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# EXHIBIT 17

## Regional Board Interaction Timeline (2017-2019)

**6/26/2017**

The Central Valley Water Board sent a new MRP to Valley Water for the McKittrick Facility, Order No. R5-2017-0806. (Attached)

**7/5/2017**

On July 5th, Valley Water requested rescission of this MRP for failure to comply with legal requirements. (Attached)

**8/27/2017**

Valley Water's consultant reaches out to the Assistant Executive Officer Clay Rodgers to schedule a meeting regarding a groundwater model to show Valley Water is not impacting groundwater considered to be beneficial used for municipal or general agricultural supply. (Attached)

**9/1/2017**

Valley Water receives a letter from RWQCB rescinding MRP R5-2017-0806. (Attached)

**10/9/2017**

Valley Water and their consultant, Catalyst Environmental Solutions, met with Board staff to describe the objectives, methods, and data needs from the Board to support a numerical groundwater flow model. The model would consider infiltration from the McKittrick ponds, to the perched zone in the Upper Tulare Sands. The model would be calibrated and validated using the results of long-term monitoring conducted by Valley at the McKittrick facility since 2002. The meeting also discussed that the development of the model was to be a collaborative effort between Board staff and Valley so that once the model was finalized, both parties could accept the model predictions. Valley Water sought RWQCB signoff on the project before proceeding. RWQCB agreed that the project had merit.

**1/10/2018** Valley Water and their consultant, Catalyst Environmental Solutions, met with RWQCB Staff and Pamela Creedon to discuss the preliminary results of the groundwater flow model. The discussion identified areas of broad agreement, as well as areas of uncertainty owing to a lack of monitor wells between the McKittrick facility and the Clean Harbors facility. The discussion included a request from the Board that Valley Water consider the amount of time they would anticipate operations to continue, and to conduct a model run for that timeframe.

**2/2/2018**

Valley Water is sent Notice of Public Hearing for a tentative resolution that would direct staff on how to regulate the McKittrick Facility moving forward. (Attached)

**2/13/2018**

Valley Water submits its comments to the RWQCB documenting the extensive research and modeling being done by both Valley Water's staff and staff at the RWQCB. (Attached) Valley Water believed that the hearing was premature and should be deferred to a later date due to the amount of cooperation between the two parties.

**2/26/2018**

Valley Water submits comments on the proposed resolution R5-2017-0031 to the RWQCB. (Attached)

**3/1/2018**

Valley Water receives a response from RWQCB to the comments submitted on 2/26/2018. (Attached)

**3/14/2018**

Valley Water and their consultants, Catalyst Environmental Solutions and WSP, met with Board staff to continue to work on input parameters to the model, to move from an interim model towards a final model. The focus of the meeting was the stratigraphy beneath the Clean Harbors facility, and Valley Water's use of data provided by the Board to determine that the Upper Zone beneath Clean Harbors has no equivalent beneath McKittrick. The meeting objective was to identify areas of agreement (including the stratigraphy), and then identify areas of disagreement with the objective of defining additional monitor wells that could resolve the areas of disagreement.

**3/26/2018**

Regional Board issues notice of hearing on MRP and Draft Resolution. (Attached)

**4/2/2018**

Valley Water instructs Kennedy Jenks to begin work on a Monitoring Well Installation and Sampling Plan (MWISP).

**4/4/2018**

Valley Water receives Monitoring and Reporting Program (MRP) from the RWQCB.

**6/4/2018**

Valley Water submits its MWISP.

**6/11/2018**

Valley Water called the RWQCB to ask if they had any comments on the MWISP.

**7/9/2018 (9:40 am)**

Valley Water receives an email from RWQCB asking to meet and discuss the MWISP on July 31.

**7/9/2018 (10:07 am)**

Valley Water responds back to the RWQCB asking for specific comments so it would know who should attend this meeting.

**7/9/2018 (1:35pm)**

RWQCB responds with brief comments, but admitted they had not done a detailed review of our plan.

**7/30/2018**

Valley Water receives a 27 July 2018 comment letter from RWQCB. (Attached) Given the late timing of these comments, Valley Water opted to cancel the July 31st meeting and provide a response to comments. The comments received also gave a deadline of August 27th to submit a revised MWISP.

**7/31/2018**

Meeting canceled.

**8/20/2018**

Valley Water responds with a comment letter addressing the concerns detailed in the 7/30/2018 letter.

**8/23/2018**

RWQCB responds to our comments, specifically pointing out that Valley Water must drill monitoring wells.

**8/27/2018**

Valley Water submits the revised MWISP. In the revised plan, Valley Water commits to drill CYM-17H1 and CYM-17A1.

**9/17/2018**

A 13 September 2018 13267 order is received Valley Water (Attached), providing a time line of requirements, and giving conditional approval of the MWISP. The order references Valley Water's "apparent refusal" to drill CYM-17A1, even after the report specifically mentions the drilling of that well.

**9/18/2018**

Valley Water reached out to David Nielsen to discuss sampling the Clean Harbors wells listed in our MWISP. David informed us that we had to use Cameron-Cole for the sampling events and forwarded their contact information.

**9/21/2018**

McCormick was contracted to do the biological review outlined in the 9/17/2018 13267 letter.

**9/26/2018**

Valley Water began the initial contract and scoping negotiations with Cameron-Cole.

**10/3/2018**

The October Biological report is submitted to the RWQCB as outlined in the 13267 order. (Exhibit 24) This report also requests a meeting with Clay Rodgers to discuss in further detail the 13267 order.

**10/5/2018**

Email from Clay Rodgers proposing dates to set up a meeting to meet with Patrick Pulupa, Melissa Thorme, Chris Reedy, Jim Waldron, and Jason Meadors.

**10/10/2018**

Valley Water sent appointment to meeting participants for October 26, 2018.

**10/26/2018**

Meeting between RWQCB and Valley Water staff. Valley Water explained the difficulties with endangered species and well location.

**11/9/2018**

Biological update as required outlining Valley Water's progress sent to RWQCB, including proposals for biological work.

**12/6/2018**

Received email from Dale Harvey with the Regional Board stating that Clay Rodgers would be the geologist reviewing submittals for the McKittrick Facility.

Valley Water responded and asked if they had a chance to review our letter and biological technical report submitted on November 28, 2018. Jason Meadors indicated that there were two monitoring wells (CYM-21A1 and CYM-17E1) that we would like to drill in the near future if the locations were deemed reasonable by the Regional Board. Requested that a call be set up between Valley Water and Clay Rodgers to discuss the sampling of the Clean Harbor wells.

Jason Meadors set up a meeting with Clay to discuss potential monitoring well locations and Clean Harbors Well sampling.

**12/10/2018**

A phone conference was held between Regional Board and Valley Water staff. CDO was threatened at this meeting.

Jason sent the Monthly Biological Update discussing Valley Water's progress regarding the additional well locations, biological surveys, and sampling Clean Harbors' wells. We requested assistance from Clay Rodgers to work with Clean Harbors to give Valley Water access.

**12/17/2018**

Jason emailed Clay Rodgers to see if he had talked to Clean Harbors about allowing Valley Water to sample their wells. Clay responded and said that he left a message and will follow up again.

**1/8/2019**

Jason called Clay and left a voice message and also emailed him regarding the sampling of the Clean Harbors wells. The email indicates that Valley Water has also recently reached out to Cameron-Cole. Cameron-Cole indicated that they were still working on the agreement with Clean Harbors.

**1/10/2019**

Jason sent the Monthly Biological Update discussing Valley Water's progress regarding the additional well locations, biological surveys, and sampling Clean Harbors' wells.

Jason spoke to Clay on the phone. Clay indicated that he had been busy, but finally spoke with David Neilson with Clean Harbors about Valley Water sampling their wells. Clean Harbors indicated to Clay that the agreement between Clean Harbors and Cameron-Cole would be done in the next couple of days. Clay indicated that we could possibly do the sampling with Clean Harbors on February 4, 2019, which would give Valley Water enough time to get the sampling results and obtain the data that Valley Water would need to make our case against the CDO threatened by the RWQCB.

**1/10/2019**

Valley Water spoke with their Landman, Tyler Tilbury about the status of the access agreements for surveying on Chevron property, where Valley Water is proposing to locate two monitoring well locations.

**1/29/2019**

Valley Water signed an access agreement with Chevron to allow surveyors to access Chevron's property. The surveyors will survey around proposed well locations. After the surveys are completed, Valley Water will be able to determine if we will be able to access the proposed locations. This process took quite some time, but Valley Water actively worked on the access agreements for several months.

**2/4/2019**

Commenced sampling of Clean Harbors' well per the MWISP.

**3/11/2019**

Valley Water sent Monthly Biological Update discussing progress regarding the additional well locations and the associated biological surveys.

**3/25/2019**

Small mammal trapping commences after multiple delays due to weather concerns. Trapping protocol requires five (5) consecutive days of dry weather.

**3/30/2019**

Small mammal trapping completed for wells that do not need Blunt Nosed Leopard Lizard (BNLL) surveys. Final reports are pending.

## Future Planned Activities

**4/15/2019 (Tentative)**

BNLL protocol surveys will begin for the well locations that require them.

**5/15/2019 (Tentative)**

Drilling of the monitoring wells for areas that do not need BNLL surveys will commence. Three well sites and 6 wells are planned.

**5/25/2019 (Tentative)**

New monitoring wells will be sampled.

**8/25/2019 (Tentative)**

Monitoring Well Installation and completion report will be submitted.

**8/30/2019 (Tentative)**

BNLL protocol surveys will be completed.

**9/15/2019 (Tentative)**

Drilling of additional wells needing BNLL surveys will commence.

**9/25/2019 (Tentative)**

Sampling of new wells will commence.

**12/25/2019 (Tentative)**

Monitoring Well Installation and completion report will be submitted.

RECEIVED
JUN 28 2017
VALLEY WATER M

CALIFORNIA
Water Boards

Central Valley Regional Water Quality Control Board

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

26 June 2017

Russell Emerson, Manager
Valley Water Management Company
7500 Meany Ave
Bakersfield, CA 93308

**CERTIFIED MAIL**
**7016 2710 0000 2623 8986**

**MONITORING AND REPORTING PROGRAM R5-2017-0806,**
**VALLEY WATER MANAGEMENT COMPANY, MCKITTRICK 1 & 1-3 FACILITY,**
**BELGIAN ANTICLINE OIL FIELD, KERN COUNTY**

Enclosed is Monitoring and Reporting Program No. R5-2017-0806 (MRP) for Valley Water Management Company's McKittrick 1 & 1-3 Facility disposal ponds.

Central Valley Water Board staff made the draft MRP available, as a courtesy, to Valley Water Management Company (Valley Water) on 18 October 2016. On 26 October 2016, Valley Water submitted comments on the draft MRP. Enclosed is a response, prepared by Central Valley Water Board staff, to your comments. Comments or suggestions that were found to be appropriate by Central Valley Water Board staff were incorporated in the final MRP.

Central Valley Water Board staff also made the following changes to the draft MRP:

- Modified language regarding current groundwater monitoring well network and data analysis.
- Added language regarding the need to further delineate the extent of the produced wastewater plume through the installation and sampling of additional monitoring wells upgradient and downgradient of the disposal ponds.
- Added language regarding possible impacts to groundwater monitoring wells owned by Clean Harbors Buttonwillow, LLC.
- Added hydrogen and oxygen isotope monitoring.

This MRP requires Valley Water Management Company to perform specific produced wastewater and groundwater monitoring at specific frequencies. Failure to comply with the Revised MRP will subject Valley Water Management Company to enforcement actions, including the potential assessment of civil liability. Previously submitted information that would fulfill some of the requirements of the MRP will be considered if resubmitted or appropriately referenced in a response to this MRP. Proposed modifications in the sampling frequency or constituent list of this MRP may be submitted in writing with technical information supporting proposed changes. All changes to this MRP shall be approved by the Executive Officer.

Submit electronic copies of all work plans, reports, analytical results, and groundwater elevation data over the Internet to the State Water Board Geographic Environmental Information Management System database (GeoTracker) for the facility using the provided Global ID as described in the MRP. In addition, a copy of each document shall be sent via electronic mail to CentralValleyFresno@waterboards.ca.gov. Include a copy of the transmittal letter. Laboratory reports submitted in compliance with this MRP shall be accompanied by an Excel file that includes the analytical data found in the laboratory report as described in the MRP.

If you have any questions regarding this matter, please contact Alejandra Lopez of this office at (559) 445-6071 or via e-mail at Alejandra.Lopez@waterboards.ca.gov

RONALD E. HOLCOMB
Senior Engineering Geologist
PG No. 6725

Enclosures: Response to MRP draft comments
MRP Order No. R5-2016-0806
Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991

cc: Julie Macedo, Office of Enforcement, State Water Resources Control Board (email)
Stephanie Yu, Office of Chief Counsel, State Water Resources Control Board (email)
John Borkovich, Division of Water Quality, State Water Resources Control Board (email)

**Regional Water Quality Control Board**
**Central Valley Region**

## Response to Written Comments for the McKittrick 1 & 1-3 Facility, Monitoring and Reporting Program Order No. R5-2017-0806

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff made the draft Monitoring and Reporting Program Order No. R5-2016-0806 (revised from R5-2016-0824) (MRP) available, as a courtesy, to Valley Water Management Company (Valley Water) on 3 October 2016. The McKittrick 1 & 1-3 Facility is regulated under Waste Discharge Requirements Order No. 69-19901. On 26 October 2016, Valley Water submitted comments on the draft MRP.

Written comments from Valley Water are summarized below, followed by responses from Central Valley Water Board staff. Based on the comments, Central Valley Water Board staff has made some changes to the MRP. Staff also made a few minor changes to improve clarity and fix typographical errors.

### VALLEY WATER MANAGEMENT COMPANY

**COMMENT No. 1:** Valley Water states that background sections are not included in many other MRPs and it is better to remove them since they are not required.

> **RESPONSE:** The Facility background information is included in the MRP to provide specific information about current site conditions. The background information has not been removed from the MRP.

**COMMENT No. 2:** Valley Water states that information regarding surrounding lands uses is not required in an MRP.

> **RESPONSE:** The surrounding land uses for agriculture and oil field production and information about the neighboring Facility, which also monitors the same three groundwater zones, provides information about the quality of groundwater near the McKittrick 1 & 1-3 Facility. This information along with groundwater chemical data obtained from the neighboring Facility monitoring wells properties are useful to support the groundwater flow directions and plume boundaries. Surrounding land use information has not been removed from the MRP.

**COMMENT No. 3:** Valley Water states that it has already been sampling for many of these constituents. Can past data be used to reduce the frequency of sampling events?

> **RESPONSE:** Yes, Valley Water may request to have the frequency of sampling or the number of sample points, and for specific parameter that have a history of sampling data. The request must include adequate technical justification for reduction in sampling frequency, required analytical parameters, and number of monitoring points.

**COMMENT No. 4:** Valley Water states that it does not have the chemical use data requested. Valley Water states that chemical use data should be requested from the operators under CWC 13267.

> **RESPONSE:** Valley Water is the responsible for produced wastewater accepted at the McKittrick 1 & 1-3 Facility. Valley Water is responsible for the quality of wastewater discharged to the ponds. As such, Valley Water is responsible for the complete characterization of the authorized discharges. A complete characterization of produced wastewater discharged from the Facility to the land cannot be made without the identification and quantification of chemicals

and additives that have the potential to enter the waste stream accepted at the McKittrick 1 & 1-3 Facility. It is Valley Water's responsibility to provide the information necessary to adequately characterize discharges to the McKittrick 1 & 1-3 Facility disposal ponds. No changes have been made to the MRP in response to this comment.

**COMMENT No. 5:** Valley Water states that, these regulations are under state law, record retention should be three years. NPDES regulations require 5 years, but not applicable to groundwater discharges.

**RESPONSE:** California Water Code section 13263.2 requires Dischargers that treat groundwater which qualifies as a hazardous waste, to retain records for three years. This requirement does not apply to the facilities regulated under the WDRs and, subsequently, does not limit the Central Valley Water Board's authority to require a greater record retention period. Under section 13267 of the California Water Code, the Central Valley Water Board has the authority to issue Monitoring and Reporting Programs that require monitoring that in turn generate data that may be evaluated to determine if discharge quality is protective of local groundwater quality. Central Valley Water Board staff finds the requirement to retain records for five years necessary to verify that the discharge complies with the WDRs and is protective of groundwater quality. No changes have been made to the MRP for this comment.

**COMMENT No. 6:** Valley Water believes that sampling should only be required where a plume has been created in close proximity to any identified off site wells. Sampling all (1 mile radius) surrounding wells well cause an unnecessary hardship on VWMC and on well owners. Sampling of water supply wells should come after determination of the existence of a plume that exists, which might potentially impact a particular offsite well(s).

**RESPONSE:** Central Valley Water Board staff have not removed the water supply well groundwater sampling requirements. The McKittrick 1 & 1-3 disposal ponds appear to already have a produced wastewater plume that extends beyond one mile to the northeast. Current monitoring well data indicates that all groundwater monitoring wells are impacted to some degree by produced wastewater discharges. In this case reducing the distance of groundwater supply wells to be sampled to less than one mile is not adequate.

**COMMENT No. 7:** Valley Water states that monitoring frequency in Table I should be footnoted to say that if chemical constituents are not detected (ND) or below the applicable water quality objective (WQO) by more than 10% in last year, then this sampling can be done annually. If detected at levels within 10% or above the objective, the sampling goes back to quarterly.

**RESPONSE:** Historical monitoring data may be used to request changes in the MRP. Valley Water did not submit historical monitoring data, or request to modify the list of monitoring constituents or their monitoring frequencies with its comments; therefore, no changes have been made to the MRP Table I in response to this comment. Each Discharger may request changes in sampling frequency. The request must include adequate technical justification for reduction in monitoring frequency.

**COMMENT No. 12:** Valley Water states that total organic carbon (TOC) is not included in the proposed General Orders, so it is not sure why it is needed.

> **RESPONSE:** TOC is part of the proposed General Orders and it is intended to capture all organics that might have been missed by other analyses.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

# MONITORING AND REPORTING PROGRAM R5-2017-0806
# OIL FIELD DISCHARGE TO LAND
# FOR
# VALLEY WATER MANAGEMENT COMPANY
# MCKITTRICK 1 & 1-3 FACILITY
# BELGIAN ANTICLINE OIL FIELD
# KERN COUNTY

This Monitoring and Reporting Program (MRP) is being required pursuant to Water Code section 13267. This MRP is for the discharge to land of produced water (wastewater) from the Cymric and South Belridge Oil Fields at the McKittrick 1 and 1-3 unlined pond systems (Facility). Valley Water Management Company (hereafter Discharger) owns and operates the Facility.

The Discharger shall not implement any changes to this MRP unless and until the Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopts, or the Executive Officer issues, a revised MRP. Changes to sample location(s) shall be established with the concurrence of Central Valley Water Board staff, and a description of the revised sample location(s) shall be submitted for approval by the Executive Officer.

This MRP includes monitoring, record-keeping, and reporting requirements. Monitoring requirements include monitoring of groundwater, discharges of produced wastewater, solid wastes, chemicals associated with petroleum exploration, and the application of recycled materials (wastewater and solids); to determine if the Discharger is complying with Waste Discharge Requirements Resolution No. 69-199 (Resolution).

## BACKGROUND

Oil field produced wastewater has been discharging at the Facility since the late 1950s. The Facility has two side by side interconnected pond systems used for the disposal of oil field produced wastewater via evaporation and percolation. The McKittrick 1 pond system occupies the west side of the Facility and is slightly higher in elevation than the McKittrick 1-3 pond system occupying the east side of the Facility. According to the Discharger incoming wastewater is discharged into netted oil/water cleaning ponds via three pipelines and then flows into smaller pass-through ponds that drain into the main evaporation and percolation disposal ponds. Two of the three pipelines which discharge into the McKittrick 1 Facility are owned and operated by California Resources Production Corporation (CRPC) and the third pipeline is operated and owned by Freeport-McMoRan Oil & Gas LLC (FMO). The McKittrick 1-3 Facility receives wastewater through one pipeline owned and operated by Freeport-McMoRan Oil & Gas LLC. Production wastewater usually flows through the disposal ponds in parallel, but the ponds can also be operated in series.

There are ten oil field injection wells within approximately two miles north and southerly of the McKittrick 1 & 1-3 disposal ponds. Two of the injection disposal wells are owned and operated by California Resources Production Corporation and eight are owned and operated by Chevron U.S.A. Inc. Land used for agriculture is located approximately 1,500 feet north of the McKittrick 1 & 1-3 disposal ponds. The California Aqueduct is approximately 3.3 miles northeast of the McKittrick 1 & 1-3 disposal ponds.

