

The Texas Natural Resource Conservation Commission (TNRCC or commission) adopts the amendments to §331.1, Purpose, Scope and Applicability; §331.2, Definitions; §331.3, Injection Prohibited; §331.4, Mechanical Integrity Required; §331.11, Classification of Injection Wells; §331.12, Conversion of Wells, §331.13, Exempted Aquifer; §331.16, Memorandum of Understanding Between the Texas Department of Health and the Texas Natural Resource Conservation Commission Regarding Radiation Control Functions; §331.42, Area of Review; §331.44, Corrective Action Standards; §331.46, Closure Standards; §331.62, Construction Standards; §331.66, Additional Requirements and Conditions; §331.67, Recordkeeping Requirements; §331.68, Post-Closure Care; §331.82, Construction Requirements; §331.105, Monitoring Standards; §331.106, Remedial Action for Excursion; §331.107, Restoration; §331.121, Class I Wells; §331.161, Applicability; §331.163, Well Construction Standards; §331.164, Cavern Construction Standards; §331.165, Waste Disposal Operating Requirements; §331.166, Monitoring and Testing Requirements; §331.167, Reporting Requirements; §331.169, Record-Keeping Requirements; §331.171, Post-Closure Care; §331.182, Area of Review; and §331.183, Construction and Closure Standards. Sections 331.2 and 331.46 are adopted *with changes* to the proposed text as published in the July 14, 2000 issue of the *Texas Register* (25 TexReg 6656). The remaining sections are adopted *without changes* to the proposed text and will not be republished.

The commission concurrently reviewed and readopts Chapter 331 in accordance with Texas Government Code, §2001.039; and the General Appropriations Act, Article IX, §9 - 10.13, 76th Legislature, 1999, which require state agencies to review and consider for readoption each of their rules

every four years. The proposal was published in the July 14, 2000 issue of the *Texas Register* (25 TexReg 6819).

BACKGROUND AND SUMMARY OF THE FACTUAL BASIS FOR THE ADOPTED RULES

In accordance with the commission's ongoing regulatory reform initiative, amendments are adopted to update and clarify Chapter 331, Underground Injection Control. The rulemaking also increases compatibility with federal rules by decreasing the record retention period, further defining the scope of the commission's jurisdiction, amending the definition of "Radioactive waste," and modifying post-closure care. This rulemaking also constitutes the commission's review and re-adoption of Chapter 331 in accordance with Texas Government Code, §2001.039; and the General Appropriations Act, Article IX, §9 - 10.13, 76th Legislature, 1999, which require state agencies to review and consider for re-adoption each of their rules every four years.

Two nonsubstantive changes have been made since the rules were proposed. In §331.2, Definitions, the term "indicates" was deleted from the definition of "verifying analysis." The term "indicated" was intended to replace "indicates" to establish the correct verb tense. Also, §331.46, Closure Standards, has been amended to correct a typographical error in subsection (b)(2), specifically "saltcavern" was changed to "salt cavern." The change was mentioned in the proposed preamble, but was not made in the rule text. These changes have been incorporated as part of this adoption package.

Three nonsubstantive changes have been made to the proposed rules preamble. In the Section by Section Discussion of §331.2, Definitions, the definitions of "area permit," and "artificial liner" were

proposed to be changed for formatting and readability respectively. “Area permit” was to be bolded, and a comma was to be deleted from the definition of “artificial liner.” No changes were made to these definitions in the proposed rules. Upon further review, the commission has determined the proposed change to “area permit” could be made administratively. The change to “artificial liner” was unnecessary and the deletion of the comma does not change the definition’s meaning.

In addition, the proposed rules included an amendment to the definition of “confining zone” to provide consistency in the use of acronyms that was not described in the proposal preamble. In the proposal preamble Section by Section Discussion of §331.44 was proposed to be amended to delete the acronym “(USDWs),” and to make the section conform to the *Texas Register* formatting requirements regarding a cross-reference to subsection (a) of this section. The acronym was not deleted in the published rule. However, upon further review, the commission has determined to retain the acronym since it is used in subsequent subsections.

Finally, the Section by Section Discussion of Subchapter E, §331.82(a) and (c) did not sufficiently describe the changes in this section. Amending this section will clarify existing agency policy relating to construction requirements for new and existing Class III injection wells, baseline wells, and monitor wells to prevent contamination of groundwater from not cemented to surface or from uncapped wells in areas where there is the potential for contamination of groundwater. The Section by Section Discussion has been changed respectively.

SECTION BY SECTION DISCUSSION

Subchapter A: General Provisions

Section 331.1, Purpose, Scope, and Applicability, is amended to clarify that exemptions from the federal rule, 40 Code of Federal Regulations (CFR) Part 148, Hazardous Waste Injection Restrictions, are outside of the commission jurisdiction.

Section 331.2, Definitions, is numbered in accordance with the requirements of the *Texas Register* and amended to improve grammar, readability, punctuation, alphabetical organization, and *Texas Register* formatting of the definitions of the following terms: abandoned well, activity, aquifer restoration, aquifer storage well, area permit, artificial liner, commercial facility, commercial UIC Class I well facility, cone of influence, existing injection well, formation, fresh water, liner, long string casing or production casing, lost circulation zone, non-commercial facility, non-commercial UIC Class I well facility, non-commercial well, and pre-injection facilities, restored aquifer, underground source of drinking water (USDW), verifying analysis, well, and well stimulation. The definition of “Caprock” is amended to insert “calcite” in place of “calcium carbonate” and to insert “anhydrite” in place of “anhydride” for more precise geological terminology. The definition of “Casing” is included in this definitions section. The definition of “Hazardous waste” is amended to reference Chapter 335. The definition of “Hazardous industrial waste” is deleted because this term is not used in the chapter. The definition of “Production area authorization” is updated to delete the previous agency name. The definitions of “RCRA” and “SDWA” are deleted because the terms are defined in Chapter 3. The definition of “Radioactive material” is deleted because this term is not used in the chapter. The

definition of “Radioactive waste” is amended for consistency with the federal definition in 40 CFR §144.3. The definition of “Total dissolved solids” is amended to provide the full federal rule citation.

On adoption, the commission is making three nonsubstantive changes to this section of the preamble and the corresponding rule as follows: First, the commission has determined that proposed amendments to “area permit” and “artificial liner” are not necessary, and the terms have been deleted from the list in the SECTION BY SECTION DISCUSSION of §331.2. “Area permit” was to be bolded, and a comma was to be deleted from the definition of “artificial liner.” No changes were made to these definitions to the proposed rule. Bolding a term being defined does not require a rule amendment, and the deletion of the comma does not change the definition’s meaning.

Second, “confining zone” has been added. The commission intended to amend the definition of “confining zone” for the purpose of renumbering and to provide consistency in the use of acronyms. The proposed rules included the amendments to the term’s definition, but it was not noted in the proposal’s preamble.

Finally, the term “indicates” was deleted from the definition of “verifying analysis” in the proposed rule. The term “indicated” was intended to replace “indicates” to establish the correct verb tense.

Section 331.3, Injection Prohibited, is amended to correct a cross-reference to Chapter 335, Subchapter F and to correct a grammatical error.

Section 331.4, Mechanical Integrity Required, is amended to implement the regulatory reform initiative.

Section 331.11, Classification of Injection Wells, is amended to improve the clarity of subsection (a)(2). Also, a new subsection (c) is adopted to clarify that monitoring wells and baseline wells which are associated with Class III injection wells, are subject to the rule requirements in this chapter, including construction and completion requirements.

Section 331.12, Conversion of Wells, is amended to correct the title of the cross-reference to §305.66.

Section 331.13, Exempted Aquifer, is amended to delete unnecessary words in subsection (b).

Section 331.16, Memorandum of Understanding Between the Texas Department of Health and the Texas Natural Resource Conservation Commission Regarding Radiation Control Functions, is amended to insert the effective date of the memorandum.

Subchapter C: General Standards and Methods

Section 331.42, Area of Review, is amended to correct the symbol for the constant “pi” in the Theis equation. In two places, the paragraph mark is replaced with the symbol for pi.

Section 331.44, Corrective Action Standards, is amended to delete the acronym “USDWs” and to conform with *Texas Register* formatting requirements. On adoption, the commission is making a

nonsubstantive change to this section of the preamble and the corresponding rule as follows: The proposed amendment to §331.44 was to delete the acronym “(USDWs),” and to make the section conform to the *Texas Register* formatting requirements. The acronym was not deleted in the published rule. The acronym is retained since it was used in subsequent subsections.

Section 331.46, Closure Standards, is amended to correct a typographical error in subsection (b)(2).

On adoption, the commission is making a nonsubstantive change to this section of the preamble and the corresponding rule as follows: This change was to specifically replace “saltcavern” with “salt cavern.” The change was mentioned in the proposed preamble, but was not made in the rule text. The adopted rule now contains this change.

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

Section 331.62, Construction Standards, is amended to correctly use an acronym for underground source of drinking water and to make a grammatical correction.

