

Chapter 173-157 WAC
UNDERGROUND ARTIFICIAL STORAGE AND RECOVERY

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WAC

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PART I INTRODUCTION

WAC 173-157-010 What is the purpose of this rule? The purpose of this rule is to establish the standards for review of applications for underground artificial storage and recovery projects and, when necessary, to identify options for mitigation of potential adverse impacts to groundwater quality or the environment. The rule also outlines the process the department of ecology will use to evaluate applications and issue permits to artificially store water in underground geological formations and subsequently recover it for beneficial use.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-010, filed 1/15/03, effective 2/15/03.]

WAC 173-157-020 What is the authority for this rule? In 2000, the Washington state legislature passed Engrossed Second Substitute House Bill 2867 (E2SHB 2867), which amended chapters 90.03 and 90.44 RCW. This bill expanded the definition of "reservoir" in RCW 90.03.370 to include "any naturally occurring underground geological formation where water is collected and stored for subsequent use as part of an underground artificial storage and recovery project." Projects of this type are more commonly known as "aquifer storage and recovery" or "ASR" projects. The legislation directed the department to adopt rules establishing the "standards for review and standards for mitigation of adverse impacts for an underground artificial storage and recovery project." The department of ecology promulgates this rule under the authorities provided in chapter 34.05 RCW and RCW 90.03.370.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-020, filed 1/15/03, effective 2/15/03.]

WAC 173-157-030 To whom does this rule apply? This rule applies to any firm, association, water users' association, corporation, irrigation district, municipal corporation, or anyone else that intends to obtain a reservoir permit to develop an underground artificial storage and recovery project pursuant to RCW 90.03.370. This chapter does not apply to projects utilizing irrigation return flow, or to operational and seepage losses that occur during the irrigation of land, or to water that is artificially stored due to the construction, operation, or maintenance of an irrigation district project, or to projects involving water reclaimed in accordance with chapter 90.46 RCW.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-030, filed 1/15/03, effective 2/15/03.]

WAC 173-157-040 What are the meanings of words and phrases used in this rule? "Aquifer storage and recovery project," "ASR project," or "underground artificial storage and recovery project" means those projects where the intent is to artificially store water in an underground geological formation through injection, surface spreading and infiltration, or other department-approved method, and to make subsequent use of the stored water.

"Artificial recharge" means either controlled subsurface addition of water directly to the aquifer or controlled application of water to the ground surface for the purpose of replenishing the aquifer.

"Beneficial use" includes, among others, uses for domestic, stock watering, industrial, commercial, agricultural, irrigation, hydroelectric power production, mining, fish and wildlife maintenance and enhancement, recreational, thermal power production, municipal, and preservation of environmental and aesthetic values.

"Confined aquifer" means an aquifer where the permeability of the beds above and below the aquifer is significantly lower than the aquifer itself.

"Department" means the Washington department of ecology.

"DOH" means the Washington department of health.

"Hydraulic continuity" means the existence of some degree of interconnection between two or more sources of water, either surface water and groundwater or two groundwater sources.

"Hydrogeology" means the study of the geologic aspects of subsurface waters.

"Normative flow" means a flow that resembles the natural flow sufficiently enough to sustain all life stages of several species native to the state of Washington, including salmonid populations.

"Permeability" means the ability for a fluid to be transmitted in porous rock, sediment, or soil.

"Piezometric elevation" means the static level to which the water from a given aquifer will rise under its full head.

"RCW" means the Revised Code of Washington.

"Receiving aquifer" or "reservoir" means any portion of a naturally occurring underground geological formation in which the source

water will be collected and stored for a future beneficial use as part of an ASR project.

"Reservoir permit" means a permit to artificially store water in underground geological formations and subsequently recover it for beneficial use.

"SEPA" means the State Environmental Policy Act, chapter 43.21C RCW.

"Secondary permit" means a permit for the appropriation of groundwater which was artificially stored in underground geological formations for subsequent beneficial use.

"Source water" means water that will be stored in a receiving aquifer.

"Stored water" means water that has been stored in a receiving aquifer pursuant to a reservoir permit issued in accordance with the provisions of this chapter.

"Transmissivity" is a measure of the rate which water passes through the geologic material within an aquifer.

"UIC" means the Underground Injection Control program, which was created by the U.S. Environmental Protection Agency pursuant to federal legislation (the Safe Drinking Water Act) and is administered by the department's water quality program.

"Vadose zone" means within the zone of aeration, i.e., water vapor above the saturation zone within an aquifer.

"WAC" means Washington Administrative Code.