Pond information follows:

| Facility | Pond | Pond dimensions LxWxLxW or LxW in feet (depths were not provided) | Pass through pond LxW in feet | Contains visible oil | Active | 2nd Semi-annual 2016 discharge |
|---|---|---|---|---|---|---|
| McKittrick 1 (west side) | CP-1 | 147x70 | - | Yes | Yes | 66,000 bbl/day |
| | CP-2 | 85x69 | - | | | |
| | CP-3 | 109x69 | - | | | |
| | CP-4 | 128x68 | - | | | |
| | CP-5 | 101x63 | - | | | |
| | CP-6 | 100x60 | - | | | |
| | P-1 | 1540x117x1598x94 | - | No | Yes | |
| | P-2 | 1608x123x1625x118 | - | | | |
| | P-3 | 1575x88x1593x90 | 88x52 | | | |
| | P-4 | 1600x86x1671x89 | 86x52 | | | |
| | P-5 | 1625x100x1647x82 | 100x52 | | | |
| | P-6 | 1649x87x1673x96 | 87x52 | | | |
| | P-7 | 1669x89x1689x92 | 89x52 | | | |
| | P-8 | 1357x93x1375x91 | 93x52 | | | |
| | P-9 | 1380x83x1401x91 | 83x52 | | | |
| | P-10 | 1399x83x1419x91 | 83x52 | | | |
| | P-11 | 1496x87x1509x89 | - | | | |
| | P-12 | 240x96 | - | | | |
| | P-13 | 63x61 | - | | | |
| | P-14 | 72x61 | - | | | |
| McKittrick 1-3 (east side) | CP-1 | 93x74 | - | Yes | Yes | |
| | CP-2 | 99x77 | - | | | |
| | CP-3 | 97x76 | - | | | |
| | P-1 | 1574x175x1706x102 | - | No | Yes | |
| | P-2 | 1615x80x1636x88 | 276x92x251x96 | | | |
| | P-3 | 1854x83x1872x96 | 96x48 | | | |
| | P-4 | 1872x86x1877x90 | 90x48 | | | |
| | P-5 | 1878x79x1871x92 | 92x48 | | | |
| | P-6 | 1874x81x1873x91 | 91x48 | | | |
| | P-7 | 1866x86x1873x92 | 92x48 | | | |
| | P-8 | 1870c80x1875x89 | 89x48 | | | |
| | P-9 | 1863x82x1867x89 | 89x48 | | | |
| | P-10 | 1857x87x1864x91 | 91x48 | | | |
| | P-11 | 1862x84x1864x92 | 92x48 | | | |
| | P-12 | 1860x80x1869x89 | 89x48 | | | |
| | P-13 | 1859x86x1862x90 | 89x48 | | | |
| | P-14 | 1853x84x1843x101 | 101x48 | | | |
| | P-15 | 1836x80x1845x85 | 95x48 | | | |
| | P-16 | 1830x82x1830x94 | 94x48 | | | |
| | P-17 | 1828x82x1829x92 | 92x48 | | | |
| | P-18 | 1826x79x1827x91 | 91x48 | | | |
| | P-19 | 1829x86x1828x92 | 91x48 | | | |
| | P-20 | 1824x81x1815x91 | 91x48 | | | |
| | P-21 | 1623x83x1590x96 | 96x48 | | | |
| | P-22 | 1587x96x1555x91 | 91x48 | | | |
| | P-23 | 1535x87x1502x91 | 91x48 | | | |
| | P-24 | 1483x91x1453x86 | 86x48 | | | |
| | P-25 | 1477x85x1435x93 | - | | | |
| | P-26 | 119x118 | - | | | |
| | P-27 | 225x119 | - | | | |
| | P-28 | 156x84 | - | | | |
| | P-29 | 204x84 | - | | | |

The McKittrick 1 & 1-3 Facility has an existing groundwater monitoring network comprised of five shallow monitoring wells and one deep monitoring well. All six groundwater monitoring wells appear to be impacted by oil field produced wastewater as described below.

McKittrick 1 & 1-3 Facility groundwater monitoring network well information:

| Well ID | Installed | Ground elevation (ft-amsl) | Top of casing (ft-amsl) | Depth to water 11/30/2016 (ft-btoc) | Groundwater elevation 11/30/2016 (ft-amsl) | Total Depth (ft-bgs) | Screen Interval (ft-bgs) | Screen Interval (ft-amsl) |
|---|---|---|---|---|---|---|---|---|
| CYM-17N1 | Nov 2002 | 451.5 | 452.9 | 127.2 | 325.7 | 240 | 105-165 | 347-287 |
| CYM-19H1 | Nov 2002 | 469.2 | 471.2 | 119.3 | 351.9 | 245 | 115-155 | 354-314 |
| CYM-21D1 | Nov 2002 | 427.1 | 429.1 | 279.5 | 149.6 | 300 | 274-294 | 153-133 |
| CYM-17K1 | Aug 2006 | 427.9 | 430.9 | 157.9 | 273.0 | 210 | 150-200 | 278-228 |
| CYM-17M1 | Sep 2006 | 446.5 | 449.5 | 171.1 | 278.4 | 197 | 155-185 | 292-262 |
| CYM-17Q1 | Aug 2006 | 437.6 | 440.6 | 200.0 | 240.6 | 208 | 160-200 | 278-238 |

According to monitoring reports submitted by VWMC, the McKittrick 1 & 1-3 unlined ponds are on alluvium that extends down to approximately 380 feet above mean sea level (AMSL). During the monitoring well installation hydrogeological investigation, alluvium underneath and nearest the disposal ponds appeared to be saturated with produced wastewater down to a clay layer known as the Corcoran Clay Equivalent (CCE) layer at approximately 360 to 380 AMSL. Monitoring reports depict a wastewater plume directly beneath the ponds percolating through the CCE. The Upper Tulare Sand is encountered beneath the CCE from approximately 360 to 311 feet AMSL. Data submitted indicates that the Upper Tulare Sand contains a mix of native groundwater and produced wastewater from discharges to the McKittrick 1 & 1-3 Facility disposal ponds. In 2006, three sentinel wells (CYM-17K1, CYM-17M1, and CYM-17Q1) were drilled down structure of the produced wastewater disposal ponds and were originally drilled dry.

Semiannual monitoring includes sampling and analysis of the six groundwater monitoring wells and oil field produced wastewater sampling from the McKittrick 1-3 disposal ponds. Shallow groundwater monitoring wells CYM-17K1, CYM-17M1, CYM-17N1, CYM-17Q1, and CYM-19H1 are completed in the Upper Tulare sand unit, and CYM-21D1 is completed in the Lower Tulare sand unit that is reportedly hydraulically separated from the upper sand unit by an extensive clay unit called the Upper Tulare Clay which is found at approximately 311 to 288 feet AMSL.

In May 2014, groundwater was detected in sentinel wells CYM-17K1, CYM-17M1, and CYM-17Q1. The quality of this groundwater is discussed further below.

The Discharger's Monitoring Report dated 30 January 2017 states that "water sampled from CYM-17K1, CYM-17M1, CYM-17N1,CYM-17Q1,and CYM-19H1 plot close to pond samples with respect to the sodium and chloride ions, indicating that they are affected by the produced water but also have higher concentrations of calcium and sulfate, which is typical of the local groundwater. The first appearance of groundwater in wells CYM-17K1, CYM-17M1 and CYM-17Q1 also represents a mix of native groundwater and water recharged in the ponds. Calculated groundwater velocities (0.33 ft/day) and the distances from well CYM-17N1 to these sentinel wells indicates the presence of water that was disposed of in the ponds over 40 years ago" (Disposal to ponds began in the late 50s).

The Upper Tulare Clay separates the Upper Tulare Sand groundwater zone from the Lower Tulare groundwater zone. The Lower Tulare groundwater zone extends from approximately 288 feet AMSL

to at least 200 feet AMSL. The Discharger's Second Semi-Annual 2016 Monitoring Report dated 30 January 2017, states that "Long-term trends show an increase in several constituents in the water sampled from CYM-21 D1. Increasing concentrations of chloride, sodium, TDS, and magnesium were measured from 2012 to 2016; and sulfate and calcium have upward trends beginning in 2011. Boron trends at well CYM-21 D1 did show a slight increase during 2013, 2014 and May 2016 but decreased during the current November 2016 sampling event. Long-term trend plots show that oxygen and hydrogen isotope compositions at well CYM-21 D1 are becoming slightly more fractionated, starting in 2011." Well CYM-21D1 is the only monitoring well drilled and screened in the Lower Tulare sand unit, and the increasing chemical constituent concentrations indicate it may also be impacted by produced wastewater discharged to the Facility's disposal ponds.

According to the State's database *GeoTracker Groundwater Ambient Monitoring and Assessment Program* (GeoTracker Gama), the closest groundwater well data (excluding site's groundwater monitoring wells) to the McKittrick 1 & 1-3 Facility ponds are monitoring wells approximately 1.98 miles (GID: 00600632 & 00600632), and 2.6 miles (GID: W0601502763) northeast on the Clean Harbors Buttonwillow, LLC hazardous waste disposal facility at 2500 West Lokern Road (Clean Harbors Facility). Early operations at the Clean Harbors Facility included the use of unlined ponds for liquid waste storage and disposal. By the mid 1990's, all unlined ponds had been clean closed and the Clean Harbors Facility altered operations to utilize lined waste management units. The Clean Harbors Facility is regulated by Waste Discharge Requirements (WDRs) Order No. 96-094 and has a groundwater monitoring network that monitors three groundwater zones. The three zones are known as the Lower Water Table Zone, the Intermediate Perched Zone, and the Upper Perched Zone. The Upper Perched Zone appears to be isolated from the Intermediate Perched Zone by a clay aquitard layer. In 7 February 2017, the Upper Perched Zone groundwater flow was reported to be predominantly to the northeast: the Intermediate Perched Zone groundwater flow was reported to be predominantly to the east; and the lower water table zone groundwater flow was reported to be predominantly to the northeast.

The following table includes Clean Harbors Facility groundwater monitoring well network information dated 6 February 2017:

| Groundwater Zone | Background well | Screen Interval (ft AMSL) | Groundwater elevation (ft MSL) | Point of Compliance well | Screen Interval (ft AMSL) | Groundwater elevation (ft MSL) |
|---|---|---|---|---|---|---|
| Upper Perched Zone | MW-QU | 215.2 – 205.2 | 216.87 | MW-131RU | 212.6 – 182.6 | 211.90 |
| | MW-TU | 210.9 – 200.9 | 214.64 | MW-145U | 228.2 – 218.2 | 217.89 |
| | MW-130U | 243.8 – 223.8 | Dry | MW-146RU | 224.6 – 194.6 | 212.18 |
| | MW-143U | 237.6 – 217.6 | 219.59 | MW-147RU | 217.5 – 187.5 | 211.82 |
| | | | | MW-158U | 243.9 – 213.9 | 219.66 |
| | | | | MW-159U | 238.1 – 208.1 | 211.94 |
| | | | | MW-160U | 242.6 – 222.6 | Dry |
| | | | | MW-161U | 242.6 – 222.6 | Dry |
| Intermediate Perched Zone | MW-148I | 187.7 – 172.7 | 181.07 | MW-137R1 | 183.6 – 168.6 | 171.00 |
| | MW-149RI | 140.8 – 125.8 | 170.49 | | | |
| Lower Water Table Zone | MW-PRL | 101.57 – 71.57 | 86.98 | MW-151RL | 110.77 – 80.77 | 83.96 |
| | MW-102RL | 134.7 – 104.7 | 123.13 | MW-152RL | 119.4 – 89.4 | 89.17* |
| | MW-119RL | 127.1 – 97.1 | 102.58 | MW-153RL | 107.06 – 77.06 | 90.11 |
| | | | | MW-163L | 119.55 – 89.55 | 89.77 |
| | | | | MW-164RL | 77.47 – 42.47 | 85.15 |
| | | | | MW-165RL | 47.73 – 27.73 | 91.51 |
| | | | | MW-166L | 113.9 – 83.9 | 91.20 |
| | | | | MW-167L | 114.9 – 84.9 | 92.15 |
| | | | | MW-168L | 114.1 – 84.3 | 92.41 |
| | | | | MW-169L | 118.4 – 88.41 | 92.02 |
| | | | | MW-170L | 126.59 – 96.59 | 110.31 |

* This fluid level is below the base of the screened interval, and most likely represents residual groundwater trapped in the well sump. The water level in this well may not be included in site potentiometric surface maps.

Clean Harbors Facility's Quarterly monitoring report data shows monitoring well MW-148I (intermediate zone) is increasing in TDS and chloride concentrations and MW-102RL (lower zone) is increasing in TDS concentration. MW-148I and MW-102RL are upgradient on the Clean Harbors Facility site, and down gradient/structure from the McKittrick 1 & 1-3 Facility disposal ponds. The increasing TDS and chloride concentrations in these wells indicates they may be influenced by the produced wastewater plume emanating from Valley Water Management Company's McKittrick 1 & 1-3 ponds.

## MONITORING

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. All analyses shall be performed in accordance with applicable sections of ***Standard Provisions and Reporting Requirements for Waste Discharge Requirements***, dated 1 March 1991 (Standard Provisions) (Attached).

Field test instruments (such as a pH meter) may be used provided that the operator is trained in the proper use of the instrument and each instrument is serviced and/or calibrated at the recommended frequency by the manufacturer or in accordance with manufacturer instructions.

Analytical procedures shall comply with the methods and holding times specified in the following: *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA); *Test Methods for Evaluating Solid Waste* (EPA); *Methods for Chemical Analysis of Water and Wastes* (EPA); *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA); *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125). Approved editions shall be those that are approved for use by the United States Environmental Protection Agency or the State Water Board's Environmental Laboratory Accreditation Program. The Discharger may propose alternative methods for approval by the Executive Officer.

A complete list of substances which are tested for and reported on by the testing laboratory shall be provided to the Central Valley Water Board. All peaks must be reported. In addition, both the method detection limit (MDL) and the practical quantification limit (PQL) shall be reported. Detection limits shall be equal to or more precise than USEPA methodologies. Analysis with an MDL greater than the most stringent drinking water standard that results in non-detection needs to be reanalyzed with the MDL set lower than the drinking water standard, if possible, or at the lowest level achievable by the laboratory. If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent below the RL (or PQL), but above the MDL, shall be reported and flagged as estimated. All quality assurance/quality control (QA/QC) samples must be run on the same dates as when samples were actually analyzed. Proper chain of custody procedures must be followed and a copy of the completed chain of custody form shall be submitted with the report. All analyses must be performed by an Environmental Laboratory Accreditation Program (ELAP) certified laboratory.

If monitoring consistently shows no significant variation in magnitude of a constituent concentration or parameter after a statistically significant number of sampling events, the Discharger may request this MRP be revised by the Executive Officer to reduce monitoring frequency or minimize the list of constituents. The proposal must include adequate technical justification for reduction in monitoring frequency.

Monitoring requirements include the periodic visual inspection of the Facility to ensure continued compliance with the Order. The MRP also requires submittal of information regarding the use of all chemicals used during well drilling, installation, operation, and maintenance activities associated with each well generating waste materials (liquids and solids) that are discharged to the McKittrick 1 & 1-3 Facility Ponds and regulated under this Order.

This MRP requires the Discharger to keep and maintain records for five years from the date the monitoring activities occurred and to prepare and submit reports containing the results of monitoring specified below. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Central Valley Water Board. Except where indicated, all monitoring must begin immediately.

## PRODUCED WASTEWATER MONITORING

Produced wastewater samples shall be representative of the volume and nature of the discharges. The Discharger shall maintain all sampling and analytical results: date, exact place, and time of sampling; dates analyses were performed; analyst's name; analytical techniques used; and results of all analyses.

The Discharger shall label all pipelines discharging production wastewater into the McKittrick 1 & 1-3 Facility. Identifying labels shall be located within five feet of the pipeline and shall include at least the following: Operator, Oil Field, and corresponding Facilities.

If the discharge is intermittent rather than continuous, then on the first day of each such intermittent discharge, the Discharger shall monitor and record data for all of the constituents listed below, after which the frequencies of analysis given in the schedule shall apply for the duration of each such intermittent discharge.

## DISCHARGE 001

The Discharger shall monitor the volume and quality of produced wastewater discharged to the McKittrick 1 & 1-3 disposal ponds from all sources. Produced wastewater samples shall be collected downstream from the treatment system and prior to discharge to land (roads, ponds, etc.) (Discharge 001).

Produced wastewater monitoring for Discharge 001 shall be collected from the sample points described below and from all additional discharge points not included below and shall include at least the following:

| Discharge ID | Lease | Sample point location |
|---|---|---|
| 001a | McKittrick 1 | Pipeline 1 discharge from Freeport-McMoRan Oil & Gas LLC |
| 001b | | Pipeline 2 discharge from California Resources Production Corporation |
| 001c | | Pipeline 3 discharge from California Resources Production Corporation |
| 001d | McKittrick 1-3 | Pipeline 1 discharge from Freeport-McMoRan Oil & Gas LLC |
| 001x[1] | Name | Description |

[1] Discharger shall label, add, monitor, and sample all existing discharge points not described in the table above which have the potential to discharge to the Facility's disposal ponds.

| Constituent/Parameter | Units | Sample Type | Frequency |
|---|---|---|---|
| Flow | MGD and Barrels/day | Metered[1] | Continuous |
| Table I – Analytical parameters | Varies | Grab | Varies |

[1] Flow may be measured with an appropriate engineered alternative if approved in writing by the Central Valley Regional Board Executive Officer.

## DISCHARGE 002

Disposal pond produced wastewater samples shall be collected in the pond at the distal end of the system (Discharge 002), or if ponds are operated in parallel, in the pond that has contained produced wastewater for the longest period of time (i.e., longest retention time) (Discharge 002) from each Facility (McKittrick 1 and from McKittrick 1-3).

Produced wastewater monitoring for Discharge 002 shall include at least the following:

| Discharge ID | Lease | Sample point location |
|---|---|---|
| 002a | McKittrick 1 | Wastewater from the pond with the longest residence time |
| 002b | McKittrick 1-3 | Wastewater from the pond with the longest residence time |

| Constituent/Parameter | Units | Sample Type | Frequency |
|---|---|---|---|
| Table I – Analytical parameters | Varies | Grab | Varies |

## CHEMICAL AND ADDITIVE MONITORING

To adequately characterize discharges into, and ultimately from, the McKittrick 1, and McKittrick 1-3 Facilities the Discharger is responsible for reporting all chemicals and additives, including those that may have entered the produced wastewater stream prior to being discharged to the Facilities. The Discharger shall obtain from oil field operators that discharge to the Facilities and provide to the Central Valley Water Board the following for all chemicals and additives used at all leases and facilities that discharge produced water to the McKittrick 1 and McKittrick 1-3 Facilities:

| Requirement | Frequency |
|---|---|
| A list of all chemicals and additives used. | **Quarterly** |
| The volume and mass of each chemical and additive used in gallons and kilograms, respectively. | **Quarterly** |
| A list of the leases and facilities where the chemicals and additives are being used. | **Quarterly** |
| Safety Data Sheets (SDSs) or Material Safety Data Sheets (MSDSs) for each chemical and/or additive used during the year. | **Annually** |

## SOLID WASTE MONITORING

The Discharger shall monitor the generation and use of solid wastes, including sludges generated at the Facility from activities, such as tank, pipe, or pond maintenance. Solid waste volumes, disposal methods, disposal facilities, and analytical results from waste characterization shall be reported in the subsequent quarterly and annual monitoring reports.

The Discharger shall provide the volumes and destination, including facility permit numbers, for all solid wastes, including hazardous wastes, which are disposed of off-site.

The disposal of solid waste on-site requires the submittal of a Solid Waste Management Plan for review and approval by the Central Valley Water Board. At a minimum, the Solid Waste Management Plan shall include the following:

1. Sampling frequencies,
2. Average volume of solid waste generated annually,

3. Solid wastes criteria for on-site disposal (e.g., non-hazardous and not within 100 feet of surface waterways),
4. Disposal method(s) and procedures,
5. Disposal location(s), and
6. Reporting requirements.

Prior to the disposal of solid wastes on-site, the Solid Waste Management Plan must be approved, in writing, by the Central Valley Water Board. Modifications to the Solid Waste Management Plan need to be submitted in an addendum report that requires written approval by the Central Valley Water Board prior to implementation. On-site solid waste monitoring shall consist of the reporting requirements specified in the approved Solid Waste Management Plan.

The Discharger shall provide the volumes and locations of all solid wastes disposed on-site and include in the quarterly reports a demonstration that the applications comply with an approved solid waste management plan.

## FACILITY MONITORING

Permanent markers or equivalent shall be in place with calibrations indicating the pond water level at design capacity and available operational freeboard. Freeboard shall be maintained at a two feet minimum. The freeboard shall be monitored on all ponds to the nearest tenth of a foot **monthly** and results **included in the quarterly report**.

Annually, prior to the anticipated rainy season, but **no later than 30 September**, the Discharger shall conduct an inspection of the Facility. The inspection shall assess repair and maintenance needed for: drainage control systems; slope failure; groundwater monitoring wells, oil booms, pond netting, or any change in site conditions that could impair the integrity of the waste management unit or precipitation and drainage control structures; and shall assess preparedness for winter conditions including, but not limited to, erosion and sedimentation control. The Discharger shall take photos of the Facility and of any problem areas before and after repairs. Any necessary construction, maintenance, or repairs shall be **completed by 31 October**. Annual Facility inspection reporting shall be **submitted by 30 November**.