Section 331.66(a)(4), Additional Requirements and Conditions, is amended to delete unnecessary words.

Section 331.67(c), Recordkeeping Requirements, is amended to reduce the record retention period from five years to three years for consistency with 40 CFR §144.51(j)(2)(ii). The language of §331.67(c) is amended for greater consistency with the corresponding federal requirement.

Section 331.68, Post-Closure Care, is amended for consistency with 40 CFR §146.72(b)(5). Additional modifications are adopted to simplify the language and to delete a reference for consistency with *Texas Register* format requirements.

Subchapter E: Standards for Class III Wells

Section 331.82(a) and (c), Construction Requirements, is amended to clarify existing commission rules on construction requirements for new and existing Class III wells, baseline wells, and monitor wells. In subsection (a), the acronym for underground sources of drinking water is spelled out on its first usage in the section. The amendments also implement an environmental protection requirement to prevent contamination of groundwater from wells not being cemented to the surface or from uncapped wells in areas where there is the potential for contamination of groundwater. Examples of areas where there is the potential for contamination or foreign matter to enter the groundwater through an inadequately cemented or uncapped well include crop lands where pesticides, herbicides, or fertilizers are used. Also, “monitoring” is changed to “monitor” in subsections (g), (h), and (i) for greater consistency with the definition of “monitor well.”

Subchapter F: Standards for Class III Well Production Area Development

Section 331.105, Monitoring Standards, is amended to correct a punctuation error and update the “Texas Water Commission” reference to “commission.”

Section 331.106(1), Remedial Action for Excursion, is amended to update the name “district” office to “commission regional” office and to delete an obsolete specific address. This section is also amended to improve grammar and to clarify the notice requirement.

Section 331.107, Restoration, is amended to update the term “Texas Water Commission district office” to “commission regional office” in subsection (b). Also, subsection (e) is amended to delete the unnecessary words.

Subchapter G: Consideration Prior to Permit Issuance

Section 331.121(a)(2), Class I Wells, is amended to correct a cross-reference to §305.45(a)(8). Also, subsection (b), is amended to correct a typographical error and to correct a cross-reference to §281.21(d). Finally, subsection (f) is amended to improve the readability and to substitute the term “RCRA” for “Resource Conservation and Recovery Act” because the term is defined in Chapter 3 of the commission’s rules.

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

Section 331.161, Applicability, is amended to correct the cross-reference to §331.14.

Section 331.163, Construction Standards, is amended to correct cross-references. In addition, the section is amended for clarification and to include provisions for photography and retention of full-hole, continuous cores. These provisions are necessary so that a permanent record of the cores will be maintained and made available for review by the public.

Section 331.164, Cavern Construction Standards, is amended to correct a typographical error and a cross-reference to §331.45(2).

Section 331.165(a)(4), Waste Disposal Operating Requirements, is amended to correct the cross-reference to §331.162.

Section 331.166, Monitoring and Testing Requirements, is amended to correct punctuation errors and to ensure consistency with the defined term “monitor well.”

Section 331.167, Reporting Requirements, is amended to correct cross-references to §§331.45(2), 331.163, 331.164, and 331.166(h). The section is also amended to correct grammatical and typographical errors.

Section 331.169, Record-Keeping Requirements, is amended to change the five-year record retention period to three years. This amendment makes the requirement consistent with federal rules.

Section 331.171 is amended to change the five-year record retention period to three years. This amendment makes the requirement consistent with federal rules.

Subchapter K: Additional Requirements for Class V Aquifer Storage Wells

Section 331.182(1), Area of Review, is amended to change “TNRCC” to “commission” in two places in accordance with current regulatory reform initiative and to correct the agency name of the Railroad Commission of Texas.

Section 331.183, Construction and Closure Standards, is amended to correct a punctuation error.

Concurrently, the commission reviewed 30 TAC Chapter 331, in accordance with Texas Government Code, §2001.039, and is publishing the notice of adoption in the Rules Review section of this issue of the *Texas Register*.

FINAL REGULATORY IMPACT ANALYSIS DETERMINATION

The commission reviewed the rulemaking in light of the regulatory analysis requirements of Texas Government Code, §2001.0225, and determined that the rulemaking is not subject to §2001.0225 because it does not meet the definition of a “major environmental rule” as defined in that statute.

“Major environmental rule” means 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, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state. The amendments to Chapter 331 do not adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, or the public health and safety of the state or a sector of the state because the adopted amendments clarify or reduce current regulatory requirements. These changes are anticipated to have minor positive economic benefits to affected facilities and will have no negative impacts on the

environment or public health and safety. The amendments do not add any additional costs to comply with the adopted regulatory requirements. In addition, the amendments are not a “major environmental rule” because they do not meet the applicability requirements listed in Texas Government Code, §2001.0225(a)(1) - (4). The amendments do not exceed a standard set by federal law, exceed an express requirement of state law, nor exceed a requirement of a delegation agreement.

TAKINGS IMPACT ASSESSMENT

The commission prepared a takings impact assessment for these rules under to Texas Government Code, §2007.043. The following is a summary of that assessment. The purpose of the rulemaking is to update and clarify Chapter 331. This rulemaking also improves consistency with federal rules. The rule amendments reduce the record retention period from five years to three years for consistency with federal rules. Promulgation and enforcement of these rules will not burden private real property which is the subject of the rules because the adopted amendments update and clarify rule requirements.

Also, the Texas Government Code, exception at §2007.003(b) regarding an action reasonably taken to fulfill an obligation mandated by federal law applies to this rulemaking.

CONSISTENCY WITH THE COASTAL MANAGEMENT PROGRAM

The commission reviewed the rulemaking and found that the rule is not specifically identified in Coastal Coordination Act Implementation Rules, 31 TAC §505.11, relating to Action and Rules Subject to the Coastal Management Program, nor will it affect any action/authorization identified in Coastal

Coordination Act Implementation Rules, 31 TAC §505.11. Therefore, the adoption is not subject to the Texas Coastal Management Program.

HEARING AND COMMENTERS

A public hearing was not held for this rulemaking. The comment period closed August 14, 2000. No written comments were received.

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

SUBCHAPTER A: GENERAL PROVISIONS

§§331.1 - 331.4, 331.11 - 331.13, 331.16

§331.1. Purpose, Scope and Applicability.

(a) The purpose of this chapter is to implement the provisions of the Injection Well Act, Texas Water Code, Chapter 27, as it applies to the commission, consistent with the policy of the Act stated in §27.003.

(b) This chapter applies to all injection wells and activities within the commission's jurisdiction.

(c) Exemptions from the prohibition of injection of hazardous waste authorized by 40 Code of Federal Regulations Part 148 are not within the scope of the commission's jurisdiction.

§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 shall have the following meanings, unless the context clearly indicates otherwise.

(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 an injection well or of pre-injection facilities, including the processing, storage, and disposal of waste.

(3) **Affected person** - Any person whose legal rights, duties, or privileges may be adversely 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 one fourth of a mile or a number calculated according to the criteria set forth in §331.42 of this title.

(10) **Area permit** - An injection well permit which authorizes the construction and operation of two or more similar injection wells 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 activities.

(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) **Buffer area** - The area between any mine area boundary and the permit area boundary.

(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.

(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.

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

(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.

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

(20) **Commercial facility** - A Class I permitted facility, where one or more commercial wells are operated.

(21) **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.

(22) **Commercial well** - A UIC 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.

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

(24) **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 (USDW) or freshwater aquifer.

(25) **Confining zone** - A part of a formation, a formation, or group of formations between the injection zone and the lowermost USDW or freshwater aquifer that acts as a barrier to the movement of fluids out of the injection zone.

(26) **Contaminant** - Any physical, biological, chemical or radiological substance or matter in water.

(27) **Control parameter** - Any chemical constituent of groundwater monitored on a routine basis used to detect or confirm the presence of mining solutions in a designated monitor well.

(28) **Disposal well** - A well that is used for the disposal of waste into a subsurface stratum.

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

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

(31) **Excursion** - The movement of mining solutions into a designated monitor well.

(32) **Existing injection well** - A Class I well which was authorized by an approved state or EPA-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).

(33) **Fluid** - Material or substance which flows or moves whether in a semisolid, liquid, sludge, gas, or any other form or state.

(34) **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.

(35) **Formation fluid** - Fluid present in a formation under natural conditions.

(36) **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 ground water contains fewer than 10,000 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.

(37) **Groundwater** - Water below the land surface in a zone of saturation.

(38) **Hazardous waste** - Hazardous waste as defined in §335.1 of this title.

(39) **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.

(40) **Injection operations** - The surface storage or subsurface emplacement of fluids occurring in connection with an injection well or wells, other than that occurring solely for construction or initial testing.

(41) **Injection well** - A well into which fluids are being injected.

(42) **Injection zone** - A formation, a group of formations, or part of a formation that receives fluid through a well.

(43) **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.

(44) **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.

(45) **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.

(46) **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.

(47) **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."

