UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

December 22, 2014

Jonathan Bishop
Chief Deputy Director
California State Water Resources Control Board
P.O. Box 100
Sacramento, CA 95812-0100

Steven Bohlen
Oil and Gas Supervisor
Division of Oil, Gas and Geothermal Resources
California Department of Conservation
801 K Street, MS 18-05
Sacramento, CA 95814-3530

Dear Messrs. Bishop and Bohlen:

I am writing to follow up on EPA's July 17, 2014 letter to CalEPA and the Resources Agency regarding the State's administration of the federal Safe Drinking Water Act Class II Oil and Gas Underground Injection Control program. In that letter, we described serious deficiencies in California's Class II program and inconsistencies with federal UIC regulations and State Program primacy requirements. The letter also set forth comprehensive requirements and deadlines for the State to address the deficiencies and bring the program into compliance. Enclosed is a summary of the status of the State's responses to the July 17 letter.

Our frequent dialogue and your efforts in the last six months have illuminated the breadth and complexity of the challenges and the substantial workload faced by the State agencies in overcoming the program's deficiencies. The State's submittals and conceptual plans presented since July are a step in the right direction. However, a more definitive overall plan of State actions and milestones is critically needed by February 6, 2015, to bring the Class II program into compliance by February 15, 2017.

This letter highlights the main areas of recent discussion and provides direction for the State's submittal of a program revision plan by February 6, 2015. This plan should comprehensively address the results of EPA's 2011 audit and 2012 review, and any other related reviews available to the State; assure

Where injection for enhanced oil recovery or waste disposal is contemplated to continue via existing wells into aquifers without approved exemptions, or into portions of aquifers that are outside the specific areas exempted, the State needs to establish a process, priorities, and a schedule to evaluate and address any potential threats from these operations, and for timely development of aquifer exemption proposals. The schedule should reflect environmental and public health priorities and provide adequate time for public participation and for EPA to finalize any needed decisions on these aquifers over the course of the next two years, and no later February 15, 2017. The State must take actions to prohibit injections after February 15, 2017 in any aquifers for which EPA has not approved an aquifer exemption.

Further, State approval of any new wells in aquifers without approved exemptions or into portions of aquifers that are outside the specific area exempted should be limited to State-approved projects in hydrocarbon producing zones, and should include considerations such as: information from drinking water well surveys and recent water quality data in the vicinity of the injection wells; use of formations with greater than 3000 ppm TDS (as we understand the State is analyzing the conditions, if any, under which continued injection into hydrocarbon producing zones with water quality of less than 3000 ppm TDS should be permitted); use of compliance orders or exercise of comparable State authorities to compel operators' submittal of complete applications for aquifer exemptions, and to prohibit injections after February 15, 2017 in any aquifers for which EPA has not approved an aquifer exemption; availability of alternate disposal options; public review processes undertaken; and concurrence by DOC/DOGGR and State/Regional Boards. It is important to note that the State's granting of an authorization for an injection well prior to obtaining EPA's approval of an aquifer exemption does not guarantee EPA's approval, which will be based on regulatory criteria.

Aquifer Exemption Process: Aquifer exemptions are an essential component of the State's Class II well permitting program. The State must determine which aquifers to exempt, provide for public participation and submit proposed exemptions to EPA for approval. The State must support the proposed exemptions with strong technical data and robust evaluations before presenting them to the public and EPA. Given the multiple state agencies involved, explicit internal processes and procedures are needed to guide the gathering and thorough evaluation of the necessary data, and seek EPA approval regarding the specific aquifer exemptions. EPA's Aquifer Exemption Checklist, provided previously and again as an enclosure with this letter, outlines the requirements for aquifer exemptions. We also provided several examples and met with State staff on November 3, 2014 to discuss required documentation.

Historic Aquifer Exemptions: In addition to wells known to the State to be injecting into zones that do not have aquifer exemptions, some existing wells inject into 11 aquifers which have been historically treated as exempt, though data provided by the State to EPA with its 1981 primacy application indicate that these 11 aquifers were non-hydrocarbon producing and contained water that was less than 3000 ppm TDS. Pursuant to Section II(H) of the Underground Injection Control Program Memorandum of Agreement Between California Division of Oil and Gas and the United States Environmental Protection Agency, EPA believes the collection and consideration of current data on the water quality of these aquifers will afford the State the opportunity to determine whether existing wells in these aquifers should continue to operate. The State's program revision plan should outline performance of specific activities by the State and operators on a schedule that will allow EPA to finalize any needed decisions on these aquifers by December 31, 2016. No new wells should be authorized in an aquifer prior to the conclusion of this process for that aquifer.

