CENTER for BIOLOGICAL DIVERSITY
Because life is good.

November 25, 2015

via FedEx

San Luis Obispo Planning Commission
Attention: Nicole Retana, Appeals
976 Osos Street
San Luis Obispo, CA 93408

APPEAL FROM PLANNING COMMISSION DECISION ON NOVEMBER 12, 2015 TO SAN LUIS OBISPO COUNTY SUPERVISORS
File Number DRC20150002

Re: Freeport-McMoRan Oil & Gas, LLC, Arroyo Grande Oil Field, Application to Extend Phase IV CUP #D010386D

Dear Supervisors,

The Center for Biological Diversity ("Center") is appealing the decision by the Planning Commission on November 12, 2015 to extend the Phase IV CUP #D010386D for three years to allow Freeport-McMoRan Oil and Gas ("FMOG") to build 31 wells at its Arroyo Grande Oil Field ("AGOF"). For reference, we are attaching comments by Matt Hagemann, certified hydrogeologist, who has reviewed FMOG's documentation ("Hagemann, November 24 Expert Letter," Attachment A). The comments submitted to the Planning Commission on November 11, 2015 ("November 11 Comments," Attachment B) and October 21, 2015 ("October 21 Comments," Attachment C) are also attached and incorporated herein.

The original CUP was operational for ten years. FMOG now requests a three-year extension or until Phase V begins to complete the 31 wells. The Center opposes this lengthy extension of an expired decade-long permit that specifically required FMOG to undergo review and approval for a new CUP if, at the end of ten years, any wells or steam generators had not yet been completed.[1] That review and approval has not occurred. Furthermore, the County may only issue extensions on CUPs in very limited circumstances. These include, for instance, that there have not been any

[1] October 21 Comments, p. 3, citing Staff Report for Phase IV CUP, Exhibit B, "Conditions of Approval."

Alaska . Arizona . California . Florida . Minnesota . Nevada . New Mexico . New York . Oregon . Vermont . Washington, DC
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intervening changes to the capacities of community resources, including but not limited to water supply, and that there have not been any relevant changes to the Land Use Ordinance or Element. These conditions have not been met here.[2] If FMOG wishes to move forward with the construction of the 31 wells, it must undergo this review and approval process for a new CUP, with either a Supplemental or Subsequent EIR or the inclusion of the 31 wells in the Phase V Draft EIR, due to be released soon.

The condition added by the Planning Commission requiring FMOG to install an unspecified number of sentry wells and sample wells if requested by neighbors within 1/2 mile of the AGOF is the very least of what the County must provide the residents whose wells, homes, and farms border the AGOF. As noted below, pursuant to an order by the Central Coast Regional Water Quality Control Board ("CCRWQCB"), FMOG is already required to sample wells within *one mile* of the AGOF, but as of August 21, 2015, had failed to do so.[3] Even without this prior requirement, however, the language of the Planning Commission's condition fails to specify who will select the monitoring/testing laboratory, how the sample sites and locations of the sentry wells will be chosen, or who will pay for sampling and testing. This information is critical in order to ensure that the data is independent and reliable, and that the residents are not saddled with the costs. What is more, while requiring sentry wells is instructive in showing what chemicals have contaminated the groundwater and already begun to migrate, the information they provide comes too late to protect the neighbors from polluted water. As the attached Hagemann expert letter notes: "the water quality conditions detected in the sentry wells may indicate a condition that is irreversible, i.e. contamination that may have already travelled beyond a point where it could be hydraulically contained."[4]

For these reasons and the reasons set forth below, it is imperative that--*in addition* to monitoring for contamination once it has occurred (within a 1-mile radius as required by the CCRWQCB rather than the 1/2-mile suggested by the Planning Commission)--the County act further to *prevent* it. Prior to allowing the 31 wells--including wells that are slated to inject wastewater into what is currently a protected aquifer under the Safe Drinking Water Act--the County must require full environmental review of the impacts of these wells.

The Center's further grounds for appeal of the Planning Commission's decision to extend the CUP are as follows:

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[2] October 21 Comments, pp. 3-7; San Luis Obispo Land Use Ordinance, County Code § 22.64.070(A).
[3] Order Pursuant to California Water Code Section 13267 (May 15, 2015), Central Coast Regional Water Quality Control Board ("CCRWQCB 13267 Order"), Attachment D, p. 1. FMOG's response to this order is available at http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000006979.
[4] Hagemann, November 24, 2015 Expert Letter, p. 4.

I. The Planning Commission ignored significant new information that has come to light since the approval of the 2004 Phase IV Environmental Impact Report ("EIR"). This includes information relating to:

- The breakdown of the regulatory system overseeing oil and gas production in the state, including at AGOF. In the last few years, it has become clear that the state has permitted thousands of wells, including wells currently operating at the AGOF, to inject into groundwater protected under the Safe Drinking Water Act. These wells either must cease operation by February 2017 or apply for an exemption from the state and US EPA.[5] Then, last month, a self-audit by DOGGR further found that the state had completely failed in its oversight over the state's injection well program. The audit revealed that the state: had permitted injection wells without required Area of Review evaluations to ensure the safety and isolation of the injection site; had failed to conduct annual reviews to ensure well safety and integrity; and was missing critical quality control data, among other failures. In addition, a large portion of the small sample of wells studied failed to meet current integrity and safety standards. DOGGR is in the process of reevaluating its regulations and enforcement procedures.[6] The County should wait for this process to occur in order to ensure that the new wells follow the strictest, most protective regulations to protect the AGOF neighbors.

- The substantial overestimation of the production capacity and efficiency of production at the AGOF in the original EIR. Data from the state and from FMOG indicate that per well oil production at AGOF is declining, while water use is on the rise.[7] By its own admission, FMOG is extracting only about 1350 barrels of oil per day (bpd) from almost 200 active oil production wells and 40 active injection wells.[8] At current production rates, the addition of the 31 new wells with the CUP extension is likely to add less than 150 bpd to this oil field's production capacity, nowhere near the additional 3,650 bpd needed to reach the production

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[5] Hagemann, November 24 Expert Letter, pp. 1-2. *See also*, Maya Golden-Krasner, Center for Biological Diversity, Comments on the Arroyo Grande Oil Field Aquifer Exemption (September 21, 2015) ("Aquifer Exemption Comments"), Attachment E, pp. 2-5.

[6] October 21, 2015 Comments, pp. 6-7; see also: Rechtschaffen, Senior Advisor, Office of the Governor, and John Laird, Secretary, California Natural Resources Agency (March 2, 2015) p. 1, *available at*: http://www.calepa.ca.gov/Publications/Reports/2015/UICFindings.pdf and Steve Bohlen, State Oil & Gas Supervisor, DOGGR and Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board, Letter to Michael Montgomery, US EPA, Region IX (October 15, 2015), *available at*: ftp://ftp.consrv.ca.gov/pub/oil/UIC%20Files/20151015%20-%20Joint%20Letter%20to%20US%20EPA%20Cat%201%20Well%20Review%20Findings.pdf.

[7] November 11 Comments, p. 2.

[8] Freeport MacMoRan, Arroyo Grande Oil Field, San Luis Obispo County, California, Dollie Sands, Pismo Formation Aquifer Exemption Application (2015), p. 17, Attachment F. Full Aquifer Exemption Application available at ftp://ftp.consrv.ca.gov/pub/oil/Aquifer_Exemptions/County/San_Luis_Obispo/Arroyo_Grande_Oilfield/Dollie_Sands_Pismo_Formation/Arroyo%20Grande%20Oilfield%20Edna%20Member%20Dollie%20Sands%20Pismo%20Formation%20Aquifer%20Exemption%20Application%20Complete.pdf.

goal of 5,000 bpd in Phase IV,[9] and certainly not enough of an increase to warrant extending the Phase IV CUP rather than rolling these wells into the Phase V EIR for environmental review.

- A new regulatory regime governing energy use and carbon intensity with the passage of AB 32 (the Global Warming Solutions Act), the Low Carbon Fuel Standard, and similar measures. FMOG's own data shows that this oil field produces a heavy crude[10], which is much more energy and carbon intensive to produce, refine, and combust than lighter crudes.[11] This issue has become increasingly important over the last decade with the passage of laws such as the Global Warming Solutions Act and the Low Carbon Fuel Standard, which are intended to decrease greenhouse gas emissions and carbon intensity. The production at the AGOF--especially with respect to the heaviness of the crude and the decreasing efficiency of the production--must be evaluated in light of these new regulations and requirements prior to approval the 31 wells.

- The advent of a historic drought that has changed the regulatory structure governing water usage in the state and at the county. The multi-year severe drought the state is currently experiences is causing people to drill their domestic and agricultural wells deeper and to tap into new groundwater sources.[12] Meanwhile the state has implemented water use restrictions due to the drought. In addition, the San Luis Obispo County Board of Supervisors adopted a resolution last year proclaiming a local emergency due to drought conditions in the County, and the County has proposed a Water Conservation Program (amending the General Plan and County Code) in response to the fact that water resources have declined over the last decade, with the drought exacerbating this decline.[13] Because FMOG is extracting water at an ever-increasing rate[14] and has not provided evidence to show that its operations do not affect local drinking water supplies,[15] the County cannot extend the CUP without first evaluating the impacts of the 31 wells in light of the drought and new water mandates.

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[9] Final EIR for Phase IV Development (2004) ("2004 FEIR"), p. 2-1, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Historical+Documents/2004+-+Phase+IV+EIR/phpEIR2004.pdf.

[10] AGOF crude has an API gravity of 12-16 *see* http://www.fcx.com/operations/USA_california.htm. *See also* USGS fact sheet, Heavy Oil and Tar Sands-Strategic Petroleum resources, *available at* http://pubs.usgs.gov/fs/fs070-03/fs070-03.html. Heavy oil is defined as oil with an API gravity lower than 22°; extra heavy oil is below 10°.

[11] *See e.g.*, Mui, Simon et al., Natural Resources Defense Council, "GHG Emission Factors for High Carbon Intensity Crude Oils" (June 2010), *available at* http://www.circleofblue.org/waternews/wp-content/uploads/2010/08/NRDC-ghg-emissions-report-from-unconventional.pdf; Karras, Greg, "Combustion Emissions from Refining Lower Quality Oil: What Is the Global Warming Potential?" *Environ. Sci. Technol.* (2010) 44, 9584–9589, available *at: http://www.cbecal.org/wp-content/uploads/2012/05/Combustion-Emissions-from-Refining-Lower-Quality-Oil.pdf.*

[12] October 21, 2015 Comments, pp. 4-5; Aquifer Exemption Comments, pp. 2-5, 19-20.

[13] October 21, 2015 Comments, p. 5.

[14] November 11 Comments, p. 2.

[15] *See* FMOG's response to CCRWQCB 13267 Order, *available at* http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000006979.

- Significant new scientific information about the impacts of oil drilling on the environment and on public health that was not evaluated in the FEIR. Since the FEIR was certified over a decade ago, significant new scientific information has demonstrated ever more harmful impacts of oil extraction on the environment and health.[16] As just one example, we have learned much more about the impacts of heavy crude on safety and the environment. The FEIR for Phase IV assumes that, in the event of an oil spill entering Pismo Creek, "the heavy, high-viscosity crude oil will spread slowly as it cools to ambient temperatures."[17] This assertion implies that a spill of high-viscosity crude oil will have less impact than a spill of lighter crude. Experience in the years since this FEIR was approved has proved this assumption to be false. A 2010 pipeline break that spilled heavy crude oil into the Kalamazoo River in 2010 has not been completely mitigated despite years of cleanup efforts.[18] The oil produced at AGOF is almost as heavy as the tar sands crude in the Kalamazoo spill.[19] The fact that heavy crude sinks *complicates* cleanup efforts rather than making them easier,[20] as the Phase IV FEIR stated. New information like this should be taken into consideration before any new well permits are granted for AGOF. In addition, as the 2012 explosion at the Chevron Refinery in Richmond, California demonstrated, heavy crudes have been found to corrode pipes, leading to increased risks of explosions and more frequent pipeline spills.[21] The pipeline that transports most of AGOF's crude oil--including oil that would be produced by these 31 wells--to the Phillips 66 Refinery runs along a public road and crosses a waterway. Thus the chance of an oil spill into this sensitive watershed is even greater than if the oil it carried contained lighter crude. As a result, a full CEQA review and additional mitigation measures are necessary before the County can allow the AGOF expansion to continue.

II. FMOG made representations (and misrepresentations) about the safety of its operations that is unsupported by the evidence presented. For instance:

- FMOG overstated the certainty of the impermeability (or extremely low permeability) of the tar seal. A main concern of the Planning Commissioners was that the existence of a tar seal said by FMOG to form several of the boundaries between the AGOF aquifer and drinking water sources is not certain. This is an important and valid concern that the Planning Commission ultimately decided to overlook, despite the fact that FMOG's own

[16] *See e.g.*, October 21, 2015 Comments, pp. 9-13.
[17] 2004 FEIR, p. 5.10-9.
[18] Brian Palmer, 5 Years Since Massive Tar Sands Oil Spill, Kalamazoo River Still Not Clean, (July 25, 2015) onEarth, *available at* http://ecowatch.com/2015/07/25/tar-sands-oil-spill-kalamazoo/; last viewed on 11/24/2015.
[19] *See supra* note 10.
[20] Palmer *supra* note 18 and Sink or Swim, infographic of Kalamazoo oil spill, *available at* http://www.onearth.org/earthwire/kalamazoo-tar-sands-oil-spill-cleanup; last viewed on 11/24/2015.
[21] U.S. Chemical Safety And Hazard Investigation Board Final Investigation Report Chevron Richmond Refinery Pipe Rupture And Fire (January 2015), p 5; *available at* http://www.csb.gov/chevron-refinery-fire/.

documentation shows that the existence of the seal is merely inferred, but not known. In the cross-section presented by FMOG, the tar seal is shown as a dashed line.[22] As stated in the attached Hagemann expert letter, the "use of a dashed line in these cross section means that the existence of the tar seal is uncertain, according to geologic mapping conventions. Therefore, the ability of the tar seal to form a lateral boundary separating Project wells from drinking water wells is unknown."[23] Additionally, the injection of steam itself could impair the integrity of any aspect of the seal that does exist,[24] an issue that the Planning Commission did not evaluate, but an EIR would.

- FMOG failed to provide the type of evidence normally used to demonstrate hydrologic isolation of an aquifer. The County cannot allow this extension because FMOG has failed to include basic information that must be, and is normally, required when evaluating the safety of oil operations on groundwater. As stated in the Hagemann expert letter attached, this information includes: "fundamental information on drinking water wells [that] is presented for public evaluation"; "boundary conditions [that] are defined, including the location of the tar seal, to show that the oil field is isolated from groundwater used for drinking water"; and, "a numerical groundwater model . . . to evaluate potential hydraulic interconnections along Project boundaries with groundwater used for drinking water, including simulation of the hydraulic sink."[25]

- FMOG has not evaluated the impacts of dewatering the aquifer on surrounding water sources. A main concern of the Planning Commissioners was the potential of the FMOG's intentional dewatering of the aquifer to create a sink that pulls in surrounding groundwater, including water tapped for drinking water wells. As stated in the Hagemann expert letter, this is a real concern: "[o]ver the past two years, net water extraction from the aquifer has averaged of 18,050 barrels, or 2.33 acre-feet/day. The dewatering lowers hydraulic pressure and creates a 'sink.' . . . The impact of this pressure sink on inducing flow from adjacent

[22] *See* Attachment G: W-E Structural Cross Section B-B' from AGOF Aquifer Exemption Application, Appendix A 7 a 2, Cross Section B to B', p. 56.
[23] Hagemann November 24 Expert Letter, p. 3. *See also* Natural Resources Defense Council (NRDC), Comments on the Aquifer Exemption (September 21, 2015) ("NRDC, Aquifer Exemption Comments"), Attachment J p. 17.
[24] NRDC, Aquifer Exemption Comments, pp. 15-16. NRDC also points out numerous other flaws in FMOG's inadequate demonstration of hydraulic isolation and explanation of aquifer boundaries. (*Id.*, p. 16.)
[25] Hagemann, November 24 Expert Letter, p. 4. *See also*, NRDC, Aquifer Exemption Comments, p. 8, noting that FMOG "has not adequately identified groundwater flow directions, either local or regional, and how pumping activities within and around the aquifer exemption boundary impacts the hydraulic gradient. Information must be collected that demonstrates water level data, relevant geologic features, and discharge rates for steady-state and non-steady state aquifer responses; to ultimately identify any potential *current* community to the aquifer exemption boundary through a radius of influence induced by a discharge promoted cone of depression." In other words, FMOG must provide a numerical groundwater model, which would demonstrate groundwater flow under a variety of pumping conditions. FMOG has failed to conduct this modeling or provide this information to any agency. As a result, it cannot assert that it has provided the information necessary to ensure the isolation of its aquifer and the protection of surrounding water users.

drinking water resources and across the exemption boundaries [into the AGOF production aquifer] has not been evaluated."[26] This must be evaluated fully before the County can allow FMOG to drill 31 new wells.

- FMOG has not fully complied with an order pursuant to California Water Code section 13267 issued by the Central Coast Regional Water Quality Control Board on May 14, 2015, which requires FMOG to sample water wells within one mile of the injection wells. There are 105 domestic water wells within one mile of the injection wells covered in this order. The documents FMOG uploaded to GeoTracker (and attached hereto)[27] do not include laboratory analysis of water samples from any domestic water wells, as required by the order. FMOG asserts that its operations pose no harm to the surrounding water table, but it has, as yet, failed to do the state-mandated water testing that would provide evidence to support or refute this claim. A document titled "Analyses of groundwater within 1 mile" includes only anecdotal reports of the smell and look of water from several extremely shallow wells through 2014, but do not include any actual laboratory analysis to determine whether the harmful chemicals present in the injection fluids from the site have migrated to the adjacent drinking water wells. As noted in the attached Hagemann expert comment letter, a minimum of 24 of the 105 domestic water wells within one mile of AGOF draw their water from the same water-bearing formation into which the oil field injects wastewater, and at similar depths underground.[28] Any documents provided to the CCRWCB purporting to provide water well information provide only general descriptions of their location, hardly any information regarding the depths of the wells, and no records of water samples from these wells. In sum, there is no evidence to back FMOG's assertion that its current or expanded operations will not affect the drinking water supply of nearby residents and farms.

- FMOG misrepresented the fate of all of the water extracted from the oil field, and has not explained where excess produced water will go.

  At the Planning Commission hearing on November 12, 2015, FMOG's representative, Mr. Martini, stated that all of the water that is produced goes through the water reclamation facility ("WRF"), and that no water is reinjected into the aquifer that has not gone through the WRF. In fact, as shown in a presentation to on the Department of Conservation web page and at the September 21, 2015 hearing regarding this aquifer exemption, at least 7600 bpd of water is reinjected into the aquifer after having gone only through the water softener and steam generators, but not through the WRF.[29] In addition, the WRF was built to handle a

[26] Hagemann, November 24 Expert Letter, p. 3.
[27] Documents filed by FMOG in response to the 5/14/2015 order pursuant to CWC § 13267 are on the enclosed disc and are also available at http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000006979.
[28] Hagemann, November 24 Letter, p. 2.
[29] Presentation: Arroyo Grande Oilfield, San Luis Obispo County, California, Edna Member, Dollie Sands, Pismo Formation

throughput of only 20,000 bpd of water.[30] The AGOF, however, currently (without the 31-well expansion) produces 29,750 bpd of water[31]--meaning that over 9,000 bpd of water cannot be moving through the WRF. This produced water at the field contains high levels of chemicals and metals, including VOCs such as benzene, chromium, lead, and aluminum, among many others.[32] It remains unclear, then, what the composition of the water is that is reinjected into the aquifer via the steam injection process, and where exactly *all* of the produced water is going. Furthermore, assuming the high temperatures involved in steam injection evaporate the VOCs from the reinjected water, a question arises regarding what the air quality impacts are of the oil extraction operations at the AGOF. While much the concern from neighbors has centered around water quality, it is important to analyze other potentially serious impacts as well, such as to air quality, noise, traffic, the nearby wetlands and sensitive species, and other resources, in a new EIR.

Furthermore, according FMOG's Aquifer Exemption Application for AGOF, the oil field currently discharges 18,050 barrels per day (bpd) of treated water into Pismo Creek, an amount equal to 64 percent of the water produced by AGOF.[33] A NPDES discharge permit issued by the CCRWQCB for this facility, effective from February 1, 2014 through February 1, 2019, allows a maximum discharge of 0.84 million gallons per day (MGD) into Pismo Creek.[34] The current discharge, converted to gallons, is 0.758 MGD. For FMOG to comply with this water board permit, it can only discharge an additional 0.082 MGD into Pismo Creek. If FMOG expands operations at AGOF, it will produce more water. The expansion envisioned in the CUP would require FMOG to find alternate means of disposing of produced water, either through additional injection, taking water offsite, or some other means. Plans for handling additional wastewater were not adequately addressed in the original FEIR nor in the FMOG's application for an extension of the CUP. The County must evaluate the impacts of the excess produced water and clarify its handling and disposal before allowing the 31-well expansion.

Aquifer Exemption Application, p. 15; *available at:* ftp://ftp.consrv.ca.gov/pub/oil/Aquifer_Exemptions/County/San_Luis_Obispo/Arroyo_Grande_Oilfield/Dollie_Sands_Pismo_Formation/Arroyo%20Grande%20Aquifer%20Exemption%20Presentation%209.21.15.pdf; Attachment H.

[30] PXP Produced Water Reclamation Facility Subsequent Environmental Impact Report (2008), ch. 3, "Project Description," *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Historical+Documents/2008+-+RO+Water+System+EIR/EIR+Documents/06+Chapter+3.0+Project+Description.pdf.

[31] Attachment F, *supra* note 8.

[32] FMOG, Response to CCRWQCB 13267 Order (August 21, 2015), Attachments A, 1-4 (Analyses of Groundwater from Each Injection Zone) *available at*: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000006979.

[33] *See supra* note 8, Attachment F: the 18,050 bpd discharged to Pismo Creek is 64 percent of AGOF's reported 29,750 bpd of produced water. *See also supra* note 28, Attachment H, p. 6.

[34] Central Coast Regional Water Quality Control Board, Draft Order R3-2013-0029, NPDES No. CA0050628 (December 5, 2013), Attachment I, pp. 4, 56-59, 64, 81, and 87.

III. Approval of expansion at the AGOF has been piecemealed into several phases and other aspects in order to avoid real environmental review.

Because the 31 wells are part of a larger planned expansion of production at the AGOF, they should be included in the Phase V EIR in order to allow for a more comprehensive and complete environmental review. CEQA requires that an EIR identify all significant impacts on the environment of the "whole of action."[35] Environmental review thus requires that a proposed project be analyzed along with reasonably foreseeable future phases or other action.[36] In addition, applicants may not avoid environmental review "by chopping up proposed projects into bite-size pieces which, individually considered, might be found to have no significant effect on the environment or to be only ministerial."[37] Environmental considerations must not be hidden by separately focusing on isolated parts, overlooking the cumulative effect of the whole action, or attempting to avoid responsibility for considering the environmental impact of the project as a whole.[38]

Here, the 31 wells are part of a much larger project that is being piecemealed into bite-sized pieces to avoid an analysis of the impacts of the larger project. First, the oil pipeline approved by the County last year from the AGOF to Phillips 66 is to accommodate expanded production. Second, the aquifer exemption is similarly meant to allow for expanded production, and includes some of the 31 wells at issue here. Third, FMOG has admitted that the 31 wells are tied into its Phase V expansion by requesting a three-year extension up to August 2018 "or until such time as a decision regarding FM O&G's pending CUP application for the Phase V Development of AGOF is made by the County."[39] FMOG further notes in its extension application that the extra three years to drill the 31 wells will "provide a seamless transition into FM O&G's proposed Phase V Development (if approved)."[40] FMOG is in the process of applying for a conditional use permit for its Phase V expansion project that is expected to have significant impacts that require mitigation to, among other environmental resources: wildlife species and vegetation that are endangered or threatened by water degradation,[41] geology,[42] groundwater and hydrology.[43]

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[35] CEQA Guidelines §§ 15126.2(a) § 15378; *RiverWatch v. Olivenhain Mun. Water Dist.* (2009) 170 Cal.App.4th 1186.
[36] *Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 396.
[37] *Orinda Assn v. Board of Supervisors* (1986) 182 Cal.App.3d 1145, 1171.
[38] *Id.*; *Bozung v. LAFCO* (1975) 13 Cal.3d 263, 283.
[39] Phase IV CUP Extension, Attachment A: Project Description, *available at:* http://www.slocounty.ca.gov/Assets/PL/referrals/south+county/DRC2015-00002_FREEPORT-MCMORAN_CUP_MODIFICATION.pdf.
[40] *Id.*
[41] Phase V Initial Study, pp. 13-18, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/initialstudy.pdf . *See also* California Department of Fish and Wildlife, Letter in Review of the Phase V Environmental Impact Report Notice of Preparation (January 8, 2013), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Notice+of+Preparation+(NOP)/Responses+Received/CADFW.pdf.

In order to comply with CEQA, he County should analyze the 31 wells as part of the Phase V EIR and (if the County so chooses) approve the CUP for these wells at that time.

CONCLUSION

For the reasons set forth above and in the attached documents, the Center urges the Board of Supervisors to overturn the Planning Commission's decision and deny FMOG's request to extend FMOG's CUP permit to allow it to build 31 wells unless or until it evaluates the impacts of these wells in an EIR.

Sincerely,

Maya Golden-Krasner
Climate Staff Attorney

cc: State Oil and Gas Supervisor Steve Bohlen,
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State Water Resources Control Board Chief Deputy Jonathan Bishop,
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Central Coast Regional Water Quality Control Board, Kenneth Harris, Executive Officer,
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[42] Phase V Initial Study, pp. 21-22.
[43] Phase V Initial Study, pp. 41-48.

Attachment A

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

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November 24, 2015

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Subject: Comments on the Land Use Permit Application Amendment to CUP #010386D

Dear Ms. Golden-Krasner:

I have reviewed the Land Use Permit Application Amendment to CUP #010386D for impacts to underlying drinking water resources. I am licensed as a Professional Geologist and a Certified Hydrogeologist in California. My professional career spans over 25 years, including nine years with U.S. EPA Region 9. At the U.S. EPA, I was a geologist in the Groundwater Protection Section which included the regional branch of the Underground Injection Control Program. At the U.S. EPA I also held the position of Senior Science Policy Advisor. I am a partner in the consulting firm I helped to found 12 years ago.

The approval of CUP #010386D in 2005 authorized Freeport McMoRan Oil and Gas, LLC, ("Applicant") to construct 95 production wells, 30 steam injection wells, 3 steam generators, 4 well pads, and to modify 31 existing well pads. Since approval, 63 production wells, 31 steam injection wells, and 5 water disposal wells have been installed as part the of Phase IV development. On December 9, 2014, the County issued final the notice to proceed for the applicant's Phase IV Drilling Program ("Project"), which approved 31 wells including 20 production wells, 8 steam injection wells and 3 water disposal wells which have yet to be installed. Under terms of the Land Use Permit Application Amendment to CUP #010386D, a three-year extension was sought by the Applicant to complete the Project. The Planning Commission approved the CUP extension on November 12, 2015.

The approval of CUP #0010386D in 2005 was based on a Final Environmental Impact Report (FEIR) that was prepared in September 2004. The FEIR lacks key information about drinking water wells and impacts to drinking water resources. In fact, there is no discussion in the FEIR about potential impacts to surrounding drinking water wells. The only discussion included in the FEIR about potential drinking water impacts is limited to one brief paragraph on p. 5.7-6 that states water supply wells on the Project site have not been impacted by steam or wastewater injection. This conclusion was reached in the FEIR through the analysis of two water supply wells on the Project site. The FEIR made no analysis of impacts to drinking water wells which are located adjacent to the Project. Prior to allowing the construction of

the remaining wells to proceed under an amendment to CUP #0010386D, the County should require the Applicant to evaluate impacts on drinking water aquifers and water supply wells.

Since the Project was approved in 2005, a new light has been cast on impacts from oil company operations on water resources. One of the key concerns that has been raised in California is the impact of injection of produced water and well stimulation fluids in aquifers that are sources of drinking water. The U.S. EPA has recently stated the California program under which injection of oil field related fluids is permitted has "serious deficiencies" and is in the process of determining if the program meets regulatory requirements for the Class II Oil and Gas Underground Injection Program.[1] An underlying foundation to the program is that the injection of water into aquifers is not allowed unless the groundwater has been exempted as a source of underground drinking water. Some of the injection of fluids into the Arroyo Grande oil field has been occurring into a non-exempt aquifer. The Applicant is currently seeking an exemption from the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) and the U.S. EPA.

Because the aquifer exemption has not been granted, the Project, which involves the extension of time for completion of 20 production wells, 8 steam injection wells and 3 water disposal wells, should be reevaluated for potential impacts to drinking water prior to approval. To adequately evaluate these impacts, fundamental information is needed, including information on where drinking water wells are located and how the aquifer will respond to the withdrawal and injection of fluids.

Some information has been presented through the aquifer exemption application process that shows 105 drinking water wells to be located within a one-mile radius of the area that has been proposed for exemption. Of these wells, 24 are known to have been completed in the Edna Member of the Pismo Formation. (This is a minimum number because well completion data has only been obtained for about half the 105 wells known to be within a one-mile radius of the Project.) The Edna Member, as defined by the U.S. Geological Survey, is the same stratigraphic unit as the Dollie Sands, the specific unit proposed for aquifer exemption.

No map has been prepared for inclusion in the public record for the exemption process or for the Project to accurately show where the 105 drinking water wells are located in an aerial sense. The only map that has been prepared shows well locations in a very general sense. The map, included as Attachment 1, depicts the 105 drinking water wells on a scale that does not allow for accurate location and uses only dots that are gradational in scale to schematically identify the location of the 105 wells that lie within the one-mile radius of the Project.

Despite the proximity of the 105 drinking water wells to the Project and the fact that at least 24 wells draw from the same water bearing unit at similar depths, no geologic cross sections that would depict the relationship of drinking water wells to the injection wells or production wells has been completed. The need for cross sections to depict the injection wells, the production wells and the drinking water wells is critical because all wells tap the same vertical interval of the Edna Member the source of drinking water. According to information included in the aquifer exemption package[2], some wells in the Edna Member produce drinking water from depths up to 510 feet. Injection into the Edna Member

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[1] ftp://ftp.consrv.ca.gov/pub/oil/UIC%20Files/CA%20Class%20II%20UIC%20letter%20December%2022%202014.docx.pdf , p. 3

[2] http://www.conservation.ca.gov/dog/Pages/Aquifer_Exemptions.aspx

occurs at depths as shallow as 600 feet (Aquifer Exemption Application, p. 17). No stratigraphic barriers (aquitards) are known to exist that would prevent the vertical migration of fluids at these depths in the Edna Member. Production wells that draw water and oil are completed across the same interval.

Prior to allowing for further completion of 30 production wells, 8 steam injection wells and 3 water disposal wells, an accurate map should be prepared to show where the drinking water wells are located in relation to oil field activities including Project wells. Cross sections should also be prepared to depict Project wells in relation to adjacent drinking water wells.

The exemption application materials claim that the drinking water aquifer and wells are laterally isolated from oil field activities by a fault to the north, the discontinuity of the Edna Member to the south, and a tar seal and loss of permeability to the east and west. The claim that the aquifer that is proposed for exemption is hydraulically isolated from drinking water sources and drinking water wells has been supported by the applicant on the basis of stratigraphic interpretation, physical aquifer characteristics, and chemical and thermal data. This evidence is highly interpretive and by no means definitive. For example, the existence and the lateral continuity of the tar seal is uncertain. A geologic cross section prepared by the Applicant shows the boundary of the tar seal to be represented by a dashed line (Aquifer Exemption Application, Appendix A 7 a 2, Cross Section B to B', p. 56/594, pdf). The use of a dashed line in these cross section means that the existence of the tar seal is uncertain, according to geologic mapping conventions.[3] Therefore, the ability of the tar seal to form a lateral boundary separating Project wells from drinking water wells is unknown.

A key question that remains is the lateral hydraulic continuity of the oil producing area with aquifers that are used for drinking water, including the Edna Member that is targeted for injection and production and is tapped by at least 24 adjacent drinking water wells. These boundary conditions need to be evaluated through use of a numerical groundwater model to estimate response in the aquifer to Project injection and pumping. Numerical (computer-based) models of groundwater systems are commonly used to simulate the flow of groundwater, including the response of water levels across aquifer boundaries under conditions of injection and pumping.

None of the boundary conditions cited by the Applicant are known to create a hydraulic seal that would preclude the intercommunication of drinking water aquifers with oil field activities, which include injection and extraction. Any boundary condition cited by the applicant as an impermeable hydraulic seal isolating the oil field with the adjacent drinking water aquifers, must be evaluated in light of the amount of water that is removed from the oil field, a condition known as dewatering. Since approval of the Project, aquifer dewatering has been actively pursued by the applicant. Over the past two years, net water extraction from the aquifer has averaged of 18,050 barrels, or 2.33 acre-feet/day.[4] The dewatering lowers hydraulic pressure and creates a "sink," according to the applicant. The impact of this pressure sink on inducing flow from adjacent drinking water resources and across the exemption boundaries has not been evaluated.

Accelerated water production from the oil field is a new condition, one that was not evaluated when the Project was approved in 2004. The acceleration in water production was made possible by a water reclamation facility, completed in early 2013, that allows for treated water to be discharged to Pismo

[3] U.S. Geologic Survey, http://geomaps.wr.usgs.gov/parks/gmap/gmap2.html
[4] Aquifer Exemption Application, p. 17

Creek. If the water reclamation facility was not completed, produced water would otherwise be injected, avoiding the creation of the pressure sink. A groundwater model is necessary to evaluate the potential that the pressure sink is creating or enhancing pathways for hydraulic communication and drawing in drinking water from adjacent areas.

The current sentry well network is totally inadequate for determining impacts of the Project on drinking water resources. Four sentry wells have been installed by the Applicant to date but these wells are completed only on the southern side of the oil field and in shallow alluvial aquifers and the uppermost part of the Edna Member. Additional sentry wells, as proposed by the Applicant would in no way be sufficient to ensure the protection of adjacent drinking water wells. Sentry wells that are improperly located may give a false sense of security that drinking water quality is being protected. Even if properly located, the water quality conditions detected in the sentry wells may indicate a condition that is irreversible, i.e. contamination that may have already travelled beyond a point where it could be hydraulically contained.

The record on the potential impacts to groundwater from the Land Use Permit Application Amendment to CUP #010386D is insufficient for decision making. Approval of the Project should be withheld until:

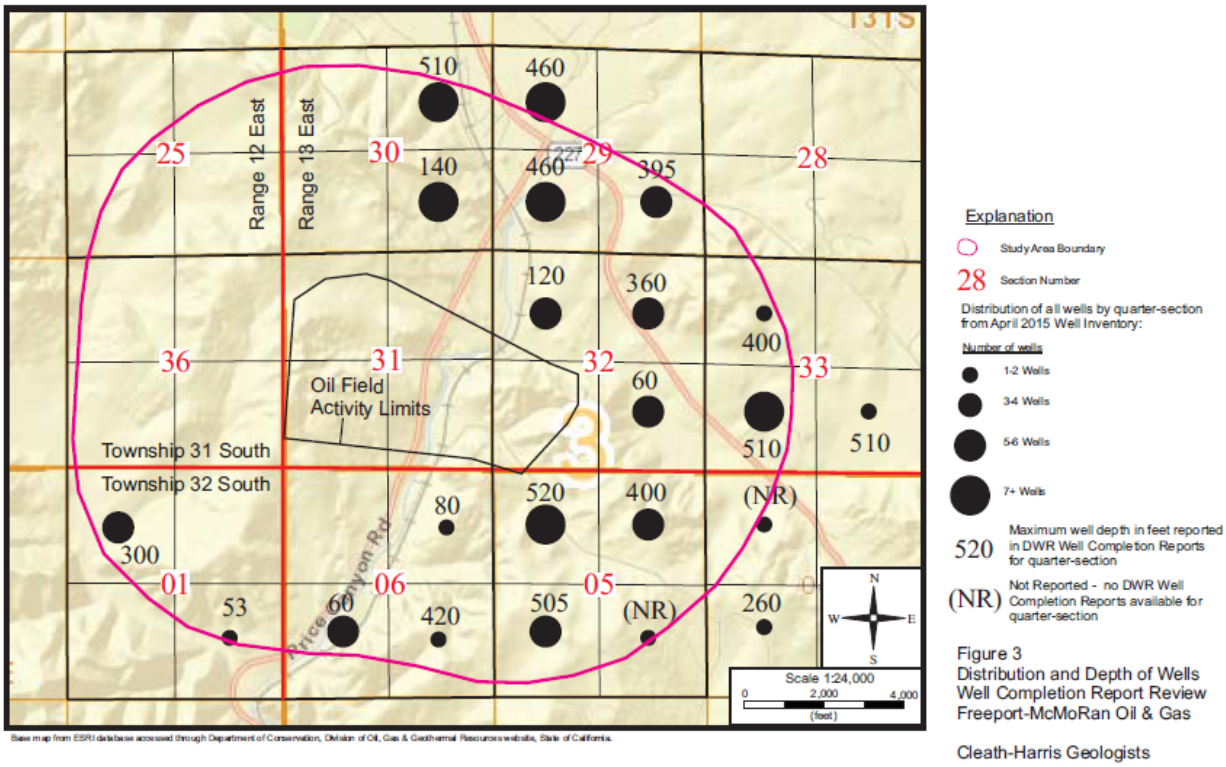
1. Fundamental information on drinking water wells, including locations and cross sectional correlations to injection wells and pumping wells, is presented for public evaluation;
2. Boundary conditions are defined, including the location of the tar seal, to show that the oil field is isolated from groundwater used for drinking water;
3. A numerical groundwater model is completed to evaluate potential hydraulic interconnections along Project boundaries with groundwater used for drinking water, including simulation of the hydraulic sink.

The public should be able to independently review this information to allow for informed comment on Project impacts.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Attachment 1: Map obtained from Appendix G-1-1, Aquifer Exemption Package, http://www.conservation.ca.gov/dog/Pages/Aquifer_Exemptions.aspx, p. 259/573 pdf.



Base map from ESRI database accessed through Department of Conservation, Division of Oil, Gas & Geothermal Resources website, State of California.

Figure 3
Distribution and Depth of Wells
Well Completion Report Review
Freeport-McMoRan Oil & Gas

Cleath-Harris Geologists

Attachment B

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

November 11, 2015

via electronic mail and U.S. mail to:

San Luis Obispo
Department of Planning and Building
Planning Commission Secretary
976 Osos Street
San Luis Obispo, CA 93408
Planning@co.slo.ca.us
RHedges@co.slo.ca.us

Re: Freeport-McMoRan Oil & Gas, LLC, Arroyo Grande Oil Field, Application to Extend Phase IV CUP # D010386D - Supplemental Information

Dear Planning Commission,

The Center for Biological Diversity ("Center") is submitting these comments to supplement the comments submitted to this Commission on October 21, 2015, incorporated by reference herein.[1] At the Planning Commission meeting held on October 22, 2015, the Planning Commission ("Commission") held over a decision on Freeport-McMoran Oil & Gas, LLC's ("FMOG") request for an extension of their CUP to build 31 wells until November 12, 2015. The Commission did this in order to gain more clarity, particularly on whether there would be any impacts to surrounding groundwater and potential sources of drinking water. Since that time, the Center has reviewed Low Carbon Fuels Standard ("LCFS") data, and retained an independent, certified professional hydrogeologist, Matt Hagemann, to review the documents submitted as part of the Phase IV CUP application (including the Final Environmental Impact Report), as well as the aquifer exemption documents under review by the State Division of Oil, Gas, and Geothermal Resources ("DOGGR") and the State Water Resources Control Board ("SWRCB").[2] Based on

[1] And attached.
[2] Mr. Hagemann's review and his CV are attached to this letter.

Maya Golden-Krasner, Climate Staff Attorney • P.O. Box 1476 • La Cañada Flintridge, CA 91012
Phone: 213-215-3729 • Fax: 510-844-7150 • mgoldenkrasner@biologicaldiversity.org

these reviews, the Center requests that the Commission deny FMOG's request to extend its CUP at this time.

At the outset, it is important to note that FMOG is relying on increasing energy and water intensity to produce oil at Arroyo Grande Oil Field ("AGOF"). This information was not and could not have been analyzed in the decade-old final Environmental Impact Report ("FEIR"). According to data collected by the California Air Resources Board ("CARB") for implementation of the LCFS (adopted after the FEIR),[3] in 2012 AGOF had 83 oil production wells and 8 injection or water disposal wells that produced 17,372 barrels per day of water ("bpd") and 998 bpd of oil. Its water to oil ratio was 17.58. According to FMOG's data in its aquifer exemption application,[4] current production from 221 active production wells is 29,750 bpd of water and 1,350 bpd of oil.[5] Its water to oil ratio is therefore now 22.[6] Over that period--during which time FMOG claims it was "dewatering the basin" to increase efficiency of oil production[7]--the average bpd of oil extracted per well at AGOF decreased by 50%, from approximately 12 bpd[8] to 6 bpd. Meanwhile, the water to oil produced ratio has increased by 25%. In other words, despite the extra injection wells and production wells built, the efficiency of oil production at AGOF is decreasing, requiring larger volumes of water to produce smaller amounts of oil.[9] The decreasing efficiency of production means that the oil field's energy intensity and water usage is going to increase, as it takes ever larger amounts of steam to produce oil. Indeed, the ratio of steam injection wells to production wells has increased significantly since 2012, and promises to increase even more with the construction of the 31 new wells (8 of which are steam injection). The

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[3] *Available at:* http://www.arb.ca.gov/fuels/lcfs/crude-oil/crude-oil.htm (OPGEE Version 1.1E) ("LCFS data 2012").
[4] *Available at*: ftp://ftp.consrv.ca.gov/pub/oil/Aquifer_Exemptions/County/San_Luis_Obispo/Arroyo_Grande_Oilfield/Dollie_Sands_Pismo_Formation/Arroyo%20Grande%20Oilfield%20Edna%20Member%20Dollie%20Sands%20Pismo%20Formation%20Aquifer%20Exemption%20Application%20Complete.pdf.
[5] *Id*. at 17.
[6] For comparison, the average water to oil ratio for California oil fields in 2012 was a little over 15. (LCFS data 2012.).
[7] *Ibid.*
[8] LCFS data 2012.
[9] At these rates--assuming water to oil ratio stays the same--if FMOG reaches its Phase IV target of 5,000 bpd of oil produced with 241 total production wells and 59 injection wells, it will have increased the amount of water produced from 29,750 bpd (1,249,500 gallons per day) to 110,200 bpd (4,628,400 gallons). (5,000 bpd target is stated in Phase IV Final EIR, submitted with Oct. 21, 2015 Center comments, at 2-1.) If oil production merely doubles over current production--to 2,700 bpd of oil--produced water volumes will increase to 59,508 bpd, or 2,499,336 gallons per day of water.

Commission must, at a minimum, evaluate and consider the costs of this increasing energy and water usage and decreasing oil field efficiency on the health of San Luis Obispo County residents and its environment before considering FMOG's request.

With respect to concerns about groundwater flow and impacts to surrounding groundwater--including drinking water--as Mr. Hagemann explains in the attached letter, there is not enough critical and commonly used information about the groundwater here for the County to be able to approve FMOG's request at this time. The extension relies on an FEIR that spent one paragraph discussing impacts on water wells based on extremely limited data, and includes no analysis of impacts to drinking water wells on adjacent properties. In order to allow the Commission to properly evaluate any impacts on surrounding groundwater, FMOG must supply basic and "fundamental" information it has so far inexplicably failed to provide. For example, Mr. Hagemann notes that in the aquifer exemption application, FMOG presents data--though incomplete--that there are at least 24 domestic water wells in the Edna Member of the Pismo Formation--at similar depths and in the same formation as is proposed for the aquifer exemption. The data on which FMOG relies, however, is incomplete and fails to include critical information such as: well completion data of all of the nearby wells; the exact spatial locations of all nearby wells; and, geological cross sections showing the relationship between the drinking water wells and the injection wells located in the same unit.

The Center is particularly concerned about the fact that FMOG has not disclosed the chemicals it uses in its operations, including those used during drilling and well maintenance. Many of these chemicals are not known to regulators, and therefore are not monitored. The wastewater and water used for steam injection do not pass through the water reclamation facility and almost certainly contain toxic chemicals. Mr. Hagemann notes that FMOG's assertion that the aquifer underneath the oil field which it uses for injection is a hydrologically isolated bowl is not supported by clear, objective data. This includes a lack of objective data demonstrating that the portion of the "Edna Member that is targeted for injection" is isolated from the area of the same Member that "is tapped by at least 24 adjacent drinking water wells." If FMOG wants to assert hydraulic isolation, it must submit a "numerical groundwater model to estimate response in the aquifer to Project injection and pumping" to support this assertion. Despite the fact that these models are

"commonly used to simulate the flow of groundwater," and that nearby residents have repeatedly raised concerns about the effects of AGOF operations on their groundwater, FMOG has inexplicably failed to provide a numerical groundwater model.

We have learned a significant amount about groundwater modeling for oil and gas operations, about the effects of oil and gas operations on climate change, and about the lack of oil and gas regulation in the state since the FEIR was certified a decade ago. In addition, the regulatory environment has changed significantly with the passage and implementation of AB 32, the LCFS, and water restrictions due to the drought, all of which must inform the Commissioners' current decision. The Commissioners should not approve an extension of time for the addition of 31 wells of this energy- and water-intensive oil field, especially in the absence of clear and convincing, professionally accepted and commonly used data demonstrating the safety of its operations on groundwater, our climate, and the health and environment of San Luis Obispo. FMOG has not provided this, so its request must be denied.

Sincerely,

/s/

Maya Golden-Krasner
Climate Staff Attorney

cc: Commissioner Jim Irving, via Vicki M. (Shelby) Fogleman
vshelby@co.slo.ca.us
Commissioner Eric Meyer
frenchbicycles@gmail.com
Commissioner Don Campbell
epv@wildblue.net
Commissioner Jim Harrison
sbwlff@sbcglobal.net
Commissioner Ken Topping
kentopping@aol.com
State Oil and Gas Supervisor Steve Bohlen,
Steven.Bohlen@conservation.ca.gov
State Water Resources Control Board Chief Deputy Jonathan Bishop,
jonathan.bishop@waterboards.ca.gov

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

Matt Hagemann, P.G, C.Hg.
(949) 887-9013
mhagemann@swape.com

November 10, 2015

Maya Golden-Krasner
Center for Biological Diversity
8033 Sunset Blvd
Los Angeles, CA 90046

Subject: Comments on the Land Use Permit Application Amendment to CUP #010386D

Dear Ms. Golden-Krasner:

I have reviewed the Land Use Permit Application Amendment to CUP #010386D for impacts to underlying drinking water resources. The approval of CUP #010386D in 2005 authorized Freeport McMoRan Oil and Gas, LLC, ("Applicant") to construct 95 production wells, 30 steam injection wells, 3 steam generators, 4 well pads, and to modify 31 existing well pads. Since approval, 63 production wells, 31 steam injection wells, and 5 water disposal wells have been installed as part the of Phase IV development. On December 9, 2014, the County issued final the notice to proceed for the applicant's Phase IV Drilling Program ("Project"), which approved 31 wells including 20 production wells, 8 steam injection wells and 3 water disposal wells which have yet to be installed. Under terms of the Land Use Permit Application Amendment to CUP #010386D, a three-year extension is sought by the applicant to complete the Project.

The approval of CUP #0010386D in 2005 was based on a Final Environmental Impact Report (FEIR) that was prepared in September 2004. The FEIR lacks key information about drinking water wells and impacts to drinking water resources. In fact, there is no discussion in the FEIR about potential impacts to surrounding drinking water wells. The only discussion included in the FEIR about potential drinking water impacts is limited to one brief paragraph on p. 5.7-6 that states water supply wells on the Project site have not been impacted by steam or wastewater injection. This conclusion was reached in the FEIR through the analysis of two water supply wells on the Project site. The FEIR made no analysis of impacts to drinking water wells which are located adjacent to the Project. Prior to allowing the construction of the remaining wells to proceed under an amendment to CUP #0010386D, the County should require the Applicant to evaluate impacts on drinking water aquifers and water supply wells.

Since the Project was approved in 2005, a new light has been cast on impacts from oil company operations on water resources. One of the key concerns that has been raised in California is the impact of injection of produced water and well stimulation fluids in aquifers that are sources of drinking water. The U.S. EPA has recently stated the California program under which injection of oil field related fluids

has “serious deficiencies” and is in the process of determining if the program meets regulatory requirements for the Class II Oil and Gas Underground Injection Program. An underlying foundation to the program is that the injection of water into aquifers is not allowed unless the groundwater has been exempted as a source of underground drinking water. The Project applicant is currently seeking such an exemption from the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR).

Because the aquifer exemption has not been granted, the Project, which involves the extension of time for completion of 8 steam injection wells and 3 water disposal wells, should be reevaluated for potential impacts to drinking water prior to approval. To adequately evaluate these impacts, fundamental information is needed, including information on where drinking water wells are located and how the aquifer will respond to injection of fluids.

Some information has been presented through the aquifer exemption application process that shows 105 drinking water wells to be located within a one-mile radius of the area that has been proposed for exemption. Of these wells, 24 are known to have been completed in the Edna Member of the Pismo Formation. (This is a minimum number because well completion data has only been obtained for about half the 105 wells known to be within a one-mile radius of the Project.) The Edna Member, as defined by the U.S. Geological Survey, is the same stratigraphic unit as the Dollie Sands, the specific unit proposed for aquifer exemption.

No map has been prepared for inclusion in the public record for the exemption process or for the Project to accurately show where the 105 drinking water wells are located in an aerial sense. The only map that has been prepared shows well locations in a very general sense. The map, included as Attachment 1, depicts the 105 drinking water wells on a scale that does not allow for accurate location and uses only dots that are gradational in scale to schematically identify the location of the 105 wells that lie within the one-mile radius of the Project.

Despite the proximity of the 105 drinking water wells to the Project and the fact that at least 24 wells draw from the same water bearing unit at similar depths, no geologic cross sections that would depict the relationship of drinking water wells to the injection wells has been completed. The need for cross sections to depict the injection wells and the drinking water wells is critical because the wells tap the same vertical interval of the Edna Member. According to information included in the aquifer exemption package[1], some wells in the Edna Member produce drinking water from depths up to 510 feet. Injection into the Edna Member occurs at depths as shallow as 600 feet (p. 17/594, pdf). No stratigraphic barriers (aquitards) are known to exist that would prevent the vertical migration of fluids at these depths in the Edna Member. Prior to allowing for further completion of 8 steam injection wells and 3 water disposal wells, an accurate map should be prepared to show where the drinking water wells are located in relation to oil field activities including Project wells. Cross sections should also be prepared to depict Project wells in relation to adjacent drinking water wells.

The exemption application materials claim that the drinking water aquifer and wells are isolated from oil field activities by a fault to the north, the discontinuity of the Edna Member to the south, and a tar seal and loss of permeability to the east and west. This claim that the aquifer that is proposed for exemption is hydraulically isolated from drinking water sources and drinking water wells has been supported by the

[1] http://www.conservation.ca.gov/dog/Pages/Aquifer_Exemptions.aspx

applicant on the basis of stratigraphic interpretation, physical aquifer characteristics, and chemical and thermal data. This evidence is highly interpretive and by no means definitive. A key question that remains is the lateral hydraulic continuity of the oil producing area with aquifers that are used for drinking water, including the Edna Member that is targeted for injection and is tapped by at least 24 adjacent drinking water wells.

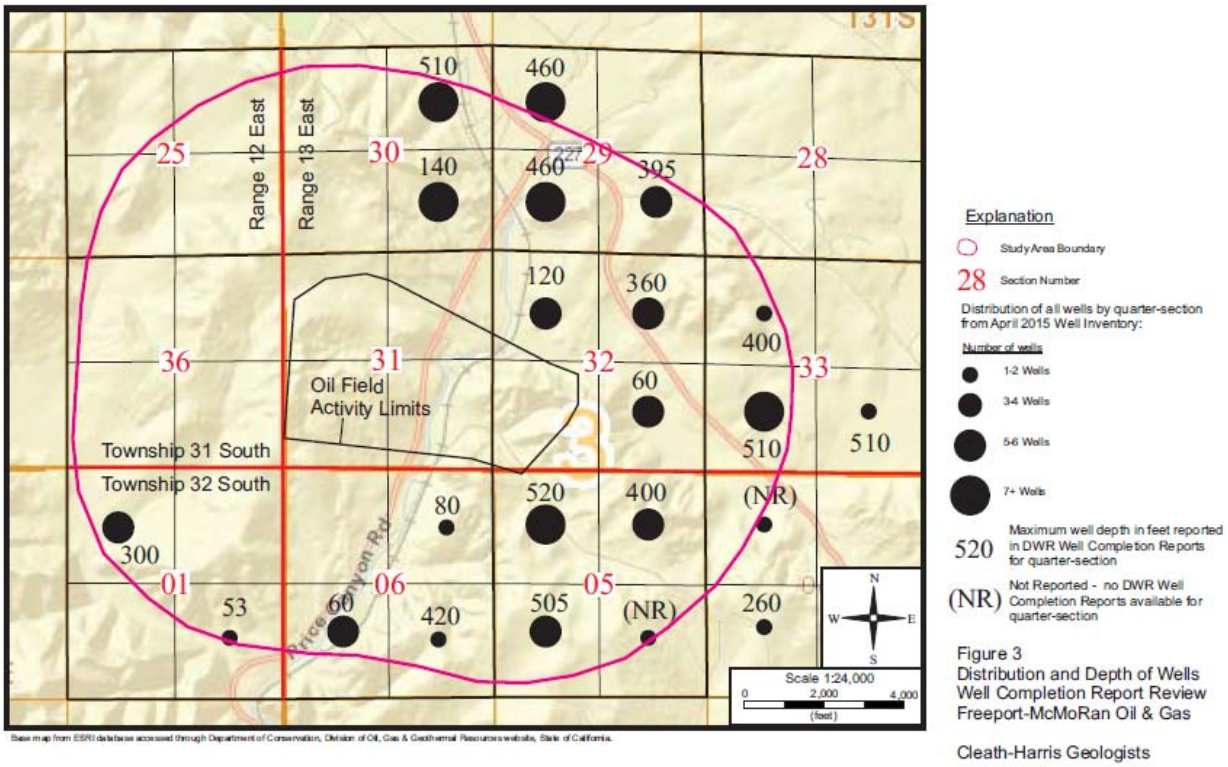
These boundary conditions need to be evaluated through use of a numerical groundwater model to estimate response in the aquifer to Project injection and pumping. Numerical (computer-based) models of groundwater systems are commonly used to simulate the flow of groundwater, including the response of water levels across aquifer boundaries under conditions of injection and pumping.

The record on the potential impacts to groundwater from the Land Use Permit Application Amendment to CUP #010386D is insufficient for decision making. Approval of the Project should be withheld until fundamental information on drinking water wells, including locations and cross sectional correlations to injection wells, is presented for public evaluation. A numerical groundwater model should also be completed to evaluate potential hydraulic interconnections along Project boundaries with groundwater used for drinking water.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Attachment 1: Map obtained from Appendix G-1-1, Aquifer Exemption Package, http://www.conservation.ca.gov/dog/Pages/Aquifer_Exemptions.aspx, p. 259/573 pdf.



Base map from ESRI database accessed through Department of Conservation, Division of Oil, Gas & Geothermal Resources website, State of California.

