



DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS, & GEOTHERMAL RESOURCES



February 6, 2015

Ms. Jane Diamond
Director, Water Division
Region IX
United States Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3901

Re: Class II Oil and Gas Underground Injection Control

Dear Ms. Diamond:

Thank you for your letter of December 22, 2014, regarding the several meetings and dialogue we have been engaging in for the past several months, and your request for a more detailed plan of action to address issues with California's Class II Oil and Gas Underground Injection Control program.

Our agencies share a common goal with the United States Environmental Protection Agency (US EPA): to ensure public health and safety and the protection of groundwater resources for California residents who live and work near oil producing areas of California. The Division of Oil, Gas, and Geothermal Resources (Division) is responsible for ensuring that operators of oil and gas injection wells adhere to environmental rules and permit requirements that protect groundwater and other resources. The State Water Resources Control Board (State Water Board) assists the Division with the protection of water resources. Consistent with our mutual roles related to ongoing injection activities, the Division and the State Water Board are working closely together for more integrated oversight of the underground injection control program.

Following a discussion of the relevant background, we lay out the intended approach jointly developed by the Division and the State Water Board to address what has been the primary focus of our discussions since last summer: details about the review and, where necessary, redirection of underground injection operations in this State. We then address your request for detail on our intended plan to meet the critique expressed in the 2011 report of the Horsley Witten Group (Horsley Witten). Finally, we conclude with a discussion of plans to communicate these developments to the public.

BACKGROUND

Oil and gas production in California is a \$34 billion annual industry, employing more than 25,000 people with an annual payroll of over \$1.5 billion. California is the third largest oil-producing state in the nation, producing about 575,000 barrels per day. Property and other tax payments to the State and local governments from the industry amount to about \$800 million annually. There are approximately 90,000 active or idle production and injection wells in the State.

Injection wells have been an integral part of California's oil and gas operations for more than 50 years. Currently, over 50,000 oilfield injection wells are operating in the State. Injection wells are used to increase oil recovery and to safely dispose of fluid produced with oil and natural gas. About 75 percent of California's oil production is the result of Enhanced Oil Recovery (EOR) methods such as steam flood, cyclic steam, water flood, and natural gas injection. Of these injection wells subject to UIC regulations, approximately 1,500 are fluid disposal wells, which are necessary to re-inject water produced with oil and gas and other fluids that cannot be disposed of through any other method, such as treatment, beneficial use, or recycling for other industrial applications. Most of the oil and gas fields in the State are quite mature. Many are in the waning stages of their productive cycle and require EOR techniques for continued development. The use of injection wells has been increasing in recent years. The increased use of injection potentially creates additional health and safety risks.

The protection of California's aquifers from contamination is a matter of the highest priority for the Division and the State Water Board, and of special importance given the state of emergency resulting from our unprecedented drought. Therefore, this effort to modernize the regulation of the State's injection wells must be both urgent and thorough. As explained more fully below, the Division has begun systematically reviewing these wells and applicable regulations as part of its mandate to protect public health and safety.

2011 Audit and Horsley Witten Report

In 2010, the Division worked with US EPA to conduct an audit to review the Division's practices and regulations, and ensure the Division's compliance with its obligations to properly administer its Class II injection program as a primacy state under the US Safe Drinking Water Act (SDWA) and applicable California law. The audit, conducted by the Horsley Witten Group, was completed in the summer of 2011. Horsley Witten highlighted several areas of concern, and the US EPA requested a plan to address the gaps identified. The Division responded in November 2012 (Enclosure A) by committing to adopt regulations and provide additional resources to close the gaps identified in the audit and create a stronger, more robust regulatory program.

