HR 1198 REVIEW OF REGULATIONS RELATED TO AQUIFER STORAGE AND RECOVERY

GEORGIA ENVIRONMENTAL PROTECTION DIVISION
WATERSHED PROTECTION BRANCH

Executive Summary

House Resolution 1198 (HR 1198), adopted during the 2016 session of the Georgia General Assembly, encourages the Environmental Protection Division to review its current regulations as they relate to aquifer storage and recovery (ASR) to ensure that they are sufficient to provide for the protection and preservation of the state's aquifers, to revise such regulations when necessary, and to consider the availability of other water supply sources in the permitting of any potential aquifer storage and recovery project.

The State of Georgia does not currently have a process specifically defined to regulate an ASR proposal from start to finish. EPD does, however, have regulatory authority under the various laws and rules that address each element in an ASR operation.

As directed by HR 1198, EPD has reviewed the existing body of regulations. An overview of current regulations and the authorities they provide to protect water supplies and for the protection and preservation of the State's aquifers is provided in the first section of the report. The second section of the report presents preliminary findings for public review and feedback.

In its preliminary findings, EPD concludes that current regulations and the authorities they provide are sufficient to protect water supplies, including underground drinking water, and provide for the protection and preservation of the State's aquifers. Taken together, these laws and rules function to regulate the entire ASR process as summarized below.

However, while the existing authorities are sufficient for these purposes, EPD has also identified actions that can facilitate a more integrated and transparent approach to implementing these authorities and therefore accomplish better outcomes for affected resources and resource users. Specifically, permitting, development and operation of any future ASR project(s) in Georgia would benefit from additional written procedural and substantive clarity provided by EPD and from steps to improve coordination in permitting. Four actions have been identified that, taken together, can be implemented to provide the regulatory clarity necessary to detail expectations for desired outcomes and to better ensure that desired outcomes are accomplished. This clarity will benefit the agency, entities interested in executing an ASR project, and the local jurisdictions and other parties interested in the protection and preservation of the state's aquifers and the protection of underground drinking water.

I. Legislative Background

A moratorium on ASR operations (injection of surface water only) in 11 coastal counties for the Floridan aquifer was in place from 1999 to July 1, 2014 (O.C.G.A. 12-5-134 and 12-5-135). This included the counties of Brantley, Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, and Wayne. The moratorium was limited in its scope in four ways. First, it was limited in duration. The moratorium generally lasted a few years and was renewed a few times before it ultimately expired in 2014. Second, it only applied to the Floridan aquifer. Third, it only applied in 11 coastal counties. Fourth, it only applied to the injection of surface water into the aquifer. It did not apply to the injection of ground water.

During the 2014 legislative session, Senate Bill 306 was introduced to amend the existing moratorium. It would have expanded the moratorium to also prohibit the injection of ground water and would have eliminated the time limitation making the moratorium permanent in those 11 counties. Senate Bill 306 did not pass.

Also during the 2014 legislative session, Senate Resolution 4 was adopted creating the Long-Term Aquifer Storage Senate Study Committee. The study committee made the following finding and recommendation:

- The challenges to sustaining present and future water supplies are great and growing. Thus, demand for water management tools such as ASR is likely to continue to grow. ASR has the potential to be a useful water resource management tool in Georgia. However, each aquifer in Georgia has unique geologic and hydrogeological properties.
- Therefore, the Committee recommends that the permitting of any ASR system in Georgia be site specific so as to ensure that the design, operation, and monitoring requirements are adequate to achieve the water resource management benefits while mitigating the environmental and geological concerns.

It is worth noting this finding was not unanimous. There was one dissent. The dissent recommended that ASR should be prohibited in drinking water aquifers.

During the 2015 legislative session, Senate Bill 36 (LC 40 0708) and House Bill 116 were introduced to permanently prohibit all ASR projects in the Floridan aquifer in 11 coastal counties. Neither Bill passed. In the Senate, Senate Bill 36 was replaced by a substitute bill (CSFA/2). It would have required EPD to adopt regulations to include restrictions or prohibitions on ASR where necessary to preserve the physical and chemical integrity of the Floridan aquifer. This bill passed in the Senate, but did not pass in the House of Representatives.