"WDFW" means the Washington department of fish and wildlife.

"You" and **"I"** means any firm, association, water users' association, corporation, irrigation district, municipal corporation, or anyone else that intends to obtain a reservoir permit to develop an underground artificial storage and recovery project pursuant to RCW 90.03.370.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-040, filed 1/15/03, effective 2/15/03.]

WAC 173-157-050 What authorization is required for an ASR project? The following permits or authorizations are required:

(1) **Water rights to source waters.**

(a) Any source water you use as part of a project by diverting from a state watercourse or withdrawing state groundwaters, must be obtained under a valid water right permit, certificate, or registered water right claim.

(b) The underlying water right specifies authorized uses. Any proposal to use stored water for different uses will require issuance of a secondary permit.

(2) **Reservoir permit.** When proposing to collect and store water in a naturally occurring underground geological formation for subsequent use as part of an ASR project, you must apply for a reservoir permit in accordance with the provisions of RCW 90.03.370 (2)(a).

(3) **Secondary permit.** You must apply for a secondary permit in accordance with the provisions of RCW 90.03.370 if you propose to apply the water stored in a reservoir to a beneficial use, except that you are not required to apply for a secondary permit if you already have a water right for the source water that authorizes the proposed beneficial use.

(4) **UIC registration.** All UIC wells to be utilized as part of an ASR project must be registered with the department in accordance with the provisions of chapter 90.48 RCW. Additionally, the construction and technical aspects of the injection wells must abide by UIC regulations as stated in chapter 173-160 WAC.

(5) **NPDES permit.** Discharges to surface water must meet water quality standards set forth in chapter 173-201A WAC to protect aquatic life.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-050, filed 1/15/03, effective 2/15/03.]

PART II APPLICATION PROCESS

WAC 173-157-100 What should I know before I apply? (1) You must assess potential impacts to the hydrogeologic system and the environment prior to submitting your application. If your application does not describe the general setting and conditions with sufficient information for the department to assess the application, the department may require you to perform a detailed feasibility study. This feasibility study should reduce uncertainty of the impacts, and better quantify the available storage capacity of the aquifer.

(2) To further reduce uncertainty, you must design a pilot phase for the project, to be used to collect data that will be used to validate the conceptual model, monitor efficacy, and adjust the monitoring, operation, and mitigation plans based upon results. The duration of this phase will be determined by the complexity of the project and stated within the reservoir permit.

(3) You may schedule a preapplication meeting with the department to discuss the project plan and likely requirements for monitoring and mitigation.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-100, filed 1/15/03, effective 2/15/03.]

WAC 173-157-110 What types of information will I need to provide as part of my application? Your application for an ASR project must contain, at a minimum:

(1) A description (conceptual model) of the hydrogeologic system (see WAC 173-157-120) prepared by a hydrogeologist licensed in the state of Washington.

(2) A project operation plan (see WAC 173-157-130) with a description of the pilot and operational phases of the ASR project prepared by an engineer or geologist licensed in the state of Washington.

(3) A description of the legal framework (see WAC 173-157-140) for the proposed project.

(4) An environmental assessment and analysis (see WAC 173-157-150) of any potential adverse conditions or potential impacts to the surrounding ecosystem(s) that might result from the project, along with a plan to mitigate such conditions or impacts.

The environmental assessment will establish whether a determination of nonsignificance or an environmental impact statement is required per SEPA regulations.

- (5) A project mitigation plan (see WAC 173-157-160), if required.
- (6) A project monitoring plan (see WAC 173-157-170).

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-110, filed 1/15/03, effective 2/15/03.]

WAC 173-157-120 What must I include in the hydrogeologic system description? Your hydrogeologic system description must include a conceptual hydrogeologic model that describes:

- (1) The aquifer targeted for storage, to include at a minimum estimates for:
 - (a) Lateral and vertical extent;
 - (b) Whether the aquifer is confined or unconfined;
 - (c) Permeability;
 - (d) Total storage volume available;
 - (e) Effective hydraulic conductivity;
 - (f) Transmissivity; and
 - (g) Potential for physio-chemical changes in the aquifer or vadose zone as a consequence of recharge.
- (2) The estimated flow direction(s) and rate of movement.
- (3) The anticipated changes to the groundwater system due to the proposed ASR project.
- (4) The estimated area that could be affected by the project.
- (5) The general geology in the vicinity of the proposed project, including stratigraphy and structure.
- (6) The locations of existing documented natural hazards that could be affected or exacerbated by the project, such as landslide-prone areas or areas of subsidence along with a plan to mitigate such conditions or impacts.
- (7) The locations of surface waters such as springs, creeks, streams or rivers that could be affected by the ASR project.
- (8) The locations of all wells or other sources of groundwater of record within the area affected by the project.
- (9) The chemical and physical composition of the source water(s) and their compatibility with the naturally occurring waters of the receiving aquifer.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-120, filed 1/15/03, effective 2/15/03.]