The Discharger shall inspect all precipitation diversion and drainage facilities for damage **within 7 days** following major storm events (e.g., a storm that causes continual runoff for at least one hour) capable of causing flooding, damage, or significant erosion. The Discharger shall take photos of any problem areas before and after repairs. Necessary repairs shall be completed **within 30 days** of the inspection. Notification and reporting requirements for major storm events shall be conducted as required in the Reporting Requirements of this MRP and shall be reported in the quarterly monitoring report following the major storm event.

The Discharger shall monitor and record on-site rainfall data using an automated rainfall gauge or an acceptable alternative. Data shall be used in establishing the severity of storm events and wet seasons for comparison with design parameters used for waste management unit design and conveyance and drainage design. Daily data and on-site observation shall be used for establishing the need for inspection and repairs after major storm events. Rainfall data shall be reported in the quarterly monitoring reports, as required by this MRP.

## GROUNDWATER WELL SURVEY

**Within 60 days** of the signature date of this MRP, the Discharger shall conduct a well survey to identify all water supply wells within one-mile of the ponds that receive produced wastewater or other authorized discharges. **Within 90 days** of the signature date of this MRP, the Discharger shall sample identified domestic water supply wells and analyze the samples for the waste constituents listed in Table I of this MRP. Groundwater well survey results (including well location and designated use for all water supply wells within one mile) and analytical results shall be reported in the quarterly report following the groundwater sample collection date. If access to private property is requested and denied, a demonstration of that denial is required.

## GROUNDWATER MONITORING

The Discharger shall operate and maintain a groundwater monitoring system. As of May 2014, all three sentinel wells installed in 2006 (CYM-17K1, CYM-17M1, and CYM-17Q1) have contained water. This indicates that the plume of produced wastewater perched on the Upper Tulare clay has reached and extended beyond the sentinel wells. The Discharger needs to perform additional work to delineate the lateral and vertical extent of the produced wastewater plume.

After measuring water levels and prior to collecting samples, each monitoring well shall be adequately purged to remove water that has been standing within the well screen and casing that may not be chemically representative of formation water. Depending on the hydraulic conductivity of the geologic setting, the volume removed during purging is typically from 3 to 5 volumes of the standing water within the well casing and screen, or additionally the filter pack pore volume.

The Discharger shall monitor groundwater wells for the following:

| Constituent/Parameter | Units | Sample Type | Frequency |
|---|---|---|---|
| Depth to groundwater | Feet[1] | Measured | **Quarterly** |
| Groundwater elevation | Feet[1] | Calculated | **Quarterly** |
| Table I – Analytical parameters | Varies | Grab | **Quarterly** |

[1] Recorded to one hundredth of a foot

**Within 30 days** of notification that permission to sample a well(s) is not granted or is revoked, the Discharger shall submit for review and approval by Central Valley Water staff a report that either: (1) demonstrates that a reduction in the number of monitoring well(s) will not impair the ability to clearly and accurately assess potential groundwater impacts, or (2) proposes the installation of a new monitoring well(s) or use of another existing well to offset the well(s) no longer able to be sampled.

## GROUNDWATER MONITORING WELL NETWORK INSTALLATION

The existing groundwater monitoring system has not fully delineated the lateral and vertical extent of the produced wastewater plume. A Monitoring Well Installation and Sampling Plan (MWISP) shall be submitted **within 60 days** of the signature date of this MRP. The MWISP shall provide for the

installation of an appropriate number of upgradient/up-structure dip groundwater monitoring wells to identify background water quality and an appropriate number of downgradient/down-structure wells to delineate the plume of produced wastewater emanating from the Facility ponds.

At a minimum, the MWISP shall include the information below.

1. General Information:
   a. Topographic map showing any existing nearby (about 2,000 feet) domestic, irrigation, and municipal supply wells and monitoring wells known to the Discharger, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features, as appropriate.
   b. Site plan showing proposed well locations, other existing wells, unused and/or abandoned wells, major physical site structures, any waste handling facilities, irrigated cropland and pasture, and on-site surface water features.
   c. Rationale for the number of proposed monitoring wells, their locations and depths, and identification of anticipated depth to groundwater.
   d. If, proposing to use existing groundwater wells as part of the MWISP, include well screen intervals in relation to groundwater levels, current well use, and rational for well selection.
   e. Local permitting information (as required for drilling, well seals, boring/well abandonment).
   f. Drilling details, including methods and types of equipment for drilling and logging activities. Equipment decontamination procedures (as appropriate) should be described.
   g. Health and Safety Plan.

2. Proposed Drilling Details:
   a. Drilling techniques.
   b. Well logging method.
   c. Proposed Monitoring Well Design - all proposed well construction information must be displayed on a construction diagram or schematic to accurately identify the following:
   d. Well depth.
   e. Borehole depth and diameter.
   f. Well construction materials.
   g. Casing material and diameter – include conductor casing, if appropriate.
   h. Location and length of perforation interval, size of perforations, and rationale.
   i. Location and thickness of filter pack, type and size of filter pack material, and rationale.
   j. Location and thickness of bentonite seal.
   k. Location, thickness, and type of annular seal.
   l. Surface seal depth and material.
   m. Type of well cap(s).
   n. Type of well surface completion.
   o. Well protection devices (such as below-grade water tight-vaults, locking steel monument, bollards, etc.).

3. Proposed Monitoring Well Development:
   a. Schedule for development (not less than 48 hours or more than 10 days after well completion).
   b. Method of development.

c. Method of determining when development is complete.
d. Parameters to be monitored during development.
e. Method for storage and disposal of development water.

4. Proposed Surveying:
   a. How horizontal and vertical position of each monitoring well will be determined.
   b. The accuracy of horizontal and vertical measurements to be obtained.
   c. The California licensed professional (licensed land surveyor or civil engineer) to perform the survey.

5. Proposed Groundwater Monitoring:
   a. Schedule (at least 48 hours after well development).
   b. Depth to groundwater measuring equipment (e.g., electric sounder or chalked tape capable of ±0.01-foot measurements).
   c. Well purging method, equipment, and amount of purge water.
   d. Sample collection (e.g., bottles and preservation methods), handling procedures, and holding times.
   e. Quality assurance/quality control (QA/QC) procedures (as appropriate).
   f. Analytical procedures.
   g. Equipment decontamination procedures (as appropriate).

6. Proposed Schedule:
   a. Fieldwork.
   b. Laboratory analyses.
   c. Report submittal.

## MONITORING WELL INSTALLATION COMPLETION REPORT

Within **90 days** of installation of a groundwater monitoring well(s), a Monitoring Well Installation Completion Report (MWICR) shall be submitted. At a minimum, the MWICR shall summarize the activities as described below.

1. General Information:
   a. Brief overview of field activities including well installation summary (such as number, depths), and description and resolution of difficulties encountered during field program.
   b. Topographic map showing any existing nearby domestic, irrigation, and municipal supply wells and monitoring wells, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features.
   c. Site plan showing monitoring well locations, other existing wells, unused and/or abandoned wells, major physical site structures, any waste handling facilities, and on-site surface water features.
   d. Period of field activities and milestone events (e.g., distinguish between dates of well installation, development, and sampling).

2. Monitoring Well Construction:
   a. Number and depths of monitoring wells installed.
   b. Monitoring well identification (i.e., numbers).
   c. Date(s) of drilling and well installation.
   d. Description of monitoring well locations including field-implemented changes (from proposed locations) due to physical obstacles or safety hazards.
   e. Description of drilling and construction, including equipment, methods, and difficulties encountered (such as hole collapse, lost circulation, need for fishing).
   f. Name of drilling company, driller, and logger (site geologist to be identified).
   g. As-built for each monitoring well with the following details:
      i. Well identification.
      ii. Total borehole and well depth.
      iii. Date of installation.
      iv. Boring diameter.
      v. Casing material and diameter (include conductor casing, if appropriate).
      vi. Location and thickness of slotted casing, perforation size.
      vii. Location, thickness, type, and size of filter pack.
      viii. Location and thickness of bentonite seal.
      ix. Location, thickness, and type of annular seal.
      x. Depth of surface seal.
      xi. Type of well cap.
      xii. Type of surface completion.
      xiii. Depth to water (note any rises in water level from initial measurement) and date of measurement.
      xiv. Well protection device (such as below-grade water tight vaults, stovepipe, bollards, etc).
   h. All depth to groundwater measurements during field program.
   i. Field notes from drilling and installation activities (e.g., all subcontractor dailies, as appropriate).
   j. Construction summary table of pertinent information such as date of installation, well depth, casing diameter, screen interval, bentonite seal interval, and well elevation.

3. Monitoring Well Development:
   a. Date(s) and time of development.
   b. Name of developer.
   c. Method of development.
   d. Methods used to identify completion of development.
   e. Development log: volume of water purged and measurements of temperature, pH and electrical conductivity during and after development.
   f. Disposition of development water.
   g. Field notes (such as bailing to dryness, recovery time, number of development cycles).

4. Monitoring Well Survey:
   a. Identify coordinate system or reference points used.
   b. Description of measuring points (i.e. ground surface, top of casing, etc.).
   c. Horizontal and vertical coordinates of well casing with cap removed.

d. Name, license number, and signature of California licensed professional who conducted survey.
e. Surveyor's field notes.
f. Tabulated survey data.

## REPORTING REQUIREMENTS

All monitoring results shall be reported in **Quarterly Monitoring Reports,** which are due by the first day of the second month after the calendar quarter. Therefore, monitoring reports are due as follows:

| | |
|---|---|
| First Quarter Monitoring Report (January – March): | **1 May** |
| Second Quarter Monitoring Report (April – June): | **1 August** |
| Third Quarter Monitoring Report (July – September): | **1 November** |
| Fourth Quarter Monitoring Report (October – December): | **1 February** |
| Facility Inspection Report (Completed by 30 October): | **30 November** |

**A transmittal letter shall accompany each monitoring report**. The transmittal letter shall discuss any exceedances of applicable effluent or groundwater limitations or other instances of non-compliance that occurred during the reporting period and all corrective actions taken or planned, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions or a time schedule for implementing the corrective actions, reference to the previous correspondence is satisfactory. **Reports shall be submitted whether or not there is a discharge**.

The Discharger shall **submit electronic copies** of all work plans, reports, analytical results, and groundwater elevation data via electronic mail to CentralValleyFresno@waterboards.ca.gov and over the Internet to the State Water Board Geographic Environmental Information Management System database (GeoTracker) at http://www.waterboards.ca.gov/ust/electronic_submittal/index.shtml

A frequently asked question document for GeoTracker can be found at http://www.waterboards.ca.gov/ust/electronic_submittal/docs/faq.pdf

Electronic submittals to GeoTracker shall comply with GeoTracker standards and procedures, as specified on the State Water Board's web site. All submittals including uploads to GeoTracker shall be completed on or prior to the due date.

In addition, a hardcopy of each document shall be submitted to:

California Regional Water Quality Control Board
Central Valley Region
1685 E Street, Suite 200
Fresno, CA 93706
Attn: Ronald E. Holcomb

GeoTracker Site Global ID: **WDR100037491**
CIWQS Place ID: **209130** for **BELGIAN ANTICLINE, MCKITTRICK 1 & 1-3**

The following information is to be included on all monitoring reports, as well as report transmittal letters:

Valley Water Management Company
Belgian Anticline, McKittrick 1 & 1-3
Waste Discharge Requirements 69-19901
Monitoring and Reporting Program R5-2017-0806
GeoTracker Site Global ID: WDR100037491
CIWQS Place ID: 209130

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible for all historical and current data. The data shall be summarized in such a manner that illustrates clearly, whether the Discharger complies with waste discharge requirements.

If the Discharger monitors any constituent at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the quarterly monitoring reports. Such increased frequency shall be indicated on the quarterly monitoring reports.

All monitoring reports shall comply with the signatory requirements in Standard Provision B.3. All monitoring reports that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

A. **All Quarterly Monitoring Reports shall include the following:**

**Produced Wastewater reporting:**

1. Tabular summary of current and historical results of produced wastewater discharges as specified on pages 7 and 8.
2. For each month of the quarter, calculation of monthly effluent flow and the historical monthly effluent flow for the last 12-months. Historical annual effluent flow data in tabular summary.
3. For each quarter, include a current and historical table of **all data** for each wastewater sample point. In addition, each quarter, include a data table for current and historical wastewater sample data for all electrical conductivity (EC), total dissolved solids (TDS), boron, sodium, and chloride concentrations.

**Facility reporting:**

1. Monthly freeboard results as specified on MRP page 9.
2. The results of Facility inspections conducted during the quarter as specified on MRP page 9.
3. Rainfall data as specified on MRP page 9.

**Chemical and Additive reporting:**

1. Tabular summary of current and historical data required as specified on MRP page 7.
2. Safety Data Sheets for all chemicals and additives that are identified in quarterly monitoring reports for that respective calendar year.
3. Tabular summary of current and historical annual volume and mass for all chemicals and additives.
4. Summary that identifies if any chemicals and additives were detected in produced wastewater discharge to the Facility ponds or groundwater.

**Solid Waste reporting:**

1. The results of solid waste monitoring specified on MRP pages 8 and 9, including the nature, volume, and weight in dry tons of solid waste produced during the quarter.
2. Tabular summary of current and historical analytical results characterizing the solid waste, and particularly, whether the waste is hazardous as defined in Title 22, CCR, Section 66261.
3. The method of disposal and disposal locations of the solid wastes.
4. If wastes are hauled to a disposal facility, evidence that the disposal facility is properly permitted and submit copies of waste manifest.

**Groundwater reporting:**

1. The results of groundwater monitoring specified on page 10.
2. For each monitoring well, a table showing all constituent concentrations for current and historical concentrations. In addition, each quarter, include a data table for current and historical groundwater sample data for all electrical conductivity (EC), total dissolved solids (TDS), boron, sodium, and chloride concentrations.
3. A groundwater contour map based on groundwater elevations for that quarter. The map shall show the gradient and direction of groundwater flow under/around the facility and/or effluent disposal area(s). The map shall also include the locations of monitoring wells and wastewater storage and discharge areas.
4. Provide a current isoconcentration map of groundwater data for EC, chloride, and boron concentrations.

**Laboratory Reports:**

1. Laboratory reports submitted in compliance with this MRP shall be accompanied by an **Excel file** that includes the analytical data found in the laboratory report. Excel files need to be generated by the laboratory, or compiled by the Discharger. At a minimum, the Excel file shall include the constituent name, sample location, sample name, sample date, analysis date, analytical method, result, unit, MDL, RL, and dilution factor. Excel files shall either be mailed to the Central Valley Water Board Office in an electronic storage device, or sent via electronic mail to CentralValleyFresno@waterboards.ca.gov. Either method of delivery needs to include, at a minimum, a copy of the transmittal letter.

B. **Fourth Quarter Monitoring Reports**, in addition to the above, by 1 February of each year, the Discharger shall submit a written report to the Executive Officer containing the following:

**Facility information:**

1. The names and general responsibilities of all persons employed to operate the produced water treatment systems.

2. The names and telephone numbers of persons to contact regarding the Facility for emergency and routine situations.
3. A statement certifying when the flow meters and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration (Standard Provision C.4).
4. A summary of all spills/releases, if any, that occurred during the year at the facility, tasks undertaken in response to the spills, and the results of the tasks undertaken.
5. A summary of the chemical and additive volume and mass use data collected under the Chemical And Additive Monitoring section, the required Material Safety Data Sheets (MDSs) / Safety Data Sheets (SDSs) sheets, and a discussion of whether any of the chemicals or additives were found in effluent discharges.
6. Tabular summary of current and historical total annual flow for Produced Wastewater Monitoring.
7. Provide a list of oil producing leases and corresponding operating company names whose produced wastewater is discharged to the ponds in the Facility.
8. A flow chart (i.e. diagram that clearly illustrates all processes that produced wastewater undergoes within the Facility up to discharge to the ponds) and map of the following:
    - Facility within the oil field,
    - Facility/Lease boundaries
    - Facility produced wastewater distribution network with all discharge points to the ponds or land.
    - Wastewater flow direction within the Facility's ponds.

**Requesting Administrative Review by the State Water Board.** Any person aggrieved by an action of the Central Valley Water Board that is subject to review as set forth in Water Code section 13320(a), may petition the State Water Board to review the action. Any petition must be made in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 and following. The State Water Board must receive the petition within thirty (30) days of the date the action was taken, except that if the thirtieth day following the date the action was taken falls on a Saturday, Sunday, or state holiday, then the State Water Board must receive the petition by 5:00 p.m. on the next business day. Copies of the laws and regulations applicable to filing petitions may be found on the internet at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml or will be provided upon request.

**Modifications.** Any modification to this Monitoring and Reporting Program shall be in writing and approved by the Assistant Executive Officer, including any extensions. Any written extension request by the Discharger shall include justification for the delay.

This monitoring and reporting program shall be effective on the signature date below.

Ordered by: Clay L. Rodgers
for PAMELA C. CREEDON, Executive Officer
6/26/2017
(Date)

**Table I – Analytical Parameters**

| Parameters | Units | Monitoring Frequency | US EPA or other Method | Reporting Frequency |
|---|---|---|---|---|
| **Field Parameters** | | | | |
| Temperature | °F[1] | Quarterly | Meter | Quarterly |
| Electrical Conductivity (EC) | µmhos/cm[2] | Quarterly | Meter | Quarterly |
| pH | pH units | Quarterly | Meter | Quarterly |
| **Monitoring Parameters** | | | | |
| Total Dissolved Solids (TDS) | mg/L[3] | Quarterly | 160.1 | Quarterly |
| Total Suspended Solids (TSS)[4] | mg/L | Quarterly | 160.2 | Quarterly |
| Electrical Conductivity (EC) | µmhos/cm | Quarterly | 2510B | Quarterly |
| Total Organic Carbon (TOC) | mg/L | Quarterly | 415.3 | Quarterly |
| Boron, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| **Standard Minerals** | | | | |
| Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Bicarbonate Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Carbonate Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Hydroxide Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Sulfate, dissolved | mg/L | Quarterly | 300.0 | Quarterly |
| Nitrate-N, dissolved | mg/L | Quarterly | 300.0 | Quarterly |
| Calcium, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| Magnesium, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| Sodium, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| Potassium | mg/L | Quarterly | 6010B | Quarterly |
| Chloride | mg/L | Quarterly | 300.0 | Quarterly |
| **PAHs**[5] | µg/L[6] | Quarterly | 8270 | Quarterly |
| **Total Petroleum Hydrocarbons (TPH)** | µg/L | Quarterly | 418.1 | Quarterly |
| **Volatile Organic Compounds** | | | | |
| Full Scan | µg/L | Quarterly | 8260B | Quarterly |
| **Oil and Grease** | mg/L | Quarterly | 1664A | Quarterly |
| **Stable Isotopes** | | | | |
| Oxygen ($^{18}O$) | pCi/L[7] | Quarterly | 900.0 | Quarterly |
| Deuterium (Hydrogen 2, $^{2}H$, or D) | pCi/L | Quarterly | 900.0 | Quarterly |
| **Radionuclides** | | | | |
| Radium-226 | pCi/L | Quarterly | SM[8] 7500-Ra | Quarterly |
| Radium-228 | pCi/L | Quarterly | SM 7500-Ra | Quarterly |

**Table I – Analytical Parameters (continued)**

| Parameters | Units | Monitoring Frequency | US EPA or other Method | Reporting Frequency |
|---|---|---|---|---|
| **Radionuclides** | | | | |
| Gross Alpha particle (excluding radon and uranium) | pCi/L | Quarterly | SM 7110 | Quarterly |
| **Constituents of Concern** | | | | |
| Lithium | mg/L | Quarterly | 200.7 | Quarterly |
| Strontium | mg/L | Quarterly | 200.7 | Quarterly |
| Iron | mg/L | Quarterly | 200.8 | Quarterly |
| Manganese | mg/L | Quarterly | 200.8 | Quarterly |
| Antimony | mg/L | Quarterly | 200.8 | Quarterly |
| Arsenic | mg/L | Quarterly | 200.8 | Quarterly |
| Barium | mg/L | Quarterly | 200.8 | Quarterly |
| Beryllium | mg/L | Quarterly | 200.8 | Quarterly |
| Cadmium | mg/L | Quarterly | 200.8 | Quarterly |
| Chromium (total) | mg/L | Quarterly | 200.8 | Quarterly |
| Chromium (hexavalent) | mg/L | Quarterly | 7196A | Quarterly |
| Cobalt | mg/L | Quarterly | 200.8 | Quarterly |
| Copper | mg/L | Quarterly | 200.8 | Quarterly |
| Lead | mg/L | Quarterly | 200.8 | Quarterly |
| Mercury | mg/L | Quarterly | 7470A | Quarterly |
| Molybdenum | mg/L | Quarterly | 200.8 | Quarterly |
| Nickel | mg/L | Quarterly | 200.8 | Quarterly |
| Selenium | mg/L | Quarterly | 200.8 | Quarterly |
| Silver | mg/L | Quarterly | 200.8 | Quarterly |
| Thallium | mg/L | Quarterly | 200.8 | Quarterly |
| Vanadium | mg/L | Quarterly | 200.8 | Quarterly |
| Zinc | mg/L | Quarterly | 200.8 | Quarterly |
| **Oil Production and Process Chemicals and Additives[9]** | µg/L | Quarterly | As Appropriate[10] | Quarterly |

[1] Degrees Fahrenheit
[2] Micromhos per centimeter
[3] Milligrams per liter
[4] TSS analyses is not required for groundwater monitoring
[5] Polycyclic aromatic hydrocarbons
[6] Micrograms per liter
[7] Picocuries per liter
[8] Standard Methods
[9] The Discharger shall provide analytical results for all chemicals and additives used in the exploration, production, and or processing of all oil and the treatment of produced wastewater discharged to land (e.g. pods, roads, etc.) as described under the Chemical and Additive Monitoring section of the MRP for which there are ELAP approved analyses. For those constituents for which there are not ELAP approved analytical methods, the Discharger shall submit a technical report describing how this issue will be addressed.
[10] Alternative analytical methods may be proposed by the Discharger but are subject to the approval of the Assistant Executive Officer.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

# STANDARD PROVISIONS AND REPORTING REQUIREMENTS FOR WASTE DISCHARGE REQUIREMENTS

1 March 1991

## A. General Provisions:

1. The requirements prescribed herein do not authorize the commission of any act causing injury to the property of another, or protect the Discharger from liabilities under federal, state, or local laws. This Order does not convey any property rights or exclusive privileges.

