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ARARs Q's & A's: State Ground-Water Antidegradation Issues

Office of Emergency and Remedial Response
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Quick Reference Fact Sheet

Section 121(d)(2) of CERCLA, as amended by the 1986 Superfund Amendments and Reauthorization Act (SARA), requires that remedial actions must at least attain Federal and more stringent State applicable or relevant and appropriate requirements (ARARs) upon completion of the remedial action. The 1990 National Contingency Plan (NCP) requires compliance with ARARs during remedial actions as well as at completion, and mandates attainment of ARARs during removal actions to the extent practicable. See revised NCP, 40 CFR section 300.435(b)(2) (55 FR 8666, 8852)(March 8, 1990) and section 300.415(i) (55 FR 8666, 8843)(March 8, 1990).

This Q's and A's fact sheet is designed to provide guidance on the status of State ground-water antidegradation provisions as potential ARARs for CERCLA ground-water and soil remedial actions. The guidance in this fact sheet reiterates Agency policy already in practice in EPA's Regional offices. The goal and policy of the Superfund program is to return usable ground water to its beneficial uses within the timeframe that is reasonable, given the particular circumstances of the site. In addition to our goal of ground-water cleanup, Superfund has a nondegradation policy in that we strive for the prevention of further degradation of the ground water during our remedial actions. However, it should be noted that more stringent State standards than those imposed by EPA policy may be imposed by State antidegradation requirements. Such State requirements, if they have been determined to be ARARs for the site, would have to be met (e.g., by meeting the discharge requirements) or waived (e.g., by the interim remedy waiver). Nevertheless, even where temporary degradation of the ground water may be required during the remedial action, we will provide protection by restricting access or providing institutional controls, and EPA response actions will ultimately result in restoration of the ground water's beneficial uses.

(NOTE: States use the terms "nondegradation" and "antidegradation" interchangeably; there does not appear to be a consistent distinction between the two. As a result, all State nondegradation and antidegradation requirements are referred to in this fact sheet as antidegradation requirements.)

Q1. What is a State ground-water antidegradation requirement?

A. State antidegradation requirements vary widely in their scope and drafting. However, as a general rule, they are anti-pollution requirements (not cleanup requirements) designed to prevent degradation of the surface water or ground water. Antidegradation requirements typically accomplish their purpose in one of two ways: (1) by prohibiting or limiting discharges that potentially degrade the surface water or ground water (typically action-specific requirements); or (2) by requiring maintenance of the surface-water or ground-water quality consistent with current uses.

Under the Clean Water Act, every State is required to classify all of the waters within its boundaries according to their intended use. As required by EPA regulation, all States have established surface-water antidegradation regulations. These requirements may be potential ARARs for CERCLA remediations involving discharges to surface water. Although not specifically required by EPA, the majority of States have also established some form of ground-water antidegradation provisions. These States may have enacted specific ground-water antidegradation statutes, or they may include ground-water protection provisions within general environmental statutes. These State provisions for ground water may constitute potential ARARs for CERCLA remediations that have an impact upon the ground water (e.g., ground-water reinjection or soil flushing).

Q2. State antidegradation requirements are often expressed as general goals. Can they be potential ARARs?

A. Yes, antidegradation requirements expressed as general goals may be potential ARARs if they are:

(1) directive in nature and intent; and (2) established through a promulgated statute or regulation that is legally enforceable (see Preamble to the revised NCP at 55 FR 8746).

Antidegradation provisions are directive in nature when they contain narrative or numerical limits, or are implemented by State regulations that provide needed specificity. For example, general antidegradation goals are sufficiently directive when implemented by regulations setting limits that ground-water contamination may not exceed. When a general State antidegradation statute does not have any implementing regulations, EPA has considerable discretion in determining what is required to interpret or comply with the law (see Preamble to the revised NCP at 55 FR 8746).[1] For example, EPA may look at State surface-water or ground-water use and classification systems, such as those that set water-quality standards, since they designate uses of a given water body and/or maximum concentration levels to protect those uses. Alternatively, EPA may look at a State's wellhead protection program for requirements concerning ground-water maintenance. If the State's narrative, general antidegradation goals stand alone, they may be nothing more than statements of intent about desired outcomes or conditions. Statements of intent are insufficiently directive to constitute potential ARARs. Likewise, vague or ambiguous narrative descriptions of ground-water degradation limits probably do not provide sufficient direction to constitute potential ARARs (see Preamble to the revised NCP at 55 FR 8746).

