

Aquifer Storage & Recovery– Permitting and Pitfalls

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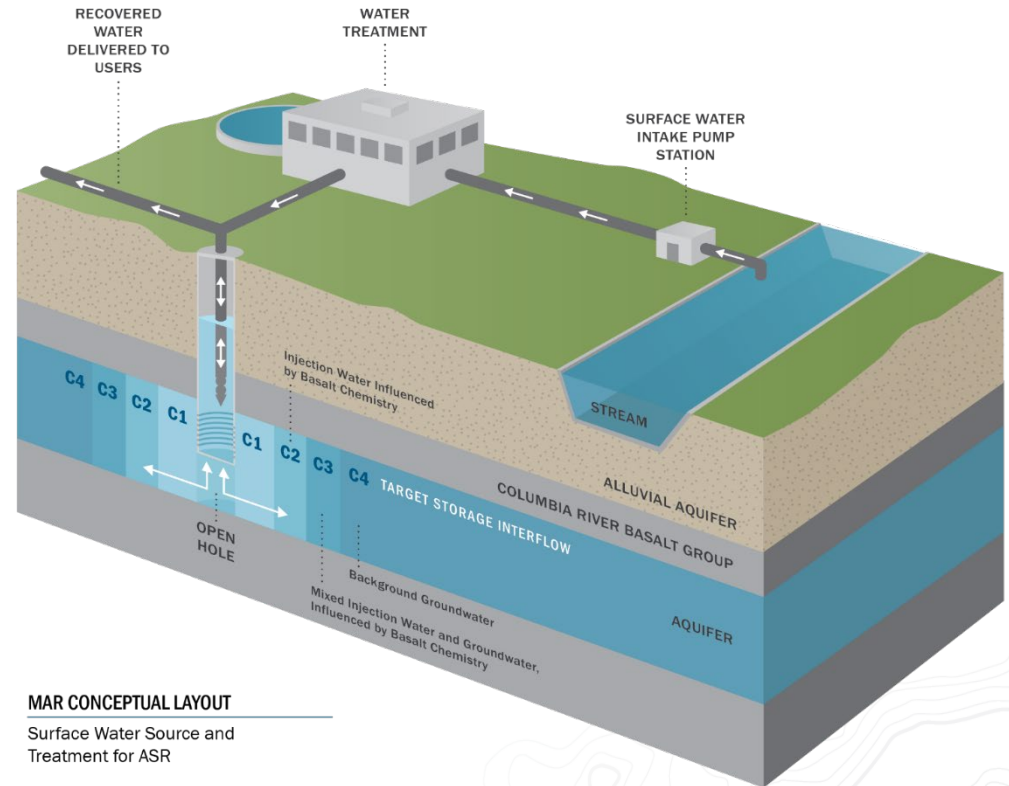


Outline

- What is ASR (in a single cartoon)
- Initial permitting considerations
- Before the permit(s) application
- Additional consideration (challenges)
- Circling back

Aquifer Storage & Recovery (ASR)

- Store water when you have legal access
 - Winter surface water storage (there's lots of it)
- Recover it when you need it
 - Summer recovery (we need it)



Authorized under WAC 173-157

- Source water rights (usually surface)
 - Groundwater right not required
 - But..., nuance in molecule for molecule recovery
- Reservoir Permit (RP) allows storage
 - If source water right incl. beneficial use RP allows recovery
 - If not, need secondary permit
 - Preliminary permit to authorize tests (unless have groundwater right?)
- Class V UIC if injection well(s)
- NPDES permit if discharging to surface water

Source Water and WDOH; WAC 246-290

- Using WDOH approved surface water source(s) vs new surface water source
 - If already WDOH approved, move forward
 - If new, not approved WDOH source, need WDOH source approval (WDOH Pub. 331-123)
- Reclaimed water (that's another road)
- Aquifer recharge (another-nother road)

Before ASR RP application (the first step):

- WAC 173-157-100 (3). Pre-app meeting to discuss project development pathway, implementation plan (IP), monitoring plan (MP), feasibility study report (FSR) (see *Ecology Pub 22-12-003*)
- Document this meeting
 - What is the FSR content
 - What does the IP look like
 - MP requirements
 - Define terms
- Have a clear project concept
- All done before new work starts

Before ASR RP application (the next steps):

- WAC 173-157-100(1). Assess potential impacts to hydrogeo system. If “...does not describe general settings and conditions with sufficient information for department to assess application...” Ecology will likely require detailed feasibility study to “...reduce uncertainty of impacts and quantify available storage capacity of the aquifer.”
- Agree on def. of *general setting and conditions*
- Agree on what *reduce uncertainty* and *quantify available storage capacity* means
- If can't go to detailed FSR
- Year 1?