2. The provisions of this Order are severable. If any provision of this Order is held invalid, the remainder of this Order shall not be affected.

3. After notice and opportunity for a hearing, this Order may be terminated or modified 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 failure to disclose fully all relevant facts;

   c. A change in any condition that results in either a temporary or permanent need to reduce or eliminate the authorized discharge;

   d. A material change in the character, location, or volume of discharge.

4. Before making a material change in the character, location, or volume of discharge, the discharger shall file a new Report of Waste Discharge with the Regional Board. A material change includes, but is not limited to, the following:

   a. An increase in area or depth to be used for solid waste disposal beyond that specified in waste discharge requirements.

   b. A significant change in disposal method, location or volume, e.g., change from land disposal to land treatment.

   c. The addition of a major industrial, municipal or domestic waste discharge facility.

   d. The addition of a major industrial waste discharge to a discharge of essentially domestic sewage, or the addition of a new process or product by an industrial facility resulting in a change in the character of the waste.

5. Except for material determined to be confidential in accordance with California law and regulations, all reports prepared in accordance with terms of this Order shall be available for public inspection at the offices of the Board. Data on waste discharges, water quality, geology, and hydrogeology shall not be considered confidential.

6. The discharger shall take all reasonable steps to minimize any adverse impact to the waters of the state resulting from noncompliance with this Order. Such steps shall include accelerated or additional monitoring as necessary to determine the nature and impact of the noncompliance.

7. The discharger shall maintain in good working order and operate as efficiently as possible any facility, control system, or monitoring device installed to achieve compliance with the waste discharge requirements.

8. The discharger shall permit representatives of the Regional Board (hereafter Board) and the State Water Resources Control Board, upon presentations of credentials, to:

   a. Enter premises where wastes are treated, stored, or disposed of and facilities in which any records are kept,

   b. Copy any records required to be kept under terms and conditions of this Order,

   c. Inspect at reasonable hours, monitoring equipment required by this Order, and

   d. Sample, photograph and video tape any discharge, waste, waste management unit, or monitoring device.

9. For any electrically operated equipment at the site, the failure of which would cause loss of control or containment of waste materials, or violation of this Order, the discharger shall employ safeguards to prevent loss of control over wastes. Such safeguards may include alternate power sources, standby generators, retention capacity, operating procedures, or other means.

10. The fact that it would have been necessary to halt or reduce the permitted activity in Order to maintain compliance with this Order shall not be a defense for the discharger's violations of the Order.

11. Neither the treatment nor the discharge shall create a condition of nuisance or pollution as defined by the California Water Code, Section 13050.

12. The discharge shall remain within the designated disposal area at all times.

**B. General Reporting Requirements:**

1. In the event the discharger does not comply or will be unable to comply with any prohibition or limitation of this Order for any reason, the discharger shall notify the Board by telephone at **(916) 464-3291** *[Note: Current phone numbers for all three Regional Board offices may be found on the internet at http://www.swrcb.ca.gov/rwqcb5/contact_us.]* as soon as it or its agents

have knowledge of such noncompliance or potential for noncompliance, and shall confirm this notification in writing within **two weeks**. The written notification shall state the nature, time and cause of noncompliance, and shall include a timetable for corrective actions.

2. The discharger shall have a plan for preventing and controlling accidental discharges, and for minimizing the effect of such events.

   This plan shall:

   a. Identify the possible sources of accidental loss or leakage of wastes from each waste management, treatment, or disposal facility.

   b. Evaluate the effectiveness of present waste management/treatment units and operational procedures, and identify needed changes of contingency plans.

   c. Predict the effectiveness of the proposed changes in waste management/treatment facilities and procedures and provide an implementation schedule containing interim and final dates when changes will be implemented.

   The Board, after review of the plan, may establish conditions that it deems necessary to control leakages and minimize their effects.

3. All reports shall be signed by persons identified below:

   a. <u>For a corporation</u>: by a principal executive officer of at least the level of senior vice-president.

   b. <u>For a partnership or sole proprietorship</u>: by a general partner or the proprietor.

   c. <u>For a municipality, state, federal or other public agency</u>: by either a principal executive officer or ranking elected or appointed official.

   d. A duly authorized representative of a person designated in 3a, 3b or 3c of this requirement if;

      (1) the authorization is made in writing by a person described in 3a, 3b or 3c of this provision;

      (2) 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 waste management unit, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

      (3) the written authorization is submitted to the Board

Any person signing a document under this Section shall make the following certification:

"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 the 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."

4. Technical and monitoring reports specified in this Order are requested pursuant to Section 13267 of the Water Code. Failing to furnish the reports by the specified deadlines and falsifying information in the reports, are misdemeanors that may result in assessment of civil liabilities against the discharger.

5. The discharger shall mail a copy of each monitoring report and any other reports required by this Order to:

   California Regional Water Quality Control Board
   Central Valley Region
   11020 Sun Center Drive, #200
   Rancho Cordova, CA 95670-6114
   *Note: Current addresses for all three Regional Board offices may be found on the internet at http://www.swrcb.ca.gov/rwqcb5/contact_us.*
   or the current address if the office relocates.

**C. Provisions for Monitoring:**

1. All analyses shall be made in accordance with the latest edition of: (1) *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA 600 Series) and (2) *Test Methods for Evaluating Solid Waste* (SW 846-latest edition). The test method may be modified subject to application and approval of alternate test procedures under the Code of Federal Regulations (40 CFR 136).

2. Chemical, bacteriological, and bioassay analysis shall be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted provided a Quality Assurance-Quality Control Program is instituted by the laboratory. A manual containing the steps followed in this program must be kept in the laboratory and shall be available for inspection by Board staff. The Quality Assurance-Quality Control Program must conform to EPA guidelines or to procedures approved by the Board.

   Unless otherwise specified, all metals shall be reported as Total Metals.

3. The discharger shall retain records of all monitoring information, including all calibration and maintenance records, all original strip chart recordings of continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to

complete the application for this Order. Records shall be maintained for a minimum of three years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Board Executive Officer.

Record of monitoring information shall include:

a. the date, exact place, and time of sampling or measurements,
b. the individual(s) who performed the sampling of the measurements,
c. the date(s) analyses were performed,
d. the individual(s) who performed the analyses,
e. the laboratory which performed the analysis,
f. the analytical techniques or methods used, and
g. the results of such analyses.

4. All monitoring instruments and devices used by the discharger to fulfill the prescribed monitoring program shall be properly maintained and calibrated at least yearly to ensure their continued accuracy.

5. The discharger shall maintain a written sampling program sufficient to assure compliance with the terms of this Order. Anyone performing sampling on behalf of the discharger shall be familiar with the sampling plan.

6. The discharger shall construct all monitoring wells to meet or exceed the standards stated in the State Department of Water Resources *Bulletin 74-81* and subsequent revisions, and shall comply with the reporting provisions for wells required by Water Code Sections 13750 through 13755.22

**D. Standard Conditions for Facilities Subject to California Code of Regulations, Title 23, Division3, Chapter 15 (Chapter 15)**

1. All classified waste management units shall be designed under the direct supervision of a California registered civil engineer or a California certified engineering geologist. Designs shall include a Construction Quality Assurance Plan, the purpose of which is to:

   a. demonstrate that the waste management unit has been constructed according to the specifications and plans as approved by the Board.

   b. provide quality control on the materials and construction practices used to construct the waste management unit and prevent the use of inferior products and/or materials which do not meet the approved design plans or specifications.

2. Prior to the discharge of waste to any classified waste management unit, a California registered civil engineer or a California certified engineering geologist must certify that the waste management unit meets the construction or prescriptive standards and performance goals in Chapter 15, unless an engineered alternative has been approved by the Board. In the case of an engineered alternative, the registered civil engineer or a certified engineering geologist must

certify that the waste management unit has been constructed in accordance with Board-approved plans and specifications.

3. Materials used to construct liners shall have appropriate physical and chemical properties to ensure containment of discharged wastes over the operating life, closure, and post-closure maintenance period of the waste management units.

4. Closure of each waste management unit shall be performed under the direct supervision of a California registered civil engineer or a California certified engineering geologist.

**E. Conditions Applicable to Discharge Facilities Exempted from Chapter 15 Under Section 2511**

1. If the discharger's wastewater treatment plant is publicly owned or regulated by the Public Utilities Commission, it shall be supervised and operated by persons possessing certificates of appropriate grade according to California Code of Regulations, Title 23, Division 4, Chapter 14.

2. By-pass (the intentional diversion of waste streams from any portion of a treatment facility, except diversions designed to meet variable effluent limits) is prohibited. The Board may take enforcement action against the discharger for by-pass unless:

   a. (1) By-pass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that 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 by-pass. Severe property damage does not mean economic loss caused by delays in production); <u>and</u>

      (2) There were no feasible alternatives to by-pass, such as the use of auxiliary treatment facilities or retention of untreated waste. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a by-pass that would otherwise occur during normal periods of equipment downtime or preventive maintenance; <u>or</u>

   b. (1) by-pass is required for essential maintenance to assure efficient operation; and

      (2) neither effluent nor receiving water limitations are exceeded; and

      (3) the discharger notifies the Board ten days in advance.

   The permittee shall submit notice of an unanticipated by-pass as required in paragraph B.1. above.

3. A discharger that wishes to establish the affirmative defense of an upset (see definition in E.6 below) in an action brought for noncompliance shall demonstrate, through properly signed, contemporaneous operating logs, or other evidence, that:

a. an upset occurred and the cause(s) can be identified;

b. the permitted facility was being properly operated at the time of the upset;

c. the discharger submitted notice of the upset as required in paragraph B.1. above; and

d. the discharger complied with any remedial measures required by waste discharge requirements.

In any enforcement proceeding, the discharger seeking to establish the occurrence of an upset has the burden of proof.

4. A discharger whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment, collection, and disposal facilities. The projections shall be made in January, based on the last three years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the discharger shall notify the Board by **31 January**.

5. Effluent samples shall be taken downstream of the last addition of wastes to the treatment or discharge works where a representative sample may be obtained prior to disposal. Samples shall be collected at such a point and in such a manner to ensure a representative sample of the discharge.

6. Definitions

a. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with 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 action.

b. The monthly average discharge is the total discharge by volume during a calendar month divided by the number of days in the month that the facility was discharging. This number is to be reported in gallons per day or million gallons per day.

Where less than daily sampling is required by this Order, the monthly average shall be determined by the summation of all the measured discharges by the number of days during the month when the measurements were made.

c. The monthly average concentration is the arithmetic mean of measurements made during the month.

d. The "daily maximum" **discharge** is the total discharge by volume during any day.

e. The "daily maximum" **concentration** is the highest measurement made on any single discrete sample or composite sample.

f. A "grab" sample is any sample collected in less than 15 minutes.

g. Unless otherwise specified, a composite sample is a combination of individual samples collected over the specified sampling period;

(1) at equal time intervals, with a maximum interval of one hour

(2) at varying time intervals (average interval one hour or less) so that each sample represents an equal portion of the cumulative flow.

The duration of the sampling period shall be specified in the Monitoring and Reporting Program. The method of compositing shall be reported with the results.

7. Annual Pretreatment Report Requirements:

Applies to dischargers required to have a Pretreatment Program as stated in waste discharge requirements.)

The annual report shall be submitted **by 28 February** and include, but not be limited to, the following items:

a. A summary of analytical results from representative, flow-proportioned, 24-hour composite sampling of the influent and effluent for those pollutants EPA has identified under Section 307(a) of the Clean Water Act which are known or suspected to be discharged by industrial users.

The discharger is not required to sample and analyze for asbestos until EPA promulgates an applicable analytical technique under 40 CFR (Code of Federal Regulations) Part 136. Sludge shall be sampled during the same 24-hour period and analyzed for the same pollutants as the influent and effluent sampling analysis. The sludge analyzed shall be a composite sample of a minimum of 12 discrete samples taken at equal time intervals over the 24-hour period. Wastewater and sludge sampling and analysis shall be performed at least annually. The discharger shall also provide any influent, effluent or sludge monitoring data for nonpriority pollutants which may be causing or contributing to Interference, Pass Through or adversely impacting sludge quality. Sampling and analysis shall be performed in accordance with the techniques prescribed in 40 CFR Part 136 and amendments thereto.

b. A discussion of Upset, Interference, or Pass Through incidents, if any, at the treatment plant which the discharger knows or suspects were caused by industrial users of the system. The discussion shall include the reasons why the incidents occurred, the corrective actions taken and, if known, the name and address of the industrial user(s) responsible. The discussion shall also include a review of the applicable pollutant limitations to determine whether any

additional limitations, or changes to existing requirements, may be necessary to prevent Pass Through, Interference, or noncompliance with sludge disposal requirements.

c. The cumulative number of industrial users that the discharger has notified regarding Baseline Monitoring Reports and the cumulative number of industrial user responses.

d. An updated list of the discharger's industrial users including their names and addresses, or a list of deletions and additions keyed to a previously submitted list. The discharger shall provide a brief explanation for each deletion. The list shall identify the inddustrial users subject to federal categorical standards by specifying which set(s) of standards are applicable. The list shall indicate which categorical industries, or specific pollutants from each industry, are subject to local limitations that are more stringent that the federal categorical standards. The discharger shall also list the noncategorical industrial users that are subject only to local discharge limitations. The discharger shall characterize the compliance status through the year of record of each industrial user by employing the following descriptions:

(1) Complied with baseline monitoring report requirements (where applicable);

(2) Consistently achieved compliance;

(3) Inconsistently achieved compliance;

(4) Significantly violated applicable pretreatment requirements as defined by 40 CFR 403.8(f)(2)(vii);

(5) Complied with schedule to achieve compliance (include the date final compliance is required);

(6) Did not achieve compliance and not on a compliance schedule;

(7) Compliance status unknown.

A report describing the compliance status of any industrial user characterized by the descriptions in items (d)(3) through (d)(7) above shall be **submitted quarterly from the annual report date** to EPA and the Board. The report shall identify the specific compliance status of each such industrial user. This quarterly reporting requirement shall commence upon issuance of this Order.

e. A summary of the inspection and sampling activities conducted by the discharger during the past year to gather information and data regarding the industrial users. The summary shall include but not be limited to, a tabulation of categories of dischargers that were inspected and sampled; how many and how often; and incidents of noncompliance detected.

f. A summary of the compliance and enforcement activities during the past year. The summary shall include the names and addresses of the industrial users affected by the following actions:

(1) Warning letters or notices of violation regarding the industrial user's apparent noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the apparent violation concerned the federal categorical standards or local discharge limitations;

(2) Administrative Orders regarding the industrial user's noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations;

(3) Civil actions regarding the industrial user's noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations;

(4) Criminal actions regarding the industrial user's noncompliance with federal categorical standards or local discharge limitations. For each industrial user, identify whether the violation concerned the federal categorical standards or local discharge limitations.

(5) Assessment of monetary penalties. For each industrial user identify the amount of the penalties;

(6) Restriction of flow to the treatment plant; or

(7) Disconnection from discharge to the treatment plant.

g. A description of any significant changes in operating the pretreatment program which differ from the discharger's approved Pretreatment Program, including, but not limited to, changes concerning: the program's administrative structure; local industrial discharge limitations; monitoring program or monitoring frequencies; legal authority of enforcement policy; funding mechanisms; resource requirements; and staffing levels.

h. A summary of the annual pretreatment budget, including the cost of pretreatment program functions and equipment purchases.

i. A summary of public participation activities to involve and inform the public.

j. A description of any changes in sludge disposal methods and a discussion of any concerns not described elsewhere in the report.

Duplicate signed copies of these reports shall be submitted to the Board and:

Regional Administrator
U.S. Environmental Protection Agency W-5
75 Hawthorne Street
San Francisco, CA 94105

and

State Water Resource Control Board
Division of Water Quality
P.O. Box 100
Sacramento, CA 95812

Revised January 2004 to update addresses and phone numbers

TELEPHONE (661) 410-7500 FAX (661) 410-7506

**VALLEY WATER MANAGEMENT COMPANY**
7500 MEANY AVE.
BAKERSFIELD, CALIFORNIA 93308

July 5, 2017

BY EMAIL AND U.S. MAIL

Ms. Pamela Creedon (pamela.creedon@waterboards.ca.gov)
Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

Mr. Clay Rodgers (clay.rodgers@waterboards.ca.gov)
Assistant Executive Officer
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

**REQUEST FOR RESCISSION OF MRP ORDER NO. R5-2017-0806**

Dear Ms. Creedon and Mr. Rodgers:

On October 21, 2016, Valley Water Management Company ("Valley") submitted comments on the administrative draft of the Monitoring and Reporting Program ("MRP") for Valley's McKittrick 1 and 1-3 Facility in the Belgian Anticline Oil Field in Kern County. Valley also provided a redline version of the Valley MRP with additional editorial changes.

Valley was very disappointed that none of the changes suggested in Valley's letter were made, and most of the suggested substantive redline changes were ignored. Making matters even worse, the MRP issued on June 26, 2017 by the Central Valley Regional Water Quality Control Board ("Regional Board") contained many new substantive provisions never seen by Valley, all of which ostensibly became immediately applicable upon signature of the MRP.

Since MRPs are intended to be part of Waste Discharge Requirements ("WDRs"), MRPs such as the Valley MRP should be subjected to the public notice and comment periods set forth in Water Code section 13167.5(a)(1). In addition, because MRPs are intended to be used to determine compliance with and be a part of the WDRs, as is the norm for Regional Board issued permits, MRPs cannot be delegated to the Executive Officer. State law prohibits the Regional Board from delegating its authority to issue or modify waste discharge requirements. *See* Water Code §13223(a)(2). Since the MRP is intended to determine compliance with the WDRs, modifications to the WDRs cannot be made by the Executive Officer. *See San Francisco Baykeeper v. SFRWQCB*, San Francisco Superior Court, Consolidated Case No. 500527, Order Granting Petition for Writ of

Mandate and Statement of Decision (2003), at pages 3-4. The Valley MRP was, therefore, issued by the Regional Board's Executive Officer without authority to do so.

To the extent the Regional Board attempts to claim authority under Water Code section 13267, that authority is also misplaced. Section 13267 allows the Regional Board to "investigate the quality of any waters of the state." See Water Code §13267(b). In conducting such an investigation, the Regional Board may require any person discharging waste to furnish the Regional Board with technical or monitoring program reports required by the Regional Board. *Id.* The burden of these reports, including cost, must "bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." *Id.* In requiring such reports, the Regional Board must provide a written explanation as to the necessity of the reports, and must identify the evidence that supports the requirement to provide the reports. *Id.; see also In the Matter of Napa Sanitation District, Bay Area Clean Water Agencies, and San Francisco BayKeeper,* State Board/OCC Files A-1318, A-1318(a), A-1318(b) (Dec. 5, 2001), at page 55 (requiring Regional Boards to include written findings and evidence in administrative orders issued pursuant to Water Code section 13267, setting forth the required analysis and rationale).

In this case, the Regional Board failed to provide any analysis or written explanation with respect to the <u>burden</u> of the requested report, <u>including cost</u>, and did not assess whether a reasonable relationship exists between the need for the requested report and the benefits to be obtained from the report. *See* Water Code §13267. Thus, there is no evidence that the Regional Board made the requisite determinations that the water quality monitoring report requested in the Valley MRP is reasonably required and/or bears a reasonable relationship to the need for the information and/or actions.

The Regional Board's failure to include such information violates the clear mandates of Water Code section 13267(b). Further, orders not supported by the findings or findings not supported by the evidence constitute an abuse of discretion. *See Topanga Association for a Scenic Community v. County of Los Angeles*, 11 Cal.3d 506, 515 (1974); *California Edison v. SWRCB*, 116 Cal. App. 751, 761 (4th Dist. 1981); *see also In the Matter of the Petition of City and County of San Francisco, et al.*, State Board Order No. WQ-95-4 at 10 (Sept. 21, 1995).

