

**STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION**

STAFF REPORT FOR REGULAR MEETING OF JANUARY 26-27, 2017

Prepared on January 5, 2017

ITEM NUMBER: 9

SUBJECT: Active Oil Field Regulatory Program Update: Aquifer Exemption Process

STAFF CONTACT: Matthew Keeling 805.549.3685; matt.keeling@waterboards.ca.gov

SUMMARY

Pursuant to recent legislation (SB 83, 2015), the State Water Resources Control Board and Regional Water Quality Control Boards (collectively Water Boards) are required to provide coordinated technical review of aquifer exemption applications associated with the Division of Oil, Gas, and Geothermal Resources' (DOGGR) implementation of US Environmental Protection Agency's (EPA) Underground Injection Control (UIC) Program for Class II injection wells pursuant to the Federal Safe Drinking Water Act (SDWA). Class II injection wells are wells that inject fluids associated with oil and natural gas production operations, typically consisting of wells used to inject produced water or steam into the subsurface for the purposes of disposal or to enhance oil recovery. Under the SDWA, injection of fluids into an underground source of drinking water (USDW) that may harm human health, or cause a violation of a primary drinking water regulation is prohibited. An aquifer exemption exempts an aquifer from this protection to allow injection that would otherwise be prohibited. The Water Board's technical advisory role in reviewing aquifer exemption and UIC project applications is to help ensure the protection of groundwater quality and beneficial uses pursuant to federal (40 CFR 146.4) and state (Public Resource Code section 3130-3132) requirements. Of the eleven anticipated aquifer exemption applications for the Central Coast Region, eight applications have been submitted for review, six of the eight submittals are under ongoing Water Board review and response to comments by applicants, and two have received preliminary concurrence from the State Water Board and are being reviewed by EPA. There are approximately 43 pending aquifer exemption applications statewide. Most, if not all, of the pending aquifer exemptions address existing Class II UIC wells that have been injecting into aquifer zones without EPA-approved aquifer exemptions in violation of the SDWA. As outlined in February 6th and March 9, 2015 correspondence between DOGGR, the State Water Board and EPA, wells currently injecting into non-exempt aquifers will be required to be shut-in (i.e., cease injection operations) on February 15, 2017 if an EPA-approved aquifer exemption is not secured by this date. DOGGR and the Water Boards have been working diligently to review and provide comments for submitted aquifer exemption applications statewide in response to the February 2017 deadline.

This staff report provides a brief overview of the Class II UIC Program aquifer exemption requirements and application review process along with an update of the Central Coast Water Board staff's exemption application evaluation and implementation efforts to-date and the associated challenges. This staff report does not provide detailed specifics for any of the Central Coast aquifer exemption applications, given their technical complexity, unique individual

conditions, and the uncertainty of the review process recommendations and outcomes. The applications and Water Board review documents will be made publicly available as part of DOGGR and State Board's public/stakeholder outreach and hearing process prior to submitting a state-approved application to EPA for review.

DISCUSSION

Class II Underground Injection Control (UIC) Program Overview

The Federal Safe Drinking Water Act (SDWA) requires the US EPA (EPA) to regulate injection wells used to dispose fluid waste. The EPA regulates injection wells with the Underground Injection Control (UIC) Program. The UIC Program and associated aquifer exemption process are intended to protect underground sources of drinking water (USDW) from the injection of fluids. Prior to the approval of UIC-related projects (i.e., permitting of injection wells), an aquifer exemption proposal request from DOGGR for the targeted injection zone (defined both laterally and vertically) must be approved by EPA or the targeted zone must be demonstrated to not be an USDW (defined in Attachment 1).

There are six classes of waste injection wells. Class II injection wells are used only to inject fluids associated with oil and natural gas production. These fluids are primarily the brine water - or treated brine water - brought to surface during oil and gas production (i.e., produced water). Class II wells are divided into three categories: disposal wells, enhanced oil recovery wells, and hydrocarbon storage wells. Although not occurring or anticipated in the Central Coast region at this time, the Class II UIC Program also applies to wells used to inject and store hydrocarbons (e.g., natural gas) and the injection of fluids and various additives at high pressures to improve oil recovery from formations through hydraulic fracturing, also known as fracking or well stimulation treatment.