(48) **Mine area** - The area defined by a line through the ring of designated monitor wells installed to monitor the production zone.

(49) **Mine plan** - A map of proposed mine areas and an estimated schedule indicating the sequence and timetable for mining and any required aquifer restoration.

(50) **Monitor well** - Any well used for the sampling or measurement of any chemical or physical property of subsurface strata or their contained fluids.

(A) Designated monitor wells are those listed in the production area authorization for which routine water quality sampling 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 surface facilities.

(51) **New injection well** - Any well, or group of wells not an existing injection well.

(52) **New waste stream** - A waste stream not permitted.

(53) **Non-commercial facility** - A Class I permitted facility which operates only non-commercial wells.

(54) **Non-commercial UIC Class I well facility** - A UIC Class I permitted facility where only non-commercial wells are operated.

(55) **Non-commercial well** - A UIC 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.

(56) **Off-site** - Property which cannot be characterized as on-site.

(57) **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.

(58) **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.

(59) **Permit area** - The area owned or under lease by the permittee which may include buffer areas, mine areas, and production areas.

(60) **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.

(61) **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.

(62) **Pre-Injection facilities** - The on-site above-ground appurtenances, structures, equipment, and other fixtures that are or will be used for storage, processing, or in conjunction with an injection operation.

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

(64) **Production area authorization** - A document, issued under the terms of an injection well permit, approving the initiation of mining activities in a specified production area within a permit area.

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

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

(67) **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.

(68) **Restored aquifer** - An aquifer whose local groundwater quality has, by natural or artificial processes, returned to levels consistent with restoration table values or better as verified by an approved sampling program.

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

(70) **Salt cavern confining zone** - A zone between the salt cavern injection zone and all USDWs and freshwater aquifers, that acts as a barrier to movement of waste out of a salt cavern injection zone, and consists of the entirety of the salt stock excluding any portion of the salt stock designated as a UIC Class I salt cavern injection zone or any portion of the salt stock occupied by a UIC Class II or Class III salt cavern or its disturbed salt zone.

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

(72) **Salt cavern injection zone** - The void space of a salt cavern that receives waste through a well, plus that portion of the salt stock enveloping the salt 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.

(73) **Salt cavern solid waste disposal well or salt cavern disposal well** - For the purposes of this chapter relating to Underground Injection Control, regulations of the commission, and

not to 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.

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

(75) **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.

(76) **Stratum** - A sedimentary bed or layer, regardless of thickness, that consists of generally the same kind of rock or material.

(77) **Surface casing** - The first string of casing (after the conductor casing, if any) that is set in a well.

(78) **Total dissolved solids (TDS)** - The total dissolved (filterable) solids as determined by use of the method specified in 40 CFR Part 136, as amended.

(79) **Transmissive fault or fracture** - A fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.

(80) **Underground injection** - The subsurface emplacement of fluids through a well.

(81) **Underground injection control (UIC)** - The program under the federal Safe Drinking Water Act, Part C, including the approved Texas state program.

(82) **Underground source of drinking water (USDW)** - An "aquifer" or its portions:

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

(B) in which the groundwater contains fewer than 10,000 mg/l total dissolved solids; and

(C) which is not an exempted aquifer.

(83) **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.

(84) **Verifying analysis** - A second sampling and analysis of control parameters for the purpose of confirming a routine sample analysis 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.

(85) **Well** - A bored, drilled, or driven shaft, or an artificial opening in the ground made by digging, jetting, or some other method, where the depth of the opening is greater than its largest surface dimension, but does not include any surface pit, surface excavation, or natural depression.

(86) **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.

(87) **Well stimulation** - Several processes used to clean the well bore, enlarge channels, and increase pore space in the interval to be injected thus making it possible for wastewater to

move more readily into the formation, including, but not limited to surging, jetting, blasting, acidizing, and hydraulic fracturing.

(88) **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.

§331.3. Injection Prohibited.

(a) Unless excluded under subsection (b) of this section, the construction of an injection well, the conversion of a well into an injection well, and the use or operation of an injection well is prohibited unless authorized by an injection well permit, order, or rule of the commission. A RCRA permit applying the standards of Chapter 335, Subchapter F of this title (relating to Permitting Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities) will constitute an underground injection control (UIC) permit for hazardous waste injection wells for which the technical standards of this chapter are not generally appropriate.

(b) The following activities are not within the scope of subsection (a) of this section:

(1) injection of waste into subsurface strata via a single family residential cesspool or other device that receives waste, which has an open bottom or perforated sides;

(2) injection of waste into subsurface strata via a septic system well used for single family residential waste disposal.

(c) This rule does not limit the authority of the commission to abate and prevent pollution of fresh water resulting from any injection activity by requiring a permit, by instituting appropriate enforcement action, or by other appropriate action.

§331.4. Mechanical Integrity Required.

Injection is prohibited for Class I and III wells which lack mechanical integrity, the result of which may pollute an underground source of drinking water. Except where excluded in the case of authorization by rule, mechanical integrity under §331.43 of this title (relating to Mechanical Integrity Standards) must be demonstrated to the satisfaction of the executive director before operation begins. Injection may be prohibited for Class V wells which lack mechanical integrity. The executive director may require a demonstration of mechanical integrity at any time if there is reason to believe mechanical integrity is lacking. When the executive director determines that a Class I or III well lacks mechanical integrity, the executive director shall give written notice of this determination to the owner or operator. Unless the executive director requires immediate cessation, the owner or operator shall cease injection into the well within 48 hours of receipt of the executive director's determination. The executive

director may allow plugging of the well or require the permittee to perform additional construction, operation, monitoring, reporting, and corrective actions which are necessary to prevent the movement of fluid into or between underground sources of drinking water caused by the lack of mechanical integrity. The owner or operator may resume injection upon written notification from the executive director that the owner or operator has demonstrated mechanical integrity.

§331.11. Classification of Injection Wells.

(a) Injection wells within the jurisdiction of the commission are classified as follows.

(1) Class I:

(A) wells used by generators of hazardous wastes or owners or operators of hazardous waste management facilities to inject hazardous waste, other than Class IV wells;

(B) other industrial and municipal waste disposal wells which inject fluids beneath the lower-most formation which within one quarter mile of the wellbore contains an underground source of drinking water.

(2) Class III. Wells which are used for the extraction of minerals, including:

(A) mining of sulfur by the Frasch process;

(B) solution mining of minerals which includes sodium sulfate, sulfur, potash, phosphate, copper, uranium and any other minerals which can be mined by this process.

(3) Class IV. Wells used by generators of hazardous wastes or of radioactive wastes, by owners or operators of hazardous waste management facilities, or by owners or operators of radioactive waste disposal sites to dispose of hazardous wastes or radioactive wastes into or above a formation which within one quarter mile of the wellbore contains an underground source of drinking water.

(4) Class V. Generally, wells covered by this paragraph inject nonhazardous fluids into or above formations that contain USDWs. Class V wells are injection wells within the jurisdiction of the commission, but are not included in Classes I, III, or IV. Class V wells include, but are not limited to:

(A) air conditioning return flow wells used to return to the supply aquifer the water used for heating or cooling in a heat pump;

(B) closed loop injection wells which are closed system geothermal wells used to circulate fluids including water, water with additives, or other fluids or gases through the earth as a heat source or heat sink;

(C) cesspools or other devices that receive wastes, which have an open bottom and sometimes have perforated sides;

(D) cooling water return flow wells used to inject water previously used for cooling;

(E) drainage wells used to drain surface fluid, primarily storm runoff, into a subsurface formation;

(F) dry wells used for the injection of wastes into a subsurface formation;

(G) recharge wells used to replenish the water in an aquifer;

(H) salt water intrusion barrier wells used to inject water into a freshwater aquifer to prevent the intrusion of salt water into the fresh water;

(I) sand backfill wells used to inject a mixture of water and sand, mill tailings, or other solids into mined out portions of subsurface mines;

(J) septic system wells used:

(i) to inject the waste or effluent from a multiple dwelling, business establishment, community, or regional business establishment septic tank; or

(ii) for a multiple dwelling, community, or regional cesspool;

(K) subsidence control wells (not used for the purpose of oil or natural gas production) used to inject fluids into a non-oil or gas producing zone to reduce or eliminate subsidence associated with the overdraft of fresh water; and

(L) aquifer storage wells used for the injection of water for storage and subsequent retrieval for beneficial use.

(b) Class II wells and Class III wells used for brine mining fall within the jurisdiction of the Railroad Commission of Texas.

(c) Baseline wells and monitor wells associated with Class III injection wells within the jurisdiction of the commission are also subject to the rules specified in this chapter.

§331.12. Conversion of Wells.

(a) Persons utilizing wells authorized by permit, rule, or otherwise, who wish to convert the well from its authorized purpose to a new or additional purpose must first obtain the appropriate approval described in paragraphs (1) - (3) of this section:

(1) Persons utilizing injection wells authorized by permit must obtain either a permit amendment pursuant to §305.62 of this title (relating to Amendment), or if appropriate, a permit revocation pursuant to §305.66 of this title (relating to Permit Denial, Suspension, and Revocation) or §305.67 of this title (relating to Revocation and Suspension Upon Request or Consent).