In this case, the requirements contained in the MRP are not supported by findings, or the findings contained in the MRP about wastewater plumes, characterizations, and water movement are not supported by any evidence. The requirements contained in the MRP are also not reasonable, considering all of the related circumstances.

As noted above, the Regional Board's request for additional monitoring and reporting is unreasonable and not supported by the evidence in this case. The purpose of monitoring is to determine compliance with WDR's requirements and the WDR does not require compliance with many of the monitored constituents.

Conducting the newly required monitoring is also a time-consuming and costly undertaking. Expending the resources necessary to conduct the new monitoring for essentially no scientific or

analytical benefit is clearly unreasonable, unsupported, and unwarranted given the long duration and history of the discharge, and the lack of an existing MUN use of the underlying groundwater.[1]

In sum, the Regional Board failed to consider or enunciate in findings supported by evidence in the administrative record detailing the reasonableness, utility, cost, and benefit of the actions mandated by the MRP prior to its issuance. For this reason, the Regional Board's action in issuing the Valley MRP was not supported by the findings, the findings were not supported by the evidence, and the request and timeframes included therein were clearly unreasonable.

For the foregoing reasons, Valley requests the Regional Board immediately **rescind** the MRP until the Regional Board complies with the Water Code, including section 13267(b).

Valley would also like to request a meeting to discuss potential requirements of an MRP further and/or coverage under one of the General Orders for this facility. One of the important topics is the inability of Valley to force its users to provide oil field chemical and additive data, which can often be characterized as confidential or proprietary information.

Because of the importance of these issues to our members, we would like to set a meeting with you and your staff before July 21, 2017 to discuss our concerns. Please contact me at (661) 763-0081 or charlie@trcopco.com to set up a meeting at your earliest convenience.

Sincerely,

Charles H. Comfort
President, Board of Directors
Valley Water Management Company

cc: Dale Harvey and Ron Holcomb, CVRWQCB (Dale.Harvey@waterboards.ca.gov, Ronald.Holcomb@waterboards.ca.gov)
Patrick Pulupa, CVRWQCB (Patrick.Pulupa@waterboards.ca.gov)
Russell Emerson, Manager, Valley Water Management Company (remerson@valleywatermanagement.org)
Melissa Thorme, Downey Brand LLP (mthorme@downeybrand.com)

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[1] As stated in the WDR, "usable ground waters in this area are confined to the Little Santa Maria Valley and other small alleviated valleys in the Belgian Anticline Oil Field south of McKittrick and to the area generally east of the Buena Vista Slough some seven miles northeast of the disposal sumps." Regional Board Resolution No. 69-189. "Underground movement of percolating waste waters from the disposal sumps towards the trough of the San Joaquin Valley is restricted by a structurally high ridge formed by the south plunging nose of South Belridge Oil Field and the north plunging nose of Elk Hills Oil Field." *Id.*

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

**Central Valley Regional Water Quality Control Board**

1 September 2017

Charles H. Comfort
President, Board of Directors,
Valley Water Management Company

RESCISSION OF MONITORING AND REPORTING PROGRAM NO. R5-2017-0806, VALLEY WATER MANAGEMENT COMPANY, MCKITTRICK 1 AND 1-3 FACILITY, KERN COUNTY

The Central Valley Water Board hereby rescinds Monitoring and Reporting Program (MRP) Order No. R5-2017-0806. In the near future, the Central Valley Water Board intends to calendar a hearing to consider the appropriate regulation of Valley Water Management's McKittrick 1 and 1-3 Facility, which may include the issuance of a revised MRP or the regulation of the Facility under an existing General Order.

The notice of such a hearing and materials relevant to the Board's consideration of these matters will be provided at a later date.

We look forward to discussing these matters with you and/or your staff. If you have any questions you may contact Dale Harvey at (559) 445-6190 or Dale.Harvey@waterboards.ca.gov or Clay Rodgers at (559) 445-5102 or Clay.Rodgers@waterboards.ca.gov.

Clay L. Rodgers

for Pamela C. Creedon
Executive Officer

cc: Pamela C. Creedon, Executive Officer, Central Valley Regional Water Quality Control Board, Rancho Cordova
Patrick Pulupa, Attorney III, Office of Chief Counsel, State Water Resources Control Board, Sacramento
Stephanie Yu, Attorney III, Office of Chief Counsel, State Water Resources Control Board, Sacramento
Julie Macedo, Attorney IV, Office of Enforcement, State Water Resources Control Board, Sacramento
Russell Emerson, Manager, Valley Water Management Company, Bakersfield
Chris Reedy, Engineer, Valley Water Management Company, Bakersfield

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

2 February 2018

Mr. Russell Emerson
Valley Water Management Company
7500 Meany Avenue
Bakersfield, CA 93308

RECEIVED
FEB 5 2018
VALLEY WATER MANAGEMENT

**NOTICE OF PUBLIC HEARINGS**
**TENTATIVE MONITORING AND REPORTING PROGRAM**
**AND**
**TENTATIVE RESOLUTION PROVIDING STAFF DIRECTION**
**FOR**
**VALLEY WATER MANAGEMENT COMPANY**
**MCKITTRICK 1 & 1-3 FACILITY**
**KERN COUNTY**

**TO ALL CONCERNED PERSONS AND AGENCIES:**

Enclosed is a tentative Monitoring and Reporting Program (MRP) and Staff Report for the Valley Water Management Company McKittrick 1 and 1-3 Facility. Also enclosed is a tentative Resolution for consideration by the Central Valley Regional Water Quality Control Board (Central Valley Water Board). The tentative Resolution would provide direction to staff on how to regulate the subject facility moving forward. A public hearing(s) considering these matters will be held during the Central Valley Water Board meeting which is scheduled for:

Date: 5/6 April 2018
Time: 8:30 a.m.
Place: California Regional Water Quality Control Board, Central Valley Region
1685 "E" Street
Fresno, Ca

To be given full consideration, any written comments concerning the tentative MRP and/or the tentative Resolution must be submitted to this office by **5:00 p.m. on 26 February 2018**. The Board Chair may exclude comments received after this deadline. Persons interested in the tentative documents are encouraged to submit comments electronically. Please indicate in the subject line, **"Comment Letter – Valley Water Management Company."**

Comment letters may be submitted to Alejandra Lopez at Alejandra.Lopez@waterboards.ca.gov, or by facsimile at (559) 445-5910, or by mail or hand delivery at the address below:

Central Valley Regional Water Quality Control Board
Attention: Alejandra Lopez
1685 E Street
Fresno, CA 93706

In order to conserve paper and reduce mailing costs, a paper copy of the tentative MRP has been sent only to the Discharger. Others are advised that the tentative MRP is available on the Central Valley Water Board's web site at:

http://www.waterboards.ca.gov/centralvalley/board_decisions/tentative_orders/index.shtml

under the heading, "Discharger-Specific Orders for Future Regional Board Meetings." Anyone without access to the Internet who needs a paper copy of the documents should contact Alejandra Lopez at (559) 445-6071 or by email at Alejandra.Lopez@waterboards.ca.gov.

Persons wishing to make non-evidentiary policy statements at the Board meeting (such statements will generally be limited to 3 minutes) are **not** required to submit written comments, but the Board appreciates receiving those comments in writing by the due date listed above so that they may be included in the packages that the Board members will receive ahead of the meeting.

Please pass this notice on to anyone you think may be interested in this issue.

W. DALE HARVEY
Supervising Engineer

Attachments: Native American Tribal Government Consultation Lists Fresno, Kings, Tulare, and Kern Counties.
Concerned Persons and Agencies List

Enclosures: Tentative Monitoring and Reporting Program (Discharger only)
Staff Report (Discharger only)
Tentative Resolution (Discharger only)

cc w/o enc.: David Albright, Drinking Water Protection Section, USEPA Region 9, San Francisco
Katherine Moore, Consultant, California Senate Natural Resources and Water Committee, Sacramento
Ken Harris, California Department of Natural Resources, Division of Oil, Gas and Geothermal Resources, Sacramento (via email)
Patrick Pulupa, State Water Resources Control Board, OCC, Sacramento (via email)
Stephanie Yu, State Water Resources Control Board, OCC, Sacramento (via email)
John Borkovich, State Water Resources Control Board, DWQ, Sacramento (via email)

cc w/o enc.(continued):

Concerned Persons and Agencies List (see attached Concerned Persons and Agencies List)
Native American Contacts (see attached Native American Tribal Government Consultation List for Kern County)

| |
|---|
| U.S. Department of the Interior, Bureau of Land Management, Bakersfield |
| Kelvin Yamada, California Department of Public Health, Environmental Management Branch, Sacramento (via email) |
| Andy Gordus, California Department of Fish and Wildlife, Fresno (via email) |
| Bill Bartling, California Department of Natural Resources, Division of Oil, Gas and Geothermal Resources, Bakersfield (via email) |
| California Department of Water Resources, Fresno |
| California Department of Toxic Substance Control, Clovis |
| California Office of Historic Preservation, Sacramento |
| County of Kern, Public Health Services Department, Environmental Health Program, Bakersfield |
| County of Kern, Planning and Community Development Department, Bakersfield |
| Kern Mosquito and Vector Control District, Bakersfield |
| West Side Mosquito and Vector Control District, Taft |
| Abby Affuant, Chevron North America Exploration and Production Company, Bakersfield (via email) |
| Mike Glavin, California Resources Corporation, Bakersfield (via email) |
| David Chapin, Aera Energy, Bakersfield (via email) |
| Kenneth Bork, Sentinel Peak Resources (via email) |
| Christopher Reedy, Valley Water Management Company, Bakersfield (via email) |
| Mellissa Thorme, Downey Brand, Sacramento (via email) |
| Vern Goehring, Sacramento (via email) |
| Robert J. Gore, The Gualco Group, Inc., Sacramento (via email) |
| Rock Zierman, California Independent Producers Association, Sacramento (via email) |
| Suzanne Noble, Western States Petroleum Association, Bakersfield (via email) |
| Hollin Kretzmann, Center for Biological Diversity, San Francisco (via email) |
| Center on Race, Poverty and the Environment, Oakland (via email) |
| Gustavo Aguirre, Center on Race, Poverty and the Environment, Delano (via email) |
| Juan Flores, Center on Race, Poverty and the Environment, Delano (via email) |
| Jennifer Clary, Clean Water Action, Oakland (via email) |
| Miriam Gordon, Clean Water Action, Oakland (via email) |
| Rosanna Esparza, , Clean Water Action, Oakland (via email) |
| Andrew Grinberg, Clean Water Action, Washington D.C. (via email) |
| Keith Nakatani, Clean Water Action, Oakland (via email) |
| Jhon Arbelaez, Earthworks, Oakland (via email) |
| Holly Pearen, Environmental Defense Fund, Boulder, CO (via email) |
| Bill Allayaud, Environmental Working Group, Sacramento (via email) |
| Kyle Jones, Sierra Club, San Francisco (via email) |
| Ms. Mary Kay Benson (via email) |
| State Board Oil & Gas Groundwater Monitoring (SB4) lyris list |
| State Board Food Safety/Oil Field Wastewater Reuse lyris list |

**Native American Heritage Commission**
**Native American Contacts**
**1/18/2018**

Pine Paiute Tribe of the Owens Valley
Genevieve Jones, Chairperson
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Big Pine , CA 93513
(760) 938-2003

(976) 938-2942 Fax

Big Pine Paiute Tribe of the Owens Valley
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(760) 938-2942 Fax

Chumash Council of Bakersfield
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chumashtribe@sbcglobal.net
661-322-0121

Kern Valley Indian Community
Julie Turner, Secretary
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Lake Isabella , CA 93240 Tubatulabal
(661) 340-0032 Cell

Kern Valley Indian Community
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Kitanemuk & Yowlumne Teion Indians
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Santa Rosa Indian Community of the Santa Rosa Rancheria
Rueben Barrios Sr., Chairperson
P.O. Box 8 Tache
Lemoore , CA 93245 Tachi
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(559) 924-3583 Fax

**This list is current only as of the date of this document and is based on the information available to the Commission on the date it was pr oduced.**

**istribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.**

**This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed: RWQCB Tribal Consultation List Update for Kern County.**

**Native American Heritage Commission**
**Native American Contacts**
**1/18/2018**

ion Indian Tribe
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oescobedo@tejontribe.net
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Tubatulabals of Kern Valley
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chairman@tulerivertribe-nsn.gov
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(559) 781-4610 Fax

Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow. Chairperson
1179 Rock Haven Ct. Foothill Yokuts
Salinas , CA 93906 Mono
kwood8934@aol.com Wuksache
(831) 443-9702

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2018-XXXX
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

This Monitoring and Reporting Program (MRP) is being required pursuant to Water Code section 13267. This MRP is for the discharge to land of produced wastewater (wastewater) from the Cymric, McKittrick, and South Belridge Oil Fields at the McKittrick 1 & 1-3 unlined disposal pond systems. The systems are interconnected, regulated as one facility, and are collectively referred to as the McKittrick 1 & 1-3 Facility or Facility. Valley Water Management Company (hereafter Discharger or Valley Water) owns and operates the Facility.

The Discharger shall not implement any changes to this MRP unless and until the Central Valley Regional Water Quality Control Board (Central Valley Water Board) adopts, or the Executive Officer issues, a revised MRP. Changes to sample location(s) shall be established with the concurrence of Central Valley Water Board staff, and a description of the revised sample location(s) shall be submitted for approval by the Executive Officer.

This MRP includes monitoring, record-keeping, reporting, and further hydrogeological investigation requirements. Monitoring requirements include monitoring of groundwater, discharges of produced wastewater, solid wastes, chemicals associated with petroleum exploration, and the application of recycled materials (wastewater and solids); to determine if the Discharger is complying with Waste Discharge Requirements Resolution No. 69-199.

## BACKGROUND

Oil field produced wastewater has been discharged to the Facility since the late 1950s. .

The Facility consists of two side-by-side, interconnected pond systems used for the disposal of produced wastewater via evaporation and percolation. The McKittrick 1 pond system occupies the west side of the Facility and is slightly higher in elevation than the McKittrick 1-3 pond system that occupies the east side of the Facility. At the McKittrick 1 pond system, incoming wastewater is discharged into six netted oil/water cleaning ponds, eight pass-through ponds, and 14 evaporation/percolation ponds. Pipelines that discharge into the cleaning ponds are owned and operated by California Resources Production Corporation (CRPC) and Sentinel Peak Resources California LLC (SPR). At the McKittrick 1-3 pond system, incoming wastewater is discharged into three netted oil/water cleaning ponds, 23 pass-through ponds, and 29 evaporation/percolation ponds. A pipeline that discharges into the McKittrick 1-3 cleaning ponds is owned and operated by SPR.

The two pond systems are partially interconnected. Wastewater can gravity flow from the first two McKittrick 1 evaporation/percolation ponds to 11 evaporation/percolation ponds in the McKittrick 1-3 system. For both pond systems, wastewater usually flows through their respective evaporation/ percolation ponds in parallel. However, the pass-through ponds adjacent to the larger evaporation/ percolation ponds can control the flow into the evaporation/percolation ponds. Therefore, each evaporation/percolation pond in each pond system can be operated independently or jointly in series.

Tentative

The *Water Quality Control Plan for the Tulare Lake Basin* (Revised 2016)(Basin Plan) designates the beneficial uses of local groundwater as Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), and Industrial Service Supply (IND). Land used for agriculture is approximately 1,500 feet north of the Facility. The California Aqueduct is approximately 3.3 miles northeast of the Facility. Local farmers use groundwater for AGR, particularly when surface waters are short.

Pond information follows:

| Facility | Pond | Pond dimensions LxWxLxW or LxW in feet (depths were not provided) | Pass through pond LxW in feet | Contains visible oil | Active | 1ST Semi-annual 2017 discharge |
|---|---|---|---|---|---|---|
| McKittrick 1 (west side) | CP-1 | 147x70 | - | Yes | Yes | 42,000 barrels/day |
| | CP-2 | 85x69 | - | | | |
| | CP-3 | 109x69 | - | | | |
| | CP-4 | 128x68 | - | | | |
| | CP-5 | 101x63 | - | | | |
| | CP-6 | 100x60 | - | | | |
| | P-1 | 1540x117x1598x94 | - | No | Yes | |
| | P-2 | 1608x123x1625x118 | - | | | |
| | P-3 | 1575x88x1593x90 | 88x52 | | | |
| | P-4 | 1600x86x1671x89 | 86x52 | | | |
| | P-5 | 1625x100x1647x82 | 100x52 | | | |
| | P-6 | 1649x87x1673x96 | 87x52 | | | |
| | P-7 | 1669x89x1689x92 | 89x52 | | | |
| | P-8 | 1357x93x1375x91 | 93x52 | | | |
| | P-9 | 1380x83x1401x91 | 83x52 | | | |
| | P-10 | 1399x83x1419x91 | 83x52 | | | |
| | P-11 | 1496x87x1509x89 | - | | | |
| | P-12 | 240x96 | - | | | |
| | P-13 | 63x61 | - | | | |
| | P-14 | 72x61 | - | | | |
| McKittrick 1-3 (east side) | CP-1 | 93x74 | - | Yes | Yes | |
| | CP-2 | 99x77 | - | | | |
| | CP-3 | 97x76 | - | | | |
| | P-1 | 1574x175x1706x102 | - | No | Yes | |
| | P-2 | 1615x80x1636x88 | 276x92x251x96 | | | |
| | P-3 | 1854x83x1872x96 | 96x48 | | | |
| | P-4 | 1872x86x1877x90 | 90x48 | | | |
| | P-5 | 1878x79x1871x92 | 92x48 | | | |
| | P-6 | 1874x81x1873x91 | 91x48 | | | |
| | P-7 | 1868x86x1873x92 | 92x48 | | | |
| | P-8 | 1870x80x1875x89 | 89x48 | | | |
| | P-9 | 1863x82x1867x89 | 89x48 | | | |
| | P-10 | 1857x87x1864x91 | 91x48 | | | |
| | P-11 | 1862x84x1864x92 | 92x48 | | | |
| | P-12 | 1860x80x1869x89 | 89x48 | | | |
| | P-13 | 1859x86x1862x90 | 89x48 | | | |
| | P-14 | 1853x84x1843x101 | 101x48 | | | |
| | P-15 | 1836x80x1845x85 | 95x48 | | | |
| | P-16 | 1830x82x1830x94 | 94x48 | | | |
| | P-17 | 1828x82x1829x92 | 92x48 | | | |
| | P-18 | 1826x79x1827x91 | 91x48 | | | |
| | P-19 | 1829x86x1828x92 | 91x48 | | | |
| | P-20 | 1824x81x1815x91 | 91x48 | | | |
| | P-21 | 1623x83x1590x96 | 96x48 | | | |

Tentative

| | | | | | | |
|---|---|---|---|---|---|---|
| | P-22 | 1587x96x1555x91 | 91x48 | | | |
| | P-23 | 1535x87x1502x91 | 91x48 | | | |
| | P-24 | 1483x91x1453x86 | 86x48 | | | |
| | P-25 | 1477x85x1435x93 | - | | | |
| | P-26 | 119x118 | - | | | |
| | P-27 | 225x119 | - | | | |
| | P-28 | 156x84 | - | | | |
| | P-29 | 204x84 | - | | | |

The Facility has an existing groundwater monitoring network comprised of five shallow monitoring wells and one deep monitoring well. All six groundwater monitoring wells appear to be impacted by oil field produced wastewater, as described below.

The following shows the Facility groundwater monitoring network well information:

| Well ID | Installed | Ground elevation (ft-amsl) | Top of casing (ft-amsl) | Total Depth (ft-bgs) | Screen Interval (ft-bgs) | Screen Interval (ft-amsl) |
|---|---|---|---|---|---|---|
| CYM-17N1 | Nov 2002 | 451.5 | 452.9 | 240 | 105-165 | 347-287 |
| CYM-19H1 | Nov 2002 | 469.2 | 471.2 | 245 | 115-155 | 354-314 |
| CYM-21D1 | Nov 2002 | 427.1 | 429.1 | 300 | 274-294 | 153-133 |
| CYM-17K1 | Aug 2006 | 427.9 | 430.9 | 210 | 150-200 | 278-228 |
| CYM-17M1 | Sep 2006 | 446.5 | 449.5 | 197 | 155-185 | 292-262 |
| CYM-17Q1 | Aug 2006 | 437.6 | 440.6 | 208 | 160-200 | 278-238 |

According to reports submitted by Valley Water, the ponds are on alluvium that extends to approximately 380 feet above mean sea level (AMSL). During the monitoring well installation hydrogeological investigation, alluvium underneath and nearest the disposal ponds appeared to be saturated with produced wastewater down to a clay layer known as the Corcoran Clay Equivalent (CCE) layer at approximately 360 to 380 AMSL. Self-monitoring reports depict a wastewater plume directly beneath the ponds percolating through the CCE. The upper Tulare sand is encountered beneath the CCE from approximately 360 to 311 feet AMSL. Data submitted indicates that the upper Tulare sand contains produced wastewater from discharges to the Facility's disposal ponds. In 2006, three sentinel wells (CYM-17K1, CYM-17M1, and CYM-17Q1) were drilled into the upper Tulare sand down structure of the produced wastewater disposal ponds and were originally reported as drilled dry.