Figure 3
Distribution and Depth of Wells
Well Completion Report Review
Freeport-McMoRan Oil & Gas

Cleath-Harris Geologists

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

Geologic and Hydrogeologic Characterization
Industrial Stormwater Compliance
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
CEQA Review

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

CENTER for BIOLOGICAL DIVERSITY Because life is good.

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October 21, 2015

via electronic mail and FedEx to:

San Luis Obispo
Department of Planning and Building
Planning Commission Secretary
976 Osos Street
San Luis Obispo, CA 93408
Planning@co.slo.ca.us
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Re: Freeport-McMoRan Oil & Gas, LLC, Arroyo Grande Oil Field, Application to Extend Phase IV CUP # D010386D

To Whom It May Concern,

The Center for Biological Diversity ("the Center") submits comments in opposition to the request by Freeport-McMoRan ("FMOG") for an extension of its conditional use permit ("CUP") for its Phase IV expansion for another three years in order to allow FMOG to build 31 new wells at the Arroyo Grande Oil Field ("AGOF"). FMOG's CUP expired in August 2015, and FMOG now seeks to extend its terms from the original ten years to thirteen. Since the County of San Luis Obispo ("County") certified the Environmental Impact Report ("EIR") for the Phase IV expansion project in 2004, however, significant new information about the health and environmental harms of oil drilling have become known, and new regulations governing oil and gas drilling have been adopted. In addition, the State has found that at least eight of the injection wells operating at the AGOF are illegally injecting into groundwater that has not been exempted from the federal protections of the Safe Drinking Water Act. The State has also recently found

that many wells across California do not meet current integrity criteria and have not been reviewed or inspected in many years. In light of all of this new and serious information, the County cannot rely on a decade-old EIR to extend FMOG's CUP to drill 31 new wells. Given that as of 2014, the total number of active (non-plugged) and new wells in all of San Luis Obispo County was approximately 400, adding 31 wells to one oil field is significant.[1] Moreover, FMOG plans to add another 450 wells in Phase V of its expansion plan, and any evaluation of impacts of these 31 wells must take into account the foreseeable Phase V expansion.

I. The County Cannot Extend FMOG's CUP, But Rather Must Issue a New CUP for the 31 Wells

The County cannot issue FMOG a CUP extension because the original conditions required that FMOG receive a new CUP for Phase IV work not completed, and because new information about environmental conditions since 2004 negate the County criteria for issuing CUP extensions.

In 2005, the County issued FMOG a CUP for its Phase IV expansion. This Phase IV project included:

- Grading of 4 new well pads (total disturbance of about 2.68 acres);
- Grading on 18 existing well pads (total disturbance of about 4.22 acres);
- Construction of 95 production wells;
- Construction of 30 injection wells;
- Construction of 3 new steam generators (previously approved in the 1994 Phase III Development Plan); and,
- Increasing production of marketable quality crude oil from 1,800 – 1,900 barrels of per day (BOPD) to 5,000 BOPD.

The CUP expired in August 2015, and FMOG has applied for an extension of the permit in order to build 31 (20 production, 8 steam injection, and 3 water disposal) Phase IV wells that have not yet been built.[2]

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[1] Natural Resources Defense Council, *Drilling in California: Who's at Risk?* (October 2014) ("NRDC, 2014"), Appendix II, Table 1.

[2] Freeport MacMoRan Oil and Gas, *Conditional Use Permit Application to extend 10-year time limit on Arroyo Grande Phase IV* (July 20, 2015), San Luis Obispo Department of Planning and Building ("Phase IV CUP

The County cannot extend the CUP for an additional three years to build 31 new wells. The Conditions of Approval for the Phase IV CUP specifically state that "[a]t the end of the ten years, any wells or steam generators not yet completed shall require review and approval of a new Conditional Use Permit."[3] The County staff now proposes to "amend" this condition to state that "[a]t the end of the thirteen years, with a start date of August 9, 2005 and end date of August 9, 2018, any wells or steam generators not yet completed shall require review and approval of a new Conditional Use Permit."[4] The County cannot simply amend its earlier conditions to explicitly require the opposite of what the condition originally stated; otherwise, the original condition would have no meaning.

CUPs expire for a reason. Conditions, knowledge, and regulations change over time. In San Luis Obispo County, CUPs normally expire 24 months from the issuance date.[5] In this case, the County gave then PXP (now FMOG) ten years--five times as long as usual--to build its Phase IV expansion. The fact that PXP and FMOG did not finish its project within the decade provided does not now provide a good reason to issue an extension. As described below, a significant amount of new information about the safety and impacts of oil drilling has been ascertained within the last ten years, and it is unreasonable to allow FMOG to defy the original condition of its CUP that it must obtain a new CUP for unfinished portions of the project after ten years.

Indeed, the County Code allows extensions (normally of 2-year, not 10-year, permits) in very limited circumstances, including:

1. There have been no changes to the provisions of the Land Use Element or Land Use Ordinance applicable to the project since the approval of the land use permit; or
2. There have been no changes in the character of the site or its surroundings that affect how the standards of the Land Use Element or Land Use Ordinance apply to the project; or
3. There have been no changes to the capacities of community resources, including but not limited to water supply, sewage treatment or disposal facilities, roads or schools such that there is no longer sufficient remaining capacity to serve the project.[6]

Extension"), *available at:* http://www.slocounty.ca.gov/Assets/PL/referrals/south+county/DRC2015-00002_FREEPORT-MCMORAN_CUP_MODIFICATION.pdf.

[3] Staff Report for Phase IV CUP, Exhibit B, "Conditions of Approval."

[4] DRC2015-00002 (Freeport-McMoRan), *Proposed Conditions of Approval* (2015), Phase IV CUP, Exhibit B.

[5] San Luis Obispo Land Use Ordinance, County Code sec. 22.64.060

[6] *Id.* 22.64.070(A).

Further, it is clearly the intention of the County Code that the three CUP 12-month extensions allowed under §22.64.070 be granted one at a time and annually, not all together as Freeport MacMoRan has requested. If the Commission is inclined to grant the Phase IV CUP Extension, which it should not, it can only grant only the first 12-month extension.

In the last decade, there have been changes--at the very least--to water supplies in the community from a multi-year severe drought that is causing water wells to dry up and people to dig deeper wells into new groundwater sources in order to find water for domestic use. Given that California is currently in the fourth year of a historic drought, and communities are more dependent than ever on underground water resources, it is vital that the County act to ensure our groundwater is protected from the toxic waste generated by oil and gas production processes. As the attached and incorporated comments from the Center for Biological Diversity and others describe,[7] the most recent data available as of October 2014 shows that groundwater levels have decreased in many basins throughout the state since spring 2013, and more notably since spring 2010; basins with notable decreases in groundwater levels are in the Sacramento River, San Joaquin River, Tulare Lake, San Francisco Bay, **Central Coast**, and South Coast hydrologic regions.[8] Indeed, there is precedent on the Central Coast for a scenario in which drought causes a major increase in reliance on groundwater supplies: during the last major drought in the late 1980s, the City of San Luis Obispo began pumping groundwater for the first time in history, and by 1990 it received 40% of its water from groundwater.[9]

Even the California Division of Oil, Gas, and Geothermal Resources ("DOGGR") acknowledges that because "some water supply wells are being drilled increasingly deeper, *supporting data must be current and accurate.*"[10] Groundwater in agricultural areas of the State, including the coastal regions, is particularly vulnerable during a drought because it is used to replace unavailable surface water supplies for agriculture. Increased pumping already stresses

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[7] Center for Biological Diversity, *Comments to California Division of Oil, Gas, and Geothermal Resources (DOGGR) re: Arroyo Grande Oil Field Aquifer Exemption Request* (September 21, 2015), and Center for Biological Diversity et al., Comment letter sign-on (September 28, 2015), attached and incorporated herein.

[8] Cal. Department of Water Resources, *Public Update for Drought Response: Groundwater Basins with Potential Water Shortages, Gaps in Groundwater Monitoring, Monitoring of Land Subsidence, and Agricultural Land Fallowing* (November 2014) ("DWR, 2014"), pp. 5, 11 (emphasis added), *available at:* http://water.ca.gov/waterconditions/docs/DWR_PublicUpdateforDroughtResponse_GroundwaterBasins.pdf.

[9] Halverson, Nathan, *What will happen to a sinking California? Just ask San Luis Obispo, Grist* (June 24, 2015) (Halverson), *available at:* http://grist.org/climate-energy/what-will-happen-to-a-sinking-california-just-ask-san-luis-obispo/.

[10] DOGGR and SWRCB, *Aquifer Exemption Process Guidance Document* (April 10, 2015) ("DOGGR Aquifer Exemption Guidance"), p. 5 (emphasis added).

this “last resort” resource because it decreases groundwater levels below wells (“overdraft”), requires more and deeper wells, reduces groundwater quality (by drawing waters from more sources increasing the likelihood of cross-contamination), increases land subsidence (irreversibly reducing the storage capacity of the aquifer network), and threatens drinking water supplies to the many communities that depend mostly or entirely on groundwater for their potable water supply.[11] Newly deepened wells reduce the water pressure in existing shallow wells, forcing nearby users to also drill deeper wells as the existing wells risk running dry. In addition, Californians have been "forced . . . to use water of lesser quality to meet their needs."[12] This increased pumping and decreased surface water supplies make any existing aquifers that are available for potential use – in agriculture or as a drinking source – that much more valuable during the current drought.

The drought has directly affected the water resources of San Luis Obispo County. On March 11, 2014, the San Luis Obispo County Board of Supervisors adopted a resolution proclaiming a local emergency due to drought conditions in the County.[13] The County has proposed a Countywide Water Conservation Program ("WCP") in response to the fact that "[w]ater levels in groundwater basins and surface lakes and reservoirs throughout the County have been in decline for over a decade, and the current 'exceptional drought' exacerbated this decline."[14] As a result, the Board of Supervisors has declared three groundwater basins in the County at Level III severity, which means "groundwater demand has met or exceeded the dependable supply."[15] Clearly there has been a major change in community resources (available water) since 2004 as a result of the drought, and that change is leading to serious environmental impacts. In addition, the WCP would be an amendment to the General Plan and the County Code. The County has not evaluated the effects of extending the CUP in light of the changes in capacity of water supplies, or consistency with the General Plan or County Code amendments; therefore, the County cannot extend it.

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[11] *See generally*, DWR, 2014.
[12] DOGGR, *Aquifer Exemption Guidance*, p. 5; Krieger, Lisa M., *California Drought: San Joaquin Valley Sinking as Farmers Race to Tap Aquifer*, San Jose Mercury News (August 19, 2015), *available at:* http://www.mercurynews.com/drought/ci_25447586/california-drought-san-joaquin-valley-sinking-farmers-race.
[13] Resolution No. 2014-64 (March 11, 2014), *available at*: http://www.slocounty.ca.gov/Assets/AD/images/Resolution+No.+2014-64.pdf.
[14] Countywide Water Conservation FEIR, Executive Summary, p. ES-1, *available at:* http://www.slocounty.ca.gov/planning/water-amendments/environmental-review.htm.
[15] *Id.*

What is more, we now know (and did not know ten years ago) that AGOF's injection operations into the aquifer are in violation of the federal Safe Drinking Water Act. In 2011, the U.S. EPA commissioned a report on California's Underground Injection Control Program ("UIC Program") ("Horsley Witten Report"). That report found, *inter alia*, that state regulations did not protect aquifers as required by the SDWA and the State's primacy agreement.[16] As of early February 2015, California had "identified approximately 2,500 wastewater disposal and enhanced oil recovery wells injecting into potentially non-exempt zones, 2,100 of which [were] 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."[17] These include at least eight injection wells *currently* operating at the AGOF.[18] The extension application contains no information on where these 31 wells--including 11 injection wells--will be, and whether they even comply with the legal requirements of the Safe Drinking Water Act, something not contemplated when the original CUP was issued. The County cannot issue or extend a CUP or otherwise condone illegal activity.

This illegal injection at the AGOF is taking place within a context of a failed effort to regulate oil and gas throughout the state. This month, DOGGR released a self-audit that documented a breakdown in its underground injection control program. It found, among other deficiencies, a failure to require Area of Review evaluations to ensure that the injection site is isolated from other sources of groundwater prior to issuing well permits; failure to conduct required annual reviews of permitted wells; missing or non-existent quality control data; and--based on only a small sample of wells--hundreds of wells that failed to meet current integrity criteria, were potential sources of pollution, or required remediation.[19] As a result, DOGGR

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[16] David Albright, Manager, Ground Water Office, US EPA Region IX, Letter to Elena Miller, State Oil and Gas Supervisor, DOGGR (July 18, 2011) ("July 18, 2011 letter").

[17] CalEPA Review of UIC Program, Memorandum from Matthew Rodriguez, Secretary of CalEPA to Cliff Rechtschaffen, Senior Advisor, Office of the Governor, and John Laird, Secretary, California Natural Resources Agency (March 2, 2015) ("March 2, 2015 CalEPA Memorandum"), p. 1, *available at*: http://www.calepa.ca.gov/Publications/Reports/2015/UICFindings.pdf.

[18] Steve Bohlen, State Oil & Gas Supervisor, DOGGR and Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board, Letter to Michael Montgomery, US EPA, Region IX (October 15, 2015), Attachment A, *available at*: ftp://ftp.consrv.ca.gov/pub/oil/UIC%20Files/20151015%20-%20Joint%20Letter%20to%20US%20EPA%20Cat%201%20Well%20Review%20Findings.pdf.

[19] DOGGR, *Underground Injection Control Program Report on Permitting and Program Assessment, Reporting Period of Calendar Years 2011-2014, Prepared pursuant to Senate Bill 855* (2010) (October 2015) ("SB 855 Report"), *available at*: ftp://ftp.consrv.ca.gov/pub/oil/Publications/SB%20855%20Report%2010-08-2015.pdf.

stated that there was an immediate need for new regulations and procedures regarding well construction, zone of endangerment analyses, inspections, remediation, data management, and other requirements to ensure minimal protection from dangerous well production activities.[20] New regulations further include well stimulation regulations that went into effect in July 2015, and a proposal to adopt new regulations for cyclic steam operations (which occur at the AGOF) because of the unique risks it poses to bore integrity and even worker safety.[21]

As a result of new environmental conditions and more limited resources due to the drought, new water management protocols that will be required under the County WCP, new information on lax oil and gas regulatory oversight, and new regulations coming into play that are essential for providing the most basic, minimum protections for health and the environment, the County cannot issue a CUP extension for the new wells. The oil field is subject to state, federal, and county laws that have not been regularly enforced but must be now--such as the Safe Drinking Water Act--and to regulations that are currently being developed and implemented, as described above. At the very least, before summarily finding that the project meets current County Code requirements despite the fact that the application provides no support for this proposition and, indeed, fails to meet the County's own criteria for issuing permit extensions, the County must ensure that it is not permitting illegal wells or condoning harmful activity. The CUP extension, therefore, must be denied.

II. The County Must Require a Subsequent EIR Before Extending or Issuing FMOG a Permit to Drill More Wells

Even if the County believes that the CUP extension is warranted under the County Code (which it is not), as a result of the new regulatory information and new environmental conditions described above, and new scientific information that has become available since the original EIR was certified in 2004, the County must prepare a supplemental or subsequent EIR (SEIR) before extending the CUP (or issuing a new CUP) for the 31 new wells. An SEIR is required when substantial changes occur in circumstances under which the project is being undertaken that will require major revisions in the EIR, or new information of substantial importance to the project

[20] *Id.*; DOGGR, *Renewal Plan for Oil and Gas Regulation: Changing Past Practices to Usher in a New Era of Oil and Gas Regulation* (October 2015) ("Renewal Plan"), *available at:* ftp://ftp.consrv.ca.gov/pub/oil/Publications/Renewal%20Plan%2010-08-2015.pdf.
[21] Renewal Plan, pp. 9-10.

that was not known and could not have been known when the EIR was certified as complete becomes available.[22] Both circumstances exist here.

A change in circumstances requires a SEIR when the change is substantial, involves new or more significant impacts that require significant changes to the EIR, and the impacts were not covered in previous EIR.[23] Meanwhile, "[n]ew information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified . . . shows any of the following:"

> (A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
>
> (B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;
>
> (C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
>
> (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.[24]

Here, the multi-year, serious drought coupled with mandatory water restrictions, new information about the poor integrity of existing wells and nearly non-existent environmental and safety regulatory oversight of oil operations, and new scientific information about the harmful impacts of oil extraction activities have come to light in the last ten years. This new information should result in new requirements and mitigation measures to reduce newly known or more severe significant impacts not previously analyzed. Therefore, a SEIR is required.

First, as described above, there is significant and substantial new information about the breakdown of the regulatory regime under which oil drilling has taken place in California up until now. FMOG's desire to drill the 31 new wells must be re-evaluated within this new context, which will provide new requirements and mitigation measures on wells and oil operations. The

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[22] Cal. Pub. Res. Code § 21166; CEQA Guidelines § 15162(a). At the very least, the County must prepare a supplemental EIR for the 31 wells, given all of the new information that has come to light in the last decade. CEQA Guidelines § 15163.
[23] CEQA Guidelines § 15162(a)(2).
[24] CEQA Guidelines § 15162(a)(3).

recent reports issued by DOGGR (discussed *supra*) demonstrate that its failure to regulate and enforce oil drilling has resulted in thousands of wells with potentially compromised integrity that can pose serious threats to the environment. Improper well construction, maintenance, or plugging can allow oil and gas "fluids and naturally occurring toxic and radioactive materials to migrate into shallower groundwater aquifers."[25]

Second, also as described above, the drought has created a substantial change in circumstances that will result in more serious adverse impacts than were understood when the 2004 EIR was certified. Eleven of the new wells will be injection wells, and their potentially significant impacts to San Luis Obispo's dwindling and precious water supplies must be evaluated before they can be permitted. Even the original 2004 EIR noted the potential for injection wells at this site to impact other beneficial and potable groundwater: "[w]astewater generated through the petroleum recovery process would be reinjected into wastewater injection wells. This wastewater reinjection could impact shallow groundwater supplies if the wastewater came in contact with groundwater used for domestic purposes. If this occurred, the water quality of down-gradient public and municipal water production wells could be degraded."[26] Given the increasingly scarce availability of water over the last few years, these potential impacts will be even more devastating and significant that previously believed.[27]

Third, we now have an incredible amount of new scientific information and knowledge about the actual impacts of oil operations on the environment, health, and safety that we did not have in 2004. This includes, for instance, new information on groundwater impacts, such as the

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[25] NRDC, 2015, p. 7, *citing* Ingraffea, Anthony, et al., *Assessment and Risk Analysis of Casing and Cement Impairment in Oil and Gas Wells in Pennsylvania, 2000–2012, Proceedings of the National Academy of Sciences*, June 2014, doi:10.1073/pnas.1323422111.

[26] San Luis Obispo County Department of Planning Building, and Padre Associates, Inc., *Final Plains Exploration and Production Phase IV Development Plan Environmental Impact Report* (September 2004) ("Phase IV EIR"), section 5.7.2.3, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Historical+Documents/2004+-+Phase+IV+EIR/phpEIR2004.pdf.

[27] *See generally:* California Council of Science and Technology, *Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* (Jul. 2015) ("CCST Report"), Vol. II, Ch. 2; U.S. EPA. (2015); U.S. Environmental Protection Agency, Washington, DC, *Assessment of the potential impacts of hydraulic fracturing for oil and gas on drinking water resources* (External review draft)., EPA/600/R-15/047, 2015, *available at:* http://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=244651; Physicians for Social Responsibility, *Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction)*, 3rd ed. (Oct. 14, 2015) ("PSR Compendium of Findings, 2015"), pp. 26-52. Although these reports evaluate hydraulic fracturing and well stimulation, many of the conclusions also apply to other oil extraction techniques, such as steam flooding, cyclic steam, horizontal drilling, injection, and other techniques that occur at the AGOF.

fact that changes in pressure, earthquakes, and subsidence from injection and dewatering[28] can cause potential changes to the water flow paths that contribute to beneficial use reservoirs;[29] in other words, they can cause groundwater to shift its flow path such that an aquifer once thought isolated could now contaminate beneficial use groundwater. Further, known and unknown abandoned wells and compromised wells can create pathways to contamination.[30] These and other potential vectors for groundwater contamination exist in the AGOF and have not been adequately studied. In addition, drilling itself can create conduits to previously isolated sources of water.[31] A recent report finds that "because the oil-containing rock layers in California are located closer to the surface than in other states, the state's groundwater is potentially vulnerable to chemical contamination through vertical faults and fissures and via old and abandoned wells."[32] Indeed, the initial study for the next phase (Phase V) expansion of the AGOF to add up to 450 wells confirms this: "[a]s this formation is relatively close to the surface, potential impacts increase to nearby potable groundwater tables."[33]

We now know, too, that the risk of well blow outs, spills, and other accidents that can contaminate soil and groundwater is much higher than previously believed. A recent analysis estimated that "[o]nshore production sites leaked oil, produced water and other material at least 9,728 times last year, releasing 716,844 barrels of fluid…. In states where comparisons could be made, the number of spills jumped 20 percent between 2013 and 2014."[34] Several recent studies have found methane, fracking fluids, brine, and heavy metals, among other oil-related pollution,

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[28] FMOG is gradually dewatering the reservoir under the AGOF. *See* FMOG, *Arroyo Grande Oil Field, San Luis Obispo County, California, Dollie Sands, Pismo Formation Aquifer Exemption Application* to DOGGR (2015) ("FMOG aquifer exemption application"), pp. 17, 21, *available at:* ftp://ftp.consrv.ca.gov/pub/oil/Aquifer_Exemptions/County/San_Luis_Obispo/Arroyo_Grande_Oilfield/Dollie_Sands_Pismo_Formation/Arroyo%20Grande%20Oilfield%20Edna%20Member%20Dollie%20Sands%20Pismo%20Formation%20Aquifer%20Exemption%20Application.pdf.

[29] CCST Report, Vol. II, Ch. 2, pp. pp. 104-109, 117-121, 124, 125-126, 151, 165.

[30] CCST Report, Vol. II, Ch. 2, pp. 104-109, 122-125, 159; United State Government Accountability Office (US GAO), *EPA Program to Protect Underground Sources from Injection of Fluids Associated With Oil and Gas Production Needs Improvement*, Report to Congressional Requesters (GAO-14-555, June 2014) ("GAO Report"), pp. 23-24.

[31] CCST Report, Vol. II, Ch. 2, pp. 104-109.

[32] PSR Compilation, p. 28. *See also* CCST Report, Summary Report, *available at:* http://ccst.us/publications/2015/2015SB4summary.pdf

[33] San Luis Obispo County Department of Planning and Building, *Initial Study, Phase V Oilfield Expansion Conditional Use Permit* (November 2012) ("Phase V Initial Study"), p. 22, available at: http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/initialstudy.pdf .

[34] NRDC, 2014, p. 6; King, Pamela, and Mike Soraghan, "*U.S. spill count rose 20% in 2014*," EnergyWire, September 29, 2015, available at http://www.eenews.net/energywire/stories/1060025432/search?keyword=spills+up+18+Percent+in+U.S.+in+2013 (accessed October 21, 2015).

in water samples from nearby drinking water wells and surface water bodies near oil and gas sites.[35] Moreover, "naturally occurring radioactive materials" brought to the surface with oil and gas produced water also poses risks to oil field workers, neighbors, and the environment because it can "accumulate in pipes and other well equipment, build up in sediments downstream of wastewater treatment facilities [such as the one at the AGOF], and contaminate the air and soil when wastewater is sprayed on roads."[36]

New information that has come to light since the 2004 EIR not only reveals increased risks of oil extraction to soil and water resources, but also to air, noise, odors, traffic, and geology (including earthquakes and subsidence).[37] Air pollution has been extensively and widely linked to all phases of oil and gas development and production.[38] Emissions include: toxic chemicals such as benzene, toluene, ethylbenzene, xylene, and hydrogen sulfide; criteria pollutants that contribute to the formation of ground-level ozone (which harms the respiratory system) such as VOCs and NOx; and, greenhouse gases such as methane, NOx, and CO2.[39] Improper plugging or idling of wells may continue to release hydrocarbons, methane, and other VOCs even after a well has become idle.[40] Health effects from exposure to these pollutants cause a wide

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[35] *See e.g.*, NRDC, 2014, p. 7; Llewellyn, Garth T., *Evaluating a Groundwater Supply Contamination Incident Attributed to Marcellus Shale Gas Development*, Proceedings of the National Academy of Sciences 112 (20) (2015): 6325–6330, doi: 10.1073/pnas.1420279112; Osborn, Stephen G., et al., *Methane Contamination of Drinking Water Accompanying Gas-Well Drilling and Hydraulic Fracturing*, Proceedings of the National Academy of Sciences 108 (20) (2011): 8172–76, doi:www.pnas.org/cgi/doi/10.1073/pnas.1100682108; Fontenot, Brian E., et al., *An Evaluation of Water Quality in Private Drinking Water Wells Near Natural Gas Extraction Sites in the Barnett Shale Formation*, Environmental Science & Technology 47 (2013): 10032–40, doi:dx.doi.org/10.1021/es4011724.

[36] NRDC, 2014, p. 9; Skalak, Katherine J., et al., *Surface Disposal of Produced Waters in Western and Southwestern Pennsylvania: Potential for Accumulation of Alkali-Earth Elements in Sediments*, International Journal of Coal Geology, 2013, doi:10.1016/j.coal.2013.12.001 (as cited in NRDC 2014).

[37] *See generally*, PSR Compendium of Findings, 2015; CCST Report.

[38] *See generally*, CCST Report, Vol. II, Ch. 3. *See also* PSR Compendium of Findings, 2015, pp. 14-26, describing the many studies from the previous five years documenting new information about increased risks of and from air pollution from oil operations.

[39] Some of the many recent studies oil operations and air pollution include: McKenzie, Lisa M. et al., *Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources*, Science of the Total Environment 424 (2012): 79–87, doi:10.1016/j.scitotenv.2012.02.018 (as cited in NRDC 2014 endnote 35); Eastern Research Group (ERG) and Sage Environmental Consulting LP, *City of Fort Worth Natural Gas Air Quality Study*, 2012, Fort Worth, TX ; Gilman, Jessica, et al., *Source Signature of Volatile Organic Compounds (VOCs) from Oil and Natural Gas Operations in Northeastern Colorado*, Environmental Science & Technology 47 (3) (2013): 1297–1305, doi:10.1021/es304119a.

[40] David T. Allen, *Atmospheric Emissions and Air Quality Impacts from Natural Gas Production and Use*, Annual Review of Chemical and Biomolecular Engineering, February 2014, doi:10.1146/annurevchembioeng- 060713-035938 (as cited in NRDC 2014 endnote 43).

of health effects, including respiratory, cardiovascular, and neurological harm, endocrine disruption, birth defects, cancer, burning eyes and skin irritation, headaches and nausea, and premature mortality.[41] In addition, the greenhouse gases emitted contribute to climate change, which will have severe environmental impacts, but was not studied in the original EIR.

The noise, odors, night-time light, and traffic associated with oil operations all have serious environmental and health effects, and new studies have documented the severity of these impacts.[42] The impacts of noise (grinding, drilling, blasting, flaring, running generators) and night-time light, for instance, can lead to stress and anxiety, hypertension, and cardiovascular and endocrine problems.[43] Truck traffic similarly contributes to noise and air pollution, as well as stress and anxiety.[44] In addition, a new study has found that oil and gas development lead to increase in traffic accidents in the area,[45] In addition to noise, air emissions, and congestion from increased traffic, such new information about safety must also be studied in a SEIR.

Additionally, new information is now known about the risks of oil and gas operations to and from earthquakes, as well as in causing adverse impacts from land subsidence. Known and unknown faults can be conduits for fluid migration.[46] In fact, the Federal Regulations require that all new Class II wells be sited "in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review."[47] What is more, we now know more about how oil and gas activity itself, including from wastewater injection, can activate faults and trigger earthquakes.[48] As a

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[41] NRDC, 2014, pp. 6-7; Finkel, Madelon, et al., *Modern Natural Gas Development and Harm to Health: The Need for Proactive Public Health Policies*, ISRN Public Health, 2013, doi:http://dx.doi.org/10.1155/2013/408658

[42] *See generally*, PSR Compendium of Findings, 2015, pp. 78-81.

[43] *Id.*

[44] *Id.*

[45] Texas A&M Transportation Institute, *Oil and Gas Energy Developments and Changes in Crash Trends in Texas*, Final Report, PRC 15-35 F (Oct. 2015).

[46] CCST Report, Vol. II, Ch. 2, pp. 125-126.

[47] 40 C.F.R. § 146.22(a). *See also* CCST Report, Vol. II, Ch. 2, p. 151 ("Site characterization requirements include a confining zone free of known open faults or fractures that separates the injection zone from underground sources of drinking water. . . .").

[48] *See generally*, PSR Compendium of Findings, 2015, pp. 81-95, describing the dozens of studies from the last five years documenting induced seismicity from injection and other well stimulation activities. *See also*, California Council on Science and Technology Lawrence Berkeley National Laboratory Pacific Institute, *Advanced Well Stimulation in California*, "Executive Summary" (August 28, 2014) ("2014 CCST Report"), pp. 41, 269-275, *available at*: http://ccst.us/publications/2014/2014wstES.pdf. Further study is needed as well. "[A]reas of the southern San Joaquin, Ventura, Santa Clarita and Santa Maria basins, where active water disposal wells are concentrated at present (Figure 5-10), have relatively high rates of seismicity in the 2-5 magnitude range. While undoubtedly most of these earthquakes are naturally-occurring, detailed study of the seismicity in relation to fluid injection will be needed to assess the likelihood that a proportion of the events in these areas are induced." 2014

2014 scientific report noted, if "produced water is disposed of by injection and not handled through an expansion of water treatment and re-use systems, it could increase seismic hazards."[49] Even a small earthquake can compromise well integrity and other oil infrastructure, leading to water and soil contamination. Subsidence is similarly likely occurring at the AGOF due to the gradual dewatering of the reservoir.[50] Neither earthquakes nor subsidence was not evaluated in the 2004 EIR, but must be studied now.

In sum, we now have an overwhelming amount of new scientific information documenting impacts from oil and gas activity that were either underestimated or not known in 2004 when the County certified the original Phase IV EIR. We also now have far more information about the failures of the state and local agencies to effectively regulate and monitor oil and gas production, and of the potential for thousands of wells across the state to contaminate air, water, and soil. Local and state agencies are in the process of updating regulations to provide even the most basic protection for oil field neighbors and workers from the harmful effects of oil operations, as well as regulations regarding water scarcity due to the drought. Given all of these changes in circumstances and new information, the County--which represents the neighbors of the AGOF--cannot and must not issue or extend a CUP for the 31 wells without, at a bare minimum, preparing a SEIR.

III. The 31 Wells are Part of a Larger Project with Reasonable Foreseeable Future Phases, and Cannot be Piecemealed to Avoid CEQA Review

CEQA requires that an EIR identify all significant impacts on the environment of the "whole of action."[51] Environmental review thus requires that a proposed project be analyzed along with reasonably foreseeable future phases or other action.[52] In addition, applicants may not avoid environmental review "by chopping up proposed projects into bite-size pieces which, individually considered, might be found to have no significant effect on the environment or to be

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CCST Report, pp. 275-6. *See also* Brodsky, Emily and Lisa J. Lajoie, *Anthropogenic Seismicity Rates and Operational Parameters at the Salton Sea Geothermal Field*, Science, vol. 341 (Aug. 2, 2013); Ellsworth, William, *Injection-Induced Earthquakes*, Science, vol. 341 (6142) (July 12, 2013); Clarke, D., et al., *Induced seismicity potential in energy technologies*, National Academies Press, 2012 (as cited in NRDC 2014, endnote 70).

[49] 2014 CCST Report, p. 41.

[50] FMOG aquifer exemption application, pp. 17, 21; CCST Report, Vol. II, Ch. 2, p. 124.

[51] CEQA Guidelines §§ 15126.2(a) § 15378; *RiverWatch v. Olivenhain Mun. Water Dist.* (2009) 170 Cal.App.4th 1186.

[52] *Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 396.

only ministerial."[53] Indeed, CEQA requires that environmental considerations must not be hidden by separately focusing on isolated parts, overlooking the cumulative effect of the whole action, or attempting to avoid responsibility for considering the environmental impact of the project as a whole.[54]

Here, the 31 wells are part of a much larger project that is being illegally piecemealed into bite-sized pieces to avoid an analysis of the impacts of the larger project. First, FMOG has explicitly said that the 31 wells are tied into its Phase V expansion. FMOG requests in its extension application for a three-year extension up to August 2018 "or until such time as a decision regarding FM O&G's pending CUP application for the Phase V Development of AGOF is made by the County."[55] FMOG further notes in its extension application that the extra three years to drill the 31 wells will "provide a seamless transition into FM O&G's proposed Phase V Development (if approved)."[56] FMOG is in the process of applying for a conditional use permit for its Phase V expansion project, which would increase oil production at the AGOF from the current approximately 1,350 barrels per day (bpd) of oil to up to 9,000-10,000 bpd--up to a nearly ten-fold increase in oil production.[57] The project would add 350 new wells and 100 replacement wells on 11 new well pads and 38 modified well pads, and will include both vertical and directional drilling.[58] In its initial study, the County of San Luis Obispo found that this project has the potential for significant impacts and impacts that require mitigation to, among other environmental resources: wildlife species and vegetation that are endangered or threatened by water degradation,[59] geology,[60] groundwater and hydrology.[61] Given that the Phase V

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[53] *Orinda Assn v. Board of Supervisors* (1986) 182 Cal.App.3d 1145, 1171.
[54] *Id.*; *Bozung v. LAFCO* (1975) 13 Cal.3d 263, 283.
[55] Phase IV CUP Extension, *Attachment A: Project Description*, *available at:* http://www.slocounty.ca.gov/Assets/PL/referrals/south+county/DRC2015-00002_FREEPORT-MCMORAN_CUP_MODIFICATION.pdf.
[56] *Id.*
[57] Freeport MacMoRan, *Application for Aquifer Exemption, Arroyo Grande Oilfield* ("FM Application"), p. 3; Phase V Initial Study, p. 2; San Luis Obispo County Department of Planning and Building, *Scoping Meeting Presentation* (Feb. 19, 2014), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Scoping+Meeting/Presentation+2-19-14.pdf.
[58] Phase V Initial Study, p. 2.
[59] Phase V Initial Study, pp. 13-18. *See also* California Department of Fish and Wildlife, *Letter in Review of the Phase V Environmental Impact Report Notice of Preparation* (January 8, 2013), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Notice+of+Preparation+(NOP)/Responses+Received/CADFW.pdf.
[60] Phase V Initial Study, pp. 21-22.
[61] Phase V Initial Study, pp. 41-48.

expansion is currently undergoing environmental review (hence, it is more than a "reasonably foreseeable" future phase), and given that the County cannot extend the CUP without first requiring a SEIR, perhaps the County should instead analyze the 31 wells in the Phase V EIR and (if the County so chooses) approve the CUP for these wells then.

Second, last year, the County approved a massive pipeline to run from the AGOF to Phillips 66 Santa Maria refinery, which would accommodate the Phase V expanded production.[62] The County approved this pipeline, which travels down residential streets and over several waterways, based only on a negative declaration and with a minor use permit.[63] In other words, by separating this project from the larger expansion of production (and sales) at the oil field, Phillips 66 and FMOG improperly skirted the requirements of CEQA.

Third, FMOG is in the process of requesting from DOGGR, the State Water Resources Control Board, and US EPA an aquifer exemption to allow FMOG to inject wastewater into an aquifer that is currently protected under the Safe Drinking Water Act.[64] As noted above, at present, FMOG has at least eight injection wells operating in the protected aquifer. FMOG has requested that the DEIR for the Phase V expansion be put on hold until the aquifer exemption process is complete.[65] In order to try to legitimize what is currently illegal and accommodate the planned expansions, FMOG is looking to this exemption process to help facilitate the increased volumes of produced water. Thus, this exemption project, too, is intricately tied to the 31 wells, the pipeline, and the Phase V expansion, and severing it from the rest of the project has allowed FMOG to unlawfully evade the requirements of CEQA. The County must not condone or assist FMOG's actions to evade public review and disclosure of the impacts of its massive planned expansion at the AGOF by extending the CUP to allow FMOG to construct the 31 wells.

III. Conclusion

Although the 31 wells were part of the AGOF Phase IV expansion plan, under the County Code and CEQA, new environmental conditions and scientific knowledge about the impacts of oil and gas activities require that the County reject FMOG's three-year extension request. Rather,

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[62] San Luis Obispo County, *Negative Declaration and Notice of Determination, Phillips 66 5.6 Mile Pipeline; Minor Use Permit; DRC2012-00101* (Sept. 25, 2014).
[63] *Id.*
[64] FMOG aquifer exemption application.
[65] Phase V Conditional Use Permit (DRC2012-00035) Ongoing Status Report, *available at*: http://www.slocounty.ca.gov/Assets/PL/environmental/plains/OngoingStatusReport.pdf.

the County must evaluate the proposed project under CEQA by requiring either a SEIR or review in the Phase V EIR before deciding whether to approve the construction of these wells. Indeed, the 31 wells is really part of a much larger project to expand production and sales at the AGOF, and must be analyzed as part of this activity. The agencies responsible for protecting California's residents from the harmful impacts of oil and gas drilling and extraction activities have fallen asleep at the wheel. It's time for the County step up and protect the public health and beautiful environment of San Luis Obispo County.

Sincerely,

/s/

Maya Golden-Krasner
Staff Attorney, Climate Law Institute
Center for Biological Diversity

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Attachment C

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

CENTER for BIOLOGICAL DIVERSITY Because life is good.

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October 21, 2015

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RHedges@co.slo.ca.us

Re: Freeport-McMoRan Oil & Gas, LLC, Arroyo Grande Oil Field, Application to Extend Phase IV CUP # D010386D

To Whom It May Concern,

The Center for Biological Diversity ("the Center") submits comments in opposition to the request by Freeport-McMoRan ("FMOG") for an extension of its conditional use permit ("CUP") for its Phase IV expansion for another three years in order to allow FMOG to build 31 new wells at the Arroyo Grande Oil Field ("AGOF"). FMOG's CUP expired in August 2015, and FMOG now seeks to extend its terms from the original ten years to thirteen. Since the County of San Luis Obispo ("County") certified the Environmental Impact Report ("EIR") for the Phase IV expansion project in 2004, however, significant new information about the health and environmental harms of oil drilling have become known, and new regulations governing oil and gas drilling have been adopted. In addition, the State has found that at least eight of the injection wells operating at the AGOF are illegally injecting into groundwater that has not been exempted from the federal protections of the Safe Drinking Water Act. The State has also recently found

that many wells across California do not meet current integrity criteria and have not been reviewed or inspected in many years. In light of all of this new and serious information, the County cannot rely on a decade-old EIR to extend FMOG's CUP to drill 31 new wells. Given that as of 2014, the total number of active (non-plugged) and new wells in all of San Luis Obispo County was approximately 400, adding 31 wells to one oil field is significant.[1] Moreover, FMOG plans to add another 450 wells in Phase V of its expansion plan, and any evaluation of impacts of these 31 wells must take into account the foreseeable Phase V expansion.

I. The County Cannot Extend FMOG's CUP, But Rather Must Issue a New CUP for the 31 Wells

The County cannot issue FMOG a CUP extension because the original conditions required that FMOG receive a new CUP for Phase IV work not completed, and because new information about environmental conditions since 2004 negate the County criteria for issuing CUP extensions.

In 2005, the County issued FMOG a CUP for its Phase IV expansion. This Phase IV project included:

- Grading of 4 new well pads (total disturbance of about 2.68 acres);
- Grading on 18 existing well pads (total disturbance of about 4.22 acres);
- Construction of 95 production wells;
- Construction of 30 injection wells;
- Construction of 3 new steam generators (previously approved in the 1994 Phase III Development Plan); and,
- Increasing production of marketable quality crude oil from 1,800 – 1,900 barrels of per day (BOPD) to 5,000 BOPD.

The CUP expired in August 2015, and FMOG has applied for an extension of the permit in order to build 31 (20 production, 8 steam injection, and 3 water disposal) Phase IV wells that have not yet been built.[2]

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[1] Natural Resources Defense Council, *Drilling in California: Who's at Risk?* (October 2014) ("NRDC, 2014"), Appendix II, Table 1.

[2] Freeport MacMoRan Oil and Gas, *Conditional Use Permit Application to extend 10-year time limit on Arroyo Grande Phase IV* (July 20, 2015), San Luis Obispo Department of Planning and Building ("Phase IV CUP

The County cannot extend the CUP for an additional three years to build 31 new wells. The Conditions of Approval for the Phase IV CUP specifically state that "[a]t the end of the ten years, any wells or steam generators not yet completed shall require review and approval of a new Conditional Use Permit."[3] The County staff now proposes to "amend" this condition to state that "[a]t the end of the thirteen years, with a start date of August 9, 2005 and end date of August 9, 2018, any wells or steam generators not yet completed shall require review and approval of a new Conditional Use Permit."[4] The County cannot simply amend its earlier conditions to explicitly require the opposite of what the condition originally stated; otherwise, the original condition would have no meaning.

CUPs expire for a reason. Conditions, knowledge, and regulations change over time. In San Luis Obispo County, CUPs normally expire 24 months from the issuance date.[5] In this case, the County gave then PXP (now FMOG) ten years--five times as long as usual--to build its Phase IV expansion. The fact that PXP and FMOG did not finish its project within the decade provided does not now provide a good reason to issue an extension. As described below, a significant amount of new information about the safety and impacts of oil drilling has been ascertained within the last ten years, and it is unreasonable to allow FMOG to defy the original condition of its CUP that it must obtain a new CUP for unfinished portions of the project after ten years.

Indeed, the County Code allows extensions (normally of 2-year, not 10-year, permits) in very limited circumstances, including:

1. There have been no changes to the provisions of the Land Use Element or Land Use Ordinance applicable to the project since the approval of the land use permit; or
2. There have been no changes in the character of the site or its surroundings that affect how the standards of the Land Use Element or Land Use Ordinance apply to the project; or
3. There have been no changes to the capacities of community resources, including but not limited to water supply, sewage treatment or disposal facilities, roads or schools such that there is no longer sufficient remaining capacity to serve the project.[6]

Extension"), *available at:* http://www.slocounty.ca.gov/Assets/PL/referrals/south+county/DRC2015-00002_FREEPORT-MCMORAN_CUP_MODIFICATION.pdf.

[3] Staff Report for Phase IV CUP, Exhibit B, "Conditions of Approval."

[4] DRC2015-00002 (Freeport-McMoRan), *Proposed Conditions of Approval* (2015), Phase IV CUP, Exhibit B.

[5] San Luis Obispo Land Use Ordinance, County Code sec. 22.64.060

[6] *Id.* 22.64.070(A).

Further, it is clearly the intention of the County Code that the three CUP 12-month extensions allowed under §22.64.070 be granted one at a time and annually, not all together as Freeport MacMoRan has requested. If the Commission is inclined to grant the Phase IV CUP Extension, which it should not, it can only grant only the first 12-month extension.

In the last decade, there have been changes--at the very least--to water supplies in the community from a multi-year severe drought that is causing water wells to dry up and people to dig deeper wells into new groundwater sources in order to find water for domestic use. Given that California is currently in the fourth year of a historic drought, and communities are more dependent than ever on underground water resources, it is vital that the County act to ensure our groundwater is protected from the toxic waste generated by oil and gas production processes. As the attached and incorporated comments from the Center for Biological Diversity and others describe,[7] the most recent data available as of October 2014 shows that groundwater levels have decreased in many basins throughout the state since spring 2013, and more notably since spring 2010; basins with notable decreases in groundwater levels are in the Sacramento River, San Joaquin River, Tulare Lake, San Francisco Bay, **Central Coast**, and South Coast hydrologic regions.[8] Indeed, there is precedent on the Central Coast for a scenario in which drought causes a major increase in reliance on groundwater supplies: during the last major drought in the late 1980s, the City of San Luis Obispo began pumping groundwater for the first time in history, and by 1990 it received 40% of its water from groundwater.[9]

Even the California Division of Oil, Gas, and Geothermal Resources ("DOGGR") acknowledges that because "some water supply wells are being drilled increasingly deeper, *supporting data must be current and accurate.*"[10] Groundwater in agricultural areas of the State, including the coastal regions, is particularly vulnerable during a drought because it is used to replace unavailable surface water supplies for agriculture. Increased pumping already stresses

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[7] Center for Biological Diversity, *Comments to California Division of Oil, Gas, and Geothermal Resources (DOGGR) re: Arroyo Grande Oil Field Aquifer Exemption Request* (September 21, 2015), and Center for Biological Diversity et al., Comment letter sign-on (September 28, 2015), attached and incorporated herein.

[8] Cal. Department of Water Resources, *Public Update for Drought Response: Groundwater Basins with Potential Water Shortages, Gaps in Groundwater Monitoring, Monitoring of Land Subsidence, and Agricultural Land Fallowing* (November 2014) ("DWR, 2014"), pp. 5, 11 (emphasis added), *available at:* http://water.ca.gov/waterconditions/docs/DWR_PublicUpdateforDroughtResponse_GroundwaterBasins.pdf.

[9] Halverson, Nathan, *What will happen to a sinking California? Just ask San Luis Obispo, Grist* (June 24, 2015) (Halverson), *available at:* http://grist.org/climate-energy/what-will-happen-to-a-sinking-california-just-ask-san-luis-obispo/.

[10] DOGGR and SWRCB, *Aquifer Exemption Process Guidance Document* (April 10, 2015) ("DOGGR Aquifer Exemption Guidance"), p. 5 (emphasis added).

this “last resort” resource because it decreases groundwater levels below wells (“overdraft”), requires more and deeper wells, reduces groundwater quality (by drawing waters from more sources increasing the likelihood of cross-contamination), increases land subsidence (irreversibly reducing the storage capacity of the aquifer network), and threatens drinking water supplies to the many communities that depend mostly or entirely on groundwater for their potable water supply.[11] Newly deepened wells reduce the water pressure in existing shallow wells, forcing nearby users to also drill deeper wells as the existing wells risk running dry. In addition, Californians have been "forced . . . to use water of lesser quality to meet their needs."[12] This increased pumping and decreased surface water supplies make any existing aquifers that are available for potential use – in agriculture or as a drinking source – that much more valuable during the current drought.

The drought has directly affected the water resources of San Luis Obispo County. On March 11, 2014, the San Luis Obispo County Board of Supervisors adopted a resolution proclaiming a local emergency due to drought conditions in the County.[13] The County has proposed a Countywide Water Conservation Program ("WCP") in response to the fact that "[w]ater levels in groundwater basins and surface lakes and reservoirs throughout the County have been in decline for over a decade, and the current 'exceptional drought' exacerbated this decline."[14] As a result, the Board of Supervisors has declared three groundwater basins in the County at Level III severity, which means "groundwater demand has met or exceeded the dependable supply."[15] Clearly there has been a major change in community resources (available water) since 2004 as a result of the drought, and that change is leading to serious environmental impacts. In addition, the WCP would be an amendment to the General Plan and the County Code. The County has not evaluated the effects of extending the CUP in light of the changes in capacity of water supplies, or consistency with the General Plan or County Code amendments; therefore, the County cannot extend it.

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[11] *See generally*, DWR, 2014.
[12] DOGGR, *Aquifer Exemption Guidance*, p. 5; Krieger, Lisa M., *California Drought: San Joaquin Valley Sinking as Farmers Race to Tap Aquifer*, San Jose Mercury News (August 19, 2015), *available at:* http://www.mercurynews.com/drought/ci_25447586/california-drought-san-joaquin-valley-sinking-farmers-race.
[13] Resolution No. 2014-64 (March 11, 2014), *available at*: http://www.slocounty.ca.gov/Assets/AD/images/Resolution+No.+2014-64.pdf.
[14] Countywide Water Conservation FEIR, Executive Summary, p. ES-1, *available at:* http://www.slocounty.ca.gov/planning/water-amendments/environmental-review.htm.
[15] *Id.*

What is more, we now know (and did not know ten years ago) that AGOF's injection operations into the aquifer are in violation of the federal Safe Drinking Water Act. In 2011, the U.S. EPA commissioned a report on California's Underground Injection Control Program ("UIC Program") ("Horsley Witten Report"). That report found, *inter alia*, that state regulations did not protect aquifers as required by the SDWA and the State's primacy agreement.[16] As of early February 2015, California had "identified approximately 2,500 wastewater disposal and enhanced oil recovery wells injecting into potentially non-exempt zones, 2,100 of which [were] 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."[17] These include at least eight injection wells *currently* operating at the AGOF.[18] The extension application contains no information on where these 31 wells--including 11 injection wells--will be, and whether they even comply with the legal requirements of the Safe Drinking Water Act, something not contemplated when the original CUP was issued. The County cannot issue or extend a CUP or otherwise condone illegal activity.

This illegal injection at the AGOF is taking place within a context of a failed effort to regulate oil and gas throughout the state. This month, DOGGR released a self-audit that documented a breakdown in its underground injection control program. It found, among other deficiencies, a failure to require Area of Review evaluations to ensure that the injection site is isolated from other sources of groundwater prior to issuing well permits; failure to conduct required annual reviews of permitted wells; missing or non-existent quality control data; and--based on only a small sample of wells--hundreds of wells that failed to meet current integrity criteria, were potential sources of pollution, or required remediation.[19] As a result, DOGGR

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[16] David Albright, Manager, Ground Water Office, US EPA Region IX, Letter to Elena Miller, State Oil and Gas Supervisor, DOGGR (July 18, 2011) ("July 18, 2011 letter").

[17] CalEPA Review of UIC Program, Memorandum from Matthew Rodriguez, Secretary of CalEPA to Cliff Rechtschaffen, Senior Advisor, Office of the Governor, and John Laird, Secretary, California Natural Resources Agency (March 2, 2015) ("March 2, 2015 CalEPA Memorandum"), p. 1, *available at*: http://www.calepa.ca.gov/Publications/Reports/2015/UICFindings.pdf.

[18] Steve Bohlen, State Oil & Gas Supervisor, DOGGR and Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board, Letter to Michael Montgomery, US EPA, Region IX (October 15, 2015), Attachment A, *available at*: ftp://ftp.consrv.ca.gov/pub/oil/UIC%20Files/20151015%20-%20Joint%20Letter%20to%20US%20EPA%20Cat%201%20Well%20Review%20Findings.pdf.

[19] DOGGR, *Underground Injection Control Program Report on Permitting and Program Assessment, Reporting Period of Calendar Years 2011-2014, Prepared pursuant to Senate Bill 855* (2010) (October 2015) ("SB 855 Report"), *available at*: ftp://ftp.consrv.ca.gov/pub/oil/Publications/SB%20855%20Report%2010-08-2015.pdf.

stated that there was an immediate need for new regulations and procedures regarding well construction, zone of endangerment analyses, inspections, remediation, data management, and other requirements to ensure minimal protection from dangerous well production activities.[20] New regulations further include well stimulation regulations that went into effect in July 2015, and a proposal to adopt new regulations for cyclic steam operations (which occur at the AGOF) because of the unique risks it poses to bore integrity and even worker safety.[21]

As a result of new environmental conditions and more limited resources due to the drought, new water management protocols that will be required under the County WCP, new information on lax oil and gas regulatory oversight, and new regulations coming into play that are essential for providing the most basic, minimum protections for health and the environment, the County cannot issue a CUP extension for the new wells. The oil field is subject to state, federal, and county laws that have not been regularly enforced but must be now--such as the Safe Drinking Water Act--and to regulations that are currently being developed and implemented, as described above. At the very least, before summarily finding that the project meets current County Code requirements despite the fact that the application provides no support for this proposition and, indeed, fails to meet the County's own criteria for issuing permit extensions, the County must ensure that it is not permitting illegal wells or condoning harmful activity. The CUP extension, therefore, must be denied.

II. The County Must Require a Subsequent EIR Before Extending or Issuing FMOG a Permit to Drill More Wells

Even if the County believes that the CUP extension is warranted under the County Code (which it is not), as a result of the new regulatory information and new environmental conditions described above, and new scientific information that has become available since the original EIR was certified in 2004, the County must prepare a supplemental or subsequent EIR (SEIR) before extending the CUP (or issuing a new CUP) for the 31 new wells. An SEIR is required when substantial changes occur in circumstances under which the project is being undertaken that will require major revisions in the EIR, or new information of substantial importance to the project

[20] *Id.*; DOGGR, *Renewal Plan for Oil and Gas Regulation: Changing Past Practices to Usher in a New Era of Oil and Gas Regulation* (October 2015) ("Renewal Plan"), *available at:* ftp://ftp.consrv.ca.gov/pub/oil/Publications/Renewal%20Plan%2010-08-2015.pdf.
[21] Renewal Plan, pp. 9-10.

that was not known and could not have been known when the EIR was certified as complete becomes available.[22] Both circumstances exist here.

A change in circumstances requires a SEIR when the change is substantial, involves new or more significant impacts that require significant changes to the EIR, and the impacts were not covered in previous EIR.[23] Meanwhile, "[n]ew information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified . . . shows any of the following:"

> (A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;
>
> (B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;
>
> (C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
>
> (D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.[24]

Here, the multi-year, serious drought coupled with mandatory water restrictions, new information about the poor integrity of existing wells and nearly non-existent environmental and safety regulatory oversight of oil operations, and new scientific information about the harmful impacts of oil extraction activities have come to light in the last ten years. This new information should result in new requirements and mitigation measures to reduce newly known or more severe significant impacts not previously analyzed. Therefore, a SEIR is required.

First, as described above, there is significant and substantial new information about the breakdown of the regulatory regime under which oil drilling has taken place in California up until now. FMOG's desire to drill the 31 new wells must be re-evaluated within this new context, which will provide new requirements and mitigation measures on wells and oil operations. The

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[22] Cal. Pub. Res. Code § 21166; CEQA Guidelines § 15162(a). At the very least, the County must prepare a supplemental EIR for the 31 wells, given all of the new information that has come to light in the last decade. CEQA Guidelines § 15163.
[23] CEQA Guidelines § 15162(a)(2).
[24] CEQA Guidelines § 15162(a)(3).

recent reports issued by DOGGR (discussed *supra*) demonstrate that its failure to regulate and enforce oil drilling has resulted in thousands of wells with potentially compromised integrity that can pose serious threats to the environment. Improper well construction, maintenance, or plugging can allow oil and gas "fluids and naturally occurring toxic and radioactive materials to migrate into shallower groundwater aquifers."[25]

Second, also as described above, the drought has created a substantial change in circumstances that will result in more serious adverse impacts than were understood when the 2004 EIR was certified. Eleven of the new wells will be injection wells, and their potentially significant impacts to San Luis Obispo's dwindling and precious water supplies must be evaluated before they can be permitted. Even the original 2004 EIR noted the potential for injection wells at this site to impact other beneficial and potable groundwater: "[w]astewater generated through the petroleum recovery process would be reinjected into wastewater injection wells. This wastewater reinjection could impact shallow groundwater supplies if the wastewater came in contact with groundwater used for domestic purposes. If this occurred, the water quality of down-gradient public and municipal water production wells could be degraded."[26] Given the increasingly scarce availability of water over the last few years, these potential impacts will be even more devastating and significant that previously believed.[27]

Third, we now have an incredible amount of new scientific information and knowledge about the actual impacts of oil operations on the environment, health, and safety that we did not have in 2004. This includes, for instance, new information on groundwater impacts, such as the

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[25] NRDC, 2015, p. 7, *citing* Ingraffea, Anthony, et al., *Assessment and Risk Analysis of Casing and Cement Impairment in Oil and Gas Wells in Pennsylvania, 2000–2012, Proceedings of the National Academy of Sciences*, June 2014, doi:10.1073/pnas.1323422111.

[26] San Luis Obispo County Department of Planning Building, and Padre Associates, Inc., *Final Plains Exploration and Production Phase IV Development Plan Environmental Impact Report* (September 2004) ("Phase IV EIR"), section 5.7.2.3, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Historical+Documents/2004+-+Phase+IV+EIR/phpEIR2004.pdf.