During the 2016 legislative session, House Resolution 1198 was adopted encouraging EPD to undertake the review described above and complete this report. No other bills related to ASR were introduced during the 2016 or 2017 legislative sessions.

II. Review of Current Regulations

The Environment Protection Division administers multiple statutes and rules designed to protect water supplies, including underground drinking water, and provide for the protection and preservation of the State's aquifers. A brief review of these statutory authorities and rules follows.[1] Each section describes a component, as identified by capital letter, in the generalized regulatory process for management of aquifer storage and recovery shown in Figure 1.

The only aquifer storage and recovery projects undertaken in Georgia recently have been pilot or initial studies.[2] At this time, EPD does not have any applications for an ASR project and is not aware of any ASR projects in Georgia in the design or planning stages. In other states, the technology has been applied at a number of locations across the country. The U.S. EPA reports that there are 542 ASR wells capable of operation at 307 project sites in the U.S.[3] The western U.S. has the largest number of ASR wells, followed by the southeastern U.S. In its most common application, aquifer storage and recovery involves withdrawal of water from a source at times with unused or excess water, pumping or injection of that water into an aquifer with appropriate characteristics for storage, and withdrawing or recovering the stored water for use during high demand periods. ASR uses the extent of the aquifer and the aquifer's porosity to store the unused or excess water rather than a surface pond or tanks. The specifics of individual projects vary, with key variables including the characteristics of the source of the stored water and the characteristics of the resource in which storage and recovery occurs or is proposed.

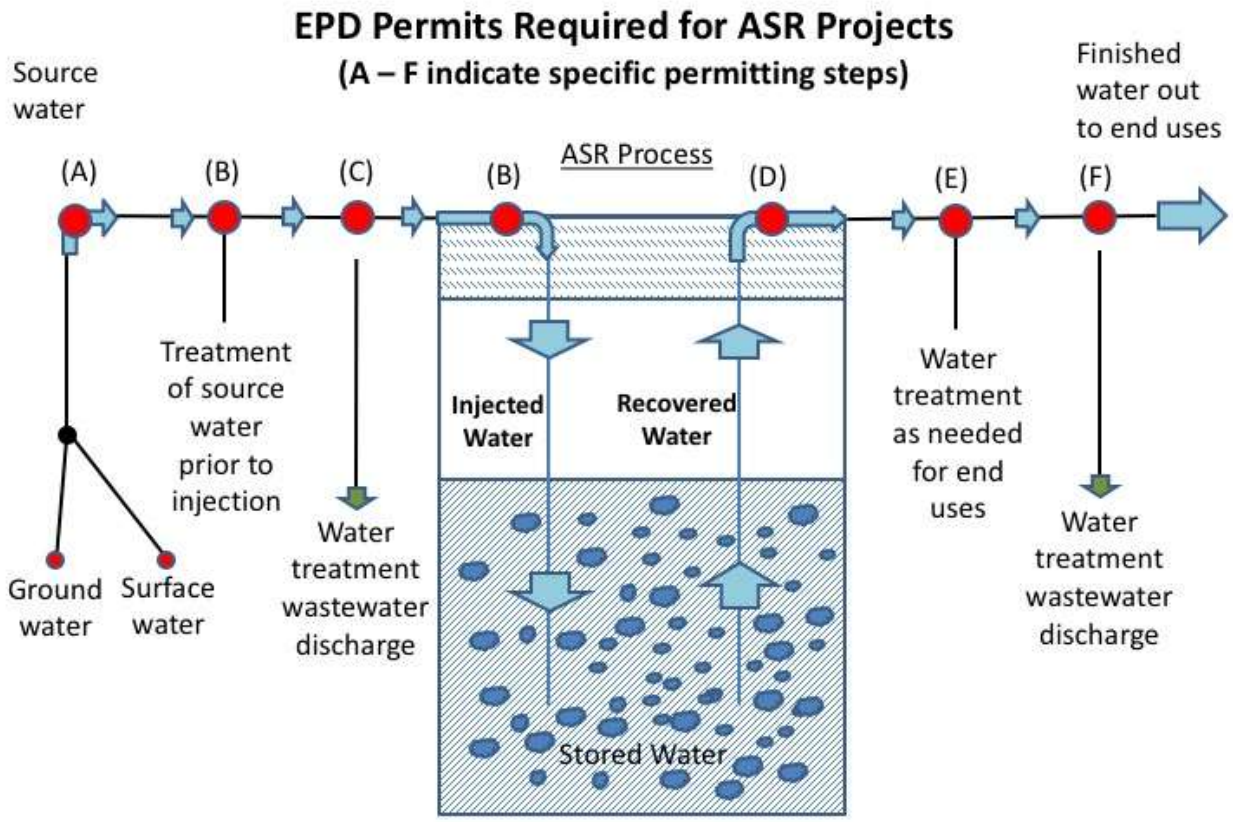
While there are limitations on withdrawals from specific aquifers in some parts of Georgia, state policy and regulations do not currently establish locations where ASR should or should not be undertaken. The sole exception is that ASR is prohibited from a radius of 100-500 feet around publicly-owned water supply wells, with the exact radius depending on aquifer characteristics. State policy and regulations also do not specify preferences or procedures for identifying areas where ASR should or should not be undertaken. Instead, individual projects are evaluated on a case-by-case and site-by-site basis. It has been EPD's experience both in the context of this