Before ASR RP application (the next steps, continued):

- WAC 173-157-100 (2) To further reduce uncertainty design pilot phase to collect data to validate conceptual hydrogeologic model and monitor and adjust plans implemented as conditions of RP app and prelim permit for pilot test
- Agree on what is needed to *reduce uncertainty*
 - Testing?
- Agree on *monitoring*
 - Existing vs new wells? (\$\$\$)
- *Pilot test* implemented in RP (AKART doc leads to developing for RP appl.)?
- Years 2 and 3?

Before ASR RP application (next steps – need more)

- WAC 173-157-120 (1) – (9) further describes topics to address for RP application:
 - Conceptual hydrogeologic model report
 - Groundwater and surface water system (what, where, how much)
 - Groundwater quality compatibility
 - Potential ASR effects and mitigation of environmental impacts
 - Groundwater monitoring, before and during pilot testing
 - Project operation
- Existing vs. new data
 - What reduces uncertainty?
- Modeling vs. direct testing?
- Agree on what is needed
- Years 3 and 4?

Before ASR RP application: getting RP approved

- WAC 173-157-200 (1) – (7) dives into **RP** reservoir permit application processing/reviews/etc.
- Additional testing needed?
- May do pilot testing under a preliminary permit?
- Years 4 and 5?
- Do not have a permitted system until prelim permit or RP or conditioned RP issued

Additional Considerations

- If source water potable muni water (WDOH existing or newly approved), disinfection byproducts (DBPs) may present:
 - DBPs (haloacetic acid, trihalomethanes, bromate, chlorite) exceeding native groundwater concentrations are contaminants (see *WAC 173-200 and Ecology Pub 92-02*), exceedances are not automatically authorized for ASR.
 - Contaminants in source water leads to anti-degradation policy (see *WAC 173-200-030*).
 - Addressing anti-D leads to treatment and/or AKART analysis by project proponent (see *Ecology Pub 17-10-035*).
 - AKART needed for Ecology to consider OCPI on a case-by-case basis with respect to GWQS.
- Native groundwater quality background determination and water quality requirements (see *Ecology Pub 92-02, Ecology Pub 22-12-003*) and source water/native groundwater and source water/aquifer matrix chemical reactions need to be characterized/modeled *as if environmental management not water resource management project*.

Additional Considerations

- If source water is reclaimed water a reclaimed water permit authorizes beneficial use of reclaimed water for groundwater recharge and the recovery of the reclaimed water from the aquifer by the project proponent (see *WAC 173-219 and Ecology Pub 15-10-024*).
- Quality Assurance Project Plan(s) (see *Ecology Pub 04-03-030*) describing planned water quality sampling, aquifer testing, and pilot testing approved by Ecology will be required at several points before pilot test preliminary permit issued.

Back to Pre-Application

- Pre-application meeting is important to set up and continue constructive dialog with Ecology and make sure there is a common basis of understanding for all the above, including the RP application content/supporting docs and
- What are the guidance docs directing
- Because:
 - Definitions, what means what...
 - Document templates
 - Staff changes at Ecology
 - Grant work scope adjustments
 - Justifying work requested/dictated by Ecology
 - Accepting potential exceptions/exemptions to guidance

Guidance Doc Citations:

DOH Pub 331-123, revised June 2020: Water System Design Manual, 518 pages, 9 Appendices. Developed by DOH to establish uniform concepts for Group A public water system design and consistent review of design documents. Chapter 5 Source of Supply particularly relevant to new surface water sources.

Ecology Pub 92-02, revised October 2005: Implementation Guidance for the Ground Water Quality Standards, 129 pages, 5 Appendices. Provides explanation and interpretation of WAC 173-200 to promote consistent statewide implementation of actions that can potentially degrade ground water quality. Topics include, but not limited to, Antidegradation Policy (Chapter 3), Hydrogeologic studies including background groundwater quality (Chapter 4 and Appendix E), and more...

Ecology Pub 04-03-030, revised December 2016, Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies, 47 pages, 12 Appendices. Describes data collection/sampling guidelines to use in projects collecting new data, like work done in support of an ASR reservoir permit application, including pilot testing and monitoring.

Ecology Pub 15-10-024, revised February 2019: Reclaimed Water Facilities Manual: The Purple Book, 160 pages. Reviews/describes reclaimed water rules, guidance, requirements, and reporting, to name a few topics.

Ecology Pub 17-10-035: Guidance for Aquifer Storage and Recovery AKART Analysis and Overriding Consideration of the Public Interest Determination, 63 pages, 4 Appendices. Provides guidance for: (1) ASR Reservoir Permit applicants for AKART analyses and when OPI considered to meet the GWQS (WAC 173-200) and (2) Ecology staff in the AKART and OPI determination approval process.

Ecology Pub 22-12-003: Underground Artificial Storage and Recovery Reservoir Permit Pre-Application Process, 1 page. A working flow chart for coordinating OCR, Water Quality, and Water Resources programs during ASR pre-app process for potential projects with OCR funding agreements.