaking and determined that a local employment impact statement is not required because the proposed rules do not adversely affect a local economy in a material way for the first five years that the proposed rules are in effect.

Draft Regulatory Impact Analysis Determination

The commission has reviewed the proposed rules to determine whether a regulatory

analysis is required by Texas Government Code, §2001.0225, and has determined that the proposed rules are not subject to §2001.0225 because they do not meet the definition of a "major environmental rule" as defined in that statute. "Major environmental rule" is defined under Texas Government Code, §2001.0225(g)(3) as "a rule the specific intent of which is to protect the environment or reduce risks to human health from environmental exposure and that may adversely affect in a material way the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state."

The specific intent of the proposed rules is to allow use of a Class I disposal well for disposal of nonhazardous DWTR, including DWTR containing NORM, into horizontally bedded or non-domal salt and its associated salt cavern. The rules substantially advance their purpose by amending existing and adding new commission rules: 1) removing the prohibition on use of a Class I well for waste disposal into a bedded salt formation; 2) providing authorization and technical standards for use of a Class I well for disposal of nonhazardous DWTR, including NORM, into a bedded salt formation; and 3) providing siting requirements and construction and performance standards for cavern construction and operation. This intent is not inconsistent with the first prong of the definition of a "major environmental rule."

However, the proposed rules do not meet the second prong of the definition of a "major

environmental rule" by adversely affecting, in a material way, the economy, a sector of the economy, productivity, competition, or jobs because the proposed rules do not require more from an applicant than is required by current rules. Additionally, the proposed rules do not meet the second prong of the definition of a "major environmental rule" because the proposed rules are not anticipated to adversely affect in a material way the environment or the public health and safety of the state or a sector of the state because the proposed rules specify construction and performance standards and waste management requirements designed to prevent the movement of fluids that could result in the pollution of a USDW or pollution of waters of the state for all stages of the life of the well and cavern(s), from construction through post closure care.

In addition to not meeting the definition of a "major environmental rule," under Texas Government Code, §2001.0025(a) the proposed rules do not exceed the four applicability requirements of Texas Government Code §2001.0025(a)(1) - (4) in that the proposal does not: 1) exceed a standard set by federal law; 2) exceed an express requirement of state law; 3) exceed a requirement of a delegation agreement; or 4) propose to adopt a rule solely under the general powers of the agency.

The proposed rules do not exceed a standard set by federal law because the commission's UIC program is authorized by the EPA and federal law does not prohibit use of a Class I well for waste disposal into a bedded salt formation. Therefore, the

proposed rules are compatible with federal law. Additionally, the proposed rules do not exceed an express requirement of state law because Texas Water Code, Chapter 27, the Injection Well Act, establishes requirements for the commission's UIC program and the Injection Well Act does not prohibit use of a Class I well for waste disposal into a bedded salt formation. Therefore, the proposed rules are compatible with state law. Additionally, the proposed rules do not exceed a requirement of a delegation agreement because the commission's UIC program is authorized by the EPA and the commission's authorized UIC program does not prohibit use of a Class I well for waste disposal into a bedded salt formation. Therefore, the proposed rules are compatible with the commission's federally authorized UIC program. Finally, the proposed rules are not proposed solely under the general powers of the agency, because they are proposed under the Texas Injection Well Act, Texas Water Code, §27.019(a), which requires the commission to adopt rules reasonably required for the performance of its powers, duties, and functions under the act.

Written comments on the draft regulatory impact analysis determination may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Takings Impact Assessment

The commission has prepared a takings impact assessment for these proposed rules in

accordance with Texas Government Code, §2007.043. The commission's preliminary assessment is that implementation of these proposed rules would not constitute a taking of real property.

The purpose of the proposed rules is to amend existing and add new commission rules to allow use of a Class I disposal well for disposal of nonhazardous DWTRs, including DWTR containing NORM, into horizontally bedded or non-domal salt and its associated salt cavern. The proposed rules substantially advance their purpose by amending existing and adding new commission rules that: 1) remove the prohibition on use of a Class I well for waste disposal into a bedded salt formation; 2) provide authorization and technical standards for use of a Class I well for disposal of nonhazardous DWTR, including NORM, into a bedded salt formation; and 3) provide siting requirements and construction and performance standards for cavern construction and operation.

Promulgation and enforcement of these proposed rules would be neither a statutory nor a constitutional taking of private real property. The proposed rules do not affect a landowner's rights in private real property because this rulemaking action does not constitutionally burden, nor restrict or limit, the owner's right to property and reduce its value by 25% or more beyond which would otherwise exist in the absence of these regulations. The proposed rules establishing authorization and standards for use of a Class I disposal well for disposal of nonhazardous DWTR into horizontally bedded or

non-domal salt and its associated salt cavern do not affect real property. The proposed rules apply only to those who apply for authorization of Class I injection wells for disposal of nonhazardous waste into horizontally bedded or non-domal salt and its associated salt cavern. Because the proposed rules remove existing restrictions and establish new requirements for the use of Class I disposal wells into bedded salt formations, the rules do not restrict or limit an owner's rights in real property or reduce its value by 25% or more beyond which would otherwise exist in the absence of the proposed rules. Therefore, the proposed rules would not affect real property in a manner that is different than real property would have been affected without the proposed rules.

Consistency with the Coastal Management Program

The commission reviewed the proposed rules and found that they are neither identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(b)(2) or (4), nor will they affect any action/authorization identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11(a)(6). Therefore, the proposed rules are not subject to the Texas Coastal Management Program.

Written comments on the consistency of this rulemaking may be submitted to the contact person at the address listed under the Submittal of Comments section of this preamble.

Announcement of Hearing

The commission will hold a public hearing on this proposal in Austin on March 20, 2012 at 10:00 a.m. in Building E, Room 201S, at the commission's central office located at 12100 Park 35 Circle. The hearing is structured for the receipt of oral or written comments by interested persons. Individuals may present oral statements when called upon in order of registration. Open discussion will not be permitted during the hearing; however, commission staff members will be available to discuss the proposal 30 minutes prior to the hearing.

Persons who have special communication or other accommodation needs who are planning to attend the hearing should contact Sandy Wong, Office of Legal Services at (512) 239-1802. Requests should be made as far in advance as possible.

Submittal of Comments

Written comments may be submitted to Michael Parrish, MC 205, Office of Legal Services, Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087, or faxed to (512) 239-4808. Electronic comments may be submitted at: *http://www5.tceq.texas.gov/rules/ecomments/*. File size restrictions may apply to comments being submitted via the eComments system. All comments should reference Rule Project Number 2011-023-331-WS. The comment period closes March 27, 2012.

Copies of the proposed rulemaking can be obtained from the commission's Web site at *http://www.tceq.texas.gov/nav/rules/propose_adopt.html*. For further information, please contact Kathryn Flegal, Radioactive Materials Division, (512) 239-6890 or *kathryn.flegal@tceq.texas.gov*.

SUBCHAPTER A: GENERAL PROVISIONS

§§331.2, 331.14, 331.17, 331.18

Statutory Authority

The amendments are proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendments implement TWC, §27.019

§331.2. Definitions.

General definitions can be found in Chapter 3 of this title (relating to Definitions). The following words and terms, when used in this chapter, have the following meanings.

(1) Abandoned well--A well which has been permanently discontinued from use or a well for which, after appropriate review and evaluation by the commission, there is no reasonable expectation of a return to service.

(2) Activity--The construction or operation of any of the following:

(A) an injection well for disposal of waste;

(B) an injection or production well for the recovery of minerals;

(C) a monitor well at a Class III injection well site;

(D) pre-injection units for processing or storage of waste; or

(E) any other class of injection well regulated by the commission.

(3) Affected person--Any person who has a personal justiciable interest related to a legal right, duty, privilege, power, or economic interest affected by the proposed injection operation for which a permit is sought.

(4) Annulus--The space in the wellbore between the injection tubing and the long string casing and/or liner.

(5) Annulus pressure differential--The difference between the annulus pressure and the injection pressure in an injection well.

(6) Aquifer--A geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to a well or spring.

(7) Aquifer restoration--The process used to achieve or exceed water quality levels established by the commission for a permit/production area.

(8) Aquifer storage well--A Class V injection well used for 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.

(9) Area of review--The area surrounding an injection well described according to the criteria set forth in §331.42 of this title (relating to Area of Review) or in the case of an area permit, the project area plus a circumscribing area the width of which is either 1/4 mile or a number calculated according to the criteria set forth in §331.42 of this title.

(10) Area permit--A permit that authorizes the construction and operation of two or more similar injection, production, or monitoring wells used in operations associated with Class III well activities within a specified area.

(11) Artificial liner--The impermeable lining of a pit, lagoon, pond, reservoir, or other impoundment, that is made of a synthetic material such as butyl rubber, chlorosulfonated polyethylene, elasticized polyolefin, polyvinyl chloride (PVC), other manmade materials, or similar materials.

(12) Baseline quality--The parameters and their concentrations that describe the local groundwater quality of an aquifer prior to the beginning of injection operations.

(13) Baseline well--A well from which groundwater is analyzed to define baseline quality in the permit area (regional baseline well) or in the production area (production area baseline well).

(14) Bedded salt--A geologic formation, group of formations, or part of a formation consisting of non-domal salt that is layered and may be interspersed with

non-salt sedimentary materials such as anhydrite, shale, dolomite, and limestone. The salt layers themselves often contain significant impurities.

(15) Bedded salt cavern disposal well--A well or group of wells and connecting storage cavities which have been created by solution mining, dissolving or excavation of salt bearing deposits or other geological formations and subsequently developed for the purpose of disposal of nonhazardous drinking water treatment residuals.

(16) Blanket material or blanket pad--A fluid placed within a salt cavern that is lighter than the water in the cavern and will not dissolve the salt or any mineral impurities that may be contained within the salt. The function of the blanket is to prevent unwanted leaching of the salt cavern roof, prevent leaching of salt from around the cemented casing, and to protect the cemented casing from internal corrosion. Blanket material typically consists of crude oil, mineral oil, or some fluid possessing similar noncorrosive, nonsoluble, low density properties. The blanket material is placed between the salt cavern's outermost hanging string and innermost cemented casing.

(17) [(14)] Buffer area--The area between any mine area boundary and the permit area boundary.

(18) [(15)] Caprock--A geologic formation typically overlying the crest and sides of a salt stock. The caprock consists of a complex assemblage of minerals including calcite ($CaCO_3$), anhydrite ($CaSO_4$), and accessory minerals. Caprocks often contain lost circulation zones characterized by rock layers of high porosity and permeability.

(19) [(16)] Captured facility--A manufacturing or production facility that generates an industrial solid waste or hazardous waste that is routinely stored, processed, or disposed of on a shared basis in an integrated waste management unit owned, operated by, and located within a contiguous manufacturing complex.

(20) [(17)] Casing--Material lining used to seal off strata at and below the earth's surface.

(21) [(18)] Cement--A substance generally introduced as a slurry into a wellbore which sets up and hardens between the casing and borehole and/or between casing strings to prevent movement of fluids within or adjacent to a borehole, or a similar substance used in plugging a well.

(22) [(19)] Cementing--The operation whereby cement is introduced into a wellbore and/or forced behind the casing.

(23) [(20)] Cesspool--A drywell that receives untreated sanitary waste containing human excreta, and which sometimes has an open bottom and/or perforated sides.

(24) [(21)] Commercial facility--A Class I permitted facility, where one or more commercial wells are operated.

(25) [(22)] Commercial underground injection control (UIC) Class I well facility--Any waste management facility that accepts, for a charge, hazardous or nonhazardous industrial solid waste for disposal in a UIC Class I injection well, except a captured facility or a facility that accepts waste only from other facilities owned or effectively controlled by the same person.

(26) [(23)] Commercial well--An underground injection control Class I injection well which disposes of hazardous or nonhazardous industrial solid wastes, for a charge, except for a captured facility or a facility that accepts waste only from facilities owned or effectively controlled by the same person.

(27) [(24)] Conductor casing or conductor pipe--A short string of large-diameter casing used to keep the top of the wellbore open during drilling operations.

(28) [(25)] Cone of influence--The potentiometric surface area around the injection well within which increased injection zone pressures caused by injection of wastes would be sufficient to drive fluids into an underground source of drinking water or freshwater aquifer.

(29) [(26)] Confining zone--A part of a formation, a formation, or group of formations between the injection zone and the lowermost underground source of drinking water or freshwater aquifer that acts as a barrier to the movement of fluids out of the injection zone.

(30) [(27)] Contaminant--Any physical, biological, chemical, or radiological substance or matter in water.

(31) [(28)] Control parameter--Any physical parameter or chemical constituent of groundwater monitored on a routine basis used to detect or confirm the presence of mining solutions in a designated monitor well. Monitoring includes measurement with field instrumentation or sample collection and laboratory analysis.

(32) [(29)] Desalination brine--The waste stream produced by a desalination operation containing concentrated salt water, other naturally occurring

impurities, and additives used in the operation and maintenance of a desalination operation.

(33) [(30)] Desalination concentrate--Same as desalination brine.

(34) [(31)] Desalination operation--A process which produces water of usable quality by desalination.

(35) [(32)] Disposal well--A well that is used for the disposal of waste into a subsurface stratum.

(36) [(33)] Disturbed salt zone--Zone of salt enveloping a salt dome cavern, typified by increased values of permeability or other induced anomalous conditions relative to undisturbed salt which lies more distant from the salt dome cavern, and is the result of mining activities during salt dome cavern development and which may vary in extent through all phases of a cavern including the post-closure phase.

(37) [(34)] Drilling mud--A heavy suspension used in drilling an injection well, introduced down the drill pipe and through the drill bit.

(38) [(35)] Drinking water treatment residuals--Materials generated, concentrated or produced as a result of treating water for human consumption.

(39) [(36)] Drywell--A well, other than an improved sinkhole or subsurface fluid distribution system, completed above the water table so that its bottom and sides are typically dry except when receiving fluids.

(40) [(37)] Enhanced oil recovery project (EOR)--The use of any process for the displacement of oil from the reservoir other than primary recovery and includes the use of an immiscible, miscible, chemical, thermal, or biological process. This term does not include pressure maintenance or water disposal projects.

(41) [(38)] Excursion--The movement of mining solutions, as determined by analysis for control parameters, into a designated monitor well.

(42) [(39)] Existing injection well--A Class I well which was authorized by an approved state or United States Environmental Protection Agency-administered program before August 25, 1988, or a well which has become a Class I well as a result of a change in the definition of the injected waste which would render the waste hazardous under §335.1 of this title (relating to Definitions).

(43) [(40)] Fluid--Material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state.

(44) [(41)] Formation--A body of rock characterized by a degree of lithologic homogeneity which is prevailingly, but not necessarily, tabular and is mappable on the earth's surface or traceable in the subsurface.