In 2013, the Department took important steps toward meeting this commitment, including:

- Added 36 staff positions and enhanced staff training on UIC Program mandates and requirements
- Added resources to address orphan well plugging and abandonment
- Worked with the Legislature to help it enact revisions for the financial requirements for bonding
- Established a Division monitoring and compliance unit to conduct internal assessment of the UIC Program

Injection Project Review and Aquifer Exemptions

The Division acknowledges that in the past it has approved UIC projects in zones with aquifers lacking exemptions. The Division has not kept up with the task of applying for the necessary aquifer exemptions in hydrocarbon-bearing zones required by statute, even though many of these zones possess attributes that would qualify them for exemption. The Division has thus been slow to reconcile the reality that industry has expanded the productive limits of oil fields established in the 1982 primacy agreement with SDWA requirements to obtain aquifer exemptions.

Complicating matters, 11 aquifers with historical injection activities before 1982 were described in State documents in the early 1980s as proposed for exemption, and were endorsed as exempt in subsequent federal documents.¹ This led to the issuance of a number of injection permits in those 11 aquifers. However, the geologic basis for such exemptions is now in question. Therefore, in addition to the zones of aquifers that are lacking exemptions, these 11 aquifers that have historically been treated as exempt will also be evaluated to determine their appropriate exemption status.

Injection Project Review Process

The Division acknowledges injection project review continues, and a process has been developed to determine the wells with the highest risks associated with injection, and the steps to be taken to bring injection well permits into compliance with the primacy agreement with US EPA. This review examines the following groups of wells, in this order:

¹ Among these documents are (1) a December 13, 1982, Region IX memo forwarding to US EPA headquarters a version of the Memorandum of Agreement containing no significant exemption denials, described by Region IX as resolving "all known issues" with California's primacy application, and (2) a May 17, 1985, letter from Frank Covington, US EPA's then-Director of the Water Management Division for Region IX that appears to confirm that US EPA did not deny any of the exemptions proposed by the Division in its primacy application.

Category 1 Wells: Class II water disposal wells injecting into non-exempt, non-hydrocarbon-bearing aquifers or the 11 aquifers historically treated as exempt

Category 2 Wells: Class II enhanced oil recovery (EOR) wells injecting into non-exempt, hydrocarbon-bearing aquifers

Category 3 Wells: Class II water disposal and EOR wells that are inside the surface boundaries of exempted aquifers, but that may nevertheless be injecting into a zone not exempted in the primacy agreement

This review covers over 30,000 wells, more than 29,000 of which are cyclic steam wells in hydrocarbon zones. Review of wells in Category 1 is nearing completion. Review of wells in Categories 2 and 3 is expected to be complete in early 2016 as annual project reviews are completed in compliance with regulation. When completed, this review will serve to clarify records and improve data quality so that the full review of the UIC program can be completed.

An initial list of wells injecting into non-exempt USDW aquifers was previously provided to US EPA. That list includes Category I and II wells. While updating, reviewing, and validating that list is ongoing, attached (Enclosure B) is a summary of the information. Of the 2,553 wells on the list, approximately 140 of the active wells have been tabbed for immediate review by the State Water Board because the aquifers are reported to be lacking hydrocarbons and contain water with less than 3,000 mg/l total dissolved solids (TDS). The State Water Board is currently reviewing those wells to screen for proximity to water supply wells or any other indication of risk of impact to drinking water and other beneficial uses.

The Division review and updating of all injection well records in this list will be completed by May 15, 2015. The State Water Board expects to be able to review each injection well at a rate of approximately 150 wells per month.

Aquifer Exemptions Process

Together, the Division and the State Water Board have identified a process for aquifer status evaluation and potential aquifer exemptions. Although injection is occurring into aquifers that have not been exempted and the 11 aquifers historically treated as exempt, the potential risks associated with such injection differ from zone to zone. Last summer, as you know, some injection wells that potentially presented health or environmental risks were ordered to cease injection, and the operators ordered to provide specific data so that the regulatory agencies could fully evaluate whether these

wells could potentially have had any measurable impact on nearby water supply wells. To date, the analytical data from the water supply wells that the State ordered to be tested have not shown any contamination of the water supply wells by oil and gas injection activities.