[1] This document is not intended to provide a comprehensive review of EPD's regulatory authorities and programs. It focuses on elements relevant to aquifer storage and recovery processes and the charge in HR 1198. Additional information is available on the Watershed Protection Branch's website (https://epd.georgia.gov/watershed-protection-branch).

[2] In 2009-2012, ASR test wells were completed in Northwest Georgia in a project sponsored by Dalton Utilities and in 2013-2015, ASR test wells were completed in Southwest Georgia in a project sponsored by the Georgia Environmental Finance Authority. In both of these cases, site-specific groundwater yields from the test wells did not justify further ASR development at those locations. In the 1990s, a water supply proposal for coastal Georgia included an ASR component, which contributed to adoption of legislation that placed the moratorium on ASR projects that would inject water into the Floridan aquifer below 11 coastal counties as described in Section I.

[3] https://www.epa.gov/uic/aquifer-recharge-and-aquifer-storage-and-recovery

Figure 1. Regulatory Requirements and EPD Permits for ASR-Related Activities



review as well as formal permitting processes that the existing regulations provide the authority and flexibility to adapt to the specifics of different circumstances and provide requirements designed to be protective under those circumstances.

To accomplish this, site-specific information, including information on aquifer characteristics, will be necessary. Aquifer characteristics at a site can determine the success or failure of an individual ASR project. Hence, identifying the generally expected aquifer characteristics before drilling is important and then confirming such characteristics through post-drilling well testing is essential. Data collection will have to be tailored to each proposed project and site, and the data collected through this process will inform each step in the permitting process described in the sub-sections below.

(A) SOURCE WATER ASSESSMENT AND WITHDRAWAL PERMITTING

Source Water Assessment

Activities on land that have the potential to affect drinking water sources are addressed through source water assessment requirements. Source water assessment takes a preventive approach to

protection of water supplies and includes several actions that can help prevent contamination from sources of pollution on the land surface that could affect wells or surface water sources of drinking water.

Approval of a source of drinking water is required before use (DNR Rule 391-3-5-.04 and 391-3-5-.06). Wells are to be protected from contamination and must meet defined criteria (DNR Rule 391-3-5-.07). Drinking water sources require a wellhead protection plan (WHPP) or a source water assessment plan (SWAP) that identifies potential pollution sources near a proposed well or surface water source (DNR Rule 391-3-5-.40 or 391-3-5-.42, respectively). Water chemistry or quality impacts from other aquifers may need to be determined before production wells are installed. For all wells, the well must be constructed to defined standards under the Water Well Standards Act (OCGA §12-5-134) and the contractor constructing the well must be a licensed water well contractor in the State of Georgia (OCGA §12-5-125).