(45) [(42)] Formation fluid--Fluid present in a formation under natural conditions.

(46) [(43)] Fresh water--Water having bacteriological, physical, and chemical properties which make it suitable and feasible for beneficial use for any lawful purpose.

(A) For the purposes of this subchapter, it will be presumed that water is suitable and feasible for beneficial use for any lawful purpose only if:

(i) it is used as drinking water for human consumption; or

(ii) the groundwater contains fewer than 10,000 milligrams per liter (mg/L) total dissolved solids; and

(iii) it is not an exempted aquifer.

(B) This presumption may be rebutted upon a showing by the executive director or an affected person that water containing greater than or equal to 10,000 mg/L total dissolved solids can be put to a beneficial use.

(47) [(44)] General permit--A permit issued under the provisions of this chapter authorizing the disposal of nonhazardous desalination concentrate and nonhazardous drinking water treatment residuals as provided by Texas Water Code, §27.023.

(48) [(45)] Groundwater--Water below the land surface in a zone of saturation.

(49) [(46)] Groundwater protection area--A geographic area (delineated by the state under Safe Drinking Water Act, 42 United States Code, §300j-13) near and/or surrounding community and non-transient, non-community water systems that use groundwater as a source of drinking water.

(50) [(47)] Hazardous waste--Hazardous waste as defined in §335.1 of this title (relating to Definitions).

(51) [(48)] Improved sinkhole--A naturally occurring karst depression or other natural crevice found in carbonate rocks, volcanic terrain, and other geologic settings which has been modified by man for the purpose of directing and emplacing fluids into the subsurface.

(52) [(49)] Individual permit--A permit, as defined in the Texas Water Code (TWC), §27.011 and §27.021, issued by the commission or the executive director to a specific person or persons in accordance with the procedures prescribed in the TWC, Chapter 27 (other than TWC, §27.023).

(53) [(50)] Injection interval--That part of the injection zone in which the well is authorized to be screened, perforated, or in which the waste is otherwise authorized to be directly emplaced.

(54) [(51)] Injection operations--The subsurface emplacement of fluids occurring in connection with an injection well or wells, other than that occurring solely for construction or initial testing.

(55) [(52)] Injection well--A well into which fluids are being injected. Components of an injection well annulus monitoring system are considered to be a part of the injection well.

(56) [(53)] Injection zone--A formation, a group of formations, or part of a formation that receives fluid through a well.

(57) [(54)] In service--The operational status when an authorized injection well is capable of injecting fluids, including times when the well is shut-in and on standby status.

(58) [(55)] Intermediate casing--A string of casing with diameter intermediate between that of the surface casing and that of the smaller long-string or production casing, and which is set and cemented in a well after installation of the surface casing and prior to installation of the long-string or production casing.

(59) [(56)] Large capacity cesspool--A cesspool that is designed for a flow of greater than 5,000 gallons per day.

(60) [(57)] Large capacity septic system--A septic system that is designed for a flow of greater than 5,000 gallons per day.

(61) [(58)] Licensed professional geoscientist--A geoscientist who maintains a current license through the Texas Board of Professional Geoscientists in accordance with its requirements for professional practice.

(62) [(59)] Liner--An additional casing string typically set and cemented inside the long string casing and occasionally used to extend from base of the long string casing to or through the injection zone.

(63) [(60)] Long string casing or production casing--A string of casing that is set inside the surface casing and that usually extends to or through the injection zone.

(64) [(61)] Lost circulation zone--A term applicable to rotary drilling of wells to indicate a subsurface zone which is penetrated by a wellbore, and which is characterized by rock of high porosity and permeability, into which drilling fluids flow from the wellbore to the degree that the circulation of drilling fluids from the bit back to ground surface is disrupted or "lost."

(65) [(62)] Mine area--The area defined by a line through the ring of designated monitor wells installed to monitor the production zone.

(66) [(63)] Mine plan--A plan for operations at a mine, consisting of:

(A) a map of the permit area identifying the location and extent of existing and proposed production areas; and

(B) an estimated schedule indicating the sequence and timetable for mining and any required aquifer restoration.

(67) [(64)] Monitor well--Any well used for the sampling or measurement with field instrumentation of any chemical or physical property of subsurface strata or their contained fluids. The term "monitor well" shall have the same meaning as the term "monitoring well" as defined in Texas Water Code [TWC], §27.002.

(A) Designated monitor wells are those listed in the production area authorization for which routine water quality sampling or measurement with field instrumentation is required.

(B) Secondary monitor wells are those wells in addition to designated monitor wells, used to delineate the horizontal and vertical extent of mining solutions.

(C) Pond monitor wells are wells used in the subsurface surveillance system near ponds or other pre-injection units.

(68) [(65)] Motor vehicle waste disposal well--A well used for the disposal of fluids from vehicular repair or maintenance activities including, but not limited to, repair and maintenance facilities for cars, trucks, motorcycles, boats, railroad locomotives, and airplanes.

(69) [(66)] New injection well--Any well, or group of wells, not an existing injection well.

(70) [(67)] New waste stream--A waste stream not permitted.

(71) [(68)] Non-commercial facility--A Class I permitted facility which operates only non-commercial wells.

(72) [(69)] Non-commercial underground injection control (UIC) Class I well facility--A UIC Class I permitted facility where only non-commercial wells are operated.

(73) [(70)] Non-commercial well--An underground injection control Class I injection well which disposes of wastes that are generated on-site, at a captured facility or from other facilities owned or effectively controlled by the same person.

(74) [(71)] Notice of change (NOC)--A written submittal to the executive director from a permittee authorized under a general permit providing changes to information previously provided to the agency, or any changes with respect to the nature or operations of the facility, or the characteristics of the waste to be injected.

(75) [(72)] Notice of intent (NOI)--A written submittal to the executive director requesting coverage under the terms of a general permit.

(76) [(73)] Off-site--Property which cannot be characterized as on-site.

(77) [(74)] On-site--The same or geographically contiguous property which may be divided by public or private rights-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing, as opposed to going along, the right-of-way. Noncontiguous properties owned by the same person but connected by a right-of-way which the owner controls and to which the public does not have access, is also considered on-site property.

(78) [(75)] Out of service--The operational status when a well is not authorized to inject fluids, or the well itself is incapable of injecting fluids for mechanical reasons, maintenance operations, or well workovers or when injection is prohibited due to the well's inability to comply with the in-service operating standards of this chapter.

(79) [(76)] Permit area--The area owned or under lease by the permittee which may include buffer areas, mine areas, and production areas.

(80) [(77)] Plugging--The act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

(81) [(78)] Point of injection--For a Class V well, the last accessible sampling point prior to fluids being released into the subsurface environment.

(82) [(79)] Pollution--The contamination of water or the alteration of the physical, chemical, or biological quality of water:

(A) that makes it harmful, detrimental, or injurious:

(i) to humans, animal life, vegetation, or property; or

(ii) to public health, safety, or welfare; or

(B) that impairs the usefulness or the public enjoyment of the water for any lawful and reasonable purpose.

(83) [(80)] Pre-injection units--The on-site above-ground appurtenances, structures, equipment, and other fixtures including the injection pumps, filters, tanks, surface impoundments, and piping for wastewater transmission between any such facilities and the well that are or will be used for storage or processing of waste to be injected, or in conjunction with an injection operation.

(84) [(81)] Production area--The area defined by a line generally through the outer perimeter of injection and recovery wells used for mining.

(85) [(82)] Production area authorization--An authorization, issued under the terms of a Class III injection well area permit, approving the initiation of mining activities in a specified production area within a permit area, and setting specific conditions for production and restoration in each production area within an area permit.

(86) [(83)] Production well--A well used to recover uranium through in situ solution recovery, including an injection well used to recover uranium. The term does not include a well used to inject waste.

(87) [(84)] Production zone--The stratigraphic interval extending vertically from the shallowest to the deepest stratum into which mining solutions are authorized to be introduced.

(88) [(85)] Public water system--A system for the provision to the public of water for human consumption through pipes or other constructed conveyances as defined in §290.38[(47)] of this title (relating to Definitions).

(89) [(86)] Radioactive waste--Any waste which contains radioactive material in concentrations which exceed those listed in 10 Code of Federal Regulations Part 20, Appendix B, Table II, Column 2, and as amended.

(90) [(87)] Registered Well--A well registered in accordance with the requirements of §331.221 of this title (relating to Registration of Wells).

(91) [(88)] Restoration demonstration--A test or tests conducted by a permittee to simulate production and restoration conditions and verify or modify the fluid handling values submitted in the permit application.

(92) [(89)] Restored aquifer--An aquifer whose local groundwater quality, within a production area, has, by natural or artificial processes, returned to the restoration table values established in accordance with the requirements of §331.107 of this title (relating to Restoration).

(93) [(90)] Salt cavern--A hollowed-out void space that has been purposefully constructed within a salt formation [stock], typically by means of solution mining by circulation of water from a well or wells connected to the surface.

(94) Salt cavern disposal well--For the purposes of this chapter, regulations of the commission, and not to underground injection control (UIC) Class II or UIC Class III wells in salt caverns regulated by the Texas Railroad Commission, a salt cavern disposal well is a type of UIC Class I injection well used:

(A) to solution mine a waste storage or disposal cavern in naturally occurring salt; and/or

(B) to inject nonhazardous, industrial, or municipal waste into a salt cavern for the purpose of storage or disposal of the waste.

(95) Salt dome--A geologic structure that includes the caprock, salt stock, and deformed strata surrounding the salt stock.

(96) [(91)] Salt dome cavern confining zone--A zone between the salt dome cavern injection zone and all underground sources of drinking water and freshwater aquifers, that acts as a barrier to movement of waste out of a salt dome cavern injection zone, and consists of the entirety of the salt stock excluding any portion of the salt stock designated as an underground injection control (UIC) Class I salt dome cavern injection zone or any portion of the salt stock occupied by a UIC Class II or Class III salt dome cavern or its disturbed salt zone.

(97) [(92)] Salt dome cavern injection interval--That part of a salt dome cavern injection zone consisting of the void space of the salt dome cavern into which waste is stored or disposed of, or which is capable of receiving waste for storage or disposal.

(98) [(93)] Salt dome cavern injection zone--The void space of a salt dome cavern that receives waste through a well, plus that portion of the salt stock enveloping

the salt dome cavern, and extending from the boundaries of the cavern void outward a sufficient thickness to contain the disturbed salt zone, and an additional thickness of undisturbed salt sufficient to ensure that adequate separation exists between the outer limits of the injection zone and any other activities in the domal area.

[(94) Salt cavern solid waste disposal well or salt cavern disposal well--For the purposes of this chapter, regulations of the commission, and not to underground injection control (UIC) Class II or UIC Class III wells in salt caverns regulated by the Texas Railroad Commission, a salt cavern disposal well is a type of UIC Class I injection well used:]

[(A) to solution mine a waste storage or disposal cavern in naturally occurring salt; and/or]

[(B) to inject hazardous, industrial, or municipal waste into a salt cavern for the purpose of storage or disposal of the waste.]

[(95) Salt dome--A geologic structure that includes the caprock, salt stock, and deformed strata surrounding the salt stock.]

(99) [(96)] Salt stock--A geologic formation consisting of a relatively homogeneous mixture of evaporite minerals dominated by halite (NaCl) that has migrated from originally tabular beds into a vertical orientation.

(100) [(97)] Sanitary waste--Liquid or solid waste originating solely from humans and human activities, such as wastes collected from toilets, showers, wash basins, sinks used for cleaning domestic areas, sinks used for food preparation, clothes washing operations, and sinks or washing machines where food and beverage serving dishes, glasses, and utensils are cleaned.

(101) [(98)] Septic system--A well that is used to emplace sanitary waste below the surface, and is typically composed of a septic tank and subsurface fluid distribution system or disposal system.

(102) [(99)] Stratum--A sedimentary bed or layer, regardless of thickness, that consists of generally the same kind of rock or material.

(103) [(100)] Subsurface fluid distribution system--An assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. This definition includes subsurface area drip dispersal systems as defined in §222.5 of this title (relating to Definitions).

(104) [(101)] Surface casing--The first string of casing (after the conductor casing, if any) that is set in a well.

(105) [(102)] Temporary injection point--A method of Class V injection that uses push point technology (injection probes pushed into the ground) for the one-time injection of fluids into or above an underground source of drinking water.

(106) [(103)] Total dissolved solids--The total dissolved (filterable) solids as determined by use of the method specified in 40 Code of Federal Regulations Part 136, as amended.

((107) [(104)] Transmissive fault or fracture--A fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.

(108) [(105)] Underground injection--The subsurface emplacement of fluids through a well.

(109) [(106)] Underground injection control--The program under the federal Safe Drinking Water Act, Part C, including the approved Texas state program.

(110) [(107)] Underground source of drinking water--An "aquifer" or its portions:

(A) which supplies drinking water for human consumption; or

(B) in which the groundwater contains fewer than 10,000 [10,000] milligrams per liter total dissolved solids; and

(C) which is not an exempted aquifer.

(111) [(108)] Upper limit--A parameter value established by the commission in a permit/production area authorization which when exceeded indicates mining solutions may be present in designated monitor wells.

(112) [(109)] Verifying analysis--A second sampling and analysis or measurement with instrumentation of control parameters for the purpose of confirming a routine sample analysis or measurement which indicated an increase in any control parameter to a level exceeding the upper limit. Mining solutions are assumed to be present in a designated monitor well if a verifying analysis confirms that any control parameter in a designated monitor well is present in concentration equal to or greater than the upper limit value.

(113) [(110)] Well--A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension, a dug hole whose depth is greater than the largest surface dimension, an improved sinkhole, or a subsurface fluid distribution system but does not include any surface pit, surface excavation, or natural depression.

(114) [(111)] Well injection--The subsurface emplacement of fluids through a well.

(115) [(112)] Well monitoring--The measurement by on-site instruments or laboratory methods of any chemical, physical, radiological, or biological property of the subsurface strata or their contained fluids penetrated by the wellbore.

(116) [(113)] Well stimulation--Several processes used to clean the well bore, enlarge channels, and increase pore space in the injection interval, [interval to be injected] thus making it possible for fluid [wastewater] to move more readily into the formation including, but not limited to, surging, jetting, and [blasting,] acidizing [, and hydraulic fracturing].

(117) [(114)] Workover--An operation in which a down-hole component of a well is repaired, the engineering design of the well is changed, or the mechanical

integrity of the well is compromised. Workovers include operations such as sidetracking, the addition of perforations within the permitted injection interval, and the addition of liners or patches. For the purposes of this chapter, workovers do not include well stimulation operations.