[27] *See generally:* California Council of Science and Technology, *Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations* (Jul. 2015) ("CCST Report"), Vol. II, Ch. 2; U.S. EPA. (2015); U.S. Environmental Protection Agency, Washington, DC, *Assessment of the potential impacts of hydraulic fracturing for oil and gas on drinking water resources* (External review draft)., EPA/600/R-15/047, 2015, *available at:* http://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=244651; Physicians for Social Responsibility, *Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking (Unconventional Gas and Oil Extraction)*, 3rd ed. (Oct. 14, 2015) ("PSR Compendium of Findings, 2015"), pp. 26-52. Although these reports evaluate hydraulic fracturing and well stimulation, many of the conclusions also apply to other oil extraction techniques, such as steam flooding, cyclic steam, horizontal drilling, injection, and other techniques that occur at the AGOF.

fact that changes in pressure, earthquakes, and subsidence from injection and dewatering[28] can cause potential changes to the water flow paths that contribute to beneficial use reservoirs;[29] in other words, they can cause groundwater to shift its flow path such that an aquifer once thought isolated could now contaminate beneficial use groundwater. Further, known and unknown abandoned wells and compromised wells can create pathways to contamination.[30] These and other potential vectors for groundwater contamination exist in the AGOF and have not been adequately studied. In addition, drilling itself can create conduits to previously isolated sources of water.[31] A recent report finds that "because the oil-containing rock layers in California are located closer to the surface than in other states, the state's groundwater is potentially vulnerable to chemical contamination through vertical faults and fissures and via old and abandoned wells."[32] Indeed, the initial study for the next phase (Phase V) expansion of the AGOF to add up to 450 wells confirms this: "[a]s this formation is relatively close to the surface, potential impacts increase to nearby potable groundwater tables."[33]

We now know, too, that the risk of well blow outs, spills, and other accidents that can contaminate soil and groundwater is much higher than previously believed. A recent analysis estimated that "[o]nshore production sites leaked oil, produced water and other material at least 9,728 times last year, releasing 716,844 barrels of fluid…. In states where comparisons could be made, the number of spills jumped 20 percent between 2013 and 2014."[34] Several recent studies have found methane, fracking fluids, brine, and heavy metals, among other oil-related pollution,

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[28] FMOG is gradually dewatering the reservoir under the AGOF. *See* FMOG, *Arroyo Grande Oil Field, San Luis Obispo County, California, Dollie Sands, Pismo Formation Aquifer Exemption Application* to DOGGR (2015) ("FMOG aquifer exemption application"), pp. 17, 21, *available at:* ftp://ftp.consrv.ca.gov/pub/oil/Aquifer_Exemptions/County/San_Luis_Obispo/Arroyo_Grande_Oilfield/Dollie_Sands_Pismo_Formation/Arroyo%20Grande%20Oilfield%20Edna%20Member%20Dollie%20Sands%20Pismo%20Formation%20Aquifer%20Exemption%20Application.pdf.

[29] CCST Report, Vol. II, Ch. 2, pp. pp. 104-109, 117-121, 124, 125-126, 151, 165.

[30] CCST Report, Vol. II, Ch. 2, pp. 104-109, 122-125, 159; United State Government Accountability Office (US GAO), *EPA Program to Protect Underground Sources from Injection of Fluids Associated With Oil and Gas Production Needs Improvement*, Report to Congressional Requesters (GAO-14-555, June 2014) ("GAO Report"), pp. 23-24.

[31] CCST Report, Vol. II, Ch. 2, pp. 104-109.

[32] PSR Compilation, p. 28. *See also* CCST Report, Summary Report, *available at:* http://ccst.us/publications/2015/2015SB4summary.pdf

[33] San Luis Obispo County Department of Planning and Building, *Initial Study, Phase V Oilfield Expansion Conditional Use Permit* (November 2012) ("Phase V Initial Study"), p. 22, available at: http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/initialstudy.pdf .

[34] NRDC, 2014, p. 6; King, Pamela, and Mike Soraghan, "*U.S. spill count rose 20% in 2014*," EnergyWire, September 29, 2015, available at http://www.eenews.net/energywire/stories/1060025432/search?keyword=spills+up+18+Percent+in+U.S.+in+2013 (accessed October 21, 2015).

in water samples from nearby drinking water wells and surface water bodies near oil and gas sites.[35] Moreover, "naturally occurring radioactive materials" brought to the surface with oil and gas produced water also poses risks to oil field workers, neighbors, and the environment because it can "accumulate in pipes and other well equipment, build up in sediments downstream of wastewater treatment facilities [such as the one at the AGOF], and contaminate the air and soil when wastewater is sprayed on roads."[36]

New information that has come to light since the 2004 EIR not only reveals increased risks of oil extraction to soil and water resources, but also to air, noise, odors, traffic, and geology (including earthquakes and subsidence).[37] Air pollution has been extensively and widely linked to all phases of oil and gas development and production.[38] Emissions include: toxic chemicals such as benzene, toluene, ethylbenzene, xylene, and hydrogen sulfide; criteria pollutants that contribute to the formation of ground-level ozone (which harms the respiratory system) such as VOCs and NOx; and, greenhouse gases such as methane, NOx, and CO2.[39] Improper plugging or idling of wells may continue to release hydrocarbons, methane, and other VOCs even after a well has become idle.[40] Health effects from exposure to these pollutants cause a wide

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[35] *See e.g.*, NRDC, 2014, p. 7; Llewellyn, Garth T., *Evaluating a Groundwater Supply Contamination Incident Attributed to Marcellus Shale Gas Development*, Proceedings of the National Academy of Sciences 112 (20) (2015): 6325–6330, doi: 10.1073/pnas.1420279112; Osborn, Stephen G., et al., *Methane Contamination of Drinking Water Accompanying Gas-Well Drilling and Hydraulic Fracturing*, Proceedings of the National Academy of Sciences 108 (20) (2011): 8172–76, doi:www.pnas.org/cgi/doi/10.1073/pnas.1100682108; Fontenot, Brian E., et al., *An Evaluation of Water Quality in Private Drinking Water Wells Near Natural Gas Extraction Sites in the Barnett Shale Formation*, Environmental Science & Technology 47 (2013): 10032–40, doi:dx.doi.org/10.1021/es4011724.

[36] NRDC, 2014, p. 9; Skalak, Katherine J., et al., *Surface Disposal of Produced Waters in Western and Southwestern Pennsylvania: Potential for Accumulation of Alkali-Earth Elements in Sediments*, International Journal of Coal Geology, 2013, doi:10.1016/j.coal.2013.12.001 (as cited in NRDC 2014).

[37] *See generally*, PSR Compendium of Findings, 2015; CCST Report.

[38] *See generally*, CCST Report, Vol. II, Ch. 3. *See also* PSR Compendium of Findings, 2015, pp. 14-26, describing the many studies from the previous five years documenting new information about increased risks of and from air pollution from oil operations.

[39] Some of the many recent studies oil operations and air pollution include: McKenzie, Lisa M. et al., *Human Health Risk Assessment of Air Emissions from Development of Unconventional Natural Gas Resources*, Science of the Total Environment 424 (2012): 79–87, doi:10.1016/j.scitotenv.2012.02.018 (as cited in NRDC 2014 endnote 35); Eastern Research Group (ERG) and Sage Environmental Consulting LP, *City of Fort Worth Natural Gas Air Quality Study*, 2012, Fort Worth, TX ; Gilman, Jessica, et al., *Source Signature of Volatile Organic Compounds (VOCs) from Oil and Natural Gas Operations in Northeastern Colorado*, Environmental Science & Technology 47 (3) (2013): 1297–1305, doi:10.1021/es304119a.

[40] David T. Allen, *Atmospheric Emissions and Air Quality Impacts from Natural Gas Production and Use*, Annual Review of Chemical and Biomolecular Engineering, February 2014, doi:10.1146/annurevchembioeng- 060713-035938 (as cited in NRDC 2014 endnote 43).

of health effects, including respiratory, cardiovascular, and neurological harm, endocrine disruption, birth defects, cancer, burning eyes and skin irritation, headaches and nausea, and premature mortality.[41] In addition, the greenhouse gases emitted contribute to climate change, which will have severe environmental impacts, but was not studied in the original EIR.

The noise, odors, night-time light, and traffic associated with oil operations all have serious environmental and health effects, and new studies have documented the severity of these impacts.[42] The impacts of noise (grinding, drilling, blasting, flaring, running generators) and night-time light, for instance, can lead to stress and anxiety, hypertension, and cardiovascular and endocrine problems.[43] Truck traffic similarly contributes to noise and air pollution, as well as stress and anxiety.[44] In addition, a new study has found that oil and gas development lead to increase in traffic accidents in the area,[45] In addition to noise, air emissions, and congestion from increased traffic, such new information about safety must also be studied in a SEIR.

Additionally, new information is now known about the risks of oil and gas operations to and from earthquakes, as well as in causing adverse impacts from land subsidence. Known and unknown faults can be conduits for fluid migration.[46] In fact, the Federal Regulations require that all new Class II wells be sited "in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review."[47] What is more, we now know more about how oil and gas activity itself, including from wastewater injection, can activate faults and trigger earthquakes.[48] As a

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[41] NRDC, 2014, pp. 6-7; Finkel, Madelon, et al., *Modern Natural Gas Development and Harm to Health: The Need for Proactive Public Health Policies*, ISRN Public Health, 2013, doi:http://dx.doi.org/10.1155/2013/408658

[42] *See generally*, PSR Compendium of Findings, 2015, pp. 78-81.

[43] *Id.*

[44] *Id.*

[45] Texas A&M Transportation Institute, *Oil and Gas Energy Developments and Changes in Crash Trends in Texas*, Final Report, PRC 15-35 F (Oct. 2015).

[46] CCST Report, Vol. II, Ch. 2, pp. 125-126.

[47] 40 C.F.R. § 146.22(a). *See also* CCST Report, Vol. II, Ch. 2, p. 151 ("Site characterization requirements include a confining zone free of known open faults or fractures that separates the injection zone from underground sources of drinking water. . . .").

[48] *See generally*, PSR Compendium of Findings, 2015, pp. 81-95, describing the dozens of studies from the last five years documenting induced seismicity from injection and other well stimulation activities. *See also*, California Council on Science and Technology Lawrence Berkeley National Laboratory Pacific Institute, *Advanced Well Stimulation in California*, "Executive Summary" (August 28, 2014) ("2014 CCST Report"), pp. 41, 269-275, *available at*: http://ccst.us/publications/2014/2014wstES.pdf. Further study is needed as well. "[A]reas of the southern San Joaquin, Ventura, Santa Clarita and Santa Maria basins, where active water disposal wells are concentrated at present (Figure 5-10), have relatively high rates of seismicity in the 2-5 magnitude range. While undoubtedly most of these earthquakes are naturally-occurring, detailed study of the seismicity in relation to fluid injection will be needed to assess the likelihood that a proportion of the events in these areas are induced." 2014

2014 scientific report noted, if "produced water is disposed of by injection and not handled through an expansion of water treatment and re-use systems, it could increase seismic hazards."[49] Even a small earthquake can compromise well integrity and other oil infrastructure, leading to water and soil contamination. Subsidence is similarly likely occurring at the AGOF due to the gradual dewatering of the reservoir.[50] Neither earthquakes nor subsidence was not evaluated in the 2004 EIR, but must be studied now.

In sum, we now have an overwhelming amount of new scientific information documenting impacts from oil and gas activity that were either underestimated or not known in 2004 when the County certified the original Phase IV EIR. We also now have far more information about the failures of the state and local agencies to effectively regulate and monitor oil and gas production, and of the potential for thousands of wells across the state to contaminate air, water, and soil. Local and state agencies are in the process of updating regulations to provide even the most basic protection for oil field neighbors and workers from the harmful effects of oil operations, as well as regulations regarding water scarcity due to the drought. Given all of these changes in circumstances and new information, the County--which represents the neighbors of the AGOF--cannot and must not issue or extend a CUP for the 31 wells without, at a bare minimum, preparing a SEIR.

III. The 31 Wells are Part of a Larger Project with Reasonable Foreseeable Future Phases, and Cannot be Piecemealed to Avoid CEQA Review

CEQA requires that an EIR identify all significant impacts on the environment of the "whole of action."[51] Environmental review thus requires that a proposed project be analyzed along with reasonably foreseeable future phases or other action.[52] In addition, applicants may not avoid environmental review "by chopping up proposed projects into bite-size pieces which, individually considered, might be found to have no significant effect on the environment or to be

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CCST Report, pp. 275-6. *See also* Brodsky, Emily and Lisa J. Lajoie, *Anthropogenic Seismicity Rates and Operational Parameters at the Salton Sea Geothermal Field*, Science, vol. 341 (Aug. 2, 2013); Ellsworth, William, *Injection-Induced Earthquakes*, Science, vol. 341 (6142) (July 12, 2013); Clarke, D., et al., *Induced seismicity potential in energy technologies*, National Academies Press, 2012 (as cited in NRDC 2014, endnote 70).

[49] 2014 CCST Report, p. 41.

[50] FMOG aquifer exemption application, pp. 17, 21; CCST Report, Vol. II, Ch. 2, p. 124.

[51] CEQA Guidelines §§ 15126.2(a) § 15378; *RiverWatch v. Olivenhain Mun. Water Dist.* (2009) 170 Cal.App.4th 1186.

[52] *Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* (1988) 47 Cal.3d 376, 396.

only ministerial."[53] Indeed, CEQA requires that environmental considerations must not be hidden by separately focusing on isolated parts, overlooking the cumulative effect of the whole action, or attempting to avoid responsibility for considering the environmental impact of the project as a whole.[54]

Here, the 31 wells are part of a much larger project that is being illegally piecemealed into bite-sized pieces to avoid an analysis of the impacts of the larger project. First, FMOG has explicitly said that the 31 wells are tied into its Phase V expansion. FMOG requests in its extension application for a three-year extension up to August 2018 "or until such time as a decision regarding FM O&G's pending CUP application for the Phase V Development of AGOF is made by the County."[55] FMOG further notes in its extension application that the extra three years to drill the 31 wells will "provide a seamless transition into FM O&G's proposed Phase V Development (if approved)."[56] FMOG is in the process of applying for a conditional use permit for its Phase V expansion project, which would increase oil production at the AGOF from the current approximately 1,350 barrels per day (bpd) of oil to up to 9,000-10,000 bpd--up to a nearly ten-fold increase in oil production.[57] The project would add 350 new wells and 100 replacement wells on 11 new well pads and 38 modified well pads, and will include both vertical and directional drilling.[58] In its initial study, the County of San Luis Obispo found that this project has the potential for significant impacts and impacts that require mitigation to, among other environmental resources: wildlife species and vegetation that are endangered or threatened by water degradation,[59] geology,[60] groundwater and hydrology.[61] Given that the Phase V

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[53] *Orinda Assn v. Board of Supervisors* (1986) 182 Cal.App.3d 1145, 1171.
[54] *Id.*; *Bozung v. LAFCO* (1975) 13 Cal.3d 263, 283.
[55] Phase IV CUP Extension, *Attachment A: Project Description*, *available at:* http://www.slocounty.ca.gov/Assets/PL/referrals/south+county/DRC2015-00002_FREEPORT-MCMORAN_CUP_MODIFICATION.pdf.
[56] *Id.*
[57] Freeport MacMoRan, *Application for Aquifer Exemption, Arroyo Grande Oilfield* ("FM Application"), p. 3; Phase V Initial Study, p. 2; San Luis Obispo County Department of Planning and Building, *Scoping Meeting Presentation* (Feb. 19, 2014), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Scoping+Meeting/Presentation+2-19-14.pdf.
[58] Phase V Initial Study, p. 2.
[59] Phase V Initial Study, pp. 13-18. *See also* California Department of Fish and Wildlife, *Letter in Review of the Phase V Environmental Impact Report Notice of Preparation* (January 8, 2013), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Notice+of+Preparation+(NOP)/Responses+Received/CADFW.pdf.
[60] Phase V Initial Study, pp. 21-22.
[61] Phase V Initial Study, pp. 41-48.

expansion is currently undergoing environmental review (hence, it is more than a "reasonably foreseeable" future phase), and given that the County cannot extend the CUP without first requiring a SEIR, perhaps the County should instead analyze the 31 wells in the Phase V EIR and (if the County so chooses) approve the CUP for these wells then.

Second, last year, the County approved a massive pipeline to run from the AGOF to Phillips 66 Santa Maria refinery, which would accommodate the Phase V expanded production.[62] The County approved this pipeline, which travels down residential streets and over several waterways, based only on a negative declaration and with a minor use permit.[63] In other words, by separating this project from the larger expansion of production (and sales) at the oil field, Phillips 66 and FMOG improperly skirted the requirements of CEQA.

Third, FMOG is in the process of requesting from DOGGR, the State Water Resources Control Board, and US EPA an aquifer exemption to allow FMOG to inject wastewater into an aquifer that is currently protected under the Safe Drinking Water Act.[64] As noted above, at present, FMOG has at least eight injection wells operating in the protected aquifer. FMOG has requested that the DEIR for the Phase V expansion be put on hold until the aquifer exemption process is complete.[65] In order to try to legitimize what is currently illegal and accommodate the planned expansions, FMOG is looking to this exemption process to help facilitate the increased volumes of produced water. Thus, this exemption project, too, is intricately tied to the 31 wells, the pipeline, and the Phase V expansion, and severing it from the rest of the project has allowed FMOG to unlawfully evade the requirements of CEQA. The County must not condone or assist FMOG's actions to evade public review and disclosure of the impacts of its massive planned expansion at the AGOF by extending the CUP to allow FMOG to construct the 31 wells.

III. Conclusion

Although the 31 wells were part of the AGOF Phase IV expansion plan, under the County Code and CEQA, new environmental conditions and scientific knowledge about the impacts of oil and gas activities require that the County reject FMOG's three-year extension request. Rather,

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[62] San Luis Obispo County, *Negative Declaration and Notice of Determination, Phillips 66 5.6 Mile Pipeline; Minor Use Permit; DRC2012-00101* (Sept. 25, 2014).
[63] *Id.*
[64] FMOG aquifer exemption application.
[65] Phase V Conditional Use Permit (DRC2012-00035) Ongoing Status Report, *available at*: http://www.slocounty.ca.gov/Assets/PL/environmental/plains/OngoingStatusReport.pdf.

the County must evaluate the proposed project under CEQA by requiring either a SEIR or review in the Phase V EIR before deciding whether to approve the construction of these wells. Indeed, the 31 wells is really part of a much larger project to expand production and sales at the AGOF, and must be analyzed as part of this activity. The agencies responsible for protecting California's residents from the harmful impacts of oil and gas drilling and extraction activities have fallen asleep at the wheel. It's time for the County step up and protect the public health and beautiful environment of San Luis Obispo County.

Sincerely,

/s/

Maya Golden-Krasner
Staff Attorney, Climate Law Institute
Center for Biological Diversity

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Attachment D

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Coast Regional Water Quality Control Board

May 14, 2015

CERTIFIED MAIL NO.
7009-2250-0001-0315-7806

Kenneth R. Bork, Agent
Freeport-McMoRan Oil & Gas LLC
1200 Discovery Drive, Suite 500
Bakersfield, CA 93309

ORDER PURSUANT TO CALIFORNIA WATER CODE SECTION 13267. You are legally obligated to respond to this Order. Read this Order carefully.

Freeport-McMoRan Oil & Gas LLC is the operator of injection wells identified as American Petroleum Institute (API) numbers 07920419, 07920426, 07920436, 07920794, 07921105, 07921154, 07921202, 07921203, 07920773, 07920498, 07920639, and 07920659 (hereinafter "injection wells subject to this Order"). The California Division of Oil, Gas, and Geothermal Resources (Division) has informed the Central Coast Regional Water Quality Control Board (Central Coast Water Board) that the injection wells subject to this Order have been injecting fluids produced by oil or gas extraction activities into an aquifer that may not have been properly designated as an exempt aquifer under the federal Safe Drinking Water Act (42 U.S.C. § 300f et seq.). The aquifer may be suitable for drinking water supply and other beneficial uses.

The Central Coast Water Board is aware that the Division is currently reviewing an aquifer exemption data package submitted by Freeport-McMoRan Oil & Gas LLC for the Pismo Formation within certain areas of the Arroyo Grande Oilfield. The information required by this Order may be used to supplement the aquifer exemption data package.

As described further below, for each injection well subject to this Order, Freeport-McMoRan Oil & Gas LLC is required to submit technical reports containing information about (1) the injection well, (2) the fluid that has been injected, (3) the quality of the groundwater within the zone(s) where fluids have been injected, and (4) nearby water supply wells, including domestic wells within a one-mile radius of the injection wells. The issuance of this Order has been coordinated with the Division.

The Central Coast Water Board's authority to require technical reports derives from section 13267 of the California Water Code, which specifies, in part, that:

> *(a) A regional board...in connection with any action relating to any plan or requirement authorized by this division, may investigate the quality of any waters of the state within its region.*

> *(b)(1) In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region...that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.*

The Central Coast Water Board is concerned about the potential threat to human health and potential impacts to water quality posed by the discharge of waste associated with the injection of fluids into aquifers that may be suitable for drinking water supply and other beneficial uses. The technical information and reports required by this Order are necessary to assess the potential threat to human health and potential impacts to water quality. The need to understand the potential threat to human health and potential impacts to water quality justifies the need for the information and reports required by this Order. Based on the nature and possible consequences of the discharges of waste, the burden of providing the required information, including reporting costs, bears a reasonable relationship to the need for the report, and the benefits to be obtained. Freeport-McMoRan Oil & Gas LLC is required to submit this information and reports because it is the operator of the injection wells subject to this Order. If Freeport-McMoRan Oil & Gas LLC and its predecessors in interest have never injected fluids into the injection wells subject to this Order, please advise Central Coast Water Board staff of this in writing as soon as possible.

Under the authority of California Water Code section 13267, the Central Coast Water Board hereby orders Freeport-McMoRan Oil & Gas LLC to:

1. **By June 12, 2015** submit a work plan that adequately describes the procedures to collect a representative groundwater sample from the injection zone(s) for each injection well subject to this Order. If a representative sample cannot feasibly be collected from one or more of the injection zones for any of the injection wells subject to this Order within the required timeframe (e.g., due to constraints posed by the design of the injection well), submit a technical report demonstrating that collection of a representative sample from those injection zones is not feasible within the required timeframe, and proposing an alternative sampling procedure and expeditious time schedule for obtaining a representative sample of groundwater from those injection zones. Alternative sampling procedures and time schedules are subject to approval by the Executive Officer of the Central Coast Water Board.
2. **By July 31, 2015**, submit a technical report that contains all of the following information:
    a. The analyses of each of the groundwater samples from the injection zone(s) for each injection well subject to this Order, in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order

b. If fluids have been injected into any of the injection wells subject to this Order recently, an analysis of a representative sample of those fluids in accordance with the water quality analysis and reporting requirements contained in Attachment A to this Order.

c. All available historical chemical analyses of the fluids injected into each injection well subject to this Order.

d. All previously obtained analytical data for groundwater samples collected from any injection zones within one (1) mile of each of the injection wells subject to this Order.

e. A list and location map of all water supply wells, including domestic wells, within one mile of each injection well subject to this Order.

f. Information for each identified water supply well, including the well owner name and contact information; type of well (i.e., domestic, irrigation, industrial, etc.); whether any of the water is used for domestic purposes; status (i.e., active, idle, etc.); well construction, including screened interval depths; borehole geophysical logs; and all analytical results for any water sample(s) collected from each water supply well. Notify Central Coast Water Board staff within 24 hours upon determination that any water supply well information cannot be obtained from the California Department of Water Resources because it is confidential.

g. For each injection well subject to this Order, the following information for items A-O shall be in spreadsheet format, labeled with the capital letters indicated. The information for items P-S shall be in attachments:

   A. The name of the owner and/or operator of the injection well;

   B. API number for the injection well;

   C. Injection well name and number

   D. Name of the field in which the injection well is located;

   E. County in the which the injection well is located;

   F. Latitude and Longitude (decimal degrees) of well head location;

   G. Latitude and Longitude Datum, indicate "1" for North American Datum of 1983 or "2" for North American Datum of 1927;

   H. Injection well total depth (feet);

   I. Top injection depth (feet);

   J. Formation/Zone name at top injection depth;

   K. Bottom injection depth (feet);

   L. Formation/Zone name at bottom injection depth;

   M. Date injection started in the well (Day/Month/Year, xx/xx/xxxx);

   N. Total injection volume in barrels by calendar year (to present day);

   O. Attach well construction diagram including all conductor casing depths, all perforations, annular material, and seals;

P. Attach a description of all sources of fluid injected;

Q. Attach all data maintained in compliance with California Code of Regulations, title 14, section 1724.10, subdivision (h).

R. Attach documentation associated with each mechanical integrity test undertaken to comply with California Code of Regulations, title 14, section 1724.10, subdivision (j).

All required work plans and technical information must be submitted in an electronic format compatible with the State's GeoTracker system following the requirements of California Code of Regulations, title 23, section 3893 (available at: http://www.waterboards.ca.gov/ust/electronic_submittal/docs/text_regs.pdf). A unique case identifier (Global ID) is assigned for each well subject to this Order and is provided in Attachment B.

Based on the information submitted in the work plan and/or technical report, additional information or action may be required.

Additionally, please submit a hard copy and an electronic copy of all submitted materials to the attention of:

John Robertson, Supervising Engineering Geologist
Central Coast Water Board
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
John.Robertson@waterboards.ca.gov

All information is to be copied to the Division hard copy and electronic), to the attention of:

Steven R. Bohlen, State Oil and Gas Supervisor
Department of Conservation, DOGGR
801 K Street
Sacramento, CA 95814-3500
Steven.Bohlen@conservation.ca.gov

Submissions pursuant to this Order need to include the following statement signed by an authorized representative of Freeport-McMoRan Oil & Gas LLC:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

The failure to furnish the required report, or the submission of a substantially incomplete report or false information, is a misdemeanor, and may result in additional enforcement actions, including issuance of an Administrative Civil Liability Complaint pursuant to California Water Code section 13268. Liability may be imposed pursuant to California Water Code section 13268 in an amount not to exceed one thousand dollars ($1,000) for each day in which the violation occurs.

Any person aggrieved by this Order of the Central Coast Water Board may petition the State Water Board to review the action in accordance with California Water Code section 13320. The State Water Board must receive the petition by 5:00 p.m., within 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations, and instructions applicable to filing petitions, are at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml, or will be provided upon request.

Be advised that sections 13260 and 13264 of the California Water Code require any person who proposes to discharge waste that could affect waters of the state to submit a Report of Waste Discharge for any new discharge or change in the character, volume, or location of an existing discharge. Fluids produced by oil or gas extraction activities that can no longer be disposed of in the injection wells subject to this Order cannot be discharged to land or waters of the state prior to the issuance of Waste Discharge Requirements, and cannot be discharged to waters of the United States prior to the issuance of an National Pollutant Discharge Elimination System (NPDES) Permit. Failure to comply with these requirements may constitute a misdemeanor under Water Code section 13265 or a felony under Water Code section 13387, and may also subject Freeport-McMoRan Oil & Gas LLC to judicial or administrative civil liabilities.

Any questions regarding this matter should be directed to John Robertson at (805) 542-4630 or at John.Robertson@waterboards.ca.gov.

Sincerely,

Kenneth A. Harris Jr.
Executive Officer

Enclosure:

Attachment A - Water Quality Sampling, Analysis and Reporting

Attachment B – GeoTracker Upload Instructions and Assigned Global Identification Number(s)

Cc list: Next page

Cc list:

John Martini, Manager
John_Martini@fmi.com
EH&S and Government Affairs
Freeport-McMoRan Oil and Gas
1200 Discovery Drive, Suite 500
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Steven Bohlen, DOGGR, Department of Conservation
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Scott Couch, State Water Board
Scott.Couch@waterboards.ca.gov

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Janice Zinky, State Water Board
Janice.Zinky@waterboards.ca.gov

John Robertson, Central Coast Water Board
John.Robertson@waterboards.ca.gov

Aaron Katona, Central Coast Water Board
Aaron.Katona@waterboards.ca.gov

ATTACHMENT A
Water Quality Sampling, Analysis, and Reporting

Water Quality Sampling

All groundwater sampling is to be performed by a qualified person. A qualified person is any person with the knowledge and training in proper sampling methods, chain of custody, and quality assurance/quality control protocols. Any person conducting groundwater sampling, other than personnel from a certified laboratory, shall consult with the certified laboratory to ensure that the sampler understands and follows the proper sampling collection procedures and protocols. All procedures to sample groundwater supply wells shall be consistent with US EPA Science and Ecosystem Support Division Operating Procedure for Groundwater Sampling (March 2013) (available at http://www.epa.gov/region4/sesd/fbqstp/Groundwater-Sampling.pdf).

Water Quality Analysis

Groundwater samples collected from wells and injection zones shall be analyzed by a laboratory certified by the Environmental Laboratory Accreditation Program, using current applicable EPA-approved analytical methods. The methods of analysis and the detection limits used shall be appropriate for the expected concentrations. The analytical method having the lowest method detection limit (MDL) shall be selected from among those methods that would provide valid results in light of any matrix effects or interferences. Analyze samples for the following:

A. Total dissolved solids
B. Metals listed in California Code of Regulations, title 22, section 66261.24, subdivision (a)(2)(A)
C. Benzene, toluene, ethylbenzene, and xylenes
D. Total petroleum hydrocarbons for crude oil
E. Polynuclear aromatic hydrocarbons (including acenaphthene, acenaphthylene, anthracene, benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, benzo[g,h,i]perylene, chrysene, dibenzo[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene)
F. Radionuclides listed under California Code of Regulations, title 22, Table 64442, which includes Gross Alpha particle activity (excluding radon and uranium), Uranium, Radium-226, and Radium-228.
G. Methane
H. Major and minor cations (including sodium, potassium, magnesium, and calcium)
I. Major and minor anions (including nitrate, chloride, sulfate, alkalinity, and bromide)
J. Trace elements (including lithium, strontium, boron, iron, and manganese)

Water Quality Reporting

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system.

Technical Report that includes

- Site plan with the location(s) of the wells sampled
- Description of field sampling procedures
- Copies of analytical laboratory reports, including quality assurance/quality control procedures and analytical test methods.
- Waste management and disposal procedures
- Table(s) of analytical results organized by well number (including API number).
- A list and location map of all the water supply wells, including domestic wells, located within a one mile radius of the injection well(s)

All GeoTracker uploads should consist of a GeoReport, GeoMap(s), and an EDF of laboratory data, if applicable.

ATTACHMENT B
GeoTracker Upload Instructions and Assigned Global Identification Number(s)

Work plans, and technical reports and associated data shall be uploaded in an electronic format compatible with the State's GeoTracker system. To begin the process:

- Log in or create a password
- Claim your site(s) (i.e. global ID)
- Add field point name(s)
- Upload the following:
  - Work plan/Technical report and associated data (GeoReport)
  - *laboratory report (EDF)
  - *Site Maps (GeoMAP)

For more information, please contact the GeoTracker Help Desk at Geotracker@waterboards.ca.gov or (866) 480-1028.

Injection Well	Assigned Global ID number
07920419	T10000006826
07920426	T10000006827
07920436	T10000006828
07920794	T10000006829
07921105	T10000006830
07921154	T10000006831
07921202	T10000006832
07921203	T10000006833
07920773	T10000006834
07920498	T10000006835
07920639	T10000006836
07920659	T10000006837

*GeoTracker submittal may not be required for all document types.

Attachment E

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

CENTER for BIOLOGICAL DIVERSITY Because life is good.

Maya Golden-Krasner
Climate Staff Attorney
Center for Biological Diversity
P.O. Box 1476
La Cañada Flintridge, CA 91012

September 21, 2015

via electronic mail and U.S. mail to:

Department of Conservation
ATTN: Aquifer Exemption
801 K Street, MS 24-02
Sacramento, CA 95814
comments@conservation.ca.gov

Re: Freeport-McMoRan Oil & Gas, LLC, Arroyo Grande Oil Field Aquifer Exemption--Dollie Sands, Pismo Formation

To Whom it May Concern,

The Center for Biological Diversity ("the Center") submits comments in opposition to the recommendation of the Department of Conservation, Division of Oil, Gas and Geothermal Resources (“DOGGR”) to exempt the Arroyo Grande Oil Field ("AGOF") aquifer in order to allow Freeport-McMoRan ("FM") to inject oil wastewater into the aquifer via Class II wells. In this time of historic drought, DOGGR, the water boards, and the U.S. Environmental Protection Agency (EPA) must tread extremely carefully in risking California's dwindling water resources. The aquifer exemption application fails to provide critical information that would allow DOGGR or EPA to even begin to make that determination, and fails to address vital questions regarding the health, safety, and welfare of the surrounding environment and residents. What is more, the little discussion that exists in the application entirely ignores FM's simultaneous project to add hundreds of new wells and increase oil production up to nine to ten times current production levels. Without further information regarding the potential impacts of this massive expansion project on the hydrogeology and chemistry of the existing oil field and aquifer, and on risks to

the area's groundwater resources, especially in a time of historic drought, the Center strongly recommends that DOGGR and EPA reject the Arroyo Grande aquifer exemption request.

I. Introduction

As DOGGR's issuance of up to 5,625 potentially unlawful Class II injection well permits shows,[1] DOGGR and the oil field operators have a history of ignoring laws and risking our water resources.[2] It is this history that has led to this aquifer exemption application. In 2011, the U.S. EPA commissioned a report on California's Underground Injection Control Program ("UIC Program") ("Horsley Witten Report"). That report found, *inter alia*, that state regulations did not protect aquifers as required by the SDWA and the State's primacy agreement.[3] The EPA requested that DOGGR provide an action plan quickly, requiring DOGGR to address the regulatory and other deficiencies by September 1, 2011.[4] To date, most of the issues identified in the Horsley Witten Report, including necessary amendments to regulations, remain unaddressed. On November 16, 2012, DOGGR acknowledged that it had been aware since 2009 that the UIC Program had failed to comply with state and federal law and regulations.[5] DOGGR stated then that a rulemaking would be commenced in 2013 to "update the UIC program, well construction, and plugging and abandonment regulations."[6] As of early February 2015, California had "identified approximately 2,500 wastewater disposal and enhanced oil recovery wells injecting into potentially non-exempt zones, 2,100 of which [were] 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

[1] Letter from Steve Bohlen, State Oil and Gas Supervisor, DOGGR, and Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board, to Michael Montgomery, U.S. EPA (July 31, 2015) ("July 31, 2015 letter"), p. 1.

[2] Letter from Steve Bohlen, State Oil and Gas Supervisor, DOGGR, and Jonathan Bishop, Chief Deputy Director, State Water Resources Control Board to Jane Diamond, Director, Water Division, Region IX, U.S. EPA (February 6, 2015) ("February 6, 2015 letter"); Memorandum, CalEPA Review of UIC Program, from Matthew Rodriguez, Secretary of CalEPA to Cliff Rechtschaffen, Senior Advisor, Office of the Governor, and John Laird, Secretary, California Natural Resources Agency (March 2, 2015) ("March 2, 2015 CalEPA Memorandum"), *available at*: http://www.calepa.ca.gov/Publications/Reports/2015/UICFindings.pdf.

[3] Letter from David Albright, Manager, Ground Water Office, US EPA Region IX, to Elena Miller, State Oil and Gas Supervisor, DOGGR (July 18, 2011) ("July 18, 2011 letter").

[4] *Id.*

[5] Letter from Tim Kustic, State Oil and Gas Supervisor, DOGGR to David Albright, Manager, Ground Water Office US EPA Region IX, Response to the US EPA June 2011 Review of California's UIC Program (Nov. 16, 2012) ("November 16, 2012 letter").

[6] November 16, 2012 Letter, attachment: Response to the US EPA June 2011 Review of California's UIC Program, p. 1.

(SDWA) of higher quality water."[7] By July 2015, the number of illegal wells identified had expanded to more than 5,600.[8]

At the outset, the law requires that water be presumed protected under the SDWA unless exempted; therefore, all injection should cease immediately.[9] Given that California is currently in the fourth year of a historic drought, and communities are more dependent than ever on underground water resources, it is vital that DOGGR act to ensure our aquifers are protected from the toxic waste generated by oil and gas production processes. Overall, 85 percent of California's public water systems depend on groundwater for at least part of their drinking water, and smaller urban and rural areas depend entirely on groundwater.[10] California's reliance on groundwater increases during times of drought and will continue to increase with the growing demand from municipal, agricultural, and industrial sources, especially as surface water availability changes as a result of climate change and drought.[11] The most recent data available as of October 2014 shows that groundwater levels have decreased in many basins throughout the state since spring 2013, and more notably since spring 2010; basins with notable decreases in groundwater levels are in the Sacramento River, San Joaquin River, Tulare Lake, San Francisco Bay, **Central Coast**, and South Coast hydrologic regions.[12] Indeed, there is precedent on the Central Coast for a scenario in which drought causes a major increase in reliance on groundwater supplies: during the last major drought in the late 1980s, the City of San Luis Obispo began pumping groundwater for the first time in history, and by 1990 it received 40% of its water from groundwater.[13]

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[7] March 2, 2015 CalEPA Memorandum, p. 1.
[8] July 31, 2015 letter, p. 1
[9] 40 C.F.R. § 144.7(a); 42 U.S.C. § 300h(d)(2).
[10] State Water Resources Control Board, Report to the Legislature: Draft Communities that Rely on Contaminated Ground Water (Feb. 2012) ("SWRCB, 2012"), p. 6.
[11] SWRCB, 2012, p. 6; Memorandum from Howitt et al., UC Davis Center for Watershed Sciences, to California Department of Food and Agriculture (May 31, 2015) ("Howitt, 2015"), *available at:* https://watershed.ucdavis.edu/files/biblio/2015Drought_PrelimAnalysis.pdf.
[12] Cal. Department of Water Resources, "Public Update for Drought Response: Groundwater Basins with Potential Water Shortages, Gaps in Groundwater Monitoring, Monitoring of Land Subsidence, and Agricultural Land Fallowing (November 2014) ("DWR, 2014"), pp. 5, 11 (emphasis added), *available at:* http://water.ca.gov/waterconditions/docs/DWR_PublicUpdateforDroughtResponse_GroundwaterBasins.pdf.
[13] Halverson, Nathan, "What will happen to a sinking California? Just ask San Luis Obispo," *Grist* (June 24, 2015) (Halverson), *available at:* http://grist.org/climate-energy/what-will-happen-to-a-sinking-california-just-ask-san-luis-obispo/.

Even DOGGR now recognizes the need "to rethink the standard approach to produced water disposal in light of the increasing demand for groundwater."[14] DOGGR thus "recommends" that operators consider other options for produced water, such as treating and reusing the waste water for other uses, rather than go through "what could be a difficult, time consuming and, in some cases, unsuccessful process of proposing to increase or change the areal extent of currently exempted aquifers, or to exempt portions of new aquifers."[15] While the Center does not condone reusing oil wastewater for uses such as agriculture, DOGGR's recognition that measures other than allowing wastewater to be injected into California's precious resources must be found is correct. However, DOGGR, as the regulatory agency in charge of these injections, must approach these exemptions from the perspective that the protection of California's groundwater resources is of paramount importance, and must do far more than send unenforceable "recommendations". This is the only approach consistent with the federal Safe Drinking Water Act ("SDWA") and the State Oil and Gas Supervisor's duty to "supervise the drilling, operation, maintenance, and abandonment of wells and the operation, maintenance, and removal or abandonment of tanks and facilities attendant to oil and gas production … within an oil and gas field, so as to prevent, as far as possible, damage to life, health, property and natural resources; damage to underground oil and gas deposits from infiltrating water and other causes; loss of oil, gas or reservoir energy, and damage to underground and surface waters suitable for irrigation or domestic purposes by the infiltration of, or the addition of, detrimental substances."[16] As the current drought has shown us, the State of California does not have the luxury of being able to sacrifice its valuable water resources for the convenience of the oil and gas industry.

Perhaps the most egregious aspect of the AGOF exemption request in particular, however, is the fact that FM is simultaneously seeking to double its permitted oil production barrels per day (bpd) from 5,000 to 9,000 to10,000, which is up to a ten-fold increase in current production.[17] The State and federal regulators--charged with protecting California's precious

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[14] DOGGR, "Notice to Operators: A Strategy for Produced Water" (Sept. 9, 2015, *available at:* ftp://ftp.consrv.ca.gov/pub/oil/Notice_to_Operators/NTO_9-2015_A%20Strategy%20for%20Produced%20Water.pdf.

[15] *Id.*

[16] Cal. Pub. Res. Code § 3106(a).

[17] San Luis Obispo County Department of Planning and Building, Initial Study, Phase V Oilfield Expansion Conditional Use Permit (November 2012) ("Phase V Initial Study"), p. 2, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/initialstudy.pdf; Price Canyon Oilfield

groundwater--should not even consider this exemption request unless and until the effects of this project on the aquifer and surrounding groundwater sources have been analyzed. If this willful disregard of a simultaneous proposed major oilfield expansion by the same applicant were not enough of a reason to deny this request, however, the State and US EPA must deny it because the burden is on the applicant to demonstrate it meets the state and federal criteria for an aquifer exemption, and this application does not meet that burden. It does not demonstrate that the aquifer is not and cannot be used as a source of drinking water, or that it is zonally isolated and will not affect other sources of water for domestic, agricultural, and other beneficial uses. It fails to analyze the risks to the integrity of the aquifer and the wells posed by earthquakes, subsidence, and other pressure changes, made all the more concerning given the proposal to increase the bpd oil production nearly ten times. For all of these reasons, this exemption must be denied.

II. Legal Requirements

A. Presumption is in Favor of Protecting Drinking Water, and Against Exemption

Congress passed the Safe Drinking Water Act ("SDWA") to protect public health by regulating and protecting the nation's public drinking water supply. The federal underground injection control program, part C of the SDWA, was established to safeguard underground drinking water sources endangered by underground injections.[18] The SDWA and its attendant regulations ("Federal Regulations") protect not only existing public water systems;[19] crucially, they also safeguard any drinking water source that supplies, or can reasonably be expected in the future to supply, any public water system.[20] In other words, the SDWA and the Federal Regulations preserve future sources of drinking water by prohibiting their contamination *before* they are drawn upon.

The primary purpose of the regulations promulgated pursuant to the Safe Drinking Water Act is to protect drinking water and potential sources of drinking water. It does not seek to balance the protection of drinking water and potential drinking water sources with industrial use

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Project (Freeport McMoran Oil & Gas) - DRC2012-00035, *documents available at:* http://www.slocounty.ca.gov/planning/environmental/environmentalnotices/pxp.htm.

[18] *Legal Envtl. Assistance Found., Inc. v. United States EPA*, 118 F.3d 1467, 1475-76 (11th Cir. 1997) (quoting House Report, H.R. Rep. No. 93-1185 at 29, reprinted in 1974 U.S.C.C.A.N. 6454, 6481).

[19] A public water system is a system for the provision of public water for human consumption through pipes or other constructed conveyances, which has at least 15 service connections or regularly serves at least 25 people. *See* 40 U.S.C. § 300f(4).

[20] 42 U.S.C. § 300h(d)(2).

of those sources. Rather, the statutory language, purpose and intent safeguard water sources from Class II well injection activities. As the court found in *United States v. King*,

> The injection provisions of the SDWA are "preventive." 1974 U.S.C.C.A.N. at 6463. Congress concluded that the most effective way to ensure clean drinking water was to prevent pollution of underground aquifers in the first place, rather than to clean up polluted aquifers after the fact. Under the SDWA, the danger posed by proposed injections to an underground aquifer is determined during the permitting process. As noted above, the SDWA puts the burden on a permit applicant to show that a proposed injection will not endanger an USDW. If an applicant fails to show that a proposed injection is safe, the SDWA requires that the permit be denied. That is, in the absence of a showing by the applicant that a proposed injection is safe, the SDWA presumes that the injection will endanger an USDW.[21]

Thus, here, the burden is on FM to prove that the aquifer will not endanger a USDW, and this application fails to do that.

For one, this application does not provide the specific constituents that will be injected into the aquifer, but oil waste water generally contains toxic contaminants that can endanger this aquifer as well as surrounding USDWs. Produced water from oil extraction contains not only naturally occurring chemicals and hydrocarbons, but also many of the same chemicals from the well stimulation along with contaminants mobilized from underground, in part via flowback fluid. In its recently-published report into hydraulic fracturing in California ("CCST Report"), the California Council of Science and Technology identified over 300 unique chemicals being used in hydraulic fracturing fluids in California.[22] Nearly one third of those chemicals did not have a Chemical Abstracts Service Registry Number (CASRN). Chemical additives reported without a CASRN cannot be fully evaluated for hazard, risk, and environmental impacts due to lack of specific identification.[23] The absence of any such evaluation means that it cannot be concluded that such chemicals will not cause harm. In the absence of a positive conclusion that a chemical will not cause harm, it must be concluded that they "may" cause harm. Accordingly, USDWs must be protected from contamination by chemicals without a CASRN. Of the chemicals used in hydraulic fracturing processes in California, "approximately one-half of chemicals used do not have publicly available results from standard aquatic toxicity tests. More

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[21] *United States v. King*, 660 F.3d 1071, 1079 (9th Cir. 2011).
[22] California Council of Science and Technology, Potential Environmental Impacts of Hydraulic Fracturing and Acid Stimulations (Jul. 2015) ("CCST Report"), Vol. II, Ch. 2, p. 50.
[23] *Id.*

than one-half are missing biodegradability, water-octanol partitioning analysis, or other characteristic measurements that are needed for understanding hazards and risks associated with chemicals."[24] Again, in the absence of information demonstrating that these chemicals will not cause harm to human health, it must be concluded that these substances *may* cause harm, and therefore they must not enter a USDW.

A survey of chemical analyses reported by well stimulation companies posted to the DOGGR reporting website shows that benzene is detected in flowback fluid at high levels—on average, 700 times the federal drinking water limit.[25] In chemical analysis reports submitted to DOGGR, tests found flowback fluid contained, among other chemicals and elements, naphthalene, hexavalent chromium, selenium, strontium, and barium.

In addition to containing chemicals used in well stimulation, wastewater can contain many harmful chemicals in the produced water (naturally occurring water drawn up along with oil), including heavy metals such as lead, mercury, and arsenic; polycyclic aromatic hydrocarbons; and even naturally occurring radioactive material.[26] Benzene, an extremely toxic carcinogen, is a common constituent of oil and gas wastewater in California.[27] DOGGR's own study found benzene in produced water samples at concentrations at 3,600 times EPA's limit for drinking water.[28] All of these substances may adversely affect the health of a human.

As a result of the potential for injectate to harm USDWs, the environment, and human health, as well as the importance of water to sustain life, all potential sources of drinking water are by default protected; as stated above, all injection into any non-exempt portion of the aquifer is in violation of state and federal law and must cease immediately. In order to allow an aquifer to be polluted, active administrative processes must be undertaken to overcome the presumption

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[24] *Id.*

[25] Cart, J., *High Levels of Benzene Found in Fracking Wastewater*, Los Angeles Times, Feb. 11, 2015, *available at:* http://www.latimes.com/local/california/la-me-fracking-20150211-story.html#page=1; DOGGR, Well Stimulation Database, *available at:* http://maps.conservation.ca.gov/doggr/iwst_index.html; 40 C.F.R. § 141.61(a) (maximum contaminant level for benzene is 0.005 mg/L, or 5 ppb).

[26] While data gaps exist for chemical compositions of California produced water, studies of other oil fields have detected harmful chemicals. *See, e.g.*, Benko, K., "Produced Water in the Western United States: Geographical Distribution, Occurrence, and Composition," 25 *Environmental Engineering Science* 2 (2008); Pampanin, Daniela & Magne Sydnes, M., "Chapter 5: Polycyclic Aromatic Hydrocarbons a Constituent of Petroleum: Presence and Influence in the Aquatic Environment," *Hydrocarbon* (Vladimir Kutcherov and Anton Kolesnivikov eds. 2013) at 87.

[27] Gamache, Mark T., DOGGR, "Benzene in Water Produced from Kern County Oil Fields Containing Fresh Water" (1993), *available at:* ftp://ftp.consrv.ca.gov/pub/oil/publications/Open-file2.pdf.

[28] *Id.* at p. 11, Table 1 (finding produced water samples with up to 18.0 parts per million, up to 3,600 times greater than the EPA limit for drinking water (0.005 parts per million).

of protection. Section 144.7 of the Federal Regulations to the SDWA provides that the Director "shall" protect as underground sources of drinking water all aquifers, and parts of aquifers, that meet the definition of a USDW.[29] The obligation to protect USDWs arises whenever an aquifer meets the criteria of a USDW, regardless of whether the Director has not acknowledged the source as such.[30] An USDW can only be exempt from the default protections if the Director actively undertakes the required administrative process.[31]

B. Federal and State Requirements for Aquifer Exemptions

Procedurally, an exemption requires a two-step process: (1) an operator will propose to the state agency (DOGGR) that an aquifer be exempt, and (2) if DOGGR approves, it will propose the exemption to the EPA.[32] Both federal and state law lay out the conditions that must be met in order for DOGGR, the water boards, and EPA to consider whether to exempt an aquifer from the protections of the SDWA. DOGGR's decision to submit an aquifer exemption to EPA for approval is a discretionary action. Under the Federal Regulations, an aquifer or a portion of an aquifer cannot be exempted unless:

> (a) It does not currently serve as a source of drinking water; and
> (b) It cannot now and will not in the future serve as a source of drinking water because:
> (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 III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible.
> (2) It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical;
> (3) It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption; or
> (4) It is located over a Class III well mining area subject to subsidence or catastrophic collapse; **or**
> (c) The total dissolved solids content of the ground water is more than 3,000 and less than 10,000 mg/l and it is not reasonably expected to supply a public water system. . . .[33]

[29] 40 C.F.R. § 144.7(a).
[30] *Id*.
[31] 40 C.F.R. § 144.7(b).
[32] *Id.*; 40 CFR § 145.32.
[33] 40 CFR § 146.4 (emphasis added).

In other words, under the Federal Regulations, DOGGR and EPA cannot exempt an aquifer from the protections of the SDWA to allow Class II injection wells if the aquifer currently serves as a source of drinking water, can or could in the future serve as a source of drinking water, *or* if the water is between 3,000 and 10,000 mg/l TDS and reasonably expected to supply a public water system (If the water is under 3,000 mg/l TDS, if it could reasonably be expected to supply a public water system, the aquifer should not qualify for an exemption, because it is considered high quality water.)[34]

State law further delineates criteria for when an aquifer may be exempted to allow Class II injection wells. Under Section 3131 of the Public Resources Code,

> (a) To ensure the appropriateness of a proposal by the state for an exempted aquifer determination subject to any conditions on the subsequent injection of fluids, and prior to proposing to the United States Environmental Protection Agency that it exempt an aquifer or portion of an aquifer pursuant to Section 144.7 of Title 40 of the Code of Federal Regulations, the division shall consult with the appropriate regional water quality control board and the state board concerning the conformity of the proposal with all of the following:
> (1) Criteria set forth in Section 146.4 of Title 40 of the Code of Federal Regulations.
> (2) The injection of fluids will not affect the quality of water that is, or may reasonably be, used for any beneficial use.
> (3) The injected fluid will remain in the aquifer or portion of the aquifer that would be exempted. . . .[35]

"Beneficial uses" "include, but are not limited to: domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves."[36] Thus, in addition to the federal criteria, DOGGR and the water boards must ensure that the aquifer is zonally isolated--that injection of fluids will entirely remain in the exempted portion of the aquifer and will not affect any water that is, or can reasonable be, used for any of these other beneficial uses.

III. Argument

A. The State and EPA Must Reject the AGOF Aquifer Exemption Request Because FM's Application Ignores a Foreseeable Major Expansion in the Number of

[34] March 2, 2015 CalEPA Memorandum p. 1.
[35] Cal. Pub. Res. Code § 3131.
[36] Cal. Water Code § 13050(f).

Wells, Well Pads, and Oil Production at the AGOF, Which Will Drastically Increase the Amount of Wastewater

FM is in the process of applying for a conditional use permit to increase oil production at the AGOF from the current approximately 1,000 barrels per day (bpd) of oil to up to 9,000-10,000 bpd--up to a nearly ten-fold increase in oil production ("Phase V expansion project").[37] The project would add 350 new wells and 100 replacement wells on 11 new well pads and 38 modified well pads, and will include both vertical and directional drilling.[38] In its initial study, the County of San Luis Obispo found that this project has the potential for significant impacts and impacts that require mitigation to, among other environmental resources: wildlife species and vegetation that are endangered or threatened by water degradation,[39] geology,[40] groundwater and hydrology.[41]

Even though it is currently in the application and environmental review process for this major expansion project, FM's aquifer exemption application fails to acknowledge it. The only place an expansion is contemplated at all is an introductory note indicating that "[c]urrent oil production averages 1,350 barrels of oil per day (bopd) and is estimated to exceed 6,000 bopd when the field is fully developed."[42] Yet, the impacts of even that much smaller expansion are not analyzed in the application.

There are too many questions that accompany this project that must be answered before the agencies can even begin to consider whether an aquifer exemption is warranted. Crucially among these are:

- Volume - How much extra wastewater will be produced? How much wastewater will move through the Water Reclamation Facility ("WRF") and ultimately be discharged into

[37] Freeport McMoRan Application for Aquifer Exemption, Arroyo Grande Oilfield ("FM Application"), p. 3; Phase V Initial Study, p. 2; San Luis Obispo County Department of Planning and Building, Scoping Meeting Presentation (Feb. 19, 2014), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Scoping+Meeting/Presentation+2-19-14.pdf.
[38] Phase V Initial Study, p. 2.
[39] Phase V Initial Study, pp. 13-18. *See also* California Department of Fish and Wildlife, Letter in Review of the Phase V Environmental Impact Report Notice of Preparation (January 8, 2013), *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Notice+of+Preparation+(NOP)/Responses+Received/CADFW.pdf.
[40] Phase V Initial Study, pp. 21-22.
[41] Phase V Initial Study, pp. 41-48.
[42] FM Application, p. 3.

Pismo Creek, and can the WRF handle that much water?[43] Will the NPDES permit need to be modified in order to discharge more water into Pismo Creek? How much will be reinjected into the aquifer? What is the volume of injected water the aquifer can handle, and how will this affect the ongoing "dewatering" project?[44] Is there a risk of subsidence from groundwater depletion, including from the dewatering project?

- Groundwater flow, hydrology, and zonal isolation - How will this extraction affect the aquifer pressure and resulting risks for changes in pressure, subsidence, and groundwater flow? What is the potential for the hundreds of new oil wells, including directional drilling wells, to induce fractures and earthquakes that can alter the groundwater flow and provide new pathways for polluted water to enter nearby drinking wells? Will it affect the volume and/or pressure of water that feeds nearby water wells?
- Toxicity - What chemicals will be injected into the aquifer to produce this oil, and what will be the chemical composition of the injection water be?

These are just some of the questions must be answered before the State and US EPA, in order to be diligent, law-abiding regulators, can even consider this exemption request.[45]

Moreover, it is likely that this aquifer exemption is intricately tied to the Phase V project in order to accommodate the large increase in the amount produced water. This exemption request is a discretionary action on the part of DOGGR,[46] and should therefore be subject to environmental review.[47] To the extent this exemption is necessary for Phase V to move forward, it has been improperly piecemealed under the California Environmental Quality Act (CEQA) from the Phase V project, and must be analyzed in the Environmental Impact Report for that

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[43] The WRF was built to handle a throughput of 20,000 bpd to accommodate a Phase IV expansion permitted output of 5,000 bpd of oil. PXP Produced Water Reclamation Facility Subsequent Environmental Impact Report (2008), ch. 3, "Project Description," *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Historical+Documents/2008+-+RO+Water+System+EIR/EIR+Documents/06+Chapter+3.0+Project+Description.pdf. This expansion project would double the permitted output.

