



CalEPA
California Environmental
Protection Agency

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MEMO: CalEPA Review of UIC Program

TO: Cliff Rechtschaffen, Senior Advisor
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FROM: Matthew Rodriguez, Secretary
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For the last eight months, the State of California, through the Division of Oil, Gas & Geothermal Resources (DOGGR) and the State Water Resources Control Board (State Water Board), and in coordination with the United States Environmental Protection Agency (U.S. EPA), has been systematically reviewing thousands of wastewater disposal and enhanced oil recovery wells to determine their proximity to water supply wells and the potential for contamination of any drinking water. Where the risk of contamination is unacceptable, the State has ordered and will continue to order those wells be shut in. As of early February 2015 the State has identified approximately 2,500 wastewater disposal and enhanced oil recovery wells injecting into potentially non-exempt zones, 2,100 of which are still active. Of these, there are approximately 140 active wastewater disposal wells injecting into aquifers with Total Dissolved Solids (TDS) less than 3,000 mg/l, a key indicator under the federal Safe Drinking Water Act (SDWA) of higher quality water. (DOGGR regulates over 50,000 oilfield injection wells in California.) To date, preliminary water sampling of select, high-risk groundwater supply wells has not detected any contamination from oil production wastewater.

Three years ago, DOGGR notified U.S. EPA that discrepancies and confusion concerning 30-year-old agreements by which the federal government granted the State regulatory authority over wastewater disposal wells likely led to the permitted injection of oil production wastewater into aquifers that are or could become sources of drinking water. In some cases, this occurred due to conflicting documentation, both in California and with the federal government, as to whether 11 aquifers were exempted from regulation when the State received authority from U.S. EPA to implement the Underground Injection Control (UIC) program of the Safe Drinking Water Act. In other cases, this permitting and injection occurred due to confusion over the precise borders of aquifers that had been authorized for injection.

In June 2014 the Governor's Office requested that the California Environmental Protection Agency (CalEPA) perform an independent review of the state's Underground Injection Control Program, as administered by DOGGR over the decades, to better understand how this occurred. This memo presents CalEPA's findings.

Background

The federal Safe Drinking Water Act was enacted in 1974 to protect public health by regulating the nation's public drinking water and its sources. Pursuant to the SDWA, U.S. EPA

promulgated regulations creating an Underground Injection Control Program to protect from contamination aquifers that are, or could become, potential sources of drinking water.

In 1981, California's Division of Oil and Gas (DOG¹) applied to U.S. EPA to become the primary enforcing agency of the UIC portion of the SDWA in California; DOG was granted primacy over the program in 1983. As part of the application process, DOG proposed to exempt certain aquifers from regulation under the UIC Program (so-called "exempt aquifers") because they were not, and would not become, sources of drinking water. Most but not all of these proposed aquifers -- which were either hydrocarbon-producing (i.e. a source of oil or gas) or already being injected with oil production wastewater -- were exempted under a Memorandum of Agreement between DOG and U.S. EPA signed on September 28 and 29, 1982.

This first version of the Memorandum of Agreement (MOA1) expressly designated as non-exempt 11 aquifers that DOG had sought to exempt and required all existing injection wells into those aquifers to be phased out over 18 months. These non-hydrocarbon-producing aquifers all had a TDS concentration below 3,000 mg/l. However, all 11 were being used at the time of the Primacy Application for wastewater disposal and, even at that point, some had been injected into for decades.

As will be discussed below, at least by December 3, 1982, a second version of that Memorandum (MOA2) was being circulated between DOG and U.S. EPA *exempting* the 11 aquifers that had been *rejected* for exemption in the prior version. MOA1 and MOA2 were virtually identical, differing only in their treatment of the 11 aquifers and in the omission of one sentence from MOA2 requiring that injection in non-exempt aquifers be phased out within 18 months. Adding to the confusion, MOA2's signature page was photocopied from MOA1, so both documents share the same date and signatures. From the early 1980s on, DOG (then DOGGR) staff and U.S. EPA staff treated the list of exempt aquifers in MOA2 as correct; after a number of years, staff was no longer even aware of the fact that MOA1 had existed.

Further, under the terms of a 1983 interagency agreement (renewed in 1988) between the Department of Conservation (which oversaw DOG) and the State Water Board, the Regional Water Quality Control Boards were to review all well permit applications approved by DOG to ensure wastewater disposal would not degrade state waters. However, having other priorities and no dedicated staff or resources for an independent review, the Regional Boards generally deferred to DOGGR's determination of whether or not an aquifer was exempt without scrutinizing the applications.

DOGGR and U.S. EPA Agreed to Exempt the 11 Aquifers, But May Not Have Followed Regulatory Procedures

As discussed below, U.S. EPA and DOG agreed in the early 1980s to exempt the 11 aquifers and seemingly adopted MOA2 as the basis for permitting of wastewater disposal wells. Nevertheless, there are questions about whether this was done in accordance with federal UIC regulations. Procedurally, there is conflicting evidence as to whether MOA2 was approved as part of the state's initial Primacy Application in February 1983 or after an aquifer exemption appeals process in June 1983. There is also little evidence in the files of state and federal agencies justifying the decision to exempt the 11 aquifers in MOA2.