§331.14. [Prohibition of Class I Salt Cavern Solid Waste Disposal Wells and Associated Caverns in Geologic Structures or Formations Other Than Salt Stocks of Salt Domes and] Prohibition of Disposal of Certain Wastes into Certain Geological Formations.

[(a) Construction and operation of Class I salt cavern solid waste disposal wells and associated caverns in geologic structures or formations other than salt stocks of salt domes is prohibited until such time at which this section is amended to provide for authorization of such facilities and activities, and specific rules for such facilities and activities are promulgated.]

(a) [(b)] Notwithstanding any provision to the contrary in this chapter, Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste), or any other chapter of this title, the storage, processing, or disposal of hazardous waste in a solution-mined salt dome cavern, bedded salt cavern, or a sulphur mine is prohibited.

(b) Waste streams other than nonhazardous drinking water treatment residuals are prohibited from injection into a Class I salt cavern disposal well located in horizontally bedded or non-domal salt and its associated salt cavern.

§331.17. Pre-injection Units Registration.

(a) Pre-injection units not otherwise authorized under this chapter, except for those pre-injection units used in conjunction with a Class I well authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, must be registered in accordance with the requirements of this section. Pre-injection units used in conjunction with a Class I well authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals are not subject to authorization by registration but are subject to authorization by an individual permit or under the general permit issued under Subchapter L of this chapter (relating to General Permit Authorizing Use of a Class I Injection Well to Inject Nonhazardous Desalination Concentrate or Nonhazardous Drinking Water Treatment Residuals).

(b) No registration shall be approved, and registrations may be denied or revoked, if the executive director determines that:

(1) a pre-injection unit causes or allows the release of fluid that would result in the pollution of underground sources of drinking water, fresh water, or surface water; or

(2) a pre-injection unit poses an immediate threat to public health or safety.

(c) Registration procedures for pre-injection units not otherwise authorized under this chapter must include the following.

(1) The owner or operator shall submit an application for registration to the executive director, in accordance with the applicable requirements of this subchapter;

(A) for any proposed pre-injection unit, obtain approval of the registration before operating the pre-injection unit; or

(B) for any existing unauthorized pre-injection unit, submit the application on or before the date the injection well permit renewal application is submitted.

(2) The owner or operator shall cease operation of any pre-injection unit if:

(A) the registration application for an existing pre-injection unit has not been submitted before approval of the injection well permit renewal;

(B) renewal of the registration is denied by the executive director;

(C) the term of the registration expires, however, if registration renewal procedures have been initiated before the permit expiration date, the existing registration will remain in full force and effect and will not expire until commission action on the application for renewal of the registration is final;

(D) the registration is denied or revoked by the executive director; or

(E) the executive director determines that the unit poses an immediate threat to public health or safety.

(d) Design criteria are as follows:

(1) pre-injection units shall be designed in such a manner as to protect underground sources of drinking water, fresh water, and surface water from pollution;

(2) pre-injection units shall be designed in such a manner as to enable the authorized injection well to meet all permit conditions and applicable rules and law;

(3) pre-injection units shall meet the design standards contained in Chapter 217 [317] of this title (relating to Design Criteria for Domestic Wastewater [Sewerage] Systems) which apply to the type of unit being proposed; and

(4) all ponds shall be lined according to the requirements of §331.47 of this title (relating to Pond Lining).

§331.18. Registration Application, Processing, Notice, Comment, Motion to Overturn.

(a) Applicability. This section sets forth the requirements for applications and the manner in which action will be taken on applications filed for a registration for pre-injection units.

(b) Contents of application. Registration applications for pre-injection units must include:

(1) complete application form(s), signed and notarized, and required number of copies provided;

(2) the verified legal status of the applicant(s) as applicable;

(3) the signature of the applicant(s), in accordance with the requirements of §305.44 of this title (relating to Signatories to Applications);

(4) a notarized affidavit from the applicant(s) verifying land ownership or landowner agreement to the proposed activity. Pre-injection unit registration information on file with the commission shall be confirmed or updated, in writing, no later than 30 days after:

(A) the mailing address and/or telephone number of the owner or operator is changed; or

(B) requested by the commission or executive director;

(5) maps showing:

(A) the name and address of persons who own the property on which the existing or proposed pre-injection unit is or will be located, if different from the applicant; and

(B) the name and address of landowners adjacent to the property on which the pre-injection unit is located or is proposed to be located.

(6) plans and specifications of the pre-injection units which have the seal of a professional engineer licensed in the State of Texas. The engineer shall certify that the submission meets the applicable technical requirements of Chapter 217 [317] of this title (relating to Design Criteria for Domestic Wastewater [Sewerage] Systems);

(7) the attachment of technical reports and supporting data required by the application; and

(8) any other information the executive director or the commission may reasonably require.

(c) Administrative completeness. Upon receipt of an application for a registration, the executive director or his designee shall assign the application a number for identification purposes. Applications for registrations shall be reviewed by the staff for administrative completeness within the period specified by §281.3(a) of this title (relating to Initial Review).

(d) Technical completeness. When the application is declared to be technically complete, the executive director or his designee shall prepare a statement of the receipt of the application and declaration of technical completeness which is suitable for mailing and shall forward that statement to the chief clerk. The chief clerk shall notify every person entitled to notification as stated in subsection (e) of this section. The notice of receipt of an application for registration and declaration of technical completeness shall contain the following information:

(1) the location of the pre-injection unit;

(2) the identifying number given the application by the executive director;

(3) the type of registration sought under the application;

(4) the name, address, and telephone number of the applicant and the name and address of the agency and the telephone number of an agency contact from whom interested persons may obtain further information about the application to register the unit;

(5) the date on which the application was submitted;

(6) a brief summary of the information included in the application;

(7) a statement that the registration application has been provided to the county judge and that it is available for review by interested parties;

(8) a brief description of public comment procedures; and

(9) the deadline to file public comment. The deadline shall be not less than 30 days after the date notice is mailed.

(e) Notice requirements.

(1) The public notice requirements of this subsection apply to new applications for a registration, and to applications for major amendment or renewal of a registration for pre-injection units.

(2) The chief clerk of the commission shall mail Notice of Receipt of Application and Technical Completeness, along with a copy of the registration application, to the county judge in the county where the pre-injection unit is located or proposed to be located.

(3) The chief clerk of the commission shall mail Notice of Receipt of Application and Technical Completeness to the adjacent landowners named on the application map or supplemental map, or the sheet attached to the application map or supplemental map.

(f) Application processing procedures. Any person who is required to obtain approval of a registration, or who requests an amendment, modification, or renewal of a registration for pre-injection units is subject to the application processing procedures and requirements found in Chapter 281 of this title (relating to Application Processing).

(g) Major amendment. A major amendment is an amendment that changes a substantive term, provision, requirement, or a limiting parameter of a registration.

Notice requirements of subsection (e) of this section are applicable to major amendments.

(h) Minor amendment. A minor amendment is an amendment to improve or maintain the quality or method of management of waste, and includes any other change to a registration issued under this chapter that will not cause or relax a standard or criterion which may result in a potential deterioration of quality of waters in the state. Notice requirements of subsection (e) of this section are not applicable to minor amendments.

(i) Public comment on registrations. A person may provide the commission with written comments on any new, major amendment, or renewal applications to register pre-injection units. The executive director shall review any written comments received within the public comment period. The written information received shall be utilized by the executive director in determining what action to take on the application for registration, in accordance with §331.17 of this title (relating to Pre-injection Units Registration [Registration of Pre-Injection Units]). After the deadline for submitting public comment, the executive director may take final action on the application.

(j) Delegation, effective date of registration, term. The commission delegates to the executive director the authority to approve pre-injection unit registrations. The

effective date for the registration of a site at which pre-injection units are located is the date that the executive director by letter, approves the application. The term for registration shall not exceed ten years and shall be synchronized with the term of the injection well permit.

(k) Motion to overturn. The applicant or a person affected may file with the chief clerk a motion to overturn the executive director's final approval of an application, under §50.139(b) - (f) of this title (relating to Motion to Overturn Executive Director's Decision).

SUBCHAPTER C: GENERAL STANDARDS AND METHODS

§§331.42 - 331.47

Statutory Authority

The amendments are proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendments implement TWC, §27.019.

§331.42. Area of Review.

(a) The area of review is the area surrounding an injection well or a group of injection wells, for which the permit application must detail the information required in Subchapter G of this chapter (relating to Consideration Prior to Permit Issuance).

(1) The area of review for Class I wells, except those wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, is an area determined by a radius of 2 1/2 miles from the proposed or existing wellbore, or the area within the cone of influence, whichever is greater.

(2) The area of review for those Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, is an area determined by a radius of 1/4 mile from the proposed or existing wellbore, or the area within the cone of influence, whichever is greater. Notwithstanding subsection (c) of this section, if the area of review is determined by a mathematical model pursuant to subsection (b) of this section, the permissible radius is the result of such calculation even if it is less than 1/4 mile.

(3) The area of review for salt <u>dome</u> cavern disposal wells and associated caverns, is the sum of the two following areas:

(A) an area determined by a radius of 2 1/2 miles from the proposed or existing wellbore; and

(B) the greatest horizontal plane cross-sectional area of the salt dome between land surface and a depth of 1,000 feet below the projected floor of the proposed or existing salt dome cavern.

(4) The area of review for Class III wells, is the project area plus a circumscribing area, a minimum of 1/4 mile, the width of which is the lateral distance from the perimeter of the project area, in which the pressures in the injection zone may cause the migration of the injection and/or formation fluid into a Underground Sources of Drinking Water.

(5) The area of review for Class V wells is an area determined by a radius of at least 1/4 mile from the proposed or existing wellbore.

(b) The computation of the cone of influence may be based upon the parameters listed in the figure in this subsection and should be calculated for an injection time period equal to the expected life of the injection well or pattern. The following modified This equation illustrates one form which the mathematical model may take:

Figure: 30 TAC §331.42(b)

[Figure: 30 TAC §331.42(b)]

$$r = (2.25\ KH[h]t\ /\ S10^{x})^{1/2}$$

Where:

$x = 4 \pi KH (h_w - h_{bo} x S_pG_b) / 2.3 Q$

r = radius of endangering influence from injection well (length)
K = hydraulic conductivity of the injection zone (length/time)
H = thickness of the injection zone (length)
t = time of injection (time)
S = storage coefficient (dimensionless)
Q = injection rate (volume/time)
h_{bo} = observed original hydrostatic head of injection zone (length) measured from the base of the lowermost underground source of drinking water
h_w = hydrostatic head of underground source of drinking water (length) measured from the base of the lowest underground source of drinking water
S_pG_b = specific gravity of fluid in the injection zone (dimensionless)
π = 3.142 (dimensionless)

The above equation is based on the following assumptions:
(1) the injection zone is homogenous and isotropic;
(2) the injection zone has infinite area extent;
(3) the injection well penetrates the entire thickness of the injection zone;
(4) the well diameter is infinitesimal compared to "r" when injection time is longer than a few minutes; and
(5) the emplacement of fluid into the injection zone creates instantaneous increase in pressure.

(c) After an appropriate review, the commission may modify the area of review. In no event shall the boundary of an area of review be less than 2 1/2 miles for Class I wells, except those wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, or 1/4 mile for Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous

drinking water treatment residuals, or 1/4 mile from any other injection well covered by the appropriate authorization. The following factors are to be included in the review:

(1) Chemistry of injection and formation fluids;

(2) Hydrogeology;

(3) Population and its dependence on ground water use; and

(4) Historical practices in the area.

(d) The executive director may require an owner or operator of an existing injection well to submit any reasonably available information regarding the area of review, if the information would aid a review for the prevention or correction of freshwater pollution.

§331.43. Mechanical Integrity Standards.

(a) An injection well has mechanical integrity if:

(1) there is no significant leak in the casing, tubing, or packer; and

(2) if there is no significant fluid movement through vertical channels adjacent to the injection wellbore.

(b) A salt cavern has integrity if it:

(1) has no anomalies or irregularities that would prevent optimum cavern filling or that would prevent the cavern from holding pressure; and

(2) has no pressure communication or fluid flow between other caverns or formations [outside the salt stock]. The tests to show salt cavern integrity shall consist of cavern pressure and sonar tests, or other tests approved by the executive director, to determine the geometric shape of the unfilled cavern.

(c) Methods and standards approved by the United States Environmental Protection Agency [EPA] through federal Underground Injection Control Program delegation to the commission, shall be applied in conducting and evaluating the tests required by this section.

(d) When the owner or operator reports the results of mechanical integrity tests to the executive director, he shall include a description of the test(s) and the method(s)

used. In making his/her evaluation, the executive director shall review monitoring and other test data submitted since the previous evaluation.

(e) The executive director may require additional or alternative tests if the results presented by the owner or operator under subsection (d) of this section are not satisfactory to the executive director to demonstrate that there is no movement of fluid into or between underground source of drinking waters [USDWs] resulting from the injection activity.

§331.44. Corrective Action Standards.

(a) Corrective action standards for all wells. In determining the adequacy of corrective action proposed or required to prevent or correct pollution of underground sources of drinking waters (USDWs), and fresh or surface water, the following factors shall be considered:

(1) toxicity and volume of the injected fluid;

(2) toxicity of native fluids and by-products of injection;

(3) population potentially affected;

(4) geology and hydrology;

(5) history of the injection operation;

(6) completion and plugging records;

(7) abandonment procedures in effect at the time a well was abandoned;

(8) hydraulic connections with USDWs, and fresh or surface water;

(9) reliability of the procedures used to identify abandoned wells;

(10) any other factors which might affect the movement of fluids into or between USDWs; and

(11) for Class III wells only, when setting corrective action requirements the executive director shall consider the overall effect of the project on the hydraulic gradient in potentially affected USDWs, and the corresponding changes in potentiometric surfaces(s) and flow directions(s) rather than the discrete effect of each well. If a decision is made that corrective action is not necessary based on the

determinations in this paragraph, the monitoring program required in §331.84 of this title (relating to Monitoring Requirements) shall be designed to verify the validity of those determinations.

(b) Additional corrective action standards for Class I wells.

(1) For such wells within the area of review which are in the opinion of the executive director inadequately constructed, completed, plugged, or abandoned, or for which plugging or completion information is unavailable, the applicant shall also submit a plan consisting of such steps or modifications as are necessary to prevent movement of fluids into or between USDWs or freshwater aquifers. Where such a plan is adequate, the commission shall incorporate it into the permit as a condition. Where the executive director's review of an application indicates that the permittee's plan is inadequate the executive director shall:

(A) require the applicant to revise the plan;

(B) prescribe a plan for corrective action as a condition of the permit; or

(C) deny the application.

(2) The criteria of subsection (a) of this section will be used to determine adequacy.

