
Central Valley Regional Water Quality Control Board

3 January 2014

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Woodland, CA 95695

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NOTICE OF APPLICABILITY (NOA) FOR WATER QUALITY ORDER 2012-0010-DWQ AQUIFER STORAGE AND RECOVERY PILOT TEST, CITY OF WOODLAND, YOLO COUNTY

Thank you for meeting with Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff on 20 November 2013, to discuss your proposed pilot test to evaluate the viability of an aquifer storage and recovery (ASR) program for the City of Woodland (City). We have reviewed the Report of Waste Discharge (ROWD), dated 12 November 2013, which included a Technical Memorandum describing the pilot test procedures, well construction details, and baseline sampling data; a completed Form 200; a copy of a Notice of Exemption (NOE) issued by the City of Woodland on 15 October 2012, and the appropriate filing fee. The City plans to conduct this pilot test to provide design information needed to obtain coverage under the State Water Resources Control Board's *General Waste Discharge Requirements for ASR Projects that Inject Drinking Water into Groundwater* (Order 2012-0010, General Order).

The pilot test will allow the City of Woodland to evaluate, plan, and design a multi-well ASR program that can provide long-term aquifer storage capacity when municipal water is available and recovery during times when water supplies are limited. The pilot test will use City Well 28 as an injection well and two nearby monitoring wells (MW-3 and MW-4) will be used to collect groundwater elevation and water quality data. Injection water for the pilot test will be provided from nearby water supply wells currently used for the City of Woodland's municipal water supply. The locations of these wells are shown on Attachment A, which forms part of this NOA by reference.

Based on the information provided by the City, the proposed ASR program qualifies for coverage under the *General Waste Discharge Requirements for ASR Projects that Inject Drinking Water into Groundwater* (State Water Resources Control Board Water Quality Order 2012-0010, General Order). Therefore, this letter serves as formal notice that the City of Woodland's ASR Program is applicable to Water Quality Order 2012-0010 as described below. The City of Woodland is hereby assigned 2012-0010-DWQ-RB5S-0003 for implementation of the ASR pilot test.

A copy of the General Order is enclosed. You can also find the General Order on the Regional Board's website at:

http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/#General

You are urged to familiarize yourself with the contents of the entire General Order. The ASR Program must be operated in accordance with the requirements contained in the General Order, Standard Provisions and Reporting Requirements for WDRs, and with the information submitted in the ROWD.

BACKGROUND AND ASR PILOT TESTING

The City currently relies on network of 19 groundwater wells as a source of drinking water. Many of the existing municipal supply wells are over 30 years old and may need to be replaced or retrofitted in the coming years to maintain compliance with drinking water standards. In 2009, a joint powers authority known as the Woodland-Davis Clean Water Agency (WDCWA) was formed between the cities of Woodland and Davis to provide surface water supplies for use within each of their service areas to meet their respective water supply needs. The City plans to convert their water supply to surface water provided through the WDCWA; however the City also plans on using ASR to balance out periods of high supply and high demand.

The ROWD provided information for Well 28, two nearby monitoring wells MW-3 and MW-4, and water supply wells owned and used by the City. Information provided included a hydrogeological overview of the Yolo Subbasin¹, well construction details, and baseline groundwater analytical results for inorganic and organic parameters. Well 28 was constructed in 2011 with screened intervals between 425 to 475 feet below ground surface (bgs), 520 to 535 feet bgs, and 570 to 590 feet bgs. Lithologic and electrical logging data from Well 28 indicates that the screened interval from 425 feet bgs to 475 feet bgs is across a gravel-sand interval, which is expected to be of moderate to high permeability and greater potential aquifer storage than the other screened intervals.

Approximately 98.6% of the injection water for the ASR pilot test will be provided from City municipal supply wells 4 and 6. Less than one percent contribution will be provided from City wells 13, 19, 20, and 22. City wells 5, 13, 15S, 16, 19, 20, 21, and 22G may also provide injection water, if pumping demands change. The wells used to supply ASR pilot test injection water are permitted with the California Department of Public Health and are required to comply with Title 22 drinking water standards.

Analytical testing from ten of the City's municipal supply wells was performed between 2010 and 2013, while sampling and analysis of the blended municipal water supply system was performed in May and August 2013. Constituents of concern identified within the City's municipal water supply include Total Dissolved Solids (TDS), nitrate, boron, selenium, and hexavalent chromium. The detected concentrations of these constituents in the municipal water supply were comparable to water quality data collected from Well 28 and the two nearby monitoring wells MW-3 and MW-4. Additionally, due to the confined nature of the

¹ California Department of Water Resources, *California's Groundwater, Bulletin 118*.

aquifer interval screened by Well 28 below 500 feet bgs, ASR pilot testing constituents is not expected to mobilize constituents from the shallow water table.

Treated drinking water will be pumped to Well 28 via the City's existing municipal distribution system and injected at an approximate rate of 1,000 gallons per minute. Based on the anticipated water storage capacity of the primary permeable zone screened in Well 28, the pilot test is anticipated to take approximately seven days, during which time water level data and sampling will be conducted from nearby monitoring wells MW-3 and MW-4.

The pilot test will also include the use of an inert tracer (xenon gas) to assess breakthrough characteristics at the two nearby monitoring wells. Based on the groundwater and injection water analytical data presented in the ROWD, the proposed pilot test is not expected to result in short or long-term degradation of groundwater quality.

ELIGIBILITY

Based on the RWD, the proposed ASR pilot test is consistent with the requirements set forth in Attachment C of the General Order and meets the following eligibility requirements:

1. Injected water will be treated and delivered to each injection well consistent with the requirements of a California Department of Public Health domestic water supply permit.
2. The existing Well 28 used for the ASR pilot test and two nearby monitoring wells were constructed in compliance with California Well Standards. All ASR related wells to be installed in the future will also comply with these standards.
3. Injected water for ASR pilot testing will be of a quality that will ensure compliance with the General Order.
4. The ASR pilot test is not restricted by local ordinance, prohibition, or other law or regulation, and
5. An environmental impact evaluation has been performed pursuant to the California Environmental Quality Act (CEQA) and is consistent with the requirements of the General Order.

GENERAL INFORMATION AND REQUIREMENTS

This Notice of Applicability authorizes implementation of the proposed ASR pilot test under Order 2012-0010-DWQ-RB5S-0003 for the wells cited in the ROWD documentation and discussed in this Notice of Applicability. In accordance with Prohibition B.4 of the General Order, operation of a pilot test shall not extend beyond 24 months from the date this Notice of Applicability is issued

The City shall comply with the Prohibitions, Requirements, Groundwater and Surface Water Limitations, and Provisions of Water Quality Order 2012-0010-DWQ-RB5S-0003. The City of Woodland is encouraged to become familiar with the contents of the entire General Order. All ASR functions must be operated in accordance with the requirements contained in the General Order and with the RWD and supporting documentation.

Please review this Notice of Applicability carefully to ensure that it completely and accurately reflects the proposed discharge. The City of Woodland will maintain exclusive control over the discharge and subject to the terms and conditions of the General Order. As such, the City of Woodland is primarily responsible for compliance with the General Order. If the City violates the terms or conditions of the General Order, the Central Valley Water Board may take enforcement action, including assessment of administrative civil liability as authorized by provisions of the California Water Code.

The required fee specified in the annual billing statement from the State Water Board shall be paid until this Notice of Applicability is officially terminated. You must notify this office in writing if the discharge regulated by this Order ceases so that coverage under the General Order can be terminated and to avoid unnecessary billing. The City of Woodland must submit a Notice of Termination following completion of the discharge before 30 June 2014 to avoid being billed for an annual fee for the fiscal year 2014/2015.

Questions regarding the General Order should be directed to Mr. Scott Armstrong at (916) 464-4616 or sarmstrong@waterboards.ca.gov. All monitoring reports, submittals, discharge notifications, and questions regarding compliance and enforcement should be directed to Mr. Brendan Kenny at (916) 464-4635 or bkenny@waterboards.ca.gov.

Original signed by Andrew Altevogt for:

PAMELA C. CREEDON
Executive Officer

Enclosures: State Water Resources Control Board Water Quality Order 2012-0010-DWQ

Attachment 1 Monitoring and Reporting Program R5-2014-0809
2 Site Location Map
3 Well No. 28 Site Plan

cc w/o enc. WDR Program Manager, State Water Resources Control Board, Sacramento
Michael McNamara, California Department of Public Health, Redding
Mr. Bruce Sarazin, Yolo County Health Department, Woodland
Elizabeth Janes, US EPA Region IX, San Francisco

**STATE WATER RESOURCES CONTROL BOARD
WATER QUALITY ORDER 2012-0010**

**GENERAL WASTE DISCHARGE REQUIREMENTS FOR
AQUIFER STORAGE AND RECOVERY PROJECTS
THAT INJECT DRINKING WATER INTO GROUNDWATER**

The State Water Resources Control Board (State Water Board) finds that:

1. A stable supply of high quality water is critical to the continued welfare, wellbeing, and economic development of California. According to the California Department of Water Resources (DWR), the demand on groundwater will continue to increase as California's population grows from 37 million (2005 estimate) to a projected 60 million by 2050 based on current trends.
2. Groundwater is an important water source for municipal water supply, agriculture, and individual water users across California. According to the DWR 2009 Water Plan:
 - a. In 1995, an estimated 13 million Californians, nearly 43 percent of the state's population, were served by groundwater. Many small to moderate-sized towns and cities (e.g., Fresno, Davis, Lodi) rely solely on groundwater for their drinking water supplies. California public water supply systems use more than 16,000 wells to supply water to the public.
 - b. Groundwater has played a leading role in transforming California into the nation's top agricultural producer, most populous state, and the seventh largest economy in the world.
 - c. With the growing limitations on available surface water exported through the Sacramento-San Joaquin Delta and the potential impacts of climate change, reliance on groundwater through conjunctive management (i.e., coordinated and planned use and management of surface water and groundwater resources together to maximize the availability and reliability of water supplies) will become increasingly important in meeting the state's future water needs.
 - d. In some areas of the state, groundwater has been overdrafted, resulting in lowered groundwater elevations and reduced groundwater storage. A comprehensive assessment of overdraft in the state's groundwater basins has not been conducted since the 2003 update of DWR Bulletin 118-80, but it is estimated that overdraft is between 1 million and 2 million acre-feet annually.
 - e. Other basins may be subject to overdraft in the future if current water management practices are continued. Overdraft can result in increased water production costs, land subsidence, water quality impairment, and environmental degradation.