As injection activities in non-exempt aquifers and the 11 aquifers historically treated as exempt are delineated and described, the Division will require relevant oil and gas operators to obtain and prepare the necessary supporting documentation to justify aquifer exemptions. If these data support an aquifer exemption proposal, the Division will prepare and submit draft proposals for aquifer exemptions to the State Water Board for their concurrence. Once both agencies are satisfied with the proposed exemption and justification, the Division will submit the aquifer exemption applications to the US EPA for approval. A more detailed statement of the Division's and State Water Board's process for development of aquifer exemption applications is described in Enclosure C.

Going forward, the Division will take the following steps in this general order:

1. Work with US EPA to clearly articulate to the public the requirements for aquifer exemptions. This will be undertaken via two US EPA-sponsored workshops, one in Bakersfield the last week of February 2015 and the second in Los Angeles the last week of March 2015. The purpose of these workshops is to inform interested stakeholders, of the kind of data and data analysis essential to the development of a robust application by the State for an exemption of a portion of an aquifer from the SDWA by the US EPA.
2. Delineate a clear process for operators to supply the required supporting data to support and justify an aquifer exemption application. The Division will prepare its own guidance document to facilitate receiving appropriate information and data from operators to prepare justifiable aquifer exemption applications. A guidance document should be available by April 1, 2015.

Although this timeline suggests that the Division may not be able to move forward with aquifer exemptions until after April 1, 2015, this is not necessarily the case. The Division has already been evaluating the data supplied by operators for the preparation of a number of aquifer exemption requests by the State. Moreover, to enhance efficiency and reduce duplication of efforts, the Division is instructing oil and gas operators to develop a process by which several adjacent operators can combine data so that portions of aquifers relevant to the operations of different operators can be considered as a whole.

The Division will provide the data and an analysis of the data to the State Water Board for consultation prior to submitting them to US EPA. The Division will submit the exemption request to US EPA if the portion of the aquifer meets the criteria for exemption and the State Water Board determines that injection into the aquifer will not adversely affect existing or potential beneficial uses of groundwater.

Wind-Down of Existing Injection and Permitting of New Injection

The Division proposes to use a combination of administrative mechanisms to ensure that existing and new injection into non-exempt aquifers and the 11 aquifers historically treated as exempt is either phased out or covered by an aquifer exemption, and that any threats to drinking water or other beneficial uses of water are urgently addressed.

To summarize, the Division will use rulemaking to codify a wind-down schedule that provides transparency to the regulated community and the public at large. The schedule will provide for the phased elimination of new and existing injection into aquifers that have not been approved as exempt by the US EPA by February 15, 2017. New injection will be allowed only if strict criteria are met, and, like existing injection, will have to cease if no new exemption has been timely obtained. At the same time, the Division, in consultation with the State Water Board, will issue administrative orders to address specific circumstances where injection poses a threat to drinking water or other beneficial uses of water. Major highlights of the approach to address existing injection and new injection into these aquifers are presented below. A more detailed and complete description of the approach is contained in Enclosure D.

Rulemaking

By April 1, 2015, the Division will initiate rulemaking to establish a regulatory-compliance schedule to eliminate Class II injection into undisputedly non-exempt aquifers statewide. The proposed regulations will require the following:

1. The first principle of the regulations will be that all Class II injection into non-exempt aquifers with less than 10,000 TDS must, in all cases, cease by February 15, 2017, unless and until an aquifer exemption has been duly approved by US EPA. Injection may be ordered to cease earlier if a well is determined to potentially impact water supply wells,² as discussed further, below. (“Administrative Orders.”)

² Injection wells potentially impacting water supply wells include injection wells into aquifers with 3,000 TDS or less that meet either of the following criteria: (1) the uppermost depth of the injection zone is less than 1,500 feet below ground surface (regardless of whether any existing supply wells are in the vicinity of the injection well), or (2) the injection depth is within 500 feet vertically and 1 mile horizontally of the screened portion of any existing water supply well.