(3) Any permit issued for a Class I well which was authorized prior to August 25, 1988, by an approved state program or an EPA-administered program or a well which has become a Class I well as a result of a change in the definition of the injected waste which would render the waste hazardous under §331.2 of this title (relating to Definitions) and which require corrective action other than pressure limitations shall include a compliance schedule requiring any corrective action accepted or prescribed under this section. Any such compliance schedule shall provide for compliance no later than two years following issuance of the permit and shall require observance of appropriate pressure limitations under paragraph (4) [(b)(4)] of this subsection until all other corrective action measures have been implemented.

(4) As part of the corrective action plan, the commission may impose an injection pressure limitation that does not cause the pressure in the injection zone to be sufficient to drive fluids into or between USDWs or freshwater aquifers in those wells described in subsection (a) of this section, which condition shall expire upon adequate completion of all corrective action measures.

(5) Action prescribed by a corrective action plan for new wells or new areas must be completed to the satisfaction of the executive director before operation of the well begins.

(6) In the event that, after an authorization for injection has been granted, additional information is submitted or discovered that a well within the applicable area of review might pose a hazard to a USDW or freshwater aquifer, the commission may prescribe a corrective action plan and compliance schedule as a condition for continued injection activities.

(7) If at any time the operator cannot assure the continuous attainment of the performance standard in §331.62(a)(5) [§331.62(5)] of this title (relating to Construction Standards), the executive director may require a corrective action plan and compliance schedule. The operator must demonstrate compliance with the performance standard, as a condition for receiving approval of continued operation of the well. The executive director also may require permit changes to provide for additional testing and/or monitoring of the well to insure the continuous attainment of the performance standard. The commission may order closure of the well if the operator fails to demonstrate, to the executive director's satisfaction, that the performance standard is satisfied.

§331.45. Executive Director Approval of Construction and Completion.

The executive director may approve or disapprove the construction and completion for an injection well or project. In making a determination whether to grant approval, the following shall be reviewed for compliance with the standards of this chapter:

(1) for Class I wells, except for those Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, and salt dome cavern disposal wells and associated salt dome caverns:

(A) actual as-built drilling and completion data on the well;

(B) all logging and testing data on the well;

(C) a demonstration of mechanical integrity;

(D) anticipated maximum pressure and flow rate at which the permittee will operate;

(E) results of the injection zone and confining zone testing program as required in §331.62(a)(7) [§331.62(7)] of this title (relating to Construction Standards) and §331.65(a) of this title (relating to Reporting Requirements);

(F) the actual injection procedure;

(G) the compatibility of injected wastes with fluids in the injection zone and minerals in both the injection zone and the confining zone and materials used to construct the well;

(H) the calculated area of review and cone of influence based on data obtained during logging and testing of the well and the formation, and where necessary, revisions to the information submitted under §331.121 of this title (relating to Class I Wells);

(I) the status of corrective action required for defective wells in the area of review;

(J) compliance with the casing and cementing performance standard in §331.62(a)(5) [§331.62(5)] of this title, and where necessary, changes to the

permit to provide for additional testing and/or monitoring of the well to insure the continuous attainment of the performance standard; and

(K) compliance with the cementing requirements in §331.62(a)(6) [§331.62(6)] of this title.

(2) for Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals:

(A) all available logging and testing program data on the well;

(B) a demonstration of mechanical integrity;

(C) the anticipated maximum pressure and flow rate at which the permittee will operate;

(D) the results of the formation testing program;

(E) the actual injection procedure;

(F) the compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone; and

(G) the status of corrective action on defective wells in the area of review.

(3) for salt dome cavern disposal wells and associated salt dome caverns:

(A) actual as-built drilling and completion data on the well;

(B) all logging, coring, and testing program data on the well and salt pilot hole;

(C) a demonstration of mechanical integrity of the well;

(D) the anticipated maximum wellhead and casing seat pressures and flow rates at which the well will operate during cavern development and cavern waste filling;

(E) results of the salt dome cavern injection zone and salt dome cavern confining zone testing program as required in §331.163(e)(3) of this title (relating to Well Construction Standards);

(F) the injection and production procedures for cavern development and cavern waste filling;

(G) the compatibility of injected materials with the contents of the salt dome cavern injection zone and the salt dome cavern confining zone, and with the materials of well construction;

(H) land subsidence monitoring data and groundwater quality monitoring data, including determinations of baseline conditions for such monitoring throughout the area of review;

(I) the status of corrective action required for defective wells in the area of review;

(J) actual as-built specifications of the well's surface support and monitoring equipment; and

(K) conformity of the constructed well system with the plans and specifications of the permit application;

(4) for Class III wells:

(A) logging and testing data on the well;

(B) a satisfactory demonstration of mechanical integrity for all new wells, excluding monitor and baseline wells;

(C) anticipated operating data;

(D) the results of the formation testing program;

(E) the injection procedures; and

(F) the status of corrective action required for defective wells in the area of review.

§331.46. Closure Standards.

(a) Applicability. Subsections (b) - (i), (k) - (n), and (r) [(q)] of this section apply to Class I wells except for salt cavern disposal wells and those Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals. For salt dome cavern disposal wells, only subsections (c), (e) - (i), (k) - (l), (n) - (p), and (r) [(c) and (e) - (q)] of this section apply. For bedded salt cavern disposal wells, only subsections (e) - (h), (k) - (l), (n) - (0), and (q) - (r) of this section apply. For Class I wells authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, only subsections (e) - (h), (n), and (r) [(q)] of this section apply.

(b) For Class I wells, prior to closing the well, the owner or operator shall observe and record the pressure decay for a time specified by the executive director. The executive director shall analyze the pressure decay and the transient pressure observations conducted pursuant to §331.64 of this title (relating to Monitoring and Testing Requirements) and determine whether the injection activity has conformed with predicted values.

(c) For [all] Class I wells, prior to well closure, appropriate mechanical integrity testing shall be conducted to ensure the integrity of that portion of the long string casing and cement that will be left in the ground after closure. Testing methods may include:

(1) pressure tests with liquid or gas;

(2) radioactive tracer surveys for wells other than salt cavern disposal wells;

(3) noise logs, temperature logs, pipe evaluation logs, cement bond logs, or oxygen activation logs; and

(4) any other test required by the executive director.

(d) For Class I wells, prior to well closure the well shall be flushed with a nonhazardous buffer fluid.

(e) In closure of all Class I wells, Class III wells, and permitted Class V wells, a well shall be plugged in a manner which will not allow the movement of fluids through the well, out of the injection zone either into or between underground sources of drinking waters (USDWs) or to the land surface. Well plugs shall consist of cement or other materials that provide protection equivalent to or greater than that provided by cement.

(f) The permittee shall notify the executive director before commencing closure according to an approved plan. For Class I wells this notice shall be given at least 60 days before commencement. At the discretion of the executive director, a shorter notice period may be allowed. The executive director shall review any revised, updated, or additional closure plans.

(g) Placement of the plugs in the wellbore shall be accomplished by an approved method that may include one of the following:

(1) the balance plug method;

(2) the dump bailer method;

(3) the two-plug method; or

(4) an alternate method, approved by the executive director, that will reliably provide a comparable level of protection.

(h) Prior to closure, the well shall be in a state of static equilibrium with the mud or nonhazardous fluid weight equalized top to bottom, either by circulating the mud or

fluid in the well at least once or by a comparable method prescribed by the executive director.

(i) Each plug used shall be appropriately tagged and tested for seal and stability before closure is completed.

(j) The closure plan shall, in the case of a Class III production zone which underlies or is in an exempted aquifer, also demonstrate that no movement of contaminants that will cause pollution from the production zone into a USDW or freshwater aquifer will occur. The commission shall prescribe aquifer cleanup and monitoring where deemed necessary and feasible to ensure that no migration of contaminants that will cause pollution from the production zone into a USDW or freshwater aquifer will occur.

(k) The following shall be considered in determining the adequacy of a plugging and abandonment plan for Class I and III wells:

(1) the type and number of plugs to be used;

(2) the placement of each plug including the elevation of the top and bottom;

(3) the type, grade, and quantity of plugging material to be used;

(4) the method of placement of the plugs;

(5) the procedure used to plug and abandon the well;

(6) any newly constructed or discovered wells, or information, including existing well data, within the area of review;

(7) geologic or economic conditions;

(8) the amount, size, and location by depth of casings and any other materials left in the well;

(9) the method and location where casing is to be parted if applicable;

(10) the estimated cost of the plugging procedure; and

(11) such other factors that may affect the adequacy of the plan.

(l) For Class I wells only, a monument or other permanent marker shall be placed at or attached to the plugged well before abandonment. The monument shall state the permit number, date of abandonment, and company name.

(m) Each owner of a Class I hazardous waste injection well, and the owner of the surface or subsurface property on or in which a Class I hazardous waste injection well is located, must record, within 60 days after approval by the executive director of the closure operations, a notation on the deed to the facility property or on some other instrument which is normally examined during a title search that will, in perpetuity, provide any potential purchaser of the property the following information:

(1) the fact that land has been used to manage hazardous waste;

(2) the name of the state agency or local authority with which the plat was filed, as well as the Austin address of the Underground Injection Control staff of the commission, to which it was submitted; and

(3) the type and volume of waste injected, the injection interval or intervals, and for salt cavern wells, the maximum cavern radius into which it was injected, and the period over which injection occurred.

(n) Within 30 days after completion of closure, the permittee shall file with the executive director a closure report on forms provided by the commission. The report shall be certified as accurate by the owner or operator and by the person who performed the closure operation (if other than the owner or operator). This report shall consist of a statement that the well was closed in accordance with the closure plan previously submitted and approved by the executive director. Where the actual closure differed from the plan previously submitted, a written statement shall be submitted specifying the differences between the previous plan and the actual closure.

(o) For salt cavern disposal wells, prior to sealing the cavern and plugging the well, the owner or operator shall complete any pre-closure monitoring of the cavern and its contents required by rule or permit.

(p) For salt dome cavern disposal wells, the cavern shall be closed according to §331.170 of this title (relating to Cavern Closure).

(q) For bedded salt cavern disposal wells, the cavern shall be closed according to §331.250 of this title (relating to Bedded Salt Cavern Closure).

(r) [(q)] The obligation to implement the closure plan survives the termination of a permit or the cessation of injection activities. The requirement to maintain and

implement an approved plan is directly enforceable regardless of whether the closure plan requirement is a condition of the permit.

§331.47. Pond Lining.

(a) Except as provided in subsection (b) of this section, all holding ponds, emergency overflow ponds, emergency storage ponds, or other surface impoundments associated with, or part of the pre-injection units associated with underground injection wells shall be lined with clay or an artificial liner as approved by the executive director or as required by permit, and shall in addition, conform to any applicable requirements of Chapter 335 of this title (relating to Industrial Solid Waste and Municipal Hazardous Waste).

(b) All surface impoundments for nonhazardous, noncommercial Class 1 industrial waste associated with Class I nonhazardous, noncommercial injection wells, or Class V injection wells permitted for the disposal of nonhazardous waste, shall meet the design standards contained in Chapter 217 [317] of this title (relating to Design Criteria for Domestic Wastewater [Sewerage] Systems) which apply to surface impoundments.

SUBCHAPTER D: STANDARDS FOR CLASS I WELLS OTHER THAN SALT CAVERN [SOLID WASTE] DISPOSAL WELLS

§331.61

Statutory Authority

The amendment is proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendment implements TWC, §27.019.

§331.61. Applicability.

The sections of this subchapter apply to all Class I injection wells, other than salt cavern <u>disposal</u> wells, unless otherwise noted.

SUBCHAPTER G: CONSIDERATION PRIOR TO PERMIT ISSUANCE

§331.120

Statutory Authority

The repeal is proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed repeal implements TWC, §27.019.

[§331.120. Compliance History; Denial of Permit.]

[(a) This section applies to applications for underground injection control (UIC) permits submitted or pending on or after May 26, 2001, and before September 1, 2002.]

[(b) The executive director shall prepare a comprehensive compliance summary for applications for UIC permits in accordance with Texas Water Code, §27.051(e).]

[(c) The summary shall include the applicant's compliance history, including the compliance history of any corporation or business entity managed, owned, or otherwise closely related to the applicant. Closely related entities include business entities that share common partnership members, association members, or corporate officers with the applicant; or business entities in which the applicant has an ownership interest of at least 20%. The applicant shall provide, as part of the UIC application, all required information relating to business entities.]

[(d) The commission shall deny the permit application in cases where the commission concludes that the applicant's compliance history is unacceptable. Whether a compliance history is unacceptable will be determined by the commission on a case-by-case basis. In making this determination, the commission will consider the nature, duration, repetition, and potential impact of violations for all media. The commission will give special weight to violations involving the failure of the applicant to obtain a permit and other violations which indicate the applicant's tendency to engage in activities without seeking appropriate authorization from the commission.]

SUBCHAPTER G: CONSIDERATION PRIOR TO PERMIT ISSUANCE

§331.121

Statutory Authority

The amendment is proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendment implements TWC, §27.019.

§331.121. Class I Wells.