Aquifer Storage and Recovery (ASR) projects will improve statewide water management by increasing local storage that will be responsive to the needs of local communities and environmental resources. Statewide implementation of ASR projects will help California fulfill its vast conjunctive use potential. This is particularly true in the Central Valley, which possesses not only the state's largest sources of surface water, but also by far the state's largest aquifer.

3. According to DWR Bulletin 118-80, a basin is subject to critical conditions of overdraft when present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts. The following eleven basins were identified as being in a critical condition of overdraft:

Pajaro Basin	Cuyama Valley Basin	Eastern San Joaquin County Basin
Kern County Basin	Chowchilla Basin	Madera Basin
Kings Basin	Kaweah Basin	Tulare Lake Basin
Tule Basin	Ventura Central Basin	

Other basins have been determined to be in a state of overdraft since the release of DWR Bulletin 118-80 including, but not limited to, the Seaside Groundwater Basin.

4. Conjunctive management of surface and groundwater supplies can be a useful tool to improve water supplies. Two widely used methods for managed groundwater recharge are recharge basins and injection wells. This General Order (Order) is intended to regulate only ASR projects that inject drinking water that has been treated pursuant to a California Department of Public Health (CDPH) domestic water supply permit.
5. In general, ASR projects¹ involve the storage of water in a suitable aquifer during times when water is available, and recovery of the water from the aquifer when it is needed. According to the United States Environmental Protection Agency (U.S. EPA), ASR wells are used to achieve two objectives: (1) storing water in the ground; and (2) recovering the stored water either using the same well or pairing recharge wells with recovery wells located in the same well field.² The benefits of ASR projects permitted by this Order may include, but are not limited to, the following:
 - a. Improved local water supply reliability and overall quality.
 - b. Improved statewide water supply reliability and overall quality.
 - c. Drought relief during the dry season.
 - d. Protection from salt water intrusion or other sources of undesirable water quality.

REGULATORY BACKGROUND AND BASIS FOR THE GENERAL ORDER

6. Water Code section 13260 states in part:

...the following persons shall file with the appropriate regional board a report of the discharge, containing the information which may be required by the regional board:

(3) Any person operating, or proposing to construct, an injection well.

7. Water Code section 13051 states in part:

As used in this division, "injection well" means any bored , drilled, or driven shaft, dug pit, or hole in the ground into which waste or fluid is discharged, and any associated subsurface appurtenances, and the depth of which is greater than the circumference of the shaft, pit, or hole.

8. Water Code section 13264 states in part:

No person shall initiate any new discharge of waste or make any material changes in any discharge, or initiate a discharge to, make any material changes in a discharge to, or construct, an injection well, prior to the filing of the report required by Section 13260 and no person shall take any of these actions after filing the report but before...: (1) The issuance of waste discharge requirements pursuant to Section 13263.

9. Water Code section 13267(d) states:

The state board or a regional board may require any person, including a person subject to a waste discharge requirement under Section 13263, who is discharging, or who proposes to discharge, wastes or fluid into an injection well, to furnish the state board or regional board with a complete report on the condition and operation of the facility or injection well, or any other information that may be reasonably required to determine whether the injection well could affect the quality of the waters of the state.

¹ Definitions and abbreviations are provided in Appendix A, which is attached hereto and is made part of this Order by reference.

² Class V Fact Sheet Aquifer Recharge and Aquifer Storage and Recovery Wells, US EPA, Office of Water and Drinking Water, September 2009.

10. Water Code section 13360 states in part:

No waste discharge requirement or other order of a regional board or the state board or decree of a court issued under this division shall specify the design, location, type of construction, or particular manner in which compliance may be had with that requirement, order, or decree, and the person so ordered shall be permitted to comply with the order in any lawful manner. However, the restrictions of this section shall not apply to waste discharge requirements or orders or decrees with respect to...:

(2) Discharges of waste or fluid to an injection well, except any well which is regulated by the Division of Oil and Gas in the Department of Conservation pursuant to Division 3 (commencing with Section 3000) of the Public Resources Code and Subpart F of Part 147 of Title 40 of the Code of Federal Regulations and is in compliance with that division and Subpart A (commencing with Section 146.1) of Subchapter D of Chapter 1 of Title 40 of the Code of Federal Regulations.

11. The United States Environmental Protection Agency implements the Underground Injection Control program. Code of Federal Regulations, title 40, part 144.12(a) states:

No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. The applicant for a permit shall have the burden of showing that the requirements of this paragraph are met.

ASR projects regulated under this Order are consistent with Class V of the Underground Injection Control program and this Order requires that ASR project operators comply with current US EPA permit by rule requirements. No requirements in this Order will cause a discharger to be in violation of the groundwater protection provisions of the Safe Drinking Water Act (42 U.S.C. section 300f et seq.).

GENERAL ORDER APPLICABILITY

12. This Order regulates certain low-threat ASR projects on a state-wide basis to achieve the following goals:

- a. Consistent regulation of ASR projects state-wide.
- b. Implementation of best practicable treatment and control (BPTC) in accordance with State Water Board [Resolution 68-16](#) (the "Antidegradation Policy") for ASR projects.
- c. A streamlined review and permitting process for ASR projects.

13. Applicability of this Order will be determined by the Executive Officer of the Regional Water Board in the region where the project will take place taking into consideration the following factors:

- a. This Order does not automatically apply to existing ASR projects and Regional Water Boards will evaluate whether this Order is the appropriate regulatory mechanism before granting coverage to any project, whether existing or proposed.
- b. Although an ASR project may be eligible for coverage under this Order, the Executive Officer of the pertinent Regional Water Board may determine that the project should be regulated under individual waste discharge requirements, a waiver of waste discharge requirements, or an enforcement order.

- c. Operators of existing ASR projects that are not currently regulated by the Regional Water Board should discuss the appropriate regulatory mechanism and monitoring requirements with the Regional Water Board.
 - d. In granting coverage under this Order, the Executive Officer of the Regional Water Board will also issue a monitoring and reporting program which may, if deemed appropriate, include monitoring and reporting requirements that differ from those contained in the monitoring and reporting program included with this Order.
14. The applicability of this Order is limited as required by Water Code section 13263(i), which states in part:

The state board or a regional board may prescribe general waste discharge requirements for a category of discharges if the state board or the regional board finds or determines that all of the following criteria apply to the discharges in that category:

- 1) *The discharges are produced by the same or similar operations.*
- 2) *The discharges involve the same or similar types of waste.*
- 3) *The discharges require the same or similar treatment standards.*
- 4) *The discharges are more appropriately regulated under general discharge requirements than individual discharge requirements.*

ASR projects to be regulated under this Order fit all of the criteria and therefore a general order is appropriate. All discharges regulated under this Order would be from similar operations producing treated potable water. The discharges will all be similar in that the primary constituents of concern will be disinfection by-products generated by drinking water treatment required pursuant to domestic water supply permits issued by CDPH. The discharges will employ similar treatment and are all required to meet the same standards prior to discharge (i.e., drinking water standards). Individual waste discharge requirements are not necessary because the discharges are similar and the discharge requirements would be similar if individual waste discharge requirements were issued.

15. To obtain or terminate coverage under this Order, an Applicant³ must submit the information described in Section C of this Order. The application fee is based on the threat and complexity of the discharge. Operation of an ASR project that involves injection of drinking water into groundwater is classified as 3C pursuant to California Code of Regulations, title 23, section 2200(a)(1) which states, in part:

Threat to water quality...and complexity...of the discharge is assigned by the Regional Board in accordance with the following definitions:

Category "3" – Those discharges of waste that could degrade water quality without violating water quality objectives, or could cause a minor impairment of designated beneficial uses as compared with Category 1 and Category 2.

Category "C" – Any discharger for which waste discharge requirements have been prescribed pursuant to Section 13263 of the Water Code not included in Category A or Category B as described above. Included are dischargers having no waste treatment systems or that must comply with best management practices, dischargers having passive treatment and disposal systems, or dischargers having waste storage systems with land disposal.

³ For the purpose of this Order, the term "Applicant" refers to the entity, whether a person, private company, or public agency, that applies for coverage under this Order. Upon Issuance of a Notice of Applicability by the Executive Officer of the applicable Regional Water Board, the Applicant becomes the "Permittee"

ASR PROJECT DESCRIPTION

16. ASR projects can increase groundwater supplies by storing water in an aquifer in times of abundant supply and extracting water when needed. Because ASR can significantly increase water storage at relatively low cost and with little environmental impact, the number of ASR projects in California has increased and may increase further in the future.
17. ASR projects are generally operated as “one-well” or “multi-well” systems. In the one-well system, water is injected into, and removed from the same well. In multi-well systems, water is injected into a well and that water is removed from a different well, wells, or a combination of injection well(s) and the different well(s).
18. Many current ASR projects utilize existing water treatment and conveyance infrastructure such as surface water intake pumping systems, water treatment plants, and potable water distribution systems to avoid the cost and environmental impacts associated with constructing duplicate treatment and conveyance systems. In such cases, a typical ASR project takes surface water from an existing surface water intake, treats it to meet drinking water standards at an existing water treatment plant, and conveys it to one or more injection wells via an existing water distribution system. During periods of aquifer injection, both water users and the injection well system receive potable water from the treatment plant. Water is later extracted from the aquifer as needed, treated again at the wellhead if necessary, and conveyed to water users in the same distribution system. It is anticipated that most ASR projects will be designed to maximize the use of existing infrastructure in this way.
19. It is anticipated that there will be a large variation in the size of ASR projects seeking coverage under this Order. Some will consist of single well projects and others will consist of large well fields. A corresponding variation in the knowledge of aquifer characteristics is expected. Pilot tests may be performed for ASR projects with limited information about aquifer characteristics; alternatively, pilot tests may not be needed when well fields and groundwater quality have been adequately characterized. This Order contains a procedure that is described in Section C, to allow implementation of a pilot test if an Applicant elects to perform one.
20. Projects that are regulated under this Order are not required to recover or hydraulically control the injected water except pursuant to a mitigation measure included in a project-specific California Environmental Quality Act (CEQA) document or a subsequent order adopted by the State Water Board or the Regional Water Board.