To be considered a potential ARAR, a State antidegradation law must be established through a promulgated statute or regulation that is legally enforceable and "of general applicability" (see NCP, section 300.400(g)(4)). To be legally enforceable, State standards must be requirements -- not guidance -- that are issued according to the State procedural requirements and that contain certain specific enforcement provisions or are otherwise directly enforceable under State law (see Preamble to the revised NCP at 55 FR 8746). The phrase "of general applicability" means that potential State ARARs must be applicable to all remedial situations described in the requirement, not just to CERCLA sites (see Preamble to the revised NCP at 55 FR 8746).

Q3. At what point do State ground-water antidegradation requirements become ARARs at a Superfund site?

A. Antidegradation requirements are generally action-specific requirements that may apply during the course of and at the completion of the Agency response action. They apply prospectively, and generally obligate the Agency only to prevent further degradation of the water during and at completion of the response action (not prior to it). While antidegradation requirements are not cleanup laws, in some limited cases they may, as relevant and appropriate requirements, be appropriate for establishing a cleanup level for past contamination.

Furthermore, EPA is not required to take any response action unless and until EPA determines that it is appropriate to do so. Even then, this action must meet (or waive) a State requirement only if the Agency determines that the requirement is an ARAR for the site. The Agency determines what Federal and State laws constitute ARARs that must be met or waived during or at the completion of a response action. Compliance with a specific Federal or State law is triggered when the Agency determines that a requirement is either applicable to site remediation, or relevant and appropriate because its use is well-suited to site circumstances. However, neither CERCLA nor the NCP requires the Agency to comply with ARARs prior to conducting a response action. Therefore, when the Agency decides to take a response action, and if the Agency determines that a State antidegradation requirement is an ARAR for a site, the Agency must meet or waive the requirement.

It should also be noted that only ARARs within the scope of the response action have to be met or waived. If the Agency is conducting an RI/FS to determine the action that may be necessary at a site, the State's ground-water antidegradation requirements are generally beyond the scope of the action, and therefore are not likely to be potential ARARs for it. Of course, if a proposed RI/FS activity such as site sampling has the potential to temporarily degrade the ground water, the specific terms of the State ground-water antidegradation requirement should be examined to determine whether it is an ARAR for that action.

Q4. When are State ground-water antidegradation requirements likely to be applicable to CERCLA **remediations that affect the ground water? When they are applicable, what is required for compliance?**

A. The attached matrix analyzes whether six hypothetical State antidegradation requirements for ground water are ARARs for four different CERCLA remediations. For most sites, the matrix may be helpful in determining whether State antidegradation require-

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1. The State may argue that its interpretation of the meaning of the goal, the State's non-binding guidance, should determine the statute's eaning. The State may also argue that State courts have upheld the ate's interpretation of the requirement. If either of these arguments is ised, advice should be sought from the Office of Regional Counsel)RC) or the Office of General Counsel (OGC).

ments are ARARs for remediations that affect the ground water. The information in the text of this fact sheet is provided to give the specific analysis and rationale underlying the conclusions reached in the attached matrix. Although only two of the six hypothetical State antidegradation requirements are analyzed here in detail, these principles should generally apply to most State ground-water antidegradation requirements.

Applicability of State ground-water antidegradation requirements depends upon three factors:

- The specific language of the State statute or regulations;
- The nature of the CERCLA remediation; and
- The circumstances at the site.

First, a review of the specific language of the State statutes (or regulations) reveals that most antidegradation requirements fall into one of two categories: (1) those that focus upon prohibited discharges; and (2) those that focus upon maintaining the ground water consistent with its uses. Second, with respect to the nature of the CERCLA remediation, there are three forms of remediation that may trigger ground-water antidegradation requirements: ground-water pump-and-treat, ground-water natural attenuation, and soil flushing. Finally, applicability is affected by the circumstances at the site such as the contaminant levels of the effluent, and the quality of the receiving aquifer. The sections that follow provide hypothetical examples of the applicability of State ground-water antidegradation requirements. The examples discuss the applicability of the two categories of State antidegradation requirements under the three different remediation scenarios (i.e., pump and treat, natural attenuation, and soil flushing).