2. Where a non-exempt aquifer contains 3,000 TDS or less and is non-hydrocarbon producing, injection must cease by October 15, 2015, unless and until an aquifer exemption has been approved by US EPA.
3. Where a non-exempt aquifer is hydrocarbon producing, new wells that are part of a previously approved project may be permitted if groundwater in the vicinity of the hydrocarbon-bearing zone does not currently have any beneficial use.³ Such approvals will include the express condition that the permit expires on February 15, 2017, unless US EPA approves an aquifer exemption before then.
4. With respect to the 11 aquifers historically treated as exempt, the State Water Board and the Division will work with US EPA to evaluate these 11 aquifers. If any portion of these aquifers meets the criteria for exemption and the State Water Board determines that injection into the aquifer will not adversely affect existing or potential beneficial uses of groundwater, the Division will prepare and submit an exemption evaluation to US EPA. The evaluation and subsequent decision for these 11 aquifers will be completed by February 15, 2017. Either by the planned regulation or by other appropriate means, the Division may allow for limited new injection into these 11 aquifers in the unusual case where the proposed injection well is part of an approved project and an initial screening of the target zone shows that the zone contains hydrocarbons, has very high levels of naturally-occurring constituents (e.g., arsenic or boron), or there are other factors that make any affected groundwater unsuitable for beneficial use. Finally, the regulation would provide that any approval is subject to evaluation of the appropriate exemption status of the aquifer.

Administrative Orders

During the process of codifying the compliance schedule to phase out injection into non-exempt aquifers, the Division will issue administrative orders to halt any injection that potentially impacts water supply wells. The Division and the State Water Board are presently evaluating all injection into non-exempt USDWs and the 11 aquifers historically treated as exempt to identify potential for such impacts. The evaluation includes screening for water wells in the area of the injection well and collection and review of data regarding the water quality and depth of the aquifer where injection is occurring. Where the evaluation indicates that an injection well potentially impacts

³ Note that this does NOT include any use of produced water.

water supply wells, the Division will issue an emergency order to the operator to cease injecting immediately.

Issues Identified in the Horsley Witten Report

The Class II UIC Program is complex, consisting of several components that have distinct attributes and therefore require focused sets of regulations, compliance approaches, and review requirements. Given the rapid evolution of technologies and industry practices to extract more oil and gas from the State's mature fields, regulations developed even a decade ago may not fully address all of the issues created by what is now routine industry practice.

Horsley Witten included several recommendations pertaining to the practices, processes and policies of the Division used to implement the State's oil and gas regulations (Enclosure C). Report recommendations address a wide range of the Division's practices, activities and regulations, either directly or indirectly, in these areas:

- The definition and protection of underground sources of drinking water (USDW) area of review (AOR) and zone of endangering influence (ZEI)
- Well construction and cementing requirements
- Plugging and abandoning requirements
- Requirements for fluid disposal
- Requirements for monitoring of zone pressure
- Annual project reviews
- Well monitoring requirements
- Idle-well planning and testing program
- Financial responsibility requirements
- Cyclic steam injection wells
- Production from diatomite

Regulation Development

Many aspects of the recommendations of the Horsley Witten report can be implemented through existing Division regulations. However, others will require new regulation. Moreover, though cyclic steam injection wells and techniques employed for oil production in diatomite formations were not specifically addressed in the Horsley Witten report, they are extensively used in California, and existing regulations in these areas can be improved.

The Division has not had significant changes to its UIC regulations since the original primacy application. Regulatory amendments will be pursued through a rulemaking process to address these needs. The Division's goal is to ensure its regulations:

- Protect public health, the environment, and resources
- Address the UIC program mandates
- Address industry practices now and into the foreseeable future
- Are developed with the public participation contemplated by statute
- Set predictable standards for the regulated community
- Are implemented and enforced properly

These regulations will be quite extensive and will take some time to develop. The Division anticipates scheduling workshops, public meetings and other outreach to discuss regulations to cover a range of topics. The workshops should include at least the following: US EPA, State Water Board, Regional Water Quality Control Boards, Department of Toxic Substances Control, Air Resources Board, oil and gas operators, county and city agencies, non-government organizations, and the general public.