ELIGIBILITY REQUIREMENTS

21. In order to be eligible for coverage under this Order, the project must meet all of the following requirements:
 - a. Drinking water that has been treated pursuant to a CDPH domestic water supply permit is placed in the aquifer via one or more injection wells.
 - b. With regard to ASR well construction:
 - i. The wells are constructed in compliance with the requirements of the California Well Standards by a licensed well driller under the supervision of a California registered engineer or geologist.
 - ii. The well construction details and lithologic log are documented and the well construction (well screen, filter pack, annular seal) limits the injected water to specific aquifer zones at the injection well.

- c. With regard to water quality, injected water:
 - i. Is of a quality that will ensure compliance with this Order.
 - ii. Has been treated and delivered to the injection well consistent with the requirements of a California Department of Public Health (CDPH) domestic water supply permit.
- d. With regard to legal authorization:
 - i. The project is not restricted by local agency ordinance, prohibition, or other applicable law or regulation.
 - ii. The project is consistent with the CEQA project description provided in this Order and any project level CEQA environmental impact evaluation has been completed prior to submitting a Notice of Intent (NOI).

GROUNDWATER QUALITY CONCERNS

- 22. This section describes the constituents of concern for ASR projects that inject treated drinking water and their potential to degrade groundwater quality. The following sections (Basin Plans, Beneficial Uses, and Regulatory Considerations; and Antidegradation Analysis) discuss how this Order ensures compliance with applicable regulations and policies.
- 23. In ASR projects, water from one source is discharged into another. Injected water may be of different quality than groundwater in the aquifer. In addition to the possibility of elevated concentrations of naturally occurring or anthropogenic constituents in the source water, mixing water from different sources may cause geochemical reactions in the aquifer that can improve or degrade groundwater quality.
- 24. The process of disinfection is designed to prevent the transmission of waterborne diseases. CDPH requires a measurable disinfectant concentration in the potable water distribution system when the water source is surface water. Specifically, California Code of Regulations title 22, section 64564, subdivision (a) states that all approved surface water utilized by a supplier shall be provided with continuous disinfection treatment sufficient to insure that the total treatment process provides inactivation of *Giardia lamblia* cysts and viruses, in conjunction with the removals obtained through filtration. Subdivision (b) states that, except for suppliers serving fewer than 500 persons, the residual disinfectant concentrations of samples collected from the distribution system shall be detectable in at least 95 percent of the samples taken each month that the system serves water to the public. The regulation further states that at any sample point in the distribution system, the presence of heterotrophic plate count (HPC) at concentrations less than or equal to 500 colony forming units per millimeter shall be considered equivalent to a detectable disinfectant residual.
- 25. Because some ASR projects will utilize existing infrastructure as described above, some disinfectant and disinfection by-products are likely to be present in the injected water. Additional disinfection by-products may be formed in the aquifer as residual disinfectant reacts with organic material in the aquifer matrix.
- 26. Disinfection by-products consist of organic and inorganic substances produced by the interaction of chemical disinfectants with naturally occurring substances in the water source. A summary of common disinfection by-products is presented below:

<u>Disinfection Byproduct</u>	<u>How Is It Formed?</u>
Trihalomethanes	
<i>Bromodichloromethane</i>	Trihalomethanes occur when naturally-occurring organic and inorganic materials in the water react with the disinfectants, chlorine, and chloramine.
<i>Bromoform</i>	
<i>Dibromochloromethane</i>	
<i>Chloroform</i>	

<u>Disinfection Byproduct</u>	<u>How Is It Formed?</u>
Haloacetic acids <i>Dichloroacetic acid</i> <i>Trichloroacetic acid</i> <i>Chloroacetic acid</i> <i>Bromoacetic acid</i> <i>Dibromoacetic acid</i>	Haloacetic acids occur when naturally-occurring organic and inorganic materials in the water react with the disinfectants, chlorine, and chloramine.
Bromate	Bromate occurs when bromide in the water reacts with the disinfectant ozone.
Chlorite	Chlorite occurs when chlorine dioxide breaks down.

None of these constituents would be present at concentrations that exceed drinking water limits (MCLs) in water injected into the aquifer because this Order requires that the injected water meet all drinking water standards.

27. Other constituents of concern that may be present in the injected water due to natural or anthropogenic sources include salinity species, metals, pesticides, pharmaceuticals and personal care products. These other constituents, if present, would be as the result of storm water runoff and treated wastewater discharged into the water source upstream of the water supply intake system. However, none of these constituents would be present at concentrations that exceed drinking water limits (MCLs) in water injected into the aquifer because this Order requires that the injected water meet all drinking water standards.
28. Finally, injection of water into any aquifer may induce geochemical reactions, some of which may cause exceedance of a water quality objective. For example, the introduction of water with a higher concentration of dissolved oxygen into an anaerobic aquifer may induce geochemical oxidation-reduction (or "redox") reactions that increase concentrations of inorganic species in the aquifer and recovered water. The redox reactions may result in higher dissolved concentrations of inorganic constituents in recovered water than in the injected water. Specifically, arsenic, iron, manganese, nitrogen, selenium, and sulfur have been identified as constituents of concern in ASR projects. However, none of these constituents would be present in the aquifer at concentrations that exceed applicable water quality objectives because this Order prohibits it.

BASIN PLANS, BENEFICIAL USES, AND REGULATORY CONSIDERATIONS

29. Water Code section 13240 requires each Regional Water Board to formulate and adopt Water Quality Control Plans (Basin Plans) for all areas within its region.
30. Water Code section 13241 states:

Each regional board shall establish such water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance; however, it is recognized that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses. Factors to be considered by a regional board in establishing water quality objectives shall include, but not necessarily be limited to, all of the following:

 - a. *Past, present, and probable future beneficial uses of water.*
 - b. *Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.*

- c. *Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.*
- d. *Economic considerations.*
- e. *The need for developing housing within the region.*
- f. *The need to develop and use recycled water.*

31. Basin Plans designate beneficial uses, establish Water Quality Objectives (WQOs), contain implementation plans and policies for protecting waters of the basin, and incorporate by reference plans and policies adopted by the State Water Board. Pursuant to Water Code section 13263(a), waste discharge requirements must implement the Basin Plan.
32. The beneficial uses of groundwater are defined in each Regional Water Board's basin plan. The beneficial uses of groundwater statewide are summarized in the following table:

REGION	Beneficial Uses								
	AGR	AQUA	FRSH	GWR	IND	MUN	PRO	REC-1	WILD
1 North Coast	x		x		x	x	x		
2 San Francisco Bay	x		x	x	x	x	x		
3 Central Coast	x				x	x			
4 Los Angeles	x				x	x	x		
5 Central Valley - Sacramento and San Joaquin River	x				x	x	x		
5 Central Valley - Tulare Lake	x				x	x	x	x	x
6 Lahontan	x	x	x		x	x			x
7 Colorado River	x				x	x			
8 Santa Ana	x				x	x	x		
9 San Diego	x		x	x	x	x	x		

AGR denotes agricultural supply. AQUA denotes aquaculture. FRSH denotes freshwater replenishment. GWR denotes groundwater recharge. IND denotes industrial service supply. MUN denotes municipal and domestic supply. PRO denotes industrial process supply. REC-1 denotes water contact recreation. WILD denotes wildlife habitat.

33. State Water Board [Resolution 88-63](#), established state policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply.

ANTIDegradation Analysis

34. Resolution 68-16 states, in part:
1. *Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.*

2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

35. As noted in Findings 22 through 28 above, constituents of concern that have the potential to degrade groundwater include disinfection by-products, salinity species, metals, pesticides, pharmaceuticals and personal care products. With the exception of disinfection by-products and certain metals that may become dissolved in the aquifer through geochemical reactions, these constituents of concern, if present, would be the result of storm water runoff and wastewater discharged into the water source upstream of the water supply intake system. However, none of these constituents would be present at concentrations that exceed drinking water maximum contaminant levels (MCLs) in water injected into the aquifer, because this Order requires that the injected water meet all drinking water standards.
36. This Order regulates discharges from ASR projects into numerous groundwater aquifers and zones, each with its own chemical characteristics. Some of these waters are high quality waters pursuant to Resolution 68-16 but there is not sufficient data to fully determine the boundaries of high quality groundwater on a statewide basis. To the extent a discharge under this Order may be of high quality waters, this Order is consistent with Resolution 68-16 as described in the findings below.
37. This Order prohibits injection of water that does not comply with drinking water standards or that would cause violation of any water quality objective within the aquifer. It also requires that ASR projects not cause a condition of pollution or nuisance. Coverage under this Order will not be granted unless the NOI demonstrates that the project will comply with the Injected Water and Groundwater Limitations of this Order.
38. ASR projects regulated by this Order will provide important economic and environmental benefits:
- Subsurface storage of potable water avoids the cost, land use, and other environmental impacts of new dams and water storage reservoirs.
 - Conjunctive use may allow communities to sustain some population and economic growth without the environmental impacts associated with increased surface water withdrawals during periods of low stream flow, which can impact the habitat value of surface waters.
 - Using existing water treatment and distribution infrastructure to supply the injection wells with potable water will avoid significant costs and potentially significant environmental impacts associated with building new water treatment plants and distribution systems.
 - Design, construction, and operation of ASR projects will enhance local employment.
- For these reasons, the limited degradation of water quality that may occur as a result of ASR projects regulated under this Order is consistent with maximum benefit to the people of the state provided that terms of the applicable Basin Plan and any relevant State Board policies are met.
39. The Permittee subject to this Order must implement best practicable treatment or control. At a minimum, the following treatment and control measures are required for all ASR projects:
- Treatment (typically flocculation, filtration, and disinfection to remove suspended solids and pathogenic microorganisms) so that all injected water is potable water produced in compliance with a CDPH domestic water supply permit.