(2) Persons utilizing injection wells authorized by rule that are to be converted to a purpose that requires authorization by permit must obtain a permit.

(3) Persons utilizing injection wells authorized by rule that are to be converted to a purpose that does not require authorization by permit must obtain the written approval of the executive director.

(b) Conversions of wells that remain exclusively within the jurisdiction of the Railroad Commission are not affected by this rule. For example, a conversion from a Class II disposal well to a water supply well regulated by the Railroad Commission would neither enter nor exit the jurisdiction of this agency and thus would not be subject to this rule.

§331.13. Exempted Aquifer.

(a) An exempted aquifer is an aquifer or a portion of an aquifer which meets the criteria for fresh water but which has been designated an exempted aquifer by the commission after notice and opportunity for public hearing. Those aquifers or portions of aquifers which were designated for exemption by the Texas Department of Water Resources in its original application for program approval submitted to the Environmental Protection Agency shall be considered to be exempted aquifers.

(b) Except for injection authorized by rule, the commission may require a permit for injection into an exempted aquifer to protect fresh water outside the exempted aquifer which may be subject to pollution caused by the injection.

(c) An aquifer or portion of an aquifer may be designated as an exempted aquifer if the following criteria are met:

(1) It does not currently serve as a source of drinking water for human consumption;
and

(2) Until exempt status is removed according to procedures in subsection (f) of this section, it will not in the future serve as a source of drinking water for human consumption because:

(A) It is mineral, hydrocarbon or geothermal energy bearing with production capability;

(B) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;

(C) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or,

(D) It is located above a Class III well mining area subject to subsidence or catastrophic collapse.

(d) No designation of an exempted aquifer submitted as part of a UIC Program shall be final until approved by the EPA as part of the delegated UIC program.

(e) Subsequent to program approval or promulgation, the commission may, after notice and opportunity for a public hearing, identify additional exempted aquifers.

(f) After notice and opportunity for public hearing, the designation of exempted aquifer may be removed by the commission thereby eliminating the exempt status, provided restoration has been accomplished if required.

§331.16. Memorandum of Understanding Between the Texas Department of Health and the Texas Natural Resource Conservation Commission Regarding Radiation Control Functions.

The Memorandum of Understanding between the Texas Department of Health and the Texas Natural Resource Conservation Commission Regarding Radiation Control Functions, effective November 30, 1998, is adopted by reference in §7.118 of this title (relating to Memorandum of Understanding between the Texas Department of Health and the Texas Natural Resource Conservation Commission Regarding Radiation Control Functions). However, the full text of the memorandum of understanding can be found only in Texas Department of Health rule 25 TAC §289.101 (relating to Memorandum of Understanding between the Texas Department of Health and the Texas Natural Resource Conservation Commission Regarding Radiation Control Functions). If a copy of this document is required and cannot be obtained from the Internet, a copy can be requested from the Texas Natural Resource Conservation Commission, Chief Clerk's Office, P.O. Box 13087, Austin, Texas 78711-3087, (512) 239-3300.

SUBCHAPTER C: GENERAL STANDARDS AND METHODS

§§331.42, 331.44, 331.46

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§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 title (relating to Consideration Prior to Permit Issuance).

(b) The area of review is:

(1) for Class I wells, 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) for salt cavern disposal wells and associated caverns, 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 cavern;

(3) for Class III wells, 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 USDW; or

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

(c) 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 Theis equation illustrates one form which the mathematical model may take:

Figure: 30 TAC §331.42(c) (No change.)

(d) 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 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.

(e) 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.

§331.44. 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 (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(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.

§331.46. Closure Standards.

(a) For Class I wells, other than salt cavern disposal 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 Class I Wells) and determine whether the injection activity has conformed with predicted values.

(b) For all Class I wells, including salt cavern disposal 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.

(c) For Class I wells, other than salt cavern disposal wells, prior to well closure the well shall be flushed with a non-hazardous buffer fluid.

(d) In closure of all Class I wells, including salt cavern disposal 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 approved in writing by the executive director, which provide protection equivalent to or greater than that provided by cement.

(e) 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.

(f) 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.

(g) 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.

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

(i) 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.

(j) 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.

(k) 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.

(l) 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 (UIC) 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.

(m) 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.

(n) 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.

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

(p) 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.

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

§§331.62, 331.66 - 331.68

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§331.62. Construction Standards.

All Class I wells shall be designed, constructed, and completed to prevent the movement of fluids that could result in the pollution of an underground source of drinking water (USDW).

(1) Design criteria. Casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well, including the post closure care period. The well shall be designed and constructed to prevent potential leaks from the well, to prevent the

movement of fluids along the wellbore into or between USDWs, to prevent the movement of fluids along the wellbore out of the injection zone, to permit the use of appropriate testing devices and workover tools, and to permit continuous monitoring of injection tubing, long string casing and annulus, as required by this chapter. All well materials must be compatible with 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.

(A) Casing design. Surface casing shall be set to a minimum subsurface depth, as determined by the executive director, which extends into the confining bed below the lowest formation containing a USDW or freshwater aquifer. At least one long string casing, using a sufficient number of centralizers, shall extend to the injection interval. In determining and specifying casing and cementing requirements, the following factors shall be considered:

- (i) depth of lowermost USDW or freshwater aquifer;
- (ii) depth to the injection interval;
- (iii) injection pressure, external pressure, internal pressure, and axial loading;

(iv) hole size;

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

(vi) 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;

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

(viii) lithology of injection and confining intervals;

(ix) presence of lost circulation zones or other subsurface conditions that could affect the casing and cementing program;

(x) types and grades of cement; and

(xi) quantity and chemical composition of the injected fluid.

(B) Tubing and packer design. All Class I injection wells shall inject fluids through tubing with a packer, set at a depth specified by the executive director. Fluid seal systems will not be approved by the commission. The annulus system shall be designed and constructed to prevent the leak of injection fluids into any unauthorized zones. In determining and specifying requirements for tubing and packer, the following factors shall be considered:

- (i) depth to the injection zone;
- (ii) characteristics of injection fluid (chemical content, corrosiveness, temperature and density);
- (iii) injection pressure;
- (iv) annular pressure;
- (v) rate (intermittent or continuous), temperature, and volume of injected fluid;
- (vi) size of casing; and
- (vii) tensile, burst, and collapse strengths of the tubing.

(2) 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 the requirements of this chapter and all permit application plans and specifications.

(3) Changes to plans and specifications. Any proposed 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.

(A) If during the drilling and/or completion of the well, the operator proposes to change the cementing of the surface casing, the executive director shall require a written description of the proposed change, including any additional data necessary to evaluate the request. The operator may not execute the change until the executive director gives written approval. The operator may change the setting depth of the surface casing to a depth greater than that specified in the permit, either during drilling and/or completion, without approval from the executive director. Approval for setting depths shallower than specified in the permit will not be authorized.

(B) If the operator proposes to change the injection interval to one not reviewed during the permit application process, the operator shall submit an application to amend the permit. The operator may not inject into any unauthorized zone.

(C) Any other changes, including but not limited to the number of casing strings, changes in the size or material of intermediate and production casings, changes in the

completion of the well, changes in the exact setting of screens or injection intervals within the permitted injection zone, and changes in the type of cement used, or method of cementing shall be considered minor changes. If minor changes are requested, the executive director may give immediate oral and subsequent written approval or written approval for those changes. The operator is required to submit a detailed written description of all minor changes, along with the information required in §331.65 of this title (relating to Reporting Requirements), before approval for operation of the well may be granted.

(4) Drilling requirements.

(A) The well shall be drilled according to sound engineering practices to minimize problems which may jeopardize completion attempts, such as deviated holes, washouts and stuck pipe.

(B) As much as technically practicable and feasible, the hole should be drilled under laminar flow conditions, with appropriate fluid loss control, to minimize hole washouts.

(C) Immediately prior to running casing, the drilling fluid in the hole is to be circulated and conditioned to establish rheological properties commensurate with proper cementing practices.

(5) Construction performance standard. All Class I wells shall be cased and all casings shall be cemented to prevent the movement of fluids along the borehole into or between USDWs or freshwater aquifers, and to prevent movement of fluids along the borehole out of the injection zone.

(6) Cementing requirements, for all Class I wells constructed after the promulgation of this rule, including wells converting to Class I status.

(A) Cementing shall be by the pump and plug or other method approved by the executive director. Cementing may be accomplished by staging. Cement pumped shall be of a volume equivalent to at least 120% of the volume calculated necessary to fill the annular space between the hole and casing and between casing strings to the surface of the ground. The executive director may require more than 120% when the geology or other circumstances warrant it. A two-dimensional caliper shall be used to measure the hole diameter. If the two-dimensional caliper can not measure the diameter of the hole over an interval, then the minimum amount of cement needed for that interval shall be a volume calculated to be equivalent to or greater than 150% of the space between the casing and the maximum measurable diameter of the caliper.