EPA delegated authority for implementation of the Class II UIC Program in California to DOGGR via a 1982 memorandum of agreement (1982 MOA). The 1982 MOA contained a list of and references to exempted aquifers. These exempted aquifers primarily include hydrocarbon producing aquifers that were in active oil production when the SDWA was adopted in 1974, and are often referred to as pre-1973 exempted aquifers.

In 2011, EPA audited DOGGR's Class II UIC program and identified substantial implementation deficiencies. In 2012, EPA also conducted a review of DOGGR's aquifer exemption-related documentation and discovered two different versions of the 1982 MOA with conflicting lists of exempted aquifers. The EPA audit identified a significant number of approved UIC projects in aquifer zones without approved exemptions, and 11 non-exempted aquifers statewide that were historically treated as exempt with respect to approved UIC projects. Consequently, a large number of UIC-related injection projects have been approved by DOGGR that are not within EPA approved exempted aquifers and therefore are not in compliance with the SDWA or applicable California water quality statutes and policies.

In response to EPA's directive to remedy deficiencies in DOGGR's implementation of the UIC program and address discrepancies associated with approved UIC projects in non-exempted aquifers, DOGGR and the State Water Board proposed a coordinated plan via a joint February 6, 2015 letter to EPA to bring the UIC program back in to compliance with the SDWA and to jointly review proposed aquifer exemptions and UIC projects. On March 9, 2015, EPA issued a response to DOGGR and State Water Board outlining agreed upon deadlines and milestones

for implementing the February 6, 2015 DOGGR and State Water Board plan that included a February 15, 2017 deadline to have EPA approved aquifer exemptions in place for existing UIC Class II wells or shut-in those wells (i.e., cease injection operations).

Legislative Mandate for Coordinated Review of Aquifer Exemption Applications

On June 24, 2015, the Governor signed Senate Bill No. 83 (Committee on Budget and Fiscal Review, 2015), "Public Resources," commonly referred to as the Resources Budget Trailer Bill, or SB 83. In response to EPA's findings and increasing concerns regarding oil field-related water quality issues, this bill requires DOGGR to consult with the Water Boards for the review of aquifer exemption applications to ensure they comply with state and federal water quality related policies and statutes, and requires both agencies to provide a public comment period and conduct a public meeting prior to making any recommendation to EPA for approval of an aquifer exemption. The coordinated review process is spelled out in SB 83 mandated amendments to the Public Resources Code (section 3130-3132).

Pursuant to the new process, State Water Board written concurrence is mandatory for an aquifer exemption application to proceed to EPA. Concurrence must conclude that the exemption application complies with applicable federal and state requirements and associated review criteria, as discussed below, prior submitting the application to EPA for review.

Aquifer Exemption Review Process

The Water Board's technical advisory role in reviewing and potentially recommending approval of aquifer exemptions is new and requires the coordination of State and Regional Water Board staff with DOGGR. Although Regional Water Board staff may coordinate directly with DOGGR or oil field operators to a limited extent to facilitate the aquifer exemption application review process, the State Water Board is the lead and primary point of contact between the Water Boards and DOGGR, and DOGGR is the primary point of contact with the oil field operators and EPA. This coordination hierarchy is intended to limit confusion and duplicity that may result without a clear lead agency for project/case management.

The following is an outline of the typical aquifer exemption application review process from the Central Coast Water Board staff perspective that does not include some of DOGGR's or the State Water Board's internal processes:

- An oil field operator, in coordination with DOGGR, prepares and submits an aquifer exemption application to the State Water Board. Prior to the submittal, DOGGR district office technical staff usually presents an overview of the forthcoming application to Water Board staff and DOGGR headquarters after reviewing the application to see if there are any initial questions or concerns. The Regional Water Board is either copied on the application submittal or the State Water Board makes it available via the regulator-only side of the GeoTracker website.
- State and Regional Water Board technical staff conduct parallel reviews of the application, sharing questions, concerns, identified data gaps, unresolved data and technical issues, etc. as needed to inform the coordinated review. This step typically takes at least two weeks of full-time effort by one Regional Water Board staff person and multiple staff may be assigned to more complex applications, such as was the case for the combined San Ardo and McCool Ranch oil fields application.