- b. Adequate characterization of injectate water quality. If injectate water quality is variable through the year, operate the ASR project to optimize use of better quality water during injection cycles.
 - c. Design and operation of ASR projects to minimize adverse aquifer conditions and geochemistry.
 - d. Additional treatment when necessary to fully protect all beneficial uses.
 - e. Groundwater monitoring of the injection/extraction wells and groundwater monitoring wells to evaluate the potential for groundwater quality changes.
 - f. Implementation of an Operation & Maintenance (O&M) Plan.
40. Introduction of disinfection by-products into the aquifer could be reduced or eliminated completely by two primary means: use of non-chemical disinfection methods or treatment after disinfection to remove disinfection by-products.
- a. The best non-chemical disinfection method available is treatment with ultraviolet (UV) light to destroy pathogens. This technology is widely available and its use for disinfecting treated wastewater is becoming more common for that use. However, UV disinfection is effectively prohibited for ASR projects that will utilize existing water treatment and distribution infrastructure as described in Finding 19, because CDPH requires that water suppliers serving surface water to 10,000 or more people maintain a residual chlorine concentration in the distribution system to prevent pathogen regrowth. In situations where UV disinfection could be allowed, this would require the Permittee to construct a new disinfection system to replace one that is still functional. The capital cost of replacement would vary, but can reasonably be expected to range from a few to several million dollars per facility depending on the design flow rate, length and diameter of required conveyance piping, pump sizes and treatment systems required to meet drinking water standards.
 - b. There are several treatment technologies available to remove disinfection by-products that are trihalomethanes (bromoform, dibromochloromethane, and chloroform) and haloacetic acids (dichloroacetic, trichloroacetic, chloroacetic, bromoacetic, and dibromoacetic acids). The most common method to remove low concentrations of these constituents is granulated activated carbon (GAC) adsorption, which involves passing the disinfected water through a vessel that contains GAC. The constituents are physically bound to the GAC by adsorption. As the adsorption sites are filled, the GAC must be changed to continue the process. The frequency of GAC replacement varies depending on the character of the disinfected water, the flow rate, and GAC vessel dimensions. Treating disinfected water to remove disinfection by-products would require the Permittee to construct a new treatment process at each injection well head to preserve chlorine residual within the distribution system that conveys treated water to the injection wells. The capital cost of GAC treatment would vary with the volume to be treated, but can reasonably be expected to range from a few to several million dollars depending on the design flow rate, pump sizes and size of the GAC treatment systems required to remove disinfection by-products.
41. Treatment technologies to remove salinity species and metals are also available. The most common broadly applicable technology is reverse osmosis, which physically separates ions from water. Reverse osmosis is an energy-intensive process and the infrastructure costs can reasonably be expected to range from a few to several million dollars depending on the design flow rate, quality of the raw water, desired quality of the treated water, and brine storage and disposal options. Reverse osmosis also generates a waste brine stream, which would create additional storage and disposal costs.

42. Degradation of groundwater by some of the constituents of concern associated with an ASR project is consistent with maximum benefit to the people of the state if the Permittee employs the minimum treatment and control technologies described in Finding 39 above. Although degradation could be further minimized by employing the treatment technologies described in Findings 40 through 41, the cost of this level of treatment is far greater than the benefits to be obtained because it is not necessary to prevent impacts to the primary beneficial use of groundwater, which is municipal and domestic supply. Economic prosperity of communities and associated industries is of maximum benefit to the people of the state and is a sufficient reason to allow some groundwater degradation, which may arise in some cases, provided that terms of the applicable Basin Plan, and other applicable State and Regional Water Board policies are consistently met.

OTHER REGULATORY CONSIDERATIONS

43. Operation of an ASR project under this Order is exempt from the requirements of *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in California Code of Regulations, Title 27 (hereafter Title 27). The activity is exempt from Title 27 requirements pursuant to Title 27 section 20090, which states that certain activities are exempt as long as the activity meets, and continues to meet, all preconditions listed. ASR projects regulated under this Order are exempt from Title 27, section 20090(c), which exempts:

...[d]ischarges of waste to wells by injection pursuant to the Underground Injection Control Program established by the United States Environmental Protection Agency (USEPA) under the Safe Drinking Water Act, [42 U.S. Code Section 300(h), see Title 40 of the Code of Federal Regulations, Parts 144 to 146, 40 CFR 144 to 146].

No requirements in this Order will cause a discharger to be in violation of the groundwater protection provisions of the Safe Drinking Water Act (42 U.S.C. section 300f et seq.).

44. Water Code section 13267(b) states:

In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order, the Notice of Applicability (NOA), and the MRP are necessary to assure compliance with this Order. The Permittee owns and/or operates the facility subject to this Order.

45. Water Code section 13267(c) states, in part:

In conducting an investigation pursuant to subdivision (a), the regional board may inspect the facilities of any person to ascertain whether the purposes of this division are being met and waste discharge requirements are being complied with.

The Standard Provisions and Reporting Requirements of this Order require that all Dischargers allow State and Regional Water Board staff to inspect the ASR facility and related records.

46. Domestic water quality monitoring requirements for public water systems are contained in the California Code of Regulations, title 22, chapter 15. Monitoring requirements are based on the number of connections, water source(s), historic water quality data, vulnerability to degradation by pollutants, and constituents of concern. Because ASR projects can change groundwater quality, additional monitoring may be appropriate.

47. California Health and Safety Code section 116470(a) states in part:

As a condition of its operating permit, every public water system shall annually prepare a consumer confidence report and mail or deliver a copy of that report to each customer. The report shall include all of the following information:

- (1) The source of the water purveyed by the public water system.*
- (2) A brief and plainly worded definition of the terms "maximum contaminant level," "primary drinking water standard," and "public health goal."*
- (3) If any regulated contaminant is detected in public drinking water supplied by the system during the past year, the report shall include all of the following information:*
 - (A) The level of the contaminant found in the drinking water, and the corresponding public health goal and primary drinking water standard for that contaminant.*
 - (B) Any violations of the primary drinking water standard that have occurred as a result of the presence of the contaminant in the drinking water and a brief and plainly worded statement of health concerns that resulted in the regulation of that contaminant.*
- (4) Information on the levels of unregulated contaminants, if any, for which monitoring is required pursuant to state or federal law or regulation.*
- (5) Disclosure of any variances or exemptions from primary drinking water standards granted to the system and the basis therefore.*

The MRP of this Order requires that all Dischargers submit a copy of these reports to the Regional Water Board.

48. Health and Safety Code section 116470(b) states in part:

On or before July 1, 1998, and every three years thereafter, public water systems serving more than 10,000 service connections that detect one or more contaminants in drinking water that exceed the applicable public health goal, shall prepare a brief written report in plain language that does all of the following:

- (1) Identifies each contaminant detected in drinking water that exceeds the applicable public health goal.*
- (2) Discloses the numerical public health risk, determined by the office, associated with the maximum contaminant level for each contaminant identified in paragraph (1) and the numerical public health risk determined by the office associated with the public health goal for that contaminant.*

- (3) Identifies the category of risk to public health, including, but not limited to, carcinogenic, mutagenic, teratogenic, and acute toxicity, associated with exposure to the contaminant in drinking water, and includes a brief plainly worded description of these terms.*
- (4) Describes the best available technology, if any is then available on a commercial basis, to remove the contaminant or reduce the concentration of the contaminant. The public water system may, solely at its own discretion, briefly describe actions that have been taken on its own, or by other entities, to prevent the introduction of the contaminant into drinking water supplies.*
- (5) Estimates the aggregate cost and the cost per customer of utilizing the technology described in paragraph (4), if any, to reduce the concentration of that contaminant in drinking water to a level at or below the public health goal.*
- (6) Briefly describes what action, if any, the local water purveyor intends to take to reduce the concentration of the contaminant in public drinking water supplies and the basis for that decision.*

The MRP of this Order requires that all Dischargers submit a copy of these reports to the Regional Water Board.

49. This Order grants no water rights to the Permittee. This Order also does not grant a Permittee any rights to use water storage space in the relevant aquifer. The Permittee must have valid legal rights, such as a water-right permit or license, water-service contract, or other rights to obtain water for underground storage under this Order.
50. This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. sections 1531 to 1544).

CALIFORNIA ENVIRONMENTAL QUALITY ACT

51. On September 19, 2012, the State Water Board adopted a Mitigated Negative Declaration for the activities described in the foregoing Findings in accordance with the provisions of the California Environmental Quality Act (CEQA; Public Resources Code, section 21100 et. seq.) and the CEQA Guidelines. Potentially significant impacts to water quality will be reduced to a less than significant level through the requirements of this Order; therefore the project will have no significant impact on the environment.
52. To mitigate or avoid potentially significant water quality impacts, this Order:
 - a. Limits applicability to ASR projects that inject water that has been treated pursuant to a CDPH domestic water supply permit and that meets drinking water standards.
 - b. Requires a project-level analysis of potentially significant environmental impacts pursuant to CEQA prior to issuance of a Notice of Applicability granting coverage under this Order.
 - c. Prohibits exceedance of any water quality objective.
 - d. Establishes an MRP to determine whether the discharge is in compliance with the applicable Basin Plan.

53. Applicants are required to submit documentation of compliance with CEQA by a lead agency that evaluates the project-specific environmental impacts. The Regional Water Board will review the CEQA document and make any findings as required by CEQA regulations prior to the issuance of a Notice of Applicability. If the Applicant is a private entity, the Regional Water Board may be the lead agency for the purpose of CEQA and the Applicant may be required to prepare the draft CEQA document and pay fees associated with filing the documents, compliance with public notice requirements, and review by the Department of Fish and Game.
54. If an Applicant elects to perform a pilot test, that activity may be exempted from the provisions of CEQA, by a categorical exemption under CEQA Guidelines section 15306. Alternatively, an Applicant can perform a pilot test-specific CEQA evaluation.
55. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

PUBLIC MEETING

56. All the above and the supplemental information and details in the attached Information Sheet, incorporated by reference herein, were considered in establishing the following conditions of discharge.
57. The State Water Board has notified all known interested agencies and persons of its intent to adopt the Order for ASR projects that utilize drinking water and has provided all known interested agencies and persons with an opportunity for a public hearing and an opportunity to submit comments.
58. The State Water Board, in a public meeting on September 19, 2012, heard and considered all comments pertaining to this Order.

IT IS HEREBY ORDERED that pursuant to Section 13263 and 13267 of the Water Code, the Permittee, its agents, successors, and assigns, in order to meet the provisions contained in division 7 of the Water Code and regulations adopted thereunder, shall comply with the following:

Note: Other prohibitions, conditions, definitions, and the method of determining compliance are contained in Attachment B, "General Order for ASR Projects, Standard Provisions" attached hereto and is made part of this Order by reference.