EPA is committed to working with the State under 40 CFR 145.33 to enable the State to maintain primacy for the Class II Oil and Gas Underground Injection Control program. Given the need to resolve the program's serious deficiencies in a timely matter, EPA has strengthened oversight and support of the program. As part of this investment, EPA is prepared to re-direct a portion of the State's anticipated FY15 federal UIC grant allocation of approximately $550,000 to specific efforts targeted to advance the State's Class II program toward compliance with the Safe Drinking Water Act. We will consult with you on work to be led by EPA with these funds.

We look forward to continuing our collective efforts towards achieving our shared commitment to protect California's underground sources of drinking water, and anticipate receiving your program revision plan by February 6, 2015.

Sincerely,

Jane Diamond
Director, Water Division

Enclosures
(1) Status of State Response to EPA's July 17, 2014 letter
(2) EPA Aquifer Exemption Checklist

Status of State Response to EPA's July 17, 2014 Letter

1. **Drinking Water Source Evaluation**

State to provide initial assessment of whether any existing and potential sources of drinking water are at risk of contamination from improper Class II injection (due Sept 15th).

Location of private and public water system wells that may be at risk due to permitted Class II injection ***SEPTEMBER 15 SWRCB SUBMITTAL OF INITIAL REVIEW COMPLETED. DOGGR review of records and list of all remaining injection wells that are discharging into non-exempt, non-hydrocarbon zones of aquifers planned for completion and submittal to the State Water Board by January 5, 2015. Depending on the number of wells that are submitted, State Water Board expects to be able to identify any injection wells that are potentially impacting water supply wells by February 6, 2015.***

A plan to ensure protection of human health from actual or potential exposure to DW affected by any injection wells ***IN PROGRESS. State has issued some shut-in orders and information orders and plans to expand use of these tools as needed as evaluations are completed.***

A plan to communicate information to the public and to address subsequent questions/concerns ***OVERDUE.***

2. **Documentation of Aquifer Exemptions**

Provide all documents that pertain to the State's requests for aquifer exemptions, EPA's approval or denial of such requests, and any post-primacy appeals by the State regarding aquifer exemptions (due August 18th). ***COMPLETED--State has indicated orally that all documents have been provided. Some documents received via e-mail on August 18, 2014; one CD of 175 documents received on September 5, 2014; one CD of 40 documents received on November 4, 2014.***

3. **Tiered Review of Class II Wells**

a. Provide the number and location of all Class II wells permitted to inject in non-hydrocarbon producing formations with water quality less than 10,000 ppm TDS (excluding the formations known to be exempt). For each well, submit: operator's name, well type, depth, field and formation names, date injection commenced, water quality of both injection formation and injection fluid, and other pertinent details. (Due August 18th). ***PARTIAL DATA SET RECEIVED; STATE ACKNOWLEDGED IT WAS INCOMPLETE AND CONTAINED INACCURACIES.***

b. Provide the number and location of all Class II wells permitted to inject in non-exempt hydrocarbon-producing formations with water quality below 10,000 ppm TDS. For each well, submit: operator's name, well type, depth, field and formation names, date injection commenced, water quality of both injection formation and injection fluid, and other pertinent details. (Due October 15th). ***PARTIAL DATA SET RECEIVED; STATE ACKNOWLEDGED IT WAS INCOMPLETE AND CONTAINED INACCURACIES.***

ED_001000_00039616-00005

c. Submit a plan and timeline for completion of a searchable database of all Class II injection well information statewide (along with a GIS overlay of the injection wells, injection formations, and aquifer exemptions). (Due September 15th). ***OVERDUE. The Division of Oil Gas and Geothermal Resources' web site contains a searchable database available to the public; however, we are awaiting a plan and timeline for making the database more robust and including additional information, such as aquifer exemptions.***

Develop a plan and timeline for submission to EPA of any new or revised aquifer exemption requests, which the State determines are appropriate. (Due September 15th). ***IN PROGRESS.***

4. State Program Consistency

Provide a status report on DOGGR's progress on the November 2012 Action Plan, which addressed Class II program deficiencies identified by EPA in our 2011 program audit. EPA also asked for a schedule for any proposed revisions to the Plan and for completing implementation of the Action Plan. (Due August 18th). ***IN PROGRESS.***

ED_001000_00039616-00006

Aquifer Exemption Checklist

Reviewed by: _____ ***Date*** _____

A- Regulatory Background and Purpose

An aquifer or a portion thereof which meets the criteria for an "underground source of drinking water" in § 146.3 may be determined to be an "exempted aquifer". The aquifer exemption criteria at 146.4 must be met as follows:

- Class I-V wells must meet criteria **146.4(a) and 146.4(b)(1)**; or **146.4(a) and 146.4(b)(2)**; or **146.4(a) and 146.4(b)(3)**; or **146.4(a) and 146.4(b)(4)**; or **146.4(a) and 146.4(c).**
- Class VI wells must meet the criteria **146.4(d)**[1].