- State and Regional Water Board technical staff develop separate, but often complementary, written comments on the application and brief their respective management on their findings before finalizing a formal response.
- Regional Water Board technical staff prepares and submits a formal comment memo signed by the Executive Officer to the State Water Board.
- Following resolution of any remaining outstanding issues between the State and Regional Water Boards, the State Water Board forwards the Regional Water Board comment memo to DOGGR along with their comments.
- The oil field operator and/or DOGGR respond to the comments and revise the application as needed. This step often involves one or more meetings between Water Board and DOGGR technical staff and oil field operators to discuss and come into agreement regarding specific unresolved issues (e.g., the need for additional water quality sampling).
- State and Regional Water Board technical staff conduct parallel review of the response to comments and revised application. For those aquifer exemption applications which oil field operators provide sufficient data and information, State Water Board drafts a preliminary concurrence letter, in coordination with the Regional Water Board, and issues it to DOGGR. If the completeness of the responses to Water Board or DOGGR comments continues to be insufficient to support the aquifer exemption application, State and Regional Water Board staff continue working with the applicant and DOGGR staff to address outstanding issues.
- For aquifer exemption applications with a State Water Board preliminary concurrence letter, DOGGR, in coordination with the State Water Board, schedules a public meeting, makes the application available to the public and initiates a 30-day public comment period.
- Following the public meeting and close of the public comment period, DOGGR compiles and responds to the public comments, requesting Water Board assistance as needed to address specific questions. Water Board technical staff reviews DOGGR's responses, as appropriate, and provides additional feedback as needed to finalize a response to comments document.
- Depending on the outcome of the public meeting and comment process, the application may require additional clarification and be referred back to the oil field operator for revision. If no significant issues are identified during this process, the State Water Board will issue a final concurrence letter and DOGGR will submit the application to EPA for review.
- As part of EPA's review process they may coordinate with DOGGR, the Water Boards and oil field operator as needed to clarify and address any questions or concerns they have regarding the aquifer exemption application.

At any step in the application review process the aquifer exemption could be denied if it does not comply with applicable federal or state requirements and associated technical review criteria. More typically, however, potential issues get worked out during the above outlined process as is typical regarding the containment of injected fluid as discussed in more detail below. Of the aquifer exemption applications in the Central Coast Region reviewed as of the date of this staff report, none have warranted an outright denial. A straight forward example of an aquifer exemption application warranting an outright denial would be if drinking water wells are pumping from the proposed aquifer exemption area (i.e., the targeted disposal zone is an underground source of drinking water or USDW).

Aquifer Exemption Criteria

The aquifer exemption applications represent hydrogeologic and beneficial use characterization reports for the targeted disposal zones and the surrounding geologic strata and structure. These reports are typically very large documents containing highly technical and complex geologic and hydrogeologic information focused on validating compliance with specific aquifer exemption criteria. In addition to the advanced technical knowledge and skillsets required to evaluate the complex technical information contained within the applications, there are a number of documents and information Water Board staff use to inform and guide the review of aquifer exemption applications. They consist of the following:

- April 10, 2015, DOGGR and State Water Board “Aquifer Exemption Guidance Document,” that provides a brief history of the aquifer exemption process, the role the state plays in enforcing the Safe Drinking Water Act, and the general process for the review of aquifer exemption applications.
- Review of current and future beneficial sources of water (e.g. domestic, municipal, agricultural, and industrial) based on well surveys, aerial survey or satellite imagery, and other available information.
- Pertinent elements of Regional Water Board Basin Plan(s) associated with designated beneficial uses and groundwater quality for given basins.
- Technical demonstration by operator that the injected fluid will remain in the exempted portion of the aquifer(s).
- Identification of underground sources of drinking water and exempted aquifers (Code of Federal Regulations, Title 40, Section 144.7).
- EPA Guidance for Review and Approval of State Underground Injection Control (UIC) Programs and Revisions to Approved State Programs.
- EPA Aquifer Exemption Checklist that is provided to EPA by DOGGR along with the final application request verifying that applicable technical questions and administrative processes have been addressed in support of the application.

Water Board staff rely on all of the above listed documents and information to evaluate compliance with specific aquifer exemption criteria promulgated within 40 CFR 146.4 and CA Public Resources Code (PRC) section 3131. The 40 CFR 146.4 requirements are primarily focused on protecting underground sources of drinking water (USDW) and include five potential criteria, only one of which needs to be met in support of an aquifer exemption, documenting that the targeted aquifer/formation is not currently a source of drinking water and could not reasonably serve as a source of drinking water in the future. The PRC 3131 criteria are primarily focused on protecting all other beneficial uses in addition to drinking water and to ensure the injected fluids remain in the exempted aquifer or portion of the aquifer (i.e., they are contained both laterally and vertically). The specific 40 CFR 146.4 and PRC 3131 requirements and the definition of an USDW are provided within Attachment 1 for reference.