[44] FM Application, pp. 17, 21 (describing the project to dewater the reservoir to increase oil output).

[45] *See generally*, EPA Aquifer Exemption Memorandum; DOGGR and SWRCB, "Aquifer Exemption Process Guidance Document" (April 10, 2015) ("DOGGR Aquifer Exemption Guidance").

[46] EPA Aquifer Exemption Memorandum, p. 3; Cal. Pub. Res. Code § 3131(c) ("Following review of the public comments, and only if the division and state board concur that the exemption proposal merits consideration for exemption, the division shall submit the aquifer exemption proposal to the United States Environmental Protection Agency.").

[47] CEQA applies to "discretionary" projects. Cal. Pub. Res. Code § 21080(a). CEQA Guidelines define discretionary projects as government actions requiring “the exercise of judgment, deliberation or decision,” (CEQA Guidelines § 15357), and further provide, in part, that “CEQA applies in situations where a governmental agency can use its judgment in deciding whether and how to carry out or approve a project." CEQA Guidelines § 15002(i).

project before it can move forward.[48] Even if the decision to exempt the aquifer in order to allow wastewater injection is a separate project, it alone has the potential to create a myriad of significant environmental impacts--to water quality, public health, and wildlife, among others--none of which has been analyzed in FM's application. For these reasons, before DOGGR and the water boards--who have responsibility to analyze the impacts and determine whether to submit the proposed exemption to EPA--can approve this project for submittal they must conduct environmental review under CEQA.[49]

B. EPA Must Reject the AGOF Aquifer Exemption Request Because FM Has Failed to Demonstrate that it Meets the Federal and State Criteria for Exemption

If the fact that the application ignores this proposed major expansion was not alone enough of a reason to reject the request, the exemption must be denied because the application fails to adequately analyze foreseeable risks to groundwater even given current operations. The risks of contamination of beneficial use waters from both oil extraction activities and from re-injecting produced water from oil and gas production are huge because of, among other reasons:

- data gaps in California's understanding of its groundwater quality and hydrogeology[50] that this application does little to supplement or rectify;
- the increasing number and depth of water supply wells in response to climate change and droughts;[51]
- the increasing amount of recent oil and gas extraction activities and injection permitting, including the instant Phase V expansion project;[52]
- data gaps and dangers associated with the chemistry of and exposure to toxic chemicals involved in oil and gas produced water and wastewater injection, [53] mirrored in this

[48] *See* CEQA Guidelines § 15126.2(a) (requiring an EIR to identify all significant effects on the environment); CEQA Guidelines § 15378 requiring analysis of the "whole of an action"; *Orinda Assn v. Board of Supervisors* (1986) 182 Cal.App.3d 1145, 1171 ("CEQA cannot be avoided by chopping up proposed projects into bite-size pieces which, individually considered, might be found to have no significant effect on the environment or to be only ministerial.").

[49] Cal. Pub. Res. Code § 21065 and CEQA Guidelines § 15378 (defining "project" broadly). *See Bozung v. Local Agency Formation Commission* (1975) 13 Cal.3d 263, 283 ("The purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind. CEQA does not, indeed cannot, guarantee that these decisions will always be those which favor environmental considerations. At the very least, however, the People have a right to expect that those who must decide will approach their task neutrally, with no parochial interest at stake.")

[50] CCST Report, Vol. II, Ch. 2, pp. 51, 138, 152, 160, 165-166

[51] *See e.g.,* SWRCB, 2012; Howitt, 2015; DWR, 2014.

[52] Phase V Initial Study.

application in the lack of data regarding the chemicals injected into the oil wells and in resulting produced and injected water;

- potential changes to the water flow paths that contribute to beneficial use reservoirs, including from changes in pressure, earthquakes, and subsidence which can occur naturally or induced by oil production and injection;[54] and,
- the existence of known and unknown abandoned wells, compromised wells, and other potential pathways of contamination.[55]

The AGOF aquifer exemption application does not and cannot demonstrate that these risks are minimal here, because it has not submitted sufficient data to make that determination. FM therefore fails to demonstrate that the aquifer meets state and federal requirements for an aquifer exemption. In addition, as demonstrated below, even though the burden is on FM to demonstrate that the aquifer meets the criteria and the legal presumption is in favor of protecting groundwater, the analysis in the application is so cursory and vague that it cannot meet this burden. As a result, the exemption request must be rejected.

1. *FM Has Not Demonstrated That the Aquifer is and Will Remain Zonally Isolated (Cal. Pub. Res. Code § 3131(a)(3))*

The California Public Resources Code requires exempted aquifers to be zonally isolated such that the injection of fluids will not affect water that is, or may reasonably be, used for any beneficial use.[56] DOGGR's Aquifer Exemption Guidance confirms that

> State Water Board staff will evaluate the information contained in the Aquifer Exemption Application as to whether or not the proposed injection will likely affect current or potential future beneficial uses of water. If for example, there is an aquifer that is currently being used, or could be used for beneficial purposes in the area where there may be a hydrological connection to the injection zone, and the injection could have an impact on this or other beneficial uses, the State will not pursue and aquifer an exemption. Demonstration of a lack of hydrologic connection is critical to pursue an aquifer exemption.[57]

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[53] CCST Report, Vol. II, Ch. 2, pp. 50, 82, 87, 96-98, 115, 150, 156-158.
[54] CCST Report, Vol. II, Ch. 2, pp. pp. 104-109, 117-121, 124, 125-126, 151, 165.
[55] CCST Report, Vol. II, Ch. 2, pp. 104-109, 122-125, 159; United State Government Accountability Office (US GAO), "EPA Program to Protect Underground Sources from Injection of Fluids Associated With Oil and Gas Production Needs Improvement," Report to Congressional Requesters (GAO-14-555, June 2014) ("GAO Report"), pp. 23-24.
[56] Cal. Pub. Res. Code §§ 3131(a)(2), (3).
[57] DOGGR, Aquifer Exemption Guidance, p. 4.

The Federal Regulations confirm this requirement, given that the aquifer will be used for Class II wells if exempted: all new Class II wells must be sited "in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review."[58]

In addition, the injection of chemical-laden fluid into an area not zonally isolated from sources of drinking water may be contrary to Proposition 65.[59] Proposition 65 provides that "[n]o person in the course of doing business shall knowingly discharge or release a chemical known to the state to cause cancer or reproductive toxicity into water or onto land where such chemical passes or probably will pass into any source of drinking water, notwithstanding any other provision or authorization of law."[60] Many of the chemicals found in flowback fluid are included by the State on the list of chemicals known to cause cancer or reproductive toxicity. Accordingly, the injection of flowback fluid in circumstances where there is not zonal isolation from drinking water sources may result in a violation of Proposition 65.

DOGGR and EPA, therefore, must not grant any exemptions where zonal isolation cannot be guaranteed. Complementing this limitation on DOGGR's power to grant authorizations to inject, the federal regulations provide that:

> [n]o owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. **The applicant for a permit shall have the burden of showing that the requirements of this paragraph are met.**[61]

Accordingly, the burden of demonstrating zonal isolation must be placed on permit applicants.

Here, that burden has not been met. FM claims in its application that the aquifer in which injection will take place is zonally isolated and poses little risk to nearby wells or groundwater. The application itself fails to prove this, however, and in fact, there are indications that pathways to other sources of water already exist. For example, there is a hydrologic connection between the aquifers of Edna Valley and Price Canyon.[62] The application also notes "some

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[58] 40 CFR § 146.22(a).
[59] Cal. Health & Safety Code §§ 25249.5 *et seq*.
[60] Cal. Health & Safety Code § 25249.5.
[61] 40 C.F.R. § 144.12 (emphasis added).
[62] FM Application, p. 19; Appendix G-1-1, Review of DWR Well Completion Reports by Cleath-Harris Geologists, Inc. (June 25, 2015), p. 2.

interconnectivity between certain layers of the reservoir."[63] This information alone dooms the application.

Previous statements and project studies have also contradicted the assertion that this aquifer is zonally isolated. The initial study for the Phase V expansion project--to add up to 350 new wells and 100 replacement wells in order to double the permitted daily oil production (and increase the permitted product up to ten times more than what is currently produced)--states that "[a]s this formation is relatively close to the surface, potential impacts increase to nearby potable groundwater tables."[64] The Final Environmental Impact Report for the previous Phase IV oil well expansion project on site also noted the potential for injection wells at this site to impact other beneficial and potable groundwater: "[w]astewater generated through the petroleum recovery process would be reinjected into wastewater injection wells. This wastewater reinjection could impact shallow groundwater supplies if the wastewater came in contact with groundwater used for domestic purposes. If this occurred, the water quality of down-gradient public and municipal water production wells could be degraded."[65] Indeed, at the Scoping Meeting on the Phase V oil production expansion project, neighbors argued that they were "'[h]aving problems with groundwater wells in this area.' 'A number of residences have had to redrill water wells.'"[66] Previous comments on the Phase IV expansion EIR and Addendum also indicated that reports have shown a lack of zonal isolation.[67]

Additionally there are further reasons--none of which are analyzed in this application--that the hydrology in this subbasin is more interconnected and complex than FM contends. For instance, changes in pressure during oil extraction--or, in this case, purposeful, gradual

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[63] FM Application, p. 13.
[64] Phase V Initial Study.
[65] San Luis Obispo County Department of Planning Building, and Padre Associates, Inc., Final Plains Exploration and Production Phase IV Development Plan Environmental Impact Report (September 2004) ("Phase IV EIR"), section 5.7.2.3, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Historical+Documents/2004+-+Phase+IV+EIR/phpEIR2004.pdf.
[66] Freeport-McMoRan Conditional Use Permit EIR Scoping Meeting Comments from February 19, 2014 Scoping Meeting ("Phase V Scoping Meeting Comments"), p. 3, *available at:* http://www.slocounty.ca.gov/Assets/PL/environmental/plains/Environmental/Scoping+Meeting/Scoping+Meeting+Summary.pdf.
[67] Letter and fax from John J. Harris, Richards, Watson, and Gershon, to Ellen Carroll, San Luis Obispo County Department of Planning and Building, and County Board of Supervisors re: Further Comments Re Helen Hale Appeal of Planning Commission Approval of Conditional Use Permit D010386D-Plains Exploration & Production Company Project - Arroyo Grande Oil Field (June 27, 2005) ("Harris Fax").

dewatering of the reservoir--can cause water flow to divert or change direction.[68] In addition, drilling itself, hydraulic and steam fracturing, and other types of production at any stage can create conduits to previously isolated sources of water.[69] Existing, older, unused wells can create pathways as well.[70] Despite the fact that the application indicates that there are approximately 300 non-operating wells at the oil field,[71] the application fails to analyze the potential risk of unused wells creating new hydrologic pathways and connections to other groundwater sources.

Furthermore, the application fails to analyze the risk that earthquakes will create new pathways to other groundwater sources, and damage wells. Known and unknown faults can be conduits for fluid migration.[72] In fact, the Federal Regulations require that all new Class II wells be sited "in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review."[73] The Arroyo Grande fault borders the proposed exempted area and is noted as a boundary to ensure zonal isolation, and there are other faults in the area as well.[74] The application, however, inexplicably contains no seismic analysis of this subbasin, or any analysis of potential changes in groundwater movement as a result of earthquakes that may occur. There is no analysis of potential impacts to this water if that fault shifts. What is more, oil and gas activity itself, including from wastewater injection, can activate faults and trigger earthquakes.[75] As a 2014

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[68] FM Application, pp. 17, 21 (dewatering). *See also,* Verweij, J. M., *Hydrocarbon Migration Systems Analysis*, (Amsterdam: Elsevier Science Publishers B.V., 1993), p. 52 ("Changing groundwater pressure conditions affect directly the system of groundwater flow in the basin. In addition, the directions of groundwater flow may also be influenced indirectly by the tectonically increasing groundwater pressure.")

[69] CCST Report, Vol. II, Ch. 2, pp. 104-109.

[70] CCST Report, Vol. II, Ch. 2, pp. 105, 107, 109, 122-123.

[71] FM Application, p. 3 ("Today there are about 260 wells in operation. To date, about 560 wells have been drilled. . . .").

[72] CCST Report, Vol. II, Ch. 2, pp. 125-126.

[73] 40 C.F.R. § 146.22(a). *See also* CCST Report, Vol. II, Ch. 2, p. 151 ("Site characterization requirements include a confining zone free of known open faults or fractures that separates the injection zone from underground sources of drinking water. . . .").

[74] Phase IV EIR, section 5.7.1.2.

[75] California Council on Science and Technology Lawrence Berkeley National Laboratory Pacific Institute, *Advanced Well Stimulation in California*, "Executive Summary" (August 28, 2014) ("2014 CCST Report"), pp. 41, 269-275, *available at*: http://ccst.us/publications/2014/2014wstES.pdf. Further study is needed as well. "[A]reas of the southern San Joaquin, Ventura, Santa Clarita and Santa Maria basins, where active water disposal wells are concentrated at present (Figure 5-10), have relatively high rates of seismicity in the 2-5 magnitude range. While undoubtedly most of these earthquakes are naturally-occurring, detailed study of the seismicity in relation to fluid injection will be needed to assess the likelihood that a proportion of the events in these areas are induced." 2014 CCST Report, pp. 275-6. *See also* Hamilton, Douglas H. and Richard L. Meehan, "Ground Rupture in the Baldwin Hills," *Science*, vol. 172, no. 3981 (April 23, 1971), pp. 333-344; Brodsky, Emily and Lisa J. Lajoie, "Anthropogenic Seismicity Rates and Operational Parameters at the Salton Sea Geothermal Field," *Science*, vol. 341 (Aug. 2, 2013); Ellsworth, William, "Injection-Induced Earthquakes," *Science*, vol. 341 (July 12, 2013).

report noted: if "produced water is disposed of by injection and not handled through an expansion of water treatment and re-use systems, it could increase seismic hazards";[76] yet, the application contains no analysis of the potential for such activity to trigger or increase the risk of earthquakes here. Without a comprehensive analysis of the risk that earthquakes--natural or induced--will aggravate, widen, extend or otherwise modify existing faults or create new ones that then provide conduits for pollutants to travel out of the aquifer into surrounding groundwater, this application cannot move forward.

FM cannot, therefore, show that this aquifer is, and will be, zonally isolated. As current and previous environmental review records have noted, there is potential for injected wastewater to affect nearby potable groundwater and municipal water sources; and, as further described below, there are over 100 water wells within one mile of the oil field. Moreover, the application does not analyze the potential for changes in pressure, earthquakes, and unused wells to open new connections and redirect water flow. There are, therefore, real, foreseeable risks that the wastewater injected into the aquifer will affect other beneficial and drinking water sources, and without any analysis of these risks, the State and EPA cannot approve this exemption based on the application before it.

2. *FM Has Not Demonstrated That the Aquifer is Not Now Nor Could be in the Future Used for Drinking Water, or Supply a Public Water System (40 C.F.R. § 146.4(a), (b), (c)), or That Exemption and Injection will Not Affect Other Sources of Water Used for Drinking Water or Other Beneficial Uses (Cal. Pub. Res. Code § 3131(a)(2))*

This lack of analysis and information is especially alarming given that there are many groundwater supply wells very near the proposed exempted area, though, again, the analysis of the potential impact on these water supplies is not comprehensive enough to overcome the presumption in favor of protecting groundwater. The groundwater in the aquifer contains less than 3,000 mg/l TDS (and in some cases less than 1,000 mg/l),[77] which means that without the produced water chemicals injected into the aquifer, there is reason to believe it could be treated and used to supply a public water system.[78] Indeed, in a consultant's sampling of well W-1,

[76] 2014 CCST Report, p. 41.
[77] FM Application, Appendix D 1-a.
[78] *See e.g.,* March 2, 2015 CalEPA Memorandum, p. 1, noting less than 3,000 mg/l as a key indicator of higher quality water.

located in the northern portion of the AGOF just north of the Arroyo Grande fault, the consultant states that with "the appropriate treatment, groundwater could be utilized as a drinking water source."[79] In fact, San Luis Obispo County is among the top ten counties in California in terms of the number of communities in the county that rely on contaminated groundwater (treated prior to consumption) as a primary drinking water source.[80]

FM and its consultants acknowledge there are over 100 water wells within one mile of the oil field, "most" of which are in "separate sub-basins"--*but apparently not all*.[81] Most of these wells, in fact, tap into the Pismo Formation, which comprises the proposed exempted area.[82] In addition, FM's consultant examined generally what wells were within a mile of the oil field, but not necessarily within the boundaries of the proposed exemption, and did not disclose the exact locations of the wells it included.[83] Without exact well locations and depths, which are not provided here, it is not possible to determine whether others are drawing on this aquifer for water supplies, or whether this aquifer could be affecting other sources of water. In fact, one cross section in the application indicates water wells within a few feet of the proposed area.[84] DOGGR's Aquifer Exemption Guidance Document requires applicants to submit "[m]aps showing the locations of any and all water supply, injection, production, or monitoring wells that could have a hydrologic connection with the proposed exempted aquifer. This survey should include all active, inactive, idle, or plugged and abandoned wells within the study area, including any known faults and formation contacts."[85] EPA's Aquifer Exemption Checklist suggests that the application include maps and tables of "each of the 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." In addition, the application should include a map with "arrow(s) to indicate the direction and speed of GW in the aquifer proposed for

[79] FM Application, Appendix G 1-2.
[80] SWRCB, 2012, p. 10.
[81] FM Application, p. 9; FM Application, Appendix G-1-1, DWR Well Review by Cleath-Harris Geologists, Inc. (June 25, 2015), p. 1; FM Application, Appendix I-1-2, Monitoring Wells Map.
[82] FM Application, Appendix G-1-1, DWR Well Review by Cleath-Harris Geologists, Inc. (June 25, 2015), p. 5; *see e.g.*, FM Application, Appendices A.7.a. and A.7.a.1.
[83] FM Application, Appendix G-1-1, DWR Well Review by Cleath-Harris Geologists, Inc. (June 25, 2015), attached maps.
[84] FM Application, Appendix A.7.a.1; FM Application, Appendix I-1-2.
[85] DOGGR, Aquifer Exemption Guidance, pp. 7, 8.

exemption."[86] Yet aside from a cross section diagram pointed out there are nearby ranch wells and a vague bubble map noting that there are wells within a mile of the oil field that draw from roughly the same area,[87] the application fails to provide any other data on the direction of groundwater flow or specific characteristics of nearby wells.

Nor does the application provide samples from these nearby wells, many of which are used for domestic use and/or irrigation. This is even more concerning given that neighbors have, in fact, described problems with their water wells: "'Having problems with groundwater wells in this area.' 'A number of residences have had to redrill water wells.' 'Some landowners in the area have problems with oil intrusion into their groundwater wells.'"[88] The application must, at a minimum, include a detailed, specific map, with latitudinal and longitudinal coordinates, that shows all drinking water wells within at least a two-mile radius of margins of the proposed exemption area. It addition, it must include a comprehensive well survey, including an analysis of the wells' water chemistries, depth screened intervals, and pumping rates.

As DOGGR acknowledges, because California is experiencing a devastating drought, drilling new and/or deeper wells is becoming much more common.[89] In its own Aquifer Exemption Guidance Document, DOGGR notes that that because "some water supply wells are being drilled increasingly deeper, supporting data must be current and accurate."[90] Groundwater in agricultural areas of the State, including the coastal regions, is particularly vulnerable during a drought because it is used to replace unavailable surface water supplies for agriculture, which reduces available water for both agricultural and potable use purposes. Increased pumping already stresses this "last resort" resource because it decreases groundwater levels below wells ("overdraft"), requires more and deeper wells, reduces groundwater quality (by drawing waters from more sources increasing the likelihood of cross-contamination), increases land subsidence (irreversibly reducing the storage capacity of the aquifer network), and threatens drinking water supplies to the many communities that depend mostly or entirely on groundwater for their potable water supply.[91] Newly deepened wells reduce the water pressure in existing shallow wells, forcing nearby users to also drill deeper wells as the existing wells risk running dry. In

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[86] EPA Aquifer Exemption Memorandum (attachment: Aquifer Exemption Checklist), C-1.
[87] *See* FM Application, Appendix G 1-1.
[88] Phase V Scoping Meeting Comments, p. 3.
[89] DOGGR, Aquifer Exemption Guidance, p. 5.
[90] *Id.*
[91] *See generally*, DWR, 2014.

addition, Californians have been "forced . . . to use water of lesser quality to meet their needs."[92] This increased pumping and decreased surface water supplies makes any existing aquifers that are available for potential use – in agriculture or as a drinking source – that much more valuable during the current drought. Thus, here, even if fluid injection is at a minimum of 450 feet from the surface, as the application states, there is no guarantee that nearby well owners won't drill at least that deep, or drill new wells, into the same Edna Member, Dollie Sands and/or Pismo Formation, to access water.

In addition, at the same time FM is pursuing a massive expansion of its oil field operations and production, King Ventures, Inc. is pursuing the annexation to Pismo Beach and development of nearly 1,700 acres in the Price Canyon area.[93] This new development will need water. Oil development and residential development are going to increasingly collide over water resources, What is more, this development could have significant impacts on Pismo Creek and surrounding areas.[94] The County, DOGGR, the water boards, and the Department of Fish and Wildlife, the Department of Water Resources, and other environmental and land use agencies need to conduct a much more in-depth analysis of how to protect this area, rather than haphazardly sacrificing California's dwindling water and environmental resources to the oil industry.

Finally, there is evidence that water from the Arroyo Grande aquifer is, in fact, already used for drinking water and for municipal water systems. Groundwater from the Arroyo Grande aquifer is imported into the Pismo Creek Watershed.[95] The produced water that is filtered through the WRF is discharged into Pismo Creek. Pismo Creek helps recharge the Santa Maria water basin: "Natural recharge to the basin comes from seepage losses from the major streams, percolation of rainfall, and subsurface flow . . . Percolation of flow in Pismo Creek provides recharge for the northern portion of the basin."[96] The Santa Maria Water Basin is the "principal

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[92] DOGGR, Aquifer Exemption Guidance, p. 5; Krieger, Lisa M., "California Drought: San Joaquin Valley Sinking as Farmers Race to Tap Aquifer," *Mercury News* (August 19, 2015), *available at:* http://www.mercurynews.com/drought/ci_25447586/california-drought-san-joaquin-valley-sinking-farmers-race.
[93] Central Coast Salmon Enhancement on Behalf of the Pismo Creek/Edna Area Steering Committee, Pismo Creek / Edna Area Watershed Management Plan, Prepared for the California Department of Fish and Game (March 2009) ("Pismo Creek Watershed, 2009"), p. 85.
[94] *Id.*
[95] Coastal San Luis RCD and Upper Salinas - Las Tablas RCD, San Luis Obispo County Watershed Management Planning Project, Phase 1 (January 2014), Pismo Creek Watershed, Section 3.2.4.7, p. 344, *available at*: http://www.us-ltrcd.org/wp-content/uploads/2014/02/IRWM-Report.pdf.
[96] California's Groundwater, Bulletin 118, Central Coast Hydrologic Region California's Groundwater

source of water for thousands of residents and landowners."[97] As a result, the aquifer is currently a source of drinking water and other beneficial uses, and cannot be exempted from the SDWA.

IV. Conclusion

Because this application fails to account for FM's simultaneous major expansion project, and because it fails to include even the most basic information needed to evaluate its consistency with California and federal law, DOGGR and EPA must reject it. Contrast, for instance, this application with EPA's review and approval of an aquifer exemption request in another case. There, in reaching its decision, EPA evaluated a number of factors, including: "(1) whether the 6.7 acre area meets the agency's criteria for exempted aquifers, (2) the various comments received from interested groups and individuals, (3) the impact of the proposed mining project on the environment in general and on surrounding sources of drinking water in particular, (4) the impact of the proposed mining project on human health, (5) restoration of the mining site and removal of contaminants from the exempt aquifer area, and (6) reasonable alternatives to the exemption as well as alternatives to the type of mining proposed by Wyoming Fuel Company."[98] Here, the application did not provide any information on the impact of the proposed exemption on the environment in general, on surrounding sources of drinking water, on human health, or any alternatives to the exemption. Nor did the application discuss restoring the site; rather, it entirely ignored the fact that the applicant is simultaneously proposing to expand it.

Finally, even if, despite these reasons, the State and EPA still believe they should grant the exemption, they should not grant it until California's new Underground Injection Control (UIC) program regulations have been adopted. Without knowing what the requirements and mitigation measures for injection will be, there is no way to analyze how or whether continuing to allow illegal injection into the aquifer could migrate, harm the environment, or degrade nearby water wells. As a result, unless and until FM has submitted a constructive and comprehensive application that actually proves the AGOF aquifer meets the standards for an exemption, and unless and until the State has finalized its UIC program regulations, the application must be rejected and injection into the non-exempt portions of the AGOF must cease immediately.

Santa Maria River Valley Groundwater Basin (last update, 2/27/04), citing Cal. Dept. Water Resources (DWR), Water Resources of the Arroyo Grande - Nipomo Mesa, 2002.

[97] *City of Santa Maria v. Adam* (2012) 211 Cal. App.4th 266, 280.

[98] *Western Nebraska Resources Council v. Environmental Protection Agency*, 793 F.2d 194, 200 (8th Cir. 1986).

Sincerely,

Maya Golden-Krasner
Staff Attorney, Climate Law Institute
Center for Biological Diversity

Attachment F

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

Natural gravitational forces promote containment of all injected produced water within the syncline. The produced water injected on the western flank of the reservoir moves back down-dip toward the bottom of the syncline. Although the practice of returning produced water back to the formation it was originally recovered from is inefficient from an oil production perspective, the natural geologic confinement offered by the reservoir formation was determined to be the best option for ensuring zonal containment of the water disposal stream.

Water injection into the reservoir, via disposal wells open at depths between about 600 and 900 ft., has been underway since the mid-1970s. By the early 1980's, injection operations exceeded 10,000 bbl./day (1.29 acre-Ft per day). Cumulative water injection into the producing horizons is estimated to have totaled 100 million bbl., (12,890 acre-ft) (App. E (2)). No incidents or observed detrimental effects to the localized environment or groundwater resources have been documented since injection operations into the Dollie zone were initiated, thus providing anecdotal support to the observations that the reservoir is geologically confined.

To improve efficiencies with the oil production operations, the Water Reclamation Facility (WRF) was designed to dewater the reservoir by returning less produced water to the formation than was being withdrawn in conjunction with the oil (App. H). Since becoming operational in 2013, treated produced water discharges to Pismo Creek from the WRF have exceeded approximately 9.8 million bbls (1,263 acre-ft). Total oil and water withdrawals from the producing formation are estimated to have exceeded 29 million bbls (3,738 acre-ft) to date. The average production, injection, and water released to Pismo creek for 2015 are presented in Table 4-1 and show a net loss of fluid for the reservoir.

Unit of Measurement	Oil Produced from Reservoir	Water Produced from Reservoir	Water and Steam Reinjected into Reservoir	Water Released to Pismo Creek
bbl/day	1,350	29,750	11,700	18,050
acre-ft/day	0.17	3.83	1.51	2.33

Table 4-1

The process of reservoir de-watering has now been underway for over 2 years. This is gradually lowering the reservoir pressure, which both allows more efficient thermal recovery operations and also makes the down-dip path of flow of any injected water more definitive due to the increased pressure sink that is being created. This reservoir de-pressuring will be further emphasized beginning late-Summer 2015, when the WESP (i.e., Wet Electrostatic Precipitator) and gas incinerator currently being installed is expected to be completed and operational, which will result in essentially all current gas reinjection (of over 2.0 MMSCF/day) into the reservoir being eliminated.

Water injection into wells "Signal E.T.S." 9N and "Pulas" 3, with cumulative injection of 8.2 million bbl (1,057 acre-ft) and 5.9 million bbl (760 acre-ft) respectively, stayed in the trough of the syncline and appear to have improved recovery in these same zones in offset wells that were subsequently drilled and logged (based on the observed reduction in oil saturation relative to pre-injection conditions) (App. E (3-1, 3-2, 3-3)).

Over the next 10 years, additional reservoir de-pressuring (voidage) will be achieved by producing oil and sending an estimated 73 million bbls (9,410 acre-ft) of water to the creek (based on water plant maximum output of 20,000 bwpd (2.58 acre-ft/day) to Pismo creek).

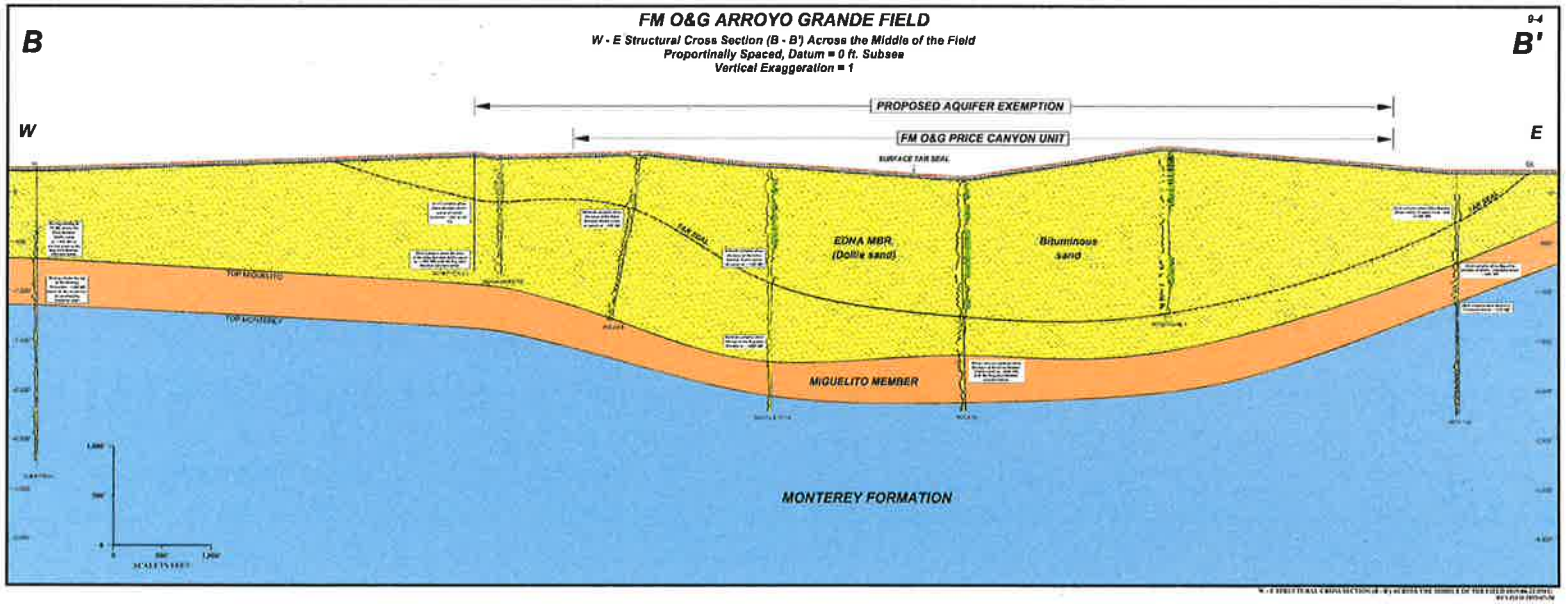
Attachment G

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

FM O&G ARROYO GRANDE FIELD

W - E Structural Cross Section (B - B') Across the Middle of the Field
Proportionally Spaced, Datum = 0 ft. Subsea
Vertical Exaggeration = 1



Attachment H

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

Arroyo Grande Oilfield

San Luis Obispo County, California

Edna Member, Dollie Sands, Pismo Formation

Aquifer Exemption Application

Class and Well Type

- EPA Class II Injection
  - Water Disposal
  - Enhanced Oil Recovery
    - Cyclic Steam
    - Steam Flood

Exemption Justification

- CFR §146.4 Criteria for exempted aquifers
  - (a) It does not currently serve as a source of drinking water
  - (b) It cannot now and will not in the future serve as a source of drinking water because:
    - (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 III operation to **contain** minerals or **hydrocarbons** that considering their quantity and location are expected to be commercially producible

History

Seeps in the Arroyo Grande oilfield were used by the Chumash Indians to seal their water craft (tomol) and their water carrying vessels.

Gaspar de Portola wrote:

“On May 12, 1770, we left these canyons and arroyo of San Ladislao and the rancheria of the Buchon and continued to the north, northeast. The stream of this canyon doesn’t run but is a marsh. In ¼ league {1 league = 2.6 miles} of walking we arrived at a group of hills very big and wide, and we crossed their slope and there were many outcrops of melted tar or chapopote, and we had to throw 200 sticks into the tar and then we crossed forward and in a league turned north in this broad canyon {Edna Valley}.”

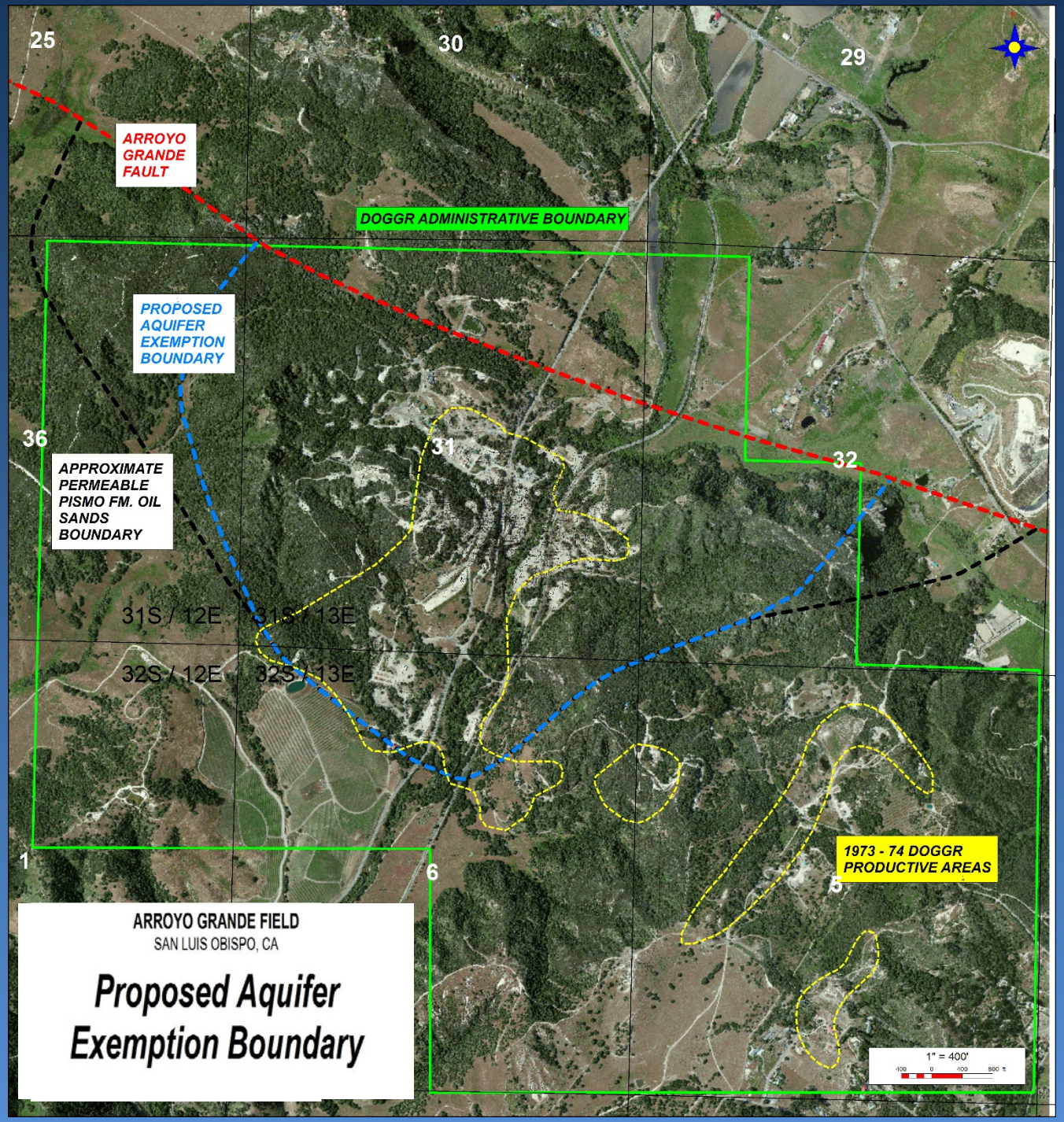
History

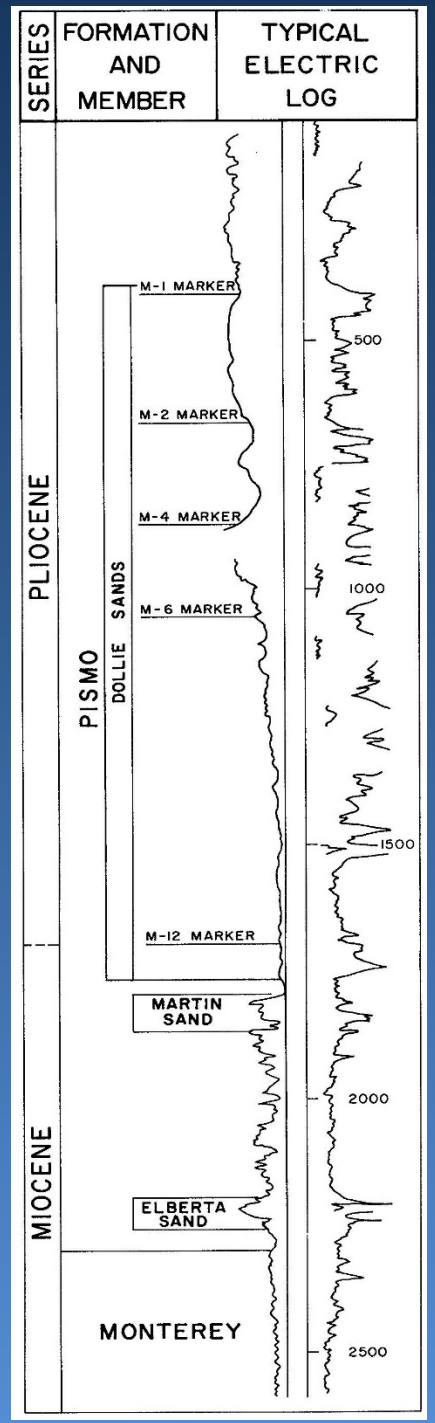
- 1880 – 1922 - 150,000 tons of tar sands mined from the surface
- 1906 – First oil well completed
- 1919 – Arroyo Grande oilfield designated by the State
- 1949 – Water Flood
- 1965 – Cyclic Steam
- 1980 – Steam Flood

Current

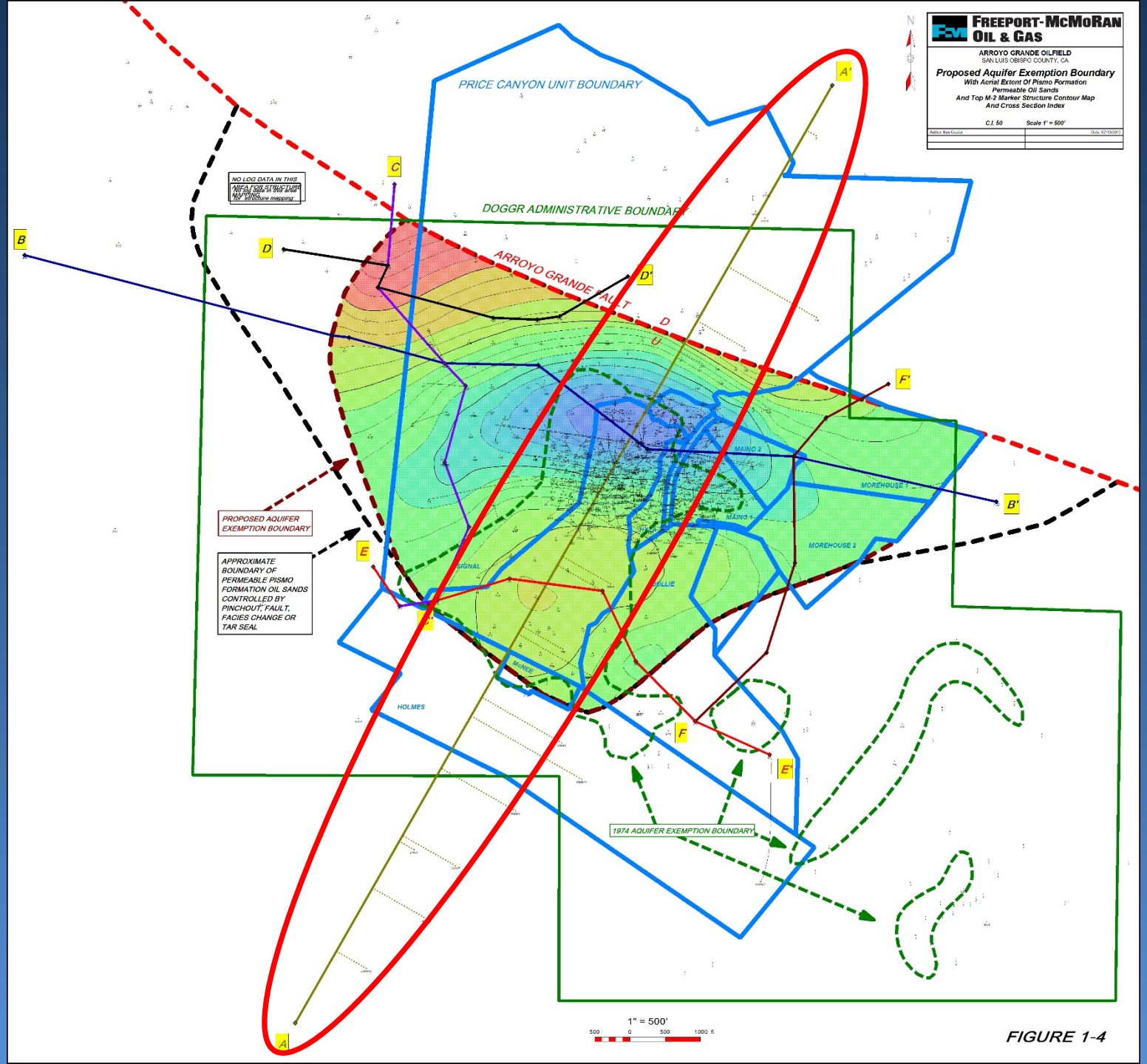
- ~560 wells drilled in total
  - 260 wells in operation
  - 19 million barrels of oil produced
  - 5th largest field in District 3 by production
- Oil Production = 1,350 bbl/day
- Water Production = 29,750 bbl/day
- Water/Steam Injection = 11,700 bbl/day
- Water not returned to Reservoir = 18,050 bbl/day

Proposed Area

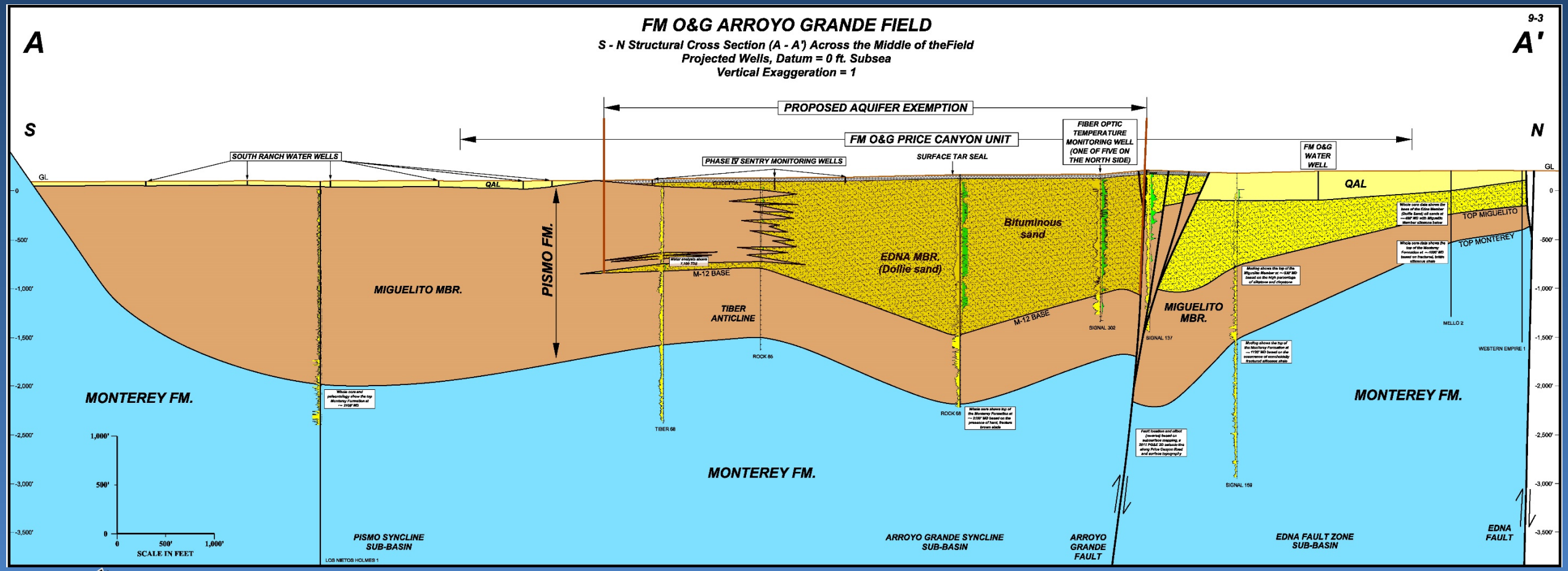




Cross Sections



A – A’ south to north across the middle



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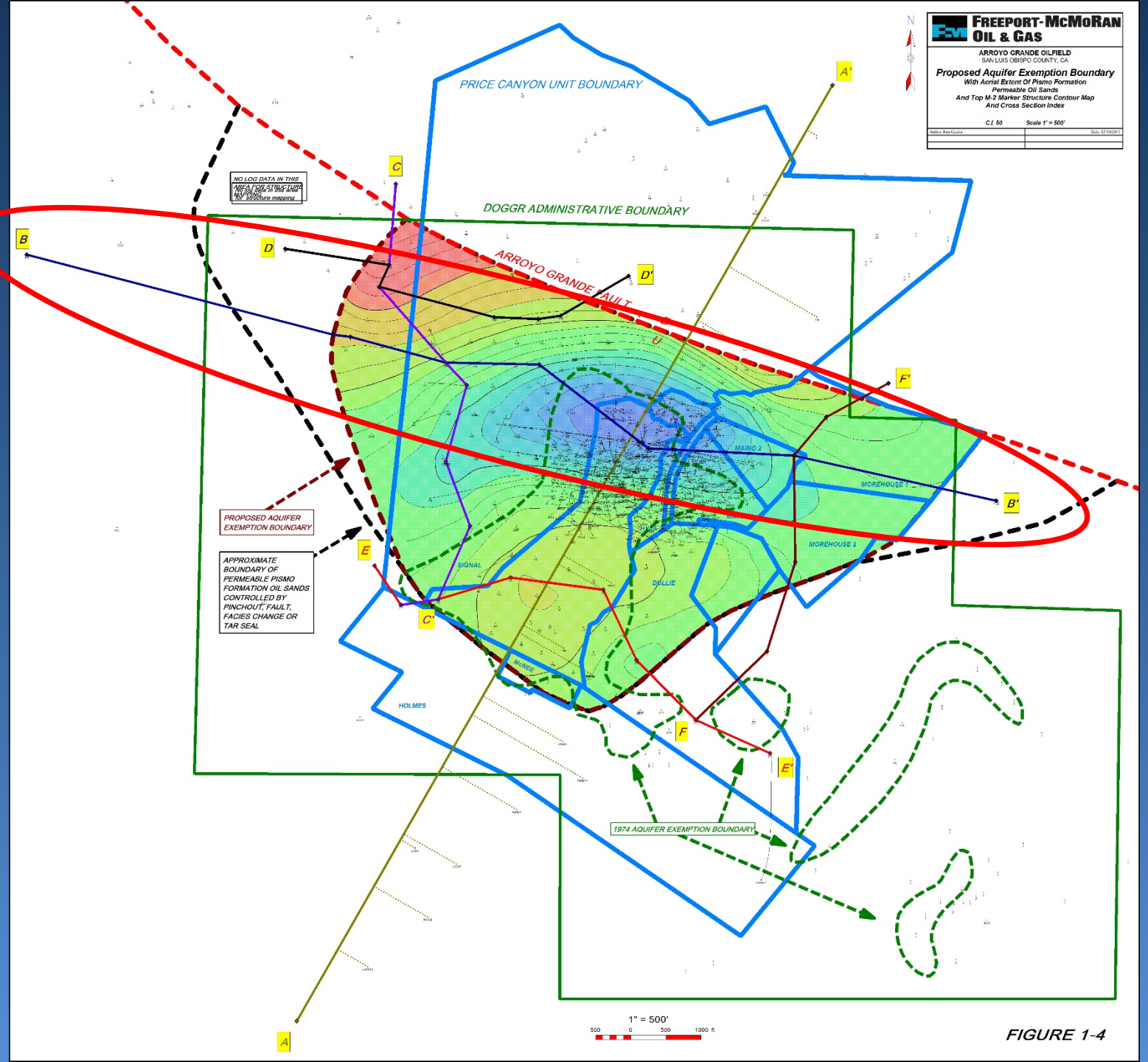
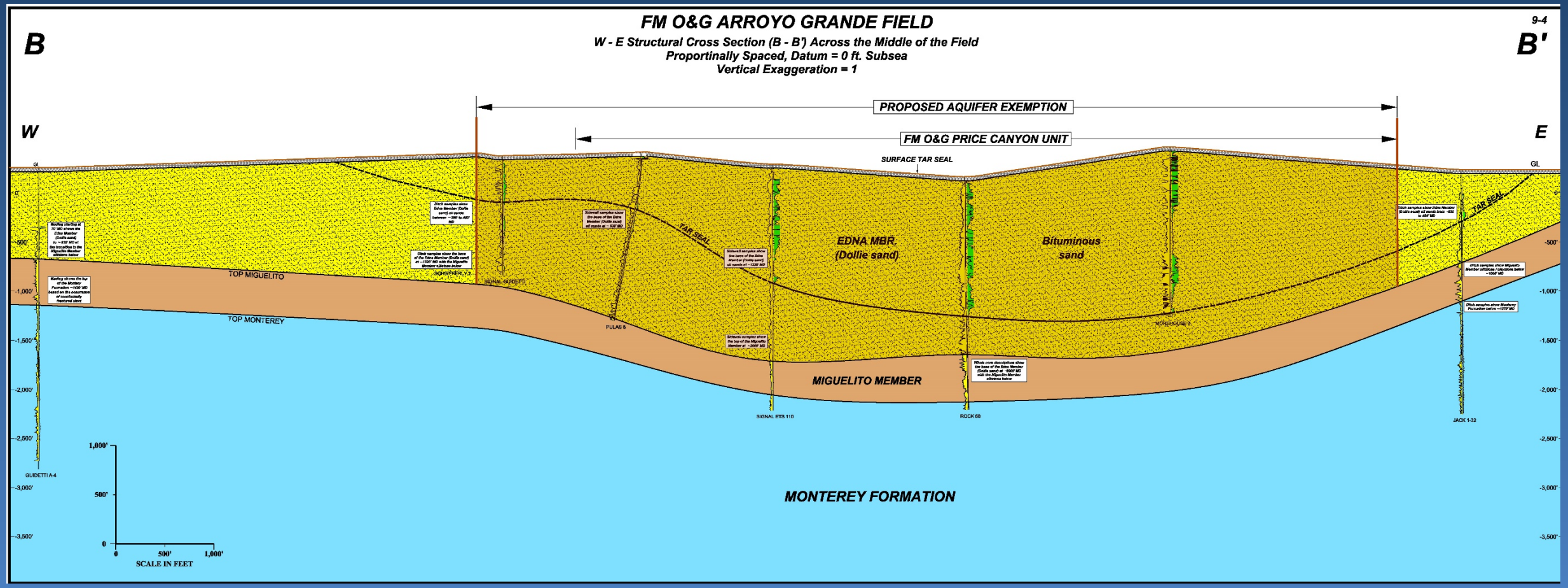
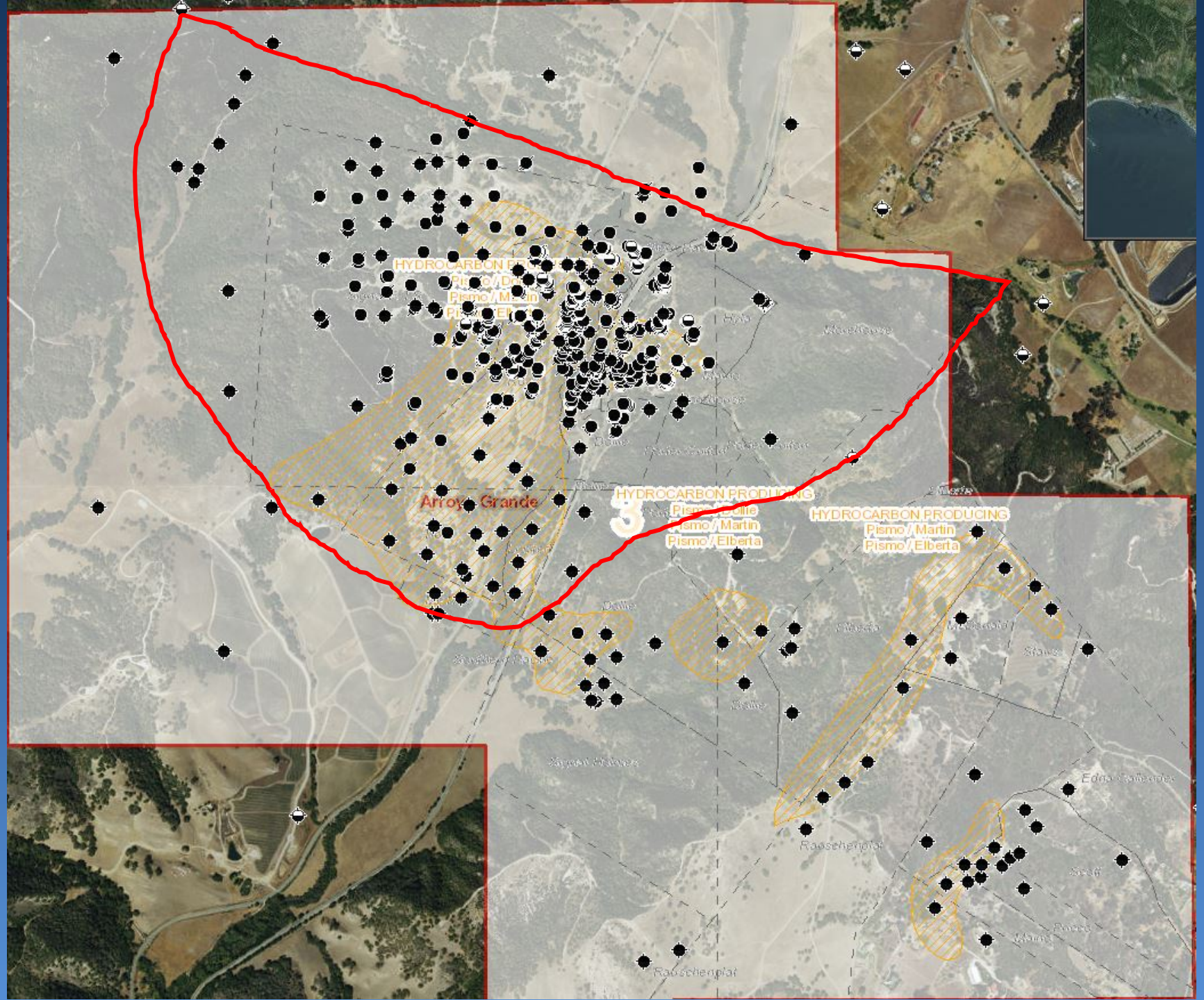