WAC 173-157-130 What must I include in the project operation plan? Your project operation plan should include, at a minimum, the following information:

- (1) The quantity and times of year source water is available for recharge.
- (2) The proposed rate of injection and withdrawal of water.
- (3) The length of time the water is proposed to be stored.
- (4) The location, number, and capacity of proposed recharge wells or infiltration basins, and recovery facilities.

(5) Any variability in quality and reliability of the source water.

(6) A description of any water treatment method(s) you will use at the time of injection and recovery to ensure compliance with the water quality standards set forth in chapter 173-200 WAC, as well as the department's antidegradation policy.

(7) Any plans to discharge ASR water to a surface body should include information on the quantity, timing, duration, and water quality parameters such as chlorine, pH and dissolved oxygen of the ASR discharge water.

(8) Any operation and maintenance plans to discharge groundwater and suspended sediment from the ASR well shall provide information on the quantity, duration, quality, and means of discharge.

(9) Destination(s) and permitting for water used for operation and maintenance (e.g., flushing water).

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-130, filed 1/15/03, effective 2/15/03.]

WAC 173-157-140 What must I include in the description of the legal framework? Your description of the legal framework should include, at a minimum:

(1) Documentation of the water rights for the source waters intended to be stored for the proposed ASR project.

(2) A list of other water rights within the ASR project area.

(3) Instream flows established by the department or stream closures in the vicinity of the point of diversion/withdrawal of the source water and/or within the ASR project area.

(4) Ownership and control of any facilities to be used for the proposed project.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-140, filed 1/15/03, effective 2/15/03.]

WAC 173-157-150 What must I include in the environmental assessment and analysis? Your environmental assessment and analysis must, at a minimum, describe:

(1) The environment within the ASR project area, including:

- (a) Proximity to contaminated areas;
- (b) Present and prior land use(s) within the ASR project area;
- (c) Location(s) of historical or existing wetland habitat(s);
- (d) Location(s) of historical or existing flood plain(s);
- (e) Location(s) of historical or existing surface water body or spring, including documented:

- (i) Base flows;
- (ii) Seven-day low flows;
- (iii) Maximum flows.

(2) Adverse impacts to the surrounding environment by the ASR project, including, but not limited to:

- (a) Slope stability;
- (b) Wetland habitat;
- (c) Flood plain;
- (d) Ground deformation;

(e) Surface water body or spring.

(3) If an environmental assessment has already been performed for the purposes of this specific ASR project, the application may simply refer to that documentation and need not repeat that analysis.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-150, filed 1/15/03, effective 2/15/03.]

WAC 173-157-160 What must I include in the project mitigation plan? Your project mitigation plan, if necessary, must be reviewed and approved or prepared by an appropriately experienced engineer licensed in the state of Washington. The mitigation plan shall prescribe actions to be taken to prevent adverse impacts to the environment and methods for evaluation of the effectiveness of these actions.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-160, filed 1/15/03, effective 2/15/03.]

WAC 173-157-170 What must I include in the project monitoring plan? Your project monitoring plan, which will be utilized to evaluate and verify the assumptions in the conceptual model, during the pilot and operational phases, must include the following:

(1) Proposed time intervals for sampling and subsequent reporting.

(2) Descriptions of measurement methodology, threshold values, and evaluation techniques for the following criteria:

(a) The quality of the source and receiving waters. This information must be provided for the period or periods of the year when the water will be stored. Testing must be done by a laboratory certified by either the department or DOH.

(b) The actual quantity of water injected.

(c) Changes in groundwater piezometric elevations in the receiving aquifer.

(d) The percentage of the initial amount of stored water that is recoverable after varying lengths of storage time to validate the estimates of the amount of stored water that is actually recovered.

(e) Data necessary to evaluate the effectiveness of required mitigation.

(f) Other data you or the department determine necessary for monitoring the ASR project and adverse impacts.

You must provide a report of the monitoring data, at least annually, to the department. Based on the complexity of the project, the department may require you to comply with a more frequent reporting schedule. The required reporting frequency will be specified in the reservoir permit.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-170, filed 1/15/03, effective 2/15/03.]