(B) If lost circulation zones or other subsurface conditions are anticipated and/or encountered, which could result in less than 100% filling of the annular space between the casing and the borehole or the casings, the owner/operator shall implement the approved contingency plan submitted according to §331.121(a)(2)(O) of this title (relating to Class I Wells).

(7) Logs and tests.

(A) Integrity testing. Appropriate logs and other tests shall be conducted during the drilling and construction of Class I wells. All logs and tests shall be interpreted by the service company which processed the logs or conducted the test; or by other qualified persons. A minimum of the following logs and tests shall be conducted:

(i) 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;

(ii) for surface casing;

(I) spontaneous potential, resistivity, natural gamma, and caliper logs before the casing is installed; and

(II) cement bond with variable density log, and temperature logs after casing is set and cemented; and

(III) and any other test required by the executive director;

(IV) the executive director may allow the use of an alternate to subclauses (I) and (II) of this clause when an alternative will provide equivalent or better information; and

(iii) for intermediate and long string casing;

(I) spontaneous potential, resistivity, natural gamma, compensated density and/or neutron porosity, dipmeter/ fracture finder, and caliper logs, before the casing is installed; and

(II) a cement bond with variable density log, casing inspection, and temperature logs after casing is set and cemented, and an inclination survey; and

(III) any other test required by the executive director; and

(iv) a mechanical integrity test consisting of:

(I) a pressure test with liquid or gas;

(II) a radioactive tracer survey;

(III) a temperature or noise log;

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

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

(B) Pressure tests. Surface casing shall be pressure tested to 1,000 psig for at least 30 minutes, and long string casing shall be tested to 1,500 psig for at least 30 minutes, unless otherwise specified by the executive director.

(C) 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, bulk density, and other necessary tests.

(8) Injectivity tests. After completion of the well, injectivity tests shall be performed to determine the well capacity and reservoir characteristics. Surveys shall be performed to establish preferred injection intervals. Prior to performing injectivity tests, the bottom hole pressure, bottom hole temperature, and static fluid level shall be determined, and a representative sample of formation fluid shall be obtained for chemical analysis. Information concerning the fluid pressure, temperature,

fracture pressure and other physical and chemical characteristics of the injection and confining zones shall be determined or calculated.

(9) Construction and workover supervision. All phases of well construction and all phases of any well workover shall be supervised by qualified individuals acting under the responsible charge of a licensed, professional engineer, with current registration pursuant to the Texas Engineering Practice Act, who is knowledgeable and experienced in practical drilling engineering and who is familiar with the special conditions and requirements of injection well construction.

(10) The executive director shall have the opportunity to witness all cementing of casing strings, logging and testing. The owner or operator shall submit a schedule of such activities to the executive director at least 30 days prior to commencing drilling of the well. The executive director shall be given at least 24 hour notice before each activity in order that a representative of the executive director may be present.

§331.66. Additional Requirements and Conditions.

(a) A permit for a Class I 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 injection well and related facilities.

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

(4) The commission may prescribe additional requirements for Class I wells to protect USDWs, and fresh or surface water from pollution.

(b) Permit requirements for owners or operators of disposal wells which inject wastes which have the potential to react with the injection formation to generate gases shall include:

(1) conditions limiting the temperature, pH, or acidity of the injected wastes; and

(2) procedures necessary to assure that pressure imbalances which might cause a backflow or blowout do not occur.

§331.67. Recordkeeping Requirements.

(a) The permittee shall keep complete and accurate records of:

(1) all monitoring required by the permit, including:

- (A) continuous records of surface injection pressures;
 - (B) continuous records of the tubing-long string annulus pressures and
volumes;
 - (C) continuous records of injection flow rates;
 - (D) monthly total volume of injected fluids;
- (2) All periodic well tests, including but not limited to:
- (A) injection fluid analyses;
 - (B) bottom hole pressure determinations;
 - (C) mechanical integrity; and
 - (D) casing inspection surveys;
- (3) all shut-in periods and times that emergency measures were used for handling
injection fluid;

(4) any additional information on conditions that might reasonably affect the operation of the injection well.

(b) All records shall be made available for review upon request from a representative of the commission.

(c) The permittee shall retain, for a period of three years following the completion of any plugging and abandonment procedures, records of all monitoring information including the nature and composition of all injected fluids or other records required by the permit. The executive director may require a permittee to submit copies of the records at any time prior to conclusion of the retention period.

§331.68 Post-Closure Care.

(a) The owner or operator of a Class I hazardous well shall prepare, maintain, and comply with a plan for post-closure care that meets the requirements of subsection (b) of this section, and is acceptable to the executive director. The obligation to implement 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.

(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 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 responsibility as required in Subchapter I of this chapter (relating to Financial Responsibility). The owner or operator shall demonstrate and maintain financial assurance in the amount of the post closure cost estimate to cover post-closure care in a manner that meets the requirements of Chapter 37, Subchapter Q of this title (relating to Financial Assurance for Underground Injection Wells). The amount of the funds available shall be no less than the amount identified in paragraph (4)(F) of this subsection. The obligation to maintain financial responsibility for post-closure care survives the termination of a permit or the cessation of injection.

(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 until pressure in the injection zone decays to the point that the well's cone of influence no longer intersects the base of the lowermost USDW or freshwater aquifer;

(D) predicted position of the waste front at closure;

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

(F) the estimated cost of proposed post-closure care.

(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 plugging and abandonment report following the procedures in §305.72 of this title (relating to UIC Permit Modification at the Request of the Permittee).

(b) The owner or operator shall:

(1) continue and complete any corrective action required under §331.44 of this title;

(2) continue to conduct any groundwater monitoring required under the permit until pressure in the injection zone decays to the point that the well's cone of influence no longer intersects the base of the lowermost USDW or freshwater aquifer. The executive director may extend the period of post-closure monitoring if he determines that the well may endanger a USDW 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. A copy of the plat shall be submitted to the Underground Injection Control (UIC) program at the Austin office of the commission;

(4) Provide appropriate notification and information to such state and local authorities as have cognizance 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 fluids. The owner or operator must deliver the records to the executive director at the conclusion of the retention period, and the records shall thereafter be retained at a location designated by the executive director for that purpose.

SUBCHAPTER E: STANDARDS FOR CLASS III WELLS

§331.82

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§331.82. Construction Requirements.

(a) Casing and cementing. All new Class III wells, baseline wells, and monitor wells associated with the mining operations shall be cased, cemented to the surface, and capped to prevent the migration of fluids which may cause the pollution of underground sources of drinking water (USDWs) and maintained in that condition throughout the life of the well. In addition, existing wells in areas where there is the potential for contamination and other harmful or foreign matter to enter groundwater through an open well, shall also be cemented to the surface and capped. The casing and cement used in

the construction of each 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:

- (1) depth to the injection zone;
- (2) injection pressure, external pressure, internal pressure, axial loading, etc.;
- (3) hole size;
- (4) size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material);
- (5) corrosiveness of injected fluids and formation fluids;
- (6) lithology of injection and confining zones; and
- (7) type and grade of cement.

(b) Alterations to construction plans. Any proposed changes or alterations to construction plans after permit issuance shall be submitted to the commission and written approval obtained before incorporating such changes.

(c) Logs and tests. Appropriate logs and other tests shall be conducted during the drilling and construction of all new Class III wells and after an existing well has been repaired. A descriptive report interpreting the results of those logs and tests shall be prepared by a knowledgeable log analyst and submitted to the executive director. The logs and tests appropriate to each type of Class III well shall be determined based on the intended function, depth, construction, and other characteristics of the well, availability of similar data in the area of the drilling site, and the need for additional information that may arise from time to time as the construction of the well progresses.

(1) During the drilling and construction of Class III wells, appropriate deviation checks shall be conducted on holes where pilot holes and reaming are used at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling.

(2) Mechanical integrity, as described in §331.43 of this title (relating to Mechanical Integrity Standards), shall be demonstrated following construction of the well.

(A) Except as provided by subparagraph (B) of this section, the following tests shall be used to evaluate the mechanical integrity of the injection well:

(i) To test for significant leaks under §331.43(a)(1) of this title, monitoring of annulus pressure, or pressure test with liquid or gas, or radioactive tracer survey, or for

Class III uranium solution mining wells only, a single point resistivity survey in conjunction with a pressure test to detect any leaks in the casing, tubing, or packer; and

(ii) To test for significant fluid movement under §331.43(a)(2) of this title, temperature log, noise log, radioactive tracer survey, cement bond log, oxygen activation log, or for Class III uranium solution mining wells only, cement records that demonstrate the absence of significant fluid movement where other tests are not suitable. For Class III wells where the cement records are used to demonstrate the absence of significant fluid movement, the monitoring program prescribed by §331.84 of this title (relating to Monitoring Requirements) shall be designed to verify the absence of significant fluid movement.