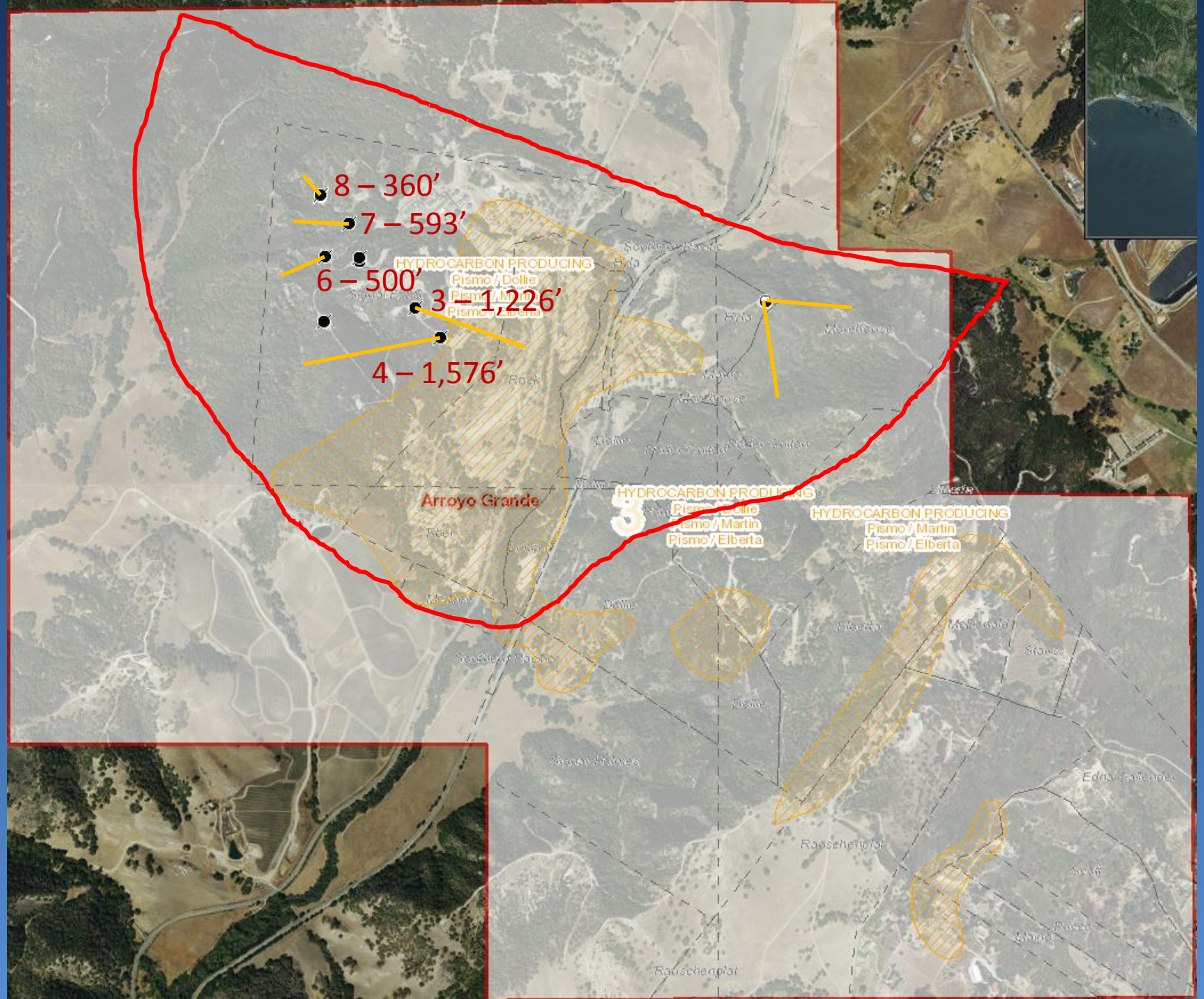
B – B’ west to east across the middle



All Known Wells for Arroyo Grande Oilfield



Active Water Disposal Injectors

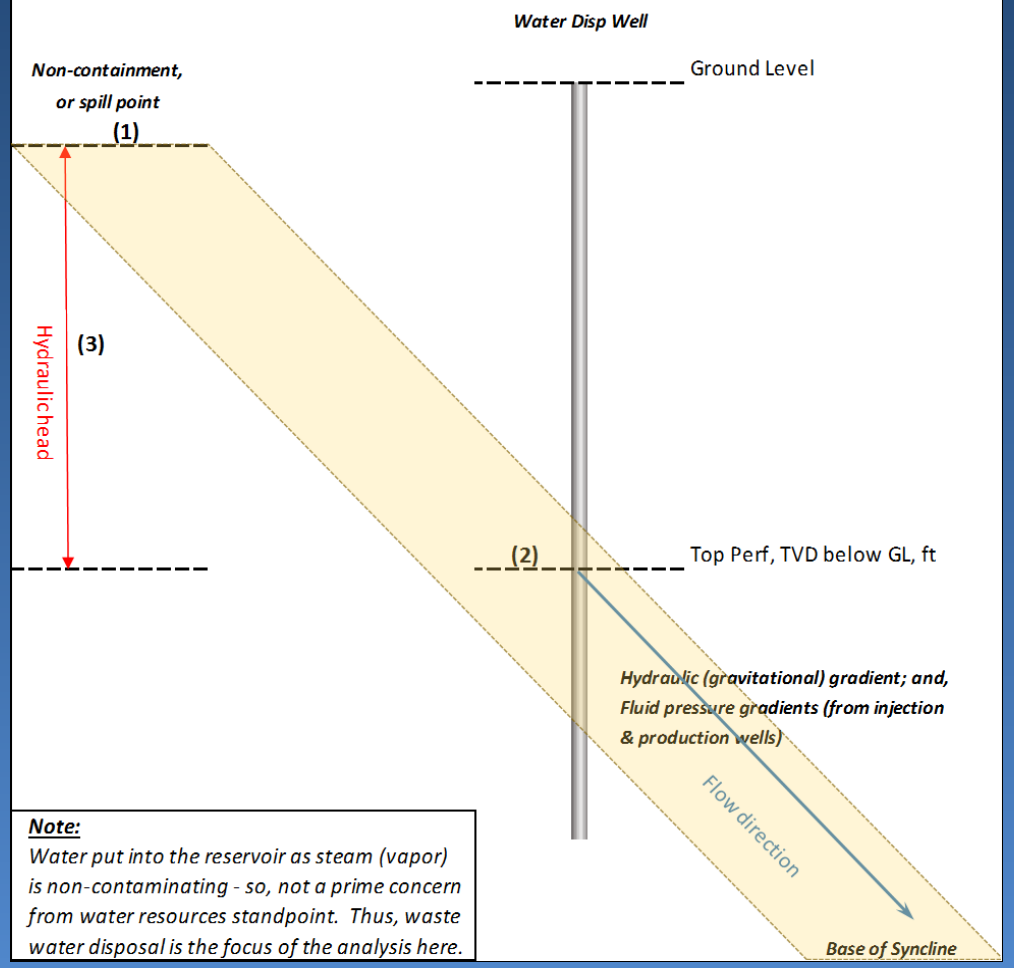


Hydraulic Analysis

Table HA-1: Hydraulic Analysis Assumptions & Results

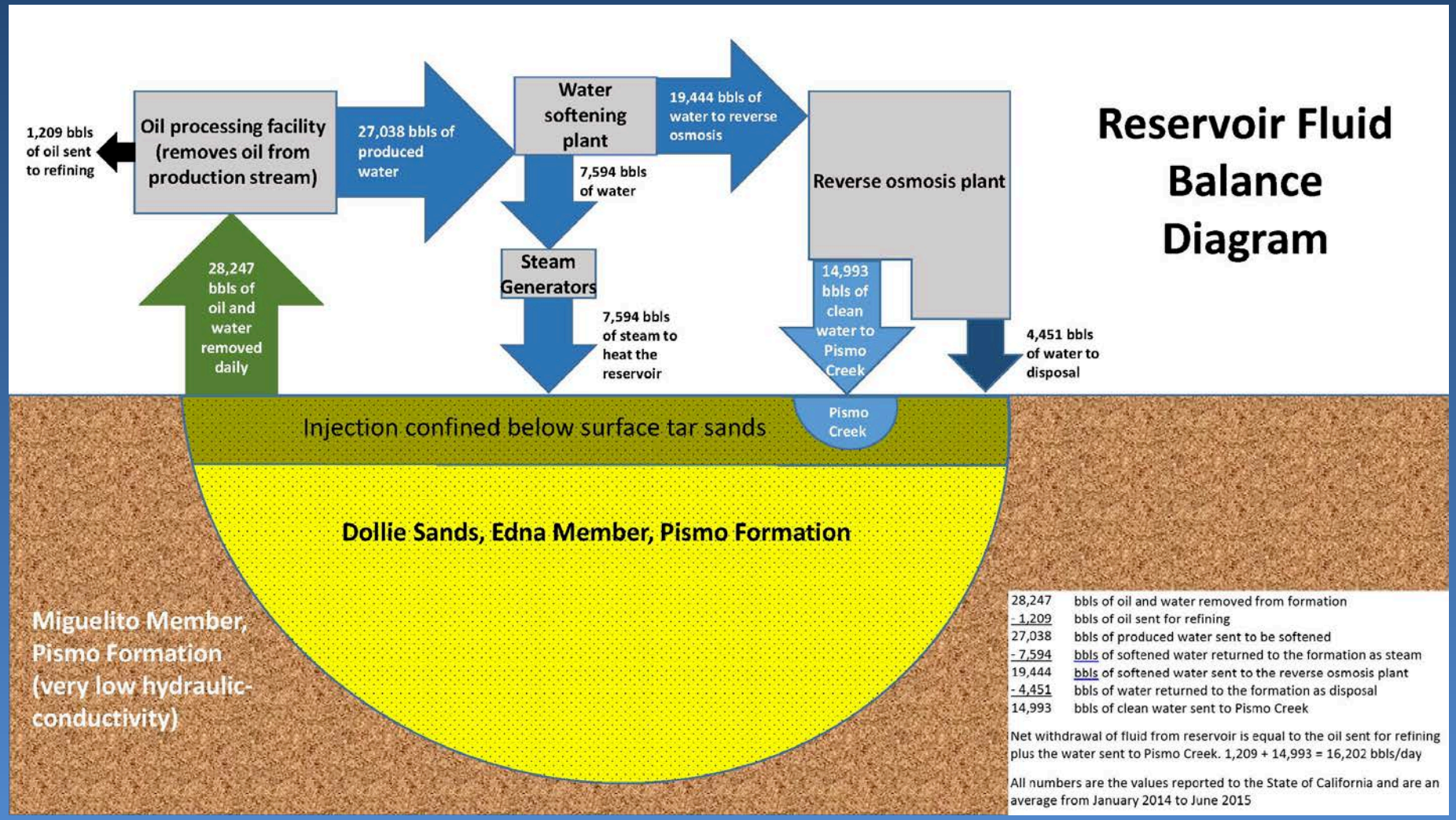
Description of Parameter or Value	*Item*	*Feb'13*	*Jun'15*
Spill level elevation, ft above MSL	(1)	275	275
Highest injection point, TVD, ft below GL	(2)	455	455
Highest injection point, ft below MSL		34	34
Vertical distance: top perf to spill level, ft	(3)	309	309
Max Allowed Fm Frac Press Grad, psi/ft		0.700	0.700
Max inj press @ top perf, psig	(9)	319	319
Actual inj press @ top perf, psig	(10)	286	231
Effective inj press gradient, psi/ft	(11)	0.627	0.507
Reservoir Fluid Grad, psi/ft	(6)	0.380	0.224
Est Reservoir Press, psi	(7)	173	102
Delta Press, psi	(8)	113	129
Fresh water gradient , psi/ft	(4)	0.435	0.435
Hydraulic head from water (if filled to spill point), psi	(5)	134	134

Figure HA-1: Schematic for Hydraulic Analysis



Note:
Water put into the reservoir as steam (vapor) is non-contaminating - so, not a prime concern from water resources standpoint. Thus, waste water disposal is the focus of the analysis here.

Reservoir Fluid Balance Diagram



Best Use of the Water

- Water Reclamation Facility
  - $60 million to construct
  - Only economic to operate if water is reused for steaming and the oil is produced and sold
    - Contains:
      - Free Oil, Benzene, Selenium, Toluene, Ethyl benzene, Xylene
  - 25+ years for current reserve estimates
    - Expansion of AE area will only help to extend that number

Conclusion

- DOGGR and SWB preliminarily approves of the aquifer exemption
  - Containment
    - Mass balance
    - Structural
  - Oil Producing
  - Best use of the resources

Water Production

Total water produced in the AG Oilfield per day	30,000	bbl/day
Total producing wells	187	wells
Average of water produced per day per well	160	bbl/day
Conversion factor	42	gal/bbl
Average of water produced per day per well	6,738	gal/day
Conversion factor	24	hr/day
Conversion factor	60	min/hr
Average of water produced per minute per well	5	gal/min
Low average production of a water well in SLO county	300	gal/min
How many wells to produce low average	64	wells
High average production of a water well in SLO county	600	gal/min
How many wells to produce high average	128	wells
Pismo formation well production	60	gal/min
How many wells to produce as a Pismo well	13	wells

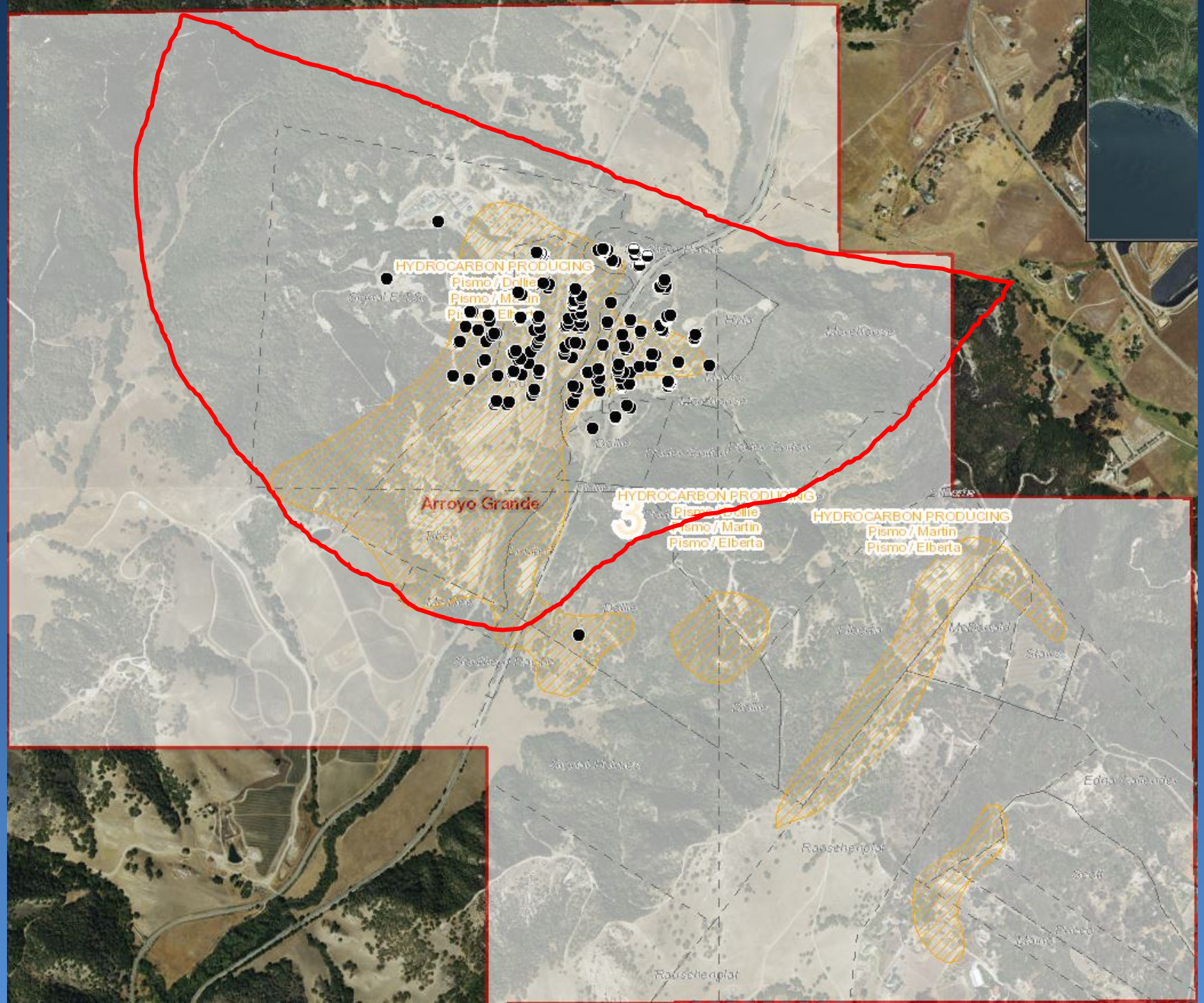
Water Production

Unit of Measurement	Oil Produced from Reservoir	Water Produced from Reservoir	Water and Steam Reinjected into Reservoir	Water Released to Pismo Creek
bbl/day	1,350	29,750	11,700	18,050
acre-ft/day	0.17	3.83	1.51	2.33

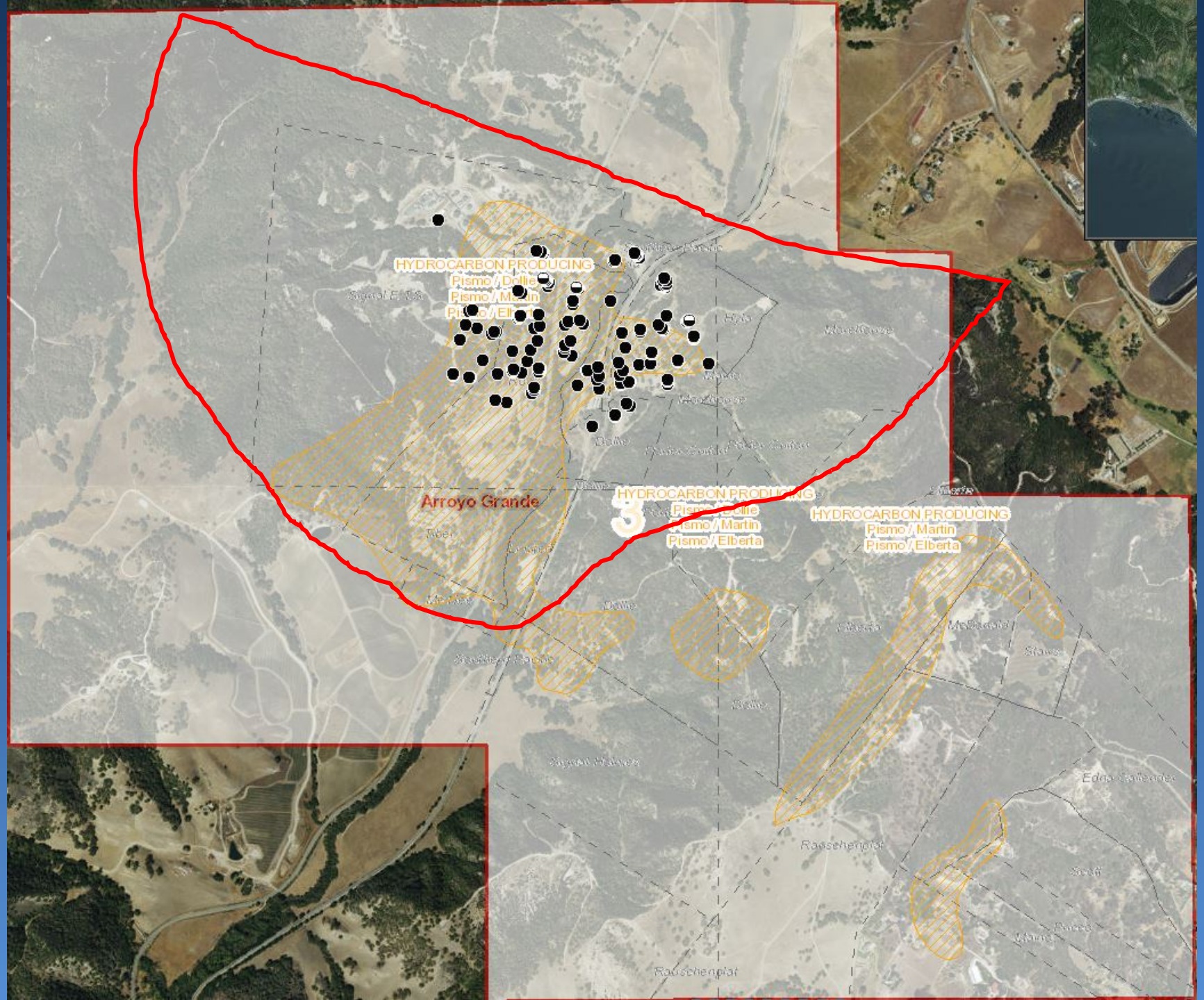
Exemption Justification

- CFR §144.7 Identification of underground sources of drinking water and exempted aquifers
- **(c) (2)** For Class II wells, a demonstration of commercial producibility shall be made as follows:
  - **(i)** For a Class II well to be used for enhanced oil recovery processes in a field or project containing aquifers from which hydrocarbons were previously produced, commercial producibility shall be presumed by the Director upon a demonstration by the applicant of historical production having occurred in the project area or field.
  - **(ii)** For 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 and porosity shall be considered by the Director, to the extent such information is available.

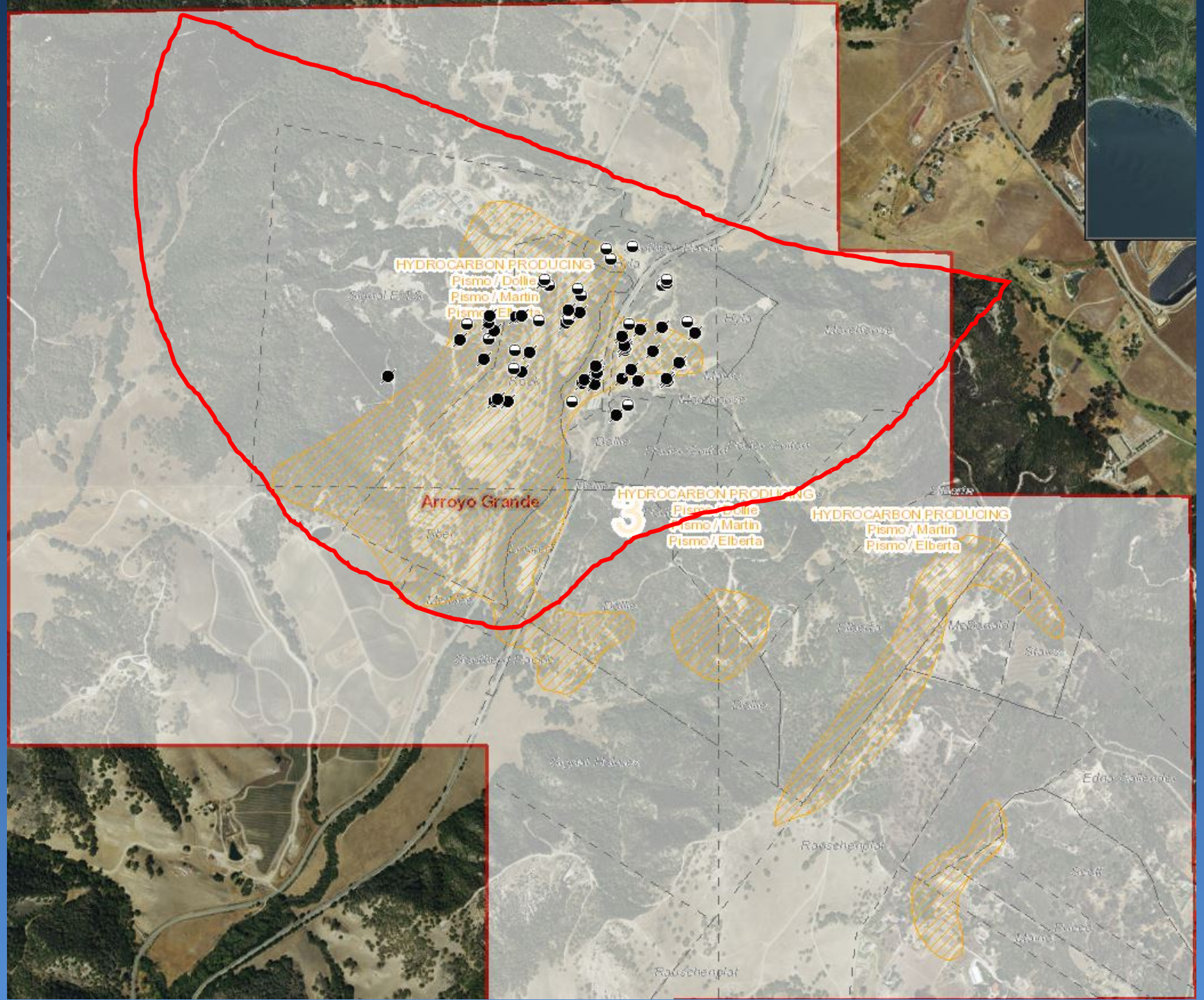
Active Oil and Gas Producers



Active Cyclic Steam Injectors



Active Steam Flood Injectors



Attachment I

Center for Biological Diversity's Appeal of

San Luis Obispo County Planning Commission's 11/12/2015 decision to extend the CUP for the Arroyo Grande Oil Field

DRAFT ORDER R3-2013-0029
NPDES NO. CA0050628

The following Discharger is subject to waste discharge requirements set forth in this Order.

Table 1. Discharger Information

Discharger	Freeport-McMoRan Oil and Gas
Name of Facility	Produced Water Reclamation Facility
Facility Address	1821 Price Canyon Road
	Arroyo Grande, CA 93420
	San Luis Obispo County

Discharges by Freeport-McMoRan Oil and Gas from the discharge point identified below are subject to waste discharge requirements as set forth in this Order.

Table 2. Discharge Location

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Produced Water	35º 11' 10.8" N	120º 37' 3.7" W	Pismo Creek

Table 3. Administrative Information

This Order was adopted by the Central Coast Water Board on:	**December 5, 2013**
This Order shall become effective on:	**February 1, 2014**
This Order shall expire on:	**February 1, 2019**
The Discharger shall file a Report of Waste Discharge as an application for reissuance of waste discharge requirements in accordance with title 23, California Code of Regulations, and an application for reissuance of a National Pollutant Discharge Elimination System (NPDES) permit no later than:	**August 1, 2018**
The U.S. Environmental Protection Agency (USEPA) and the Central Coast Water Board have classified this discharge as follows:	**Major**

I, Kenneth A. Harris Jr., Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, Central Coast Region, on the date indicated above.

_____

Kenneth A. Harris Jr., Executive Officer

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I. FINDINGS

The California Regional Water Quality Control Board, Central Coast Region (hereinafter Central Coast Water Board), finds:

A. Legal Authorities. This Order serves as Waste Discharge Requirements (WDR's) pursuant to article 4, chapter 4, division 7 of the California Water Code (commencing with section 13260). This Order is also issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the Water Code (commencing with Section 13370). It shall serve as a National Pollutant Discharge Elimination System (NPDES) permit for point source discharges from this facility to surface waters. This Order also serves as a Master Recycling Permit pursuant to article 4, chapter 7, division 7 of the Water Code (commencing with section 13500).

B. Background and Rationale for Requirements. The Central Coast Water Board developed the requirements in this Order based on information submitted as part of the NPDES renewal application, through monitoring and reporting programs, and other available information. The Fact Sheet (Attachment F) contains background information and rationale for this Order's requirements, and is hereby incorporated into this Order and constitutes part of this Order's Findings. Attachments A through E and F are also incorporated into this Order.

C. Provisions and Requirements Implementing State Law. The provisions/requirements in subsections III.B , III.C, and IV.B of this Order are included to implement state law only. These provisions/requirements are not required or authorized under the federal CWA; consequently, violations of these provisions/requirements are not subject to the enforcement remedies that are available for NPDES violations.

D. Notification of Interested Parties. The Central Coast Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of the notification are provided in the Fact Sheet of this Order.

E. Consideration of Public Comment. The Central Coast Water Board, in a public meeting, heard and considered all comments pertaining to the discharge. Details of the Public Hearing are provided in the Fact Sheet of this Order.

THEREFORE, IT IS HEREBY ORDERED, that Order No. R3-2008-0004 is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the Water Code (commencing with section 13000) and regulations adopted thereunder, and the provisions of the CWA and regulations and guidelines adopted thereunder, the Discharger shall comply with the requirements in this Order. This action in no way prevents the Central Coast Water Board from taking enforcement action for past violations of the previous Order. If any part of this Order is subject to a temporary stay of enforcement, unless otherwise specified, the Discharger shall comply with the analogous portions of the previous Order, which shall remain in effect for all purposes during the pendency of the stay.

II. DISCHARGE PROHIBITIONS

A. The discharge of any waste not specifically regulated by this Order, excluding storm water regulated by General Permit No. CAS000001 (Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities), is prohibited.

B. Discharge of treated wastewater at a location other than Discharge Point No. 001, as described by this Order, is prohibited, unless the discharge is regulated by General Permit No. CAS000001 or another discharge permit.

C. The overflow or bypass of wastewater from the Discharger's collection, treatment, or disposal facilities and the subsequent discharge of untreated wastewater, except as provided for in Attachment D, Standard Provision I.G (Bypass), is prohibited.

D. Creation of a condition of pollution, contamination, or nuisance, as defined by Section 13050 of the CWC, is prohibited.

E. Effluent flow shall not exceed the 0.84 MGD design flow capacity of the treatment facility.

III. EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

A. Effluent Limitations - Discharge Point No. 001

1. Final Effluent Limitations – Discharge Point No. 001

a. The Discharger shall maintain compliance with the following effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Location EFF-001 as described in the attached Monitoring and Reporting Program (MRP):

Table 4. Effluent Limitations

Parameter	Units	Effluent Limitations[1]		
		Instantaneous Maximum	Average Monthly	Maximum Daily
Total Dissolved Solids (TDS)	mg/L	--	--	450
	lbs/day	--	--	3.1×10^3
pH	s.u.	7.0 – 8.3 at all times		
Oil and Grease	mg/L	--	--	35
Benzene	µg/L	--	1.0	2.0
Phenol	µg/L	--	1.0	2.0

[1] Based on a flow rate of 0.84 MGD.

b. Dry Weather Flow. Effluent average dry weather flow shall not exceed a monthly average of 0.84 MGD.

c. Acute Toxicity. Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:

i. 70 percent, minimum for any one bioassay; and

ii. 90 percent, median for any three consecutive bioassays.

d. Chronic Toxicity. There shall be no chronic toxicity in the effluent discharge.

B. Land Discharge Effluent Specifications – Not Applicable

C. Reclamation Specifications

1. The Discharger shall maintain compliance with the reclamation discharge specifications below. Compliance shall be measured as described in the attached MRP:

Table 5. Reclamation Discharge Specifications

Parameter	Units	Effluent Limitations[1]		
		Instantaneous Maximum	Average Monthly	Maximum Daily
TDS	mg/L	--	--	450
pH	s.u.	6.5 – 8.4 at all times		
Oil and Grease	mg/L	--	--	35
Benzene	µg/L	--	1.0	2.0
Phenol	µg/L	--	1.0	2.0

[1] Based on a flow rate of 0.84 MGD.

2. Reclaimed water used for landscape irrigation shall not exceed water quality objectives for agricultural water use specified in the Basin Plan Table 3-4.

3. Reclaimed water shall not be allowed to run off to Pismo Creek or tributary streams.

IV. RECEIVING WATER LIMITATIONS

A. Surface Water Limitations

Receiving water limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. The discharge shall not cause the following in the Pismo Creek:

1. Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses. Coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater.

2. Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.

3. Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

4. Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.

5. Waters shall not contain settleable material in concentrations that result in deposition of material that causes nuisance or adversely affects beneficial uses.

6. Waters shall not contain oils, greases, waxes, or other similar materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses. This may require effluent oil and grease to be less than 35 mg/L.

7. Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

8. The suspended sediment load and suspended sediment discharge rate to surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

9. Concentrations of toxic metals and inorganic chemicals in waters shall not be increased in such a manner that may adversely affect beneficial uses.

10. Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increase in turbidity attributable to controllable water quality factors shall not exceed the following limits.

a. 5 NTU, where natural turbidity is less than 25 NTU.

b. 20 percent, where natural turbidity is between 25 and 50 NTU.

c. 10 NTU, where natural turbidity is between 50 and 100 NTU.

d. 10 percent, where natural turbidity is greater than 100 NTU.

11. The pH value shall not be depressed below 7.0 nor raised above 8.3. The change in normal ambient pH levels shall not exceed 0.5 units.

12. Dissolved oxygen concentrations in receiving waters shall not be reduced below 7.0 mg/L at any time.

13. Natural temperature of receiving waters shall not be altered unless it can be demonstrated to the satisfaction of the Central Coast Water Board that such alteration in temperature does not adversely affect beneficial uses. At no time or place shall the temperature be increased by more than 5° F above natural receiving water temperature.

14. All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality conditions shall not be less than that for the same water body in areas unaffected by the waste discharge.

15. The discharge of wastes shall not cause concentrations of un-ionized ammonia (NH_3) to exceed 0.025 mg/L (as N) in the receiving water.

16. No individual pesticide or combination of pesticides shall reach concentrations that adversely affect the beneficial uses of the receiving water. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life. For waters where existing concentrations are presently nondetectable or where beneficial uses would be impaired by concentrations in excess of nondetectable levels, total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of analytical methods as prescribed in *Standard Methods for the Examination of Water and Wastewater*, latest edition, or other equivalent methods approved by the Executive Officer.

17. Waters shall not contain organic substances in concentrations greater than the following:

Table 6. Organic Substances Water Quality Objectives

Parameter	Water Quality Objective
Methylene Blue Activated Substances	0.2 mg/L
Phenols	1.0 µg/L
PCBs[1]	0.3 µg/L
Phthalate Esters	0.002 µg/L

[1] PCBs refer to sum of PCB 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

18. Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent, which presents a hazard to human, plant, animal, or aquatic life. In no circumstance shall receiving waters contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) for radioactivity presented in Table 4 of Title 22 California Code of Regulations, Division 4, Chapter 15, Article 5.

19. Receiving waters shall not contain concentrations of chemical constituents in excess of the primary MCLs specified for drinking water in Table 64431-A (Primary MCLs for Inorganic Chemicals) and Table 64444-A (Primary MCLs for Organic Chemicals) of Title 22 California Code of Regulations, Division 4, Chapter 15.

20. Receiving waters shall not contain concentrations of chemical constituents in amounts that adversely affect the agricultural beneficial use. Interpretation of adverse effects shall be derived from guidelines of the University of California Agricultural Extension Service guidelines presented in Section III, Table 3-3 of the Basin Plan.

21. Receiving waters shall not contain concentrations of chemical constituents in excess of those levels specified for irrigation and livestock watering in Section III, Table 3-4 of the Basin Plan. Salt concentrations for irrigation waters shall be controlled through implementation of the anti-degradation policy to the effect that mineral constituents of currently or potentially usable waters shall not be increased.

22. Receiving waters shall not contain concentrations of chemical constituents known to be deleterious to fish or wildlife in excess of the levels presented in Section III, Table 3-5 of the Basin Plan.

23. Cadmium shall not exceed 0.003 mg/L, when hardness in receiving waters is greater than 100 mg/L as $CaCO_3$, nor shall cadmium exceed 0.0004 mg/L when hardness in receiving waters is equal to or less than 100 mg/L as $CaCO_3$.

24. Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200 organisms/100 mL, nor shall more than 10 percent of samples collected during any 30-day period exceed 400 organisms/100 mL.

B. Groundwater Limitations

Activities at the Facility shall not cause exceedance/deviation from the following water quality objectives for groundwater established by the Basin Plan. The Central Coast Water Board may require the Discharger to investigate the cause of exceedances in the groundwater before determining whether the Discharger caused any water condition that exceeds the following groundwater limitations.

1. Groundwater shall not contain taste or odor-producing substances in concentrations that adversely affect beneficial uses.

2. The Discharger shall not cause a statistically significant increase of mineral constituent concentrations in underlying groundwaters as determined by comparison of samples collected from wells located up-gradient and down-gradient of the waters affected by the discharge.

3. Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life. In no circumstances shall groundwater contain concentrations of radionuclides in excess of the MCLs for radioactivity presented in Table 4 of Title 22 California Code of Regulations, Division 4, Chapter 15, Article 5.

4. The median concentration of coliform organisms in groundwater, over any seven-day period, shall be less than 2.2 organisms/100 mL.

5. Groundwater shall not contain concentrations of chemical constituents in excess of the primary MCLs specified for drinking water in Table 64431-A (Primary MCLs for Inorganic Chemicals) and Table 64444-A (Primary MCLs for Organic Chemicals) of Title 22 California Code of Regulations, Division 4, Chapter 15.

6. Groundwater shall not contain concentrations of chemical constituents in amounts that adversely affect the agricultural supply beneficial use. Interpretation of adverse effects shall be as described in University of California Agricultural Extension Service guidelines provided in Table 3-3 of the Basin Plan.

7. Groundwater used for irrigation and livestock watering shall not exceed concentrations of chemical constituents in excess of those levels specified for irrigation and livestock watering in Section III, Table 3-4 of the Basin Plan.

V. PROVISIONS

A. Standard Provisions

1. The Discharger shall comply with all Standard Provisions included in Attachment D of this Order.

2. The Discharger shall comply with the following provisions. In the event that there is any conflict, duplication, or overlap between provisions specified by this Order, the more stringent provision shall apply.

3. Failure to comply with provisions or requirements of this Order, or violation of other applicable laws or regulations governing discharges from this facility, may subject the Discharger to administrative or civil liabilities, criminal penalties, and/or other enforcement remedies to ensure compliance. Additionally, certain violations may subject the Discharger to civil or criminal enforcement from appropriate local, state, or federal law enforcement entities.

B. MRP Requirements

The Discharger shall comply with the Monitoring and Reporting Program, and future revisions thereto, in Attachment E of this Order. All monitoring shall be conducted according to 40 C.F.R. 136, *Guidelines Establishing Test Procedures for Analysis of Pollutants* or other equivalent methods approved in advance by the Executive Officer.

C. Special Provisions

1. Reopener Provisions

This Order may be reopened for modification, or revocation and reissuance, as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements on internal waste stream(s), and monitoring for surrogate parameters. Additional requirements may be included in this Order as a result of the special condition monitoring data.

2. Special Studies, Technical Reports, and Additional Monitoring Requirements

a. Toxicity Reduction Requirements

When acute toxicity is detected in the effluent greater than the applicable effluent limitation established in section III.A.1.c., or chronic toxicity is detected greater than a chronic toxicity trigger of 1 TUc, and the discharge is continuing, the Discharger shall resample immediately, retest, and report the results to the Executive Officer, who will determine whether to initiate an enforcement action, require a Toxicity

Reduction Evaluation (TRE) in accordance with the Discharger's TRE Workplan, or implement other measures.

A TRE is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases - characterization, identification, and confirmation using aquatic organism toxicity tests. The TRE shall include all reasonable steps to identify the source of toxicity. The Discharger shall take all reasonable steps to reduce toxicity to the required level once the source of toxicity is identified.

Within 90 days of the effective date of this Order, the Discharger shall submit to the Central Coast Water Board, a TRE Workplan, which describes steps that the Discharger intends to follow in the event that a toxicity effluent limitation or toxicity trigger established by this Order is exceeded in the discharge. The workplan shall be prepared in accordance with current technical guidance and reference material, including EPA/600/2-88/062, and shall include, at a minimum:

i. Actions that will be taken to investigate/identify the causes/sources of toxicity;

ii. Actions that will be evaluated to mitigate the impact of the discharge, to correct the non-compliance, and/or to prevent the recurrence of acute or chronic toxicity (this list of action steps may be expanded, if a TRE is undertaken); and

iii. A schedule under which these actions will be implemented.

When monitoring measures toxicity in the effluent above a limitation or toxicity trigger established by this Order, if the discharge is continuing, the Discharger shall resample immediately, and retest for the applicable acute or chronic toxicity. Results of an initial failed test and results of subsequent monitoring shall be reported to the Executive Officer as soon as possible following receipt of monitoring results. The Executive Officer will determine whether to initiate enforcement action, whether to require the Discharger to implement a TRE, or to implement other measures. When the Executive Officer requires the Discharger to conduct a TRE, the TRE shall be conducted giving due consideration to guidance provided by the USEPA's Toxicity Reduction Evaluation Procedures, Phases 1, 2, and 3 (USEPA document Nos. EPA 600/R-91/003, 600/R-92/080, and 600/R-92/081, respectively). A TRE, if necessary, shall be conducted in accordance with the following schedule.

Table 7. Toxicity Reduction Evaluation Schedule

Action Step	When Required
Take all reasonable measures necessary to immediately reduce toxicity, where the source is known.	Within 24 hours of identification of noncompliance.
Initiate the TRE in accordance to the Workplan.	Within 7 days of notification by the Executive Officer.
Conduct the TRE following the procedures in the Workplan.	Within the period specified in the Workplan (not to exceed one year, without an approved Workplan).
Submit the results of the TRE, including summary of findings, required corrective action, and all results and data.	Within 60 days of completion of the TRE.
Implement corrective actions to meet Permit limits and conditions.	To be determined by the Executive Officer.

3. Best Management Practices and Pollution Prevention

a. Best Management Practices. The Discharger shall develop and implement a Best Management Practices (BMP) plan to ensure that no contaminated storm water leaves the treatment and disposal facilities and flow to surface waters. A BMP plan is designed to prevent, or minimize the potential for release of toxic substances from ancillary activities to the water of the State through plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw materials storage. BMP plans may either be source controls, which prevents a discharge, or treatment controls, which remove pollutants from a discharge before reaching surface or ground waters. BMPs should be certified by the State Water Resources Quality Control Board to be considered “best”. Further information regarding BMP plans is found in Chapter 4 of the Basin Plan, and the appropriate Best Management Practices Handbook.

If a storm water pollution prevention plan (SWPPP) is developed for compliance with the General Permit No. CAS000001, pursuant to Provision VI.C.6, below, the SWPPP will satisfy this BMP plan requirement.

b. Pollutant Minimization Program – Not Applicable

4. Construction, Operation and Maintenance Specifications – Not Applicable

5. Special Provisions for Municipal Facilities (POTWs Only) – Not Applicable.

6. Other Special Provisions

a. Discharges of Storm Water. For the control of storm water discharged from the site of the produced water facilities, if applicable, the Discharger shall seek authorization to discharge under and meet the requirements of the State Water Board’s Water Quality Order 97-03-DWQ, NPDES General Permit No. CAS0000001, Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities.

7. Compliance Schedules – Not Applicable

VI. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in section IV of this Order will be determined as specified below:

A. General. Compliance with effluent limitations for reportable pollutants shall be determined using sample reporting protocols defined in the MRP and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the reportable pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level (ML).

B. Multiple Sample Data. When determining compliance with a measure of central tendency (arithmetic mean, geometric mean, median, etc.) of multiple sample analyses and the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND), the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

1. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

2. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

C. Chronic Whole Effluent Toxicity Effluent Limitation (Section III.A.2). Compliance with the accelerated monitoring and TRE/TIE provisions of Provision V.C.2.a shall constitute compliance with the effluent limitation.

ATTACHMENT A – DEFINITIONS

Arithmetic Mean (μ)
Also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL)
The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL)
The highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Bioaccumulative
Those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic
Pollutants are substances that are known to cause cancer in living organisms.

Coefficient of Variation (CV)
CV is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Daily Discharge
Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in this Order), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

The daily discharge may be determined by the analytical results of a composite sample taken over the course of one day (a calendar day or other 24-hour period defined as a day) or by the arithmetic mean of analytical results from one or more grab samples taken over the course of the day.

For composite sampling, if 1 day is defined as a 24-hour period other than a calendar day, the analytical result for the 24-hour period will be considered as the result for the calendar day in which the 24-hour period ends.

Detected, but Not Quantified (DNQ)
DNQ are those sample results less than the RL, but greater than or equal to the laboratory's MDL. Sample results reported as DNQ are estimated concentrations.

Dilution Credit
Dilution Credit is the amount of dilution granted to a discharge in the calculation of a water quality-based effluent limitation, based on the allowance of a specified mixing zone. It is calculated from the dilution ratio or determined through conducting a mixing zone study or modeling of the discharge and receiving water.

Effluent Concentration Allowance (ECA)
ECA is a value derived from the water quality criterion/objective, dilution credit, and ambient background concentration that is used, in conjunction with the coefficient of variation for the effluent monitoring data, to calculate a long-term average (LTA) discharge concentration. The ECA has the same meaning as waste load allocation (WLA) as used in USEPA guidance (Technical Support Document For Water Quality-based Toxics Control, March 1991, second printing, EPA/505/2-90-001).

Enclosed Bays
Enclosed Bays means indentations along the coast that enclose an area of oceanic water within distinct headlands or harbor works. Enclosed bays include all bays where the narrowest distance between the headlands or outermost harbor works is less than 75 percent of the greatest dimension of the enclosed portion of San Francisco Bay. Enclosed bays include, but are not limited to, Humboldt Bay, Bodega Harbor, Tomales Bay, Drake's Estero, San Francisco Bay, Morro Bay, Los Angeles-Long Beach Harbor, Upper and Lower Newport Bay, Mission Bay, and San Diego Bay. Enclosed bays do not include inland surface waters or ocean waters.

Estimated Chemical Concentration
The estimated chemical concentration that results from the confirmed detection of the substance by the analytical method below the ML value.

Estuaries
Estuaries means waters, including coastal lagoons, located at the mouths of streams that serve as areas of mixing for fresh and ocean waters. Coastal lagoons and mouths of streams that are temporarily separated from the ocean by sandbars shall be considered estuaries. Estuarine waters shall be considered to extend from a bay or the open ocean to a point upstream where there is no significant mixing of fresh water and seawater. Estuarine waters include, but are not limited to, the Sacramento-San Joaquin Delta, as defined in California Water Code section 12220, Suisun Bay, Carquinez Strait downstream to the Carquinez Bridge, and appropriate areas of the Smith, Mad, Eel, Noyo, Russian, Klamath, San Diego, and Otay rivers. Estuaries do not include inland surface waters or ocean waters.

Inland Surface Waters
All surface waters of the State that do not include the ocean, enclosed bays, or estuaries.

Instantaneous Maximum Effluent Limitation
The highest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous maximum limitation).

Instantaneous Minimum Effluent Limitation
The lowest allowable value for any single grab sample or aliquot (i.e., each grab sample or aliquot is independently compared to the instantaneous minimum limitation).

Maximum Daily Effluent Limitation (MDEL)
The highest allowable daily discharge of a pollutant, over a calendar day (or 24-hour period). For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic mean measurement of the pollutant over the day.

Median
The middle measurement in a set of data. The median of a set of data is found by first arranging the measurements in order of magnitude (either increasing or decreasing order). If the number of measurements (*n*) is odd, then the median = $X_{(n+1)/2}$. If *n* is even, then the median = $(X_{n/2} + X_{(n/2)+1})/2$ (i.e., the midpoint between the *n*/2 and *n*/2+1).

Method Detection Limit (MDL)
MDL is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero, as defined in 40 C.F.R., part 136, Attachment B, revised as of July 3, 1999.

Minimum Level (ML)
ML is the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes, and processing steps have been followed.

Mixing Zone
Mixing Zone is a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to the overall water body.

Not Detected (ND)
Sample results less than the laboratory's MDL.

Ocean Waters
The territorial marine waters of the State as defined by California law to the extent these waters are outside of enclosed bays, estuaries, and coastal lagoons. Discharges to ocean waters are regulated in accordance with the State Water Board's California Ocean Plan.

Persistent pollutants
Persistent pollutants are substances for which degradation or decomposition in the environment is nonexistent or very slow.

Pollutant Minimization Program (PMP)
PMP means waste minimization and pollution prevention actions that include, but are not limited to, product substitution, waste stream recycling, alternative waste management

methods, and education of the public and businesses. The goal of the PMP shall be to reduce all potential sources of a priority pollutant(s) through pollutant minimization (control) strategies, including pollution prevention measures as appropriate, to maintain the effluent concentration at or below the water quality-based effluent limitation. Pollution prevention measures may be particularly appropriate for persistent bioaccumulative priority pollutants where there is evidence that beneficial uses are being impacted. The Central Coast Water Board may consider cost effectiveness when establishing the requirements of a PMP. The completion and implementation of a Pollution Prevention Plan, if required pursuant to California Water Code section 13263.3(d), shall be considered to fulfill the PMP requirements.

Pollution Prevention
Pollution Prevention means any action that causes a net reduction in the use or generation of a hazardous substance or other pollutant that is discharged into water and includes, but is not limited to, input change, operational improvement, production process change, and product reformulation (as defined in California Water Code section 13263.3). Pollution prevention does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified to the satisfaction of the State or Central Coast Water Board.

Reporting Level (RL)
The RL is the ML (and its associated analytical method) chosen by the Discharger for reporting and compliance determination from the MLs included in this Order. The MLs included in this Order correspond to approved analytical methods for reporting a sample result that are selected by the Regional Water Board either from Appendix 4 of the SIP in accordance with section 2.4.2 of the SIP or established in accordance with section 2.4.3 of the SIP. The ML is based on the proper application of method-based analytical procedures for sample preparation and the absence of any matrix interferences. Other factors may be applied to the ML depending on the specific sample preparation steps employed. For example, the treatment typically applied in cases where there are matrix-effects is to dilute the sample or sample aliquot by a factor of ten. In such cases, this additional factor must be applied to the ML in the computation of the RL.

Sanitary Sewer Overflow is any overflow, spill, release, discharge, or diversion of untreated or partially treated wastewater from a sanitary sewer system. Sanitary sewer overflows include: (1) overflows or releases of untreated or partially treated wastewater that reach waters of the United States; (2) overflows or releases of untreated or partially treated wastewater that do not reach waters of the United States; and (3) wastewater backups into buildings and on private property that are caused by blockages or flow conditions within the publically owned portion of a sanitary sewer system.

Satellite Collection System
The portion, if any, of a sanitary sewer system owned or operated by a different public agency than the agency that owns and operates the wastewater treatment facility that a sanitary sewer system is tributary to.

Source of Drinking Water
Any water designated as municipal or domestic supply (MUN) in a Central Coast Water Board Basin Plan.

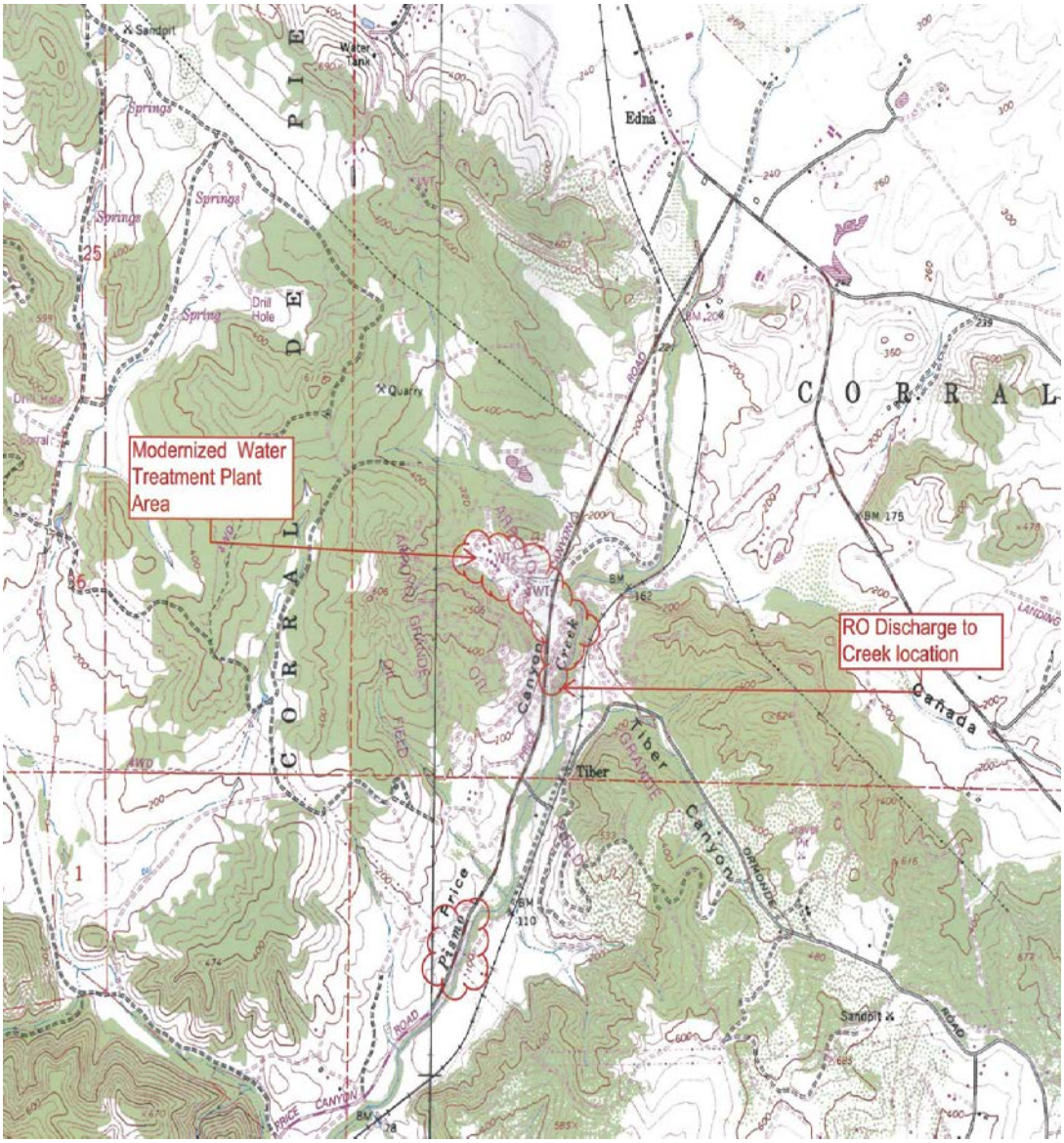
Standard Deviation (σ)
Standard Deviation is a measure of variability that is calculated as follows:

$$\sigma = (\sum[(x - \mu)^2]/(n - 1))^{0.5}$$

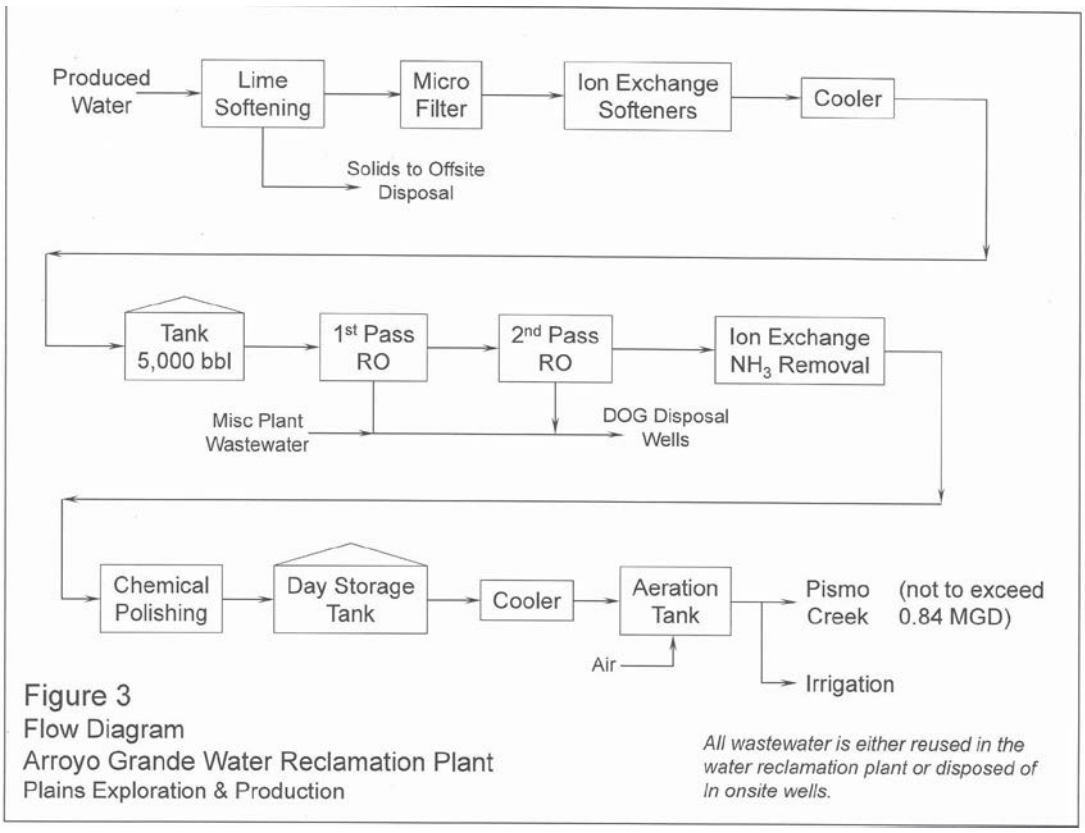
where:
x is the observed value;
μ is the arithmetic mean of the observed values; and
n is the number of samples.