Regardless of the AE request or the type of injection activity, in all cases, first and foremost a demonstration that the aquifer or portion thereof does not currently serve as a source of drinking water is the required first step in the process. **EPA must evaluate each AE request to ensure the criteria are met prior to approval. EPA should also document its rationale for approving or disapproving each AE request in its statement of basis and, in case of exemptions that are substantial program revisions, EPA must provide public notice and an opportunity for the public to comment and request a public hearing.**

The purpose of this checklist is to ensure that appropriate and adequate information is collected to facilitate review of AE requests, and documentation of AE decisions. Some information described here may not apply to all AE requests.

B- General Information

AE request received by EPA on _____

Is the aquifer exemption Substantial_____ **Non-Substantial**_____
Describe basis for substantial/non-substantial determination_____
Is the aquifer exemption Complex? (Existence of drinking water wells, populated area ...) _____
Did the state or tribe provide public notice and opportunity for public hearing on the aquifer exemption request (144.7 (b)) Y/N
Were there any public comments? Y/N If yes, identify where they may be located_____
Date(s) of notice(s) published_____, Public meeting(s) held_____, Hearing held _____, any notable findings or pending litigation _____
Describe the notice and comment process and the final decision_____
Describe the basis for the decision to exempt the aquifer or the basis for the decision to withhold or deny approval of the exemptions request_____
Any anticipated issues associated with EPA approval or disapproval of the AE request Y/N_____
Any meetings between EPA/States/Tribes/Operator to discuss issues Y/N list_____

Is the request submitted by a primacy state or tribe? Y/N If yes name the State/Tribe/Agency _____ **Contact:**_____
AE identified by the Primacy State or tribe and submitted for EPA review and final determination on _____

Name of the Owner/operator_____
Well/Project Name:_____ **Well Class** _____
Purpose of injection: _____(mineral mining/oil and gas/other)

Where is the proposed aquifer exemption located? Township, Section, Range, Quarter Section or other method used to identify the area _____ Latitude and longitude information _____County_____ City_____ State_____ Add information about distance to nearest Town, County _____

Name of aquifer or portion of aquifer to be exempted _____

_____

[1] Additional Class VI only requirements in 40 CFR 144.7(d)(1) and (2) apply. This checklist does not address those requirements.

Areal extent of the area proposed for exemption_____
Depth and thickness of the aquifer _____
Discuss the total dissolved solid (TDS) content of the aquifer, including the TDS at the top and bottom of the exempted zone, and the locations and depths of all fluids samples taken. _____

C- Regulatory Criteria

An aquifer or a portion thereof may be determined to be an exempted aquifer for Class I-V wells if it meets the criteria in paragraphs (a) –(c) below. Other than EPA approved aquifer exemption expansions that meet the criteria set forth in 146.4(d), new aquifer exemptions for Class VI wells shall not be issued.

146.4: ( ) **(a)** ***Not currently used as a drinking water source*** **and:**

( ) **(b)(1)** It is mineral, hydrocarbon, or geothermal energy producing, or can be demonstrated by a permit applicant as part of a permit application for a Class II or Class II operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible; or
( ) **(b)(2)** It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical; or
( ) **(b)(3)** It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or
( ) **(b)(4)** It is located over a Class III well mining area subject to subsidence or catastrophic collapse; or
( ) **(c)** TDS is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system.