Potential Areas for New and Modified Regulations

We envision that a thorough review of the UIC program, the necessary attendant revision of existing regulations, and the development of needed new regulatory measures will require a period of approximately three years. The areas in which the Division is contemplating new or modified regulations include:

- Well construction and cementing requirements
- Plugging and abandoning requirements
- Evaluation of the zone of endangering influence (ZEI)
- Requirements for fluid disposal
- Requirements for monitoring of zone pressure
- Annual project reviews
- Well monitoring requirements
- Inspections and compliance/enforcement practices and tools
- Idle-well planning and testing program
- Cyclic steam injection wells
- Production from diatomite

Exclusive of proposed program revisions and aquifer exemption, the following milestones need to be met:

- Review of each and all current UIC projects for completeness of records and development of a list of deficiencies.
- Meetings with operators to review records and project deficiencies, and develop a compliance schedule (exclusive of aquifer exemptions).
- Initiate and complete rulemaking as a comprehensive package.

The Division will prepare a more detailed work plan for UIC rulemaking by April 15, 2015.

Searchable Database for Class II Wells

Activities to review UIC projects, check and revise data on all injection wells, and the development of aquifer exemption applications will all drive improvement in the Division's data that in turn will drive the need for vastly improved data management systems.

The Division's data management systems need significant upgrades. In response to the demands created by the requirements of the well stimulation program as a result of Senate Bill 4, the Division has hired additional GIS staff whose combined capabilities will be sufficient to manage all of the Division's needs. However, other aspects of the data management problem will be more difficult to resolve and will be conducted continuously in the background as project reviews, well reviews, and aquifer exemption information are compiled in a GIS environment.

You asked for a forecast of when the Division might be able to have a fully searchable database of injection wells available. Unfortunately, we cannot respond with specificity to this request due to inadequacies in the data management environment itself, and current lack of financial resources needed to create an adequate environment. The Division is, however, strongly committed to this effort and will follow up with US EPA when we can provide a more definitive answer.

The Division has created a team to develop a Feasibility Study Report (FSR) that will consider the Division's current and future requirements for data management and the kind of data environment that is needed for the Division to serve all stakeholders far more efficiently and effectively in the future. The FSR is a fundamental first step in the State's IT-procurement process and will be completed in December 2015. An approved

FSR will lead to a budget change proposal to seek the funds needed for system development.

Communication Plans

The closure of injection wells in Kern County during the summer of 2014, has required focused attention to communication with key stakeholder groups. These include industry, environmental organizations, elected officials – especially the state and federal elected representatives – the press, and via the press, the public.

The Division and the State Water Board have responded to a large number of stakeholder and public inquiries, and, to enhance public awareness, have developed frequently asked questions, statements, and presentations delivered at numerous public fora.

In short, much preparatory work has been accomplished. However we will continue to build on this communications foundation with additional attention to meet growing inquiries. We take seriously our responsibility to address growing public concern and press inquiries in a timely and informative manner.

Communication and outreach can be amplified by providing regularly updated information on the UIC program, background documents and reports, frequently asked questions, and work status on priority items noted above, specifically aquifer exemption applications, all clearly linked on the Division's web page. This page will serve as a clearinghouse for information on program activities, items of interest to stakeholders, and meeting and other notifications.

The Division and the State Water Board will continue to meet regularly with industry, environmental and other non-governmental organizations, elected officials, as well as US EPA.

CONCLUSION

The severe drought emergency, new regulations for well stimulation with ground water monitoring and other requirements, as well as long overdue revisions to the UIC program, have fundamentally changed how the Division and the State Water Board work together to protect public health and ensure the security of the State's

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groundwater resources. We are committed to making this relationship effective so that the State can achieve full compliance with the SWDA, and we are committed to revising the UIC program efficiently, and with public safety as a first priority. We look forward to continuing our active dialog with you and to advancing our Federal-State partnership.

Sincerely,



Steve Bohlen
State Oil and Gas Supervisor

Sincerely,



Jonathan Bishop
Chief Deputy Director

Attachments

cc: Cliff Rechtschaffen, Governor's Office
John Laird, Natural Resources Agency
Matthew Rodriguez, CalEPA