Toxicity Reduction Evaluation (TRE)
TRE is a study conducted in a step-wise process designed to identify the causative agents of effluent or ambient toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in toxicity. The first steps of the TRE consist of the collection of data relevant to the toxicity, including additional toxicity testing, and an evaluation of facility operations and maintenance practices, and best management practices. A Toxicity Identification Evaluation (TIE) may be required as part of the TRE, if appropriate. (A TIE is a set of procedures to identify the specific chemical(s) responsible for toxicity. These procedures are performed in three phases (characterization, identification, and confirmation) using aquatic organism toxicity tests.)

ATTACHMENT B – FACILITY MAP



ATTACHMENT C – PROCESS FLOW DIAGRAM



ATTACHMENT D –STANDARD PROVISIONS

I. STANDARD PROVISIONS – PERMIT COMPLIANCE

A. Duty to Comply

1. The Discharger must comply with all of the conditions of this Order. Any noncompliance constitutes a violation of the Clean Water Act (CWA) and the California Water Code and is grounds for enforcement action, for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application. (40 C.F.R. § 122.41(a).)

2. The Discharger shall comply with effluent standards or prohibitions established under Section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if this Order has not yet been modified to incorporate the requirement. (40 C.F.R. § 122.41(a)(1).)

B. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Discharger in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Order. (40 C.F.R. § 122.41(c).)

C. Duty to Mitigate

The Discharger shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this Order that has a reasonable likelihood of adversely affecting human health or the environment. (40 C.F.R. § 122.41(d).)

D. Proper Operation and Maintenance

The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems that are installed by the Discharger only when necessary to achieve compliance with the conditions of this Order (40 C.F.R. § 122.41(e)).

E. Property Rights

1. This Order does not convey any property rights of any sort or any exclusive privileges. (40 C.F.R. § 122.41(g).)

2. The issuance of this Order does not authorize any injury to persons or property or invasion of other private rights, or any infringement of state or local law or regulations. (40 C.F.R. § 122.5(c).)

F. Inspection and Entry

The Discharger shall allow the Central Coast Water Board, State Water Board, United States Environmental Protection Agency (USEPA), and/or their authorized representatives (including an authorized contractor acting as their representative), upon the presentation of credentials and other documents, as may be required by law, to (40 C.F.R. § 122.41(i); Wat. Code, § 13383):

1. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order (40 C.F.R. § 122.41(i)(1));

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order (40 C.F.R. § 122.41(i)(2));

3. Inspect and photograph, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order (40 C.F.R. § 122.41(i)(3)); and

4. Sample or monitor, at reasonable times, for the purposes of assuring Order compliance or as otherwise authorized by the CWA or the Water Code, any substances or parameters at any location. (40 C.F.R. § 122.41(i)(4).)

G. Bypass

1. Definitions

   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. (40 C.F.R. § 122.41(m)(1)(i).)

   b. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities, which causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production. (40 C.F.R. § 122.41(m)(1)(ii).)

2. Bypass not exceeding limitations. The Discharger may allow any bypass to occur which does not cause exceedances of effluent limitations, but only if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions listed in Standard Provisions – Permit Compliance I.G.3, I.G.4, and I.G.5 below. (40 C.F.R. § 122.41(m)(2).)

3. Prohibition of bypass. Bypass is prohibited, and the Central Coast Water Board may take enforcement action against the Discharger for bypass, unless (40 C.F.R. § 122.41(m)(4)(i)):

    a. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage (40 C.F.R. § 122.41(m)(4)(i)(A));

    b. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance (40 C.F.R. § 122.41(m)(4)(i)(B)); and

    c. The Discharger submitted notice to the Central Coast Water Board as required under Standard Provisions – Permit Compliance I.G.5 below. (40 C.F.R. § 122.41(m)(4)(i)(C).)

4. The Central Coast Water Board may approve an anticipated bypass, after considering its adverse effects, if the Central Coast Water Board determines that it will meet the three conditions listed in Standard Provisions – Permit Compliance I.G.3 above. (40 C.F.R. § 122.41(m)(4)(ii).)

5. Notice

    a. Anticipated bypass. If the Discharger knows in advance of the need for a bypass, it shall submit a notice, if possible at least 10 days before the date of the bypass. (40 C.F.R. § 122.41(m)(3)(i).)

    b. Unanticipated bypass. The Discharger shall submit notice of an unanticipated bypass as required in Standard Provisions - Reporting V.E below (24-hour notice). (40 C.F.R. § 122.41(m)(3)(ii).)

H. Upset

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Discharger. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation. (40 C.F.R. § 122.41(n)(1).)

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of Standard Provisions – Permit Compliance I.H.2 below are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review. (40 C.F.R. § 122.41(n)(2).).

2. Conditions necessary for a demonstration of upset. A Discharger who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that (40 C.F.R. § 122.41(n)(3)):

   a. An upset occurred and that the Discharger can identify the cause(s) of the upset (40 C.F.R. § 122.41(n)(3)(i));

   b. The permitted facility was, at the time, being properly operated (40 C.F.R. § 122.41(n)(3)(ii));

   c. The Discharger submitted notice of the upset as required in Standard Provisions – Reporting V.E.2.b below (24-hour notice) (40 C.F.R. § 122.41(n)(3)(iii)); and

   d. The Discharger complied with any remedial measures required under Standard Provisions – Permit Compliance I.C above. (40 C.F.R. § 122.41(n)(3)(iv).)

3. Burden of proof. In any enforcement proceeding, the Discharger seeking to establish the occurrence of an upset has the burden of proof. (40 C.F.R. § 122.41(n)(4).)

II. STANDARD PROVISIONS – PERMIT ACTION

A. General

This Order may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Discharger for modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any Order condition. (40 C.F.R. § 122.41(f).)

B. Duty to Reapply

If the Discharger wishes to continue an activity regulated by this Order after the expiration date of this Order, the Discharger must apply for and obtain a new permit. (40 C.F.R. § 122.41(b).)

C. Transfers

This Order is not transferable to any person except after notice to the Central Coast Water Board. The Central Coast Water Board may require modification or revocation and reissuance of this Order to change the name of the Discharger and incorporate such other requirements as may be necessary under the CWA and the Water Code. (40 C.F.R. § 122.41(l)(3); § 122.61.)

III. STANDARD PROVISIONS – MONITORING

A. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. (40 C.F.R. § 122.41(j)(1).)

B. Monitoring results must be conducted according to test procedures under 40 C.F.R., part 136 or, in the case of sludge use or disposal, approved under 40 C.F.R., part 136 unless otherwise specified in 40 C.F.R., part 503 unless other test procedures have been specified in this Order. (40 C.F.R. § 122.41(j)(4); § 122.44(i)(1)(iv).)

IV. STANDARD PROVISIONS – RECORDS

A. Except for records of monitoring information required by this Order related to the Discharger's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 C.F.R., part 503), the Discharger shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Regional Water Board Executive Officer at any time. (40 C.F.R. § 122.41(j)(2).)

B. **Records of monitoring information shall include**:

1. The date, exact place, and time of sampling or measurements (40 C.F.R. § 122.41(j)(3)(i));
2. The individual(s) who performed the sampling or measurements (40 C.F.R. § 122.41(j)(3)(ii));
3. The date(s) analyses were performed (40 C.F.R. § 122.41(j)(3)(iii));
4. The individual(s) who performed the analyses (40 C.F.R. § 122.41(j)(3)(iv));
5. The analytical techniques or methods used (40 C.F.R. § 122.41(j)(3)(v)); and
6. The results of such analyses. (40 C.F.R. § 122.41(j)(3)(vi).)

C. **Claims of confidentiality for the following information will be denied (40 C.F.R. § 122.7(b)):**

1. The name and address of any permit applicant or Discharger (40 C.F.R. § 122.7(b)(1)); and
2. Permit applications and attachments, permits and effluent data. (40 C.F.R. § 122.7(b)(2).)

V. STANDARD PROVISIONS – REPORTING

A. Duty to Provide Information

The Discharger shall furnish to the Central Coast Water Board, State Water Board, or USEPA within a reasonable time, any information which the Central Coast Water Board, State Water Board, or USEPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order or to determine compliance

with this Order. Upon request, the Discharger shall also furnish to the Central Coast Water Board, State Water Board, or USEPA copies of records required to be kept by this Order. (40 C.F.R. § 122.41(h); Wat. Code, § 13267.)

B. Signatory and Certification Requirements

1. All applications, reports, or information submitted to the Central Coast Water Board, State Water Board, and/or USEPA shall be signed and certified in accordance with Standard Provisions – Reporting V.B.2, V.B.3, V.B.4, and V.B.5 below. (40 C.F.R. § 122.41(k).)

2. All permit applications shall be signed by either a principal executive officer or ranking elected official. For purposes of this provision, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of USEPA). (40 C.F.R. § 122.22(a)(3).).

3. All reports required by this Order and other information requested by the Central Coast Water Board, State Water Board, or USEPA shall be signed by a person described in Standard Provisions – Reporting V.B.2 above, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described in Standard Provisions – Reporting V.B.2 above (40 C.F.R. § 122.22(b)(1));

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.) (40 C.F.R. § 122.22(b)(2)); and

   c. The written authorization is submitted to the Central Coast Water Board and State Water Board. (40 C.F.R. § 122.22(b)(3).)

4. If an authorization under Standard Provisions – Reporting V.B.3 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Standard Provisions – Reporting V.B.3 above must be submitted to the Central Coast Water Board and State Water Board prior to or together with any reports, information, or applications, to be signed by an authorized representative. (40 C.F.R. § 122.22(c).)

5. Any person signing a document under Standard Provisions – Reporting V.B.2 or V.B.3 above shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure

that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations." (40 C.F.R. § 122.22(d).)

C. Monitoring Reports

1. Monitoring results shall be reported at the intervals specified in the Monitoring and Reporting Program (Attachment E) in this Order. (40 C.F.R. § 122.22(l)(4).)

2. Monitoring results must be reported on a Discharge Monitoring Report (DMR) form or forms provided or specified by the Central Coast Water Board or State Water Board for reporting results of monitoring of sludge use or disposal practices. (40 C.F.R. § 122.41(l)(4)(i).)

3. If the Discharger monitors any pollutant more frequently than required by this Order using test procedures approved under Part 136 or, in the case of sludge use or disposal, approved under Part 136 unless otherwise specified in Part 503, or as specified in this Order, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Central Coast Water Board. (40 C.F.R. § 122.41(l)(4)(ii).)

4. Calculations for all limitations, which require averaging of measurements, shall utilize an arithmetic mean unless otherwise specified in this Order. (40 C.F.R. § 122.41(l)(4)(iii).)

D. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this Order, shall be submitted no later than 14 days following each schedule date. (40 C.F.R. § 122.41(l)(5).)

E. Twenty-Four Hour Reporting

1. The Discharger shall report any noncompliance that may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the Discharger become aware of the circumstances. A written submission shall also be provided within five (5) days of the time the Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. (40 C.F.R. § 122.41(l)(6)(i).)

2. The following shall be included as information that must be reported within 24 hours under this paragraph (40 C.F.R. § 122.41(l)(6)(ii)):

a. Any unanticipated bypass that exceeds any effluent limitation in this Order. (40 C.F.R. § 122.41(l)(6)(ii)(A).)

b. Any upset that exceeds any effluent limitation in this Order. (40 C.F.R. § 122.41(l)(6)(ii)(B).)

3. The Central Coast Water Board may waive the above-required written report under this provision on a case-by-case basis if an oral report has been received within 24 hours. (40 C.F.R. § 122.41(l)(6)(iii).)

F. Planned Changes

The Discharger shall give notice to the Central Coast Water Board as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required under this provision only when (40 C.F.R. § 122.41(l)(1)):

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in section 122.29(b) (40 C.F.R. § 122.41(l)(1)(i)); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this Order. (40 C.F.R. § 122.41(l)(1)(ii).)

3. The alteration or addition results in a significant change in the Discharger's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan. (40 C.F.R.§ 122.41(l)(1)(iii).)

G. Anticipated Noncompliance

The Discharger shall give advance notice to the Central Coast Water Board or State Water Board of any planned changes in the permitted facility or activity that may result in noncompliance with General Order requirements. (40 C.F.R. § 122.41(l)(2).)

H. Other Noncompliance

The Discharger shall report all instances of noncompliance not reported under Standard Provisions – Reporting V.C, V.D, and V.E above at the time monitoring reports are submitted. The reports shall contain the information listed in Standard Provision – Reporting V.E above. (40 C.F.R. § 122.41(l)(7).)

I. Other Information

When the Discharger becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the

Central Coast Water Board, State Water Board, or USEPA, the Discharger shall promptly submit such facts or information. (40 C.F.R. § 122.41(l)(8).)

VI. STANDARD PROVISIONS – ENFORCEMENT

A. The Central Coast Water Board is authorized to enforce the terms of this Order under several provisions of the Water Code, including, but not limited to, sections 13385, 13386, and 13387.

VII. ADDITIONAL PROVISIONS – NOTIFICATION LEVELS

A. Non-Municipal Facilities

Existing manufacturing, commercial, mining, and silvicultural Dischargers shall notify the Central Coast Water Board as soon as they know or have reason to believe (40 C.F.R. § 122.42(a)):

1. That any activity has occurred or will occur that would result in the discharge, on a routine or frequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following "notification levels" (40 C.F.R. § 122.42(a)(1)):

   a. 100 micrograms per liter (µg/L) (40 C.F.R. § 122.42(a)(1)(i));

   b. 200 µg/L for acrolein and acrylonitrile; 500 µg/L for 2,4-dinitrophenol and 2-methyl-4,6-dinitrophenol; and 1 milligram per liter (mg/L) for antimony (40 C.F.R. § 122.42(a)(1)(ii));

   c. Five (5) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge (40 C.F.R. § 122.42(a)(1)(iii));

   d. The level established by the Central Coast Water Board in accordance with section 122.44 (f). (40 C.F.R. § 122.42(a)(1)(iv).)

2. That any activity has occurred or will occur that would result in the discharge, on a non-routine or infrequent basis, of any toxic pollutant that is not limited in this Order, if that discharge will exceed the highest of the following “notification levels" (40 C.F.R. § 122.42(a)(2)):

   a. 500 micrograms per liter (µg/L) (40 C.F.R. § 122.42(a)(2)(i));

   b. 1 milligram per liter (mg/L) for antimony (40 C.F.R. § 122.42(a)(2)(ii));

   c. Ten (10) times the maximum concentration value reported for that pollutant in the Report of Waste Discharge (40 C.F.R. § 122.42(a)(2)(iii)); or

   d. The level established by the Central Coast Water Board in accordance with section 122.44(f). (40 C.F.R. § 122.42(a)(2)(iv).)

VII. CENTRAL COAST WATER BOARD STANDARD PROVISIONS

A. Central Coast Standard Provisions – Prohibitions

1. Introduction of "incompatible wastes" to the treatment system is prohibited.

2. Discharge of high-level radiological waste and of radiological, chemical, and biological warfare agents is prohibited.

3. Discharge of "toxic pollutants" in violation of effluent standards and prohibitions established under §307(a) of the Clean Water Act (CWA) is prohibited.

4. Discharge of sludge, sludge digester or thickener supernatant, and sludge drying bed leachate to drainageways, surface waters, or the ocean is prohibited.

5. Introduction of pollutants into the collection, treatment, or disposal system by an "indirect discharger" that:

   a. Inhibit or disrupt the treatment process, system operation, or the eventual use or disposal of sludge; or

   b. Flow through the system to the receiving water untreated; and

   c. Cause or "significantly contribute" to a violation of any requirement of this Order, is prohibited.

6. Introduction of "pollutant free" wastewater to the collection, treatment, and disposal system in amounts that threaten compliance with this order is prohibited.

B. Central Coast Standard Provisions – Provisions

1. Collection, treatment, and discharge of waste shall not create nuisance or pollution, as defined by California Water Code (CWC) §13050.

2. All facilities used for transport or treatment of wastes shall be adequately protected from inundation and washout as the result of a 100-year frequency flood.

3. Operation of collection, treatment, and disposal systems shall be in a manner that precludes public contact with wastewater.

4. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of in a manner approved by the Executive Officer.

5. Wastewater treatment plants shall be supervised and operated by persons possessing certificates of appropriate grade pursuant to Title 23 of the California Code of Regulations.

6. After notice and opportunity for a hearing, this order may be terminated for cause, including, but not limited to:

    a. violation of any term or condition contained in this order.

    b. obtaining this order by misrepresentation, or by failure to disclose fully all relevant facts.

    c. a change in any condition or endangerment to human health or environment that requires a temporary or permanent reduction or elimination of the authorized discharge.

    d. a substantial change in character, location, or volume of the discharge.

7. Provisions of this permit are severable. If any provision of the permit is found invalid, the remainder of the permit shall not be affected.

8. After notice and opportunity for hearing, this order may be modified or revoked and reissued for cause, including:

    a. Promulgation of a new or revised effluent standard or limitation.

    b. A material change in character, location, or volume of the discharge.

    c. Access to new information that affects the terms of the permit, including applicable schedules.

    d. Correction of technical mistakes or mistaken interpretations of law.

    e. Other causes set forth under Sub-part D of 40 CFR Part 122.

9. Safeguards shall be provided to ensure maximal compliance with all terms and conditions of this permit. Safeguards shall include preventative and contingency plans and may also include alternative power sources, stand-by generators, retention capacity, operating procedures, or other precautions. Preventative and contingency plans for controlling and minimizing the effect of accidental discharges shall:

    a. identify possible situations that could cause "upset," "overflow," "bypass," or other noncompliance. (Loading and storage areas, power outage, waste treatment unit outage, and failure of process equipment, tanks and pipes should be considered.)

    b. evaluate the effectiveness of present facilities and procedures and describe procedures and steps to minimize or correct any adverse environmental impact resulting from noncompliance with the permit.

10. Physical facilities shall be designed and constructed according to accepted engineering practice and shall be capable of full compliance with this order when properly operated and maintained. Proper operation and maintenance shall be described in an Operation and Maintenance Manual. Facilities shall be accessible during the wet-weather season.

11. The discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the discharger to achieve compliance with the conditions of this order. Electrical and mechanical equipment shall be maintained in accordance with appropriate practices and standards, such as NFPA 70B, *Recommended Practice for Electrical Equipment Maintenance*; NFPA 70E, *Standard for Electrical Safety in the Workplace*; ANSI/NETA MTS *Standard for Maintenance: Testing Specifications for Electrical Power Equipment and Systems*, or procedures established by insurance companies or other industry resources.

12. If the discharger's facilities are equipped with SCADA or other systems that implement wireless, remote operation, the discharger should implement appropriate safeguards against unauthorized access to the wireless systems. Standards such as NIST SP 800-53, *Recommended Security Controls for Federal Information Systems*, can provide guidance.

13. Production and use of recycled water is subject to the approval of the Central Coast Water Board. Production and use of recycled water shall be in conformance with reclamation criteria established in Chapter 3, Title 22, of the California Code of Regulations and Chapter 7, Division 7, of the California Water Code. An engineering report pursuant to section 60323, Title 22, of the California Code of Regulations is required and a waiver or water reclamation requirements from the Central Coast Water Board is required before reclaimed water is supplied for any use, or to any user, not specifically identified and approved either in this Order or another order issued by this Board.

C. Central Coast Standard Provisions – General Monitoring Requirements

1. If results of monitoring a pollutant appear to violate effluent limitations based on a weekly, monthly, 30-day, or six-month period, but compliance or non-compliance cannot be validated because sampling is too infrequent, the frequency of sampling shall be increased to validate the test within the next monitoring period. The increased frequency shall be maintained until the Executive Officer agrees the original monitoring frequency may be resumed.

   For example, if copper is monitored annually and results exceed the six-month median numerical effluent limitation in the permit, monitoring of copper must be increased to a frequency of at least once every two months (Central Coast Standard Provisions – Definitions I.G.13.). If suspended solids are monitored weekly and results exceed the weekly average numerical limit in the permit, monitoring of suspended solids must be increased to at least four (4) samples every week (Central Coast Standard Provisions – Definitions I.G.14.).

2. Water quality analyses performed in order to monitor compliance with this permit shall be by a laboratory certified by the State Department of Public Health (DPH) for the constituents being analyzed. Bioassays performed to monitor compliance with this permit shall be in accord with guidelines approved by the State Water Resources Control Board (State Water Board) and the State Department of Fish and Game

3. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Samples shall be taken during periods of peak loading conditions. Influent samples shall be samples collected from the combined flows of all incoming wastes, excluding recycled wastes. Effluent samples shall be samples collected downstream of the last treatment unit and tributary flow and upstream of any mixing with receiving waters.

4. All monitoring instruments and devices used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy.

D. Central Coast Standard Provisions – General Reporting Requirements

1. Reports of marine monitoring surveys conducted to meet receiving water monitoring requirements of the Monitoring and Reporting Program shall include at least the following information:

   a. A description of climatic and receiving water characteristics at the time of sampling (weather observations, floating debris, discoloration, wind speed and direction, swell or wave action, time of sampling, tide height, etc.).

   b. A description of sampling stations, including differences unique to each station (e.g., station location, grain size, rocks, shell litter, calcareous worm tubes, evident life, etc.).

   c. A description of the sampling procedures and preservation sequence used in the survey.

   d. A description of the exact method used for laboratory analysis. In general, analysis shall be conducted according to Central Coast Standard Provisions – C.1 above, and Federal Standard Provision – Monitoring III.B. However, variations in procedure are acceptable to accommodate the special requirements of sediment analysis. All such variations must be reported with the test results.

   e. A brief discussion of the results of the survey. The discussion shall compare data from the control station with data from the outfall stations. All tabulations and computations shall be explained.

2. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule shall be submitted

within 14 days following each scheduled date unless otherwise specified within the permit. If reporting noncompliance, the report shall include a description of the reason, a description and schedule of tasks necessary to achieve compliance, and an estimated date for achieving full compliance. A second report shall be submitted within 14 days of full compliance.

3. The "Discharger" shall file a report of waste discharge at least 180 days before making any material change or proposed change in the character, location, or plume of the discharge.

4. Within 120 days after the discharger discovers, or is notified by the Central Coast Water Board, that monthly average daily flow will or may reach design capacity of waste treatment and/or disposal facilities within four years, the discharger shall file a written report with the Central Coast Water Board. The report shall include:

   a. the best estimate of when the monthly average daily dry weather flow rate will equal or exceed design capacity.

   b. a schedule for studies, design, and other steps needed to provide additional capacity for waste treatment and/or disposal facilities before the waste flow rate equals the capacity of present units.

   In addition to complying with Federal Standard Provision – Reporting V.B., the required technical report shall be prepared with public participation and reviewed, approved and jointly submitted by all planning and building departments having jurisdiction in the area served by the waste collection, treatment, or disposal facilities.

5. All "Dischargers" shall submit reports electronically to the:
   California Regional Water Quality Control Board
   Central Coast Region
   centralcoast@waterboards.ca.gov
   895 Aerovista Place, Suite 101
   San Luis Obispo, CA 93401-7906

   In addition, "Dischargers" with designated major discharges shall submit a copy of each document to:

   Regional Administrator
   USEPA, Region 9
   Attention: CWA Standards and Permits Office (WTR-5)
   75 Hawthorne Street
   San Francisco, California 94105

6. Transfer of control or ownership of a waste discharge facility must be preceded by a notice to the Central Coast Water Board at least 30 days in advance of the proposed transfer date. The notice must include a written agreement between the existing "Discharger" and proposed "Discharger" containing a specific date for transfer of

responsibility, coverage, and liability between them. Whether a permit may be transferred without modification or revocation and reissuance is at the discretion of the Board. If permit modification or revocation and reissuance is necessary, transfer may be delayed 180 days after the Central Coast Water Board's receipt of a complete permit application. Please also see Federal Standard Provision – Permit Action II.C.

7. Except for data determined to be confidential under CWA §308 (excludes effluent data and permit applications), all reports prepared in accordance with this permit shall be available for public inspection at the office of the Central Coast Water Board or Regional Administrator of USEPA. Please also see Federal Standard Provision – Records IV.C.

8. By February 1st of each year, the discharger shall submit an annual report to the Central Coast Water Board. The report shall contain the following:

   a. Both tabular and graphical summaries of the monitoring data obtained during the previous year.

   b. A discussion of the previous year's compliance record and corrective actions taken, or which may be needed, to bring the discharger into full compliance.

   c. An evaluation of wastewater flows with projected flow rate increases over time and the estimated date when flows will reach facility capacity.

   d. A discussion of operator certification and a list of current operating personnel and their grades of certification.

   e. The date of the facility's Operation and Maintenance Manual (including contingency plans as described in Provision B.9), the date the manual was last reviewed, and whether the manual is complete and valid for the current facility.

   f. A discussion of the laboratories used by the discharger to monitor compliance with effluent limits and a summary of performance relative to Section C, General Monitoring Requirements.

   g. If the facility treats industrial or domestic wastewater and there is no provision for periodic sludge monitoring in the Monitoring and Reporting Program, the report shall include a summary of sludge quantities, analyses of its chemical and moisture content, and its ultimate destination.

   h. If appropriate, the report shall also evaluate the effectiveness of the local source control or pretreatment program using the State Water Resources Control Board's "Guidelines for Determining the Effectiveness of Local Pretreatment Program."

E. Central Coast Standard Provisions – General Pretreatment Provisions

1. Discharge of pollutants by "indirect dischargers" in specific industrial sub-categories (appendix C, 40 CFR Part 403), where categorical pretreatment standards have been established, or are to be established, (according to 40 CFR Chapter 1, Subchapter N), shall comply with the appropriate pretreatment standards by the date specified therein or, if a new indirect discharger, upon commencement of discharge.

F. Central Coast Standard Provisions – Enforcement

1. Any person failing to file a report of waste discharge or other report as required by this permit shall be subject to a civil penalty not to exceed $5,000 per day.

2. Upon reduction, loss, or failure of the treatment facility, the "Discharger" shall, to the extent necessary to maintain compliance with this permit, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided.

G. Central Coast Standard Provisions – Definitions (Not otherwise included in Attachment A to this Order)

1. A “composite sample" is a combination of no fewer than eight individual samples obtained at equal time intervals (usually hourly) over the specified sampling (composite) period. The volume of each individual sample is proportional to the flow rate at the time of sampling. The period shall be specified in the Monitoring and Reporting Program ordered by the Executive Officer.

2. “Daily Maximum” limit means the maximum acceptable concentration or mass emission rate of a pollutant measured during a calendar day or during any 24-hour period reasonably representative of the calendar day for purposes of sampling. It is normally compared with results based on "composite samples” except for ammonia, total chlorine, phenolic compounds, and toxicity concentration. For all exceptions, comparisons will be made with results from a “grab sample.”

3. “Discharger," as used herein, means, as appropriate: (1) the Discharger, (2) the local sewering entity (when the collection system is not owned and operated by the Discharger), or (3) "indirect discharger" (where "Discharger" appears in the same paragraph as "indirect discharger," it refers to the discharger.)

4. “Duly Authorized Representative" is one where:

   a. the authorization is made in writing by a person described in the signatory paragraph of Federal Standard Provision V.B.;

   b. the authorization specifies either an individual or the occupant of a position having either responsibility for the overall operation of the regulated facility, such as the plant manager, or overall responsibility for environmental matters of the company; and,

c. the written authorization was submitted to the Central Coast Water Board.

5. A "grab sample" is defined as any individual sample collected in less than 15 minutes. "Grab samples" shall be collected during peak loading conditions, which may or may not be during hydraulic peaks. It is used primarily in determining compliance with the daily maximum limits identified in Central Coast Standard Provision – Provision G.2. and instantaneous maximum limits.

6. "Hazardous substance" means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the Clean Water Act.

7. "Incompatible wastes" are:

   a. Wastes that create a fire or explosion hazard in the treatment works.

   b. Wastes that will cause corrosive structural damage to treatment works, or wastes with a pH lower than 5.0 unless the works is specifically designed to accommodate such wastes.

   c. Solid or viscous wastes in amounts that cause obstruction to flow in sewers or that cause other interference with proper operation of treatment works.

   d. Any waste, including oxygen-demanding pollutants (BOD, etc), released in such volume or strength as to cause inhibition or disruption in the treatment works and subsequent treatment process upset and loss of treatment efficiency.

   e. Heat in amounts that inhibit or disrupt biological activity in the treatment works or that raise influent temperatures above 40°C (104°F) unless the treatment works is designed to accommodate such heat.

8. "Indirect Discharger" means a non-domestic discharger introducing pollutants into a publicly owned treatment and disposal system.

9. "Log Mean" is the geometric mean. Used for determining compliance of fecal or total coliform populations, it is calculated with the following equation:

   Log Mean = (C1 x C2 x...x Cn)1/n,

   in which "n" is the number of days samples were analyzed during the period and any "C" is the concentration of bacteria (MPN/100 ml) found on each day of sampling. "n" should be five or more.

10. "Mass emission rate" is a daily rate defined by the following equations:

    mass emission rate (lbs/day) = 8.34 x Q x C; and,

    mass emission rate (kg/day) = 3.79 x Q x C,

where “C" (in mg/L) is the measured daily constituent concentration or the average of measured daily constituent concentrations and “Q” (in MGD) is the measured daily flowrate or the average of measured daily flowrates over the period of interest.

11. "Maximum Allowable Mass Emission Rate," whether for a month, week, day, or six-month period, is a daily rate determined with the formulas in paragraph G.10, above, using the effluent concentration limit specified in the permit for the period and the average of measured daily flows (up to the allowable flow) over the period.

12. “Maximum Allowable Six-Month Median Mass Emission Rate" is a daily rate determined with the formulas in Central Coast Standard Provision – Provision G.10, above, using the "six-month median" effluent limit specified in the permit, and the average of measured daily flows (up to the allowable flow) over a 180-day period.

13. "Median" is the value below which half the samples (ranked progressively by increasing value) fall. It may be considered the middle value, or the average of two middle values.

14. "Monthly Average" (or "Weekly Average,” as the case may be) is the arithmetic mean of daily concentrations or of daily mass emission rates over the specified 30-day (or 7-day) period.

    Average = (X1 + X2 + ... + Xn) / n

    in which “n" is the number of days that samples were analyzed during the period and “X" is either the constituent concentration (mg/L) or mass emission rate (kg/day or lbs/day) for each sampled day. “n" should be four or greater.

15. "Municipality" means a city, town, borough, county, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial waste, or other waste.

16. "Overflow" means the intentional or unintentional diversion of flow from the collection and transport systems, including pumping facilities.

17. "Pollutant-free wastewater" means inflow and infiltration, stormwaters, and cooling waters and condensates which are essentially free of pollutants.

18. "Primary Industry Category" means any industry category listed in 40 CFR Part 122, Appendix A.

19. "Removal Efficiency" is the ratio of pollutants removed by the treatment unit to pollutants entering the treatment unit. Removal efficiencies of a treatment plant shall be determined using “Monthly averages" of pollutant concentrations (C, in mg/L) of influent and effluent samples collected about the same time and the following equation (or its equivalent):

$C_{Effluent}$ Removal Efficiency (%) = 100 x (1 – $C_{effluent}$ / $C_{influent}$)

20. "Severe property damage" means substantial physical damage to property, damage to treatment facilities that causes them to become inoperable, or substantial and permanent loss to natural resources that can reasonably be expected to occur in the absence of a "bypass." It does not mean economic loss caused by delays in production.

21. "Sludge" means the solids, residues, and precipitates separated from, or created in, wastewater by the unit processes of a treatment system.

22. To "significantly contribute" to a permit violation means an "indirect discharger" must:

    a. Discharge a daily pollutant loading in excess of that allowed by contract with the "Discharger" or by federal, state, or local law;

    b. Discharge wastewater which substantially differs in nature or constituents from its average discharge;

    c. Discharge pollutants, either alone or in conjunction with discharges from other sources, that results in a permit violation or prevents sewage sludge use or disposal; or

    d. Discharge pollutants, either alone or in conjunction with pollutants from other sources, that increase the magnitude or duration of permit violations.

23. "Toxic Pollutant" means any pollutant listed as toxic under Section 307 (a) (1) of the Clean Water Act or under 40 CFR Part 122, Appendix D. Violation of maximum daily discharge limitations are subject to 24-hour reporting (Federal Standard Provisions V.E.).

24. “Zone of Initial Dilution" means the region surrounding or adjacent to the end of an outfall pipe or diffuser ports whose boundaries are defined through calculation of a plume model verified by the State Water Board.

ATTACHMENT E – MONITORING AND REPORTING PROGRAM

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ATTACHMENT E – MONITORING AND REPORTING PROGRAM (MRP)

The Code of Federal Regulations 40 C.F.R. § 122.48 require that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Regional Water Quality Control Board (Central Coast Water Board) to require technical and monitoring reports. This MRP establishes monitoring and reporting requirements, which implement the federal and California regulations.

I. GENERAL MONITORING PROVISIONS

A. Laboratories analyzing monitoring samples shall be certified by the California Department of Public Health (DPH), in accordance with Water Code section 13176, and must include quality assurance/quality control data with their reports.

B. Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring locations specified below and, unless otherwise specified, before the monitored flow joins or is diluted by any other waste stream, body of water, or substance. Monitoring locations shall not be changed without notification to and approval of the Central Coast Water Board.

C. Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated, and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than ±10 percent from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration, and operation of acceptable flow measurement devices can be obtained from the following references.

1. *A Guide to Methods and Standards for the Measurement of Water Flow*, U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 96 pp. (Available from the U.S. Government Printing Office, Washington, D.C. 20402. Order by SD Catalog No. C13.10:421.)

2. *Water Measurement Manual*, U.S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U.S. Government Printing Office, Washington D.C. 20402. Order by Catalog No. 172.19/2:W29/2, Stock No. S/N 24003-0027.)

3. *Flow Measurement in Open Channels and Closed Conduits*, U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Services (NTIS) Springfield, VA 22151. Order by NTIS No. PB-273 535/5ST.)

4. *NPDES Compliance Sampling Manual*, U.S. Environmental Protection Agency, Office of Water Enforcement, Publication MCD-51, 1977, 140 pp. (Available from the General Services Administration (8FFS), Centralized Mailing Lists Services, Building 41, Denver Federal Center, CO 80225.)

D. All monitoring instruments and devices used by the Discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once per year to ensure continued accuracy of the devices.

E. Monitoring results, including noncompliance, shall be reported at intervals and in a manner specified in this MRP.

F. Unless otherwise specified by this MRP, all monitoring shall be conducted according to test procedures established at 40 C.F.R. 136, *Guidelines Establishing Test Procedures for Analysis of Pollutants*. All analyses shall be conducted using the lowest practical quantitation limit achievable using the specified methodology. Where effluent limitations are set below the lowest achievable quantitation limits, pollutants not detected at the lowest practical quantitation limits will be considered in compliance with effluent limitations. Analysis for toxics listed by the California Toxics Rule (CTR) shall also adhere to guidance and requirements contained in the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (2005) (SIP).

G. Monitoring and sampling periods are defined as follows unless otherwise specified in this MRP:

1. **Daily**: Midnight through 11:59 PM, or any 24-hour period that reasonably represents a calendar day for purposes of sampling.

2. **Weekly**: Sunday through Saturday (Note: *For weekly monitoring and sampling periods that start in one monthly reporting period but end in the next, the Discharger may report the weekly data in the monthly monitoring report containing the last day of the weekly period*.)

3. **Monthly**: 1st day of calendar month through last day of calendar month

4. **Quarterly:** First Quarter: January 1st through March 31st
   Second Quarter: April 1st through June 30th
   Third Quarter: July 1st through September 30th
   Fourth Quarter: October 1st through December 31st

5. **Semi-Annually**: First Half: January 1st through June 30th
   Second half: July 1st through December 31st

6. **Annually**: January 1st through December 31st

II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order.

Table E-1. Monitoring Station Locations

Type of Sampling Location	Monitoring Location Name	Monitoring Location Description
Influent	INF-001	Influent wastewater, prior to discharge to the treatment facilities.
Effluent	EFF-001	Location representative of final effluent following full treatment, prior to contact with the receiving water or other waste streams.
Reclaimed Water	REC-001	Location representative of reclaimed water following full treatment, prior to distribution.
Upstream Receiving Water	RW-001	Pismo Creek immediately upstream of Discharge Point No. 001 where representative samples of background conditions in the receiving water, not influenced by this discharge, can be collected.
Downstream Receiving Water	RW-002	Pismo Creek immediately downstream of Discharge Point No. 001 where representative samples of downstream conditions in the commingled stream can be collected.

III. INFLUENT MONITORING REQUIREMENTS

A. Monitoring Location INF-001

The Discharger shall monitor the influent at Monitoring Location INF-001 as follows.

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow	MGD	continuous	Continuous[1]
Max Daily Flow	MGD	calculated	1/Month
Mean Daily Flow	MGD	calculated	1/Month

Footnotes to Table E-2:

Units:

MGD = million gallons per day

[1] Continuous monitoring for flow and daily reporting.

IV. EFFLUENT MONITORING REQUIREMENTS

A. Monitoring Location EFF-001

The Discharger shall monitor the discharge at Monitoring Location EFF-001 as follows:

Table E-3. Effluent Monitoring Location EFF-001

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total Flow	MGD	Continuous	Daily
Mean Daily Flow	MGD	--	Monthly
Maximum Daily Flow	MGD	--	Monthly
pH [1]	s.u.	Grab	Daily
Total Ammonia (as N) [1]	mg/L	Grab	Quarterly
Nitrate (as N)	mg/L	Grab	Quarterly
Phosphorus	mg/L	Grab	Quarterly
Biochemical Oxygen Demand (BOD_5)	mg/L	C-24	Monthly
Total Dissolved Solids (TDS)	mg/L	C-24	Weekly
Total Suspended Solids (TSS)	mg/L	C-24	Monthly
Temperature [1]	ºF	Grab	Monthly
Benzene	µg/L	Grab	Monthly
Phenol	µg/L	Grab	Monthly
Oil and Grease	mg/L	Grab	Monthly
Acute Toxicity [2]	TUa	C-24	2/Year
Chronic Toxicity [2]	TUc	C-24	2/Year
Radium-226 and 228, combined [3]	pCi/L	Grab	Quarterly
Hardness	mg/L $CaCO_3$	Grab	Quarterly
Metals [3] [4]	µg/L	C-24	Quarterly
CTR Pollutants 13-126 [5]	µg/L	C-24/Grab	1/Year
Title 22 Pollutants [6]	µg/L	C-24	1/Year

Parameter	Units	Sample Type	Minimum Sampling Frequency

Footnotes to Table E-3

Units:

MGD	=	million gallons per day
mg/L	=	milligrams per liter
mg/L $CaCO_3$	=	milligrams per liter as calcium carbonate
µg/L	=	micrograms per liter
pCi/L	=	picocuries per liter
s.u	=	standard units
C-24	=	24-hour composite

[1] Temperature and pH shall be measured simultaneously with the sample taken for measurement of total ammonia. Results shall be used to calculate un-ionized ammonia concentration.

[2] Whole effluent acute and chronic toxicity monitoring shall be conducted according to the requirements established in section V of this Monitoring and Reporting Plan. Acute and chronic testing will alternate each quarter, such that each are tested twice per year.

[3] Monitoring shall continue on a quarterly basis for eight consecutive monitoring events (2 years), at which time monitoring frequency may be reduced to one time per year following written approval by the Central Coast Water Board Executive Officer.

[4] Metals include the CTR metals identified as pollutant numbers 1-13 at 40 C.F.R. 131.38 (b), the Title 22 metals for which maximum contaminant levels are established by Table 64431-A, in Title 22 of the California Code of Regulations, Section 64431; and those metals with applicable water quality objectives established in Tables 3-4 and 3-5 of the Basin Plan for the protection of agriculture and aquatic life beneficial uses – aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium (+3 and +6), cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

[5] The CTR priority pollutants are those listed by the California Toxics Rule at 40 CFR 131.38 (b)(1). These pollutants shall be monitored one time per year. Analyses, compliance determination, and reporting for these pollutants shall adhere to applicable provisions of the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP). The Discharger shall instruct its analytical laboratory to establish calibration standards so that the Minimum Levels (MLs) presented in Appendix 4 of the SIP are the lowest calibrated standards. The Discharger and its analytical laboratory shall select MLs, which are below applicable water quality criteria of the CTR; and when applicable water quality criteria are below all MLs, the Discharger and its analytical laboratory shall select the lowest ML. Monitoring for the CTR pollutants in effluent shall occur simultaneously with monitoring required for the CTR pollutants in receiving water.

[6] The Title 22 pollutants are those for which primary Maximum Contaminant Levels (MCLs) have been established by the Department of Health Services and which are listed in Tables 64431-A and 64444-A of the California Code of Regulations, Title 22, Division 4, Chapter 15. Where these pollutants are included in other groups of pollutants (CTR Priority Pollutants), monitoring does not need to be duplicated. Analytical methods shall adhere to the Detection Limits for Purposes of Reporting (DLRs) established by Title 22 of the California Code of Regulations, Division 4, Chapter 15, section 64432 and 64445.1. Monitoring for the Title 22 pollutants in effluent shall occur simultaneously with monitoring required for the Title 22 pollutants in receiving water.

V. WHOLE EFFLUENT TOXICITY TESTING REQUIREMENTS

A. Whole Effluent Acute Toxicity – Monitoring Location EFF-001

1. The Discharger shall perform monitoring for acute toxicity as specified in Table E-3. Bioassays shall be conducted using the fathead minnow (*Pimephales promelas*) and the water flea (*Ceriodaphnia dubia*), unless the Executive Officer specifies in writing otherwise. The fathead minnow shall be used to study the effluent effect on larval survival and the water flea shall be used to study the effluent effect on survival.

Table E-4. Approved Test for Acute Toxicity

Species	Scientific Name	Effect	Test Duration (days)
Fathead Minnow	*Pimephales promelas*	Larval Survival	7
Water Flea	*Ceriodaphnia dubia*	Survival	7

2. All bioassays shall be performed in accordance with *Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms,* 5th Edition (EPA 821-R-02-012), or subsequent editions.

B. Whole Effluent Chronic Toxicity – Monitoring Location EFF-001

1. Chronic Toxicity Monitoring Requirements

a. Toxicity Trigger. A toxicity trigger of 1 TUc is established for the discharge of effluent through Discharge Point No. 001.

b. Sampling. The Discharger shall collect 24-hour composite samples of the effluent at EFF-001, as specified in Table E-3 above, for critical life stage toxicity testing as indicated below. For toxicity testing requiring renewals, 24-hour composite samples collected on consecutive days are required. The Discharger may request approval from the Executive Officer for an alternative to the renewal sampling requirements above.

c. Test Species. The test species shall be *Pimephales promelas*. The Executive Officer may change the test species if data suggest that another test species is more sensitive to the discharge.

Table E-5. Short-Term Methods for Estimating Chronic Toxicity – Fresh Water

Species	Scientific Name	Effect	Test Duration (days)
Fathead Minnow	*Pimephales promelas*	Larval Survival	7

d. Methodology. Sample collection, handling, and preservation shall be in accordance with USEPA protocols. In addition, bioassays shall be conducted in compliance with the most recently promulgated test methods, as shown in Appendix E-1 and *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms,* currently third edition (EPA-821-R-02-014) and/or *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, currently fourth Edition (EPA-821-R-02-013), with exceptions granted the Discharger by the Executive Officer and the Environmental Laboratory Accreditation Program (ELAP).

e. Dilution Series. The Discharger shall conduct tests at 100%, 75%, 50%, 25%, and 12.5%. The "%" represents percent effluent as discharged. The Discharger

may use the biological buffer MOPS (3-(N-Morpholino)propanesulfonic Acid) to control pH drift and ammonia toxicity caused by increasing pH during the test.

2. Chronic Toxicity Reporting Requirements

a. Routine Reporting. Toxicity test results for the current reporting period shall include, at a minimum, for each test:

i. Sample dates

ii. Test initiation date

iii. Test species

iv. End point values for each dilution (e.g. number of young, growth rate, percent survival)

v. NOEC values in percent effluent

vi. IC_{15}, IC_{25}, IC_{40}, and IC_{50} values (or EC_{15}, EC_{25} ... etc.) in percent effluent

vii. TUc values (100/NOEC, 100/IC_{25}, or 100/EC_{25})

viii. Mean percent mortality (±s.d.) after 96 hours in 100% effluent (if applicable)

ix. NOEC and LOEC values for reference toxicant tests

x. IC_{50} or EC_{50} values for reference toxicant tests

xi. Available water quality measurements for each test (pH, dissolved oxygen, temperature, conductivity, hardness, salinity, ammonia)

b. Compliance Summary. The results of the chronic toxicity testing shall be provided in the next Self-Monitoring Report and shall include a summary table of chronic toxicity data from at least eleven of the most recent samples. The information in the table shall include the items listed above under 2.a., item numbers i, iii, v, vi (IC_{25} or EC_{25}), vii, and viii.

C. Quality Assurance

1. For the acute toxicity testing using a t-test, two dilutions shall be used, i.e., 100 percent effluent and a control (when a t-test is used instead of an LC50).

2. If organisms are not cultured in-house, concurrent testing with a referenced toxicant shall be conducted. Where organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests also shall be conducted using the same test conditions as the effluent toxicity tests (e.g., same test duration, etc.).

3. If either the reference toxicant test or effluent test does not meet all test acceptability criteria (TAC) as specified in the toxicity test references, then the permittee must

resample and retest within 15 working days or as soon as possible. The retesting period begins when the Discharger collects the first sample required to complete the retest.

4. The reference toxicant and effluent tests must meet the upper and lower bounds on test sensitivity as determined by calculating the percent minimum significant difference (PMSD) for each test result. The test sensitivity bound is specified for each test method in the respective methods manuals.

D. Accelerated Monitoring Requirements

1. When acute toxicity is detected in the effluent above an effluent limitation established by this Order or when the chronic toxicity trigger of 1 TUc is exceeded during regular toxicity monitoring, and the testing meets all test acceptability criteria, the Discharger shall resample immediately to verify the effluent toxicity. If the retest results in acute toxicity less than 90 percent survival or chronic toxicity greater than 1 TUc, the Discharger shall initiate accelerated monitoring.

2. The Discharger shall implement an accelerated monitoring frequency consisting of performing three toxicity tests in a six-week period following the first failed test results, or as otherwise instructed by the Executive Officer. Test results shall be submitted to the Central Coast Water Board within 15 days of the conclusion of each test.

3. Unless otherwise specified by the Executive Officer, if the implementation of the generic Toxicity Reduction Evaluation (TRE) work plan indicates the source of the exceedance of the effluent limitation or toxicity trigger (for instance, a temporary plant upset), then only one additional test is necessary. If exceedance of the effluent limitation or toxicity trigger is detected in this test, the Discharger will continue with accelerated monitoring requirements or implement the Toxicity Identification and Toxicity Reduction Evaluations.

4. Unless otherwise specified by the Executive Officer, if none of the three tests indicated exceedance of the effluent limitation or toxicity trigger, then the Discharger may return to the normal bioassay testing frequency.

E. Conducting Toxicity Identification Evaluations (TIE) and Toxicity Reduction Evaluations (TRE)

1. Unless otherwise specified by the Executive Officer, if toxicity is confirmed to be present in the effluent during accelerated monitoring. A TIE may be required as part of the TRE.

Toxicity shall be confirmed if the acute toxicity effluent limitations established in section III.A.1.c are not met or chronic toxicity tests result in greater than 1 TUc.

2. The TIE shall be conducted to identify and evaluate toxicity in accordance with procedures recommended by the United States Environmental Protection Agency (USEPA) which include the following:

a. Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I, (USEPA, 1992a) (EPA-600-6-91-005F);

b. Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition (USEPA, 1991a) (EPA-600-R-91-003);

c. Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Sampling Exhibiting Acute and Chronic Toxicity (USEPA, 1993a) (EPA-600-R-92-080); and

d. Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity (USEPA, 1993b) (EPA-600-R-92-081).

3. As part of the TIE investigation, the Discharger shall be required to implement its TRE work plan. The Discharger shall take all reasonable steps to control toxicity once the source of the toxicity is identified. A failure to conduct required toxicity tests or a TRE within a designated period shall result in the establishment of numerical effluent limitations for chronic toxicity in a permit or appropriate enforcement action. Recommended guidance in conducting a TRE includes the following:

a. Generalized Methodology for Conducting Industrial Toxicity Recduction Evaluations (TREs) (USEPA, April 1989) (EPA/600/2-88/070);

b. Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants (USEPA, August 1999) (EPA/833B-99/002); and

b. Clarifications Regarding Toxicity Reduction and Identification Evaluations in the National Pollutant Discharge Elimination System Program dated March 27, 2001, USEPA Office of Wastewater Management, Office of Regulatory Enforcement.

VI. LAND DISCHARGE MONITORING REQUIREMENTS – NOT APPLICABLE

VII. RECLAIMED WATER MONITORING REQUIREMENTS

1. The Discharger shall maintain records of the volumes of water delivered to each reclamation site. For each location of reclamation/reuse, the following information shall be maintained and reported:

- Location and uses of reclaimed water.
- Land owners on which reclaimed water is used.
- Total volume and maximum daily volume of water reclaimed during the reporting period.
- Percent of total flow that is reclaimed.

2. Reclaimed water shall be monitored as specified below at Monitoring Location REC-001 in order to demonstrate compliance with section III.C of the Order.

Table E-6. Reclaimed Water - Monitoring Location REC-001

Parameter	Units	Sample Type	Minimum Sampling Frequency
Total Flow	MGD	Continuous	Daily
Mean Daily Flow	MGD	--	Monthly
Maximum Daily Flow	MGD	--	Monthly
pH	s.u.	Grab	Daily
Total Dissolved Solids (TDS)	mg/L	C-24	Weekly
Benzene	µg/L	Grab	Monthly
Phenol	µg/L	Grab	Monthly
Oil and Grease	mg/L	Grab	Monthly

VIII. RECEIVING WATER MONITORING REQUIREMENTS

A. Receiving Water Monitoring – RW-001 and RW-002

1. The Discharger shall monitor the receiving water into Pismo Creek at Monitoring Stations RW-001 and RW-002 in accordance with the following schedule:

Table E-7. Receiving Water Monitoring Requirements- RW-001 and RW-002

Parameter	Units	Sample Type	Minimum Sampling Frequency
Hardness (as $CaCO_3$)	mg/L	Grab	Every other year [1]
TDS	mg/L	Grab	Every other year [1]
Temperature	°F	Grab	Every other year [1]
Oil and Grease	mg/L	Grab	Every other year [1]
CTR Pollutants [2]	µg/L	Grab	Every other year [1]
Title 22 Pollutants [3]	µg/L	Grab	Every other year [1]
Basin Plan Table 3-3 Pollutants [4]	vary	Grab	Every other year [1]
Basin Plan Table 3-4 Pollutants [5]	mg/L	Grab	Every other year [1]

[1] Monitoring shall include sampling in a dry season and in a wet season during the expected five-year permit term that begins at the time of permit adoption.
[2] Those pollutants identified in the CTR at 40 C.F.R. 131.38. Analyses, compliance determination, and reporting for these pollutants shall adhere to applicable provisions of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP).*
[3] Those pollutants with primary MCLs established at Tables 64431-A and 64444-A of the California Code of Regulations, Title 22, Division 4, Chapter 15.
[4] Those pollutants with water quality standards established by the Basin Plan at Table 3-3, Guidelines for Interpretation of Quality of Water for Irrigation.
[5] Those pollutants with water quality standards established in the Basin Plan at Table 3-4, Water Quality Objectives for Agricultural Water Use.

IX. OTHER MONITORING REQUIREMENTS – NOT APPLICABLE

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

The Discharger shall comply with all Federal Standard Provisions and Central Coast Water Board Standard Provisions (Attachment D) related to monitoring, reporting, and recordkeeping.

B. Self-Monitoring Reports (SMRs)

1. The Discharger shall submit electronic SMRs using the State Water Board's California Integrated Water Quality System (CIWQS) Program website (http://www.waterboards.ca.gov/water_issues/programs/ciwqs/). The CIWQS website will provide additional directions for SMR submittal in the event of a service interruption for electronic submittal. The Discharger shall use the current version of the Permittee Entry Template (PET) tool to configure data into the applicable CIWQS Data Format, and shall update that template according to this Order (e.g., add/delete parameters, revise limits, update monitoring locations, etc). Blank versions of the latest PET tool are available at:

http://www.waterboards.ca.gov/water_issues/programs/ciwqs/chc_npdes.shtml.

2. The Discharger shall report in the SMR the results for all monitoring specified in this MRP under sections III through X. The Discharger shall submit SMRs including the results of all required monitoring using USEPA approved test methods or other test methods specified in this Order. If the Discharger monitors any pollutant more frequently than required by this Order, the results of this monitoring shall be included in the calculations and reporting of the data submitted in the SMR.

3. Sampling and monitoring as required by this MRP shall begin on the effective date of this Order. The Discharger shall complete all required monitoring and reporting according to the following schedule unless otherwise directed by the Executive Officer:

Table E-8. SMR Schedule

SMR Name	Permit Section for Monitoring & Sampling Data Included in Report	SMR Submittal Frequencies	SMR Due Date
NPDES Monitoring Report - General	MRP Section III (Influent) and Section IV.A (Effluent)	Monthly	First day of second calendar month following period of sampling

SMR Name	Permit Section for Monitoring & Sampling Data Included in Report	SMR Submittal Frequencies	SMR Due Date
NPDES Monitoring Report – Recycled Water	MRP Section VII Table E-5 (Recycled Water)	Monthly	First day of second calendar month following period of sampling
NPDES Monitoring Report - Quarterly Constituents	MRP Section IV.A Table E-3 (Effluent)	Quarterly	1st Quarter: May 1st 2nd Quarter: Aug 1st 3rd Quarter: Nov 1st 4th Quarter: Feb 1st
NPDES Monitoring Report - Chronic Toxicity	MRP Section IV Table E-3 (Effluent)	Semi-annually	1st half: May 1st (following 1st Qtr sampling) 2nd half: Nov 1st (following 3rd Qtr sampling)
NPDES Monitoring Report - Acute Toxicity	MRP Section IV Table E-3 (Effluent)	Semi-annually	1st half: Aug 1st (following 2nd Qtr sampling) 2nd half: Feb 1st (following 4th Qtr sampling)
NPDES Monitoring Report – CTR and Title 22	MRP Section IV.A Table E-3 (Effluent)	Annually	February 1st (following calendar year of sampling)
Summary Report	Attachment D, Standard Provision VIII.D.8	Annually	February 1st (following calendar year of sampling)
NPDES Monitoring Report – Receiving Water	MRP Section VIII.A Table E-6 (Receiving Water)	Biannually	February 1st, 2015, 2017, and 2019 (following sampling in calendar year 2014 dry season, 2016 wet season, and 2018 wet or dry season)

4. **Reporting Protocols.** The Discharger shall report with each sample result the applicable reported Reporting Level (RL) and the current Method Detection Limit (MDL), as determined by the procedure in 40 C.F.R. Part 136.