[Note on "current uses": Some State antidegradation statutes require maintenance of ground-water quality consistent with its "current uses." Where the State statute (or implementing regulation) has defined "current uses," that definition should be considered an integral part of the requirement that helps determine whether EPA response actions comply with these requirements, if they are determined to be ARARs. For example, any State antidegradation statute that defines "current uses" as "present uses" would be met at sites where the CERCLA discharge is to an aquifer that is already contaminated such that it has no present uses. State antidegradation requirements that do not define "current uses" will generally be met at Superfund sites where EPA ground-water or soil remediation maintains, or does not adversely effect, the current quality of the aquifer. The following analysis of antidegradation requirements for maintaining the ground water is based upon the assumption that they do not define "current uses."]

Scenario #1: Pump-and-Treat

Assumption: The ground water is contaminated or, at a minimum, contains a plume of contamination. The ground water is a Class I or II aquifer (which means that it is or may be a potential source of drinking water).

A) **State ground-water antidegradation requirements that prohibit discharges:** These are not applicable to ground-water pump-and-treat remedies if there is no "discharge," as defined under the ARAR. However, even if the reinjections associated with each iteration during pump-and-treat constitute a discharge under the State statute, the statute is violated only if the discharge constitutes the type prohibited by the statute.

Compliance: If, for example, the statute prohibits discharges that are injurious to public health, the remedy generally would comply with it where the receiving aquifer is already contaminated. (A discharge of contaminated effluent into a contaminated aquifer generally would not be "injurious to public health.")[2] Moreover, the discharge, as part of a contained pump-and-treat system, may not be injurious to public health. [Note: Since it is EPA's goal to restore ground water to its beneficial uses, the Superfund program would rarely propose a pump-and-treat remedy that would degrade pristine or only slightly contaminated water. In those rare cases where the remedy involves reinjections to a pristine or only slightly contaminated aquifer, an interim action waiver might be appropriate.]

B) **State antidegradation requirements that require ground-water maintenance consistent with its current uses:** These generally are applicable to ground-water pump-and-treat remediations.

Compliance: The remedy generally would comply with these requirements during pump-and-treat remediations, if the remedy maintains (i.e., does not adversely effect) the current quality of the aquifer. Current quality of the aquifer should generally be maintained through pump-and-treat for two reasons: (1) pump-and-treat remediation will decrease, not increase, the contaminant level of the aquifer; and (2) it serves to contain the contaminated plume.

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[2] A State may argue that it has interpreted the phrase "injurious to public health" in guidance or policies, or that court decisions have addressed the issue, and that EPA must follow that interpretation. If such an argument is raised, it must be referred to ORC or OGC.

Therefore, if these conditions are satisfied, the antidegradation provision should be met.[3]

[Note: If pump-and-treat reinjections fail to maintain the current quality of the aquifer, an interim action waiver could be invoked, assuming the aquifer will be suitable for its current use upon completion of the remediation.]

Scenario #2: Natural Attenuation

Assumption: The ground water is contaminated or, at a minimum, contains a plume of contamination. The ground water is a Class I or II aquifer (which means that it is or may be a potential source of drinking water).

A) **State ground-water antidegradation requirements that prohibit discharges:** These are not applicable to natural attenuation of the ground water because there is no discharge during natural attenuation.

Compliance: The statute is not applicable to natural attenuation, but it may be relevant and appropriate depending upon circumstances at the site (see Question #5 below).

B) **State antidegradation requirements that require ground-water maintenance consistent with its current uses:** These are potentially applicable to natural attenuation.

Compliance: The remedy generally would comply with these requirements during natural attenuation remediation, if the remedy maintains (i.e., does not adversely affect) the current quality of the aquifer. Moreover, it is unlikely that natural attenuation will interfere with the ground water's current uses, since natural attenuation is typically confined to sites where the contaminant level is low, there are small areas of contamination, and the plume will not migrate significantly. Therefore, natural attenuation generally should meet this type of antidegradation requirement.