(a) The commission shall consider the following before issuing a Class I Injection Well Permit:

(1) all information in the completed application for permit;

(2) all information in the Technical Report submitted with the application for permit in accordance with §305.45(a)(8) of this title (relating to Contents of Application for Permit). Subparagraphs (A) - (R) of this paragraph apply to all Class I wells except those Class I wells [Wells] authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals. Information to be considered includes, but is not limited to:

(A) a map showing the location of the injection well for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number, or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, and other pertinent surface features, including residences and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;

(B) a tabulation of all wells within the area of review which penetrate the injection zone or confining zone, and for salt dome cavern disposal wells, the salt dome cavern injection zone, salt dome cavern confining zone and caprock. Such data shall include a description of each well's type, construction, date drilled, location,

depth, record of plugging and/or completion, and any additional information the executive director may require;

(C) the protocol followed to identify, locate, and ascertain the condition of abandoned wells within the area of review which penetrate the injection or the confining zones;

(D) maps and cross-sections indicating the general vertical and lateral limits of underground sources of drinking water (USDWs) and freshwater aquifers, their positions relative to the injection formation and the direction of water movement, where known, in each USDW or freshwater aquifer which may be affected by the proposed injection;

(E) maps, cross-sections, and description of the geologic structure of the local area;

(F) maps, cross-sections, and description of the regional geologic setting;

(G) proposed operating data:

(i) average and maximum daily injection rate and volume of the fluid or waste to be injected over the anticipated life of the injection well;

(ii) average and maximum injection pressure;

(iii) source of the waste streams;

(iv) an analysis of the chemical and physical characteristics of the waste streams;

(v) for salt dome cavern waste disposal, the bulk waste density, permeability, porosity, and compaction rate, as well as the individual physical characteristics of the wastes and transporting media;

(vi) for salt dome cavern waste disposal, the results of tests performed on the waste to demonstrate that the waste will remain solid under cavern conditions; and

(vii) any additional analyses which the executive director may reasonably require;

(H) proposed formation testing program to obtain an analysis of the chemical, physical, and radiological characteristics of formation fluids, and other information on the injection zone and confining zone;

(I) proposed stimulation program, if needed;

(J) proposed operation and injection procedures;

(K) engineering drawings of the surface and subsurface construction details of the injection well and pre-injection units, except that pre-injection units registered under the provisions of §331.17 of this title (relating to Pre-Injection Units Registration) shall be considered under that section;

(L) contingency plans, based on a reasonable worst case scenario, to cope with all shut-ins; loss of cavern integrity, or well failures so as to prevent migration of fluid into any USDW;

(M) plans (including maps) for meeting the monitoring requirements of this chapter, such plans shall include all parameters, test methods, sample methods, and quality assurance procedures necessary and used to meet these requirements;

(N) for wells within the area of review which penetrate the injection zone or confining zone but are not adequately constructed, completed, or plugged, the corrective action proposed to be taken;

(O) construction procedures including a cementing and casing program, contingency cementing plan for managing lost circulation zones and other adverse subsurface conditions, well materials specifications and their life expectancy, logging procedures, deviation checks, and a drilling, testing, and coring program;

(P) delineation of all faults within the area of review, together with a demonstration, unless previously demonstrated to the commission or to the United States Environmental Protection Agency, that the fault is not sufficiently transmissive or vertically extensive to allow migration of hazardous constituents out of the injection zone;

(Q) the authorization status under this chapter of the pre-injection units for the injection well; and

(R) information demonstrating compliance with the applicable design criteria of Chapter 217 [317] of this title (relating to Design Criteria for Domestic

Wastewater [Sewerage] Systems), for pre-injection units associated with Class I nonhazardous, noncommercial injection wells.

(3) This paragraph applies to those Class I wells [Wells] authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals. Information to be considered includes, but is not limited to:

(A) a map showing the injection well(s) for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number, or name, and location of all producing wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;

(B) a tabulation of data on all wells within the area of review that penetrate into the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the executive director may require;

(C) a topographic map (or other map if a topographic map is unavailable) extending one mile beyond the property boundaries of the source depicting the facility and each of its intake and discharge structures; each of its hazardous waste treatment, storage, or disposal facilities; each well where fluids from the facility are injected underground; and those wells, springs, and other surface water bodies, and drinking water wells listed in public records or otherwise known to the applicant within a quarter mile of the facility property boundary;

(D) maps and cross sections indicating the general vertical and lateral limits of all underground sources of drinking water within the area of review, their position relative to the injection formation and the direction of water movement, where known, in each underground source of drinking water which may be affected by the proposed injection;

(E) maps and cross sections detailing the geologic structure of the local area;

(F) generalized maps and cross sections illustrating the regional geologic setting;

(G) proposed operating data:

(i) average and maximum daily rate and volume of the fluid to be injected;

(ii) average and maximum injection pressure; and

(iii) source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids;

(H) proposed formation testing program to obtain an analysis of the chemical, physical and radiological characteristics of and other information on the receiving formation;

(I) proposed stimulation program;

(J) proposed injection procedure;

(K) schematic or other appropriate drawings of the surface and subsurface construction details of the well;

(L) contingency plans to cope with all shut-ins or well failures so as to prevent migration of fluids into any underground source of drinking water;

(M) plans (including maps) for meeting the monitoring requirements in §331.64 of this title (relating to Monitoring and Testing Requirements);

(N) for wells within the area of review which penetrate the injection zone but are not properly completed or plugged, the corrective action proposed to be taken under §331.45(2)(G) of this title (relating to Executive Director Approval of Construction and Completion); and

(O) construction procedures including a cementing and casing program, logging procedures, deviation checks, and a drilling, testing, and coring program; and

(4) whether the applicant will assure, in accordance with Chapter 37, Subchapter Q of this title (relating to Financial Assurance for Underground Injection Control Wells), the resources necessary to close, plug, abandon, and if applicable, provide post-closure care for the well and/or waste disposal cavern as required;

(5) the closure plan, corrective action plan, and post-closure plan submitted in the technical report accompanying the permit application; except that a post-closure plan is not required for those Class I wells [Wells] authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals; and

(6) any additional information required by the executive director for the evaluation of the proposed injection well.

(b) In determining whether the use or installation of an injection well is in the public interest under Texas Water Code, §27.051(a)(1), the commission shall also consider:

(1) the compliance history of the applicant in accordance with Texas Water Code, §27.051(e) and §281.21(d) of this title (relating to Draft Permit, Technical Summary, Fact Sheet, and Compliance History);

(2) whether there is a practical, economic and feasible alternative to an injection well reasonably available to manage the types and classes of hazardous waste;

(3) if the injection well will be used for the disposal of hazardous waste, whether the applicant will maintain liability coverage for bodily injury and property damage to third parties that is caused by sudden and nonsudden accidents in accordance with Chapter 37 of this title (relating to Financial Assurance); and

(4) that any permit issued for a Class I injection well for disposal of hazardous wastes generated on site requires a certification by the owner or operator that:

(A) the generator of the waste has a program to reduce the volume or quantity and toxicity of such waste to the degree determined by the generator to economically practicable; and

(B) injection of the waste is that practicable method of disposal currently available to the generator which minimizes the present and future threat to human health and the environment.

(c) The commission shall consider the following minimum criteria for siting before issuing a Class I injection well permit for all Class I wells except those Class I wells [Wells] authorized to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals. For Class I wells [Wells] authorized

to inject only nonhazardous desalination concentrate or nonhazardous drinking water treatment residuals, only paragraph (1) of this subsection applies.

(1) All Class I injection wells shall be sited such that they inject into a formation that is beneath the lowermost formation containing, within 1/4 mile of the wellbore, a USDW or freshwater aquifer.

(2) The siting of Class I injection wells shall be limited to areas that are geologically suitable. The executive director shall determine geologic suitability based upon:

(A) an analysis of the structural and stratigraphic geology, the hydrogeology, and the seismicity of the region;

(B) an analysis of the local geology and hydrogeology of the well site, including, at a minimum, detailed information regarding stratigraphy, structure, and rock properties, aquifer hydrodynamics, and mineral resources; and

(C) a determination that the geology of the area can be described confidently and that limits of waste fate and transport can be accurately predicted through the use of analytical and numerical models.

(3) Class I injection wells shall be sited such that:

(A) the injection zone has sufficient permeability, porosity, thickness, and areal extent to prevent migration of fluids into USDWs or freshwater aquifers;

(B) the confining zone:

(i) is laterally continuous and free of transecting, transmissive faults or fractures over an area sufficient to prevent the movement of fluids into a USDW or freshwater aquifer; and

(ii) contains at least one formation of sufficient thickness and with lithologic and stress characteristics capable of preventing initiation and/or propagation of fractures.

(4) The owner or operator shall demonstrate to the satisfaction of the executive director that:

(A) the confining zone is separated from the base of the lowermost USDW or freshwater aquifer by at least one sequence of permeable and less permeable strata that will provide an added layer of protection for the USDW or freshwater aquifer in the event of fluid movement in an unlocated borehole or transmissive fault; or

(B) within the area of review, the piezometric surface of the fluid in the injection zone is less than the piezometric surface of the lowermost USDW or freshwater aquifer, considering density effects, injection pressures, and any significant pumping in the overlying USDW or freshwater aquifer; or

(C) there is no USDW or freshwater aquifer present;

(D) the commission may approve a site which does not meet the requirements in subparagraphs (A), (B), or (C) of this paragraph if the owner or operator can demonstrate to the commission that because of the geology, nature of the waste, or other considerations, that abandoned boreholes or other conduits would not cause endangerment of USDWs, and fresh or surface water.

(d) The commission shall also consider the following additional information, which must be submitted in the technical report of the application as part of demonstrating that the facility will meet the performance standard in §331.162 of this

title (relating to Performance Standard), before issuing a salt dome cavern Class I injection well permit:

(1) a thorough characterization of the salt dome to establish the geologic suitability of the location, including:

(A) data and interpretation from all appropriate geophysical methods (such as well logs, seismic surveys, and gravity surveys), subject to the approval of the executive director, necessary to:

(i) map the overall geometry of the salt dome, including all edges and any suspected overhangs of the salt stock;

(ii) demonstrate the existence of a minimum distance of 500 feet between the boundaries of the proposed salt dome cavern injection zone and the boundaries of the salt stock;

(iii) define the composition and map the top and thickness of the sedimentary rock units between the caprock and surface, including the flanks of the salt stock;

(iv) define the composition and map the top and thickness of the caprock overlying the salt stock;

(v) map the top of the salt stock;

(vi) calculate the movement and the salt loss rate of the salt stock;

(vii) define any other caverns and other uses of the salt dome, and address any conditions that may result in potential adverse impact on the salt dome; and

(viii) satisfy any other requirement of the executive director necessary to demonstrate the geologic suitability of the location;

(B) a surface-recorded three-dimensional seismic survey, subject to the following minimum requirements:

(i) the lateral extent of the survey will be determined by the executive director; and

(ii) the survey must provide information as part of demonstrating that the location is geologically suitable for the purpose of meeting the performance standard in §331.162 of this title;

(C) identification of any unusual features, such as depressions or lineations observable at the land surface or within or detectable within the subsurface, which may be indicative of underlying anomalies in the caprock or salt stock, which might affect construction, operation, or closure of the cavern;

(D) the petrology of the caprock, salt stock, and deformed strata; and

(E) for strata surrounding the salt stock, information on their nature, structure, hydrodynamic properties, and relationships to USDWs, including a demonstration that the proposed salt dome cavern injection zone will not be in or above a formation which within 1/4 mile of the salt dome cavern injection zone contains a USDW;

(2) establishment of a pre-development baseline for subsidence and groundwater monitoring, over the area of review;

(3) characterization of the predicted impact of the proposed operations on the salt stock, specifically the extent of the disturbed zone;

(4) demonstration of adequate separation between the outer limits of the injection zone and any other activities in the domal area. The thickness of the disturbed zone, as well as any additional safety factors will be taken into consideration; and

(5) the commission will consider the presence of salt cavern storage activities, sulfur mining, salt mining, brine production, oil and gas activity, and any other activity which may adversely affect or be affected by waste disposal in a salt cavern.

(e) Information requirements for Class I hazardous waste injection well permits.

(1) The following information is required for each active Class I hazardous waste injection well at a facility seeking an underground injection control permit:

(A) dates well was operated; and

(B) specification of all wastes that have been injected in the well, if available.

(2) The owner or operator of any facility containing one or more active hazardous waste injection wells must submit all available information pertaining to any release of hazardous waste or constituents from any active hazardous waste injection well at the facility.

(3) The owner or operator of any facility containing one or more active Class I hazardous waste injection wells must conduct such preliminary site investigations as are necessary to determine whether a release is occurring, has occurred, or is likely to have occurred.

(f) Interim Status under the Resource Conservation Recovery Act (RCRA) [RCRA] for Class I hazardous waste injection wells. The minimum state standards which define acceptable injection of hazardous waste during the period of interim status are set out in this chapter. The issuance of an underground injection well permit does not automatically terminate RCRA interim status. A Class I well's interim status does, however, automatically terminate upon issuance of a RCRA permit for that well, or upon the well's receiving a RCRA permit-by-rule under §335.47 of this title (relating to Special Requirements for Persons Eligible for a Federal Permit by Rule). Thus, until a Class I well injecting hazardous waste receives a RCRA permit or RCRA permit-by-rule, the well's interim status requirements are the applicable requirements imposed under this

chapter, including any requirements imposed in the underground injection control [UIC] permit.

[(g) Before issuing a permit for a hazardous waste injection well in a solution-mined salt dome cavern, the commission by order must find that there is an urgent public necessity for the hazardous waste injection well. The commission, in determining whether an urgent public necessity exists for the permitting of the hazardous waste injection well in a solution-mined salt dome cavern, must find that:]

[(1) the injection well will be designed, constructed, and operated in a manner that provides at least the same degree of safety as required of other currently operating hazardous waste disposal technologies;]

[(2) consistent with the need and desire to manage the state hazardous wastes generated in the state, there is a substantial or obvious public need for additional hazardous waste disposal capacity and the hazardous waste injection well will contribute additional capacity toward servicing that need;]

[(3) that the injection well will be constructed and operated in a manner so as to safeguard public health and welfare and protect physical property and the environment;]

[(4) the has demonstrated that groundwater and surface waters, including public water supplies, will be protected from the release of hazardous waste from the salt dome waste containment cavern; and]

[(5) any other criteria required by the commission to satisfy that the test of urgency has been met.]

SUBCHAPTER I: FINANCIAL RESPONSIBILITY

§331.142

Statutory Authority

The amendment is proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendment implements TWC, §27.019.

§331.142. Financial Assurance.

(a) The permittee shall secure and maintain financial assurance for plugging and abandonment in the amount of the plugging and abandonment cost estimate for Class I, Class I salt cavern disposal wells and associated salt caverns, and Class III wells in a

manner that meets the requirements of Chapter 37, Subchapter Q of this title (relating to Financial Assurance for Underground Injection Control Wells). Financial assurance for plugging and abandonment shall be provided in the amount of the plugging and abandonment cost estimate as provided in §331.143 of this title (relating to Cost Estimate for Plugging and Abandonment and Aquifer Restoration). Financial assurance for post closure of Class I hazardous wells shall be provided in the amount of the post closure cost estimate.

(b) The permittee of a hazardous waste Class I waste injection well [or Class I salt cavern disposal well and associated salt cavern] shall establish and maintain sufficient liability coverage for bodily injury and property damage to third parties caused by sudden or nonsudden accidental occurrences arising from operations of the facility that meets the requirements of Chapter 37 of this title (relating to Financial Assurance) and §305.154(a)(11) of this title (relating to Standards).

(c) The requirement to maintain financial responsibility is enforceable regardless of whether the requirement is a condition of the permit.

SUBCHAPTER J: STANDARDS FOR CLASS I SALT DOME CAVERN [SOLID WASTE] DISPOSAL WELLS

§§331.161, 331.162, 331.165, 331.168, 331.170, 331.171

Statutory Authority

The amendments are proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendments implement TWC, §27.019.

§331.161. Applicability.

The sections of this subchapter apply to all Class I salt cavern [solid waste] disposal wells and their associated salt caverns located in the salt stocks of salt domes, and not to such facilities in horizontally bedded or non-domal salt. [As provided by

§331.14 of this title (relating to Prohibition of Class I Salt Cavern Solid Waste Disposal Wells and Associated Caverns in Geologic Structures or Formations Other Than Salt Stocks of Salt Domes and Prohibition of Disposal of Hazardous Waste into Certain Geological Formations), salt cavern solid waste disposal wells and associated caverns in geologic structures or formations other than salt stocks of salt domes are prohibited until such time at which §331.14 of this title and this subchapter are amended to allow the subject facilities, and any necessary specific rules for such facilities are added by amendment to this subchapter or promulgated as a new subchapter.]