(B) The executive director may allow the use of a test to demonstrate mechanical integrity other than those listed in subparagraph (A) of this paragraph with the written approval of the administrator of the United States Environmental Protection Agency (EPA) or his authorized representative. To obtain approval, the executive director shall submit a written request to the EPA administrator, which shall set forth the proposed test and all technical data supporting its use. The EPA administrator shall approve the request if it will reliably demonstrate the mechanical integrity of wells for which its use is proposed. Any alternate method approved by the EPA administrator shall be published in the Federal Register and may be used unless its use is restricted at the time of approval by the EPA administrator.

(3) Additional logs and tests may be required by the executive director when appropriate.

(d) Construction and testing supervision. All phases of well construction and testing shall be supervised by a person who is knowledgeable and experienced in practical drilling engineering and who is familiar with the special conditions and requirements of injection well construction.

(e) Injection zone characteristics - water bearing formation. Where the injection zone is a water bearing formation, the following information concerning the injection zone shall be determined or calculated:

- (1) fluid pressure;
- (2) temperature;
- (3) fracture pressure;
- (4) other physical and chemical characteristics of the injection zone;
- (5) physical and chemical characteristics of the formation fluids; and
- (6) compatibility of injected fluids with formation fluids.

(f) Injection zone characteristics - non-water bearing formations. Where the injection formation is not a water bearing formation, the fracture pressure shall be determined or calculated.

(g) Monitor well location. Where injection is into a formation which contains water with less than 10,000 mg/l TDS, monitor wells shall be completed into the injection zone and into any USDW above the injection zone which could be affected by the mining operation. These wells shall be located to detect any excursion of injection fluids, production fluids, process by-products, or formation fluids outside the mining area or zone. If the operation may be affected by subsidence or catastrophic collapse, the monitor wells shall be located so that they will not be physically affected. Designated monitor wells shall be installed at least 100 feet inside any permit area boundary, unless excepted by written authorization from the commission.

(h) Subsidence or catastrophic collapse. Where the injection wells penetrate a USDW in an area subject to subsidence or catastrophic collapse an adequate number of monitor wells shall be completed into the USDW to detect any movement of injected fluids, process by-products or formation fluids into the USDW. The monitor wells shall be located outside the physical influence of the subsidence or catastrophic collapse.

(i) Monitor well criteria. In determining the number, location, construction, and frequency of monitoring of the monitor wells the following criteria shall be considered:

- (1) the population relying on the USDW affected or potentially affected by the injection operation;
- (2) the proximity of the injection operation to points of withdrawal of drinking water;
- (3) the local geology and hydrology;
- (4) the operating pressures and whether a negative pressure gradient is being maintained;
- (5) the chemistry and volume of the injected fluid, the formation water, and the process by-products; and
- (6) the injection well density.

SUBCHAPTER F: STANDARDS FOR CLASS III WELL

PRODUCTION AREA DEVELOPMENT

§§331.105 - 331.107

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§331.105. Monitoring Standards.

The following shall be accomplished to detect mining solutions in designated monitor wells:

(1) Routine sampling. Water samples shall be taken at least twice a month at two-week intervals from all monitor wells for permit/production area(s) in which mining solutions have been introduced. These shall be analyzed for the control parameters by the second working day and reported as required in §331.85(e) of this title (relating to Reporting Requirements). The determined values

shall be entered on appropriate forms within three working days after analysis. These data shall be kept readily available on site for review by commission representatives.

(2) Duration of monitoring program. The program of monitoring detailed in paragraph (1) of this subsection shall be continued in each permit/mine area until the executive director is officially notified that restoration has commenced. Further monitoring as required by permit shall continue until aquifer restoration and stabilization in that particular permit/mine area has been achieved in compliance with §331.107 of this title (relating to Restoration).

(3) Verifying analysis. If the results of a routine sample analysis show that the value of any control parameter is equal to or above the upper limit established for that permit/mine area, the operator shall complete a verifying analysis of samples taken from each apparently affected well within two days.

(4) Sampling frequency when mining solutions present. During the period of time when mining solutions are present in a designated monitor well, water samples will be taken at least two times per week and analyzed for all control parameters by the second day after the sample is taken.

§331.106. Remedial Action for Excursion.

If the verifying analysis indicates that mining solutions are present in a designated monitor well, the operator shall take the following actions:

(1) notification - notify the commission regional office by the next working day by telephone and notify the executive director by letter postmarked within 48 hours of identification of the excursion. The notification must identify the affected monitor well and the control parameter concentrations.

(2) analysis-complete a groundwater analysis report for each affected well on forms provided by the executive director (including accuracy checks and stiff diagram) for the following: pH, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, silica, total dissolved solids (180 degrees Celsius), specific conductance and dilute conductance, and any other specified constituents. Results shall be reported in accordance with §331.85(e) of this title relating to Reporting Requirements).

(A) The permittee will clean up all designated monitor wells, all zones outside of the production zone, and the production zone outside of the mine area that contain mining solutions. The permittee may use any method judged necessary and prudent to define the extent of the mining solutions and to effect this clean-up in an expeditious and practical manner. Well clean-up is deemed to be accomplished when the water quality in the affected monitor well(s) has been restored to values consistent with current local baseline water quality as confirmed by three consecutive daily samples for the control parameters.

(B) The executive director may determine that cleanup is not necessary if the permittee can demonstrate that the change in water quality is not due to the presence of mining solutions or fluids from other mining activities.

§331.107. Restoration.

(a) Restoration table. Upon issuance and renewal, Class III permits and production area authorizations shall contain a restoration table listing restoration goals as provided by §331.104 of this title (relating to Establishment of Baseline and Restoration Values).

(b) Mining completion. When the mining of a permit or production area is completed, the permittee shall notify the appropriate commission regional office and the executive director and shall proceed to reestablish groundwater quality in the affected permit or mine area aquifers to levels consistent with the values listed in the restoration table for that permit or mine area. Restoration efforts shall begin as soon as practicable but no later than 30 days after mining is completed in a particular production area. The executive director, subject to commission approval, may grant a variance from the 30-day period for good cause shown.

(c) Timetable. Aquifer restoration, where appropriate for each permit or mine area, shall be accomplished in accordance with the timetable specified in the currently approved mine plan, unless otherwise authorized by the commission. Authorization for expansion of mining into new production areas may be contingent upon achieving restoration progress in previously mined production areas

within the schedule set forth in the mine plan. The commission may amend the permit to allow an extension of the time to complete restoration after considering the following factors:

- (1) efforts made to achieve restoration by the original date in the mine plan;
- (2) technology available to restore groundwater for particular parameters;
- (3) the ability of existing technology to restore groundwater to baseline quality in the area;
- (4) the cost of achieving restoration by a particular method;
- (5) the amount of water which would be used or has been used to achieve restoration;
- (6) the need to make use of the affected aquifer; and
- (7) complaints from persons affected by the permitted activity.

(d) Reports. Beginning six months after the date of initiation of restoration of a permit or production area, as defined in the mine plan, the operator shall provide to the executive director semi-annual restoration progress reports until restoration is accomplished for the permit or mine area.

(e) Stability sampling. The permittee shall obtain stability samples and complete an analysis for certain parameters listed in the restoration table from all production area baseline wells. Stability samples shall be conducted at a minimum of 30-day intervals for a minimum of three sample sets and reported to the executive director. The permittee shall notify the executive director at least two weeks in advance of sample dates to provide the opportunity for splitting samples and for selecting additional wells for sampling, if desired. To insure water quality has stabilized, a period of 180 days must elapse between cessation of restoration operations and the final set of stability samples. The executive director shall determine within 45 days of the receipt of all sample analysis results whether or not restoration has been achieved. Upon acknowledgment in writing by the executive director confirming achievement of final restoration, the permittee shall accomplish closure of the area in accordance with §331.86 of this title (relating to Closure).

(f) Restoration table values not achieved. After an appropriate effort has been made to achieve restoration to levels consistent with values listed in the restoration table for a production area, the permittee may cease restoration operations, reduce bleed and request that the restoration table be amended. With the request for amendment, the permittee shall submit the results of three consecutive sample sets taken at a minimum of 30-day intervals from all production area baseline wells used in determining the restoration table to verify current water quality. Stabilization sampling may commence 60 days after cessation of restoration operations.

(1) In determining whether the restoration table should be amended, the commission will consider the following items addressed in the request:

- (A) uses for which the groundwater was suitable at baseline water quality levels;
 - (B) actual existing use of groundwater in the area prior to and during mining;
 - (C) potential future use of groundwater of baseline quality and of proposed restoration quality;
 - (D) the effort made by the permittee to restore the groundwater to baseline;
 - (E) technology available to restore groundwater for particular parameters;
 - (F) the ability of existing technology to restore groundwater to baseline quality in the area under consideration;
 - (G) the cost of further restoration efforts;
 - (H) the consumption of groundwater resources during further restoration; and
 - (I) the harmful effects of levels of particular parameter.
- (2) The commission may amend the restoration table if it finds that:

(A) reasonable restoration efforts have been undertaken, giving consideration to the factors listed in paragraph (1) of this subsection;

(B) the values for the parameters describing water quality have stabilized for a period of 180 days;

(C) the formation water present in the aquifer would be suitable for any use to which it was reasonably suited prior to mining; and

(D) further restoration efforts would consume energy, water, or other natural resources of the state without providing a corresponding benefit to the state.