Semiannual self-monitoring reports include sampling and analyses of the six groundwater monitoring wells and oil field produced wastewater sampling from the McKittrick 1 & 1-3 disposal ponds. Shallow groundwater monitoring wells CYM-17K1, CYM-17M1, CYM-17N1, CYM-17Q1, and CYM-19H1 are completed in the upper Tulare sand unit, and CYM-21D1 is completed in the deeper Tulare sand unit that is reportedly hydraulically separated from the upper Tulare sand unit by a clay unit called the upper Tulare clay, which is found at approximately 311 to 288 feet AMSL. The deeper Tulare sand contains the regional aquifer.

In September 2010, Valley Water submitted a self-monitoring report that indicates that sentinel wells CYM-17K1, CYM-17M1, CYM-17Q1 contained a significant amount of water, but Valley Water did not sample the wells. Subsequent reports state that sentinel well soundings are provided in field notes, but the reports do not contain field notes for the three sentinel wells. In May 2014, Valley Water

sampled groundwater in sentinel wells CYM-17K1, CYM-17M1, and CYM-17Q1. The analyses indicate that the water in the wells was largely produced wastewater from the Facility ponds.

The Discharger's 30 January 2017 self-monitoring report states that "water sampled from CYM-17K1, CYM-17M1, CYM-17N1,CYM-17Q1,and CYM-19H1 plot close to pond samples with respect to the sodium and chloride ions, indicating that they are affected by the produced water but also have higher concentrations of calcium and sulfate, which is typical of the local groundwater". The report further states that "The first appearance of groundwater in wells CYM-17K1, CYM-17M1 and CYM-17Q1 also represents a mix of native groundwater and water recharged in the ponds. Calculated groundwater velocities (0.33 ft/day) and the distances from well CYM-17N1 to these sentinel wells indicates the presence of water that was disposed of in the ponds over 40 years ago" Disposal to ponds began in the late 50s, and the sentinel wells contained water in 2010 indicating that produced wastewater has likely migrated much farther downgradient in the upper Tulare sand than implied in the Valley Water reports.

As described, the upper Tulare clay separates the upper Tulare sand groundwater zone from the deeper Tulare sand groundwater zone. The deeper Tulare sand groundwater zone extends from approximately 288 feet AMSL to at least 200 feet AMSL. Well CYM-21D1 is the only Valley Water monitoring well drilled and screened in the deeper Tulare sand. In October 2017, Valley Water submitted a technical report entitled *Valley Water Management Company, Cymric Area Sampling and Analysis Report, First Semi-Annual 2017* (October 2017 Report). Samples from each of the Valley Water wells in the upper Tulare sand were chemically similar to the produced wastewater in the ponds. Monitoring well CYM-21D1 in the deeper Tulare showed indications of produced water impacts. The October 2017 Report states, "The overall trend of increasing concentrations of chloride, magnesium, sodium, and boron at VWMC Lower Tulare Sand well CYM-21D1 continued with the June 2017 sampling event with concentrations of chloride of 2,400 mg/L and TDS of 8,500 mg/L. The boron concentration in June 2017 was 22 mg/L. These concentrations are the highest recorded and indicate influence from produced water mixing with native groundwater." The conclusions of the October 2017 Report confirm that produced wastewater has migrated through the upper Tulare clay and that it is not a reliable aquitard in the area of the Facility. The data submitted in self-monitoring reports by Valley Water also indicate that from 2002 to 2017 the TDS concentrations in CYM-21D1 have increased from about 1,200 mg/L to 8,500 mg/L, and the chloride concentrations have increased from 334 mg/L to 2,400 mg/L. The TDS and chloride concentrations now exceed State drinking water Maximum Contaminant Levels and agricultural water quality objectives, indicating that produced water from the Facility ponds have caused a condition of pollution in the deeper Tulare sand.

According to the State's database *GeoTracker Groundwater Ambient Monitoring and Assessment Program* (GeoTracker Gama), the closest groundwater well data (excluding site's groundwater monitoring wells) to the Facility ponds are monitoring wells approximately 1.98 miles (GID: 00600632 & 00600632), and 2.6 miles (GID: W0601502763) northeast on the Clean Harbors Buttonwillow, LP hazardous waste disposal facility at 2500 West Lokern Road (Clean Harbors Facility). Early operations at the Clean Harbors Facility included the use of unlined ponds for liquid waste storage and disposal. By the mid 1990's, all unlined ponds had been clean closed and the Clean Harbors Facility altered operations to utilize lined waste management units. The Clean Harbors Facility is regulated by Waste Discharge Requirements (WDRs) Order No. 96-094 and has a groundwater monitoring network

that monitors three groundwater zones. The three zones are known as the Lower Water Table Zone, the Intermediate Perched Zone, and the Upper Perched Zone. The Upper Perched Zone appears to be isolated from the Intermediate Perched Zone by a clay aquitard layer. In 14 August 2017, the Upper Perched Zone groundwater flow was reported to be predominantly to the northeast: the Intermediate Perched Zone groundwater flow was reported to be predominantly to the east; and the lower water table zone groundwater flow was reported to be predominantly to the northeast.

The following table includes Clean Harbors Facility groundwater monitoring well network information dated 14 August 2017:

| Groundwater Zone | Background well | Screen Interval (ft AMSL) | Groundwater elevation (ft MSL) | Point of Compliance well | Screen Interval (ft AMSL) | Groundwater elevation (ft MSL) |
|---|---|---|---|---|---|---|
| Upper Perched Zone | MW-QU | 215.2 – 205.2 | 217.2 | MW-134RU | 212.6 – 182.6 | 212.97 |
| | MW-TU | 210.9 – 200.9 | 211.78 | MW-145U | 228.2 – 218.2 | Dry |
| | MW-130U | 243.8 – 223.8 | Dry | MW-146RU | 224.6 – 194.6 | 211.68 |
| | MW-143U | 237.6 – 217.6 | 219.42 | MW-147RU | 217.5 – 187.5 | 212.74 |
| | | | | MW-158U | 243.9 – 213.9 | 218.26 |
| | | | | MW-159U | 238.1 – 208.1 | 212.75 |
| | | | | MW-160U | 242.6 – 222.6 | Dry |
| | | | | MW-161U | 242.6 – 222.6 | Dry |
| Intermediate Perched Zone | MW-148I | 187.7 – 172.7 | 180.21 | MW-137R1 | 183.6 – 168.6 | 170.27 |
| | MW-149RI | 140.8 – 125.8 | 169.64 | | | |
| Lower Water Table Zone | MW-PRL | 101.57 – 71.57 | 85.91 | MW-151RL | 110.77 – 80.77 | 83.13 |
| | MW-102RL | 134.7 – 104.7 | 122.8 | MW-152RL | 119.4 – 89.4 | 89.1* |
| | MW-119RL | 127.1 – 97.1 | 101.16 | MW-153RL | 107.06 – 77.06 | 88.38 |
| | | | | MW-163L | 119.55 – 89.55 | 89.58* |
| | | | | MW-164RL | 77.47 – 42.47 | 83.83 |
| | | | | MW-165RL | 47.73 – 27.73 | 91.46 |
| | | | | MW-166L | 113.9 – 83.9 | 90.43 |
| | | | | MW-167L | 114.9 – 84.9 | 91.69 |
| | | | | MW-168L | 114.1 – 84.3 | 91.37 |
| | | | | MW-169L | 118.4 – 88.41 | 96.03 |
| | | | | MW-170L | 126.59 – 96.59 | 107.41 |

* This fluid level is below the base of the screened interval, and most likely represents residual groundwater trapped in the well sump. The water level in this well may not be included in site potentiometric surface maps.

Clean Harbors Facility's Quarterly monitoring report data shows monitoring well MW-148I (intermediate zone) and MW-102RL (lower zone) are increasing in TDS and chloride concentrations. MW-148I and MW-102RL are upgradient on the Clean Harbors Facility site, and down gradient/structure from the McKittrick 1 & 1-3 Facility disposal ponds. From 2011 to 2017, the TDS in MW-148I has increased from about 2,340 mg/L to 5,400 mg/L, and from 2009 to 2017 the chloride concentration has increased from about 246 mg/L to 1,200 mg/L. From 2013 to 2017, the TDS in MW-102RL has increased from about 3,040 mg/L to 3,900 mg/L, and from 2007 to 2017 the chloride concentration has increased from about 450 mg/L to 740 mg/L. The increasing TDS and chloride concentrations in these wells indicates they have been adversely influenced by the produced wastewater from Valley Water Management Company's Facility.

Valley Water owns the Facility and is responsible for the discharge from the McKittrick 1 & 1-3 Facility ponds. The discharges are migrating east and have polluted groundwater in the in the upper Tulare sand and the deeper Tulare sand, which contains the regional aquifer. These aquifers are used locally AGR. The monitoring requirements contained in the MRP are necessary to fully characterize the discharge and the lateral and vertical extent of the groundwater plume emanating from the Facility and inform an effective strategy to protect water quality. The related costs are reasonable considering the magnitude of known and potentially ongoing impacts to water quality.

## MONITORING

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. All analyses shall be performed in accordance with applicable sections of ***Standard Provisions and Reporting Requirements for Waste Discharge Requirements***, dated 1 March 1991 (Standard Provisions) (Attached).

Field test instruments (such as a pH meter) may be used provided that the operator is trained in the proper use of the instrument and each instrument is serviced and/or calibrated at the recommended frequency by the manufacturer or in accordance with manufacturer instructions.

Analytical procedures shall comply with the methods and holding times specified in the following: *Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater* (EPA); *Test Methods for Evaluating Solid Waste* (EPA); *Methods for Chemical Analysis of Water and Wastes* (EPA); *Methods for Determination of Inorganic Substances in Environmental Samples* (EPA); *Standard Methods for the Examination of Water and Wastewater* (APHA/AWWA/WEF); and *Soil, Plant and Water Reference Methods for the Western Region* (WREP 125). Approved editions shall be those that are approved for use by the United States Environmental Protection Agency or the State Water Board's Environmental Laboratory Accreditation Program. The Discharger may propose alternative methods for approval by the Executive Officer.

A complete list of substances which are tested for and reported on by the testing laboratory shall be provided to the Central Valley Water Board. All peaks must be reported. In addition, both the method detection limit (MDL) and the practical quantification limit (PQL) shall be reported. Detection limits shall be equal to or more precise than USEPA methodologies. Analysis with an MDL greater than the most stringent drinking water standard that results in non-detection needs to be reanalyzed with the MDL set lower than the drinking water standard, if possible, or at the lowest level achievable by the laboratory. If the regulatory limit for a given constituent is less than the RL (or PQL), then any analytical results for that constituent below the RL (or PQL), but above the MDL, shall be reported and flagged as estimated. All quality assurance/quality control (QA/QC) samples must be run on the same dates as when samples were actually analyzed. Proper chain of custody procedures must be followed and a copy of the completed chain of custody form shall be submitted with the report. All analyses must be performed by an Environmental Laboratory Accreditation Program (ELAP) certified laboratory.

If monitoring consistently shows no significant variation in magnitude of a constituent concentration or parameter after a statistically significant number of sampling events, the Discharger may request this MRP be revised by the Executive Officer to reduce monitoring frequency or minimize the list of constituents. The proposal must include adequate technical justification for reduction in monitoring frequency.

Monitoring requirements include the periodic visual inspection of the Facility to ensure continued compliance with the Order. The MRP also requires submittal of information regarding the use of all chemicals used during well drilling, installation, operation, and maintenance activities associated with each well generating waste materials (liquids and solids) that are discharged to the McKittrick 1 & 1-3 Facility Ponds and regulated under this Order.

This MRP requires the Discharger to keep and maintain records for five years from the date the monitoring activities occurred and to prepare and submit reports containing the results of monitoring specified below. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Central Valley Water Board. Except where indicated, all monitoring must begin immediately.

## PRODUCED WASTEWATER MONITORING

Produced wastewater samples shall be representative of the volume and nature of the discharges. The Discharger shall maintain all sampling and analytical results: date, exact place, and time of sampling; dates analyses were performed; analyst's name; analytical techniques used; and results of all analyses.

The Discharger shall label all pipelines discharging production wastewater into the Facility. Identifying labels shall be located within five feet of the pipeline and shall include at least the following: Operator, source Oil Field, and corresponding generating leases and facilities.

If the discharge is intermittent rather than continuous, then on the first day of each such intermittent discharge, the Discharger shall monitor and record data for all of the constituents listed below, after which the frequencies of analysis given in the schedule shall apply for the duration of each such intermittent discharge.

### DISCHARGE 001

The Discharger shall monitor the volume and quality of produced wastewater discharged to the disposal ponds from all sources. Produced wastewater samples shall be collected downstream from the treatment system and prior to discharge to land (roads, ponds, etc.)
(Discharge 001).

Produced wastewater monitoring for Discharge 001 shall be collected from the sample points described below and from all additional discharge points not included below and shall include at least the following:

Tentative

| Discharge ID | Lease | Sample point location |
|---|---|---|
| 001a | McKittrick 1 | Pipeline 1 discharge from Sentinel Peak Resources California LLC |
| 001b | | Pipeline 2 discharge from California Resources Production Corporation |
| 001c | | Pipeline 3 discharge from California Resources Production Corporation |
| 001d | McKittrick 1-3 | Pipeline 1 discharge from Sentinel Peak Resources California LLC |
| 001x[1] | Name | Description |

[1] Discharger shall label, add, monitor, and sample all existing discharge points not described in the table above which have the potential to discharge to the Facility's disposal ponds.

| Constituent/Parameter | Units | Sample Type | Frequency |
|---|---|---|---|
| Flow | MGD and Barrels/day | Metered[1] | Continuous |
| Table I – Analytical parameters | Varies | Grab | Varies |

[1] Flow may be measured with an appropriate engineered alternative if approved in writing by the Central Valley Regional Board Executive Officer.

**DISCHARGE 002**

Disposal pond produced wastewater samples shall be collected in the pond at the distal end of the system (Discharge 002), or if ponds are operated in parallel, in the pond that has contained produced wastewater for the longest period of time (i.e., longest retention time) (Discharge 002) from each pond system (McKittrick 1 and from McKittrick 1-3) at the Facility. Produced wastewater monitoring for Discharge 002 shall include at least the following:

| Discharge ID | Lease | Sample point location |
|---|---|---|
| 002a | McKittrick 1 | Wastewater from the pond with the longest residence time |
| 002b | McKittrick 1-3 | Wastewater from the pond with the longest residence time |

| Constituent/Parameter | Units | Sample Type | Frequency |
|---|---|---|---|
| Table I – Analytical parameters | Varies | Grab | Varies |

**CHEMICAL AND ADDITIVE MONITORING**

To adequately characterize discharges into, and ultimately from, the Facility, the Discharger is responsible for reporting all chemicals and additives, including those that may have entered the produced wastewater stream prior to being discharged to each pond system at the Facility. The Discharger shall obtain from oil field operators that discharge to the Facility and provide to the Central Valley Water Board the following for all chemicals and additives used at all leases and facilities that discharge produced water to each pond system at the Facility:

Tentative

| Requirement | Frequency |
|---|---|
| A list of all chemicals and additives used. | **Quarterly** |
| The volume and mass of each chemical and additive used in gallons and kilograms, respectively. | **Quarterly** |
| A list of the leases and facilities where the chemicals and additives are being used. | **Quarterly** |
| Safety Data Sheets (SDSs) or Material Safety Data Sheets (MSDSs) for each chemical and/or additive used during the year. | **Annually** |

## SOLID WASTE MONITORING

The Discharger shall monitor the generation and use of solid wastes, including sludges generated at the Facility from activities, such as tank, pipe, or pond maintenance. Solid waste volumes, disposal methods, disposal facilities, and analytical results from waste characterization shall be reported in the subsequent quarterly and annual monitoring reports.

The Discharger shall provide the volumes and destination, including facility permit numbers, for all solid wastes, including hazardous wastes, which are disposed of off-site.

The disposal of solid waste on-site requires the submittal of a Solid Waste Management Plan for review and approval by the Central Valley Water Board. At a minimum, the Solid Waste Management Plan shall include the following:

1. Sampling frequencies,
2. Average volume of solid waste generated annually,
3. Solid wastes criteria for on-site disposal (e.g., non-hazardous and not within 100 feet of surface waterways),
4. Disposal method(s) and procedures,
5. Disposal location(s), and
6. Reporting requirements.

Prior to the disposal of solid wastes on-site, the Solid Waste Management Plan must be approved, in writing, by the Central Valley Water Board. Modifications to the Solid Waste Management Plan need to be submitted in an addendum report that requires written approval by the Central Valley Water Board prior to implementation. On-site solid waste monitoring shall consist of the reporting requirements specified in the approved Solid Waste Management Plan.

The Discharger shall provide the volumes and locations of all solid wastes disposed on-site and include in the quarterly reports a demonstration that the applications comply with an approved solid waste management plan.

Tentative

## FACILITY MONITORING

Permanent markers or equivalent shall be in place with calibrations indicating the pond water level at design capacity and available operational freeboard. Freeboard shall be maintained at a two feet minimum. The freeboard shall be monitored on all ponds to the nearest tenth of a foot **monthly** and results **included in the quarterly report**.

Annually, prior to the anticipated rainy season, but **no later than 30 September**, the Discharger shall conduct an inspection of the Facility. The inspection shall assess repair and maintenance needed for: drainage control systems; slope failure; groundwater monitoring wells, oil booms, pond netting, or any change in site conditions that could impair the integrity of the waste management unit or precipitation and drainage control structures; and shall assess preparedness for winter conditions including, but not limited to, erosion and sedimentation control. The Discharger shall take photos of the Facility and of any problem areas before and after repairs. Any necessary construction, maintenance, or repairs shall be **completed by 31 October**. Annual Facility inspection reporting shall be **submitted by 30 November**.

The Discharger shall inspect all precipitation diversion and drainage facilities for damage **within 7 days** following major storm events (e.g., a storm that causes continual runoff for at least one hour) capable of causing flooding, damage, or significant erosion. The Discharger shall take photos of any problem areas before and after repairs. Necessary repairs shall be completed **within 30 days** of the inspection. Notification and reporting requirements for major storm events shall be conducted as required in the Reporting Requirements of this MRP and shall be reported in the quarterly monitoring report following the major storm event.

The Discharger shall monitor and record on-site rainfall data using an automated rainfall gauge or an acceptable alternative. Data shall be used in establishing the severity of storm events and wet seasons for comparison with design parameters used for waste management unit design and conveyance and drainage design. Daily data and on-site observation shall be used for establishing the need for inspection and repairs after major storm events. Rainfall data shall be reported in the quarterly monitoring reports, as required by this MRP.

## GROUNDWATER WELL SURVEY

**Within 60 days** of the signature date of this MRP, the Discharger shall conduct a well survey to identify all water supply wells within two and one half-miles of the ponds that receive produced wastewater or other authorized discharges. **Within 90 days** of the signature date of this MRP, the Discharger shall sample identified domestic water supply wells and analyze the samples for the waste constituents listed in Table I of this MRP. Groundwater well survey results (including well location and designated use for all water supply wells within one mile) and analytical results shall be reported in the quarterly report following the groundwater sample collection date. If access to private property is requested and denied, a demonstration of that denial is required.

## GROUNDWATER MONITORING

The Discharger shall operate and maintain a groundwater monitoring system. Field notes in Valley Water's self-monitoring reports indicate the sentinel wells CYM-17K1, CYM-17M1, and CYM-17Q1 may have contained produced wastewater from the ponds as early as 2010 and sampling in 2014 confirmed the presence of produced water from the ponds. This indicates that the plume of produced wastewater above the upper Tulare clay has reached and extended beyond the sentinel wells Valley Water's 2017 self-monitoring report demonstrates high salinity produced wastewater has migrated beyond the sentinel wells and also impacted groundwater at CYM-21D1 in the deeper Tulare sand, which contains the regional aquifer. The Discharger needs to perform additional work to delineate the lateral and vertical extent of the produced wastewater plume.

After measuring water levels and prior to collecting samples, each monitoring well shall be adequately purged to remove water that has been standing within the well screen and casing that may not be chemically representative of formation water. Depending on the hydraulic conductivity of the geologic setting, the volume removed during purging is typically from 3 to 5 volumes of the standing water within the well casing and screen, or additionally the filter pack pore volume.

The Discharger shall monitor groundwater wells for the following:

| Constituent/Parameter | Units | Sample Type | Frequency |
|---|---|---|---|
| Depth to groundwater | Feet[1] | Measured | **Quarterly** |
| Groundwater elevation | Feet[1] | Calculated | **Quarterly** |
| Table I – Analytical parameters | Varies | Grab | **Quarterly** |

[1] Recorded to one hundredth of a foot

**Within 30 days** of notification that permission to sample a well(s) is not granted or is revoked, the Discharger shall submit for review and approval by Central Valley Water staff a report that either: (1) demonstrates that a reduction in the number of monitoring well(s) will not impair the ability to clearly and accurately assess potential groundwater impacts, or (2) proposes the installation of a new monitoring well(s) or use of another existing well to offset the well(s) no longer able to be sampled.