§331.162. Performance Standard.

The operator and permittee shall assure for construction, operation, maintenance, monitoring, closure, and post-closure of a Class I salt cavern [solid waste] disposal well and associated cavern, the continuous attainment of a performance standard of no escape of waste [hazardous constituents] from the salt cavern injection zone. [Demonstration of attainment of this standard may be shown by modeling waste transport over a period of at least 15,000 years.] The provisions of this chapter, as well as any permit or order issued by the commission, shall be construed as minimum operating requirements. To qualify for a permit or to otherwise operate a Class I salt cavern [solid waste] disposal well and associated cavern, permit applicants and facility operators must demonstrate that this performance standard will be satisfied even if it is necessary to go beyond the minimum operating requirements described in this chapter.

§331.165. Waste Disposal Operating Requirements.

(a) General operating requirements.

(1) Injection pressure at the wellhead shall not exceed a maximum, which shall be calculated, so as to assure that the pressure in the cavern during injection does not disrupt the bond between the salt, cement, and the casing seat, initiate new fractures or propagate existing fractures in the cavern or the confining zone, or cause movement of fluid or waste out of the injection zone.

(2) Injection between the outermost casing protecting underground sources of drinking water (USDWs), and fresh or surface water and the wellbore is prohibited.

(3) The annulus between the outer tubing and long string casing shall be filled with an inert gas approved by the commission. The annulus pressure, at all times that the well is in service, shall be at least 100 pounds per square inch [psi] greater than the injection tubing pressure, to detect well malfunctions, unless the executive director determines that such a requirement might harm the integrity of the well.

(4) Chemical and physical characteristics of all injected materials and cavern contents, including but not limited to, bulk density and compressive strength of solidified waste, shall protect and be compatible with the injection well, associated facilities, and injection zone, and shall ensure proper operation of the facility to meet the performance standard of §331.162 of this title (relating to Performance Standard). In addition, after cavern construction is certified and a cavern is authorized to receive wastes under §331.164(f) of this title (relating to Cavern Construction Standards), all injected materials and cavern contents shall not cause further dissolution of the cavern walls.

(5) The waste stream shall be stabilized, prior to injection, to minimize the generation of fluids in the cavern.

(6) All injection of waste into a salt cavern shall be performed through the inner of two removable tubings with a packer to seal the annulus between the outer tubing and long string casing, near the bottom of the long string casing.

(7) Unauthorized releases of cavern contents to the atmosphere are prohibited.

(8) The cavern will be operated so as to control the extent of the disturbed zone.

(9) If an automatic alarm or shutdown is triggered, the owner or operator shall immediately investigate and identify as expeditiously as possible the cause of the alarm or shutoff. If, upon such investigation, the well or cavern appears to be lacking integrity, or if monitoring required under §331.166(c) of this title (relating to Monitoring and Testing Requirements) otherwise indicates that the well or cavern lacks integrity, the owner or operator shall:

(A) immediately cease injection of waste unless authorized by the executive director to continue or resume injection;

(B) take all necessary steps to determine the presence or absence of a leak; and

(C) notify the executive director within 24 hours after the alarm or shutdown.

(10) If the loss of integrity is discovered pursuant to paragraph (3) of this subsection or during periodic integrity testing, the owner or operator shall:

(A) immediately cease injection of waste;

(B) take all steps required to determine whether there may have been a release of [hazardous] wastes [or hazardous waste constituents] into any unauthorized zone;

(C) notify the executive director within 24 hours after loss of mechanical integrity is discovered;

(D) notify the executive director when injection can be expected to resume; and

(E) restore and demonstrate well mechanical integrity and/or cavern integrity to the satisfaction of the executive director prior to resuming injection of waste.

(11) Whenever the owner or operator obtains evidence that there may have been a release <u>of</u> [or] injected wastes into an unauthorized zone:

(A) the owner or operator shall immediately cease injection of waste, and:

(i) notify the executive director within 24 hours of obtaining such evidence;

(ii) take all necessary steps to identify and characterize the extent of any release;

(iii) propose a remediation plan for executive director review and approval;

(iv) comply with any remediation plan specified by the executive director;

(v) implement any remediation plan approved by the executive director; and

(vi) where such release is into a USDW or freshwater aquifer currently serving as a water supply, within 24 hours notify the local health department,

place a notice in a newspaper of general circulation and notify by mail the adjacent landowners:

(B) the executive director may allow the operator to resume injection prior to completing cleanup action if the owner or operator demonstrates that the injection operation will not endanger USDWs or freshwater aquifers.

(12) Cavern contents shall not interfere with the set-up of any stabilized waste injected after the waste and solidifying agents have been mixed, but is injected while is still pumpable and has not set.

(13) Waste emplacement must be performed in such a manner as to minimize gas or fluid entrapment, so that compaction of wastes does not disrupt the integrity of the cavern.

(14) A salt cavern disposal well [solid waste disposal cavern] shall be operated in a manner which will not generate high temperatures that will result in nonattainment of the performance standard of §331.162 of this title [(relating to Performance Standard)].

(15) All fluids purged from the cavern after emplacement of any waste shall be managed at a [hazardous] waste management facility pursuant to applicable state and federal regulations.

(b) Workovers.

(1) The permittee shall notify the executive director before commencing any workover operation or corrective maintenance which involves taking the injection well out of service. The notification shall be in writing and shall include plans for the proposed work. The executive director may grant an exception of the prior written notification when immediate action is required. Approval by the executive director shall be obtained before the permittee may begin any workover operation or corrective maintenance that involves taking the well out of service. Pressure control equipment shall be installed and maintained during workovers which involve the removal of tubing.

(2) Mechanical integrity of the well shall be demonstrated following any major operations which involve removal of the injection tubing, recompletions, or unseating of the packer.

(c) Temporary cessation of operations.

(1) An owner or operator of a Class I salt cavern [solid waste] disposal well who ceases injection operations temporarily, may keep the well open provided he:

(A) has received written authorization from the executive director; and

(B) has described actions or procedures, satisfactory to the executive director, that the owner or operator will take to ensure that the well will not endanger USDWs, and fresh or surface water during the period of temporary disuse. These actions and procedures shall include compliance with the technical requirements applicable to active injection wells, including mechanical integrity, and monitoring, unless waived by the executive director.

(2) The owner or operator of a well that has ceased operations for more than two years shall notify the executive director, in writing, 30 days prior to resuming operation of the well.

§331.168. Additional Requirements and Conditions.

(a) A permit for a Class I salt cavern [solid waste] disposal well shall include expressly or by reference the following conditions.

(1) A sign shall be posted at the well site which shall show the name of the company, company well number, commission permit number, the depth of the cavern floor and ceiling, and the cavern diameter. The sign and identification shall be in the English language, clearly legible, and shall be in numbers and letters at least one inch high.

(2) An all-weather road shall be installed and maintained to allow access to the injection well and related facilities.

(3) The wellhead and associated facilities shall be painted, if appropriate, and maintained in good working order without detectable leaks.

(4) Secondary containment of the wellhead shall consist of a diked, impermeable pad or sump.

(5) The commission may prescribe additional requirements for Class I salt cavern [solid waste] disposal wells in order to protect underground sources of drinking water, and fresh or surface water from pollution.

(6) The obligation to implement the plugging and abandonment plan and the post-closure plan survives the termination of a permit or the cessation of injection activities. The requirement to maintain an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

(b) Pressure control equipment including blowout preventers or a wellhead with closeable valves shall be required to be installed and maintained in proper operating condition at all times at the casing head, extending from the time of advancing the surface casing hole after conductor casing is set, to the time of well closure, to safeguard against any pressure imbalance which might cause a backflow, blowout, or fracturing of the salt to occur.

§331.170. Cavern Closure.

(a) The owner or operator of a Class I salt cavern [solid waste] disposal well shall prepare, maintain, and comply with a plan for cavern closure that meets the minimum following requirements, and that is acceptable to the executive director.

(1) The owner or operator shall submit the plan as a part of the permit application and, upon approval, or approval with modifications, by the executive director, such plan shall be a condition of any permit issued.

(2) The owner or operator shall submit all proposed revisions to the plan and obtain any necessary permit amendments, as appropriate, over the life of the well and cavern.

(3) The plan shall include, at a minimum, the following information:

(A) upon cessation of waste disposal, and prior to cavern sealing, the operator shall:

(i) monitor the cavern pressure and cavern fluid volume and fluid chemical composition, to provide information regarding the cavern's natural closure characteristics and any ensuant pressure buildup;

(ii) provide predictions from data gathered in clause (i) of this subparagraph of cavern behavior after sealing is completed;

(iii) demonstrate, to the executive director, utilizing actual pre-closure monitoring data, that the sealing of the cavern will not result in any pressure buildup within the cavern that could adversely affect [effect] the integrity of the cavern, well, or seal;

(iv) fill all partially filled caverns with crushed salt or another approved suitable material which is compatible with the waste and the salt stock;

(v) complete any monitoring of the cavern and its contents required by rule or permit;

(vi) use redundant seals or plugs, comprised of different compositions and sealing properties, to provide for immediate as well as long-term salt cavern injection zone containment;

(vii) obtain written authorization from the executive director for cavern sealing;

(B) upon completion of cavern sealing, the owner or operator shall:

(i) monitor the seal for leaks;

(ii) demonstrate to the executive director that the seal is not leaking prior to requesting authorization for closing the wellbore;

(iii) obtain written authorization from the executive director to begin well closure.

(b) The well shall be closed in accordance with §331.46 of this title (relating to Closure Standards).

§331.171. Post-Closure Care.

(a) The owner or operator of a Class I salt cavern [solid waste] disposal well shall prepare, maintain, and comply with a plan for post-closure care that meets the requirements of subsection (b) of this section, and that is acceptable to the executive director.

(1) The owner or operator shall submit the plan as a part of the permit application and, upon approval by the executive director, such plan shall be a condition of any permit issued.

(2) The owner or operator shall submit any proposed significant revision to the plan and obtain any necessary permit amendment, as appropriate over the life of the well, but no later than the date of the closure report required under §331.46 of this title (relating to Closure Standards).

(3) The plan shall provide financial assurance as required in this chapter. The owner or operator shall demonstrate and maintain financial assurance in the amount of the post closure cost estimate to cover post closure in a manner that meets the requirements of this chapter and Chapter 37, Subchapter Q of this title (relating to Financial Assurance for Underground Injection Control Wells). The amount of the funds available shall be no less than the amount identified in paragraph (4)(F) of this subsection.

(4) The plan shall include the following information:

(A) the pressure in the injection zone before injection began;

(B) the anticipated pressure in the injection zone at the time of closure;

(C) the predicted time based on actual preclosure monitoring data until pressure in the injection interval reaches equilibrium with the surrounding salt stock;

(D) predicted position of the waste front at closure (cavern sealing and well plugging);

(E) the status of any corrective action required under §331.44 of this title (relating to Corrective Action Standards);

(F) the estimated cost of proposed closure and post-closure care to be based on a reasonable worst case scenario.

(5) At the request of the owner or operator, or on his own initiative, the executive director may modify the post-closure plan after submission of the closure report following the procedures in §331.46 of this title [(relating to Closure Standards)].

(b) The owner or operator shall:

(1) continue and complete any corrective action required under §331.44 of this title [(relating to Corrective Action Standards)];

(2) continue to conduct any groundwater monitoring and subsidence monitoring required under the permit until pressure in the injection interval reaches equilibrium with the salt stock. The executive director may extend the period of post-

closure monitoring if he determines that the well or cavern may endanger an underground source of drinking water or freshwater aquifer;

(3) submit a survey plat to the local zoning authority designated by the executive director. The plat shall indicate the location of the well relative to permanently surveyed benchmarks, the depth of the cavern ceiling and floor, and the maximum cavern radius. A copy of the plat shall be submitted to the underground injection control [(UIC)] staff of the commission;

(4) provide appropriate notification and information to such state and local authorities as have authority over drilling activities to enable such state and local authorities to impose appropriate conditions on subsequent drilling activities that may penetrate the well's confining or injection zone;

(5) retain for a period of three years following well closure records reflecting the nature, composition, and volume of all injected materials. The executive director shall require the owner or operator to deliver the records to the executive director at the conclusion of the retention period, and all records shall thereafter be retained at a location designated by the executive director for that purpose.

SUBCHAPTER L: GENERAL PERMIT AUTHORIZING USE OF A CLASS I INJECTION WELL TO INJECT NONHAZARDOUS DESALINATION CONCENTRATE OR NONHAZARDOUS DRINKING WATER TREATMENT RESIDUALS

§331.206

Statutory Authority

The amendment is proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The proposed amendment implements TWC, §27.019.

§331.206. Annual Fee Assessments.

A person authorized by a general permit shall pay annual facility and waste management fees according to Chapter 335, Subchapter J of this title (relating to Hazardous Waste Generation, Facility and Disposal Fee System [Permits for Land Treatment Demonstrations Using Field Tests or Laboratory Analyses]) unless specified in the general permit.

SUBCHAPTER N: STANDARDS FOR CLASS I BEDDED SALT CAVERN DISPOSAL WELLS

§§331.241 - 331.251

Statutory Authority

These new sections are proposed under Texas Water Code (TWC), §5.102, which provides the commission the power to perform any acts necessary and convenient to the exercise of its jurisdiction and powers as provided by this code and other laws; §5.103, which provides the commission with the authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state; §5.105, which authorizes the commission to establish and approve all general policy of the commission by rule; and §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells.

The new sections implement TWC, §27.019.

§331.241. Applicability.

(a) The sections of this subchapter apply to all Class I disposal wells located in horizontally bedded or non-domal salt and their associated salt caverns, and not to such facilities located in the salt stocks of salt domes.

(b) The receipt, processing or disposal of radioactive material under this subchapter is subject to the applicable requirements of Chapter 336 of this title (relating to Radioactive Substance Rules).

§331.242. Bedded Salt Cavern Disposal Well Performance Standard and Siting Requirements.

(a) Performance standard. The operator and permittee shall assure for construction, operation, maintenance, monitoring, closure, and post-closure of a Class I disposal well located in horizontally bedded or non-domal salt and associated cavern, the continuous attainment of a performance standard to prevent the movement of fluids that would result in the pollution of an underground source of drinking water.