A. ELIGIBILITY REQUIREMENTS

Only projects that will meet all of the following requirements may receive coverage under this Order:

1. Water injected into the aquifers must be water that has been treated to meet all drinking water standards consistent with the requirements of a CDPH domestic water supply permit.
2. All injection wells must be constructed in compliance with the requirements of the California Well Standards by a licensed well driller under the supervision of a California licensed engineer or geologist.
3. For all injection wells, the well construction details and lithologic log must be documented and the well construction (well screen, filter pack, annular seal) must limit the injected water to the specified aquifer target zones.
4. The project must not be prohibited by local agency ordinance, prohibition, or other applicable law or regulation.
5. The project must be consistent with the CEQA project description provided in this Order and any project level CEQA environmental impact evaluation has been completed.

B. PROHIBITIONS

1. Injection of water into the aquifer storage zone contrary to the description provided in the NOI, the NOA, the requirements set forth in this Order, or any mitigation measures adopted by the CEQA lead agency is prohibited.
2. Operation of an ASR project that results in a condition of pollution or nuisance (as defined in Water Code section 13050) is prohibited.
3. Injection of water that has not been fully treated and disinfected prior to injection in compliance with an applicable CDPH domestic water supply permit is prohibited.
4. Operation of a pilot test shall not extend beyond 24 months from the date the pilot test Notice of Applicability is issued.

C. SPECIFICATIONS

1. If constituents of concern are detected in groundwater samples related to operation of an ASR project, and the concentrations are higher than the permissible concentration listed in the NOA, the Permittee shall immediately notify the Regional Water Board and implement the Non-Compliance Response Plan as described in Provision F.1.c.
2. The Permittee shall design, operate and maintain all systems and equipment to ensure continuous compliance with the requirements of this Order. Such systems and equipment may include additional treatment systems as necessary.
3. If source water quality is variable through the year, the Permittee shall operate the ASR project to optimize use of better quality water during injection cycles. The Permittee shall implement controls such as fences and alarm systems as necessary to prevent unauthorized access to the ASR facilities.
4. The Permittee shall develop, maintain, and implement an Operation and Maintenance (O&M) Plan to ensure that operations personnel are familiar with the ASR system and the requirements of this Order, and have access to specific procedures to immediately evaluate and address threatened or actual violations of this Order.
5. The Executive Officer or the Regional Water Board may terminate Notice of Applicability for any ASR project at any time for cause pursuant to Attachment B.
6. Discharge of water from well development, pipeline flushing, or other maintenance activities shall be discharged under appropriate discharge permits. This Order does not authorize such discharges.

D. APPLICATION FOR COVERAGE/TERMINATION OF COVERAGE

1. To obtain coverage under this Order, an Applicant must submit to the applicable Regional Water Board an NOI that consists of the following:
 - a. An application fee for a threat and complexity of "3-C" as described in California Code of Regulations, title 23, section 2200. The fee shall be submitted in the form of a check made payable to the *State Water Board*. The current fee schedule is available on the Internet at:
http://www.waterboards.ca.gov/resources/fees/docs/fy1112fee_schdl_wdr.pdf
 - b. A completed Form 200. The form is available on the Internet at:
http://www.waterboards.ca.gov/publications_forms/forms/docs/form200.pdf
 - c. A technical report, prepared under the supervision of a California licensed engineer or geologist that addresses the items listed in Attachment C, which is attached hereto and is made part of this Order by reference. Please submit one of the following:

- i. If a pilot test is planned for an ASR project, at a minimum the technical report shall address the pilot test information requirements listed in Attachment C. It is recognized that some information will not be available until the pilot test is performed, but the report should be as complete as possible based on the available information. The water quality characterization shall include all the analytes listed in MRP Order WQ 2012-0010, which is attached hereto and is made part of this Order by reference, or in a revised MRP issued by the Executive Officer.
 - ii. If a pilot test has been completed, submit a technical addendum that describes the pilot test, presents the data collected, and completes or revises the technical report and antidegradation analysis as appropriate.
 - iii. If a pilot test is not planned, then adequate information to answer all the items listed on Attachment C should be available and a complete technical report shall be submitted.
 - d. Documentation that the ASR project injection wells are registered with the US Environmental Protection Agency's Underground Injection Control Program. Information is available on the internet at:

<http://www.epa.gov/region9/water/groundwater/injection-wells-register.html>
2. To authorize a pilot test or an ASR project, the Executive Officer will issue an NOA for either the pilot test or the ASR project as described below:
 - a. If a pilot test is proposed and the Executive Officer determines the pilot test NOI is consistent with the requirements of the Order, the Executive Officer will issue an NOA that will, at a minimum, contain the following:
 - i. A statement that the pilot test described in the NOI is consistent with the Order.
 - ii. A description of the pilot test, including an inventory of injection/extraction wells, the injection/extraction target zones, and monitoring wells with a description of the zones that will be monitored.
 - iii. If a CEQA categorical exemption for the activity is not used, the NOA will include requirements to implement any water quality related mitigation measures included in a project specific CEQA document.
 - iv. Details of injection source water, water quality, and any applicable limits to the injection schedule and volume of injected water.
 - v. An MRP that lists the constituents to be monitored, the monitoring frequency, and the groundwater monitoring network. MRP Order WQ 2012-0010 is part of this Order. However, an Executive Officer may elect to issue a different MRP that supersedes MRP Order WQ 2012-0010. The monitoring network shall be installed prior to initiating the pilot test.
 - vi. Adequate scaled figures and maps to describe the ASR project components and monitoring well locations.
 - b. For a pilot test technical addendum, or an ASR project without a pilot test, if the Executive Officer determines the NOI is complete and the project is consistent with the requirements of the Order, the Executive Officer will issue an NOA that will, at a minimum, contain the following:
 - i. A statement that the ASR project, as defined by the NOI is consistent with the Order.
 - ii. A description of the ASR project including an inventory of injection/ extraction wells, the injection/extraction target zones, and monitoring wells with a description of the zones monitored.

- iii. Requirements to implement any water quality related mitigation measures included in the project specific CEQA document.
 - iv. Details of injection source water, water quality, and any applicable limits to the injection schedule and volume of injected water.
 - v. An MRP that lists the constituents to be monitored, the monitoring frequency, and the groundwater monitoring network. MRP Order WQ 2012-0010 is part of this Order. However, an Executive Officer may elect to issue a different MRP that supersedes MRP Order WQ 2012-0010. If any part of the monitoring network requires installation, it shall be installed prior to injecting water.
 - vi. Adequate scaled figures and maps to describe the ASR project components and monitoring well locations.
3. If a Permittee permanently ceases activity at an ASR project, termination of the Order coverage shall be requested in writing. Upon submission of the request, authorization to continue storing water under the Order is immediately terminated. The Executive Officer will issue a Notice of Termination within **60 days** of termination request.

E. INJECTED WATER AND GROUNDWATER LIMITATIONS

1. Water to be injected shall comply with both primary and secondary MCLs at each point of injection.
2. If pre-ASR project conditions in the aquifer storage zone(s) exceed any applicable water quality objectives, the quality of the injected water may not exceed those water quality objectives.
3. Operation of an ASR project shall not cause groundwater to exceed any of the following:
 - a. Primary or Secondary MCLs. Injected water shall comply with any new MCL on the date that the new MCL applies to the drinking water system.
 - b. Numeric water quality objectives in the Basin Plan for beneficial uses within the ASR project's area of hydrologic influence.
 - c. Any Basin Plan water quality objective for the beneficial uses of groundwater.

F. PROVISIONS

1. All of the following reports shall be submitted pursuant to Water Code section 13267, and prepared by a California registered professional as described in Provision No. F.2.
 - a. Within **90 days** after issuance of the NOA, the Permittee shall submit a Sampling and Analysis Plan – A description of sampling methods, sample preservation, sample containers, recordkeeping, quality control/quality assurance procedures, chain-of-custody forms, etc., in compliance with the MRP.
 - b. Within **30 days** after completion of any new injection well, the Permittee shall submit a copy of the Class V injection well permit by rule notification and registration documentation that has been submitted to the United States Environmental Protection Agency.
 - c. Within **90 days** after discovering non-compliance with this Order, and prior to re-initiating injection, the Permittee shall submit a Non-Compliance Response Plan. The Non-Compliance Response Plan shall describe the response to conditions of non-compliance with constituents of concern listed in the NOA. The Non-Compliance Response Plan shall include the following:
 - i. A list of all constituents of concern and the concentrations that exceeded the limits presented in the NOA.

- ii. The status of the ASR project (e.g., describe the current injection and extraction status).
 - iii. Corrective measures underway or proposed to address the exceedance and to prevent recurrence.
 - d. Within **30 days** after the date of discovery, the Permittee shall report to the Regional Water Board:
 - i. Any toxic chemical release data it reports to the State Emergency Response Commission pursuant to Section 313 of the "Emergency Planning and Community Right to Know Act of 1986."
 - ii. Any violation of the domestic water supply permit requiring notification of CDPH.
2. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and/or geology, shall be prepared under the direction of appropriately qualified professional(s).
3. The Permittee shall comply with MRP Order WQ 2012-0010 or a project-specific MRP issued by a Regional Water Board Executive Officer with the NOA, and any revisions thereto as ordered by the Executive Officer.
4. The Permittee shall comply with the Standard Provisions and Reporting Requirements for General Waste Discharge Requirements for ASR Projects, contained in Attachment B. This attachment and its individual paragraphs are referenced as "Standard Provision(s)."
5. Any person signing an NOI, monitoring report, or other technical report makes the following certification, whether written or implied:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.
6. Before making a material change in an ASR project, which operates under a NOA, the Permittee shall submit an NOI to the Regional Water Board. A material change includes, but is not limited to, the following:
 - a. An increase in the amount of water injected so that the aquifer storage zone becomes larger than described in the NOA or CEQA evaluation.
 - b. A change in the raw water source, quality, or timing of injection.
 - c. A change in the injection target zone.
 - d. A change in raw water treatment technique (e.g. disinfection method change) that results in revision of the domestic water supply permit by CDPH.
7. The Permittee must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of the NOA.