( ) **(d)** *The areal extent of an aquifer exemption for a Class II enhanced oil recovery or enhanced gas recovery well may be expanded for the exclusive purpose of Class VI injection for geologic sequestration under § 144.7(d) if it does not currently serve as a source of drinking water; and the TDS is more than 3,000 mg/l and less than 10,000 mg/l; and it is not reasonably expected to supply a public water system.*

1- Demonstration that the aquifer or portion thereof does not currently serve as a source of drinking water per 146.4(a)

Describe the proposed exempted area and how it was determined:_____
_____

TDS:_____ **Top:**_____ **Bottom:**_____
Lithology: _____
Permeability: _____ **Porosity:** _____ **Groundwater flow direction:** _____
Upper and Lower Confining Zone(s) and description of vertical confinement from USDWs:
_____
Oil or mineral production history:_____

Are there any public or private drinking water wells within and nearby the proposed exempted area for which the proposed exempted portion of the aquifer might be a source of drinking water Y/N If yes, list all those wells
_____

- *Include*: pertinent map(s) visually showing the areal extent of exemption boundary, depth and thickness of the aquifer proposed for exemption, all known subsurface structures such as faults affecting the aquifer, and each of the inventoried water well locations by well # or owner name.
- *Include*: Table of all inventoried water wells showing: Well Name/#, Owner, (Private/Public), Contact information, Purpose of well (Domestic, Irrigation, Livestock, etc.), depth of source water, name of aquifer, well completion data, age of well (if known), and the primary source of well data (Applicant/State/Tribe/EPA).
- *Include*: Map showing the areal extent of exemption boundary, all domestic water wells considered potentially down gradient of the exemption and hydraulically connected to the exemption. If wells are deemed horizontally and/or vertically isolated from the exemption, this should be foot noted on the Table as well. Use arrow(s) to indicate the direction and speed of GW in the aquifer proposed for exemption.

- Describe the evidence presented in the application and/or methodology used to conclude GW direction and speed when relevant.
- *Include*: any source water assessment and/or protection areas and designated sole source aquifers located within the delineated area.

What is the appropriate area to examine for drinking water wells? Although guidance 34 says it should be a minimum of 1/4 mile, the determination of the appropriate area is on a case by case basis. Describe area and give a rationale.

Are there any public or private drinking water wells or springs capturing (or that will be capturing) or producing drinking water from the aquifer or portion thereof within the proposed exemption area? Y/N*

- Evaluate the capture zone of the well (s) in the area near the proposed project (i.e., the volume of the aquifer(s) or portion(s) thereof from within which groundwater is expected to be captured by that well).
- A drinking water well's current source of water is the volume (or portion) of an aquifer which contains water that will be produced by a well in its lifetime. What parameters were considered to determine the lifetime of the well?

_____

- (*) If the answer to this question is Yes, therefore the aquifer currently serves as a source of drinking water.

2- Demonstration that the aquifer or portion thereof is mineral, hydrocarbon or geothermal energy producing per 146.4(b)(1)

Did the permit applicant for a Class II or III operation demonstrate as part of the permit application that the aquifer or portion thereof contains minerals or hydrocarbons that, considering their quantity and location are expected to be commercially producible? Did the permit applicant furnish the data necessary to make the demonstration as required by 40 C.F.R. 144.7(c)(1) and (2)? Summarize this demonstration and data _____

- Include narrative statement, logs, maps, data and state issued permit.
- If the proposed exemption is to allow a Class II enhanced oil recovery well operation in a field or project containing aquifers from which hydrocarbon were previously produced, commercial producibility shall be presumed by the Director upon a demonstration of historical production having occurred in the project area or field. Many times it may be necessary to slightly expand an existing Class II operation to recover hydrocarbons and an aquifer exemption for the expanded area may be needed. If the expanded exemption for the Class II EOR well is for a well field or project area where hydrocarbons were previously produced, commercial producibility would be presumed.
- For new or existing Class II wells not located in a field or project containing aquifers from which hydrocarbons were previously produced, information such as logs, core data, formation description, formation depth, formation thickness and formation parameters such as permeability or porosity shall be considered by the Director, to the extent available.
- Many Class II injection well permit applicants may consider much information concerning production potential to be proprietary. As a matter of policy, some states/tribes do not allow any information submitted as part of a permit application to be confidential. In those cases where potential production information is not being submitted, EPA would need some record basis for concluding that the permit application demonstrates that the aquifer contains commercially producible minerals or hydrocarbons. For example, the permit application may include the results of any R & D pilot project. In this case, the applicant should state the reasons for believing that there are commercially producible quantities of minerals within the expanded area. Also, exemptions relating to new or existing Class II wells not located in a field or project containing aquifers from which hydrocarbons were previously produced should include the following types of information:
  - a- Production history of the well if it is a former production well which is being converted.
  - b- Description of any drill stem tests run on the horizon in question. This should include information on the amount of oil and water produced during the test
  - c- Production history of other wells in the vicinity which produce from the horizon in question.
  - d- Description of the project, if it is an enhanced recovery operation including the number of wells and there location.