[Note: Where such requirements are not met, an interim action waiver might be appropriate, assuming the aquifer will be suitable for its current use upon completion of the remediation.]

[3] Here, again, the State may argue that a more limited definition of "current uses" is the only valid interpretation. If so, consult ORC or OGC.

Scenario #3: Soil Flushing

Assumptions: The soil is contaminated. Through soil flushing, contaminated effluent will enter the ground water and then be extracted for treatment. The ground water is a Class I or II aquifer (which means that it is or may be a potential source of drinking water). The aquifer may or may not be contaminated.

A) **State ground-water antidegradation requirements that prohibit discharges:** These are likely to be applicable because the effluent from the soil flushing probably constitutes a discharge. However, the statute is violated only if the discharge constitutes the type prohibited by the statute.

Compliance: If, for example, the statute prohibits discharges injurious to public health, EPA may conclude that soil flushing would comply with it where the receiving aquifer is already contaminated. (A discharge of contaminated effluent into a contaminated aquifer generally would not be "injurious to public health.") Moreover, if pump-and-treat remediation is conducted concurrently with the soil flushing, EPA may conclude that the "discharge" is not injurious to public health because it would be controlled and contained through the pump-and-treat remediation.[4]

[Note: Since it is EPA's goal to restore ground water to its beneficial uses, the Superfund program would rarely propose a soil flushing remedy that would degrade pristine or only slightly contaminated water. Thus, the issue of compliance of soil flushing with an antidegradation standard should rarely be a problem for Superfund ground-water remediations. In rare cases where degradation of a pristine aquifer through soil flushing is necessary, RPMs should invoke the interim measures ARARs waiver.]

B) **State antidegradation requirements that require ground-water maintenance consistent with its current uses:** These presumably are applicable to soil flushing.

Compliance: The remedy generally would comply with these requirements during soil flushing, if the remedy maintains (i.e., does not adversely effect) the current quality of the aquifer. Current quality of the aquifer is maintained if the effluent at least meets current water quality levels of the aquifer. Because soil flushing is generally only considered for contaminated aquifers, these requirements typically may be met.[5]

[4] Again, the State may argue that a more limited interpretation is required. If so, consult ORC or OGC.

[5] State arguments that a more restrictive interpretation of the standard is required should be referred to ORC or OGC.

Highlight 1: KEY FACTORS FOR THE APPLICABILITY OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS TO SOIL FLUSHING

- Whether the State statute is triggered because either the effluent constitutes a "discharge" under the State law, or the State statute requires ground-water maintenance (during CERCLA remediation) consistent with current uses;
- Whether the statute defines "current uses" as present uses or pre-contamination uses;
- Whether the aquifer is pristine, slightly contaminated, or greatly contaminated;
- Whether the effluent has high contaminant levels; and,
- Whether soil flushing will be conducted concurrently with pump-and-treat remediation of the ground water.

Q5. Are State ground-water antidegradation requirements likely to be relevant and appropriate requirements for remediation that affects the ground water?

A. It depends upon whether the requirements are well-suited for use at the site. While examples are given below, a more definite answer cannot be given because relevance and appropriateness is a site-specific determination. See section 300.400(g)(2) of the revised NCP. (See the attached matrix for additional examples.)

For example, State antidegradation requirements that are applicable to discharges injurious to public health are potentially relevant and appropriate to all ground-water remediations (whether or not there is a discharge), by prohibiting remediations injurious to public health. These principles, when applied to CERCLA remediations, should be analyzed as follows:[6]

A) EPA does not consider pump-and-treat remediations of a contaminated plume to be injurious to public health because they are generally effective at containing and treating contaminated plumes. (See OSWER Directive 9355.4-03, October 1989, entitled "Considerations in Ground-Water Remediation at Superfund Sites"). Therefore, pump-and-treat remediations would generally comply with these requirements, if relevant and appropriate.