   The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).

b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ. The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+ a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

d. Dischargers are to instruct laboratories to establish calibration standards so that the ML value (or its equivalent if there is differential treatment of samples relative to calibration standards) is the lowest calibration standard. At no time is the Discharger to use analytical data derived from extrapolation beyond the lowest point of the calibration curve.

5. **Compliance Determination.** Compliance with effluent limitations for priority pollutants shall be determined using sample reporting protocols defined above and Attachment A of this Order. For purposes of reporting and administrative enforcement by the Regional and State Water Boards, the Discharger shall be deemed out of compliance with effluent limitations if the concentration of the priority pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reporting level (RL).

6. **Multiple Sample Data.** When determining compliance with an AMEL, AWEL, or MDEL for priority pollutants and more than one sample result is available, the Discharger shall compute the arithmetic mean unless the data set contains one or more reported determinations of "Detected, but Not Quantified" (DNQ) or "Not Detected" (ND). In those cases, the Discharger shall compute the median in place of the arithmetic mean in accordance with the following procedure:

a. The data set shall be ranked from low to high, ranking the reported ND determinations lowest, DNQ determinations next, followed by quantified values (if any). The order of the individual ND or DNQ determinations is unimportant.

b. The median value of the data set shall be determined. If the data set has an odd number of data points, then the median is the middle value. If the data set has an even number of data points, then the median is the average of the two values around the middle unless one or both of the points are ND or DNQ, in which case the median value shall be the lower of the two data points where DNQ is lower than a value and ND is lower than DNQ.

7. The Discharger shall submit SMRs in accordance with the following requirements:

a. The Discharger shall arrange all reported data in a tabular format. The data shall be summarized to clearly illustrate whether the facility is operating in compliance with interim and/or final effluent limitations. The Discharger is not required to duplicate the submittal of data that is entered in a tabular format within CIWQS. When electronic submittal of data is required and CIWQS does not provide for entry into a tabular format within the system, the Discharger shall electronically submit the data in a tabular format as an attachment.

b. The Discharger shall attach a cover letter to the SMR. The information contained in the cover letter shall clearly identify violations of the WDRs; discuss corrective actions taken or planned; and the proposed time schedule for corrective actions. Identified violations must include a description of the requirement that was violated and a description of the violation.

C. Discharge Monitoring Reports

1. Similar to section X.B.1 above, at any time during the term of this permit, the State or Central Coast Water Board may notify the Discharger to electronically submit (DMRs). Until such notification is given specifically for the submittal of DMRs, the Discharger shall submit DMRs in accordance with the requirements described below.

2. DMRs must be signed and certified as required by the standard provisions (Attachment D). The Discharger shall submit the original DMR and one copy of the DMR to one of the addresses listed below:

Standard Mail	FedEx/UPS/Other Private Carriers
State Water Resources Control Board Division of Water Quality c/o DMR Processing Center PO Box 100 Sacramento, CA 95812-1000	State Water Resources Control Board Division of Water Quality c/o DMR Processing Center 1001 I Street, 15th Floor Sacramento, CA 95814

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1) or on self-generated forms that follow the exact same format of EPA Form 3320-1.

D. Other Reports

The Discharger shall report the results of any special studies, monitoring, and reporting required by section V.C (Special Studies, Technical Reports, and Additional Monitoring) of the Order with the first monthly SMR following the respective due date.

ATTACHMENT F - FACT SHEET

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ATTACHMENT F – FACT SHEET

As described in section I of this Order, the Central Coast Water Board incorporates this Fact Sheet as findings of the Central Coast Water Board supporting the issuance of this Order. This Fact Sheet includes the legal requirements and technical rationale that serve as the basis for the requirements of this Order.

This Order has been prepared under a standardized format to accommodate a broad range of discharge requirements for dischargers in California. Only those sections or subsections of this Order that are specifically identified as "not applicable" have been determined not to apply to this Discharger. Sections or subsections of this Order not specifically identified as "not applicable" fully apply to this Discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table F-1. Facility Information

WDID	3 400412441
Discharger	Freeport-McMoRan Oil and Gas
Name of Facility	Produced Water Reclamation Facility
Facility Address	1821 Price Canyon Road Arroyo Grande, CA 93420 San Luis Obispo County
Facility Contact, Title, Phone	David Rose, EH&S Manager, (805) 934-8220
Authorized Person to Sign and Submit Reports	David Rose, EH&S Manager, (805) 934-8220
Mailing Address	201 S. Broadway Orcutt, CA 93455
Billing Address	SAME
Type of Facility	Treatment of Produced Water Derived from Crude Oil Extraction
Major or Minor Facility	Major
Threat to Water Quality	2
Complexity	A
Pretreatment Program	No
Reclamation Requirements	Yes
Facility Permitted Flow	0.84 million gallons per day (MGD)
Watershed	Pismo Creek
Receiving Water	Pismo Creek (below the Hyla Crossing)
Receiving Water Type	Inland Fresh Surface Water

A. Freeport-McMoRan Oil and Gas (hereinafter the Discharger), formerly Plains Exploration and Production, is the owner and operator of the Produced Water Reclamation Facility (hereinafter the Facility), a wastewater treatment plant.

For the purposes of this Order, references to the "dischargers" or "permittee" in applicable federal and state laws, regulations, plans, and policies are held to be equivalent to references to the Discharger herein.

B. The Facility discharges wastewater to Pismo Creek, a water of the United States, tributary to the Pacific Ocean within the Estero Bay Watershed. The Discharger was previously regulated by Order No. R3-2008-0004 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0050628 adopted on May 9, 2008. Attachment B provides a map of the area around the Facility. Attachment C provides a flow schematic of the Facility.

Prior to making any change in the point of discharge, place of use, or purpose of use of treated wastewater that results in a decrease of flow in any portion of a watercourse, the Discharger must file a petition with the State Water Resources Control Board (State Water Board), Division of Water Rights, and receive approval for such a change. The State Water Board retains the jurisdictional authority to enforce such requirements under Water Code section 1211.

C. The Discharger filed a report of waste discharge (ROWD) and submitted an application for reissuance of its Waste Discharge Requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permit on October 29, 2012.

II. FACILITY DESCRIPTION

A. Description of Wastewater and Biosolids Treatment or Controls

The Discharger owns and operates a crude oil recovery facility within the Arroyo Grande Oil Field, and has recently completed construction on a new wastewater reclamation facility for treatment of the produced water generated by the oil extraction process. Produced water is all water associated with oil and gas producing formations when the reservoir is produced and brought to the surface. The water may include flow from above or below the hydrocarbon zone or flow from an injection recovery facility. The treatment plant utilizes two phases. The first phase consists of warm-lime softening, microfiltration to remove particulates, strong-acid cation softening, and cooling of the produced water as a pretreatment before the second phase. Miscellaneous plant wastewater is incorporated into the wastestream before the beginning of the second phase. The second series of treatments include a two pass reverse osmosis (RO) system, weak-ion exchange NH_3 removal, chemical polishing, storage, cooling, and aeration. The treated water goes into both irrigation uses and the rest is discharged into the Pismo Creek, with volumes not to exceed 0.84 MGD. The produced water reclamation facility is located approximately 1,700 feet from Pismo Creek. As of the October 26, 2012 submittal date of the ROWD by the Discharger, the Facility had not yet commenced operation of the produced water treatment system, nor had any discharges from the Facility occurred.

B. Discharge Points and Receiving Waters

Effluent from the Facility is discharged to Pismo Creek below the Hydra Crossing, a water of the United States, located within the Estero Bay hydrologic unit.

Table F-2. Outfall Locations

Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Produced Water	35º 11' 10.8"	120º 37' 3.7"	Pismo Creek

On July 11, 2006, the Discharger submitted a report, titled "Revised Hydrologic , Water Quality, and Biological Characterization of the Pismo Creek Report", in which Pismo Creek was characterized as possessing measured base flow conditions ranging from 0.58 to 1.1 MGD (0.9 to 1.76 cubic feet per second; cfs). As of the submittal date of the ROWD, no discharge has yet occurred at the Facility, however, the anticipated discharge volume of treated produced water from the Facility to Pismo Creek is approximately 0.84 MGD (1.3 cfs)

A 2002 Department of Water Resources report, titled "Water Resources of the Arroyo Grande – Nipomo Mesa", states that groundwater in the area of the discharge is recharged by stream infiltration from Pismo Creek. Based on this information and the fact that agricultural wells are located immediately downstream from the discharge location, the Central Coast Water Board has determined that the discharge contributes to recharging groundwater used for agricultural purposes downstream of the discharge point.

The 2002 Department of Water Resources report does not clearly indicate whether seawater intrusion (which had been identified in an earlier report) was occurring in the Pismo Creek basin. However, the report does clearly warn of potential seawater intrusion into the groundwater basin if groundwater extraction rates exceed the rate of recharge. Because the discharge has been found to contribute to groundwater recharge, the discharge also serves to prevent and/or reduce the potential for seawater intrusion into groundwater sources.

A 2009 Department of Fish and Game report, titled "Pismo Creek/Edna Area Water Management Plan" (prepared on behalf of the Pismo Creek/Edna Area Steering Committee) states that ocean water, at high tide, flows into Pismo Creek for about 0.5 miles, up to a point where there is a levee protecting the Pismo Beach Wastewater Treatment Plant. The Facility is upstream of the Pismo Beach Wastewater Treatment Plant, and as inflows are stopped at the WWTP, the receiving waters of Pismo Creek at the Facility can be inferred to be freshwater.

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Effluent limitations contained in the existing Order for discharges from Discharge Point No. 001 and representative monitoring data for Monitoring Location EFF-001, for the term of the previous Order are as follows:

Table F-3. Historic Effluent Limitations and Monitoring Data

Parameter	Units	Effluent Limitations			Monitoring Data (From May 2008 – October 2012)[1]		
		Instantaneous Maximum	Average Monthly	Daily Maximum	Instantaneous Max	Highest Monthly Average	Highest Daily Discharge
Flow	MGD	0.84	--	--	NA	NA	NA
TDS	mg/L	--	--	450	NA	NA	NA
	lbs/day	--	--	3,100	NA	NA	NA
pH	s.u.	7.0 – 8.3 at all times			NA	NA	NA
Oil and Grease	mg/L	--	--	35	NA	NA	NA
Acute Toxicity	TUa	--	--	1.0	NA	NA	NA
Benzene	µg/L	--	1.0	2.0	NA	NA	NA
Phenol	µg/L	--	1.0	2.0	NA	NA	NA

Footnotes to Table F-3:

mg/L = milligrams per liter
s.u. = Standard Units
lbs/day = pounds per day
µg/L = micrograms per liter
TUa = acute toxicity units
NA = Not Available

[1] The Discharger reported that no discharges had occurred between the date of the adoption of the previous Order and the date that the ROWD was submitted.

D. Compliance Summary

No discharges have occurred at the Facility during the term of the previous Order.

E. Planned Changes

Currently no changes are planned. The Discharger recently completed construction on the Arroyo Grande Produced Water Reclamation Facility, and anticipates discharges will begin in 2013.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in this Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order serves as Waste Discharge Requirements (WDRs) pursuant to article 4, chapter 4, division 7 or the California Water Code (commencing with section 13260). This Order is also issued pursuant to Section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and chapter 5.5, division 7 of the Water Code (commencing with Section 13370). It shall serve as a National Pollution Discharge Elimination System (NPDES) permit for point source discharges from this facility to surface waters. This Order also serves as a Master Recycling Permit pursuant to article 4, chapter 7, division 7 of the Water Code (commencing with Section 13500).

B. California Environmental Quality Act (CEQA)

Under Water Code Section 13389, this action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of CEQA (commencing with section 21100) of Division 13 of the Public Resources Code.

C. State and Federal Laws, Regulations, Policies, and Plans

1. **Water Quality Control Plans**. The California Water Resources Control Board, Central Coast Region (Central Coast Water Board) adopted a Water Quality Control Plan for the Central Coast Region (hereinafter the Basin Plan) first in 1975, with the most recent update approved on June 8, 2011, that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for receiving waters addressed through the plan. Requirements in this Order implement the Basin Plan. In addition, the Basin Plan implements State Water Resources Control Board (State Water Board) Resolution No. 88-63, which establishes State policy that all waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. Beneficial uses established by the Basin Plan for Pismo Creek are presented below.

Table F-4. Basin Plan Beneficial Uses of Pismo Creek

Discharge Point	Receiving Water Name	Beneficial Uses
001	Pismo Creek	Municipal and Domestic Supply (MUN) Agricultural Supply (AGR) Industrial Service Supply (IND) Ground Water Recharge (GWR) Water Contact Recreation (REC-1) Non-contact Water Recreation (REC-2) Wildlife Habitat (WILD) Cold Fresh Water Habitat (COLD) Warm Fresh Water Habitat (WARM) Migration of Aquatic Organisms (MIGR) Spawning, Reproduction, and/or Early Development (SPWN) Preservation of Biological Habitats of Special Significance (BIOL) Rare, Threatened, or Endangered Species (RARE) Freshwater Replenishment (FRESH) Commercial and Sport Fishing (COMM)

Groundwater throughout the Central Coast Region is suitable for agricultural water supply, municipal and domestic water supply, and industrial use. Requirements of this Order implement the Basin Plan.

2. **Thermal Plan.** The State Water Board adopted a Water Quality Control Plan for Control Temperature in the Coastal and Interstate Waters and Enclosed Bays and

Estuaries of California (Thermal Plan) on January 7, 1971, and amended this plan on September 18, 1975. This plan contains temperature objectives for inland surface waters. Requirements of this Order implement the Thermal Plan.

3. **National Toxics Rule (NTR) and California Toxics Rule (CTR).** USEPA adopted the NTR on December 22, 1992, and amended it on May 4, 1995, and November 9, 1999. About 40 criteria in the NTR apply in California. On May 18, 2000, USEPA adopted the CTR. The CTR promulgated new toxics criteria for California and, in addition, incorporated the previously adopted NTR criteria that apply in the State. The CTR was amended on February 13, 2001. These rules contain water quality criteria for priority pollutants that are applicable to the receiving water for discharges from the Facility.

4. **State Implementation Policy.** On March 2, 2000, the State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (hereinafter State Implementation Policy or SIP*).* The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria USEPA promulgated for California through the NTR and the priority pollutant objectives the Central Coast Water Board established in the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria USEPA promulgated through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. The SIP establishes implementation provisions for priority pollutant criteria and objectives and provisions for chronic toxicity control. Requirements of this Order implement the SIP.

5. **Antidegradation Policy.** Federal regulation at 40 C.F.R. section 131.12 require that State water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16, which incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that the existing quality of waters be maintained unless degradation is justified based on specific findings. The Central Coast Water Board's Basin Plan implements and incorporates by reference both the State and federal antidegradation policies. As discussed in section IV.D.2 of this Fact Sheet, the permitted discharge is consistent with the antidegradation provisions of 40 C.F.R. section 131.12 and State Water Board Resolution No. 68-16.

   Effluent limitation guidelines at 40 C.F.R. 435 for the Oil and Gas Extraction Point Source Category prohibit discharges from such facilities. However, the Discharger meets an exception to this prohibition described in 40 C.F.R. 435 Subpart E for discharges of produced water for use in agricultural and/or wildlife propagation. 40 C.F.R. 435 Subpart E establishes effluent limits for those onshore facilities that qualify for this discharge exception. Such an exception may be granted only for circumstances where discharges will provide substantial benefit for receiving water or downstream agricultural uses. As discussed earlier, discharge water is helpful in recharging groundwater in the area. The Discharger employs high levels of

wastewater treatment to assure high quality effluent that will not result in diminished water quality from that required by applicable law, guidance, and policy, including policy established in the Basin Plan. The Central Coast Water Board has determined that due to the benefit to be provided to agricultural or wildlife beneficial uses and due to the high level of produced water treatment at the Facility, authorization of the discharge by this Order is consistent with applicable State and federal anti-degradation policy.

6. **Anti-Backsliding Requirements.** CWA Sections 402(o)(2) and 303(d)(4) and 40 C.F.R. section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. All limitations and requirements of this Order are consistent with anti-backsliding requirements of the CWA and NPDES Regulations.

7. **Endangered Species Act Requirements.** This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code, §§ 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C.A. §§ 1531 to 1544). This Order requires compliance with effluent limits, receiving water limits, and other requirements to protect the beneficial uses of waters of the state, including protecting rare and endangered species. The discharger is responsible for meeting all requirements of the applicable Endangered Species Act.

D. Impaired Water Bodies on CWA 303(d) List

CWA section 303(d) requires states to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations on point sources. For all 303(d) listed water bodies and pollutants, the Regional Water Board must develop and implement Total Maximum Daily Loads (TMDLs) that will specify Waste Load Allocations (WLAs) for point sources and Load Allocations (LAs) for non-point sources.

The USEPA approved the State's 2010 303(d) list of impaired water bodies on November 12, 2010. The 2010 303(d) list identifies Pismo Creek as impaired for *E. coli*, fecal coliform, low dissolved oxygen, and salinity (sodium and chloride). Currently there are no TMDLs established for Pismo Creek. TMDLs are scheduled to be completed in 2021.

Although effluent data is not available for review, due to the type of discharge and the high level of treatment provided to the effluent, the Discharger is not expected to contribute to the impairment of the receiving water.

E. Other Plans, Polices and Regulations

1. **Storm Water Management.** For the control of storm water discharged from the site of the wastewater treatment facilities, the Order requires the Discharger to seek authorization to discharge under and meet the requirements of the State Water Resource Control Board's Water Quality Order No. 97-03-DWQ, NPDES General Permit No. CAS000001, *Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities*, if applicable.

2. **Recycled Water Policy.** The State Water Board's Recycled Water Policy, which was adopted via Resolution No. 2009-0011, calls for the development of regional groundwater basin/sub-basin salt/nutrient management plans. Pursuant to the letter from statewide water and wastewater entities dated December 19, 2008 and attached to Resolution No. 2009-0011, the local water and wastewater entities, together with local salt/nutrient contributing stakeholders, will fund locally driven and controlled, collaborative processes open to all stakeholders that will prepare salt and nutrient management plans for each basin/sub-basin in California, including compliance with CEQA and participation by Central Coast Water Board staff. The policy was added to establish participation in development of a regional groundwater basin/sub-basin salt/nutrient management plan.

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. NPDES regulations establish two principal bases for effluent limitations. At 40 C.F.R. 122.44(a) permits are required to include applicable technology-based limitations and standards; and at 40 C.F.R. 122.44(d) permits are required to include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. When numeric water quality objectives have not been established, but a discharge has the reasonable potential to cause or contribute to an excursion above a narrative criterion, WQBELs may be established using one or more of three methods described at 40 C.F.R. 122.44(d) - 1) WQBELs may be established using a calculated water quality criterion derived from a proposed State criterion or an explicit State policy or regulation interpreting its narrative criterion; 2) WQBELs may be established on a case-by-case basis using USEPA criteria guidance published under CWA Section 304(a); or 3) WQBELs may be established using an indicator parameter for the pollutant of concern.

Several specific factors affecting the development of limitations and requirements in this Order are discussed below.

A. Discharge Prohibitions

1. **Discharge Prohibition III.A** (Discharge of waste not specifically regulated by this Order is prohibited): This prohibition is similar to the previous Orders and is based on 40 C.F.R. 122.21(a), duty to apply, and CWC Section 13260, which requires filing a ROWD before discharges can occur. Discharges not described in the ROWD, and subsequently in this Order, are prohibited.

2. **Discharge Prohibition III.B** (No discharge at a location or in a manner except as described by this Order). The Order authorizes a single, specific point of discharge to surface waters, and the limitations and conditions established by the Order are based on specific information provided by the Discharger and gained by the Regional Water Board through site visits, monitoring reports, and other information. Discharges to surface waters at locations not contemplated by this Order or discharges of a character not contemplated by this Order are therefore viewed as inconsistent with CWA Section 402's prohibition against discharges of pollutants except in compliance with the Act's permit requirements, effluent limitations, and other enumerated provisions. This prohibition has been retained from the previous Order.

3. **Discharge Prohibition III.C** (The overflow or bypass of wastewater from the Discharger's collection, treatment, or disposal facilities and the subsequent discharge of untreated or partially treated wastewater, except as provided for in Attachment D, Standard Provision I.G (Bypass), is prohibited). The discharge of untreated or partially treated produced water from the Discharger's collection, treatment, or disposal facilities represents an unauthorized bypass pursuant to 40 C.F.R. 122.41(m) or an unauthorized discharge, which poses a threat to human health and/or aquatic life, and therefore, is explicitly prohibited by the Order. This prohibition has been retained from the previous Order.

4. **Discharge Prohibition III.D** (Creation of pollution, contamination, or nuisance, as defined by CWC Section 13050, is prohibited). This prohibition is newly established in the Order and is based on CWC Section 13050.

5. **Discharge Prohibition III.E** (Discharge flow shall not exceed 0.84 MGD.) The purpose of the prohibition is to assure that the treatment plant's design capacities are not exceeded, and thereby, to assure efficient treatment of wastewater.

B. Technology-Based Effluent Limitations

1. Scope and Authority

Section 301(b) of the CWA and implementing USEPA permit regulations at 40 C.F.R. 122.44 (a) require that permits include applicable technology-based limitations and standards, at a minimum, and any more stringent effluent limitations necessary to meet applicable water quality standards. The discharge authorized by this Order is required to meet minimum federal technology-based requirements

drawn from Effluent Limitations Guidelines and Standards for the Oil and Gas Extraction Point Source Category in 40 C.F.R. 435, as well as meet Best Professional Judgment (BPJ) in accordance with 40 C.F.R. 125, specifically, 40 C.F.R. 125.3.

2. Applicable Technology-Based Effluent Limitations

The Discharger's Produced Water Reclamation Facility is subject to technology-based effluent limitations established in 40 C.F.R. 435, Effluent Guidelines and Standards for the Oil and Gas Extraction Point Source Category, Subpart C (Onshore Subcategory). The Effluent Guidelines and Standards prohibit discharges from these facilities, certain exceptions to the discharge prohibitions are allowed.

Prior to the adoption of the previous Order, the Discharger submitted documentation to the Central Coast Water Board justifying the exception to the discharge prohibition established at 40 C.F.R. 435 Subpart E, for the Agricultural and Wildlife Water Use Subcategory. This exception permits discharges of produced water when it has a use in agriculture or wildlife propagation, meaning that the produced water is of high enough quality to be used for wildlife or livestock watering or other agricultural uses and that the produced water is actually put to such use during periods of discharge [40 C.F.R. 435.51 (c)]. USEPA established this exception because, in arid portions of the western United States, low salinity produced waters are often a significant source of usable water for agricultural and wildlife propagation purposes [44 Fed. Reg. 22069, 22072 (April 13, 1979)]. For a Discharger to qualify, the discharge must be necessary for irrigation or animal watering, among other uses [41 Fed. Reg. 44942, 4948 (October 13, 1976)].

As discussed in section II.B of this Fact Sheet, the Discharger submitted documentation that the discharge contributes to recharging groundwater used for agricultural purposes downstream. Additionally, the Discharger submitted documentation stating that the discharge will contribute to recharging groundwater in a manner that will help prevent and/or reduce potential seawater intrusion. Discharged water quality (as per requirements in this permit) is adequate to support wildlife in and around Pismo Creek. Due to this qualification, the discharge meets applicable criteria for exception to the federal prohibition of discharge, based upon its use in agricultural and wildlife propagation.

Applicable Effluent Guidelines and Standards for the Agricultural and Wildlife Water Use Subcategory require that there be no discharge of pollutants from any source (other than produced water) associated with production, field exploration, drilling, well completion, or well treatment (i.e., drilling muds, drill cuttings, and produced sands); and that oil and grease in discharges of produced water shall not exceed a daily maximum effluent limitation of 35 milligrams per liter (mg/L). These requirements are incorporated into the permit.

The following table summarizes technology-based effluent limitations established by the Order.

Table F-5. Technology-Based Effluent Limitations

Parameter	Units	Effluent Limitations		
		Average Monthly	Average Weekly	Maximum Daily
Oil and Grease	mg/L	---	---	35

C. Water Quality-Based Effluent Limitations (WQBELs)

1. Scope and Authority

Section 301(b) of the CWA and 40 C.F.R. section 122.44(d) require that permits include limitations more stringent than applicable federal technology-based requirements where necessary to achieve applicable water quality standards, including numeric and narrative objectives within a standard.

40 C.F.R. Section 122.44(d)(1)(i) requires that permits include effluent limitations for all pollutants that are or may be discharged at levels that have the reasonable potential to cause or contribute to an exceedance of a water quality standard, including numeric and narrative objectives within a standard. Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, water quality-based effluent limitations (WQBELs) must be established using: (1) USEPA criteria guidance under CWA section 304(a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the state's narrative criterion, supplemented with other relevant information, as provided in section 122.44(d)(1)(vi).

The process for determining reasonable potential and calculating WQBELs, when necessary, is intended to protect the designated uses of receiving waters as specified in the Basin Plan and achieve applicable WQOs and criteria that are contained in other state plans and policies, or any applicable water quality criteria contained in the CTR and NTR.

2. Applicable Beneficial Uses and Water Quality Objectives

Beneficial uses described by the Basin Plan for Pismo Creek are presented in section III.C, Table F-4 of the Fact Sheet. Water quality criteria applicable to this receiving water are established by the CTR, the NTR, and by the Basin Plan. The Discharger reported that no discharge had occurred during the term of the previous Order. As such, effluent data was not available for analysis and performance of an RPA based on new data was infeasible.

3. Determining the Need for WQBELs

NPDES regulations at 40 C.F.R. 122.44(d) require effluent limitations to control all pollutants which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard.

The SIP, statewide policy that became effective on May 22, 2000, establishes procedures to implement water quality criteria from the NTR and CTR and for priority, toxic pollutant objectives established in the Basin Plan. The implementation procedures of the SIP include methods to determine reasonable potential (for pollutants to cause or contribute to excursions above State water quality standards) and to establish numeric effluent limitations, if necessary, for those pollutants which show reasonable potential.

The SIP Section 1.3 requires the Regional Water Board to use all available, valid, relevant, and representative receiving water and effluent data and information to conduct a reasonable potential analysis. Since no discharges occurred during the term of the previous Order, effluent data was unavailable for analysis. Consequently, collection of receiving water data was deferred until the Facility commences operation and effluent data becomes available.

Some freshwater water quality criteria for metals are hardness dependent; i.e., as hardness decreases, the toxicity of certain metals increases and the applicable water quality criteria become correspondingly more stringent. The previous Order utilized a minimum observed receiving water hardness concentration of 270 mg/L as $CaCO_3$ which has been retained in this Order due to the lack of current effluent or receiving water data.

To conduct the reasonable potential analysis, the Central Coast Water Board identified the maximum observed effluent (MEC) and background (B) concentrations for each priority, toxic pollutant from receiving water and effluent data provided by the Discharger and compared this data to the most stringent applicable water quality criterion (C) for each pollutant from the NTR, CTR, and the Basin Plan. Section 1.3 of the SIP establishes three triggers for a finding of reasonable potential.

- Trigger 1 – If the MEC is greater than C, there is reasonable potential, and an effluent limitation is required.

- Trigger 2 – If B is greater than C, and the pollutant is detected in effluent (MEC > ND), there is reasonable potential, and an effluent limitation is required.

- Trigger 3 – After reviewing other available and relevant information, a permit writer may decide that a WQBEL is required. Such additional information may include, but is not limited to: the facility type, the discharge type, solids loading analyses, lack of dilution, history of compliance problems, potential toxic impact of the discharge, fish tissue residue data, water quality and beneficial uses of the

receiving water, CWA 303(d) listing for the pollutant, and the presence of endangered or threatened species or their critical habitat.

During the term of the previous Order, the Discharger submitted data from three sampling events in January 2007 of untreated produced water. This "worst-case" dataset was used in the RPA for the previous Order, and was also submitted in a document titled *Revised Hydrologic Water Quality and Biological Characterization of Pismo Creek*. This resulted in reasonable potential findings (by Trigger 1) for both benzene and phenol.

The following table summarizes the RPA for each priority, toxic pollutant or Title 22 pollutant that was measured in effluent during monitoring events from May 2008 through October 2012. Since no discharges occurred at the Facility during the term of the previous Order, effluent and receiving water data were unavailable for analysis. It should be noted that the Discharger marked all pollutants in Part B of EPA Form 2C of the ROWD as, "Believed Absent".

Table F-6. Summary of RPA Results

CTR #	Priority Pollutants	MEC or Minimum DL (1),(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1),(2) (µg/L)	RPA Results (3)
1	Antimony	Not Available	6.0	Not Available	Cannot Determine
2	Arsenic	Not Available	10	Not Available	Cannot Determine
3	Beryllium	Not Available	4.0	Not Available	Cannot Determine
4	Cadmium	Not Available	5.0	Not Available	Cannot Determine
5a	Chromium (III)	Not Available	50	Not Available	Cannot Determine
5b	Chromium (VI)	Not Available	11	Not Available	Cannot Determine
6	Copper	Not Available	22	Not Available	Cannot Determine
7	Lead	Not Available	11	Not Available	Cannot Determine
8	Mercury (303d listed)	Not Available	0.050	Not Available	Cannot Determine
9	Nickel	Not Available	100	Not Available	Cannot Determine
10	Selenium	Not Available	10	Not Available	Cannot Determine
11	Silver	Not Available	22	Not Available	Cannot Determine
12	Thallium	Not Available	1.7	Not Available	Cannot Determine
13	Zinc	Not Available	200	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL [(1),(2)] (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL [(1),(2)] (µg/L)	RPA Results [(3)]
14	Cyanide	Not Available	5.2	Not Available	Cannot Determine
15	Asbestos	Not Available	No Criteria	Not Available	Cannot Determine
16	2,3,7,8-TCDD (303d listed)	Not Available	0.000000013	Not Available	Cannot Determine
17	Acrolein	Not Available	320	Not Available	Cannot Determine
18	Acrylonitrile	Not Available	0.059	Not Available	Cannot Determine
19	Benzene	Not Available	1.0[(4)]	Not Available	Cannot Determine
20	Bromoform	Not Available	4.3	Not Available	Cannot Determine
21	Carbon Tetrachloride	Not Available	0.25	Not Available	Cannot Determine
22	Chlorobenzene	Not Available	30	Not Available	Cannot Determine
23	Chlorodibromomethane	Not Available	0.40	Not Available	Cannot Determine
24	Chloroethane	Not Available	No Criteria	Not Available	Cannot Determine
25	2-Chloroethylvinyl ether	Not Available	No Criteria	Not Available	Cannot Determine
26	Chloroform	Not Available	No Criteria	Not Available	Cannot Determine
27	Dichlorobromomethane	Not Available	0.56	Not Available	Cannot Determine
28	1,1-Dichloroethane	Not Available	5.0	Not Available	Cannot Determine
29	1,2-Dichloroethane	Not Available	0.38	Not Available	Cannot Determine
30	1,1-Dichloroethylene	Not Available	0.057	Not Available	Cannot Determine
31	1,2-Dichloropropane	Not Available	0.52	Not Available	Cannot Determine
32	1,3-Dichloropropylene	Not Available	0.50	Not Available	Cannot Determine
33	Ethylbenzene	Not Available	300	Not Available	Cannot Determine
34	Methyl Bromide	Not Available	48	Not Available	Cannot Determine
35	Methyl Chloride	Not Available	No Criteria	Not Available	Cannot Determine
36	Methylene Chloride	Not Available	4.7	Not Available	Cannot Determine
37	1,1,2,2-Tetrachloroethane	Not Available	0.17	Not Available	Cannot Determine
38	Tetrachloroethylene	Not Available	0.80	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL [(1),(2)] (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL [(1),(2)] (µg/L)	RPA Results [(3)]
39	Toluene	Not Available	150	Not Available	Cannot Determine
40	1,2-Trans-Dichloroethylene	Not Available	10	Not Available	Cannot Determine
41	1,1,1-Trichloroethane	Not Available	200	Not Available	Cannot Determine
42	1,1,2-Trichloroethane	Not Available	0.60	Not Available	Cannot Determine
43	Trichloroethylene	Not Available	2.7	Not Available	Cannot Determine
44	Vinyl Chloride	Not Available	0.50	Not Available	Cannot Determine
45	2-Chlorophenol	Not Available	120	Not Available	Cannot Determine
46	2,4-Dichlorophenol	Not Available	93	Not Available	Cannot Determine
47	2,4-Dimethylphenol	Not Available	540	Not Available	Cannot Determine
48	2-Methyl- 4,6-Dinitrophenol	Not Available	13	Not Available	Cannot Determine
49	2,4-Dinitrophenol	Not Available	70	Not Available	Cannot Determine
50	2-Nitrophenol	Not Available	No Criteria	Not Available	Cannot Determine
51	4-Nitrophenol	Not Available	No Criteria	Not Available	Cannot Determine
52	3-Methyl 4-Chlorophenol	Not Available	No Criteria	Not Available	Cannot Determine
53	Pentachlorophenol	Not Available	0.28	Not Available	Cannot Determine
54	Phenol	Not Available	100[(4)]	Not Available	Cannot Determine
55	2,4,6-Trichlorophenol	Not Available	2.1	Not Available	Cannot Determine
56	Acenaphthene	Not Available	1,200	Not Available	Cannot Determine
57	Acenaphthylene	Not Available	No Criteria	Not Available	Cannot Determine
58	Anthracene	Not Available	9,600	Not Available	Cannot Determine
59	Benzidine	Not Available	0.00012	Not Available	Cannot Determine
60	Benzo(a)Anthracene	Not Available	0.0044	Not Available	Cannot Determine
61	Benzo(a)Pyrene	Not Available	0.0044	Not Available	Cannot Determine
62	Benzo(b)Fluoranthene	Not Available	0.0044	Not Available	Cannot Determine
63	Benzo(ghi)Perylene	Not Available	No Criteria	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL (1),(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1),(2) (µg/L)	RPA Results (3)
64	Benzo(k)Fluoranthene	Not Available	0.0044	Not Available	Cannot Determine
65	Bis(2-Chloroethoxy)Methane	Not Available	No Criteria	Not Available	Cannot Determine
66	Bis(2-Chloroethyl)Ether	Not Available	0.030	Not Available	Cannot Determine
67	Bis(2-Chloroisopropyl)Ether	Not Available	1,400	Not Available	Cannot Determine
68	Bis(2-Ethylhexyl)Phthalate	Not Available	1.8	Not Available	Cannot Determine
69	4-Bromophenyl Phenyl Ether	Not Available	No Criteria	Not Available	Cannot Determine
70	Butylbenzyl Phthalate	Not Available	3,000	Not Available	Cannot Determine
71	2-Chloronaphthalene	Not Available	1,700	Not Available	Cannot Determine
72	4-Chlorophenyl Phenyl Ether	Not Available	No Criteria	Not Available	Cannot Determine
73	Chrysene	Not Available	0.0044	Not Available	Cannot Determine
74	Dibenzo(a,h)Anthracene	Not Available	0.0044	Not Available	Cannot Determine
75	1,2-Dichlorobenzene	Not Available	600	Not Available	Cannot Determine
76	1,3-Dichlorobenzene	Not Available	400	Not Available	Cannot Determine
77	1,4-Dichlorobenzene	Not Available	5.0	Not Available	Cannot Determine
78	3,3 Dichlorobenzidine	Not Available	0.040	Not Available	Cannot Determine
79	Diethyl Phthalate	Not Available	23,000	Not Available	Cannot Determine
80	Dimethyl Phthalate	Not Available	313,000	Not Available	Cannot Determine
81	Di-n-Butyl Phthalate	Not Available	2,700	Not Available	Cannot Determine
82	2,4-Dinitrotoluene	Not Available	0.11	Not Available	Cannot Determine
83	2,6-Dinitrotoluene	Not Available	No Criteria	Not Available	Cannot Determine
84	Di-n-Octyl Phthalate	Not Available	No Criteria	Not Available	Cannot Determine
85	1,2-Diphenylhydrazine	Not Available	0.040	Not Available	Cannot Determine
86	Fluoranthene	Not Available	300	Not Available	Cannot Determine
87	Fluorene	Not Available	1,300	Not Available	Cannot Determine
88	Hexachlorobenzene	Not Available	0.00075	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL (1),(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1),(2) (µg/L)	RPA Results (3)
89	Hexachlorobutadiene	Not Available	0.44	Not Available	Cannot Determine
90	Hexachlorocyclopentadiene	Not Available	50	Not Available	Cannot Determine
91	Hexachloroethane	Not Available	1.9	Not Available	Cannot Determine
92	Indeno(1,2,3-cd)Pyrene	Not Available	0.0044	Not Available	Cannot Determine
93	Isophorone	Not Available	8.4	Not Available	Cannot Determine
94	Naphthalene	Not Available	No Criteria	Not Available	Cannot Determine
95	Nitrobenzene	Not Available	17	Not Available	Cannot Determine
96	N-Nitrosodimethylamine	Not Available	0.00069	Not Available	Cannot Determine
97	N-Nitrosodi-n-Propylamine	Not Available	0.0050	Not Available	Cannot Determine
98	N-Nitrosodiphenylamine	Not Available	5.0	Not Available	Cannot Determine
99	Phenanthrene	Not Available	No Criteria	Not Available	Cannot Determine
100	Pyrene	Not Available	960	Not Available	Cannot Determine
101	1,2,4-Trichlorobenzene	Not Available	5.0	Not Available	Cannot Determine
102	Aldrin	Not Available	0.00013	Not Available	Cannot Determine
103	Alpha-BHC	Not Available	0.0039	Not Available	Cannot Determine
104	beta-BHC	Not Available	0.014	Not Available	Cannot Determine
105	gamma-BHC	Not Available	0.019	Not Available	Cannot Determine
106	delta-BHC	Not Available	No Criteria	Not Available	Cannot Determine
107	Chlordane (303d listed)	Not Available	0.00057	Not Available	Cannot Determine
108	4,4'-DDT (303d listed)	Not Available	0.00059	Not Available	Cannot Determine
109	4,4'-DDE (linked to DDT)	Not Available	0.00059	Not Available	Cannot Determine
110	4,4'-DDD	Not Available	0.00083	Not Available	Cannot Determine
111	Dieldrin (303d listed)	Not Available	0.00014	Not Available	Cannot Determine
112	Alpha-Endosulfan	Not Available	0.060	Not Available	Cannot Determine
113	beta-Endosulfan	Not Available	0.060	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL (1),(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1),(2) (µg/L)	RPA Results (3)
114	Endosulfan Sulfate	Not Available	110	Not Available	Cannot Determine
115	Endrin	Not Available	0.036	Not Available	Cannot Determine
116	Endrin Aldehyde	Not Available	0.76	Not Available	Cannot Determine
117	Heptachlor	Not Available	0.00021	Not Available	Cannot Determine
118	Heptachlor Epoxide	Not Available	0.00010	Not Available	Cannot Determine
119-125	PCBs sum (303d listed)	Not Available	0.00017	Not Available	Cannot Determine
126	Toxaphene	Not Available	0.00020	Not Available	Cannot Determine
Drinking Water Quality Objectives					
	Aluminum	Not Available	1,000	Not Available	Cannot Determine
	Barium	Not Available	1,000	Not Available	Cannot Determine
	Boron	Not Available	750	Not Available	Cannot Determine
	Fluoride	Not Available	1,000	Not Available	Cannot Determine
	cis-1,2-Dichloroethylene	Not Available	6.0	Not Available	Cannot Determine
	Methyl-tert-butyl ether	Not Available	13	Not Available	Cannot Determine
	Styrene	Not Available	100	Not Available	Cannot Determine
	Trichlorofluoromethane	Not Available	150	Not Available	Cannot Determine
	1,1,2-Trichloro-1,2,2-Trifluoroethane	Not Available	1,200	Not Available	Cannot Determine
	Xylenes	Not Available	1,750	Not Available	Cannot Determine
	Alachlor	Not Available	2.0	Not Available	Cannot Determine
	Atrazine	Not Available	1.0	Not Available	Cannot Determine
	Bentazon	Not Available	18	Not Available	Cannot Determine
	Carbofuran	Not Available	18	Not Available	Cannot Determine
	2,4-D	Not Available	70	Not Available	Cannot Determine
	Dalapon	Not Available	200	Not Available	Cannot Determine
	Dibromochloropropane (1,2-Dibromo-3-chloropropane)	Not Available	0.20	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL (1),(2) (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL (1),(2) (µg/L)	RPA Results (3)
	Di(2-ethylhexyl)adipate	Not Available	400	Not Available	Cannot Determine
	Dinoseb	Not Available	0.010	Not Available	Cannot Determine
	Diquat	Not Available	20	Not Available	Cannot Determine
	Endothall	Not Available	100	Not Available	Cannot Determine
	Ethylene Dibromide	Not Available	0.020	Not Available	Cannot Determine
	Glyphosate	Not Available	700	Not Available	Cannot Determine
	Methoxychlor	Not Available	30	Not Available	Cannot Determine
	Molinate	Not Available	20	Not Available	Cannot Determine
	Oxamyl	Not Available	50	Not Available	Cannot Determine
	Picloram	Not Available	500	Not Available	Cannot Determine
	Simazine	Not Available	4.0	Not Available	Cannot Determine
	Thiobencarb	Not Available	70	Not Available	Cannot Determine
	2,4,5-TP (Silvex)	Not Available	10	Not Available	Cannot Determine
	Nitrate (as NO3) (mg/L)	Not Available	10	Not Available	Cannot Determine
	Nitrate+Nitrite (sum as nitrogen) (mg/L)	Not Available	10	Not Available	Cannot Determine
	Nitrite (as nitrogen) (mg/L)	Not Available	1.0	Not Available	Cannot Determine
	Perchlorate	Not Available	6.0	Not Available	Cannot Determine
R3 Basin Plan WQO					
	Cobalt	Not Available	50	Not Available	Cannot Determine
	Iron	Not Available	5,000	Not Available	Cannot Determine
	Lithium	Not Available	2,500	Not Available	Cannot Determine
	Manganese	Not Available	200	Not Available	Cannot Determine
	Molybdenum	Not Available	10	Not Available	Cannot Determine
	Vanadium	Not Available	100	Not Available	Cannot Determine

CTR #	Priority Pollutants	MEC or Minimum DL [(1),(2)] (µg/L)	Governing WQO/WQC (µg/L)	Maximum Background or Minimum DL [(1),(2)] (µg/L)	RPA Results [(3)]

Footnotes to Table F-6:

(1) The MEC or maximum background concentration is the actual detected concentration. Where detection values were available and the pollutant was not detected, the detection value was provided with a "<" before it. Where the pollutant was non-detect and a detection value was not available, "ND" was entered. Where NA is entered, it is because there is no receiving water data and the Discharger reported that all data was Believed Absent, as such, there are no MDLs to report.

(2) The MEC or maximum background concentration is "Not Available" when there are no monitoring data for the constituent.

(3) RPA Results = Yes, if MEC => WQO/WQC, or B > WQO/WQC and MEC is detected;
= No, if MEC and B are < WQO/WQC or all effluent data are undetected;
= Undetermined (Ud), if no criteria have been promulgated;
= Cannot Determine, if there are insufficient data.

(4) Based on Basin Plan, section II.A.2.a, Other Organics.

Because effluent data was not available to evaluate reasonable potential, reasonable potential results from an RPA conducted for the previous permit term, based on three monitoring events in January 2007 to characterize untreated produced water from the Arroyo Grande oil field, have been carried over. These results assumed no treatment, and thus represent the worst-case scenario for effluent quality. For hardness dependent metals, the minimum receiving hardness of 270 (as $CaCO_3$) mg/L was used.

The previous RPA determined reasonable potential for benzene (reported concentration of 23 µg/L) and phenol (reported concentration of 100 µg/L). Thus, effluent limitations for benzene and phenol must be established in this Order.

4. WQBEL Calculations

a. If reasonable potential exists to exceed applicable water quality criteria or objectives, then a WQBEL must be established in accordance with one or more of the three procedures contained in Section 1.4 of the SIP. These procedures include:

i. If applicable and available, use of the wasteload allocation (WLA) established as part of a TMDL.

ii. Use of a steady-state model to derive MDELs and AMELs.

iii. Where sufficient effluent and receiving water data exist, use of a dynamic model, which has been approved by the Regional Water Board.

b. Since many of the streams in the Region have minimal upstream flows, mixing zones and dilution credits are usually not appropriate. Therefore, in this tentative Order, no dilution credit is being allowed.

c. WQBELs Calculation Example

The following demonstrates how WQBELs are established when reasonable potential exists.

Concentration-Based Effluent Limitations

Two sets of AMEL and MDEL values are calculated separately, one set for the protection of aquatic life and the other for the protection of human health. The AMEL and MDEL limitations for aquatic life and human health are compared, and the most restrictive AMEL and the most restrictive MDEL are selected as the WQBEL.

Calculation of aquatic life AMEL and MDEL:

Step 1: For each constituent requiring an effluent limitation, identify the applicable water quality criteria or objective. For each criteria determine the effluent concentration allowance (ECA) using the following steady state equation:

$ECA = C + D(C-B)$ when $C > B$, and
$ECA = C$ when $C \leq B$,

Where C = The priority pollutant criterion/objective, adjusted if necessary for hardness, pH and translators.
D = The dilution credit, and
B = The ambient background concentration

As discussed above, for this Order, dilution was not allowed; therefore:

$ECA = C$

Step 2: For each ECA based on aquatic life criterion/objective, determine the long-term average discharge condition (LTA) by multiplying the ECA by a factor (multiplier). The multiplier is a statistically based factor that adjusts the ECA to account for effluent variability. The value of the multiplier varies depending on the coefficient of variation (CV) of the data set and whether it is an acute or chronic criterion/objective. Table 1 of the SIP provides pre-calculated values for the multipliers based on the value of the CV. Equations to develop the multipliers in place of using values in the tables are provided in Section 1.4, Step 3 of the SIP and will not be repeated here.

$LTA_{acute} = ECA_{acute} \times Multiplier_{acute\ 99}$

$LTA_{chronic} = ECA_{chronic} \times Multiplier_{chronic\ 99}$

The CV for the data set must be determined before the multipliers can be selected and will vary depending on the number of samples and the standard deviation of a data set. If the data set is less than 10 samples, or at least 80% of the samples in the data set are reported as non-detect, the CV shall be set equal to 0.6. All samples were reported as non-detect, and as such a CV of 0.6 was used for all.

Step 3: Select the most limiting (lowest) of the LTA.

$$LTA = \text{most limiting of } LTA_{acute} \text{ or } LTA_{chronic}$$

Step 4: Calculate the WQBELs by multiplying the LTA by a factor (multiplier). WQBELs are expressed as AMEL and MDEL. The multiplier is a statistically based factor that adjusts the LTA for the averaging periods and exceedance frequencies of the criteria/objectives and the effluent limitations. The value of the multiplier varies depending on the probability basis, the CV of the data set, the number of samples (for AMEL) and whether it is a monthly or daily limit. Table 2 of the SIP provides pre-calculated values for the multipliers based on the value of the CV and the number of samples. Equations to develop the multipliers in place of using values in the tables are provided in Section 1.4, Step 5 of the SIP and will not be repeated here.

$$AMEL_{aquatic\ life} = LTA \times AMEL_{multiplier\ 95}$$
$$MDEL_{aquatic\ life} = LTA \times MDEL_{multiplier\ 99}$$

AMEL multipliers are based on a 95th percentile occurrence probability, and the MDEL multipliers are based on the 99th percentile occurrence probability. If the number of samples is less than four (4), the default number of samples to be used is four (4).

Calculation of human health AMEL and MDEL:

Step 5: For the ECA based on human health, set the AMEL equal to the $ECA_{human\ health}$

$$AMEL_{human\ health} = ECA_{human\ health}$$

Step 6: Calculate the MDEL for human health by multiplying the AMEL by the ratio of the $Multiplier_{MDEL}$ to the $Multiplier_{AMEL}$. Table 2 of the SIP provides pre-calculated ratios to be used in this calculation based on the CV and the number of samples.

$$MDEL_{human\ health} = AMEL_{human\ health} \times (Multiplier_{MDEL} \mathbf{/} Multiplier_{AMEL})$$

Step 7: Select the lower of the AMEL and MDEL based on aquatic life and human health as the water-quality based effluent limit for the Order.

d. Calculated Effluent Limitations.

i. **Benzene.** The criteria for benzene (1 µg/L) is based on Table 3-1 of the Basin Plan, for the protection of human health. Consistent with Step 5 above, the AMEL is set equal to the ECA of 1 µg/L. Consistent with Step 6 above, the MDEL is computed by multiplying the AMEL of 1 µg/L by the ratio (MDEL/AMEL multiplier) provided in Table 2 of the SIP based on a CV of 0.6. For a CV of 0.6, a multiplier of 2.01 is provided, resulting in a AMEL of 2.0 µg/L.

ii. **Phenol.** The criteria for phenol (1 µg/L) is based on section III of the Basin Plan, for the protection of human health. Consistent with Step 5 above, the AMEL is set equal to the ECA of 1 µg/L. Consistent with Step 6 above, the MDEL is computed by multiplying the AMEL of 1 µg/L by the ratio (MDEL/AMEL multiplier) provided in Table 2 of the SIP based on a CV of 0.6. For a CV of 0.6, a multiplier of 2.01 is provided, resulting in a AMEL of 2.0 µg/L.

The calculated effluent limitations for benzene and phenol are consistent with the WQBELs contained in the previous Order, thus State and federal anti-backsliding regulations have been satisfied.

5. Whole Effluent Toxicity (WET)

WET limitations protect receiving water quality from the aggregated toxic effect of a mixture of pollutants in effluent. WET tests measure the degree of response of exposed aquatic test organisms to an effluent. The WET approach allows for protection of the narrative “no toxics in toxic amounts” criterion while implementing numeric criteria for toxicity. There are two types of WET tests - acute and chronic. An acute toxicity test is conducted over a short time period and measures mortality. A chronic toxicity test is conducted over a longer period of time and may measure mortality, reproduction, and growth.

The Basin Plan requires that all waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Survival of aquatic organisms in surface waters subjected to a waste discharge or other controllable water quality conditions shall not be less than that for the same water body in areas unaffected by the waste discharge or for another control water.

The previous Order included an effluent limitation for acute toxicity of 1.0 TU_a). Because TU_a is determined by the concentration of effluent that is lethal to half the test organisms (TU_a = 100/LC50), the current effluent limitation allows for survival

rates in 100 percent effluent as low as 50 percent. This effluent limitation is not protective of the Basin Plan's narrative water quality objective stated above.

The acute toxicity effluent limitation has been revised to require a 3-sample median of 90 percent survival, and a single sample minimum of 70 percent.

Because impacts of toxicity are not always lethal and not detectable through acute toxicity, and effluent data is not available for the discharge, a narrative chronic toxicity effluent limitation and monitoring requirements have been established to evaluate compliance with the Basin Plan's narrative toxicity objective.

The Discharger is required to conduct acute and chronic WET testing and/or monitoring, as specified in the Monitoring and Reporting Program (Attachment E, section V). Special Provision V.C.2.a of this Order requires the Discharger to investigate the causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity. If the discharge demonstrates toxicity exceeding the acute toxicity effluent limitations or numeric chronic toxicity monitoring trigger, the Discharger may be required to initiate a Toxicity Reduction Evaluation (TRE) in accordance with an approved TRE workplan. The numeric chronic toxicity monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to perform accelerated chronic toxicity monitoring, as well as the threshold to evaluate the need to initiate a TRE if effluent toxicity has been demonstrated.

6. Basin Plan

a. pH. The Basin Plan establishes a WQO for pH of between 6.5 to 8.3 standard units for the protection of receiving waters with the beneficial use of Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), and Water Recreation (REC1 and REC2). In addition, the Basin Plan establishes a WQO for pH between 7.0 to 8.5 standard units for the beneficial use of Freshwater Habitat (COLD and WARM) and Fish Spawning (SPWN). The previous Order established an effluent limitation of 7.0 to 8.3 and this limitation is retained in the current permit.

b. Total Dissolved Solids (TDS). Produced waters generated during the production of crude petroleum and natural gas will contain a variety of dissolved salts with concentrations varying and dependent upon geographical locations. A 1976 USEPA study showed levels in produced waters from onshore facilities in California ranging from 580 mg/L to 27,300 mg/L [USEPA, Developmental Document for Interim Final Effluent Limitations Guidelines and Proposed New Source Performance Standards for the Oil and Gas Extraction Point Source Category, EPA 440/I-76/055-a (1976)]. Due to use of the Facility's produced waters for agricultural purposes and the potential for elevated levels of TDS in the produced waters, the Central Coast Water Board established a water quality based effluent limitation for TDS of 450 mg/L in the previous Order, reflecting a recommended standard for waters used in agriculture. [Regional Water Quality

Control Board, Central Coast Region, *A Compilation of Water Quality Goals* (August 2000)]. Further, this effluent limitation is protective of the median ground water objectives and surface water objectives for TDS in the San Luis Obispo Creek sub-area of the Estero Bay sub-basin of 900 mg/L and 650 mg/L, respectively.

Based on the treatment facility to be used by the Discharger, the effluent is not expected to contain high levels of salinity or TDS, however effluent data is not available to verify that there is no reasonable potential to exceed applicable water quality standards for TDS. Thus, the effluent limitation for TDS has been retained in the current permit.

D. Final Effluent Limitation Considerations

Final technology-based and water quality-based effluent limitations established by the Order are discussed in the preceding sections of the Fact Sheet.

1. Satisfaction of Anti-Backsliding Requirements.

The Order retains effluent limitations equal to or more stringent than those established in the previous Order for acute toxicity, benzene, oil and grease, pH, phenol, and TDS.

An acute toxicity limitation has been carried over from the previous permit and a narrative chronic toxicity effluent limitation and numeric chronic toxicity trigger have been established in order to comply with the Basin Plan's narrative objective for toxicity. The numeric chronic toxicity trigger will ensure appropriate best management practices and toxicity reduction measures are implemented by the Discharger. The narrative chronic toxicity effluent limitation, combined with the chronic toxicity trigger, TRE requirements, and acute toxicity limitation shall ensure the Discharger operates the Facility in a manner to comply with toxicity water quality objectives and does not represent less stringent requirements.

2. Satisfaction of Antidegradation Policy

Provisions of the Order are consistent with applicable anti-degradation policy expressed by NPDES regulations at 40 C.F.R. 131.12 and by State Water Board Resolution No. 68-16. This Order does not authorize increases in discharge rates or pollutant loadings, and its limitations and conditions otherwise assure maintenance of the existing quality of receiving waters.

3. Stringency of Requirements for Individual Pollutants

This Order contains both technology-based and water quality based effluent limitations for individual pollutants. The technology based effluent limitations consists of restrictions on oil and grease. Restrictions on these pollutants are discussed in

section IV.B of the Fact Sheet. This Order's technology-based pollutant restrictions implement the minimum, applicable federal technology-based requirements. In addition, this Order contains effluent limitations more stringent than the minimum, federal technology-based requirements that are necessary to meet water quality standards. These limitations are not more stringent than required by the CWA.