## GROUNDWATER MONITORING WELL NETWORK INSTALLATION

The existing groundwater monitoring system has not fully delineated the lateral and vertical extent of the produced wastewater plume. A Monitoring Well Installation and Sampling Plan (MWISP) shall be submitted **within 60 days** of the signature date of this MRP. The MWISP shall provide for the installation of an appropriate number of upgradient/up-structure dip groundwater monitoring wells to identify background water quality and an appropriate number of downgradient/down-structure wells to delineate the plume of produced wastewater emanating from the Facility ponds.

Tentative

At a minimum, the MWISP shall include the information below.

1. General Information:
   a. Topographic map showing any existing nearby (about 2.5 mile) domestic, irrigation, and municipal supply wells and monitoring wells known to the Discharger, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features, as appropriate.
   b. Site plan showing proposed well locations, other existing wells, unused and/or abandoned wells, major physical site structures, any waste handling facilities, irrigated cropland and pasture, and on-site surface water features.
   c. Rationale for the number of proposed monitoring wells, their locations and depths, and identification of anticipated depth to groundwater.
   d. If, proposing to use existing groundwater wells as part of the MWISP, include well screen intervals in relation to groundwater levels, current well use, and rational for well selection.
   e. Local permitting information (as required for drilling, well seals, boring/well abandonment).
   f. Drilling details, including methods and types of equipment for drilling and logging activities. Equipment decontamination procedures (as appropriate) should be described.
   g. Health and Safety Plan.

2. Proposed Drilling Details:
   a. Drilling techniques.
   b. Well logging method.
   c. Proposed Monitoring Well Design - all proposed well construction information must be displayed on a construction diagram or schematic to accurately identify the following:
   d. Well depth.
   e. Borehole depth and diameter.
   f. Well construction materials.
   g. Casing material and diameter – include conductor casing, if appropriate.
   h. Location and length of perforation interval, size of perforations, and rationale.
   i. Location and thickness of filter pack, type and size of filter pack material, and rationale.
   j. Location and thickness of bentonite seal.
   k. Location, thickness, and type of annular seal.
   l. Surface seal depth and material.
   m. Type of well cap(s).
   n. Type of well surface completion.
   o. Well protection devices (such as below-grade water tight-vaults, locking steel monument, bollards, etc.).

3. Proposed Monitoring Well Development:
   a. Schedule for development (not less than 48 hours or more than 10 days after well completion).
   b. Method of development.
   c. Method of determining when development is complete.
   d. Parameters to be monitored during development.

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e. Method for storage and disposal of development water.

4. Proposed Surveying:
   a. How horizontal and vertical position of each monitoring well will be determined.
   b. The accuracy of horizontal and vertical measurements to be obtained.
   c. The California licensed professional (licensed land surveyor or civil engineer) to perform the survey.

5. Proposed Groundwater Monitoring:
   a. Schedule (at least 48 hours after well development).
   b. Depth to groundwater measuring equipment (e.g., electric sounder or chalked tape capable of ±0.01-foot measurements).
   c. Well purging method, equipment, and amount of purge water.
   d. Sample collection (e.g., bottles and preservation methods), handling procedures, and holding times.
   e. Quality assurance/quality control (QA/QC) procedures (as appropriate).
   f. Analytical procedures.
   g. Equipment decontamination procedures (as appropriate).

6. Proposed Schedule:
   a. Fieldwork.
   b. Laboratory analyses.
   c. Report submittal.

## MONITORING WELL INSTALLATION COMPLETION REPORT

Within **90 days** of installation of a groundwater monitoring well(s), a Monitoring Well Installation Completion Report (MWICR) shall be submitted. At a minimum, the MWICR shall summarize the activities as described below.

1. General Information:
   a. Brief overview of field activities including well installation summary (such as number, depths), and description and resolution of difficulties encountered during field program.
   b. Topographic map showing any existing nearby domestic, irrigation, and municipal supply wells and monitoring wells, utilities, surface water bodies, drainage courses and their tributaries/destinations, and other major physical and man-made features.
   c. Site plan showing monitoring well locations, other existing wells, unused and/or abandoned wells, major physical site structures, any waste handling facilities, and on-site surface water features.
   d. Period of field activities and milestone events (e.g., distinguish between dates of well installation, development, and sampling).

Tentative

2. Monitoring Well Construction:
   a. Number and depths of monitoring wells installed.
   b. Monitoring well identification (i.e., numbers).
   c. Date(s) of drilling and well installation.
   d. Description of monitoring well locations including field-implemented changes (from proposed locations) due to physical obstacles or safety hazards.
   e. Description of drilling and construction, including equipment, methods, and difficulties encountered (such as hole collapse, lost circulation, need for fishing).
   f. Name of drilling company, driller, and logger (site geologist to be identified).
   g. As-built for each monitoring well with the following details:
      i. Well identification.
      ii. Total borehole and well depth.
      iii. Date of installation.
      iv. Boring diameter.
      v. Casing material and diameter (include conductor casing, if appropriate).
      vi. Location and thickness of slotted casing, perforation size.
      vii. Location, thickness, type, and size of filter pack.
      viii. Location and thickness of bentonite seal.
      ix. Location, thickness, and type of annular seal.
      x. Depth of surface seal.
      xi. Type of well cap.
      xii. Type of surface completion.
      xiii. Depth to water (note any rises in water level from initial measurement) and date of measurement.
      xiv. Well protection device (such as below-grade water tight vaults, stovepipe, bollards, etc).
   h. All depth to groundwater measurements during field program.
   i. Field notes from drilling and installation activities (e.g., all subcontractor dailies, as appropriate).
   j. Construction summary table of pertinent information such as date of installation, well depth, casing diameter, screen interval, bentonite seal interval, and well elevation.

Tentative

3. Monitoring Well Development:
   a. Date(s) and time of development.
   b. Name of developer.
   c. Method of development.
   d. Methods used to identify completion of development.
   e. Development log: volume of water purged and measurements of temperature, pH and electrical conductivity during and after development.
   f. Disposition of development water.
   g. Field notes (such as bailing to dryness, recovery time, number of development cycles).

4. Monitoring Well Survey:
   a. Identify coordinate system or reference points used.
   b. Description of measuring points (i.e. ground surface, top of casing, etc.).
   c. Horizontal and vertical coordinates of well casing with cap removed.
   d. Name, license number, and signature of California licensed professional who conducted survey.
   e. Surveyor's field notes.
   f. Tabulated survey data.

**REPORTING REQUIREMENTS**

All monitoring results shall be reported in **Quarterly Monitoring Reports,** which are due by the first day of the second month after the calendar quarter. Therefore, monitoring reports are due as follows:

| | |
|---|---|
| First Quarter Monitoring Report (January – March): | **1 May** |
| Second Quarter Monitoring Report (April – June): | **1 August** |
| Third Quarter Monitoring Report (July – September): | **1 November** |
| Fourth Quarter Monitoring Report (October – December): | **1 February** |
| Facility Inspection Report (Completed by 30 October): | **30 November** |

**A transmittal letter shall accompany each monitoring report**. The transmittal letter shall discuss any exceedances of applicable effluent or groundwater limitations or other instances of non-compliance that occurred during the reporting period and all corrective actions taken or planned, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions or a time schedule for implementing the corrective actions, reference to the previous correspondence is satisfactory. **Reports shall be submitted whether or not there is a discharge**.

The Discharger shall **submit electronic copies** of all work plans, reports, analytical results, and groundwater elevation data via electronic mail to CentralValleyFresno@waterboards.ca.gov and over the Internet to the State Water Board Geographic Environmental Information Management System database (GeoTracker) at http://www.waterboards.ca.gov/ust/electronic_submittal/index.shtml

A frequently asked question document for GeoTracker can be found at http://www.waterboards.ca.gov/ust/electronic_submittal/docs/faq.pdf

Electronic submittals to GeoTracker shall comply with GeoTracker standards and procedures, as specified on the State Water Board's web site. All submittals including uploads to GeoTracker shall be completed on or prior to the due date.

In addition, a hardcopy of each document shall be submitted to:

California Regional Water Quality Control Board
Central Valley Region
1685 E Street, Suite 200
Fresno, CA 93706
Attn: Ronald E. Holcomb

GeoTracker Site Global ID: **WDR100037491**
CIWQS Place ID: **209130** for **BELGIAN ANTICLINE, MCKITTRICK 1 & 1-3**

The following information is to be included on all monitoring reports, as well as report transmittal letters:

Valley Water Management Company
Belgian Anticline, McKittrick 1 & 1-3
Waste Discharge Requirements 69-19901
Monitoring and Reporting Program R5-2017-0806
GeoTracker Site Global ID: WDR100037491
CIWQS Place ID: 209130

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible for all historical and current data. The data shall be summarized in such a manner that illustrates clearly, whether the Discharger complies with waste discharge requirements.

If the Discharger monitors any constituent at the locations designated herein more frequently than is required by this Order, the results of such monitoring shall be included in the calculation and reporting of the values required in the quarterly monitoring reports. Such increased frequency shall be indicated on the quarterly monitoring reports.

All monitoring reports shall comply with the signatory requirements in Standard Provision B.3. All monitoring reports that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of persons registered to practice in California pursuant to California Business and Professions Code sections 6735, 7835, and 7835.1.

A. **All Quarterly Monitoring Reports shall include the following:**

**Produced Wastewater reporting:**

1. Tabular summary of current and historical results of produced wastewater discharges as specified on pages 7 and 8.
2. For each month of the quarter, calculation of monthly effluent flow and the historical monthly effluent flow for the last 12-months. Historical annual effluent flow data in tabular summary.
3. For each quarter, include a current and historical table of **all data** for each wastewater sample point. In addition, each quarter, include a data table for current and historical wastewater sample data for all electrical conductivity (EC), total dissolved solids (TDS), boron, dissolved sodium, potassium, dissolved calcium, dissolved magnesium, chloride, alkalinity as CaCO3, dissolved sulfate, isotopes for oxygen ($^{18}O$), and deuterium (Hydrogen 2, $^{2}H$, or D) concentrations.

**Facility reporting:**

1. Monthly freeboard results as specified on MRP page 9.
2. The results of Facility inspections conducted during the quarter as specified on MRP page 9.
3. Rainfall data as specified on MRP page 9.

**Chemical and Additive reporting:**

1. Tabular summary of current and historical data required as specified on MRP page 7.
2. Safety Data Sheets for all chemicals and additives that are identified in quarterly monitoring reports for that respective calendar year.
3. Tabular summary of current and historical annual volume and mass for all chemicals and additives.
4. Summary that identifies if any chemicals and additives were detected in produced wastewater discharge to the Facility ponds or groundwater.

**Solid Waste reporting:**

1. The results of solid waste monitoring specified on MRP pages 8 and 9, including the nature, volume, and weight in dry tons of solid waste produced during the quarter.
2. Tabular summary of current and historical analytical results characterizing the solid waste, and particularly, whether the waste is hazardous as defined in Title 22, CCR, Section 66261.
3. The method of disposal and disposal locations of the solid wastes.
4. If wastes are hauled to a disposal facility, evidence that the disposal facility is properly permitted and submit copies of waste manifest.

**Groundwater reporting:**

1. The results of groundwater monitoring specified on page 10.
2. For each monitoring well, a table showing all constituent concentrations for current and historical concentrations. In addition, each quarter, include a data table for current and historical groundwater sample data for all electrical conductivity (EC), total dissolved solids

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(TDS), boron, dissolved sodium, potassium, dissolved calcium, dissolved magnesium, chloride, alkalinity as CaCO3, dissolved sulfate, isotopes for oxygen ($^{18}O$), and deuterium (Hydrogen 2, $^{2}H$, or D) concentrations.

3. A groundwater contour map based on groundwater elevations for that quarter. The map shall show the gradient and direction of groundwater flow under/around the facility and/or effluent disposal area(s). The map shall also include the locations of monitoring wells and wastewater storage and discharge areas.
4. Provide a current isoconcentration map of groundwater data for EC, chloride, and boron concentrations.

**Laboratory Reports:**

1. Laboratory reports submitted in compliance with this MRP shall be accompanied by an **Excel file** that includes the analytical data found in the laboratory report. Excel files need to be generated by the laboratory, or compiled by the Discharger. At a minimum, the Excel file shall include the constituent name, sample location, sample name, sample date, analysis date, analytical method, result, unit, MDL, RL, and dilution factor. Excel files shall either be mailed to the Central Valley Water Board Office in an electronic storage device, or sent via electronic mail to CentralValleyFresno@waterboards.ca.gov. Either method of delivery needs to include, at a minimum, a copy of the transmittal letter.

B. **Fourth Quarter Monitoring Reports**, in addition to the above, by 1 February of each year, the Discharger shall submit a written report to the Executive Officer containing the following:

**Facility information:**

1. The names and general responsibilities of all persons employed to operate the produced water treatment systems.
2. The names and telephone numbers of persons to contact regarding the Facility for emergency and routine situations.
3. A statement certifying when the flow meters and other monitoring instruments and devices were last calibrated, including identification of who performed the calibration (Standard Provision C.4).
4. A summary of all spills/releases, if any, that occurred during the year at the facility, tasks undertaken in response to the spills, and the results of the tasks undertaken.
5. A summary of the chemical and additive volume and mass use data collected under the Chemical And Additive Monitoring section, the required Material Safety Data Sheets (MDSs) / Safety Data Sheets (SDSs) sheets, and a discussion of whether any of the chemicals or additives were found in effluent discharges.
6. Tabular summary of current and historical total annual flow for Produced Wastewater Monitoring.
7. Provide a list of oil producing leases, corresponding oil field, and operating company names whose produced wastewater is discharged to the ponds in the Facility.
8. A flow chart (i.e. diagram that clearly illustrates all processes that produced wastewater undergoes within the Facility up to discharge to the ponds) and map of the following:
   - Facility within the oil field,
   - Facility/Lease boundaries

- Facility produced wastewater distribution network with all discharge points to the ponds or land.
- Wastewater flow direction within the Facility's ponds.

**Requesting Administrative Review by the State Water Board.** Any person aggrieved by an action of the Central Valley Water Board that is subject to review as set forth in Water Code section 13320(a), may petition the State Water Board to review the action. Any petition must be made in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 and following. The State Water Board must receive the petition within thirty (30) days of the date the action was taken, except that if the thirtieth day following the date the action was taken falls on a Saturday, Sunday, or state holiday, then the State Water Board must receive the petition by 5:00 p.m. on the next business day. Copies of the laws and regulations applicable to filing petitions may be found on the internet at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml or will be provided upon request.

**Modifications.** Any modification to this Monitoring and Reporting Program shall be in writing and approved by the Assistant Executive Officer, including any extensions. Any written extension request by the Discharger shall include justification for the delay.

This monitoring and reporting program shall be effective on the signature date below.

Ordered by: _____

PAMELA C. CREEDON, Executive Officer

_____

(Date)

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**Table I – Analytical Parameters**

| Parameters | Units | Monitoring Frequency | US EPA or other Method | Reporting Frequency |
|---|---|---|---|---|
| **Field Parameters** | | | | |
| Temperature | °F[1] | Quarterly | Meter | Quarterly |
| Electrical Conductivity (EC) | µmhos/cm[2] | Quarterly | Meter | Quarterly |
| pH | pH units | Quarterly | Meter | Quarterly |
| **Monitoring Parameters** | | | | |
| Total Dissolved Solids (TDS) | mg/L[3] | Quarterly | 160.1 | Quarterly |
| Total Suspended Solids (TSS)[4] | mg/L | Quarterly | 160.2 | Quarterly |
| Electrical Conductivity (EC) | µmhos/cm | Quarterly | 2510B | Quarterly |
| Total Organic Carbon (TOC) | mg/L | Quarterly | 415.3 | Quarterly |
| Boron, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| **Standard Minerals** | | | | |
| Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Bicarbonate Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Carbonate Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Hydroxide Alkalinity as CaCO3 | mg/L | Quarterly | 310.1 | Quarterly |
| Sulfate, dissolved | mg/L | Quarterly | 300.0 | Quarterly |
| Nitrate-N, dissolved | mg/L | Quarterly | 300.0 | Quarterly |
| Calcium, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| Magnesium, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| Sodium, dissolved | mg/L | Quarterly | 6010B | Quarterly |
| Potassium | mg/L | Quarterly | 6010B | Quarterly |
| Chloride | mg/L | Quarterly | 300.0 | Quarterly |
| **PAHs**[5] | µg/L[6] | Quarterly | 8270 | Quarterly |
| **Total Petroleum Hydrocarbons (TPH)** | µg/L | Quarterly | 418.1 | Quarterly |
| **Volatile Organic Compounds** | | | | |
| Full Scan | µg/L | Quarterly | 8260B | Quarterly |
| **Oil and Grease** | mg/L | Quarterly | 1664A | Quarterly |
| **Stable Isotopes** | | | | |
| Oxygen ($^{18}O$) | pCi/L[7] | Quarterly | 900.0 | Quarterly |
| Deuterium (Hydrogen 2, $^{2}H$, or D) | pCi/L | Quarterly | 900.0 | Quarterly |
| **Radionuclides** | | | | |
| Radium-226 | pCi/L | Quarterly | SM[8] 7500-Ra | Quarterly |

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**Table I – Analytical Parameters**

| | | | | |
|---|---|---|---|---|
| Radium-228 | pCi/L | Quarterly | SM 7500-Ra | Quarterly |

**(continued)**

| **Parameters** | **Units** | **Monitoring Frequency** | **US EPA or other Method** | **Reporting Frequency** |
|---|---|---|---|---|
| **Radionuclides** | | | | |
| Gross Alpha particle (excluding radon and uranium) | pCi/L | Quarterly | SM 7110 | Quarterly |
| **Constituents of Concern** | | | | |
| Lithium | mg/L | Quarterly | 200.7 | Quarterly |
| Strontium | mg/L | Quarterly | 200.7 | Quarterly |
| Iron | mg/L | Quarterly | 200.8 | Quarterly |
| Manganese | mg/L | Quarterly | 200.8 | Quarterly |
| Antimony | mg/L | Quarterly | 200.8 | Quarterly |
| Arsenic | mg/L | Quarterly | 200.8 | Quarterly |
| Barium | mg/L | Quarterly | 200.8 | Quarterly |
| Beryllium | mg/L | Quarterly | 200.8 | Quarterly |
| Cadmium | mg/L | Quarterly | 200.8 | Quarterly |
| Chromium (total) | mg/L | Quarterly | 200.8 | Quarterly |
| Chromium (hexavalent) | mg/L | Quarterly | 7196A | Quarterly |
| Cobalt | mg/L | Quarterly | 200.8 | Quarterly |
| Copper | mg/L | Quarterly | 200.8 | Quarterly |
| Lead | mg/L | Quarterly | 200.8 | Quarterly |
| Mercury | mg/L | Quarterly | 7470A | Quarterly |
| Molybdenum | mg/L | Quarterly | 200.8 | Quarterly |
| Nickel | mg/L | Quarterly | 200.8 | Quarterly |
| Selenium | mg/L | Quarterly | 200.8 | Quarterly |
| Silver | mg/L | Quarterly | 200.8 | Quarterly |
| Thallium | mg/L | Quarterly | 200.8 | Quarterly |
| Vanadium | mg/L | Quarterly | 200.8 | Quarterly |
| Zinc | mg/L | Quarterly | 200.8 | Quarterly |
| **Oil Production and Process Chemicals and Additives[9]** | µg/L | Quarterly | As Appropriate[10] | Quarterly |

[1] Degrees Fahrenheit
[2] Micromhos per centimeter
[3] Milligrams per liter
[4] TSS analyses is not required for groundwater monitoring
[5] Polycyclic aromatic hydrocarbons
[6] Micrograms per liter
[7] Picocuries per liter
[8] Standard Methods
[9] The Discharger shall provide analytical results for all chemicals and additives used in the exploration, production, and or processing of all oil and the treatment of produced wastewater discharged to land (e.g. pods, roads, etc.) as described under the Chemical and

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Additive Monitoring section of the MRP for which there are ELAP approved analyses. For those constituents for which there are not ELAP approved analytical methods, the Discharger shall submit a technical report describing how this issue will be addressed.
[10] Alternative analytical methods may be proposed by the Discharger but are subject to the approval of the Assistant Executive Officer.

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STAFF REPORT

VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

## INTRODUCTION

Valley Water Management Company (Valley Water) owns and operates oil field produced wastewater disposal pond systems named the McKittrick 1 ponds and McKittrick 1-3 ponds. The systems are interconnected, regulated as one facility, and collectively referred to at the McKittrick 1 & 1-3 Facility or Facility. The Facility is approximately 8.7 miles west of the community of Buttonwillow, as shown on Attachment A.

Oil field produced wastewater from various operators has been discharged to the Facility's approximately 149 acres of ponds for disposal by percolation and evaporation since the late 1950s. Produced wastewater comes from the South Belridge, Cymric, and McKittrick oil fields and is high in salinity and boron. The Facility is not within an established oil field (Attachment B).