(3) If the restoration table is amended, restoration sampling shall commence and proceed as described in subsection (e) of this section.

SUBCHAPTER G: CONSIDERATION PRIOR TO PERMIT ISSUANCE

§331.121

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§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) including, but 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 cavern disposal wells, the salt cavern injection zone, salt 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 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 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 system;

(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;

(3) 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.

(4) the closure plan, corrective action plan, and post-closure plan submitted in the technical report accompanying the permit application;

(5) 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 for the disposal of hazardous waste 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 Summary);

(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) 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 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 be 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:

(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 criteria, which must be addressed in the technical report of the application, before issuing a salt cavern Class I injection well permit:

(1) geologic suitability of the location:

(A) a thorough geologic characterization of the salt dome, including the geometry of the salt stock and its calculated movement and calculated salt loss rate. Data submitted must be sufficient to image underneath all overhangs, to delineate the edge of the salt stock, to define any other caverns or co-uses of the salt stock, and to address any conditions that may result in potential adverse impact on the salt stock. Well logs, seismic reflection surveys, gravity surveys, and any other appropriate geophysical methods necessary to characterize the salt dome are to be utilized. Seismic reflection data submitted must include a surface recorded three-dimensional seismic grid survey sufficient to image underneath all suspected overhangs and to delineate the edge of the stock;

(B) 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;

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

(D) for strata surrounding the salt stock, information on their nature, structure, hydrodynamic properties, and relationships to USDWs, including a demonstration that the proposed salt cavern injection zone will not be in or above a formation which within 1/4 mile of the salt 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 a 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 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 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 applicant 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 J: STANDARDS FOR CLASS I SALT CAVERN

SOLID WASTE DISPOSAL WELLS

§§331.161, 331.163 - 331.167, 331.169, 331.171

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§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), salt cavern solid waste disposal wells and associated caverns in horizontally bedded or non-domal salt 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 in horizontally bedded or non-domal salt are added by amendment to this subchapter or promulgated as a new subchapter.

§331.163. Well Construction Standards.

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

(b) Casing and cementing.

(1) All Class I salt cavern disposal wells shall be cased and all casings which extend to the surface shall be cemented to the surface to prevent the movement of fluids into or between underground sources of drinking water (USDWs) or freshwater aquifers, and to prevent potential leaks of fluids from the well. Cementing shall be by the pump and plug or other method approved by the commission, and cement circulated shall be of a volume equivalent to at least 120% of the calculated volume needed to fill the annular space between the hole and casing and between casing strings to the surface of the ground. Circulation of cement may be accomplished by staging. The executive director may approve an alternative method of cementing in cases where the cement cannot be recirculated to

the surface, provided the owner or operator can demonstrate by using logs that the cement is continuous or does not allow any fluid movement behind the well casings. Casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well, including the post-closure care.

(A) Surface casing shall be set to a minimum subsurface depth, as determined by the executive director, which extends into a confining bed below the lowest formation containing a USDW or freshwater aquifer.

(B) At least one string of intermediate casing, using a sufficient number of centralizers, shall extend at least 100 feet into the salt stock.

(C) At least one long string casing, using a sufficient number of centralizers, shall extend into the salt stock, to the following depths, whichever is greater:

(i) 500 feet into the salt stock; or

(ii) 500 feet below any rock type of recognizable thickness as determined by logging, which is different from salt, and that is hydraulically connected to formations outside the salt stock. For the purposes of this rule, all rock types of recognizable thickness on logs which are different from salt shall be assumed to be in hydraulic connection unless demonstrated otherwise.

(2) 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; and

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

(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.

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

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

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

(d) Well annulus system factors for consideration. All elements of the design of the well's tubing-longstring casing annulus system, including the outer tubing and packer, shall be approved by

permit or by the executive director's approval that any proposed modifications to the plans and specifications in the permit application will provide protection equivalent to or greater than the original plans and specifications. In determining and specifying requirements for a tubing and packer system, the following factors shall be considered:

- (1) depth of setting;
 - (2) characteristics of injection fluid;
 - (3) injection pressure;
 - (4) annular pressure;
 - (5) rate, temperature, and volume of injected fluid;
 - (6) size of casing; and
 - (7) tensile, burst, and collapse strengths of the tubing.
- (e) 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. A minimum of 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 for all formations overlying the caprock;

(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;

(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 prior to drilling out the cemented casing shoe, surface casing shall be pressure tested to 1,000 psi for 30 minutes, and the intermediate and long string casing shall be tested to 1,500 psi for 30 minutes, unless otherwise specified by the executive director.

(B) After drilling out the cemented long string casing shoe, and prior to 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) Full-hole continuous cores shall be taken beginning at the top of the caprock, or if caprock is not encountered, from the top of the salt stock, to a total investigated depth of 1,000 feet below the intended cavern floor. Cores shall be analyzed at sufficient frequency to provide representative data for the caprock, salt cavern confining zone, and the salt cavern injection zone, including permeability, porosity, bulk density, compressive strength (uniaxial), shear strength (triaxial), water content, and compatibility with permitted waste material. The full-hole, continuous cores shall be photographed for permanent records. The photographs of the cores shall be submitted to the commission as a part of the well completion report as required by §331.167(a)(1) of this title (relating to Reporting Requirements). The cores shall be archived at a facility approved by the executive director. The photos and cores will be maintained as public records.

(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.

(C) Prior to commencement of injection for cavern construction, the pilot hole or core hole shall be filled with salt-saturated cement from total investigated depth back to the designed depth of the salt cavern floor.

(D) Upon satisfactory completion of all coring requirements of this subsection and all reports and certification requirements of subsection (i) of this section, for at least one salt cavern disposal well in a multi-cavern waste disposal project, the executive director may modify or waive provisions in subparagraphs (A), (B), and (C) of this paragraph.

(4) Well integrity testing. The mechanical integrity of a well must be demonstrated prior to 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.

(f) 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 (API), the American Society for Testing Materials (ASTM), or comparable standards acceptable to the executive director.

(g) Surface facilities.

(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) Surface facilities, 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.

(h) Construction supervision. All phases of well construction and all phases of any well workover shall be supervised by a professional engineer, with current registration pursuant to the Texas Engineering Practice Act, who is knowledgeable and experienced in practical drilling engineering and who is familiar with the special conditions and requirements of injection well construction.

(i) Approval of completion of the well construction stage. Prior to beginning cavern construction, 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 professional engineer with current registration pursuant to the Texas Engineering Practice Act:

(1) final construction, "as-built" plans and specifications, reservoir data, and an evaluation of the considerations set out in §331.45(1) 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;

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

§331.164. 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 cavern construction by controlled dissolution. The creation of waste storage or disposal caverns within the 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 salt cavern injection interval. The top of the cavern shall be at least 100 feet below the base of the long string casing. 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:

(1) the minimum distance between the salt cavern injection zone boundaries and the boundaries of the salt stock, as determined by available geologic data, shall not be less than 500 feet;

(2) adjacent caverns shall be separated by a minimum pillar to cavern diameter (P/D) ratio of 2.0 to ensure a sufficient amount of undisturbed salt for cavern safety and stability. Adjacent salt cavern injection zones shall also be separated by a confining thickness of salt;

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

(4) plans for continual monitoring of the volumes of fluids injected and produced during cavern development;

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

(6) the cavern construction process shall be conducted under the supervision of a qualified professional engineer, with current registration under the Texas Engineering Practices Act, in accordance with accepted practices in the cavern construction industry.

(7) all cavern solutioning brines shall be disposed of in facilities authorized by the commission for such purpose.

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

(1) All injection activities during cavern construction shall be performed with the annulus between the outer tubing and long string casing filled with a non-corrosive inhibiting fluid sufficient to protect the bond between salt, cement, and the long string casing seat.

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

(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 throughout the cavern construction process. 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) Prior to waste filling, the integrity of the cavern shall be tested in accordance with a test method described in the applicant's cavern construction plan, specified by permit or approved by the executive director in accordance with subsection (a) of this section.

(e) 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) 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 salt cavern construction stage.

(2) Approval of completion of the cavern construction stage. Within 90 days of completion of cavern construction, including configuration of the well for waste disposal, and prior to beginning waste emplacement, the permittee shall obtain written approval from the executive director which states that the cavern construction is in compliance with the applicable provisions of the permit. To obtain approval, the permittee shall submit to the executive director the following reports and certifications prepared and sealed by a professional engineer with current registration pursuant to 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(2) 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;

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

§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 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 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 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.

§331.166. 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 required 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 both tubing strings and on the annulus between the outer tubing and long string casing/liner.