Aquifer Exemption Criteria - Applied

Based on the CFR and PRC criteria, aquifer exemption applications need to contain sufficient technical information documenting the following:

1. That the targeted aquifer/formation does not currently serve as a source of drinking water (40 CFR 146.4(a)).

2. That the targeted aquifer/formation cannot serve as a source of drinking water based on one of four specific criteria (40 CFR 146.4(b) (1) (2) (3) or (4)). Or alternatively, that the TDS content of the groundwater is between 3,000 and 10,000 mg/L and it is not reasonably expected to supply a public water system (40 CFR 146.4(c)).
3. The injected fluids will not adversely affect any existing or reasonably foreseeable future beneficial uses (PRC 3131(a)(2)), and
4. That the injected fluid will be contained within the exempted portion of the aquifer (PRC 3131(a)(3)).

Items 1 and 3 above are primarily substantiated by the inclusion of a comprehensive well survey identifying the location and depth of all existing wells in an area extending at least one-quarter mile beyond the proposed aquifer exemption boundary. Comprehensive well surveys require the review and compilation of well information from multiple sources (e.g., Department of Water Resources, county level well and drinking water permitting agencies, local water agencies/districts, GeoTracker and USGS databases, etc.) as well as aerial photography and in-field "windshield" surveys as needed to confirm well locations and identify potential well locations based on land uses and associated structures. In cases where there are significant uncertainties regarding containment of injected fluid, Water Board staff typically recommend extending the required well survey beyond the one-quarter mile minimum to ensure at-risk wells are identified and protected.

Item 2 requires technical information supporting one of the five criteria options. Although the applications are supposed to only rely on one of these criteria per EPA guidance, they often include information supporting multiple criteria. Information provided in support of these criteria typically include, hydrocarbon production data, water quality data, geologic formation and depth information and associated maps, and drinking water well and treatment system cost estimates.

Item 4 requires more complex geologic and hydrogeologic technical information documenting either physical containment due to geologic structures, hydraulic containment due inward pressure or water level gradients, or a combination of both. Containment needs to be documented both laterally and vertically. Structural geologic containment features typically include overlying and underlying geologic layers of lower permeability, faults, pinch outs, traps, etc. Hydraulic containment is more difficult to document and is challenging to ensure beyond the operational life of the oil field because it is primarily induced by the oil field operations that change over time (e.g., changes in extraction and injection locations and volumes), although it can also be induced by natural conditions. As discussed in more detail within the challenges discussion below, uncertainties regarding containment, particularly hydraulic containment or poorly defined structural containment, may require controls at the UIC project level to ensure and document compliance with the aquifer exemption containment criteria.

More often than not, the complex nature and uncertainties of the geology and hydrogeology of the formation and oil field operations requires the identification of multiple lines of evidence to validate concurrence with the proposed aquifer exemptions. This multiple lines of evidence approach often warrants documenting, as part of the aquifer exemption process, that monitoring or other conditions will need to be required for subsequent UIC projects to ensure containment of injected fluids within the exempted area into the future.

Central Coast Region Oil Field Aquifer Exemptions

Although DOGGR initially identified about 15 potential aquifer exemption applications in the Central Coast Region, five of them have been combined into a single application or consist of

more focused application requests for smaller areas that will be pursued as a contingency in the event an associated broader exemption request is not approved. Of the eleven currently anticipated aquifer exemption applications in the Central Coast, eight have been submitted to the Water Board. Water Board staff has completed their review of two with the State Water Board issuing preliminary concurrence letters for both of these applications. The six remaining submitted applications are subject to ongoing review and response to comments. The eleven applications address approximately 47 UIC water disposal wells identified as injecting into non-exempt aquifers, and an unknown and significantly larger number of steam injection wells. The pending aquifer exemption applications are tabulated below – in order received - and Attachments 2 and 3 identify their location based on oil field.