WAC 173-157-180 Where do I submit my application for a reservoir and/or secondary permit? You must submit your application to the

ecology water resources regional office that serves the area where your project would be located. Please refer to the department's website for telephone numbers.

(1) The Northwest regional office serves Whatcom, Island, Kitsap, San Juan, Skagit, Snohomish, and King counties.

(2) The Southwest regional office serves Clallam, Jefferson, Grays Harbor, Mason, Thurston, Pierce, Pacific, Lewis, Wahkiakum, Cowlitz, Clark, and Skamania counties.

(3) The Central regional office serves Okanogan, Chelan, Douglas, Kittitas, Yakima, Klickitat, and Benton counties.

(4) The Eastern regional office serves Ferry, Stevens, Pend Oreille, Lincoln, Spokane, Grant, Adams, Whitman, Franklin, Walla Walla, Columbia, Garfield, and Asotin counties.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-180, filed 1/15/03, effective 2/15/03.]

PART III APPLICATION REVIEW PROCESS

WAC 173-157-200 How will the department issue reservoir permits and/or secondary permits for ASR projects? (1) The department will process applications for permits for ASR projects in accordance with the provisions of RCW 90.03.250 through 90.03.320, RCW 90.03.370, chapter 173-152 WAC and this chapter. The department shall expedite processing applications for those projects that:

(a) Will not require a new water right for diversion or withdrawal of the water to be stored;

(b) Are adding or changing one or more purposes of use for the stored water;

(c) Are adding to the storage capacity of an existing reservoir; or

(d) Are applying for the secondary permit to secure use of water stored in an existing reservoir.

(2) The department shall give strong consideration to the overriding public interest in its evaluation of compliance with groundwater quality protection standards.

(3) Any application considered under this chapter that may impact surface waters will be subject to review by the department, WDFW, DOH, and the appropriate Indian tribe(s), specifically to ensure that the following do not occur during ASR project injections or withdrawals:

(a) Alteration of the normative hydrograph which may result in adverse impacts to fish;

(b) Detrimental changes in temperature, nutrient, heavy metals, hydrocarbon, or other deleterious material levels during critical spawning and rearing periods;

(c) Disruption of natural downwelling or upwelling within stream during critical spawning and rearing periods; or

(d) Saturation of stream bank which could lead to erosion, bank failure, and excess sedimentation entering the stream which can alter stream chemistry, flow, and bed morphology.

Each ASR project application will be subject to public notice and comment per RCW 90.03.280. The department will consider any comments by the reviewers in evaluating the application.

(4) The department may issue a conditioned permit to prevent any long-term changes to the aquifer, or other adverse impacts to the environment. The conditioning will provide for a pilot phase of the project, to be used to collect data, monitor efficacy, evaluate the effectiveness of any mitigation plan approved under WAC 173-157-150, and adjust the ASR project or mitigation plan based upon pilot phase results.

(5) Permits will contain a schedule for:

- (a) Development and completion of the project;
- (b) Monitoring and reporting during the pilot and operational phases of the project.

(6) The department can, upon a showing of good cause, issue extensions for the permit in accordance with the provisions of RCW 90.03.320.

(7) Once sufficient information is developed and provided to the department to verify that the project is viable and the requirements of RCW 90.03.330 have been met, the department will issue proper documentation for the reservoir and secondary permit, if any, with the priority date or dates based on the underlying source water right.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-200, filed 1/15/03, effective 2/15/03.]

WAC 173-157-210 Can I appeal a decision made by the department on my application? Yes, all final written decisions of the department made on applications pursuant to this chapter are subject to review by the pollution control hearings board in accordance with the provisions of chapter 43.21B RCW if you comply with the requirements for appeal established by statute and rule.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-210, filed 1/15/03, effective 2/15/03.]

WAC 173-157-220 Can this regulation be reviewed or updated? Yes, the department may initiate a review of the rules established in this chapter whenever new information, changing conditions, statutory modifications, or other factors make it necessary or desirable to consider revisions.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-220, filed 1/15/03, effective 2/15/03.]

WAC 173-157-230 Where can I obtain copies of ecology statutes and regulations? Copies of statutes and regulations cited in this chapter may be obtained from the public records office at the department's headquarters office. You may also obtain copies by downloading documents from the department's internet site at <http://www.ecy.wa.gov> or copies of rules of the pollution control hearings board from the pollution control hearings board's internet site at <http://www.eho.wa.gov>.

[Statutory Authority: RCW 90.03.370 (2)(b) and 90.44.460. WSR 03-03-081 (Order 02-06), § 173-157-230, filed 1/15/03, effective 2/15/03.]