(c) Continuous recording devices. Continuous recording devices shall be installed and used, and maintained in proper operating condition at all times to record tubing string pressures, injection flow rates (by volume or mass), injection waste temperatures, injection waste density, volume and composition of displaced fluids and gases, injection volumes, tubing-long string casing annulus pressure, volume of annulus contents, and any other data specified by the permit. The composition of

emplaced and displaced gases will be continuously recorded and monitored for change in composition.

When a change in composition is detected a sample will be taken to establish the chemical composition of the displaced gases. The instruments shall be housed in weatherproof enclosures. 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.

(d) Testing and calibration of monitoring instruments. All gauges, and pressure sensing and recording devices shall be tested and calibrated quarterly.

(e) Well mechanical integrity. The owner or operator shall maintain mechanical integrity of the injection well at all times that the well is in service. Mechanical integrity of the well must be demonstrated:

(1) within 12-month intervals, or within extended intervals not to exceed 15 months upon approval of the executive director, during the operating life of the well;

(2) by a temperature log, noise log, or other approved log required by the executive director at least once every five years to test for fluid movement along the borehole; and

(3) a casing inspection, casing evaluation, or other approved log may be required by the executive director to determine the condition of the casing.

(f) Cavern integrity. The owner or operator must maintain cavern integrity at all times. The integrity of the cavern must be demonstrated within 12-month intervals, or within extended intervals not to exceed 15 months upon approval of the executive director, by:

(1) pressure tests that determine if pressure interference or fluid flow exists between other caverns or formations; and

(2) a sonar test, or other test approved by the executive director, to determine the geometric shape of the unfilled cavern.

(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 by the executive director if the injection well owner or operator satisfactorily demonstrates, prior to authorization to conduct injection operations, 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 executive director shall require the owner or operator to develop an ambient monitoring program, based on a site-specific assessment of the potential for waste and/or fluid movement from the well or injection zone and subsidence due to groundwater withdrawal or salt movement.

(2) The executive director shall require subsidence and groundwater quality monitoring over the area of review, and any other type of ambient necessary to comply with §331.162 of this title (relating to Performance Standard).

(3) Any monitor wells within the area of review selected for the observation of water quality, subsidence, formation pressure, or any other parameter, shall be monitored at an accuracy, frequency, and density sufficient to protect underground sources of drinking water, and fresh or surface water.

(i) Hydrogeologic compatibility determination. The owner or operator shall submit information demonstrating to the satisfaction of the executive director that the waste stream and its anticipated reaction products will not alter the permeability, thickness, or other relevant characteristics of the salt cavern confining or salt cavern injection zones 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. Any other monitoring and testing requirements, including determination of composition and volume of leachate, shall be specified as permit conditions.

(k) 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 prior to conducting tests.

§331.167. Reporting Requirements.

(a) Pre-operation reports.

(1) 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(2) of this title (relating to Executive Director Approval of Construction and Completion) and §331.163 of this title (relating to 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. The permittee shall integrate the data obtained into adjusted injection zone fluid transport calculations, and updated cross-sections of the injection zone, and shall include these items in the completion report.

(2) 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(2) of this title and §331.164 of this title (relating to 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. The permittee shall integrate the data obtained into adjusted injection zone waste transport calculations, waste front calculations and updated cross-sections of the injection zone and include these items in the completion report.

(3) 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.

(4) Start-up date and time. 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 prior to beginning injection operations. The permittee shall notify the executive director at least 24 hours prior to beginning drilling and cavern construction operations.

(5) Approval of construction and completion. Prior to beginning operations, the permittee shall obtain written approval from the executive director which states that the constructions and completions of the well and cavern are in compliance with the applicable provisions of the salt cavern solid waste disposal well permit. To obtain certification, the permittee shall submit to the executive director the following reports and certifications prepared and sealed by a professional engineer with current registration pursuant to the Texas Engineering Practice Act:

(A) final construction, "as-built" plans and specifications, reservoir data, and an evaluation of the considerations set out in §331.45(2) of this title;

(B) certification that the construction of the well, cavern, and associated facilities 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 data obtained on the confining and injection zones will not result in a need for a change in the operating parameters specified in the permit.

(b) Operating reports.

(1) Injection operation quarterly report. 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). The executive director may require more frequent reporting.

(2) Injection operation monthly report. For commercial facilities only the following shall apply.

(A) The permittee shall submit to the commission within 10 days after the last day of each month a report describing chemical characteristics of new waste streams received for injection. The report shall be on forms provided by or acceptable to the commission.

(B) The permittee shall submit within 30 days after the last day of each month a report to the commission including the following information for wastes received and injected during the month:

(i) names and locations of the companies and plants generating the wastes;

(ii) chemical and physical characteristics and volume of waste received from each company including pH;

(iii) names of companies transporting the wastes; and

(iv) a log of injection operations for each injection episode including, but not limited to, time of injection, injection rate, injection pressures, injection fluid volume, injection fluid pH, and injection fluid density.

(C) The permittee shall submit to the commission within 20 days of the last day of each month a report of injection operations on forms provided by the commission. These forms will comply with the reporting requirements of 40 Code of Federal Regulations §146.69(a). The executive director may require more frequent reporting.

(3) 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 §331.166(h) of this title (relating to 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 1/2 mile of the injection well and for all other 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.

(4) 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 and interpretations of all logs and data collected.

(5) 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.

(6) Emergency report of leak or other failure. The permittee shall notify the underground injection control (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.

§331.169. Record-Keeping Requirements.

(a) The permittee shall keep complete and accurate records of, but not limited to:

(1) All monitoring required by the permit, including:

(A) continuous records of surface injection pressures;

(B) continuous records of the pressures and volumes of the annulus between the tubing and long string;

(C) continuous records of injection and production flow rates;

(D) monthly total volume of injected and produced materials;

(E) continuous records of cavern gases chemistry and pressures;

(F) continuous records of cavern fill volume and chemistry; and

(G) continuous records of cavern fluid volume;

(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;

(4) any additional information on conditions that might reasonably affect the operation of the injection 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 prior to conclusion of the retention period.

§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 K: ADDITIONAL REQUIREMENTS FOR CLASS V

AQUIFER STORAGE WELLS

§331.182, §331.183

STATUTORY AUTHORITY

The amended sections are adopted under Texas Water Code, §5.103, which provides the commission authority to adopt any rules necessary to carry out its powers and duties under this code and other laws of this state and to adopt rules repealing any statement of general applicability that interprets law or policy; §5.105 which authorizes the commission to establish and approve all general policy of the commission by rule; §27.019, which requires the commission to adopt rules reasonably required for the regulation of injection wells; and Texas Health and Safety Code, §361.024, which provides the commission authority to adopt rules and establish minimum standards of operation for the management and control of solid waste under this chapter.

§331.182. Area of Review.

The area of review for a Phase I Class V aquifer storage well is the area determined by a radius of 1/4 mile from the proposed or existing wellbore. The area of review for a Phase II Class V aquifer storage well is the area determined by a radius of 1/4 mile from the perimeter of a buffer zone as described under §295.22(e)(5) of this title (relating to Additional Requirements for the Underground Storage of Surface Water for Subsequent Retrieval and Beneficial Use). In the application for

authorization, the applicant shall provide information on the activities within the area of review including the following factors and their adverse impacts, if any, on the injection operation:

(1) location of all artificial penetrations that penetrate the interval to be used for aquifer storage, including but not limited to: water wells and abandoned water wells from commission well files or ground water district files; oil and gas wells and saltwater injection wells from the Railroad Commission of Texas files; and waste disposal wells/other injection wells from the commission disposal well files;

(2) completion and construction information, where available, for identified artificial penetrations; and

(3) site specific, significant geologic features, such as faults and fractures.

§331.183. Construction and Closure Standards.

All Class V aquifer storage wells shall be designed, constructed, completed, and closed to prevent commingling, through the wellbore and casing, of injection waters with other fluids outside of the authorized injection zone; mixing through the wellbore and casing of fluids from aquifers of substantively different water quality; and infiltration through the wellbore and casing of water from the surface into ground water zones.

(1) Plans and specifications. Except as specifically required in the terms of the Class V aquifer storage well authorization, the drilling and completion of a Class V aquifer storage well shall be done in accordance with the requirements of §331.132 of this title (relating to Construction Standards) and the closure of a Class V aquifer storage well shall be done in accordance with the requirements of §331.133 of this title (relating to Closure Standards).

(A) If the operator proposes to change the injection interval to one not reviewed during the authorization process, the operator shall notify the executive director immediately. The operator may not inject into any unauthorized zone.

(B) The executive director shall be notified immediately of any other changes, including but not limited to, changes in the completion of the well, changes in the setting of screens, and changes in the injection intervals within the authorized injection zone.

(2) Construction materials. Casing materials for Class V aquifer storage wells shall be constructed of materials resistant to corrosion.

(3) Construction and workover supervision. All phases of any aquifer storage well construction, workover or closure shall be supervised by qualified individuals who are knowledgeable and experienced in practical drilling engineering and who are familiar with the special conditions and requirements of injection well and water well construction.