WHPPs and SWAPs are site-specific based on information gathered during site visits. They rely upon existing data, including well-specific data to determine the size of the management zone needed around the well, when that is available. Plans can recommend not using a source based on the inventory of potential pollution sources. They can also help well owners and water system operators identify pollution sources and implement best management practices (BMPs) to protect water supply sources. Under EPD rules, updates to the plans occur every 10 years and include recommendations about newly-identified potential pollution sources. Implementation of restrictions on activities that may threaten drinking water sources depend on local authorities and action. There are no specific monitoring, compliance, or enforcement provisions. Information on WHPPs and SWAPs are provided to water customers in areas served by community water systems through formal public notice in the annual Consumer Confidence report.

Water Withdrawal Permitting

Permits are required for withdrawal of water from surface water or groundwater sources in volumes exceeding 100,000 gallons per day. Source water for an ASR project, whether the source of ASR water is surface water or groundwater, is expected to be withdrawn above this threshold and permits would therefore be required for the withdrawal. The statutes that authorize permitting of groundwater and surface water withdrawals distinguish between farm and non-farm withdrawals (also called municipal and industrial (M&I) withdrawals). The withdrawal of source water for an ASR project does not meet the statutory definition of farm use, so it would be permitted with a non-farm or M&I withdrawal permit for the purpose of "underground reinjection" into a specified aquifer or aquifers. Consequently, the water withdrawal permitting requirements are important elements of the current regulations that protect water supplies and provide for the protection and preservation of the State's aquifers.

The following discussion highlights specific elements of the surface and groundwater withdrawal permitting processes that are likely to be relevant when considering an ASR project. This discussion is not intended to be exhaustive and all appropriate water withdrawal application requirements and conditions must be met.

The water withdrawal permitting process is designed to determine the impacts of withdrawals on source waters in addition to unreasonable local, or downstream, impacts prior to issuance of the permit. For example, under DNR Rule 391-3-2-.04, the groundwater withdrawal application requests information before construction of a well and consideration is then given to quantity of water requested, aquifer(s) to be used, location, effect on others, and related considerations. Similarly, under DNR Rule 391-3-6-.07, the surface water withdrawal rules require permittees to pass an established minimum instream flow at or immediately downstream of the point of withdrawal.

For non-farm (M&I) withdrawals, an applicant requests specific permit limits which, for surface water withdrawals, are usually set based on monthly average and maximum day amounts. For groundwater withdrawals, permits limits are usually set based on annual average and monthly average amounts. If indicated by site-specific conditions, a daily limit may also be established. The requested withdrawal limit is based on anticipated water demand projections, aquifer capacity to provide that amount of water, and a determination of impacts on the aquifer or nearby users. Using criteria established in OCGA §12-5-96, including characteristics of the producing aquifer, the desired yield, and location of other permitted wells, EPD analyzes the submission and may grant a permit in the amount requested or at a reduced limit or may deny the permit altogether.

Water withdrawal regulations allow for the specification of time periods or conditions when withdrawals may or may not occur, in order to minimize impacts on other water users. These provisions may be added as special conditions to a withdrawal permit as indicated by site-specific circumstances.

The amount of water requested for a municipal or industrial water withdrawal permit is established through the application process and specified in the permit. A M&I water withdrawal permit cannot be issued for an open-ended amount of potential water withdrawal, either at the original source (point A in Figure 1) or at water recovery (point E in Figure 1).

The applicant must provide data and information supporting their withdrawal proposal, to be checked and quality controlled by the permitting unit using known information from the USGS, state sources, additional localized well / aquifer analysis, and other available data. Applications are evaluated for their impacts on the source and on other nearby or downstream permitted users.