8. The Permittee must pay an annual fee in accordance with the fee schedule in Title 23, section 2200 and annual fee invoices issued by the State Water Board. Annual fees are based on Threat to Water Quality and Complexity ratings. The rating for projects regulated under this Order is 3C. The fee is subject to review and revision by the State Water Board. Annual Fee invoices are issued each year by the State Water Board for the state fiscal year (July 1 through June 30).
9. A copy of this Order shall be kept at the ASR project site for reference by operating personnel. Key operating and site management personnel shall be familiar with its contents.
10. This Order grants no property rights of any sort or any exclusive privileges. In addition, this Order grants no legal rights to divert, extract, and/or use groundwater or surface water or to store water in an aquifer.
11. In the event of any change in control or ownership of the ASR project facilities owned or controlled by the Permittee, the Permittee shall notify the succeeding owner of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Regional Water Board.
12. If the Permittee becomes aware that it failed to submit any relevant information or submitted incorrect information any document to the Regional Water Board, it shall submit the required or corrective information to that Regional Water Board within **30 days**.
13. The State Water Board will review this Order periodically and will revise requirements when necessary.

CERTIFICATION


I, Jeanine Townsend, Clerk to the Board, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the State Water Board, on September 19, 2012.

AYE: Chairman Charles R. Hoppin
Vice Chair Frances Spivy-Weber
Board Member Tam M. Doduc
Board Member Steven Moore
Board Member Felicia Marcus

NAY: None

ABSENT: None

ABSTAIN: None



Jeanine Townsend
Clerk to the Board

ATTACHMENT A
DEFINITIONS AND ACRONYMS
GENERAL WASTE DISCHARGE REQUIREMENTS FOR ASR PROJECTS
THAT INJECT DRINKING WATER INTO GROUNDWATER

Term	Definition (as used in this Order)
Adsorption	The attraction and adhesion of a layer of ions from an aqueous solution to the solid mineral surfaces with which it is in contact.
Applicant	The entity, whether a person, private company, or public agency, that applies for coverage under this Order. Upon issuance of a Notice of Applicability by the Executive Officer of the applicable Regional Water Board, the Applicant becomes the "Permittee".
Aquifer	Rock or sediment in a formation, group of formations, or part of a formation which is saturated and sufficiently permeable to transmit economic quantities of water to wells and springs.
Aquifer Storage and Recovery (ASR)	Aquifer storage and recovery involves the storage of water in a suitable aquifer through a well during times when water is available, and recovery of the water when it is needed.
Aquifer Storage Zone	Defined by the horizontal and vertical extent of injected water. The aquifer storage zone will generally extend farther away from the injection well(s) depending upon stratigraphic variations in hydraulic conductivity, groundwater gradient, flow direction, and operation of extraction well(s).
Area of Hydrologic Influence	The area of hydrologic influence is defined as the area of the aquifer which is affected chemically or physically by the ASR project (the aquifer storage zone plus any additional areas affected by the ASR project).
BPTC	Best practicable treatment or control
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
Composite Sample	A composite sample is a combination of individual samples collected over the specified sampling period either: (1) at equal time intervals with a maximum interval of one hour, or (2) at varying time intervals so that each sample represents an equal portion of cumulative flow.
Conductivity (Hydraulic Conductivity)	A mathematical factor that describes the rate at which water can move through a permeable medium. Higher values allow more rapid water movement.

Term	Definition (as used in this Order)
Conjunctive Management (Use)	Conjunctive management of water supplies refers to the coordinated and planned use and management of both surface water and groundwater resources to maximize the availability and reliability of water supplies in a region.
Disinfection Byproducts (DBPs)	Disinfection byproducts are chemical compounds that are formed when disinfectants used in water treatment plants react with bromide and/or natural organic matter (e.g., decaying vegetation) present in the source water or groundwater.
Domestic Water Supply Permit	A domestic water supply permit is issued by the California Department of Public Health for operation of a public water system that serves greater than 200 connections.
DWR	California Department of Water Resources
General Order (Order)	General Waste Discharge Requirements Order
Grab Sample	A grab sample is any sample collected over a period less than 15 minutes.
Groundwater	The water contained in interconnected pores of an aquifer that can flow freely into wells (phreatic water).
Groundwater Basin	An alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and a definable bottom.
Injected Water (Injectate)	Injected water is potable water treated pursuant to the requirements of a CDPH domestic water supply permit which is injected into an aquifer through an injection well. Once placed in the aquifer, injected water is groundwater.
Injection Target Zone	The depth interval in which water is to be stored.
Injection Well	A bored, drilled, or driven shaft, dug pit, or hole in the ground into which waste or fluid is discharged, and any associated subsurface appurtenances, and the depth of which is greater than the circumference of the shaft, pit, or hole.
MCL	Maximum Contaminant Level
Monitoring Well	A well that is used to measure groundwater elevation and collect groundwater samples. A monitoring well is generally constructed with a relatively short (less than 20 feet) screen interval.
NOA	Notice of Applicability
NOI	Notice of Intent

Term	Definition (as used in this Order)
O&M	Operation and Maintenance
Overdraft	A condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years that approximate average conditions plus any temporary surplus. Overdraft may cause land subsidence and damage to the environment and increase the energy cost of pumping groundwater.
Permittee	The entity, whether a person, private company, or public agency, that performs the activities regulated under this Order and is responsible for compliance with this Order. The Notice of Applicability issued by the Executive Officer of the applicable Regional Water Board will specify the name(s) of the Permittee(s).
Public Drinking Water System (Public Water System)	<p>A public drinking water system (public water system) means a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. A public water system includes the following:</p> <ol style="list-style-type: none">(1) Any collection, treatment, storage, and distribution facilities under control of the operator of the system which are used primarily in connection with the system.(2) Any collection or pretreatment storage facilities not under the control of the operator that are used primarily in connection with the system.(3) Any water system that treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption. <p>(reference: California Health and Safety Code section 116275(h))</p>
Recharge	<p>Groundwater recharge is the mechanism by which surface water moves from the land surface, through the topsoil and subsurface, and into the aquifer, or through injection of water directly into an aquifer by wells.</p> <p>Groundwater recharge can be either natural or managed. Natural recharge occurs from precipitation falling on the land surface, from water stored in lakes, and from streams carrying storm runoff.</p> <p>Managed recharge occurs when water is placed into constructed recharge or spreading ponds or basins, or when water is injected into the subsurface by wells. Managed recharge is also known as artificial, intentional, or induced recharge. Two widely used</p>

Term	Definition (as used in this Order)
	methods for managed groundwater recharge are recharge basins and injection wells.
Salt Water Intrusion	The movement of salt water into an aquifer formally occupied by fresh water.
Screen (Well Screen)	An engineered pipe equipped with slots, holes, continuous wire-wrap, or similar construction that allows groundwater to enter the well (extraction), or injected water to exit the well (injection).
USEPA	United States Environmental Protection Agency
Water Quality Objective (WQO)	The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of pollution or nuisance within a specific area.

ATTACHMENT B
STANDARD PROVISIONS AND REPORTING REQUIREMENTS
GENERAL WASTE DISCHARGE REQUIREMENTS FOR ASR PROJECTS
THAT INJECT DRINKING WATER INTO GROUNDWATER

A. General Provisions:

1. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, or protect the Permittee from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.
2. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.
3. After notice and opportunity for a hearing, this Order may be terminated or modified for cause, including, but not limited to:
 - a. Violation of any term or condition contained in this Order;
 - b. Obtaining this Order by misrepresentation, or failure to disclose fully all relevant facts;
 - c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge;
 - d. A material change in the character, location, or volume of discharge.
4. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Regional Water Board. Data on ASR equipment, water quality, geology, and hydrogeology shall not be considered confidential.
5. The Permittee shall take all reasonable steps to minimize any adverse impact to the waters of the state resulting from noncompliance with this Order. Such steps shall include, but are not limited to, accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance.
6. The Permittee shall maintain in good working order and operation any facility, control system, or monitoring device installed to achieve compliance with the Order.
7. The Permittee shall permit representatives of the Regional Water Board and the State Water Board, upon presentations of credentials, to:
 - a. Enter ASR project premises and facilities in which any records are kept,
 - b. Copy any records required to be kept under terms and conditions of this Order,
 - c. Inspect at reasonable hours, monitoring equipment required by this Order, and
 - d. Sample, photograph and video record any ASR project related equipment, chemical storage area, or monitoring device.
8. For any electrically operated equipment at the site, the failure of which would cause a violation of this Order, the Permittee shall employ safeguards to prevent violations. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means.
9. The fact that it would have been necessary to halt or reduce the permitted activity in Order to maintain compliance with this Order shall not be a defense for the Permittee's violations of the Order.
10. Neither the treatment nor the discharge shall create a condition of nuisance or pollution as defined by the California Water Code, section 13050.

B. General Reporting Requirements:

1. In the event the Permittee does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the Permittee shall notify the Regional Water Board that issued the NOA by telephone as soon as it or its agents have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing within **two weeks**. The written notification shall state the nature, time and cause of noncompliance, and shall include a schedule for corrective actions. (Note: Current phone numbers for all Regional Water Board offices may be found on the internet at:

http://www.waterboards.ca.gov/about_us/contact_us/docs/rwqcb_directory.pdf

2. All reports shall be signed by persons identified below:
 - a. For a corporation: by a principal executive officer of at least the level of senior vice-president.
 - b. For a partnership or sole proprietorship: by a general partner or the proprietor.
 - c. For a municipality, state, federal or other public agency: by either a principal executive officer or ranking elected or appointed official.
 - d. A duly authorized representative of a person designated in 2a, 2b or 2c of this requirement if:
 - i. The authorization is made in writing by a person described in 2a, 2b or 2c of this provision;
 - ii. the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and
 - iii. the written authorization is submitted to the Regional Water Board.
3. Technical and monitoring reports specified in this Order are required pursuant to Water Code section 13267. Failing to furnish the reports by the specified deadlines and falsifying information in the reports may result in assessment of civil liabilities against the Permittee.
4. The Permittee shall mail a copy of each monitoring report and any other reports required by this Order to the Regional Water Board that issued the NOA. Note: Current addresses for Regional Water Boards may be found on the internet at:

http://www.waterboards.ca.gov/about_us/contact_us/docs/rwqcb_directory.pdf

C. Provisions for Monitoring:

1. All analyses shall be made in accordance with the latest edition of:
 - a. *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA 600 Series) and
 - b. *Test Methods for Evaluating Solid Waste* (SW 846-latest edition). The test method may be modified subject to application and approval of alternate test procedures under the Code of Federal Regulations (40 CFR 136).
2. Chemical, bacteriological, and bioassay analysis shall be conducted at a laboratory certified for such analyses by the California Department of Public Health. In the event a certified laboratory is not available to the Permittee, analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by Regional Water Board staff. The Quality Assurance-Quality Control Program must conform to EPA guidelines or to procedures approved by the Regional Water Board.