B) Natural attenuation remediation would also be expected to comply with these requirements prohibiting injurious discharges (if relevant and appropriate). Examples include sites where: (1) a contaminated plume is located within a Class III aquifer; (2) a contaminated plume is moving within parts of a Class I or II aquifer that are also significantly contaminated; or (3) the plume is small, its contaminant levels are low, and it will not migrate significantly. Natural attenuation might be said not to comply with these requirements if it allows a contaminated plume to move into a pristine, or only slightly contaminated portion of a Class I or II aquifer; the interim action waiver must be invoked at such sites, and precautions such as institutional controls should be taken.

C) Soil flushing generally would comply with these requirements, if relevant and appropriate, at sites where the aquifer is already contaminated. Contaminants from soil flushing might be said to be injurious to public health if introduced into a pristine, or only slightly contaminated portion of a Class I or II aquifer. In those rare cases where it is necessary to select this remedy at such sites, the interim action waiver must be invoked, and precautions such as institutional controls should be taken.

Highlight 2: COMPLIANCE WITH STANDARDS SET BELOW DETECTION LEVELS

State ground-water antidegradation standards that are set below detection levels cannot be measured or verified. Therefore, if such standards are applicable, the technical impracticability waiver should generally be invoked where compliance with such standards is not possible due to detection limits. Potentially relevant and appropriate standards that cannot be measured or verified may not be appropriate and, therefore, are not ARARs (see Preamble to the revised NCP, 55 FR 8750-8752).

Regions should not extrapolate from existing data or technologies to reach a level set below detection capabilities because such extrapolations cannot be verified scientifically with any degree of certainty. Without verification, neither the Agency nor the potentially responsible parties could legally establish that cleanup goals were met. Furthermore, the NCP states that relevant and appropriate requirements must be measurable and attainable since their purpose is to set a standard that an actual remedy will attain (see Preamble to the revised NCP, 55 FR 8752).

[6] The following reflects EPA's general analysis of how several types of remediation should be evaluated. The State may take a different and more limited view of what was intended under the statute. If the State argues for a different interpretation of its laws, consult ORC or OGC.

Highlight 3: POTENTIAL ARARs WAIVERS FOR STATE ANTIDEGRADATION REQUIREMENTS

The Interim Measure Waiver: This waiver provides that the action selected need not attain an ARAR where the action "is only part of a total remedial action that will attain such level or standard of control when completed." See CERCLA section 121(d)(4)(d). Therefore, the interim measures waiver may be used to waive ARARs for interim measures which, by their temporary nature, do not attain all ARARs. However, the interim measure must be followed by, or be part of, complete measures that attain all ARARs, and it should not exacerbate site problems nor interfere with the final remedy (see the revised NCP, 55 FR 8747-8748 (March 8, 1990)).

The Inconsistent Application of State Requirements Waiver: This waiver is intended to prevent the application to Superfund sites of State requirements that have not been consistently applied elsewhere in a State. State standards are presumed to have been consistently applied unless there is evidence to the contrary. When questioned by EPA, States may provide evidence of consistency of application by demonstrating: (1) the similarity of sites or response circumstances; (2) the proportion of noncompliance cases; (3) reasons for noncompliance; and (4) intentions to apply future requirements (see the revised NCP, 55 FR 8749 (March 8, 1990)).

NOTICE: The policies set out in this ARARs Q's and A's are intended solely for guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this Q's and A's, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance at any time without public notice.

MATRIX ANALYSIS OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS AS THEY PERTAIN TO CERTAIN REMEDIES AND SITE CIRCUMSTANCES*