After representatives of DOG and U.S. EPA Region 9 signed MOA1 on September 28 and 29 (respectively), 1982, the agreement was forwarded to U.S. EPA's national office for review. The

¹ DOG was the precursor entity to DOGGR. The name change occurred in 1992.

national office returned the agreement, asking for changes. Notes from an internal U.S. EPA phone conversation indicate that the national office specifically requested that the 18-month phase-out of the injection wells in the 11 non-exempt aquifers be removed. The next version of the Memorandum sent by Region 9 to the national office for review, on December 13, was MOA2: the 18-month phase-out had been removed *and* the 11 non-exempt aquifers had been transposed into the list of exempt aquifers. In transmitting MOA2, Region 9 noted that "with the addition of these attachments, all known issues regarding the Primacy Application have been resolved." The national office submitted California's Primacy Application, including a version of the Memorandum, to the U.S. EPA Administrator for review, which was approved on February 4, 1983 (effective March 14, 1983). However, which version was transmitted to the Administrator, MOA1 or MOA2, is unknown.

The federal regulations² memorializing the delegation of UIC Primacy to DOG incorporate by reference the Memorandum signed on September 29, 1982; however, because MOA1 and MOA2 have identical signature pages it is unclear which version is being referred to. MOA2 is the last version of the Memorandum that DOG and Region 9 agreed to and presumably would have been the version transmitted to the Administrator. DOG files include a version of MOA1 with "VOID" handwritten across the top and strikethroughs of the 11 non-exempt aquifers that were ultimately exempted under MOA2. Similarly, U.S. EPA files include a version of MOA2 with asterisks indicating the 11 aquifers that had been newly exempted. This suggests MOA2 was adopted along with the transfer of UIC Program primacy.

In February and April 1983, however, DOG wrote oil operators injecting into the 11 aquifers to notify them the aquifers were not exempt and that they had 18 months to cease injecting. This would only be the case if MOA1 were correct (as MOA2 had exempted those aquifers). In June 1983 DOG wrote a second set of letters saying DOG's appeal of these aquifers' status to U.S. EPA had been successful, and they were now exempt. Aside from these representations, there is no evidence DOG put together an appeals packet with information justifying an exemption and transmitted it to U.S. EPA. Nor is there evidence that the procedures required to approve a post-primacy aquifer exemption were followed, which at minimum required the written approval of the Administrator and may have required a new public process and publication in the *Federal Register*.

Even more confusingly, during the two-month period when the "appeal" was apparently being considered, the Department of Conservation and the State Water Board signed their interagency agreement to review well permit applications, attaching for reference MOA2 as the valid agreement between DOG and U.S. EPA. Other documents similarly suggest that, despite the shut-down notice letters, the 11 aquifers had already been exempted per MOA2. Two February and March 1983 letters from oil producers expressed concern about one of the 11 aquifers being non-exempt; DOG district staff wrote across the top of both letters that "[t]his zone is exempted." A February 1983 summary of the responses to public comment regarding DOG's 1983 Primacy Application, found in U.S. EPA files, states that U.S. EPA approved "all but two" of the aquifers DOG had requested for exemption, short of the 11 listed in MOA1.³

Regardless of timing, by early or mid-1983 U.S. EPA and DOG appear to have agreed that MOA2 governed and the 11 aquifers were exempt. Both agencies treated the aquifers as exempt from that point through 2012, when DOGGR staff re-discovered MOA1 and notified U.S. EPA. For example:

² 40 CFR §147.250 (1984).

³ MOA2 listed no non-exempt aquifers, but DOG and U.S. EPA would discuss exempting two new aquifers in late 1983, which may have been the two referred to.

- An undated DOGGR letter, likely from 1983, includes a list of exempt aquifers and “recently” exempted aquifers that includes the 11 aquifers. This list would be periodically reissued by DOGGR management to district office staff into the 1990s.
- In 1984, U.S. EPA noted in the *Federal Register* that some parties were confused over which aquifers had been exempted in California and pledged that U.S. EPA Region 9 would maintain a public list of all exempt aquifers. The next year, in 1985, U.S. EPA wrote an oil producers association clarifying which aquifers had been exempted in California, attaching the list of exempt aquifers from MOA2, which included the 11 formerly non-exempt aquifers from MOA1.
- From at least the late 1980s through the 2010s, DOGGR’s UIC Manual of Instruction, an injection well permitting manual issued to all the districts, also included a copy of MOA2.
- In 2011, an independent audit of DOGGR’s UIC permitting program prepared at the request of U.S. EPA Region 9 included an attachment of MOA2 as the relevant agreement.