Assessments of potential impacts on the resource are based on available hydrologic data and the quality of those assessments may be limited by the extent or quality of available data. For permitting of withdrawals associated with ASR projects, site-specific information that is essential for successful design and operation of an ASR project may have to be generated from initial drilling and well testing under a temporary permit. This information may also be essential for the determination of impacts and potential approval of withdrawal permit(s). In most cases, without this extensive testing, an abundance of site-specific information is not readily available.

All new draft groundwater and surface water withdrawal permits are subject to a minimum 30-day public notice and comment period, with a possibility of public meeting or hearing prior to permit issuance. Like other permits issued by EPD, a withdrawal permit may be appealed within 30 days of issuance.

Once a withdrawal goes into operation, monitoring is often required as a condition of groundwater or surface water withdrawal permits. EPD rules allow for a range of compliance and enforcement actions in the event of a violation of permit conditions.

(B) TREATMENT OF SOURCE WATER AND INJECTION FOR ASR

Injection of source water for storage in an ASR project, including the requirements for treatment prior to injection, would be permitted under the underground injection control (UIC) regulations (DNR Rule 391-3-6-.13). The UIC regulations incorporate both preventative and remediation approaches.

Under the UIC rules, all aquifers are currently considered underground sources of drinking water (DNR Rule 391-3-6-.13(4)(a)).[4] Therefore, to protect aquifers for drinking water purposes, regulations for underground injection (DNR Rule 391-3-6-.13) specify that fluids injected into groundwater must meet Maximum Contaminant Levels (MCL) specified in rules adopted under the Safe Drinking Water Act (DNR Rule Chapter 391-3-5). Those rules specify MCLs for turbidity, microbiologicals, 17 inorganic compounds, 53 organic compounds, 8 disinfectants or disinfectant byproducts, and 5 radioactivity-related measures. For ASR projects, this means that, prior to storage, source water will have to be treated for specific contaminants, depending on the characteristics of the source water. The requirement that injected water must meets MCLs helps to protect current use and maintain the potential for future use of groundwater.

While the UIC rules do not establish site-specific requirements for ASR, the general requirements for Class V injection wells apply to ASR projects (DNR Rule 391-3-6-.13(11-13)).

[4] The UIC rules also establish a process whereby the EPD Director may exempt an aquifer from protection as an underground source of drinking water (DNR Rule 391-3-6-.13(4)(b)). No aquifers have been exempted to date, and advances in treatment technologies (e.g., reverse osmosis) mean that aquifers not currently used for drinking water may be used in the future.

UIC permits are site-specific and the general requirements provide the authority and flexibility to tailor a permit on a case-by-case basis. In addition, injection wells associated with ASR projects are prohibited in the inner management zone of a wellhead protection area.

UIC regulation is based on the chemistry of the injected fluid and information on site geology and aquifer characteristics. For ASR projects, data related to source water chemistry and treatment requirements prior to injection would be needed. Site-specific information on source water chemistry, project design, and aquifer characteristics would be used to inform water quality evaluations and permit requirements designed to preserve groundwater resources for present and future users by preventing significant deterioration. Some of this information may be developed through pilot or cycle testing, which would be conducted under an initial permit of limited duration specifically for the cycle test. The final UIC permit would then be based on the findings of the cycle test.

A specific consideration in permitting of an ASR project is the presence or absence of pyrite, arsenic, zinc and other trace metals. Petrographic and geochemical analysis is necessary to evaluate the presence or absence of these compounds and the potential for mobilization of trace minerals due to different chemistry of the source water compared to the receiving aquifer. This information would be considered and applied in UIC permitting and/or permitting of water withdrawal for recovery of water from the ASR system.

Monitoring requirements for UIC permits are determined on a case-by-case basis and included as permit conditions (DNR Rule 391-3-6-.13(11)(g) and (12)(g)). Monitoring requirements generally include geochemical parameters within the area of influence of the injection well. If monitoring results indicate water quality or other violations, then corrective action, a responsibility of the permittee, must be taken to address the non-compliance (DNR Rule 391-3-6-.13(11)(h)).