REMEDY/SITE CIRCUMSTANCES

STATE LAW	GROUND-WATER REMEDIATION: PUMP AND TREAT (Aquifer With a Contaminated Moving Plume)	GROUND-WATER REMEDIATION: NATURAL ATTENUATION (Aquifer With a Contaminated Moving Plume)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Followed by Pump and Treat)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Concurrent With Pump and Treat)
1. The ground water must be protected. Discharges that are injurious to public health are prohibited. RAR:** ground-water remediations that are injurious to public health are prohibited. This may arguably occur if a remediation allows a contaminated plume to move.	• Not applicable if there is no discharge. If each reinjection is a "discharge," the requirement is met if the discharge is not "injurious to public health" (e.g., where the receiving aquifer is already contaminated, or if the reinjection has low contaminant levels). It is generally not a RAR if the plume is moving into parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Not applicable because there is no discharge. It is generally not a RAR if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it by limiting natural attenuation to sites where the plume will not migrate to the portions of the aquifer used for drinking and contaminant levels are low, thereby preventing injury to public health. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, the requirement is met if the discharge is not injurious to public health (e.g., because the aquifer already exceeds health-based levels or if the discharge has low contaminant levels). If discharging to a pristine or slightly contaminated aquifer, we may use the interim action waiver.	• May be a discharge; however, the requirement is met if the discharge is not injurious to public health (e.g., because the aquifer already exceeds health-based levels or if the discharge has low contaminant levels). If it is an ARAR, we may comply with it by conducting pump and treat simultaneously, if the discharge (as it is part of a contained treatment system) is not injurious to public health. Otherwise, we may use the interim action waiver.
2. The ground water must be protected. No discharge is permitted unless a State Board issues a permit. RAR:** ground-water remediations must protect the ground water consistent with State permit standards (which may, for example, prohibit the introduction of contaminants into a portion of an aquifer used for drinking).	• Permits are not required (see CERCLA §121(e)(1)). Substantive requirements of the permit program are not applicable if there is no discharge. If each reinjection constitutes a "discharge," the requirement is met if each reinjection meets the substantive requirements of the permitting regulations (e.g., no "harmful" discharge). It is generally not a RAR if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Permits are not required (see CERCLA §121(e)(1)). Substantive requirements of the permit program are not applicable because there is no discharge. It is generally not a RAR if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we may comply with it by limiting natural attenuation to sites where the plume will not migrate into portions of the aquifer designated for drinking or other protected uses. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, no permits are required under CERCLA §121(e)(1). If the substantive requirements of the permit program are ARARs, the action may comply if the contaminant levels of the effluent entering the ground water do not exceed the discharge standards set in the ROD (based on State permit requirements). Otherwise, we may use the interim action waiver.	• May be a discharge; however, no permits are required under CERCLA §121(e)(1). If the substantive requirements of the permit program are ARARs, the action may comply if the contaminant levels of the effluent entering the ground water do not exceed the discharge standards set in the ROD (based on State permit requirements). Otherwise, we may use the interim action waiver.

* This matrix provides general considerations only. Consult with ORC or OGC on specific applications.

** Relevant and Appropriate Requirement

MATRIX ANALYSIS OF STATE GROUND-WATER ANTIDEGRADATION REQUIREMENTS AS THEY PERTAIN TO CERTAIN REMEDIES AND SITE CIRCUMSTANCES*

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STATE LAW	GROUND-WATER REMEDIATION: PUMP AND TREAT (Aquifer With a Contaminated Moving Plume)	GROUND-WATER REMEDIATION: NATURAL ATTENUATION (Aquifer With a Contaminated Moving Plume)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Followed by Pump and Treat)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Concurrent With Pump and Treat)
3. The ground water must be protected. No discharge is permitted to a usable aquifer. RAR:** ground-water remediations that do not protect a usable aquifer are prohibited. This may occur if the remediation allows a contaminated plume to move.	• Requirement is not applicable if there is no discharge. If each reinjection constitutes a "discharge," the requirement is not applicable if the prior contamination already rendered the aquifer unusable. The requirement is not a RAR if the plume has rendered the aquifer unusable or if the plume is moving to parts of the aquifer that are also significantly contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is not applicable because there is no discharge. Also, the requirement is not applicable if the plume has rendered the aquifer unusable. The requirement may not be a RAR if the plume has rendered the aquifer unusable or if the plume is moving to parts of the aquifer already contaminated. If it is a RAR, and it requires some degree of plume containment, we may comply with it by limiting natural attenuation to sites where the plume will not migrate to usable portions of the aquifer. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, the requirement is not applicable if the aquifer is not usable (e.g., because it is already contaminated). This requirement is probably applicable if the aquifer is pristine or slightly contaminated. If so, we may use the interim action waiver.	• May be a discharge; however, the requirement is not applicable if the aquifer is not usable (e.g., because it is already contaminated). If it is an ARAR, we may comply with it by simultaneously conducting pump and treat if the prompt containment and treatment of contaminants protects usable portions of the aquifer. Otherwise, we may use the interim action waiver.
4. The ground water must be protected. No discharge is permitted if it interferes with existing uses. RAR:** ground-water remediations that interfere with existing or potential uses are prohibited. This may occur if the remediation allows a contaminated plume to move.	• Requirement is not applicable if there is no discharge. If each reinjection constitutes a "discharge," the requirement is met if the existing uses(/quality) of the aquifer is maintained (e.g., where the aquifer is already contaminated). It would generally not be a RAR if the plume is moving to a portion of the aquifer that is already contaminated. If it is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is not applicable because there is no discharge. It would generally not be a RAR if the plume is moving to a portion of the aquifer that is already contaminated. If it is a RAR, and it requires some degree of plume containment, we may comply with it by limiting natural attenuation to sites where contaminant levels are low and any plume migration will not affect the existing uses(/quality) of the aquifer. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• May be a discharge; however, the requirement is not applicable if the existing uses (/quality) of the aquifer is maintained (e.g., where the aquifer is already contaminated). This requirement is probably applicable if the aquifer is pristine or slightly contaminated. If so, we may use the interim action waiver.	• May be a discharge; however, the requirement is not applicable if the existing uses (/quality) of the aquifer is maintained (e.g., where the aquifer is already contaminated). This requirement is probably applicable if the aquifer is pristine or slightly contaminated. If so, we may use the interim action waiver.