Central Coast Region Aquifer Exemption Application Status

Oil Field	Formation ¹	Application Received	Review ²	Preliminary Concurrence Letter Issued	Public Hearing	Submitted to EPA
Arroyo Grande	Pismo (Edna Member)	7/27/2015	complete ³	8/9/2015	complete	2/8/2016
Cat Canyon	Sisquoc	7/27/2016	ongoing ³	-	-	-
San Ardo & McCool Ranch	Lombardi & Aurignac Sands	8/15/2016	complete ³	12/5/2015	2/9/2016 (tentative)	pending
Lynch Canyon	Lanigan Sand	8/16/2016	ongoing ³	-	-	-
Lynch Canyon	Santa Margarita	8/30/2016	ongoing ³	-	-	-
Zaca	Monterey	10/28/2016	ongoing ³	-	-	-
Lompoc (NW & main area)	Monterey	12/15/2016	ongoing	-	-	-
Casmalia	Monterey	12/22/2016	ongoing	-	-	-
Orcutt	-	pending	-	-	-	-
Cat Canyon, Gato Ridge	-	pending	-	-	-	-
Barham Ranch	-	pending	-	-	-	-

Notes:

1. "Formation" refers to a specific geologic unit.
2. Includes initial review to reviewing and responding to response to initial comments as well as coordinating with DOGGR and operator to address specific issues.
3. Formal Regional Water Board staff comments issued to State Board and DOGGR.

Central Coast Water Board staff are coordinating very closely with State Water Board and DOGGR staff during the review of aquifer exemption and UIC project applications, and to develop recommendations as appropriate to either approve or deny them based on compliance with applicable state and federal requirements with an emphasis on protecting groundwater quality and all beneficial uses. The Central Coast Water Board has four staff dedicated to the Active Oil Field Regulation program, three engineering geologists (Aaron Katona, Mike McKee, and Nicholas Smaira) and a senior water resources control engineer (Matthew Keeling). The timing, number and technical complexity of aquifer exemption applications in the Central Coast

currently requires the allocation of almost all of these staffing resources plus additional management resources (i.e., EO, AEO and supervisory staff) to participate in Water Board, DOGGR and EPA briefings and to review and finalize formal Regional Water Board recommendations.

Class II Underground Injection Control (UIC) Project Review

The Water Boards also act in a technical advisory capacity for the review of individual Class II UIC project applications within or outside of approved aquifer exemption areas pursuant to a 1988 memorandum of agreement (1988 MOA) between the State Water Board and DOGGR. The 1988 MOA is currently being revised to include clarification of roles in the review of aquifer exemptions, as well as for the coordinated regulatory oversight of other oil field-related activities with water quality implications (e.g., permitting and inspection of storage and disposal of produced water via surface impoundments or ponds, etc.). Due to depressed oil prices, new Class II UIC projects have slowed significantly. The Water Boards have received and are conducting ongoing review of two UIC project applications for the Central Coast region. Depending on future oil prices and other factors, we anticipate receiving additional UIC project applications subsequent to the current aquifer exemption application review effort. In addition, per the February 6, 2015, DOGGR and Water Board proposed joint plan submitted to EPA, Water Board staff will coordinate with DOGGR on the re-review of a potentially large number of existing Class II UIC projects that may not have been appropriately vetted at the time they were permitted.

Challenges

The coordinated aquifer exemption application review process is subject to a host of technical and administrative challenges associated with implementing a higher level of water quality-related review and oversight than has historically been applied to aquifer exemptions in California. While a revised memorandum of agreement between the Water Boards and DOGGR regarding respective roles and the aquifer exemption process is still pending, Water Board staff is conducting exemption application reviews based on the formal guidance and criteria outlined above which does not always account for some of the technical uncertainties and nuances of applying simplified criteria to highly complex geologic formations and aquifer systems. Ongoing political pressure to process the applications before the February 15, 2017 deadline creates additional challenges with respect to conducting consistent and thorough reviews as required to ensure water quality and beneficial uses are protected. Some of the challenges are discussed in more detail below.

Water Quality Data Limitations

It is not uncommon for aquifer exemption applications to contain unsubstantiated or compromised water quality data, making it difficult to effectively evaluate whether the requested exemption meets applicable criteria. Depending on the 40 CFR 146.4 criteria being pursued, water quality data may be required to document total dissolved solids (TDS) concentrations within the targeted formation/aquifer in support of the exemption requests. The water quality data provided in support of aquifer exemptions are often decades old, derived from samples collected from very complex and deep injection or oil extraction wells that may have been modified to facilitate sampling or other oil field related practices, and that may have been subject to or under the influence of fluid injection prior to sampling.