For Class III wells, the Director must require an applicant to furnish data necessary to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing and the Director must consider information contained in the mining plan for the proposed project, such as a map and general description of the mining zone, general information on the mineralogy and geochemistry of the mining zone, analysis of the amenability of the mining zone to the proposed mining

method, and a time-table of planned development of the mining zone. Information to be provided may also include: a summary of logging which indicates that commercially producible quantities of minerals or hydrocarbons are present.

3- Demonstration that the aquifer or portion thereof is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical per 146.4(b)(2)

Is the aquifer or portion thereof situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical? _____

- List evidence in the application showing how this demonstration was made.
- EPA consideration of an aquifer exemption request under this provision would include information related to: The availability of less costly and more readily available alternative supplies, the adequacy of alternatives to meet present and future needs, and costs for treatment (including cost of disposal of treatment residuals) and or development associated with the use of the aquifer.
- The economic evaluation, submitted by the applicant, should consider the above factors, and these that follow:

1. Distance from the proposed exempted aquifer to public water supplies.
2. Current sources of water supply for potential users of the proposed exempted aquifer.
3. Availability, quantity and quality of alternative water supply sources.
4. Analysis of future water supply needs within the general area.
5. Depth of proposed exempted aquifer.
6. Quality of the water in the proposed exempted aquifer.

4- Demonstration that the aquifer or portion thereof is too contaminated per 146.4(b)(3)

Is the aquifer or portion thereof proposed for exemption so contaminated that it would be economically or technologically impractical to render that water fit for human consumption _____

- List evidence in the application showing that the area to be exempted is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption.
- Economic considerations would also weigh heavily in EPA's decision on aquifer exemption requests under this section. Unlike the previous section, the economics involved are controlled by the cost of technology to render water fit for human consumption. Treatment methods can usually be found to render water potable. However, costs of that treatment may often be prohibitive either in absolute terms or compared to the cost to develop alternative water supplies.
- EPA's evaluation of aquifer exemption requests under this section will consider the following information submitted by the applicant:

(a) Concentrations, types, and source of contaminants in the aquifer.
(b) If contamination is a result of a release, whether contamination source has been abated.
(c) Extent of contaminated area.
(d) Probability that the contaminant plume will pass through the proposed exempted area.
(e) Ability of treatment to remove contaminants from ground water.
(f) Current and alternative water supplies in the area.
(g) Costs to develop current and future water supplies, cost to develop water supply from proposed exempted aquifer. This should include well construction costs, transportation costs, water treatment costs, etc.
(h) Projections on future use of the proposed aquifer.

5- Demonstration that the aquifer or portion thereof is located over a Class III well mining area subject to subsidence or catastrophic collapse per 146.4(b)(4)

Is the aquifer or portion thereof proposed for exemption located over a Class III well mining area subject to subsidence or catastrophic collapse?

- List evidence in the application showing that the area to be exempted is located over a Class III well mining area subject to subsidence or catastrophic collapse_____

- Discuss the mining method and why that method necessarily causes subsidence or catastrophic collapse. The possibility that non-exempted underground sources of drinking would be contaminated due to the collapse should also be addressed in the application.

6- Demonstration that the aquifer or portion thereof has TDS more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system per 146.4(c)

Is the TDS of the aquifer or portion thereof proposed for exemption more than 3,000 and less than 10,000 mg/l?_____

Is the aquifer proposed for exemption or portion thereof not reasonably expected to supply a public water system?_____

- Identify and discuss the information on which the determination that the total dissolved solids content of the ground water in the proposed exemption is more than 3,000 and less than 10,000 mg/l and the aquifer is not reasonably expected to supply a public water system.
- Include information about the quality and availability of water from the aquifer proposed for exemption. Also, the exemption request must analyze the potential for public water supply use of the aquifer. This may include: a description of current sources of public water supply in the area, a discussion of the adequacy of current water supply sources to supply future needs, population projections, economy, future technology, and a discussion of other available water supply sources within the area.

7- Demonstration that a Class II aquifer exemption may be expanded to Class VI per 146.4(d) *(Refer to additional requirements in EPA's regulations for Class VI aquifer exemptions for this demonstration)*

May the areal extent of an aquifer exemption for a Class II enhanced oil recovery or enhanced gas recovery well be expanded for the exclusive purpose of Class VI injection for geologic sequestration under § 144.7(d)?_____

- List evidence in the application showing an existing Class II operation associated with AE that is being converted into Class VI_____