* This matrix provides general considerations only. Consult with ORC or OGC on specific applications.

** Relevant and Appropriate Requirement

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STATE LAW	GROUND-WATER REMEDIATION: PUMP AND TREAT (Aquifer With a Contaminated Moving Plume)	GROUND-WATER REMEDIATION: NATURAL ATTENUATION (Aquifer With a Contaminated Moving Plume)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Followed by Pump and Treat)	SOIL REMEDIATION: SOIL FLUSHING (Where the Aquifer May or May Not Be Contaminated -- Concurrent With Pump and Treat)
5. Maintain ground water at existing high quality unless the State Board approves the change to the water quality. [Statute requires ground-water maintenance at existing high quality during remediation. This may require containment of a contaminated moving plume.] RAR:** same as applicable.	• Requirement is not applicable if the ground water is not of high quality due to the contaminated plume. This requirement may be applicable if the aquifer is pristine or only slightly contaminated. If so, we may use the interim action waiver. It may be a RAR if the plume is moving to portions of the aquifer that are designated for drinking or other protected uses. If the requirement is a RAR, and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is not applicable if the ground water is not of high quality due to the contaminated plume. If the requirement is a RAR, we may comply with it by limiting natural attenuation to sites where the plume contaminant levels are low and the plume will not migrate significantly. Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• Requirement is not applicable if the ground water is already contaminated. This requirement may be applicable if the aquifer is pristine or only slightly contaminated. If so, we may use the interim action waiver.	• Requirement is not applicable if the ground water is already contaminated. This requirement may be applicable if the aquifer is pristine or only slightly contaminated. If so, we may use the interim action waiver.
6. Ground-water quality must be maintained commensurate with current uses. Statute requires maintenance of ground-water quality during remediation. This may require containment of a contaminated moving plume. RAR:** same as applicable.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current quality of the aquifer (e.g., where the reinjections at least meet current water uses(/quality) levels of the aquifer). If the requirement is an ARAR and it requires some degree of plume containment, we comply with it through pump and treat.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current uses(/quality) of the aquifer (e.g, where plume contaminant levels are low, there are small areas of contamination, and the plume will not migrate significantly). Otherwise, we may use the interim action waiver, usually accompanied by institutional controls.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current uses(/quality) of the aquifer (e.g., where the effluent at least meets the current water quality levels of the aquifer). Otherwise, we may use the interim action waiver.	• Requirement is presumably applicable. Requirement is met if the remedy maintains the current uses(/quality) of the aquifer (e.g., where the effluent at least meets the current water quality levels of the aquifer). Otherwise, we may use the interim action waiver.

* This matrix provides general considerations only. Consult with ORC or OGC on specific applications.

** Relevant and Appropriate Requirement