The UIC rules provide sufficient authority and flexibility to address site-specific considerations in permitting a proposed ASR project. However, an applicant currently has little to no guidance on how to approach permitting of an ASR project.

Under the UIC rules, there are no public notice, comment, or hearing requirements for permits for Class V injection wells. However, public notice and comment would be beneficial for UIC permits associated with ASR projects, and this will be undertaken in conjunction with public notice for the other permit(s) required for the project.

(C) DISCHARGE OF WASTEWATER DURING SOURCE WATER TREATMENT

Treatment of source water may produce wastewater as a by-product, which is generally managed through discharge to nearby surface waters. Wastewater discharged to surface waters must be

treated or managed to ensure that the discharge does not cause or contribute to instream violations of water quality criteria for the designated use of the receiving water body. Each designated use, including drinking water, has specific criteria that must be achieved at all times.

Individual wastewater permits are site-specific. Evaluation of data provided in the application is used to determine the specific impact on the receiving waterbody. The evaluation occurs during the application review and drafting of the wastewater discharge or NPDES[5] permit. Monitoring and effluent limits may be imposed in the NPDES permit to protect the receiving water body from the effluent discharge (40 CFR Part 122.41(e)).

Permits are based on effluent data provided by the applicant, site-specific receiving water data, other data from ambient surface and groundwater monitoring, and the water quality standards and criteria for the receiving water body. In addition, information from the State of GA's 303(d) Impaired Waters List, water quality modeling, and published Total Maximum Daily Loads will be considered, if applicable to the water body in question.

There is a minimum 30-day public notice and comment period for draft NPDES permits, with the potential for a public hearing (DNR Rule 391-3-6-.06(7)(b) and (c)). Upon issuance of the NPDES permit, the permittee has a "duty to comply" with the permit conditions and applicable State and Federal regulations (40 CFR Part 122.41(e)). Enforcement actions may be taken for violations of the Georgia Water Quality Control Act, rules promulgated pursuant to it, or permit terms or conditions (DNR Rule 391-3-6-.06(16)).

(D) RECOVERY OF INJECTED WATER

Recovery of water stored in an ASR project would be permitted through the same water withdrawal permitting procedures as applied to withdrawal of source water (described under step A above). However, the withdrawal may be permitted for farm use or non-farm (M&I) use, depending on the purpose(s) of the project and the end use(s) of the water. If the project is designed to provide water solely for irrigation or other farm uses as defined in the water withdrawal regulations (DNR Rule 391-3-2-.02(d) and 391-3-6-.07(2)(g)), the recovery of the stored water would need an agricultural withdrawal permit. For other purposes, a non-farm or M&I withdrawal permit would be required for recovery of the stored water.

As noted above, State regulations allow for water withdrawal permits to incorporate any number of special conditions. This ability to design permit conditions provides considerable authority and flexibility in dealing with any concerns noted during the permitting process as well as the establishment of practical guidelines and practices for use in the actual withdrawal operations.

[5] NPDES stands for National Pollutant Discharge Elimination System as defined by the federal Clean Water Act.

Withdrawal permit conditions can also readily be coordinated with those from other permits so that conditions in various permits are consistent and work in a coordinated fashion.

As noted above, because of Georgia's very limited experience with ASR, multiple permit conditions, some perhaps new to Georgia, are likely to be necessary to establish the appropriate operational parameters for an ASR project. Such conditions may establish practical, operational limits, monitoring or reporting requirements, enhanced metering of withdrawals or monitoring of groundwater conditions. Examples include the following: designated time periods for injection and/or withdrawals; relative volume of injection and withdrawals; resource conditions under which withdrawals may be limited or allowed; metering or measurements provisions; and enhanced reporting requirements. Monitoring requirements would likely include water levels at specific locations and periodic sampling of the ASR recovered water to be sure that leaching of metals from the aquifer formation doesn't occur over time. Off-site monitoring of water levels could be included if indicated by the volume of withdrawal. Since assessments at the time of permitting are only as good as the quality of available hydrologic data, it is only after operations begin and run for a while that unacceptable impacts may become apparent (such as unforeseen unreasonable impacts on the aquifer or other existing permitted users). In the event such impacts develop, steps to mitigate them can be implemented through conditions that use an adaptive management approach to permit modifications (such as reducing/limiting production amounts, establishing time of use restrictions, or other provisions).