(b) The provisions of this chapter, as well as any permit or order issued by the commission, shall be construed as minimum operating requirements. To qualify for a permit or to otherwise operate a Class I disposal well located in horizontally bedded or non-domal salt and associated cavern, permit applicants and facility operators must demonstrate that this performance standard will be satisfied even if it is necessary to go beyond the minimum operating requirements described in this chapter.

(c) Siting. In addition to the minimum siting criteria for Class I disposal wells, each permit applicant for a Class I bedded salt cavern disposal well and associated cavern shall identify potential risks to the waste disposal operation within the area of review.

§331.243. Bedded Salt Cavern Disposal Well Construction Standards.

(a) Wells shall be sited in such a fashion that they inject into a formation which is beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water (USDW).

(b) Plans and specifications. Except as specifically required in the terms of the disposal well permit, the drilling and completion of the well shall be done in accordance with all permit application plans and specifications.

(c) Any proposed changes to the plans and specifications must be in accordance with §331.62(a)(3) of this title (relating to Construction Standards).

(d) Casing and cementing.

(1) Wells shall be cased and cemented to prevent the movement of fluids into or between USDW. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

(A) depth of lowermost USDW or freshwater aquifer;

(B) depth to the injection zone;

(C) injection pressure, external pressure, internal pressure, and axial loading;

(D) hole size;

(E) size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material);

(F) the maximum burst and collapse pressures, and tensile stresses which may be experienced at any point along the length of the casings at any time during the construction, operation, and closure of the well;

(G) corrosive effects of injected materials, formation fluids, and temperatures;

(H) lithology of injection and confining zones;

(I) types and grades of cement;

(J) quantity and chemical composition of the injected fluid; and

(K) cement and cement additives which must, at a minimum, be of sufficient quality and quantity to maintain integrity over the design life of the well.

(2) Surface casing shall be set to a minimum subsurface depth which extends into a confining bed below the lowest formation containing a USDW or freshwater aquifer.

(3) A second or long string casing, using a sufficient number of centralizers, shall be set into the salt formation.

(4) The cement for that part of the casing opposite a salt formation shall be prepared with salt-saturated cementing material.

(e) Injection tubings. Except for circulation of drilling fluids during well construction, all injection activities for bedded salt cavern construction and waste disposal in a bedded salt cavern shall be performed using removable injection tubing(s) suspended from the wellhead.

(1) All injection activities during bedded salt cavern construction shall be performed with the annulus between the tubing and long string casing filled with a noncorrosive fluid sufficient to protect the long string casing seat.

(2) All injection of waste into a bedded salt cavern shall be performed through tubing with a packer to seal the annulus between the tubing and casing near the bottom of the casing, or tubing with an approved fluid seal as an alternative. The tubing, packer, and fluid seal shall be designed for the expected service.

(f) Well annulus system factors for consideration. In determining and specifying requirements for a tubing and packer system or tubing with a fluid seal, the following factors shall be considered and addressed:

(1) depth of setting;

(2) characteristics of injection fluid and waste;

(3) injection pressure;

(4) annular pressure;

(5) rate, temperature, and volume of injected waste;

(6) size of casing; and

(7) tensile, burst, and collapse strengths of the tubing.

(g) Logs and tests.

(1) Geophysical logging. Appropriate logs and other tests shall be conducted during the drilling and construction phases of the well including drilling into the salt. All logs and tests shall be interpreted by the service company which processed the logs or conducted the test, or by other qualified persons. At a minimum the following logs and tests shall be conducted:

(A) deviation checks on all holes, conducted at sufficiently frequent intervals to assure that avenues for fluid migration in the form of diverging holes are not created during drilling;

(B) a spontaneous potential and resistivity log;

(C) from the ground surface or from the base of conductor casing to the total investigated depth including all core hole or pilot hole:

(i) natural gamma ray log;

(ii) compensated density and neutron porosity logs;

(iii) acoustic or sonic log;

(iv) inclination (directional) survey; and

(v) caliper log (open hole);

(D) from the ground surface or from the base of conductor casing to the lowermost casing seat:

(i) cement bond with variable density log;

(ii) temperature log (cased hole); and

(iii) casing inspection log; and

(E) fracture detector log from the base of the surface casing to the total investigated depth including all core hole or pilot hole.

(2) Pressure tests.

(A) After installation and cementing of casings, and before drilling out the cemented casing shoe, surface casing shall be pressure tested at mill test pressure or 80% of the calculated internal pressure at minimum yield strength, and the intermediate and long string casing shall be tested to 1,500 pounds per square inch (psi) for 30 minutes, unless otherwise specified by the executive director.

(B) After drilling out the cemented long string casing shoe, and before drilling more than 100 feet of core hole or pilot hole below the long string casing

shoe, the bond between the salt, cement, and casing shall be tested at a pressure of 0.8 psi per foot of depth.

(C) The pilot hole and/or core hole shall be tested between the long string casing shoe and the total investigated depth, at a casing seat pressure of 0.8 psi per foot of depth.

(3) Coring.

(A) Core samples. Full-hole cores shall be taken from selected intervals of the injection zone and lowermost overlying confining zone; or, if full-hole coring is not feasible or adequate core recovery is not achieved, sidewall cores shall be taken at sufficient intervals to yield representative data for selected parts of the injection zone and lowermost overlying confining zone. Core analysis shall include a determination of permeability, porosity, and bulk density.

(B) In situ permeability, lithostatic gradients, and fracture pressure gradients shall be determined in the core hole for the salt, within the cavern injection interval.

(4) Before commencement of injection for cavern construction, any portion of the pilot hole or core hole that extends beyond the intended wall of the cavern shall be filled with salt-saturated cement from total investigated depth back to the designed cavern boundary.

(5) Well integrity testing. The mechanical integrity of a well must be demonstrated before initiation of injection activities. A mechanical integrity test shall consist of:

(A) a pressure test with liquid or gas;

(B) a temperature, noise log, or oxygen activation log;

(C) a casing inspection log, if required by the executive director; and

(D) any other test required by the executive director.

(h) Compatibility. All well materials must be compatible with formations and fluids with which the materials may be expected to come into contact. A well shall be deemed to have compatibility as long as the materials used in the construction of the well meet or exceed standards developed for such materials by the American Petroleum

Institute, the American Society for Testing Materials, or comparable standards acceptable to the executive director.

(i) Pre-injection units.

(1) The injection pump system shall be designed to assure that the surface injection pressure limitations authorized by the well permit shall not be exceeded.

(2) Instrumentation shall be installed to continuously monitor changes in annulus pressure and annulus fluid volume for the purpose of detecting well malfunctions.

(3) Pre-injection units, while allowing for pressure release, shall be designed to prevent the release of unauthorized cavern contents to the atmosphere.

(4) To protect the ground surface from spills and releases, the wellhead will have secondary containment in the form of a diked, impermeable pad or sump.

(j) Construction supervision. All phases of well construction and all phases of any well workover shall be supervised by a licensed professional engineer or licensed professional geoscientist, as appropriate, with current registration under the Texas

Engineering Practice Act or Texas Geoscience Practice Act, who is knowledgeable and experienced in practical drilling engineering and who is familiar with the special conditions and requirements of waste disposal well construction.

(k) Approval of completion of the well construction stage. Before beginning cavern construction and operation, the permittee shall obtain written approval from the executive director which states that the well construction is in compliance with the applicable provisions of the permit. To obtain approval, the permittee shall submit to the executive director within 90 days of completion of well construction, including all logging, coring, and testing of the pilot hole, the following reports and certifications prepared and sealed by a licensed professional engineer or licensed professional geoscientist with current registration under the Texas Engineering Practice Act or Texas Geoscience Practice Act:

(1) final construction, "as-built" plans and specifications, reservoir data, and an evaluation of the considerations set out in §331.45(3) of this title (relating to Executive Director Approval of Construction and Completion);

(2) certification that construction of the well has been completed in accordance with the provisions of the disposal well permit and with the design and construction specifications of the permittee's application; and

(3) certification that actual reservoir data obtained will not result in the need for a change in the operating parameters specified in the permit.

§331.244. Bedded Salt Cavern Construction Standards.

(a) Plans and specifications. Except as specifically required in the terms of the disposal well permit, construction of the cavern shall be done in accordance with all permit application plans and specifications. Any proposed changes to the plans and specifications must be certified in writing by the executive director that said changes provide protection standards equivalent to or greater than the original design criteria.

(b) Standards for bedded salt cavern construction.

(1) The creation of waste disposal caverns within bedded salt shall be accomplished by the controlled dissolution of the sidewalls of the well bore to a specified maximum diameter, between selected elevations specified in the permit as the top and bottom of the injection interval.

(2) The enlargement of a portion of the original well bore to serve as the cavern shall be done according to the cavern construction plans which shall be

submitted as a part of the permit application. The cavern construction plans shall demonstrate at a minimum, the following:

(A) adjacent caverns shall be separated by a minimum pillar to cavern diameter ratio of 2.0 to ensure a sufficient amount of separation for cavern safety and stability;

(B) that cavern dimensions have been designed by a qualified professional engineer and geologist, to ensure the structural integrity of the cavern;

(C) if an applicant proposes to conduct solution-mining activities concurrent with waste disposal, a plan for the controlled expansion of the cavern.

(D) plans for continual monitoring of the volumes of materials injected and produced during cavern development and waste injection;

(E) plans for cavern pressure tests and sonar surveys to determine the cavern dimensions, volume, geometric shape, and characterization of anomalies;

(F) the cavern construction process shall be conducted under the supervision of a qualified professional engineer, with current registration under the

Texas Engineering Practice Act, in accordance with accepted practices in the cavern construction industry.

(G) all brines displaced from the cavern shall be managed and/or disposed of in facilities authorized for such purpose.

(c) Injection tubing. Except for circulation of drilling fluids during well construction, all injection activities for bedded salt cavern construction and waste disposal in a bedded salt cavern shall be performed through removable injection tubing(s) installed inside the cemented long string casing and extending from the wellhead at ground surface to the bedded salt cavern below the long string casing seat.

(d) Logs and Tests.

(1) The permit applicant shall submit, as part of its construction plan, information identifying the tests which it will use to verify cavern dimensions. This information shall include at a minimum, the following:

(A) a description of surveys, logs, and tests to be run and analyzed, including any quantitative performance standards appropriate for any such procedure; and

(B) the frequency of such surveys or logs.

(2) Before waste disposal, the integrity of the cavern shall be tested in accordance with §331.43(b) of this title (relating to Mechanical Integrity Standards).

(e) Workovers.

(1) The permittee shall notify the executive director before commencing any workover operation or corrective maintenance which involves taking the disposal well out of service. The notification shall be in writing and shall include plans for the proposed work. The executive director may grant an exception of the prior written notification when immediate action is required. Approval by the executive director shall be obtained before the permittee may begin any workover operation or corrective maintenance that involves taking the well out of service. Pressure control equipment shall be installed and maintained during workovers which involve the removal of tubing.

(2) Well mechanical integrity shall be demonstrated following any major operations which involve removal of the injection tubing, recompletions, or unseating of the packer. Cavern integrity demonstration may be required by the executive director in instances where the integrity of the casing seat or cavern may be compromised.

(f) Reports and approval.

(1) Initial cavern integrity report. The operator shall submit a report with the results of all tests regarding cavern integrity, within 30 days of completion of the bedded salt cavern construction stage.

(2) Notification of completion of the cavern construction stage. Within 90 days of completion of cavern construction, the permittee shall provide notification to the executive director which states that the cavern construction is in compliance with the applicable provisions of the permit. The permittee shall submit to the executive director the following reports and certifications prepared and sealed by a professional engineer with current registration under the Texas Engineering Practice Act:

(A) final construction, "as-built" plans and specifications, injection and confining zone data, and an evaluation of the considerations under §331.45(3) of this title (relating to Executive Director Approval of Construction and Completion);

(B) certification that the construction of the cavern has been completed in accordance with the provisions of the disposal well permit and with the design and construction specifications of the permittee's application;

(C) certification that actual confining and injection zone data obtained will not result in need for a change in the operating parameters specified in the permit; and

(D) certification that the bedded salt cavern injection zone will not be in or above a formation which within 1/4 mile of the bedded salt cavern injection zone contains an underground source of drinking water.

§331.245. Bedded Salt Cavern Disposal Well Operating Requirements.

(a) General operating requirements.

(1) A maximum allowable operating pressure and test pressure shall not exceed 0.8 pounds per square inch per foot of depth measured at the higher elevation of either the long string casing seat or the highest interior elevation of the cavern roof, but in no case shall it disrupt the bond between the salt, cement, and the casing seat, initiate new fractures or propagate existing fractures in the cavern or the confining zone, or cause movement of fluid or waste out of the injection zone.

(2) A minimum operating pressure that is protective of bedded salt cavern integrity shall be maintained.

(3) Injection between the outermost casing protecting underground sources of drinking water (USDWs), and fresh or surface water and the wellbore is prohibited.

(4) Unless an alternative to a packer has been approved under §331.243(d) of this title (relating to Bedded Salt Cavern Disposal Well Construction Standards), the annulus between the tubing and long string casing shall be filled with a noncorrosive fluid approved by the commission. The annulus pressure, at all times that the well is in service, shall be at least 100 pounds per square inch greater than the injection tubing pressure, to detect well malfunctions, unless the executive director determines that such a requirement might harm the integrity of the well.

(5) Chemical and physical characteristics of all injected materials and cavern contents shall protect and be compatible with the disposal well, associated facilities, and injection zone, and shall ensure proper operation of the facility to meet the performance standard of §331.242 of this title (relating to Bedded Salt Cavern Disposal Well Performance Standard and Siting Requirements).

(6) All injection of waste into a bedded salt cavern shall be performed through removable tubing(s) with a packer or fluid seal to seal the annulus between the outer tubing and long string casing, near the bottom of the long string casing.

(7) Unauthorized releases of cavern contents to the atmosphere are prohibited.

(8) Before beginning waste disposal operations, a blanket material shall:

(A) be placed into the salt cavern to prevent unwanted leaching of the cavern roof;

(B) consist of crude oil, mineral oil, or other fluid possessing similar noncorrosive, nonsoluble, low-density properties;

(C) be sufficient to protect the integrity of the cement and formation bond at the long string casing seat; and

(D) be of sufficient volume to contact the entire cavern roof.

(9) The cavern roof and level of the blanket material shall be monitored at least once every five years by running a density interface survey or using an alternative method.

(10) If an automatic alarm or shutdown is triggered, the owner or operator shall immediately investigate and identify as expeditiously as possible the cause of the alarm or shutoff. If, upon such investigation, the well or cavern appears to be lacking integrity, or if monitoring required under §331.246(c) of this title (relating to Bedded Salt Cavern and Well Monitoring and Testing Requirements) otherwise indicates that the well or cavern lacks integrity, the owner or operator shall:

(A) immediately cease injection of waste unless authorized by the executive director to continue or resume injection;

(B) take all necessary steps to determine the presence or absence of a leak; and

(C) notify the executive director within 24 hours after the alarm or shutdown.