3. Unless otherwise specified, all metals shall be reported as total metals.
4. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of three years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board Executive Officer.
 - a. Record of monitoring information shall include:
 - i. The date, exact place, and time of sampling or measurements,
 - ii. The individual(s) who performed the sampling of the measurements,
 - iii. The date(s) analyses were performed,
 - iv. The individual(s) who performed the analyses,
 - v. The laboratory which performed the analysis,
 - vi. The analytical techniques or methods used, and
 - vii. The results of such analyses.
5. All monitoring instruments and devices used by the Permittee to fulfill the prescribed monitoring program shall be properly maintained and calibrated at least yearly to ensure their continued accuracy.
6. The Permittee shall maintain a written sampling program sufficient to assure compliance with the terms of this Order. Anyone performing sampling on behalf of the Permittee shall be familiar with the sampling plan.
7. The Permittee shall construct all monitoring wells to meet or exceed the standards stated in the State Department of Water Resources *Bulletins 74-81, 74-90*, and subsequent revisions, and shall comply with the reporting provisions for wells required by Water Code sections 13750 et seq.
8. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.

ATTACHMENT C
NOTICE OF INTENT TECHNICAL REPORT REQUIREMENTS
GENERAL WASTE DISCHARGE REQUIREMENTS FOR ASR PROJECTS
THAT INJECT DRINKING WATER INTO GROUNDWATER

A technical report, prepared under the supervision of a California licensed engineer or geologist, shall include the following and any additional information needed to describe and characterize the ASR project and anticipated effects on water quality. It is anticipated that information availability for different projects, will vary; some may be in areas with adequate study and/or past ASR project operation, and others may be in areas with little available information.

The technical report may address:

- A. A pilot test to collect additional information for the purpose of preparing a technical addendum to complete an NOI.
- B. A technical addendum describing the results of the pilot test and completing the information needs of the NOI.
- C. An ASR project if adequate information on the project is known from a nearby ASR project, relevant data from the proposed project area, or operation of the ASR project itself.

At a minimum, the technical report shall address the following:

- 1. The Applicant's statement of intent to comply with the terms and conditions of this Order.
- 2. A copy of the CDPH domestic water supply permit for the injected source water.
- 3. A project description that includes:
 - a. A map that identifies all of the wells that will be used for injection/extraction and/or monitoring.
 - b. The target aquifer zones into which water will be injected. Provide available information on the aquifer thickness, the presence of low or high permeability zones, and groundwater elevations.
 - c. The area of hydrologic influence of the proposed project. This information shall be supported by analysis of existing data or a numerical model.
 - d. The types and areal extent of land uses within that area of influence, including locations of agricultural, industrial, municipal, and domestic water supply wells within the area of hydrologic influence.
 - e. The location, source, and areal extent of known or probable contaminants latent in or above the receiving formation, including a history of any past or ongoing remedial actions in the vicinity. Include an analysis of the potential for operation of an ASR project to impact remedial activities, mobilize contaminants, or cause groundwater to come into contact with contaminated soil.
 - f. A description of regional groundwater conditions and non-ASR activities that may influence groundwater quality in the project vicinity. This description should include a discussion of groundwater quality trends that may complicate future interpretation of monitoring data presented in the monitoring reports.
 - g. If a pilot test will be performed, a schedule for the test. Note that operation of a pilot test shall not extend beyond 24 months from the date the pilot test NOA is issued.
- 4. Well construction details and soil boring logs for existing injection/extraction, and monitoring wells. For planned wells, provide the proposed well construction details. All wells shall be constructed in conformance with the California Well Standards.
- 5. For any existing injection wells, a copy of the Class V injection well permit by rule notification and registration documentation that has been submitted to the United States Environmental Protection Agency.

6. A project-specific list of constituents of concern including the following:
 - a. Primary or Secondary MCLs.
 - b. Numeric water quality objectives in the Basin Plan for beneficial uses associated with the land uses within the ASR project's area of hydrologic influence.
 - c. Any Basin Plan water quality objective for the beneficial uses of groundwater.
7. Any proposed changes to the attached MRP technical justification for the proposed changes based on site-specific conditions.
8. Documentation of CEQA compliance, including a site-specific analysis of any impacts that the proposed project would have on beneficial uses of groundwater in the relevant area.
 - a. If a pilot test will be performed:
 - i. The activity may be eligible for exemption from the provisions of the CEQA, by a categorical exemption (CEQA Guidelines section 15306). Alternatively, a Permittee can perform a pilot test specific CEQA evaluation.
 - b. If a pilot test will not be performed:
 - i. The CEQA document shall address all items in the initial study not addressed in the negative declaration adopted for the General Order.
 - ii. Documentation that the Applicant has analyzed potential impacts the ASR project might have on beneficial uses of groundwater within the project's area of hydrologic influence and has solicited comments from the Regional Water Board that will act as a responsible agency pursuant to CEQA Guidelines section 15306.
9. A demonstration that the project will not violate the Injected Water or Groundwater Limitations of the General Order. At a minimum, the analysis shall address the constituents listed in Findings 24 through 28.

If a pilot test will be performed, the available information may be limited. The potential for such violation shall be determined by calculation and/or numeric modeling based on the available data.

If a pilot test will not be performed, adequate information should be available to determine if the Injected Water and Groundwater Limitations would be violated. The determination shall be supported by data collected at the ASR project (from the ASR well, technical analysis based on groundwater sampling and other relevant data from the proposed project area or a nearby ASR well constructed and operated similarly).

All conclusions must be supported by data, all calculation methods justified, and calculations provided. Appropriately annotated spreadsheets or software reports are acceptable in lieu of hand calculations. The following information is required:

- a. Groundwater Degradation Assessment
 - i. List of constituents of concern: average and range.
 - ii. Any basin plan water quality objective for the beneficial uses of groundwater.
 - iii. List of water resource constituents that may be affected by the discharge: average and range.
 - iv. A comparison of injected water quality to pre-ASR project activity groundwater quality in the aquifer storage zone.
 - v. Forecast the extent of degradation that will result from the project. The forecast must show no exceedances of water quality objectives in groundwater.

**STATE WATER RESOURCES CONTROL BOARD
MONITORING AND REPORTING PROGRAM – ORDER WQ 2012-0010
GENERAL WASTE DISCHARGE REQUIREMENTS FOR
AQUIFER STORAGE AND RECOVERY PROJECTS
THAT INJECT DRINKING WATER INTO GROUNDWATER**

This Monitoring and Reporting Program (MRP) allows determination of the potential for groundwater degradation and incorporates requirements for monitoring of injected water and groundwater. This MRP is issued pursuant to Water Code section 13267. The Permittee shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer.

All samples shall be representative of the volume and nature of the monitored medium. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. Injection flow monitoring shall be conducted continuously using a flow meter and shall be reported in gallons per day and cumulative totals.

Field test instruments (such as those used to monitor pH) may be used provided that:

1. The operator is trained in the proper use of the instrument;
2. The instruments are field calibrated prior to each use;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the “Reporting” section of this MRP.

INJECTION WELL MONITORING

Injection wells shall be monitored when water is being injected into the aquifer. Monitoring of the injection wells shall include, at a minimum, the following

<u>Constituent/Parameter</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Well Operational Status ¹	N/A	Recorded	Daily	Quarterly
Daily Average Injection Rate	gpd ²	Meter	Continuous	Quarterly
Injected Water, cumulative total for year to date	ac•ft/yr	Meter	Continuous	Quarterly
Extracted Water, cumulative total for year to date	ac•ft/yr	Meter	Continuous	Quarterly

¹ Well Operational Status shall be reported for each well associated with the ASR project. Injection activity shall be recorded on a daily basis.

² Alternative units may be used to report the data.

INJECTED WATER MONITORING

Injected water is limited to potable water that the Permittee produces through its CDPH permitted domestic water supply permit. Section 116470 of the California Health and Safety Code requires:

1. An Annual Water Quality Report (AWQR). The AWQR characterizes the injected water.
2. Public water systems that serve more than 10,000 service connections and that detect one or more contaminants in drinking water that exceed the applicable public health goal, are required to prepare a report that addresses the contaminant issue.

Both of the reports shall be submitted as part of the Annual Report.

Additionally, potable water used as injected water shall be monitored during periods when injection is occurring. Monitoring of the injected water shall include at least the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u> ^{1,2}	<u>Reporting Frequency</u> ¹
pH	pH units	Grab	Quarterly	Quarterly
Arsenic	mg/L	Grab	Quarterly	Quarterly
Iron	mg/L	Grab	Quarterly	Quarterly
Manganese	mg/L	Grab	Quarterly	Quarterly
Nitrate (as Nitrogen)	mg/L	Grab	Quarterly	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly	Quarterly

¹ The sampling and reporting frequency shall be quarterly for one year, commencing on the first date of injection under this Order. Thereafter, sampling is not required.

² Injected water sampling is not required for any quarter during which injection did not occur.

EXTRACTION WELL MONITORING

The following extraction wells shall be monitored if water was injected in the previous calendar year:

1. An extraction well used for injection in the previous calendar year.
2. An extraction well that is pumping a substantial amount of previously injected water.

Monitoring of the extraction wells shall include at least the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u>	<u>Reporting Frequency</u>
Well Activity ¹	N/A	Recorded	Daily	Quarterly
Average Pumping Rate	gpd ²	Meter	Continuous	Quarterly
Extracted Water/Year ³	ac•ft/yr	Meter	Continuous	Quarterly
Electrical Conductivity	umhos/cm	Grab	Quarterly ^{4,5}	Quarterly ⁴
pH	pH units	Grab	Quarterly ^{4,5}	Quarterly ⁴
Arsenic	mg/L	Grab	Quarterly ^{4,5}	Quarterly ⁴
Iron	mg/L	Grab	Quarterly ^{4,5}	Quarterly ⁴
Manganese	mg/L	Grab	Quarterly ^{4,5}	Quarterly ⁴
Nitrate (as Nitrogen)	mg/L	Grab	Quarterly ^{4,5}	Quarterly ⁴
Total Dissolved Solids	mg/L	Grab	Quarterly ^{4,5}	Quarterly ⁴

¹ Well Activity shall be reported for all wells associated with the ASR project. Injection/extraction activity shall be recorded on a daily basis.