Use of specific aquifers for storage and recovery will depend on the conditions of that aquifer. A noteworthy example is the Clayton aquifer in Southwest Georgia. If an ASR project is proposed with withdrawal from the Clayton aquifer, EPD will only be able to consider permitting that project if those withdrawals are less than the amount injected into the Clayton. At present, withdrawal permits are not being issued for any new or increased withdrawals from the Clayton aquifer.

(E) TREATMENT OF RECOVERED WATER FOR END USE

Once stored water is recovered, it may need to be treated for end use. The specifics here will depend on project purpose(s). Treatment may be to levels needed for irrigation, industrial use, or streamflow augmentation, if those are the project purposes. If the ASR project is developed for drinking water, treatment of recovered water will be required to meet Maximum Contaminant Levels specified in the Rules for Safe Drinking Water (DNR Rule Chapter 391-3-5). Monitoring, public notice, compliance and enforcement provisions will be followed as specified in the Safe Drinking Water rules.

(F) DISTRIBUTION OF TREATED WATER AND DISCHARGE OF WASTEWATER FROM TREATMENT FOR END USE

Specifics of distribution requirements will also depend on project purpose(s). If the ASR project is developed for drinking water supply, distribution of the treated water will have to be consistent with the provisions of the Safe Drinking Water Act and rules adopted pursuant to that Act (DNR Rule Chapter 391-3-5). Monitoring, public notice, compliance and enforcement provisions are addressed in the Safe Drinking Water rules.

See Section C above for information on discharge of any wastewater produced during treatment of recovered water for end use.

III. Findings

EPD has reviewed this existing body of regulations and concluded that these authorities are sufficient to protect water supplies, including underground drinking water, and provide for the protection and preservation of the State's aquifers. When taken together and, implemented in a coordinated manner for a specific project (as they should be), these laws and rules function to effectively regulate the entire ASR process.

While the existing authorities are sufficient for these purposes, EPD has also identified actions to facilitate a more integrated and transparent approach to implementing these authorities and therefore accomplish better outcomes for affected resources and resource users. Specifically, permitting, development and operation of any future ASR project(s) in Georgia would benefit from additional written procedural and substantive clarity from EPD and from steps to improve coordination in permitting. Advance information for applicants, and early and thorough coordination with potential applicants, will allow better coordination in permitting and better outcomes. Because of groundwater's susceptibility to degradation and the interconnection between ground-water use and ground-water, these steps will be particularly useful in the context of ASR, a relatively untested technology here in Georgia.

Four actions have been identified that, taken together, will be implemented to provide the regulatory clarity necessary to detail, from the outset, expectations for desired outcomes and to better ensure that desired outcomes are accomplished. This clarity will benefit the agency, entities interested in executing an ASR project, and local jurisdictions and other parties interested in the protection and preservation of the state's aquifers and the protection of underground drinking water:

1. Preparation of written instructions from EPD that detail, for the applicant, requirements and expectations for timing, acquisition, and analysis of the necessary data and

information on project-specific technical details. These could include but are not limited to the following:

a. hydraulic gradient,
b. aquifer transmissivity,
c. water chemistry,
d. appropriate treatment standards to ensure the process is sufficiently protective at each of the different project stages, and
e. appropriate thresholds for understanding the relationship between:
    i. volumes,
    ii. location, and
    iii. aquifer type.