In many cases, available data only consist of rudimentary laboratory reports or references and lack sufficient supporting sampling and quality assurance documentation to effectively

determine the representativeness of the data. This is particularly true for historical oil field water quality data because comprehensive water sampling and testing guidance, like that employed by the Water Boards for its water quality programs, was lacking for oilfield water quality sampling until just recently. Although DOGGR issued more comprehensive guidance to operators in June 2015, and is currently in the process of updating this guidance in coordination with the State Water Board, more recently collected water quality data sometimes still lack a sufficient level of documentation regarding well purging activities, sampling depth/interval, and sample collection, handling and testing procedures (e.g., stabilization of field parameters, chain of custody, laboratory QA/QC, etc.). The relative shortcomings of oil field-related water quality data collection and documentation procedures is an artifact of an oil industry and oversight program focused on production and simplified water quality criteria focused on TDS or salinity. Most, if not all, historical oil field water quality data were collected to answer questions in real-time with no apparent consideration of any potential future use as is now being employed in support of aquifer exemptions. As such, field sampling and laboratory documentation were typically not recorded or maintained. In some cases, provided data is for portions of aquifers outside of proposed exemption areas or merely consist of estimates based on geophysical well logs and other data that can be used to estimate salinity.

Various brine fluids, particularly potassium chloride (KCl), are often used during well completion and workover activities to stabilize the well bore. In some instances, idle injection and extraction wells are filled with a concentrated, high density brine solutions such as KCl to prevent borehole collapse or seepage into the well by increasing the hydrostatic pressure within the well. The presence of KCl water or other brine fluids within a well or the surrounding formation, if not sufficiently purged prior to sampling, can result in high TDS concentrations that are not representative of natural conditions. Therefore, it is important to evaluate associated cation and anion balance water quality data, if available, as a quality assurance check for all reported TDS results. Several water quality data results submitted in support of the TDS exemption criteria have exhibited significant anthropogenic sources of KCl, thus invalidating the TDS result.

To address these water quality data issues, Water Board staff has requested additional sampling documentation as may be available, and in more extreme cases recommended additional water quality sampling as needed in support of the application. It can be technically difficult and costly to collect additional samples from existing production or injection wells even if a suitable one is available that will produce water quality results that are representative of natural (i.e., pre-injection) conditions. In cases where additional sampling may be necessary, Central Coast Water Board staff has initiated a work plan process with the oil field operator in conjunction with DOGGR to help ensure the resulting water quality samples are representative of the targeted formation/aquifer. In an attempt to highlight and address this issue, Central Coast Water Board staff submitted a memo to State Board outlining the problem and recommending specific protocols that DOGGR should require oil field operators to follow when implementing water quality sampling.

Validity of non-USDW Approved UIC Projects

The SDWA does not consider groundwater with total dissolved solids (TDS) concentrations of 10,000 mg/L or greater as being an USDW unless it is currently being used to supply a public water system (see Attachment 1 for USDW definition). Subsequently, an aquifer exemption is not required for UIC projects for the injection of fluids into aquifers or portions of aquifers with TDS concentrations of 10,000 mg/L or greater. Unlike for aquifer exemptions, a formal review process and associated criteria do not exist for evaluating the TDS non-USDW case beyond providing water quality data as part of individual UIC project applications. The above noted challenges regarding water quality data limitations creates uncertainty regarding the validity of

historically approved and new non-USDW injection projects that should be addressed via additional water quality data review. As time permits, Central Coast Water Board staff is evaluating, as part of the statewide 13267 UIC well technical information request effort initiated in 2015 and 2016, a number of existing UIC projects reportedly subject to the 10,000 mg/L or greater TDS threshold to determine if they are valid and to identify appropriate review criteria. Although this issue may not be addressed until after the current aquifer exemption review effort runs its course, Central Coast Water Board staff has been advocating for the development of uniform statewide criteria, similar to that for aquifer exemptions, for the review and approval of UIC projects in non-USDW areas to ensure water quality and beneficial uses are protected.