(11) If the loss of integrity is discovered under paragraph (4) of this subsection or during periodic integrity testing, or if unauthorized communication is established between bedded salt caverns, the owner or operator shall:

(A) immediately cease injection of waste;

(B) take all steps required to determine whether there may have been a release of wastes into any unauthorized zone;

(C) notify the executive director within 24 hours after loss of mechanical integrity is discovered;

(D) notify the executive director when injection can be expected to resume; and

(E) restore and demonstrate well mechanical integrity and/or cavern integrity before resuming injection of waste.

(12) Whenever the owner or operator obtains evidence that there may have been a release of injected wastes or brine into an unauthorized zone:

(A) the owner or operator shall immediately cease injection of waste, and:

(i) notify the executive director within 24 hours of obtaining such evidence;

(ii) take all necessary steps to identify and characterize the extent of any release;

(iii) propose a remediation plan for executive director review and approval;

(iv) comply with any remediation plan specified by the executive director;

(v) implement any remediation plan approved by the executive director; and

(vi) where such release is into a USDW or freshwater aquifer currently serving as a water supply, within 24 hours notify the local health department,

place a notice in a newspaper of general circulation and notify by mail the adjacent landowners.

(B) The executive director may allow the operator to resume injection before completing cleanup action if the owner or operator demonstrates that the injection operation will not endanger USDWs or freshwater aquifers.

(13) All fluids displaced from the cavern after injection of any waste shall be managed under applicable state and federal regulations.

(b) Workovers.

(1) The permittee shall notify the executive director before commencing any workover operation or corrective maintenance which involves taking the disposal well out of service. The notification shall be in writing and shall include plans for the proposed work. The executive director may grant an exception of the prior written notification when immediate action is required. Approval by the executive director shall be obtained before the permittee may begin any workover operation or corrective maintenance that involves taking the well out of service. Pressure control equipment shall be installed and maintained during workovers which involve the removal of tubing.

(2) Mechanical integrity of the well shall be demonstrated following any major operations which involve removal of the injection tubing, recompletions, or unseating of the packer.

§331.246. Bedded Salt Cavern and Well Monitoring and Testing Requirements.

(a) Waste analysis plan. All material injected into or produced from the cavern shall be sampled and analyzed in accordance with the approved written waste analysis plan as specified by 40 Code of Federal Regulations §146.68(a).

(b) Pressure gauges. Pressure gauges shall be installed and maintained in proper operating conditions at all times on the tubing string(s) and on any annulus extending to the wellhead.

(c) Continuous recording devices. Continuous recording devices and instruments shall be installed in weatherproof enclosures, used, and maintained in proper operating condition at all times to record:

(1) tubing string pressures;

(2) the pressure and volume of any annular space that extends to the wellhead;

(3) injection and production fluid flow rates, volume, and density;

(4) the volume and composition of displaced gases; and

(5) any other data specified by the permit.

(d) Automatic Alarms. The owner or operator shall also install and use:

(1) automatic alarm and automatic shutoff systems, designed to sound and shut-in the well when pressures and flow rates or other parameters approved by the executive director exceed a range and/or gradient specified in the permit; or

(2) automatic alarms designed to sound when the pressures, flow rates, or other parameters approved by the executive director exceed a rate and/or gradient specified in the permit, in cases where the owner or operator certifies that a trained operator will be on location and able to immediately respond to alarms at all times when the well is operating.

(e) Testing and calibration of monitoring instruments. All gauges, and pressure sensing and recording devices shall be tested and calibrated semi-annually.

(f) Mechanical integrity. The owner or operator shall maintain mechanical integrity of the disposal well and bedded salt cavern at all times that the well and cavern are in service.

(1) Mechanical integrity of the well must be demonstrated:

(A) before the well is initially placed in service;

(B) within five-year intervals during the operating life of the well to test for fluid movement along the borehole;

(C) after each workover which involves removal of the injection tubing, recompletions, or unseating of the packer; and

(D) before the well is plugged, unless the mechanical integrity test has been performed in the last five years.

(2) Mechanical integrity of the cavern must be demonstrated:

(A) before the cavern is initially placed in service;

(B) within five-year intervals during the operating life of the cavern; and

(C) in instances where the integrity of the casing seat or cavern may be compromised.

(3) Mechanical integrity test methods.

(A) Each bedded salt cavern disposal well shall be tested for mechanical integrity using a nitrogen-brine interface method.

(B) Each bedded salt cavern shall be tested for mechanical integrity using a hydrostatic brine test.

(C) A sonar survey, or other test approved by the executive director, shall be conducted for each bedded salt cavern.

(D) A pressure test shall be performed on each bedded salt cavern disposal well and cavern.

(4) The owner or operator may use an alternative cavern integrity test if the alternative integrity test is substantially equivalent to the integrity tests specified in paragraph (3) of this subsection. The owner or operator shall submit the following information for the executive director's consideration:

(A) A description of the test method and the theory of operation, including the test sensitivities, a justification for the test parameters, and the pass and fail criteria for the test;

(B) a description of the well and cavern conditions under which the test can be conducted;

(C) the procedure for interpreting the test results; and

(D) an interpretation of the test upon completion of the test.

(5) The well and cavern integrity testing shall be conducted at the maximum allowable operating pressure.

(g) Corrosion monitoring.

(1) Corrosion monitoring of well materials shall be conducted quarterly. Test materials shall be the same as those used in the injection tubing, packer, and long string casing, and will be continuously exposed to the waste with the exception of when the well is taken out of service.

(2) Corrosion monitoring may be waived if the disposal well owner or operator demonstrates that the waste will not be corrosive to the well materials with which the waste is expected to come into contact throughout the life of the well. The demonstration shall include a description of the methodology used to make that determination.

(h) Ambient monitoring.

(1) The owner or operator shall comply with ambient monitoring requirements in accordance with §331.64(h) of this title (relating to Monitoring and Testing Requirements).

(2) The owner or operator shall conduct subsidence monitoring (elevation surveys) over the area of review and any other type of ambient monitoring necessary to comply with §331.242 of this title (relating to Bedded Salt Cavern Disposal Well Performance Standard and Siting Requirements). Elevation surveys shall be conducted by a licensed professional land surveyor.

(i) Hydrogeologic compatibility determination. The owner or operator shall submit information demonstrating that the waste stream and its anticipated reaction products will not alter the permeability, thickness, or other relevant characteristics of the bedded salt cavern confining zone or bedded salt cavern injection zone such that they would no longer meet the requirements specified in §331.121 of this title (relating to Class I Wells).

(j) Other monitoring and testing. The owner or operator shall conduct any other monitoring and testing requirements, including determination of composition and volume of leachate.

(k) All testing and monitoring of the bedded salt disposal cavern and well shall be planned and supervised, and test results shall be reviewed by qualified individuals acting under the responsible charge of a licensed professional engineer or licensed professional geoscientist, as appropriate, with current registration under the Texas Engineering

Practice Act or Texas Geoscience Practice Act.

(l) Notification of scheduled logging and testing. The executive director or his designated representative shall have the opportunity to witness all logging and testing. The owner or operator shall submit a written schedule of such activities to the executive director at least seven days before conducting tests.

§331.247. Bedded Salt Cavern Disposal Well Reporting Requirements.

(a) Pre-operation reports.

(1) Start-up date and time. At least 24 hours before beginning drilling and cavern construction operations, the permittee shall notify the executive director in writing of the anticipated well construction and cavern construction start-up dates. Compliance with all pre-operation terms of the permit must occur before beginning injection operations.

(2) Notice of Completion. The permittee shall submit notice of completion of construction to the executive director as specified in §331.65(e)(1) of this title (relating to Reporting Requirements).

(3) Well completion report. Within 90 days after the completion of the well, the permittee shall submit a Well Completion Report to the executive director addressing the considerations and standards in §331.45(3) of this title (relating to Executive Director Approval of Construction and Completion) and §331.243 of this title (relating to Bedded Salt Cavern Disposal Well Construction Standards), and including a completed copy of the commission's Well Data Form, and a surveyor's plat showing the exact location and giving the latitude and longitude of the well. The report will also include a certification that a notation on the deed to the facility property or on some other instrument which is normally examined during title search has been made stating the surveyed location of the well, and the well permit number.

(4) Cavern completion report. Within 90 days after the completion of the cavern, the permittee shall submit a Cavern Completion Report to the executive director addressing the considerations and standards in §331.45(3) of this title and §331.244 of this title (relating to Bedded Salt Cavern Construction Standards), and including a surveyor's plat showing the exact location and giving the latitude and longitude of the cavern. The report will also include a certification that a notation on the deed to the facility property or on some other instrument which is normally examined during title search has been made stating the surveyed location of the cavern, the well permit number, the depth of the cavern floor and ceiling, the cavern diameter, the dates of operation, and its permitted waste streams.

(5) Local authorities. The permittee shall provide written notice to the executive director in a manner specified by the executive director that a copy of the permit has been properly filed with the health and pollution control authorities of the county, city, and town where the well is located.

(b) Operating reports.

(1) Injection operation quarterly report.

(A) For noncommercial facilities only, within 20 days after the last day of the months of March, June, September, and December, the permittee shall submit to the executive director a quarterly report of injection operation on forms supplied by the executive director. These forms will comply with the reporting requirements of 40 Code of Federal Regulations §146.69(a).

(B) The owner or operator shall submit inventory balance data measuring the volume of waste and brine injected into or withdrawn from each bedded salt cavern well, including methods for measuring and verifying volume.

(C) The executive director may require more frequent reporting.

(2) Injection zone annual report. For all facilities, the permittee shall submit annually with the December report of injection operation an updated graphic or other acceptable report and description of the effects of the well and cavern on the area of review, including a report on monitoring required by §331.246(j) of this title (relating to Bedded Salt Cavern and Well Monitoring and Testing Requirements). To the extent such information is reasonably available the report shall also include:

(A) locations of newly constructed or newly discovered wells within the area of review if such wells were not included in the technical report accompanying the permit application or in later reports;

(B) a tabulation of data as required by §331.121(a)(2)(B) of this title (relating to Class I Wells) for all such wells within the area of review that penetrate the injection zone or confining zone; and

(C) for noncommercial facilities only, a current injection fluid analysis.

(3) Workover reports. Within 30 days after the completion of the workover, a report shall be filed with the executive director including the reason for well workover and the details of all work performed.

(4) Well mechanical integrity, cavern integrity, and other reports. The permittee shall submit within 30 days after test completion a report including both data and interpretation on the results of:

(A) periodic tests of well and cavern integrity; and,

(B) any other test of the injection well or cavern if required by the executive director.

(5) Emergency report of leak or other failure. The permittee shall notify the underground injection control staff of the Austin office and the local district office of the commission, within 24 hours of any significant change in monitoring parameters or of any other observations which could reasonably be attributed to a leak or other failure of the well equipment or cavern integrity.

§331.248. Additional Requirements and Conditions for Bedded Salt Cavern Disposal Wells.

(a) A permit for a Class I bedded salt cavern disposal well shall include expressly or by reference the following conditions.

(1) A sign shall be posted at the well site which shall show the name of the company, company well number, and commission permit number. The sign and identification shall be in the English language, clearly legible, and shall be in numbers and letters at least one inch high.

(2) An all-weather road shall be installed and maintained to allow access to the disposal well and related facilities.

(3) The wellhead and associated facilities shall be painted, if appropriate, and maintained in good working order without detectable leaks.

(4) Secondary containment of the wellhead shall consist of a diked, impermeable pad or sump.

(5) The executive director may prescribe additional requirements for Class I bedded salt cavern disposal wells in order to protect underground sources of drinking water, and fresh or surface water from pollution.

(6) The obligation to implement the plugging and abandonment plan and the post-closure plan survives the termination of a permit or the cessation of injection activities. The requirement to maintain an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.

(b) Pressure control equipment including blowout preventers or a wellhead with closeable valves shall be required to be installed and maintained in proper operating condition at all times at the casing head, extending from the time of advancing the surface casing hole after conductor casing is set, to the time of well closure, to safeguard against any pressure imbalance which might cause a backflow, blowout, or fracturing of the salt to occur.

§331.249. Record-Keeping Requirements for Bedded Salt Cavern Disposal Wells.

(a) The permittee shall keep complete and accurate records of, but not limited to:

(1) all required monitoring, including continuous records of:

(A) tubing string pressures;

(B) the pressure and volume of any annular space that extends to the wellhead;

(C) injection and production fluid flow rates, volume and density;

(D) the volume and composition of displaced gases; and

(E) any other data specified by the permit.

(2) all periodic well tests, including but not limited to:

(A) analyses of injected and produced materials;

(B) cavern integrity;

(C) well mechanical integrity; and

(D) casing inspection surveys;

(3) all shut-in periods and times that emergency measures were used for handling injection fluid or waste; and

(4) any additional information on conditions that might reasonably affect the operation of the disposal well.

(b) All records shall be made available promptly on location for review upon request from a representative of the commission.

(c) The permittee shall retain on location, for a period of three years following abandonment, records of all information resulting from any monitoring activities, including the chemical and physical characteristics of injected waste, or other records required by the permit. The executive director may require a permittee to submit copies of the records at any time before conclusion of the retention period.

§331.250. Bedded Salt Cavern Closure.

(a) The owner or operator of a Class I bedded salt cavern disposal well shall prepare, maintain, and comply with a plan for cavern closure that meets the following minimum requirements:

(1) The owner or operator shall submit the plan as a part of the permit application and, upon approval, or approval with modifications by the executive director, such plan shall be a condition of any permit issued.

(2) The owner or operator shall submit all proposed revisions to the plan and obtain any necessary permit amendments, as appropriate, over the life of the well and cavern.

(3) The plan shall include, at a minimum, the following information:

(A) Upon cessation of waste disposal, and before cavern sealing, the operator shall:

(i) Conduct a gamma-density log to determine the cavern top, salt top and to check for fluid behind the casing.

(ii) Conduct a sonar caliper survey on the storage cavern if no sonar has been run within the past five years. The owner or operator may use another similar proven technology designed to determine cavern configuration and measure cavern capacity as a substitute for a sonar survey.

(B) All brine displaced from the well or flushed from waste lines during the plugging operation shall be managed and disposed of under applicable state and federal regulations.

(b) The well shall be closed in accordance with §331.46 of this title (relating to Closure Standards).

§331.251. Post-Closure Care for Bedded Salt Cavern Disposal Wells.

The owner or operator of a Class I bedded salt cavern disposal well shall prepare, maintain, and comply with a plan for post-closure care that meets the requirements of §331.68(b) of this title (relating to Post-Closure Care).