2. Completion of a pre-application project checklist by the applicant. The checklist would provide an initial description of the project, allowing identification of the permits likely to be needed, key EPD associates to involve, and initial discussion of potential data and time requirements for project and permit review processes.
    a. A pre-application checklist would be a new, preliminary step in the regulatory process triggered anytime EPD receives an applicant's inquiry or an application package for projects that involve a project, system or systems designed to inject source water into groundwater for storage and subsequent recovery for some end use or uses (i.e., an ASR project). This checklist would guide EPD and the applicant's initial understanding of project specifics, so EPD can provide early feedback on regulatory constraints.
    b. The checklist will include a basic description of the following:
        i. Project purpose, including end uses and any interim uses of the stored water.
        ii. Consideration of alternate water supply sources (to the degree water supply is a component of that specific ASR project).
        iii. Project design, including:
            1. Source water and target aquifer(s);
            2. Anticipated volumes of storage and recovery, sequencing of injection and recovery, and recovery cycle (short or long-term); and
            3. Project elements designed to protect water supplies and underground drinking water and provide for the protection and preservation of the State's aquifers.
3. Designation of a single individual within EPD's Watershed Protection Branch to coordinate permitting and communication regarding the project.
4. Consultation between EPD and the applicant, early in the permitting process, to develop a comprehensive site-specific and project-specific "roadmap" designed to clarify timing, data, and information expectations as well as regulatory requirements. In these meetings,

EPD would work with the applicant to prepare a customized regulatory pathway specific to the details of the ASR project. The project-specific "roadmap" can then serve as a basis for public information as well as providing guidance on the applicant and agency action as permitting and project development proceeds.

EPD will undertake these actions over the next twelve months. The goal is to produce draft documents for public review and comment in nine months and then finalize the products three months after that. Overall, the actions will be designed to improve the technical information base, coordination, and communication in order to reach better outcomes in ASR regulation.

These actions will allow EPD to determine the regulatory approaches most appropriate to specific resources and specific projects, thereby aligning requirements and analyses with project specifics and avoiding pre-defined one-size-fits-all approaches. Depending on project specifics, the owner/operator may be asked to include a risk management plan to address specific concerns or operational scenarios identified in early project review. The project-specific roadmap should be designed to provide transparency on regulatory decision points for the applicant and the public. It will define the points for joint or coordinated public notice on permits, while also meeting the requirements of underlying regulations, so that external parties know that they will be able to see and evaluate permits as part of an overall ASR project.

In some projects, injection of source water may increase the net amount of groundwater available, but due to a longer recovery period, some or all of the recovered water may come from a different volume of water than that which was stored. The pre-application checklist and consultation will be particularly important for a project of this nature, as permit evaluation and conditions may be more complex than in a project with a shorter recovery period.

As noted above, if water supply is a purpose of a specific ASR project, consideration of other sources of water supply should be addressed in the pre-application checklist. An ASR operation would not create more available water; the purpose would be to change the timing of water availability. Consequently, the availability of other water supply sources during the summer or during dry years may be a resource limitation in the project area. Consideration of other sources of water supply in the pre-application checklist and subsequent consultation with EPD, including any limitations during dry periods, will facilitate the water withdrawal permitting component of the overall sequence of ASR regulation.

Except for permits for wastewater discharges and some provisions for well construction and wellhead protection, best management practices (BMPs) for the components of the ASR process are generally not identified or addressed in the applicable regulations. The pre-application project plan and the coordinated permitting process that flows from it should be designed to incorporate opportunities to utilize and encourage the use of BMPs appropriate for conditions in

Georgia. As BMPs for each step in the ASR process are identified and language is defined, such practices can be included as conditions of the appropriate EPD permit.

In closing, it is worth noting that, in the past 10 years, the only ASR project for which EPD has received applications was a small, pilot project designed with a limited duration. At this time, EPD does not have any applications for an ASR project and is not aware of any ASR projects in Georgia in the design or planning stages. These facts support the actions recommended here as consistent with agency resources, flexible and responsive given the current need and uncertainty about future need for regulatory response, and effective given the stated goals of HR 1198.