Containment – Addressing Uncertainties

For some aquifer exemption applications, it is difficult to completely and definitively document the lateral and vertical containment of injected fluids within the proposed aquifer exemption area due to incomplete or generalized geologic data and uncertainties regarding future injection activities. This can make it difficult to validate the PRC 3131 containment criteria at the aquifer exemption application level. In many cases these issues can only be partially addressed at the aquifer exemption application level through the identification of multiple lines of evidence indicating that the injected fluids are expected to remain in the proposed exemption area due to a combination of geologic features and operational controls. However, operational controls can only be applied at the individual UIC project application and implementation level (note: projects can include individual or multiple injection wells) and are subject to change over time with respect to the number, location and operation of UIC wells within an exempted aquifer. The same is also true for UIC projects in areas identified as not being an USDW per the 10,000 mg/L TDS criteria. Although not necessarily technically relevant or binding at the exemption application level, Water Board comments and preliminary concurrence letters often reference the need for conditions at the UIC project level to ensure and document containment over time. Appropriate conditions would generally include various forms of water quality or water level (i.e., gradient) monitoring, or injection pressure or volume limitations and associated monitoring. DOGGR has historically applied various operational conditions and requirements at the project level, but it is currently uncertain how DOGGR and the Water Boards will coordinate water quality focused requirements and compliance verification. At this time Water Board staff is relying on the aquifer exemption process to document the need for conditions at the project level and it is anticipated that a process will be developed as part of the pending revisions to the 1988 MOA or other guidance to ensure and document ongoing containment of injected fluids, such that specific UIC injection projects are adhering to conditions recommended as part of the aquifer exemption approval process. At a minimum, DOGGR and Water Board staff will need to review aquifer exemption application documents when reviewing future UIC project applications to help determine the need for conditions.

Existing Aquifer Exemption Boundaries - Uncertainties

The limits of existing exempted areas are not always well documented because they are often based on simplified historical two dimensional cross-section maps lacking sufficient geospatial location reference points. In most cases the exempted areas are defined both laterally and vertically (i.e., via rudimentary plan and cross-section maps), whereas, in some cases they may only be defined laterally or vertically. This can make it difficult to evaluate requests for the expansion of existing exempted areas or new contiguous areas. This can also complicate the evaluation of the containment criteria as discussed above. Although geographic information system (GIS) mapping techniques are now being implemented in most cases and have improved the ability to define aquifer exemption areas, standardized mapping requirements are needed to maintain a consistent statewide database of aquifer exemption areas.

Water Well Surveys

A single comprehensive statewide well database does not exist to effectively streamline the identification of the number, location, depth and use of water wells. Although the Division of Water Resources (DWR) maintains the most comprehensive statewide well inventory database consisting of well completion reports, well search results can be difficult to review and often contain data gaps with respect to existing wells or well location and construction information. A DWR well search can return a significant number of well completion reports for existing and abandoned wells in a given area and the reports are not always complete or accurate. As noted above, a comprehensive survey requires the review of all available local and statewide sources of well information along with the implementation of field investigations and review of aerial photography. In many cases, submitted well surveys include gaps and inconsistencies that need to be rectified to facilitate Water Board review of the aquifer exemption application. The myriad of often disparate sources of well information can take a significant amount of time to compile and review. This is true for both the applicant and Water Board staff.

GeoTracker – Oil Program Tools and Business Rules

Oil field operators and Water Board staff have been directed to use the State Water Board's GeoTracker information system to manage oil field related 13267 requests for technical information regarding ponds and UIC wells, and to manage aquifer exemption and UIC project applications. However, specific oil field related tools are limited and no formal guidance has been developed beyond the existing Underground Storage Tanks (UST) program tools and guidance, which are not always applicable. This absence of uniform guidance makes it difficult for Water Board staff to effectively and consistently manage oil field related submittals and data within the GeoTracker database. As a result, Water Board staff has been selectively uploading and managing oil field related information, or withholding it pending the development of tools and guidance, in an ad hoc and potentially inconsistent manner. Since early 2015, Central Coast Water Board staff has been advocating for the implementation of an oil field program GeoTracker working group to evaluate and develop appropriate tools and guidance as needed to effectively and consistently upload and manage oil field related information. The first working group meeting is tentatively scheduled for February of this year. Time permitting, Central Coast Water Board staff has been developing recommended GeoTracker business rules that it will share with the forthcoming working group or implement on a regional scale if necessary.