4. Summary of Final Effluent Limitations – Discharge Point No. 001

a. The Discharger shall maintain compliance with the following effluent limitations at Discharge Point No. 001, with compliance measured at Monitoring Location E-001 as described in the attached Monitoring and Reporting Program (MRP) (Attachment E).

Table F-7. Effluent Limitations

Parameter	Units	Effluent Limitations		
		Instantaneous Maximum	Average Monthly	Maximum Daily
TDS	mg/L	--	--	450
	lbs/day[1]	--	--	3.1×10^3
pH	s.u.	7.0 – 8.3 at all times		
Acute Toxicity	TUa	--	--	1.0
Oil and Grease	mg/L	--	--	35
Benzene	µg/L	--	1.0	2.0
Phenol	µg/L	--	1.0	2.0

[1] Based on a flow rate of 0.84 MGD.

b. Dry Weather Flow. Effluent average dry weather flow shall not exceed a monthly average of 0.84 MGD.

E. Interim Effluent Limitations – Not Applicable

F. Land Discharge Effluent Limitations and Specifications – Not Applicable

G. Reclamation Specifications

This Order includes reclamation specifications reflecting Basin Plan water quality objectives for agricultural supply water. The reclamation limitations are consistent with effluent limitations described above, except that a broader range of pH (6.5 to 8.4) is allowed due to the less pH sensitive use and consistent with Basin Plan criteria. Also, toxicity limitations applicable to the stream discharge (for protection of aquatic life) are not applicable to irrigation uses and do not appear in the reclamation limitations.

Reclamation requirements have been carried over from Order No. R3-2008-0004.

V. RATIONALE FOR SURFACE RECEIVING WATER LIMITATIONS

A. Surface Water

Receiving water quality is a result of many factors, some unrelated to the discharge. This Order considers these factors and is designed to minimize the influence of the discharge on the receiving water. Specific WQOs established by the Basin Plan to meet this goal for all inland surface waters are included as Receiving Water Limitations in section V.A of the Order. All receiving water limitations are retained from the previous Order. In addition, applicable limitations for chemical constituents identified in Tables 3-3, 3-4, and 3-5 of the Basin Plan have been established.

B. Groundwater

Groundwater limitations included in section V.B of the Order include general objectives as established in Chapter 3, Section II.A.4 of the Basin Plan and specific numeric WQOs for groundwater within the Pismo Creek sub area of the Estero Bay groundwater unit as established in Table 3-8 of the Basin Plan. All groundwater limitations in this Order are retained from the previous Order.

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

40 C.F.R. section 122.48 require that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 also authorize the Central Coast Water Board to require technical and monitoring reports. The Monitoring and Reporting Program (MRP), Attachment E of this Order, establishes monitoring and reporting requirements that implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the MRP for this facility.

A. Influent Monitoring

Influent monitoring requirements have been newly established in order to support reclaimed water monitoring requirements which require the Discharger to evaluate the proportion of the reclaimed influent flow.

B. Effluent Monitoring

Effluent monitoring is necessary to determine compliance with effluent limitations and evaluate compliance with applicable water quality objectives and criteria. Effluent monitoring requirements from the previous Order for Discharge Point No. 001 are retained in this Order.

C. Whole Effluent Toxicity Testing Requirements

Whole effluent toxicity (WET) limitations protect receiving water quality from the aggregate toxic effect of a mixture of pollutants in the effluent. Acute toxicity testing

measures mortality in 100 percent effluent over a short test period and chronic toxicity testing is conducted over a longer period of time and may measure mortality, reproduction, and or growth. This Order retains limitations for acute toxicity, establishes a chronic toxicity trigger of 1 TUc, and established monitoring requirements for acute and chronic toxicity for Discharge Point No. 001.

D. Reclaimed Water Monitoring

Reclaimed water monitoring is necessary to determine compliance with applicable limitations and evaluate compliance. Monitoring requirements are retained from the previous Order, with frequencies established consistent with effluent monitoring requirements.

E. Receiving Water Monitoring

1. Surface Water

Surface water receiving water monitoring requirements are retained from the previous Order as necessary to determine compliance with surface water limitations and for the protection of public health.

F. Land Discharge Monitoring Requirements – Not Applicable

G. Other Monitoring Requirements – Not Applicable

VII. RATIONALE FOR PROVISIONS

A. Standard Provisions

Standard Provisions, which apply to all NPDES permits in accordance with 40 C.F.R. section 122.41, and additional conditions applicable to specified categories of permits in accordance with 40 C.F.R. section 122.42, are provided in Attachment D. The discharger must comply with all standard provisions and with those additional conditions that are applicable under section 122.42.

40 C.F.R. section 122.41(a)(1) and (b - n) establish conditions that apply to all state-issued NPDES permits. These conditions must be incorporated into the permits either expressly or by reference. If incorporated by reference, a specific citation to the regulations must be included in the Order. 40 C.F.R. section 123.25(a)(12) allows the State to omit or modify conditions to impose more stringent requirements. In accordance with 40 C.F.R. section 123.25, this Order omits federal conditions that address enforcement authority specified in 40 C.F.R. sections 122.41(j)(5) and (k)(2), because the enforcement authority under the Water Code is more stringent. In lieu of these conditions, this Order incorporates by reference Water Code Section 13387(e).

B. Special Provisions

1. Reopener Provisions

The Order may be modified in accordance with the requirements set forth at 40 C.F.R. 122 and 124, to include appropriate conditions or limits based on newly available information, or to implement any, new State water quality objectives that are approved by the UsEPA. As effluent is further characterized through additional monitoring, and if a need for additional effluent limitations becomes apparent after additional effluent characterization, the Order will be reopened to incorporate such limitations.

2. Special Studies and Additional Monitoring Requirements

a. Toxicity Reduction Requirements

The Order retains the requirement to perform a TRE, if the acute toxicity limitation is exceeded or if chronic toxicity is detected in the effluent above 1 TUc. When toxicity monitoring measures acute or chronic toxicity in the effluent above the limitation or trigger established by the Order, the Discharger is required to resample and retest. When all monitoring results are available, the Executive Officer can determine whether to initiate enforcement action, whether to require the Discharger to implement TRE requirements, or whether other measures are warranted.

3. Best Management Practices and Pollution Prevention

a. Best Management Practices. The Discharger is required to develop a Best Management Practices (BMP) plan which prevents, or minimizes the potential for, release of toxic substances from ancillary activities to the waters of the United States through plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs include “methods, measures, or practices, selected by an agency to meet its nonpoint source control needs.” BMP plans may include structural and nonstructural controls and operation and maintenance procedures. This Order requires the Discharger to implement and update the BMP plan on an ongoing basis to ensure that no contaminated storm water leaves the Facility’s property and enters surrounding surface waters.

4. Construction, Operation, and Maintenance Specifications – Not Applicable

5. Special Provisions for Municipal Facilities (POTWs Only) – Not Applicable

6. Other Special Provisions

a. Discharges of Storm Water. For the control of storm water discharged from the site of wastewater treatment and disposal facilities, if applicable, the Discharger

shall seek authorization to discharge under and meet the requirements of the State Water Resources Quality Control Board's Water Quality Order 97-03-DWQ, NPDES General Permit No. CAS000001, Waste Discharge Requirements for Discharges of Storm Water Associated with Industrial Activities Excluding Construction Activities.

7. Compliance Schedules – Not Applicable

VIII. PUBLIC PARTICIPATION

The Central Coast Water Board is considering the issuance of WDRs that will serve as an NPDES permit for Freeport-McMoRan Oil and Gas' Produced Water Reclamation Facility. As a step in the WDR adoption process, the Central Coast Water Board staff has developed tentative WDRs. The Central Coast Water Board encourages public participation in the WDR adoption process.

A. Notification of Interested Parties

The Central Coast Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe WDRs for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through written publication in the Telegram Tribune newspaper and posted on the Central Coast Water Board website.

B. Written Comments

Central Coast Water Board staff determinations are tentative. Interested persons are invited to submit written comments concerning these tentative WDRs. Comments must be submitted either in person or by mail to the Executive Office at the Water Board at the address above on the cover page of this Order.

To receive a full response from the Central Coast Water Board staff and to be considered by the Central Coast Water Board, written comments should be received at the Central Coast Water Board offices by 5:00 p.m. on **October 4, 2013.**

C. Public Hearing

The Central Coast Water Board will hold a public hearing on the tentative WDRs during its regular Board meeting on the following date and time and at the following location:

Date:	**December 5, 2013**
Time:	**8:30 am**
Location:	**Central Coast Water Board** **895 Aerovista Place, Suite 101** **San Luis Obispo, CA 93401**

Interested persons are invited to attend. At the public hearing, the Central Coast Water Board heard testimony pertinent to the discharge, WDRs, and permit. For accuracy of the record, important testimony was requested in writing.

D. Reconsideration of Waste Discharge Requirements

Any person affected by the action of the Central Coast Water Board to adopt this Order may petition the State Water Resources Control Board (State Water Board) to review the action In accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050. Information for filing a petition will be provided upon request to the State Water Board. Any person affected by this Order may also request the Central Coast Water Board to reconsider the Order. To be timely, such a request must be made within 30 days of the date of this Order. Note that even if reconsideration by the Central Coast Water Board is sought, filing a petition with the State Water Board within the time is necessary to preserve the petitioner's legal rights. If the Discharger chooses to request reconsideration of this Order or file a petition with the State Water Board, the Discharger must comply with the Order while the request for reconsideration and/or petition is being considered. The petition must be submitted within 30 days of the Central Coast Water Board's action to the following address:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

E. Information and Copying

The Report of Waste Discharge (ROWD), other supporting documents, and comments received are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Central Coast Water Board by calling (805) 549-3147.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDRs and NPDES permit should contact the Central Coast Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this Order should be directed to Katie DiSimone at (805) 542-4638 or Katie.DiSimone@waterboards.ca.gov.

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

STAFF REPORT FOR REGULAR MEETING OF DECEMBER 5-6, 2013
Prepared on October 22, 2013

ITEM NUMBER: **10**

SUBJECT: **Revision of Waste Discharge Requirements, Reissuance of National Pollutant Discharge Elimination System Permit No. CA0050628 for Freeport-McMoRan Oil & Gas LLC, San Luis Obispo County, Order No. R3-2013-0029**

STAFF CONTACT: **Katie DiSimone 805/542-4638 or kdisimone@waterboards.ca.gov**

KEY INFORMATION

Location:	1821 Price Canyon Road, San Luis Obispo, San Luis Obispo County
Place ID:	653246
Type of Discharge:	Treated Produced Water from Oil Production Facility
Permitted Flow:	0.84 million gallons per day (mgd; average dry weather flow)
Type of Treatment:	Oil/Water separation, chemical treatment, reverse osmosis, ammonia removal, cooling, and aeration
Disposal Method:	Pismo Creek via diffuser
Existing Orders:	Waste Discharge Requirements Order No. R3-2008-0004
This Action:	**Adopt Order No. R3-2013-0029**

DISCUSSION

Freeport-McMoRan Oil & Gas LLC (hereinafter Discharger) is currently discharging pursuant to Order No. R3-2008-0004, National Pollutant Discharge Elimination System (NPDES) Permit No.CA0050628. The Discharger submitted a Report of Waste Discharge (ROWD), dated October 29, 2012, and applied for an NPDES permit renewal to discharge up to 0.84 MGD of treated production water from its oil exploration and production activities within the Arroyo Grande Oil Field.

The Discharger owns and operates a crude oil recovery facility, and has recently completed construction of a new wastewater reclamation facility for the treatment of the produced water generated by the oil extraction process. Produced water is all water associated with oil and gas producing formations when the reservoir is produced and brought to the surface. The water may include flow from above or below the hydrocarbon zone or flow from an injection recovery facility. At the time the proposed order was drafted, the Discharger had not begun discharges to Pismo Creek under its existing permit. However, since the drafting of this revised permit, the facility has begun discharging treated water to Pismo Creek. There have been no violations or problems with the discharge since it began in late March 2013.

CHANGES FROM THE EXISTING ORDER

The proposed Order is structured in accordance with the statewide NPDES permit template. The proposed Order is consistent with the previous Order with the exception of the following changes/modifications, which are also discussed in detail in the proposed permit fact sheet:

Substantive changes

- Updated the Central Coast Standard Provisions in Attachment D-1 to be consistent with the January 2013 revision.

- Acute toxicity effluent limitation has been revised to be more protective of the Basin Plan's narrative water quality objective. Additionally, a chronic toxicity trigger and narrative effluent limitation has been added. These are discussed in the Fact Sheet (page F-26).

- Influent monitoring has been added for flow. This requirement will help assess recycled water streams and permit compliance.

- Added a special provision requiring the approval of California Department of Public Health (CDPH) prior to recycled water use (page 12). While the previous permit established recycled water specifications in anticipation of irrigation use, the Discharger has not yet obtained approval from CDPH for any recycled water projects. The Discharger is required to obtain CDPH approval consistent with Title 22 of the California Code of Regulations; and the special provision reiterates that requirement.

Minor changes

- Updated facility information as the Discharger's name has changed from Plains Exploration and Production to Freeport-McMoRan Oil & Gas LLC.

COMMENTS

Public notice was provided and posted for the consideration of this proposed permit. There were minor comments from the Discharger submitted during the comment period. Staff has responded to those comments and made minor edits to the draft order as a result of the Discharger's comments. A complete discussion can be found in the order in the Fact Sheet section VIII.B (pages F-33 and F-34).

Based on recent discussions with the Discharger, staff has also added a brief discussion of recycled water as it pertains to this order and facility (Fact Sheet Section II.E Planned Changes). Although 40 CFR 435 Effluent Guidelines and Standards for the Oil and Gas Extraction Point Source Category, Subpart C simply prohibit discharges from such facilities, the Water Board determined, in issuing the original permit, that the discharge meets applicable criteria to qualify for exception to the federal prohibition of discharge, based on its use in agricultural and wildlife propagation (i.e., increased flow in Pismo Creek). The facility is not currently using recycled water; however, the Discharger has indicated a desire to evaluate the possible use of recycled water for landscape irrigation.

RECOMMENDATION

Adopt Order R3-2013-0029, as proposed.

ATTACHMENT

For copies, please refer to the Central Coast Water Board's internet website at:
http://www.waterboards.ca.gov/centralcoast/board_info/agendas/2013/2013_agendas.shtml

1. Proposed Order No. R3-2013-0029, including the following attachments:
   Attachment A – Definitions
   Attachment B – Map
   Attachment C – Flow Schematic
   Attachment D – Standard Provisions
   Attachment E – Monitoring and Reporting Program (MRP)
   Attachment F – Fact Sheet

P:\NPDES\Facilities\San Luis Obispo\PXP Price Cyn\2013 permit\R3-2013-0029 Staff report.doc

Attachment J

Center for Biological Diversity's Appeal of
San Luis Obispo County Planning Commission's 11/12/2015
decision to extend the CUP for the Arroyo Grande Oil Field

21 September, 2015

Dr. Steven Bohlen
Division of Oil, Gas & Geothermal Resources
Department of Conservation
801 K Street, MS 24-02
Sacramento, CA 95814

ATTN: Aquifer Exemption

Submitted electronically via Comments@conservation.ca.gov

On behalf of the Natural Resources Defense Council ("NRDC"), which has 2.4 million members and activists, more than 380,000 of whom are Californians, we write to submit our comments on the proposal to expand the current aquifer exemption designation for the Dollie Sands of the Pismo Formation in the Arroyo Grande Oil Field located in unincorporated San Luis Obispo County, near the intersection of Ormonde Road and Price Canyon Road.

At the outset, we must state our strong objection to the inadequate and outdated criteria[1] that are used when deciding whether to grant aquifer exemptions like the one at issue here. When the U.S. Environmental Protection Agency ("EPA") was crafting its underground injection control ("UIC") program regulations in the early 1980s, the agency bowed to pressure from the oil industry and watered down the aquifer exemption criteria in response to a lawsuit brought by the American Petroleum Institute.[2] The oil industry's influence on the exemption criteria was not rooted in science or groundwater needs, but rather was based on industry's fears that robust aquifer exemption criteria might prohibit the use of certain technologies.[3] Moreover, the weak exemption criteria were based on treatment technology that was available at the time, *i.e.* more than thirty years ago. EPA has not updated the criteria since then, and in the meantime, treatment technologies have improved considerably and in fact are in great demand today due to chronic drought conditions that are driving water users in some parts of the country to turn to lower-quality water sources. To put it bluntly, the exemption criteria are outdated and wholly inadequate to protect usable groundwater.

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[1] 40 C.F.R. § 146.4(a)-(c).
[2] Noel, John. *Aquifer Exemptions: A First-ever Look at the Regulatory Program That Writes off Drinking Water Resources for Oil, Gas and Uranium Profits.* Rep. Clean Water Action/Clean Water Fund, Jan. 2015. Web. 10 Apr. 2015.
[3] Taylor, K. A., Fram, M. S., Landon, M. K., Kulongoski, J. T., & Faunt, C. C. (2014). *Oil, Gas, and Groundwater Quality in California - a discussion of issues relevant to monitoring the effects of well stimulation at regional scales.* Sacramento: U.S. Geological Survey California Water Science Center.

As our more detailed comments below will demonstrate, the proposed aquifer exemption at issue here fails to meet even EPA's deficient exemption criteria, much less the more stringent "beneficial use" requirements set forth in the California's Public Resources Code. For these reasons, we urge the Division and the Water Boards to reject this aquifer exemption application and refrain from sending it on to EPA for approval.

Respectfully submitted,

Lance Larson
Science Fellow

Briana Mordick
Staff Scientist

Damon Nagami
Senior Attorney & Director
Southern California Ecosystems Project

George Peridas
Senior Scientist

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INTRODUCTION

California's Groundwater Crisis

California's drought, now in its fourth year, is causing terrible hardship and impacts across the state to rural communities, agricultural users, and fish and wildlife populations. The state's Department of Water Resources has announced that "[b]ecause of increased pumping, groundwater levels are reaching record lows—up to 100 feet lower than previous records"[4], which in turn is exacerbating the already alarming subsidence rates in the Central Valley.[5]

In the midst of this historic drought, it was revealed that more than 2,500 wells have been improperly permitted to inject potentially toxic oil and gas wastewater and other fluids into federally protected Underground Sources of Drinking Water ("USDWs"). Although the presence or extent of any contamination remains unclear, some of these wells have been operating for decades, injecting billions of gallons of wastewater and other fluids into high quality drinking water.[6]

California's groundwater supplies are at a premium now more than ever. It is with this backdrop that any aquifer exemption application must be considered, and every effort made to protect this valuable resource.

DOGGR Needs To Explain Why These Disposal Wells Have Not Been Shut Down Already

In comparative analysis (Table 1) with the nine wells shut down statewide by the Division in March 2015, there's little, if any, difference between the depths, groundwater quality, and presence of surrounding water users. The disposal wells at Arroyo Grande are operating outside of the currently active hydrocarbon producing portions of the field; Figure 1 shows that currently active production and enhanced recovery injection wells are largely located within the 1973/1974 oil production boundary.

Further, the injection water quality characteristics are unknown. However, the injection water quantity is shown in Table 2, by year, for 11 out of the 14 non-compliant water disposal wells. Since the early 1980s, around the inception of the aquifer exemption program, roughly 63 million gallons of waste water have been injected into this protected aquifer. [7]

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[4] See "NASA Report: Drought Causing Valley Land to Sink", DWR press release, Aug19, 2015. Available here: http://www.water.ca.gov/news/newsreleases/2015/081915.pdf

[5] See "Progress Report: Subsidence in the Central Valley, California", Farr, T. G., Jones, C., Liu, Z., Jet Propulsion Laboratory, California Institute of Technology, August 2015.

[6] California Natural Resources Agency. Department of Conservation. *CALIF. DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES SEEKS END TO INJECTION IN KERN, TULARE COUNTY WELLS State's Review Is Ongoing; Look at High-Priority Wells Nearly Complete*. California Natural Resources Agency, 3 Mar. 2015. Web. 21 Sept. 2015. <http://www.conservation.ca.gov/index/news/Documents/2015-03%20Division%20of%20Oil,%20Gas,%20and%20Geothermal%20Resources%20orders%20UIC%20wells%20shut%20in.pdf>.

[77] See table 2: Underlying data for injection volumes were taken from DOGGR's well finder database (see an example well 0720498: http://opi.consrv.ca.gov/opi/opi.dll/WellFrame?UsrP_ID=100100100&PWT__ID=100015907&PWT__WellTypeCode=WD&StartRow=1&SortFields=WMtr_WellStatus&NewSortFields=WMtr_WellStatus&FormStack=WellList&PriorState=WMtr_APINumber%3D07920498&UsrP_RecentYearFirst=1)
Note: upon review, information for well 0720419, while the magnitudes are accurate, are displayed in reverse order compared to the year.

Table 1: Comparison of relevant characteristics of the nine wells shut down in March 2015 and the disposal wells currently operating in non-exempt aquifers.

	Depth to Top of Inj Zone (ft)	Zone Water TDS (mg/L)	Injection Water TDS (mg/L)	Number of Supply Wells within 1 mile
Nine Injection Wells Shut Down 3/2015 °	475	710	13,000	None
	882	710	13,000	None
	490	680	618	5
	608	680	618	6
	1,400	444	460	40
	3,365	566	3,000	60
	1,415	366	1,500	None
	559	1,200	1,200	1
	250	916	1,500	1
	920	2,328	8,700	1
	1,493	539	No data	None
Proposed Arroyo Grande Aquifer Exemption 14 non-compliant active water disposal wells+	750*	1028#	No Data	47^

°http://www.biologicaldiversity.org/campaigns/california_fracking/pdfs/20140915_State_Board_UIC_well_list_Category_1a.pdf

* Based on the average Dollie Sand depth (application page 44)

Equivalent concentration of 60 grain/gal (application page 44). Conversion was x17.118, according to http://www.water-research.net/Waterlibrary/watermanual/conversion_factors.pdf
However, it's unclear if groundwater samples were established outside of the hydrocarbon bearing zone.

^ On Page 278, the study area includes a boundary of 1 mile around the production area.
There were 105 wells located within that boundary, and 53 of those wells had a well completion report. Of those 53, 6 were completed in the Monterey Formation, which is not included in the proposed aquifer exemption proposal and subtracted from 53. Therefore, 47 wells with completion reports are located within 1 mile, in consistent geological zones with the aquifer exemption, of the proposed aquifer exemption boundary. The distance is approximate, because wells were reported at the quarter section level and further spatial resolution was not provided.

+ List of API numbers for 14 Non-compliant disposal wells within proposed exemption boundary:
7920419, 7920426, 7920433, 7920436, 7920498, 7920606, 7920639, 7920659, 7920773, 7920794, 7921105, 7921154, 7921202, 7921203

Table 2: API and Well Numbers of 11 of the 14 non-compliant water disposal wells within the proposed aquifer exemption boundary

	API and Well Numbers of Non-compliant UIC disposal Wells												
	7920419	7920426	7920433	7920436	7920498	7920773	7920794	7921105	7921154	7921202	7921203		
Year	135	140	142	161	169	2	3	4	6	7	8	Total Gallons Injected	Cumulative Gallons Injected
2015	514,735	0	1,234		7,890		258,686	185,782	76,790	61,094	4,956	1,111,167	63,160,377
2014	454,143	0	34,950		16,229		538,448	318,984	201,298	163,047	64,709	1,791,808	62,049,210
2013	281,477	39,375			17,203	486,876	695,534	438,420	195,781	12,604		2,167,270	60,257,402
2012	223,377	154,633			51,398	949,605	1,231,366	315,307	391,033	807		3,317,526	58,090,132
2011	194,300	179,601			40,002	877,230	1,284,340	477,412	205,105	27,153		3,285,143	54,772,606
2010	166,815	224,981			79,374	967,617	1,134,271	652,358	280,507			3,505,923	51,487,463
2009	261,008	33,806			126,418	1,581,441	850,156	337,671	108,721			3,299,221	47,981,540
2008	387,619	358,997			255,206	1,456,035	13,830	753,818				3,225,505	44,682,319
2007	443,890	334,076			241,215	1,610,248		774,915				3,404,344	41,456,814
2006	333,853	192,903			501,948	1,982,928		9,310				3,020,942	38,052,470
2005	357,363	226,238			215,055	1,424,775						2,223,431	35,031,528
2004	395,819	226,651			215,690	1,414,592						2,252,752	32,808,097
2003	352,901	133,601			476,070	1,484,729						2,447,301	30,555,345
2002	383,756	70,785			968,256	1,202,798						2,625,595	28,108,044
2001	466,972	84,782			51,146	2,014,869						2,617,769	25,482,449
2000	530,741	123,381			141,708	1,789,300						2,585,130	22,864,680
1999	575,091	145,584			240,924	1,922,778						2,884,377	20,279,550
1998	331,077	138,885			227,301	1,483,581						2,180,844	17,395,173
1997	338,166	91,290			184,202	526,226						1,139,884	15,214,329
1996	353,380	135,173			233,558							722,111	14,074,445
1995	357,134	118,997			256,782							732,913	13,352,334
1994	479,461	135,215			335,081							949,757	12,619,421
1993	311,775	13,148			676,991							1,001,914	11,669,664
1992	237,317				830,653							1,067,970	10,667,750
1991	175,643				585,313							760,956	9,599,780
1990	339,274				382,732							722,006	8,838,824
1989	356,318				331,555							687,873	8,116,818
1988	281,803				334,179							615,982	7,428,945
1987	241,921				361,030							602,951	6,812,963
1986	334,556				884,716							1,219,272	6,210,012
1985	162,584				1,300,035							1,462,619	4,990,740
1984				95,968	1,462,267							1,558,235	3,528,121
1983				752,318	962,214							1,714,532	1,969,886
1982				104,189	151,165							255,354	255,354

Alternative Disposal Methods Are Available

The applicant concludes with the threat that, "If injection of the waste waters from the WRF ["Water Reclamation Facility"] into the oil reservoir is not allowed, operations at the WRF will be shut down, subsequently eliminating the water supply that is currently benefiting the Southern California Steelhead and Tidewater Goby habitat." The suggestion that discharge of WRF water should be allowed to occur at the expense of possibly contaminating USDWs is wholly inappropriate and outside the regulatory scope of the proposed exemption application. If the injection of waste waters threatens USDWs, then it is absolutely appropriate that injection cease. This scenario presented by the applicant is also a false choice. None of the parties involved are proposing to completely prohibit subsurface disposal, merely requiring that it occur only into appropriate zones that are not non-exempt USDWs and will not contaminate non-exempt USDWs. The applicant's threat also implies that there are no means other than injection to dispose of reject water from the WRF, which is false.

Higher Bar Set by the State

California statutes set a higher bar than 40 CFR §146.4. Rather than being concerned exclusively with use of an aquifer as a drinking water source, Section 10350 of the Water Code defines "beneficial uses" as follows:

> "(f) "Beneficial uses" of the waters of the state that may be protected against quality degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves."

Section 3131 of the Public Resources Code requires that the Division consult with the Water Boards prior to proposing an aquifer exemption to EPA concerning the conformity of the proposal with all of the following:

> *"(1) Criteria set forth in Section 146.4 of Title 40 of the Code of Federal Regulations.*
>
> *(2) The injection of fluids will not affect the quality of water that is, or may reasonably be, used for any beneficial use.*
>
> *(3) The injected fluid will remain in the aquifer or portion of the aquifer that would be exempted."*[8]

The intent of the law here is not only to safeguard aquifers that currently serve as sources of drinking water, but for any "beneficial use", now or in the future, within reason. In addition, the law intends to ensure that fluids injected into an exempt (portion of) an aquifer will not migrate outside the exemption boundaries, i.e. that there is hydrologic isolation between exempt and non-exempt portions. This is a much broader remit, and one which cannot be justified merely on the basis of showing conformity with 40 CFR §146.4(a) and 40 CFR §146.4(b)(1).

As we explain in the following section, neither the Division and Water Boards nor Freeport-McMoRan have produced sufficient evidence that the portion of the aquifer proposed for exemption will not be of any beneficial use in the future. An analysis demonstrating the current and future technical or economic

[8] California Public Resources Code, Section 3131(a).

impossibility of beneficial use, based on levels of contamination, ease of access, technological availability of purification options and other factors is missing. In addition, we do not believe that the current data and proposed project operation practices demonstrate hydrologic isolation for the injectate.

Inconsistency with Goals of UIC Program

Granting this exemption may set a dangerous precedent, allowing operators of Class II wells to first potentially contaminate USDWs and then retroactively apply for exemptions for the very USDWs they may be contaminating. This may create a situation and an expectation whereby aquifers that previously would not have met the criteria for an exemption may in future qualify for one due to pollution caused by the operator.

TECHNICAL CONSIDERATIONS

Criterion 146.4(a) Has Not Been Met

In order to receive an exemption, the applicant must demonstrate that the proposed aquifer exemption meets the criteria at 40 CFR §146.4(a), which states that an aquifer can only be exempted if, "(a) It does not currently serve as a source of drinking water." The applicant has not adequately demonstrated that the proposed aquifer does not currently serve as a source of drinking water.

The applicant's well water analysis demonstrates that roughly 105 water supply wells are located within 1 mile of the aquifer exemption boundary (page 278). Of those, only 53 have well completion reports and known completion depths and spatial locations.

First, as a minimum requirement of satisfying 146.4(a), the application must identify the depths, status, and use of the remaining unidentified 52 wells.

While the current application suggests that private wells are not physically located within the proposed aquifer exemption boundary, the current application has not adequately identified groundwater flow directions, either local or regional, and how pumping activities within and around the aquifer exemption boundary impacts the hydraulic gradient. Information must be collected that demonstrates water level data, relevant geological features, and discharge rates for steady-state and non-steady state aquifer responses; to ultimately identify any potential *current* communication to the aquifer exemption boundary through a radius of influence induced by a discharge promoted cone of depression.

From a recent aquifer exemption in Texas, EPA denied a portion of a proposed aquifer exemption boundary due to "…significant lack of ground water elevation data for this area."[9] Furthermore, EPA stated "EPA cannot accurately determine whether the area would currently act as a source of drinking water because of the lack of data needed to determine the ground water flow direction north of the Northwest Fault." (*id*) Therefore, EPA rescinded a portion of the aquifer exemption that did not have sufficient ground water information to show that the aquifer was not currently being used.

The application relies heavily on anecdotal evidence and contains numerous vague and/or confusing statements indicating that the analysis of existing drinking water wells/uses is incomplete.

[9] http://www.epa.gov/region6/water/swp/groundwater/goliad-aquifer/transmittallettertotceq.pdf

To justify that the aquifer in question is not a current source of drinking water and is not hydraulically connected to the current users, the applicant states "There is no evidence that the injected fluids have migrated beyond the confines of the reservoir after decades of injection operations. Cleath Harris Geologists ("CHG") was retained by the applicant to conduct a review of the groundwater supply well logs within a mile of the oilfield (App. G (1-1)). CHG's report validates that *most* of these water wells in the region are in separate structural sub-basins, hydraulically isolated from the oil field" (emphasis added). (p 8-9) This statement implies that not all of these water supply wells are hydraulically isolated from the oil field.

The applicant goes on to state, "None of the logs contained information, notes, or entries indicating heat from the oil field thermal operations had been encountered when the groundwater supply wells were drilled." (p. 9) However, neither the applicant nor its consultant provided the dates when the water wells were drilled or dates when steam enhanced oil recovery ("EOR") operations commenced. If the groundwater supply wells were drilled prior to the commencement of EOR activities, then of course heat from oil field thermal operations certainly would not detected. Additionally, it is unclear why heat alone was the only factor considered when determining whether or not oil field thermal operations may have impacted nearby groundwater resources, when these operations may also have impacted water chemistry. They then state, "Furthermore, the logs of the groundwater supply wells did not provide any evidence of hydrocarbon saturation *on the same level* as evidenced by the logs of wells drilled within the confines of the oil reservoir" (emphasis added) (p. 9). The phrase "on the same level" is vague and implies that hydrocarbons are present in these groundwater supply wells, indicating that they are not hydraulically isolated from the oil field.

The applicant states, "Well 'Rock' 85 is adjacent to Phase IV Sentry monitoring well MW-2 which has not shown any events related to oilfield operations since it was installed nine years ago." (p. 14) It is not clear what is meant by "events" or how the lack such events demonstrate that injection operations do not endanger groundwater. In a similar statement, the applicant claims, "No incidents or observed detrimental effects to the localized environment or groundwater resources have been documented since injection operations into the Dollie zone were initiated, thus providing anecdotal support to the observations that the reservoir is geologically confined." (p. 17) Again, the meaning of "detrimental effects" is not defined and is not clear whether the operator has actually been monitoring for such effects.

The applicant and its consultant have not definitively determined that the various subbasins are indeed isolated from the proposed exemption zone, stating, "The Indian Knob Valley subbasin *appears* structurally and hydraulically isolated from other water-bearing zones in the study area," and "The Oak Park subbasin, which covers areas mapped as Edna and Squire Members of the Pismo Formation, *appears* structurally and hydraulically isolated from other water-bearing zones in the study area" (emphasis added) (p. 20). This is an unacceptable condition for adequate protection of USDWs.

The proposed aquifer exemption application presents insufficient information on the potential for private well users that could be currently drawing water from within the proposed aquifer exemption boundary. Based on the available information, EPA cannot grant this exemption based on 146.4(a).

Criterion 146.4(b)(1) Has Not Been Met

The applicant claims that the proposed aquifer exemption is justified based on the criterion at 40 CFR §146.4(b)(1), which states that an aquifer can be exempted if:

> *"(b) It cannot now and will not in the future serve as a source of drinking water because:*
>
> *(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 III operation to contain minerals or hydrocarbons that considering their quantity and location are expected to be commercially producible."*

The applicant has not adequately demonstrated that this criterion has been met.

Presence of Hydrocarbons in Commercial Quantities Has Not Been Adequately Demonstrated

The applicant proposes to exempt the Edna/Dollie Sands Member of the Pismo Formation from ground surface to the base Edna/top Miguelito Member on the basis that "There are only hydrocarbon-bearing sands in the oilfield." The applicant states that this claim is supported by sidewall and whole core data, production data, and well logs.

40 CFR §146.4(b)(1) requires an aquifer to be hydrocarbon producing, or contain hydrocarbons in quantities that are "commercially producible." In other words, it is not sufficient to simply demonstrate that hydrocarbons are present in the proposed exemption zone; the applicant must also demonstrate that those hydrocarbons are, or can be commercially producible, due to their size and location. The applicant has failed to demonstrate this throughout the entire proposed exemption volume.

DOGGR and EPA have already exempted the hydrocarbon bearing zone, within the aquifer exemption boundary, as demonstrated in Figure 1. According to the 'List of Permitted Wells Sent to EPA'[10] spreadsheet, 14 disposal wells (green dots) and 76 EOR wells (pink dots), all of them non-compliant, are located within the proposed aquifer exemption ("AE") boundary (red line), yet outside of the currently exempted, hydrocarbon bearing aquifer boundary (blue line). The hydrocarbon bearing unit was based on a shapefile provided through DOGGR's FTP website, which delineated the spatial boundaries for the 1973 and 1974 oil productive units. However none of the active UIC wells located within the exempted, hydrocarbon bearing aquifer were listed in the 'List of Permitted Wells Sent to EPA' spreadsheet suggesting they are in-compliance with SDWA.

[10] http://www.conservation.ca.gov/dog/general_information/Pages/UndergroundinjectionControl(UIC).aspx

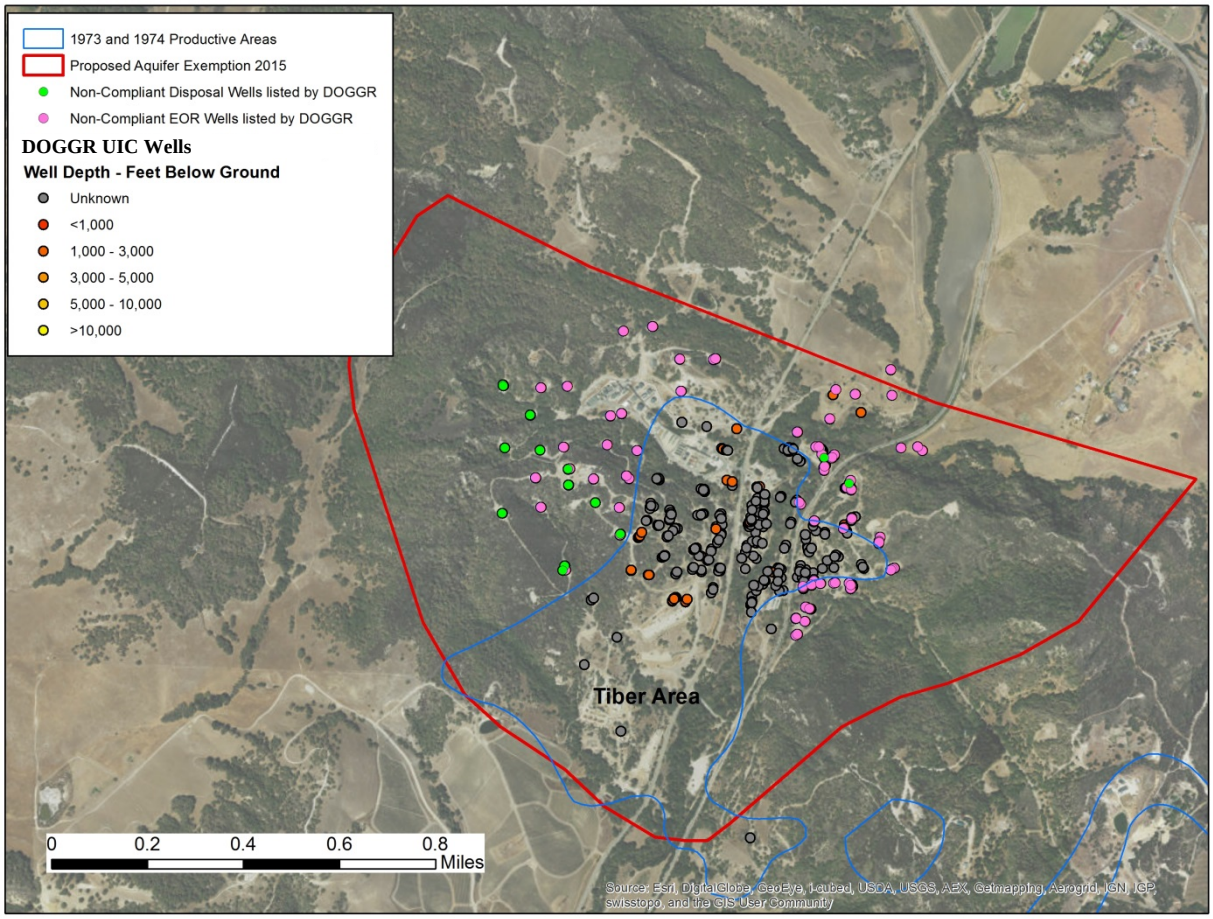

Figure 1: Site map showing the proposed aquifer exemption boundary (red line), the current aquifer exemption boundary (blue line), the non-compliant UIC wells, and compliant disposal and EOR wells.

EPA must not grant an aquifer exemption for disposal wells based on 40 CFR §146.4(b)(1), for a non-producing portion of the aquifer that is also not demonstrated to be suitable for economical hydrocarbon recovery. While the applicant claims, "Hydrocarbons are distributed throughout the oilfield reservoir, both vertically and aerially" (page 3) the location, distribution, and recovery of the economically producible hydrocarbons are overwhelming located within the already exempted portion (blue line) of the proposed aquifer exemption (red line). Currently, the zone outside the boundary of the existing exemption is host mostly to disposal wells.

Core Data Deficiencies

A significant amount of sidewall and whole core data is available for the field. However, the depth to the shallowest core sample is 122 feet.[11] The average shallowest core sample depth is 462 feet. Consequently, much of the shallow subsurface of the oil field within the proposed aquifer boundary is not characterized with core data.

[11] The applicant does not specify the datum for the core depth data. We assume that the datum is the ground surface and that depths are MD.

The applicant also has not provided the dates on which these core samples were taken nor the methodology used to determine oil and water saturation, making it difficult to accurately interpret this data. Oil saturation is typically determined indirectly based on water saturation. Accurately determining oil saturation requires knowing whether cored intervals contain only moveable hydrocarbons, or both moveable hydrocarbons and moveable water. The latter situation can occur in oil fields with long development histories, such as Arroyo Grande, and requires more sophisticated analysis to determine saturation. Additionally, samples taken years or decades ago likely no longer represent the current saturation state of the cored intervals, particularly those in which enhanced recovery operations have occurred. As presented, the core data is insufficient to establish the presence of commercially producible hydrocarbons throughout the entire proposed exemption volume.

Well Log Data Deficiencies

The applicant claims that resistivity logs demonstrate the presence of oil saturated sands throughout the entire proposed exemption volume, both vertically and aerially. The applicant appears to claim that resistivity readings greater than a cutoff value indicate the presence of hydrocarbons, which is represented as green shading on resistivity logs. However, neither the value(s) of this cutoff nor the justification for using such cutoff has been provided in the application.

Distinguishing hydrocarbon-bearing zones from water-bearing zones requires running resistivity logs that interrogate at multiple depths into the formation in order to determine the resistivity profiles for the flushed, invaded, and uninvaded zones of the borehole, and by extension determine the resistivity values for formation water and hydrocarbons. In the cross-section presented in Appendix A7a7, only a single resistivity log is presented for each well, despite the fact that in some cases the log header indicates that shallow, medium, and/or deep resistivity measurements were taken. Additionally, although log headers for core data appear in tracks two and three, these values are not plotted on the logs. Comparison of core- and log-derived data is an important check on saturation values.

Distinguishing water- from hydrocarbon-bearing zones is further complicated in the Arroyo Grande field by the fact that the formation water is low TDS, meaning that both formation water and hydrocarbons will have high resistivity. In fact, the applicant's own data appears to demonstrate that the resistivity cutoff may not be valid. In Appendix A7a3, cross section C-C', a note next to the Guidetti A-1 well log states, "Mudlog shows Edna Member (Dollie sand) gray, wet (no shows) sands from 90' to 1600' MD." Yet, the resistivity log from approximately 600' to 1200' MD is shaded green, which the applicant claims indicates the presence of hydrocarbons.

The applicant has not justified how a resistivity cutoff value can be used to distinguish water-bearing zones from hydrocarbon-bearing zones. Given that the applicant's claim that hydrocarbons are ubiquitously present throughout the field is heavily reliant on its assertion that resistivity logs demonstrate the presence of hydrocarbon-bearing zones, this is a significant shortcoming of the application. As presented, the log data is insufficient to establish the presence of commercially producible hydrocarbons throughout the entire proposed exemption volume.

Completions Data Deficiencies

The applicant states that pre-1974 completion data, "…demonstrate oil production at all levels of the reservoir that are being developed currently." However, Appendix A7a7, AG Pre-1974 Well Completions

Cross Section, indicates that wells are typically completed approximately between the top M1/M2 Marker and tar seal/top M12 Marker of the Edna/Dollie Sands Member. This is also confirmed by well files for a sample of recently completed wells, which show that the top perforation or top slot for wells completed with a slotted liner coincides approximately with the top M1/M2 Marker, and the lowest perforation or bottom slot coincides approximately with the top of the M12 Marker:

API	Top Perf/ Slotted Liner	Bottom Perf/ Slotted Liner	Top M2 (feet MD)	Top M6 (feet MD)	Top M12 (feet MD)
07921222	280	1454	490	611	1262
07921217	419	1573	579	797	1377
07921203	460	820	451	662	-
07921174	641	986	192	293	1023
07921171	744	1619	724	921	1583
07921170	746	1636	728	944	1609
07921162	270	1150	228	346	1178
07921161	251	1195	-	324	1057
07921160	280	1012	214	330	1014
07921158	403	1547	574	721	1396
07921157	412	1530	580	717	1346
07921154	603	1055	631	1015	-
07921140	270	1197	378	503	1175

Additionally, the applicant states that, "…fluid injection is a minimum of 450' from surface," confirming that production and injection do not take place in the shallow subsurface. Despite this, the applicant is proposing to exempt the entire Edna/Dollie Sand Member from surface to the top of the Miguelito Member.

The applicant has not demonstrated that commercial production is occurring or possible, as required by 40 CFR §146.4(b)(1), either shallower than approximately the top M1/M2 Marker or deeper than the tar seal/top M12 Marker. As such, these intervals are not eligible for an aquifer exemption. Including the portion of the Edna/Dollie member from the tar seal/top M12 Marker to the top Miguelito in the exemption significantly increases the total exempted volume, particularly in the updip portions of the field to the north and west where the productive horizons thin and shallow, as demonstrated in x-sections B-B', C-C', and D-D'. Additionally, exempting this portion of the Edna/Dollie member is inconsistent with the applicant's claim that the tar seal is in fact a basal confining zone capable of preventing the movement of fluids.

The proposed aquifer exemption boundary must either be revised, the applicant must provide additional information to demonstrate that 40 CFR §146.4(b)(1) is met for the entire proposed exemption volume, or the applicant must rely on a different criterion to justify the exemption.

Analysis of Alternatives to 40 CFR §146.4(b)(1)

The applicant has not adequately demonstrated that the requirements under 40 CFR §146.4(b)(1) are met for the entire proposed aquifer exemption volume. Therefore, for the EPA to consider this aquifer exemption so that it complies with 146.4(b), the applicant must demonstrate one of the other 146.4(b) criteria has been adequately satisfied.

Exemption Under 40 CFR §146.4(b)(2) Is Inappropriate

40 CFR §146.4(b)(2) requires that: "*It is situated at a depth or location which makes recovery of water for drinking water purposes economically or technically impractical.*"

Since the proposed exemption is from the ground surface through the Edna member of the Pismo formation, this option is inappropriate. The depth to the bottom of the formation varies, but generally is <1,000 feet deep. This is more than economically feasible and practical for drinking water purposes, now and in the future. According to the applicant's private well analysis of DWR data (page 278), there are ~53 private supply wells (with well completion reports, 105 total private supply wells) within 1 mile that are drawing water from aquifers generally <1,000 feet deep.

Exemption Under 40 CFR §146.4(b)(3) Would Require Additional Supporting Data; Application Under Such Is Inappropriate Under State Law

40 CFR §146.4(b)(3) requires that: "*It is so contaminated that it would be economically or technologically impractical to render that water fit for human consumption.*"

Water quality data presented in the application (page 251)[12], was sampled from wells within the currently exempted, hydrocarbon bearing aquifer. This aquifer represents an already exempted, hydrocarbon bearing aquifer and data from this aquifer does not represent geochemical conditions and groundwater quality outside the hydrocarbon bearing zone.

For this condition to be adequately satisfied, the applicant would need to demonstrate a statistically sound number of random groundwater samples *outside* of the hydrocarbon bearing portion of the aquifer to adequately characterize the groundwater. For characterizing the water quality, EPA's unified guidance on establishing groundwater monitoring programs should be used.[13]

According to the information provided in table 2, roughly 63 million gallons of waste water have already been injected into this aquifer. From the data available currently, it's largely unclear what impacts have transpired on groundwater quality. However, the applicant is treating 21,000 bwpd of produced water at the WRF, three quarters of which is discharged into Pismo Creek. This demonstrates that it is already economically and technologically practical to render this water fit for beneficial uses.

Based on the sampling results and analysis, justification for 146.4(b)(3) could be either be supported or denied based upon the presence of water contamination making these portions of the aquifer unfit for

[12] Of note: We were unable to locate the API numbers in the application or in DOGGR's spreadsheet containing all UIC wells, for several of the well listed. Nor were dates, QA/QC reports, or sampling data available for review.
[13] http://www.epa.gov/wastes/hazard/correctiveaction/resources/guidance/sitechar/gwstats/unified-guid.pdf

human consumption. However, adequate supporting analysis to that effect has not been presented, and indications are that such a demonstration would be unlikely.

Exemption under 40 CFR §146.4(b)(4) Is Not Applicable

40 CFR §146.4(b)(3) requires that: *"It is located over a Class III well mining area subject to subsidence or catastrophic collapse."*

This exemption application is not associated with a Class III well mining area, and this option is irrelevant.

Additionally, as we outline above, the Division and Water Boards under the California Public Resources Code are tasked with ensuring that "the injection of fluids will not affect the quality of water that is, or may reasonably be, used for any beneficial use" before submitting an aquifer exemption application to EPA. Regardless of the requirements under 40 CFR §146.4(b), given the shallow depth of the field and the already existing beneficial use (industrial), it appears that submission of this application to EPA is inappropriate.

Comments on the Applicant's Hydraulic Analysis

EPA does not need an applicant to demonstrate hydraulic confinement to grant an aquifer exemption. This alarming fact demonstrates a severe flaw in this regulatory program and demonstrates how little analysis is required for this scientifically invalid regulatory process. However, as demonstrated above, the proposed aquifer exemption has not met EPA's requirements for criteria 40 CFR §146(a) and 40 CFR §146.4(b). Therefore, EPA must not approve this aquifer exemption application in its current form. Furthermore, as discussed above, the State of California sets a higher bar, requiring that the applicant demonstrate that injected fluid will remain in the aquifer or portion of the aquifer that would be exempted. This standard has not been met, as discussed in detail below, and the Division and Water Boards should not submit this application to EPA in its current form.

'Tar Seal' and Adequate Confinement

The applicant needs to explicitly define 'tar seal'. We were unable to locate a definition or explanation of the term, nor its consistent or widespread use, through a relevant peer-review literature search, in relevant scientific textbooks[14], or even through a general online search. Further, what protocol was used to delineate the boundaries of the 'tar seal' needs definition and clarification. First and foremost, the applicant needs to define the intrinsic properties as a seal that would preclude the transmission of contaminants or potentially impaired groundwater outside the boundary of the proposed exemption. The blanket assumption that this 'tar seal' will act as an impermeable, barrier indefinitely is grossly underestimating the potential for off-site migration of contaminants into USDWs and potential drinking water sources.

Furthermore, the injection of steam is a cause for concern, since steam could (further) impair the integrity of the seal. For example, the well-established extraction technique known as Steam Assisted Gravity Drainage used for hydrocarbon production from tar sands relies on injecting steam to melt the bitumen

[14] Bates RL, Jackson JA. Dictionary of Geological Terms. 3rd ed. New York: The American Geological Institute; 1984.

and allow it to flow to a nearby well. The technique is used extensively in Canada.[15] Given this ability of steam, we call into question the assertions of confinement put forward by the operator.

Confinement on east and west side of the proposed exemption boundary has not been established. On page 16, the applicant notes, *"The reservoir thins and pinches out (facies change) up-dip into the less permeable, finer-grained Edna Member sands and to the very fine-grained Miguelito Member siltstones and claystones. The reduction in permeability to finer-grained sands, siltstones and claystones provides the seal preventing fluid or steam migration eastward or westward from the oilfield."*

This statement is troubling for several reasons. First, according to Hall 1973, the Miguelito member is inconsistently distributed throughout the proposed spatial area. Hall 1973 definition[16] suggests discontinuities in the Miguelito member which could significantly alter preferential flow paths and hydrogeological characteristics throughout this aquifer.

Next, according to throughout DWR's (application page 278) private well report, 6 well completion reports are located within 1 mile of the proposed aquifer exemption and are located in the Miguelito Member. The presence of private wells currently drawing from this aquifer suggests 1) it is capable of storing and transmitting significant amounts of groundwater, 2) it is an aquifer, not a confining aquitard or aquitude, and 3) depending on various hydrogeological factors, there's a potential of well discharge to enhance the hydraulic gradient away from the aquifer exemption boundary.

Additionally, as shown in maps and cross-sections provided by the applicant, permeable Edna Member sands extend to the east-southeast and west-northwest of the proposed exemption boundary (Appendix A 4-1 and Appendix A7a2). The applicant has not adequately demonstrated that there are any geologic features at the proposed boundary that could prevent injected or displaced fluids from migrating beyond the proposed boundary into these permeable Edna Member sands. The applicant has not provided any permeability or porosity maps or cross-sections documenting the alleged loss in permeability it claims will provide confinement on the east and west sides of the field. The applicant has not presented any density porosity or neutron porosity logs and, as discussed above, although core permeability and porosity data are available, these have not been plotted on the cross-sections submitted by the applicant.

Finally, for the current 'hydraulic analysis' to be appropriate for this site, the applicant needs to demonstrate 1) site specific information of confined aquifer conditions, 2) adequate characterization of the boundary conditions and not assumptions, and 3) quantitative aquifer properties and understanding of head level responses.

It's unclear whether or not the proposed aquifer is under confined or unconfined conditions, which has significant implications on predicting how phreatic (or potentiometric) surface will be influenced by various injection and recovery activities. Artificial changes to the hydraulic gradient must be assessed in

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[15] See, for example, http://www.conocophillips.ca/technology-and-innovation/unconventional/Pages/sagd.aspx and http://www.energy.alberta.ca/OilSands/pdfs/FS_SAGD.pdf

[16] defined as *"Interbedded brown siltstone and claystone, moderately resistant, bedded (beds average 4 in. thick). Locally, claystone hackly fractured with lenses of siliceous or dolomitic siltstone. Opaline and porcelaneous shale in the west. Locally bituminous sandy siltstone. Tmpm2 – Brown silty claystone and siltstone, poorly bedded."*

order to understand local groundwater flow conditions, along with a quantitative description of the structural aquifer characteristics.

Presence of Surface Tar Seal Not Adequately Demonstrated

As part of its justification for exempting the Edna/Dollie Sands Member from surface to depth, the applicant claims that a "tar seal" is present across the entire surface of the proposed exemption boundary. To support this claim, the applicant references maps and cross-sections prepared by DOGGR in 1944 and 1958 showing the location and distribution of tar sands. Neither of these maps is consistent with the applicant's interpretation that the "tar seal" is present across the entire surface of the proposed exemption. Both publications from DOGGR show that the tar sands occur in discrete and discontinuous deposits that outcrop at various locations throughout the field, contradicting the applicant's stylized cross-sections in Appendices A7a1 – A7a6, which depict the "tar seal" as a single, continuous deposit at the surface.

Conclusion

The current draft application has not demonstrated compliance with existing Federal requirements for approving new aquifer exemptions. The analysis presented does not demonstrate the absence of drinking water wells within the proposed exemption area, and the operator has failed to demonstrate that hydrocarbon production is taking place, or can commercially occur in the future, from the entire extent of the proposed exemption. In addition, the Division and Water Boards should not submit the application to EPA in its current form, as it fails to demonstrate hydraulic confinement with any reasonable degree of confidence, and beneficial use from portions of the aquifer that would be exempted is already taking place and is very plausible, or even likely, in the future. While the additional conditions DOGGR and the Water Board are considering incorporating into any future project approvals and permits, such as monitoring wells and a "buffer zone," are entirely appropriate, it is not at all clear how and under what authority either agency would implement these in practice, nor can the approval of an aquifer exemption by EPA, to our knowledge, be based on the conditional implementation of project-level measures under state authority by other agencies. Therefore these proposed measures provide little additional assurance that injected fluid will remain in the proposed exempted area. In fact, they point towards uncertainty and lack of confidence in confinement.[17]

Significant new evidence and analysis would need to be presented in order for the currently proposed boundary to be eligible for submission and approval for exemption – if this is indeed possible. At the very least, the lateral extent as well as the vertical extent of the proposed boundary would need to be revised in order to qualify as hydrocarbon bearing or commercially producible zones, and to satisfy hydraulic confinement requirements.

[17] California State Water Resources Control Board. (n.d.) Preliminary Concurrence on the Dollie Sands of the Pismo Formation Aquifer Exemption Document, Arroyo Grande Oilfield. [Memorandum] Sacramento, CA.