DOGGR Also Permitted Injection in Non-Exempt Zones

About half of the active wastewater disposal wells injecting into sub-3,000 mg/l TDS aquifers are injecting into the 11 aquifers that were listed as *non-exempt* in MOA1, but *exempt* in MOA2. The remaining half are the result of different types of permitting errors. Until the 2010s, project and well permitting decisions were mostly delegated to DOGGR’s six district offices. DOGGR headquarters in Sacramento generally did not review district permitting decisions; nor did it provide standardized guidance on identifying the injectable zone for exempt aquifers. Limited oversight from DOGGR headquarters may have contributed to several types of permitting errors, including:

- Border Confusion: Permits were granted for injection wells that fell just *outside* the productive limits of a hydrocarbon-producing field but *inside* the slightly larger administrative boundaries for that field.⁴ Many DOGGR staff believed the administrative limits to define an exempt aquifer. However, the state’s UIC Primacy Application to U.S. EPA had proposed to exempt certain hydrocarbon-producing aquifers based on their 1973 and 1974 productive limits, and not their administrative limits.
- Expanding Productive Limits: With advances in oil extraction technology, the effective productive limits for many fields have expanded since they were drawn in the 1970s. Staff may have believed that injection was permitted in the actual, present productive limits of a field, rather than looking to the boundaries established in the Primacy Application.
- Depth Confusion: Some injection wells were within the areal boundaries of an exempt aquifer, but were nonetheless injecting above or below the exempt aquifer, into a non-exempt zone. It appears, in certain cases, staff based their permitting decisions only on the contour maps included in the Primacy Application without also looking to the depth

⁴ “Productive limits” means the outermost areas of a field where hydrocarbons could be extracted. They differ from administrative field limits, which are the administrative boundaries created using the Public Land Survey System. In practice, productive limits have expanded over time with improvements in oil production technology.

interval for the exempted aquifer, which was produced in a table elsewhere in the Primacy Application.

- Partial Exemption: In certain cases, only portions of an aquifer were exempted and not the whole aquifer. Staff granting permits based solely off of a list of which field and zone had been exempted, without referring back to the Primacy Application, may have mistakenly believed the whole aquifer was exempt.

Recent Discovery and Actions

DOGGR staff first became aware of a potential systemic problem with the aquifer exemption process in 2011, when a headquarters staffer temporarily working in a district office noticed a discrepancy between lists of exempted aquifers. In late 2011, DOGGR staff further discovered that there were two different versions of the Memorandum in DOGGR files: MOA1 classifying the 11 aquifers as not exempt and MOA2 classifying them as exempt. DOGGR notified U.S. EPA in early 2012. DOGGR and U.S. EPA agreed that DOGGR would identify all the wells injecting into non-exempt zones and ask oil operators in those zones to start the process of applying for an aquifer exemption.

In 2014 the Central Valley Regional Water Board independently discovered that injection had been permitted in sub-3,000 mg/l TDS aquifers. It notified DOGGR that there may be groundwater supply wells at risk. Until that time, DOGGR had not treated the injection wells, which are located in oil fields, as a significant public health risk, although questions about this had been raised within DOGGR. The Governor's office assembled an inter-agency team to assess and address any public health risk.

The State, in coordination with U.S. EPA, responded by initiating a process to review most of the state's injection wells, prioritizing wells that were injecting into non-exempt, non-hydrocarbon-bearing aquifers, as well as the 11 aquifers which had historically been treated as exempt. Thus far, the State Water Board has evaluated just over 200 injection wells of highest concern for potential risk to water supplies. In 2014, 11 injection wells were ordered shut-in, along with orders requiring oil producers to provide testing of injection well injectate and nearby groundwater supply wells. In March, 2015, DOGGR confirmed or requested the closure of 12 additional wells. Injection permits for 11 wells were voluntarily relinquished at DOGGR's request. A 12th well was ordered shut in by DOGGR.

Additionally, DOGGR headquarters is now doing a second review of all new or expanded project permit applications prior to approval by the districts. This will provide another opportunity to correct any permitting errors and will promote greater permitting consistency across the six DOGGR districts.

Going forward, in conjunction with U.S. EPA, DOGGR and the State Water Board have proposed an enforceable compliance schedule to eliminate injection into non-exempt aquifers, as outlined in a February 6, 2015 letter to U.S. EPA. Specifically, for non-exempt aquifers between 3,000 to 10,000 mg/l TDS, all injections must cease by February 15, 2017, unless an aquifer exemption is applied for by the state and approved by U.S. EPA. For non-exempt aquifers with less than 3,000 mg/l TDS, the deadline to stop injecting is October 15, or immediately where the injection is potentially impacting water supplies. For the 11 aquifers historically treated as exempt, DOGGR and the State Water Board will work with U.S. EPA on a case-by-case basis to determine by February 15, 2017, whether these aquifers qualify for exemption. During the review process, DOGGR will continue to issue emergency orders to stop any injection that potentially impacts water supply wells.