Measure Z – Monterey County “Protect Our Water” Initiative

Ballot Measure Z titled, “Protect Our Water: Ban Fracking and Limit Risky Oil Operations Initiative,” was approved by Monterey County voters this last November. Although Measure Z does not pose any tangible challenges to the Water Board, it does create a high level of uncertainty regarding future oil related activities in Monterey County. The measure calls for amendments to the Monterey County General Plan, Local Coastal Plan and Fort Ord Master Plan to limit oil production related fluid injection and wastewater disposal activities. The ultimate outcome of Measure Z is uncertain because it is currently subject to litigation, and an associated stay request, that will likely take years to settle. Although Measure Z could have significant implications regarding the ongoing operation of oil fields in Monterey County, particularly the use of injection wells for water disposal and enhanced oil recovery as needed to facilitate production, it currently has no effect on the Water Board's coordinated aquifer exemption application review process. This is because the pending county level land use requirements have no direct bearing on the federal and state level Class II UIC Program requirements and associated processes. If Measure Z is ultimately upheld, it appears that it would prohibit new and phase out existing, over a five year period, injection wells and other oil field related activities and appurtenances at the county permitting level. Water Board staff are closely following the

Measure Z process to stay informed while proceeding with aquifer exemption application reviews. There are currently three pending aquifer exemption applications in Monterey County.

Timing and Prioritization

Central Coast Water Board staff is currently coordinating on the review of six applications in various stages of the process and three additional application submittals are anticipated in the near future. Due to the political and time sensitive nature of the current aquifer exemption effort, this work takes precedence over all other Central Coast Water Board Active Oil Field Regulatory Program work. As such, our 13267 order related produced water pond and UIC reviews and strategic planning work are being delayed to facilitate the timely coordination and review of the applications. In some cases, the application review process is taking precedence over the development of tools and guidance to streamline or more effectively facilitate our review and document the process (e.g., the development of water quality sampling and reporting requirements, GeoTracker business rules, etc. as noted above). The aquifer exemption review process has been accelerating to expedite the review process as the February 15, 2017 deadline gets closer.

Technical Advisory Role

Many of the above noted challenges are compounded by the fact that the Water Boards are merely acting in a technical advisory capacity to DOGGR for the implementation of the Class II UIC Program and have limited control over the process and the outcome of individual aquifer exemption applications. Moreover, the Regional Water Boards are essentially two steps removed from the process given the State Water Board coordinates directly with DOGGR on programmatic issues and subsequently coordinates with the Regional Water Boards as needed to solicit input and provide direction. Subsequently, Central Coast Water Board staff recommendations regarding aquifer exemption applications are considered in the broader context of the politics regarding aquifer exemptions as well as State Water Board and DOGGR priorities. In addition, Central Coast Water Board recommendations regarding ways to improve the process are also subject to potentially competing recommendations and priorities of DOGGR, the State Water Board and other Regional Water Boards. This is a paradigm shift for Water Board staff accustomed to acting in a more direct technical and regulatory oversight role and having more control over programmatic issues, as is the case in other programs.

CONCLUSION

The Water Boards have been directed to provide technical review of aquifer exemption applications to ensure they comply with applicable state and federal requirements before DOGGR refers them to EPA for review and approval. Although not without its challenges as noted above, Water Board staff is committed to providing robust and transparent technical oversight for aquifer exemptions and UIC projects in coordination with the State Water Board and DOGGR to ensure water quality and all beneficial uses are protected. As part of this effort, Central Coast Water Board staff will continue to clearly identify known uncertainties with respect to containment or other issues to set the stage for the application of conditions or monitoring requirements at the UIC project level. Central Coast Water Board staff will also continue advocating for programmatic tools and guidance with specific recommendations as needed to improve the process. Depending on oil prices and other unforeseen issues, it is anticipated that the Water Boards will be required to review a large number of existing and new UIC project applications once the current aquifer exemption application review effort is complete. As a critical component of the UIC project reviews, Central Coast Water Board staff will conduct more focused fluid injection containment evaluations and recommend conditions and monitoring

requirements as needed to facilitate and document compliance with the containment requirement. Active Oil Field program staff will continue to provide the board updates on exemption and injection related work as well as other programmatic efforts (i.e., produced water disposal ponds, etc.).

ATTACHMENTS

1. Excerpts from 40 CFR 146.4, PRC 3131, and 40 CFR 144.3 regarding aquifer exemption requirement/criteria and USDW definition
2. Region 3 Oil Fields - North: Aquifer Exemption Status Map
3. Region 3 Oil Fields - South: Aquifer Exemption Status Map