² Alternative units may be used to report the data.

³ Extracted Water/Year represents the total amount of water extracted from a well for the calendar year.

⁴ The sampling and reporting frequency shall be quarterly for one year, commencing on the first date of injection under this Order. After four quarterly sampling events are completed, regardless of whether they occur during four consecutive quarters, further sampling is not required.

⁵ Extracted water sampling is not required for any quarter during which extraction did not occur.

GROUNDWATER AQUIFER MONITORING

If the Permittee proposes to monitor the target zone using wells other than those designated as injection or extraction wells, the monitoring wells shall be monitored in accordance with the following.

Prior to construction and/or sampling of any groundwater monitoring wells, the Permittee shall submit plans and specifications to the Regional Water Board for approval. Once installed, all new wells shall be added to the monitoring network and shall be sampled and analyzed according to the schedule presented below. All samples shall be collected using approved EPA methods. Groundwater elevations shall be calculated to determine groundwater gradient and direction of flow.

Prior to sampling, the groundwater elevations shall be measured and the wells shall be purged of at least three well volumes until temperature, pH, and electrical conductivity have stabilized. Use of low flow or passive sampling methods that do not require well purging are acceptable if described in the approved Sampling and Analysis Plan (SAP). Samples shall be filtered using a 0.45 micron filter if required by the SAP. Depth to groundwater shall be measured to the nearest 0.01 feet. Groundwater monitoring shall include, at a minimum, the following:

<u>Constituent</u>	<u>Units</u>	<u>Type of Sample</u>	<u>Sampling Frequency</u> ¹	<u>Reporting Frequency</u> ¹
Electrical Conductivity	umhos/cm	Grab	Quarterly	Quarterly
pH	pH units	Grab	Quarterly	Quarterly
Arsenic	mg/L	Grab	Quarterly	Quarterly
Iron	mg/L	Grab	Quarterly	Quarterly
Manganese	mg/L	Grab	Quarterly	Quarterly
Nitrogen (as Nitrate)	mg/L	Grab	Quarterly	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly	Quarterly

¹ The sampling and reporting frequency shall be quarterly for one year, commencing on the first date of injection under this Order. Thereafter, sampling is not required.

REPORTING

In reporting monitoring data, the Permittee shall arrange the data in tabular form so that the date, sample type (e.g., source water, injection well, extraction well, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with the Order, NOA, and Basin Plan. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

As required by the California Business and Professions Code sections 6735, 7835, and 7835.1, all groundwater monitoring reports shall be prepared under the supervision of a registered professional engineer or geologist and signed by the registered professional.

A. QUARTERLY MONITORING REPORT

For the first year commencing with the date of first injection under this Order, the Permittee shall establish a quarterly sampling schedule for injection wells, injected water, extraction wells, and groundwater monitoring such that samples are obtained as required. For subsequent years, quarterly

monitoring reports are not required. Quarterly monitoring reports shall be submitted to the Regional Water Board by the **1st day of the second month after the quarter** (e.g. the January-March quarter is due by May 1st) each year. The quarterly monitoring report shall include the following:

1. A discussion of the status (dates of injection, extraction, and idle time) for all extraction/injection wells associated with the ASR project.
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the injection, extraction, and groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the Order, the NOA, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each monitoring well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of casing volume; and total volume of water purged (if applicable, see notes on passive sampling in the Receiving Water section).
3. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any.
4. Results of groundwater monitoring (analytical results tabulated with reporting limits for non-detectable results).
5. A narrative discussion of the analytical results for all groundwater locations monitored including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports (as applicable).
6. A comparison of monitoring data to the groundwater limitations presented in the NOA and an explanation of any violation of those requirements. Any other violation of the Order with explanation and corrective action to prevent future violations.
7. Summary data tables of historical and current water table elevations and analytical results.
8. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum.
9. Copies of laboratory analytical report(s) for groundwater monitoring.

B. Annual Monitoring Report

For the first year commencing with the date of first injection under this Order, an annual monitoring report shall be prepared in addition to the quarterly monitoring reports. For subsequent years, only the annual monitoring report is required. The annual monitoring report shall be submitted to the Regional Water Board by **1 February** each year. The annual monitoring report shall include the following:


1. The annual water quality report and public health goal report published during the calendar year (if required by CDPH).
2. For the first year only, tabular and graphical summaries of all monitoring data collected during the year.
3. Projected ASR project activity for the next calendar year.
4. A discussion of compliance and corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the Order and/or the Notice of Applicability.

MONITORING AND REPORTING PROGRAM – ORDER WQ 2012-0010
GENERAL WASTE DISCHARGE REQUIREMENTS FOR AQUIFER STORAGE
AND RECOVERY PROJECTS THAT INJECT DRINKING WATER INTO GROUNDWATER

- 5 -

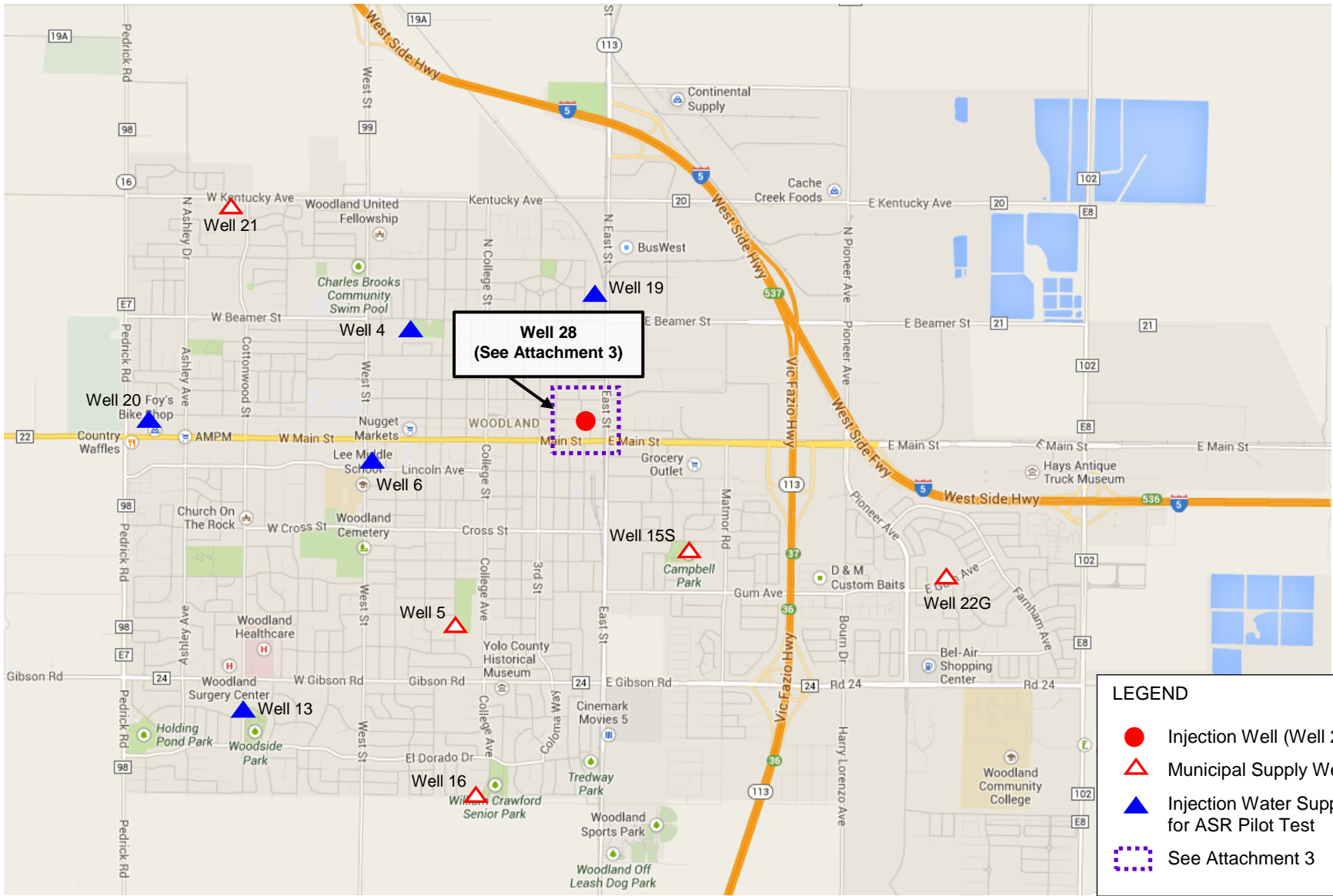
A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of violations found during the reporting period, and actions taken or planned for correcting noted violations. If the Permittee has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain a statement by the Permittee, or the Permittee's authorized agent, under penalty of perjury, that to the best of the signer's knowledge the report is true, accurate and complete.

The Permittee shall implement the above monitoring program as of the date of this Order.

Ordered by: 
Executive Officer

September 19, 2012
Date

September 19, 2012



LEGEND

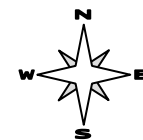
- Injection Well (Well 28)
- △ Municipal Supply Well
- ▲ Injection Water Supplied for ASR Pilot Test
- See Attachment 3

Drawing Reference:

Modified from Figure 1
 NOI Technical Memorandum
 West Yost Associates and Google Maps, 2013.

SITE LOCATION MAP

CITY OF WOODLAND
 AQUIFER STORAGE AND RECOVERY PROGRAM
 YOLO COUNTY



approx. scale
 1 in. = 2,440 ft.



Drawing Reference:
 Modified from Fig. 3
 NOI Technical Memorandum
 West Yost Associates and
 Google Maps, 2013.

WELL 28 SITE PLAN
 CITY OF WOODLAND
 AQUIFER STORAGE AND RECOVERY PROGRAM
 YOLO COUNTY