Discharges to the ponds are regulated under Resolution No. 69-199 (Resolution), adopted by the Central Valley Water Board (Board) on 14 February 1969. The Resolution covers Valley Water Management discharges in the Belgian Anticline, Cymric, and McKittrick Oil Fields. The Resolution prohibits the discharges from creating pollution and nuisance, but does not require monitoring of the discharges to the ponds or to groundwater.

In June 2010, at the request of Board staff, Valley Water began voluntarily monitoring its discharge and groundwater down structure of the Facility. As discussed in detail below, the groundwater monitoring preformed to date indicates that saline produced wastewater has migrated to the east beyond the Valley Water groundwater monitoring well network and has polluted or threatens to pollute groundwater that is being used or could potentially be used for beneficial uses. Therefore, additional characterization of discharges to the ponds and expansion of the existing groundwater monitoring network is necessary.

On 26 June 2017, the Assistant Executive Officer signed, on behalf of the Executive Officer, a Monitoring and Reporting Program (MRP) to Valley Water after considering Valley Water's comments on a previously circulated administrative draft MRP. The issued MRP was designed to require the complete characterization of the discharges to the ponds and expansion of Valley Water's groundwater monitoring network to delineate the plume of produced wastewater emanating from beneath the ponds. The MRP was very similar to the MRPs associated with *Waste Discharge Requirements General Order for Oil Field Discharges to Land* (General Order), *General Order Number One* and *General Order Number Two* adopted by the Central Valley Water Board (Board) at its 6 April 2017 meeting. Valley Water subsequently requested rescission of the MRP, submitted a petition to State Board that asserted the Executive Officer does not have the authority to issue MRPs, and expressed a desire to obtain coverage for the subject discharges under General Order Number Three, which does not require groundwater monitoring.

This Staff Report describes why a Board ordered/issued MRP is necessary and why coverage under General Order Three is not appropriate. Specifically, it will describe the Facility, the

discharges to the Facility, the local geology, the results of groundwater monitoring conducted to date, and why additional monitoring is necessary and appropriate. It also provides the basis for a Resolution by the Board to give staff guidance on how to regulate this specific site going forward. In preparing this Staff Report, Board staff reviewed the Board files for the Facility, including, but not limited to, those documents listed in Attachment C

**FACILITY**

The Facility is constructed on alluvial fan deposits just east of the Cymric and Monument Junction oil fields as shown on Attachment D. These fan deposits are discussed in more detail below, but are generally considered to be coarse grained and highly permeable. Structurally, the fans dip from the southwest to the northeast. Similarly, topography in the area slopes at about 30-feet-per-mile from the west-southwest to the east-northeast, as shown by the surface water channels depicted on Attachment D. The Clean Harbors Buttonwillow, LLC, Class I waste facility (Clean Harbors) is about 1.5 miles to the east-northeast, as shown on Attachment D.

Table 1 below presents the range of analytical results for various constituents associated with samples of produced wastewater discharged to the ponds from 10 February 1988 through 28 June 2017. These analytical results are from samples collected by Board staff during field inspections or submitted by, or on behalf of, Valley Water.

Table 1. *Range of Select Constituents Discharged to or in McKittrick 1 & 1-3 Ponds*

| **Parameter (units)** | **Concentration range** | **State MCL[4]** |
|---|---|---|
| Electrical Conductivity (EC) @ 25°C[1] (µS/cm[2]) | 15,000 - 42,000 | 1,600/2,200[5] |
| Total Dissolved Solids (TDS) (mg/L) | 7,772 - 26,000 | 1,000/1,500[5] |
| Chloride (mg/L) | 4,100 - 16,000 | 500/600[5] |
| Boron (mg/L) | 42.5 - 130 | |
| Benzene (µg/L[3]) | 4.9 - 400 | 1.0[6] |
| Toluene (µg/L) | 7.2 - 1000 | 100[6] |
| Ethylbenzene (µg/L) | 0.93 - 120 | 300[6] |
| Xylenes (µg/L) | 4.7 - 550 | 1750[6] |

1. °C = Centigrade.
2. µS/cm = microsiemens per centimeter which is equivalent to micromhos per centimeter.
3. µg/L = micrograms per liter.
4. State of California drinking water Maximum Contaminant Level (MCL)
5. Secondary MCL, upper limit/short term limit.
6. Primary MCL.

The State Drinking Water Maximum Contaminant Levels are presented for comparison purposes. Oil field produced wastewater discharged to the Facility is from the more saline marine Diatomite Formation and the relatively less saline Tulare Formation. The range in concentrations above depends on the number of wells producing and the corresponding zone of

production discharging to the ponds. The electrical conductivity (EC), chloride, and boron concentrations in the produced wastewater greatly exceed the numerical limits set for oil field discharges to land in the *Water Quality Control Plan for the Tulare Lake Basin* (Revised 2016)(Basin Plan) of 1,000 umhos/cm, 175 mg/L, and 1.0 mg/L respectively. The discharges to the ponds also greatly exceed Maximum Contaminant Levels (MCLs) limits for EC, total dissolved solids (TDS), chloride, benzene, and toluene, and greatly exceed EC, TDS, chloride, and boron objectives for agriculture.

The discharge flows to the McKittrick 1 & 1-3 ponds were not metered until recently. Reported flows and their sources are shown in Attachment E and have ranged from 5000 barrels (bbls) per day (~ 210,000 gallons per day 'gpd') to 115,000 bbls per day (4.83 million gpd). The average of the reported flows is approximately 67,000 bbls per day or 2.8 million gpd. Based on the average flows, the volume of produced water discharged to the ponds from 1960 to 2018 is about 1.4 billion barrels (60 billion gallons).

## GENERAL HYDROGEOLOGY AND GROUNDWATER MONITORING RESULTS

Several general studies of the hydrogeology in the area that encompasses the Valley Water facilities that serve the Cymric and Monument Junction Oil Fields have been conducted. At Board staff's request, Valley Water has also conducted hydrogeology studies in the area of the McKittrick 1 & 1-3 ponds and installed a groundwater monitoring network. Similarly, Clean Harbors, has conducted local hydrogeology studies and installed a groundwater monitoring network for its facility. The following describes salient information in those reports and studies. As previously mentioned, the reports and studies consulted are listed in Attachment C.

### Stratigraphy

The following describes the general stratigraphy underlying the McKittrick 1 & 1-3 Facility and the Clean Harbors facility. The nomenclature is generally consistent with that provided in Valley Water technical reports and self-monitoring reports. Attachment F.1 and F.2 provide general cross sections.

#### Alluvium

The first layer underlying the McKittrick 1 & 1-3 Facility is comprised of Holocene age alluvial fans consisting of sediments transported eastward from the Coast Ranges. These sediments are in interbedded layers of poorly sorted relatively coarse-grained, subangular to angular sands with silts and clays. Angular to subangular gravelly sands occasionally occur in the interbedded sequence.

Geomega's report on the initial hydrogeologic investigation, dated 17 October 2003, said "Silty clay layers within the shallower alluvial fan sequence act to perch groundwater in the Cymric area. Multi-perched water zones in the alluvial fan sequence encountered in borehole/monitoring wells CYM-17N1 and CYM-19H1 are apparent from air rotary drilling and geophysical log interpretation." The alluvium is saturated to the east and serves as an aquifer

for water supply wells.

Regional bed referred to as the "Corcoran Clay Equivalent", or CCE, or basal alluvial clay

Under the alluvium is a silty-clay to clay bed probably deposited in an alluvial plain to lacustrine environment transition. This bed separates the alluvium from the Tulare Formation. As described in the studies and reports provided by Valley Water, this bed does not act as a significant aquitard; i.e. it does not act as a significant barrier to the downward migration of produced wastewater discharged from the McKittrick 1 & 1-3 Facility ponds.

Upper Tulare

Below the CCE is what is called the upper Tulare or upper Tulare sand. It consists of Pleistocene age deposits that vary greatly from lacustrine delta deposits to braided stream, and point bar deposits, probably as a result of a Tulare Lake regressional sequence. The deposits are comprised of fine-grained sands with interbedded silt and clay layers and gravel lenses. The upper Tulare sand serves as an aquifer to the east that supplies water supply wells.

Regionally extensive clay layer

The upper Tulare sand is separated from what is called the deeper Tulare or deeper Tulare sand by a dense, stiff clay bed approximately 70 feet thick. This is sometimes called the upper Tulare clay.

Deeper Tulare

The deeper Tulare or deeper Tulare sand is composed primarily of fine-grained to medium-grained well-sorted sands. Valley Water documents indicate the deeper Tulare contains the "regional aquifer." The deeper Tulare serves as an aquifer for water supply wells to the east.

**Depositional Environment**

Within the Cymric area, the Quaternary stratigraphic depositional environment generally consists of uplifted arid alluvial fan systems underlain by lacustrine (lake deposits) silts, sands, and clays. Alluvial fan systems are formed from the release of water-borne sediments from mountainous catchments into an adjacent valley or basin. Sediments are deposited to the fan by sheet flow and an incised channel that is an extension of the catchment feeder channel. The incised channel will usually end short of the distal portion of the fan. At the end of the channel, flows expand laterally onto the fan surface. Headward-eroding gullies are common on the distal fan either as single channels or as a downward-converging network. These gullies may eventually intersect the incised channel which could result in changing the active portion of the fan to another direction. Alluvial fan systems can transition to an alluvial plain and then on to a lacustrine environment. Alluvial plain deposits are typically well sorted, fine to medium-grained sands. Lacustrine deposits are formed by sedimentation in a lake. These deposits are characterized by well-sorted, fine-grained sediments, such as clays and silts, which formed in a low-energy environment. The edges of lacustrine deposits may have alluvial delta or fluvial

deposits.

Potentially significant consequences of the above described depositional environment include:

1. What appear to be homogenous (uniform) and isotropic (similar in all directions) deposits in cross-section may actually be heterogeneous (varied) in nature due to the channel cutting and deposition of higher energy (larger) sediments laid down during higher energy storm events.

2. What appear to be continuous confining layers in cross section such as the CCE and the clay layer that separates the upper Tulare from the deeper Tulare may be riddled with more permeable channel deposits that compromise the layers' integrity, preventing them from serving as effective aquitard.

3. Intersecting the more permeable channel deposits with monitoring wells is difficult without detailed subsurface information. Groundwater typically flows preferentially much faster through channel deposits.

**Groundwater Monitoring Networks and Results**

The locations of the Valley Water McKittrick 1 & 1-3 Facility groundwater monitoring wells and select Clean Harbors facility groundwater monitoring wells are shown in Attachment G. The monitoring well network does not have any upgradient or up-structure wells

As part of the initial hydrogeologic investigation in 2002, Valley Water installed monitoring wells CYM-19H1 and CYM-17N1 in the upper Tulare and monitoring well CYM-21D1 in the deeper Tulare. The borings for the monitoring wells were drilled using air rotary drilling until groundwater was encountered. At that point, the drilling method was switched to mud rotary.

Analysis of groundwater samples obtained in 2002 contained elevated concentrations of EC, TDS, chloride, and boron. Valley Water's consultant Geomega, Inc., concluded in its September 2003 report titled *Hydrogeologic Characterization Report Valley Waste Disposal Company, Cymric Field Study* (Phase I Study) that produced wastewater from the ponds had infiltrated the upper Tulare at least as far as 0.75 miles from the Facility. The Phase I Study also concluded that groundwater samples from well CYM-21D1 indicated that produced wastewater had not reached groundwater in the deeper Tulare at that point at that time.

In 2006, Valley Water completed monitoring wells CYM-17K1, CYM-17M1, CYM-17Q1, and CYM-19H1 in an unsaturated portion of the upper Tulare down-structure from the wells installed in 2002. The well locations are also shown in Attachment G. These wells were positioned as "sentinel wells" that would indicate whether and when the plume of produced water reached those points in the upper Tulare downgradient from the ponds. Geomega, Inc., submitted an April 2007 report titled *Phase II Hydrogeologic Characterization Report Valley Waste Disposal Company, Cymric Field Study* (Phase II Report) including results from samples obtained in 2006. The Phase II report concluded that produced wastewater was present in the upper

Tulare, but the sentinel wells were dry. Well CYM-21D1, in the deeper Tulare, did not show any indication of a produced wastewater impact at the time of sampling.

Borehole/Monitoring well details are presented in Table 2.

Table 2. *Valley Water McKittrick 1 & 1-3 Groundwater Monitoring Well Information.*

| Well | Distance to VWMC[1] ponds | Well total depth (ft bgs[2]) | Surface Elevation (ft AMSL[3]) | Screen interval (ft AMSL[3]) | Screen interval (ft bgs) | 6/27/2017 Water elevation (ft AMSL[3]) |
|---|---|---|---|---|---|---|
| CYM-19H1 | 1,500 feet (0.28 miles) | 245 | 469.2 | 354-314 | 115-155 | 349.5 |
| CYM-17N1 | 3,300 feet (0.62 miles) | 240 | 451.5 | 347-287 | 105-165 | 326.1 |
| CYM-17M1 | 4,300 feet (0.81 miles) | 197 | 446.5 | 292-262 | 155-185 | 279.0 |
| CYM-17Q1 | 5,438 feet (1.03 miles) | 208 | 437.6 | 278-238 | 160-200 | 240.8 |
| CYM-17K1 | 5,861 feet (1.11 miles) | 210 | 427.9 | 278-228 | 150-200 | 273.2 |
| CYM-21D1 | 6,700 feet (1.27 miles) | 300 | 427.1 | 274-294 | 274-294 | 149.1 |

[1] VWMC = Valley Water Management Company
[2] ft bgs = feet below ground surface
[3] AMSL = feet above mean sea level

In September 2010, Valley Water submitted a self-monitoring report titled *Valley Water Waste Disposal Company, 2010 Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area* prepared on its behalf by Schlumberger Water Services. The report indicates that sentinel wells CYM-17K1, CYM-17M1, CYM-17Q1 contained a significant amount of water, but Valley Water did not sample the wells. Subsequent reports state that sentinel well soundings are provided in field notes, but the reports do not contain field notes.

In February 2015, Valley Water submitted a self-monitoring report titled *Valley Water Management Company, 2014 Second Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area* prepared by J Schlumberger Water Services and summarizing data collected in November 2014. The report indicates that CYM-17M1 had 26.56 feet of water, CYM-17K1 had 48.99 feet of water, CYM-17Q1 had 6.93 feet of water at the time of sampling demonstrating that produced wastewater was present in the sentinel wells (CYM-17K1, CYM-17M1, CYM-17Q1), and that these wells were hydraulically downgradient from the wells installed in 2002. The report also concluded that there were no indications of a produced water impact on the groundwater monitored by well CYM-21D1 in the deeper Tulare, even though chemical constituent concentrations associated with produced wastewater (e.g., EC, TDS, and chloride) had been increasing in well CYM-21D1 since about 2002, and more significantly since 2010, as shown in Attachment H.

In October 2017, Valley Water submitted a technical report entitled *Valley Water Management Company, Cymric Area Sampling and Analysis Report, First Semi-Annual 2017* (October 2017 Report). The report was prepared by WSP USA on behalf of Valley Water and includes data from Valley Water's June 2017 monitoring event including sampling results from the Facility ponds and groundwater monitoring wells. Samples from each of the Valley Water wells in the upper Tulare were chemically similar to the produced wastewater in the ponds. Monitoring well CYM-21D1 in the deeper Tulare showed indications of produced water impacts. The report states, "The overall trend of increasing concentrations of chloride, magnesium, sodium, and boron at VWMC Deeper Tulare Sand well CYM-21D1 continued with the June 2017 sampling event with concentrations of chloride of 2,400 mg/L and TDS of 8,500 mg/L. The boron concentration in June 2017 was 22 mg/L. These concentrations are the highest recorded and indicate influence from produced water mixing with native groundwater." The data submitted in self-monitoring reports by Valley Water also indicate that from 2002 to 2017 the TDS concentrations in CYM-21D1 have increased from about 1,200 mg/L to 8,500 mg/L, and the chloride concentrations have increased from 334 mg/L to 2,400 mg/L. Table 3 summarizes the Valley Water data. As previously mentioned, the TDS and chloride trends are presented in Attachment H. This information along with the increasing water levels in the Valley Water Facility groundwater monitoring wells indicates the mound of produced water emanating from the Facility ponds is continuing to expand. Attachments I.1 and I.2 present the water level trends. The direction of groundwater flow is predominantly to the northeast.

Table 3. *Valley Water McKittrick 1 & 1-3 Facility Groundwater Monitoring Well Water Quality.*

| Well ID | Distance from ponds (ft[1]) | No. of results & (date range) | EC (umhos/cm[2]) | TDS (mg/L[3]) | Boron (mg/L[3]) | Chloride (mg/L[3]) |
|---|---|---|---|---|---|---|
| CYM-19H1 | 1,500 | 15 (2002 – 2017) | 15,600 – 19,060 | 10,500 – 14,000 | 30 – 41 | 4,120 – 5,400 |
| CYM-17N1 | 3,500 | 15 (2002 – 2017) | 10,900 – 24,870 | 7,450 – 18,000 | 20 – 76 | 2,700 – 7,900 |
| CYM-17M1 | 4,400 | 5 (2014 – 2017) | 24,080 24,430 | 12,000 – 15,000 | 41 – 55 | 5,100 – 5,700 |
| CYM-17Q1 | 5,300 | 5 (2014 – 2017) | 24,440 – 24,900 | 13,000 – 16,000 | 45 - 60 | 4,900 – 5,900 |
| CYM-17K1 | 5,900 | 5 (2014 – 2017) | 24,250 – 24,390 | 16,000 – 18,000 | 55 - 68 | 4,200 – 7,200 |
| CYM-21D1 | 6,850 | 15 (2002 – 2017) | 1,970 – 5,430 | 1,200 – 8,500 | 2.5 - 22 | 334 - 2,400 |

[1] ft = feet.
[2] umhos/cm = micromhos per centimeter.
[3] mg/L = milligram per liter.

Central Valley Water Board staff have reviewed the self-monitoring reports for the Clean Harbors Class I landfill facility. As described previously, the Clean Harbors facility is about 1.5 miles to the east-northeast, as shown on Attachment B. The Clean Harbors facility is also down structure and down gradient of the McKittrick 1 & 1-3 Facility ponds. In its hydrogeological investigations, Clean Harbors has differentiated threes zones that contain groundwater: 1. Perched zone, 2. Intermediate zone, and 3. Lower zone. These zones generally correspond to the Alluvium, upper Tulare, and deeper Tulare.

Valley Water obtained split samples during the June 2017 sampling of the Clean Harbors groundwater monitoring wells. In part, the samples were analyzed for general minerals and stable isotopes of oxygen and hydrogen. Generally, the native groundwater in the Cymric area is enriched in sodium, calcium, and sulfate, likely due to the abundance of gypsum present throughout the sediments of the Tulare formation. In contrast, the produced wastewater discharged to Valley Water's ponds are marine waters from deeper zones that occur with petroleum and, as such, are enriched with sodium and chloride.

Clean Harbors' groundwater monitoring wells MW-148I and MW-102RL are on the upgradient side of the Class I facility (i.e., the side closest to the McKittrick 1 & 1-3 Facility) (Attachment G). MW-48I is screened in the upper Tulare sand and MW-102RL is screened in the deeper Tulare. Groundwater sample analyses from monitoring well MW-148I and MW-102RL indicate that TDS and chloride concentrations in these wells has been increasing from as early as 2007, as shown on Attachments J.1 and J.2. From 2011 to 2017, the TDS in MW-148I has increased from about 2,340 mg/L to 5,400 mg/L, and from 2009 to 2017 the chloride concentration has increased from about 246 mg/L to 1,200 mg/L. From 2013 to 2017, the TDS in MW-102RL has increased from about 3,040 mg/L to 3,900 mg/L, and from 2007 to 2017 the chloride concentration has increased from about 450 mg/L to 740 mg/L. Concentrations of sulfate have been stable. The data suggest that groundwater at the Clean Harbors location has been adversely impacted by produced wastewater and polluted with respect to TDS and chloride.

Stable isotopes of oxygen and hydrogen can be used to differentiate between wastewaters discharged to ponds and native groundwaters, or a combination thereof. The ratios of $H^2$ to $H^1$ and $O^{18}$ to $O^{16}$ are measured in each sample and are expressed as parts-per-thousand differences from that of Vienna Standard Mean Ocean Water. They are then plotted with $\delta^2H$ on the y-axis and $\delta^{18}O$ on the x-axis, as shown on Attachment K.1 and K.2. The plotted points are compared to the Global Meteoric Water Line or a Local Meteoric Water Line. Native groundwater that has not been significantly evaporated plots below, but near the LMWL, as shown on Attachment K.1 and K.2. Wastewater that has been subject to significant evaporation in ponds plots farther to the right side of the graph, and farther from the LMWL. Mixtures plot in between the two, with those containing more pond water plotting farther to the right than those containing less pond water.

Attachment K.1 and K.2 show results from Clean Harbors MW-170L and Kern County Water Well 23. These wells are below and slightly to the right of the LMWL, and probably do not represent groundwater that has been mixed with any significant volume of produced wastewater from ponds. There are only single sample results for Clean Harbors MW-102RL and MW-149I,

but these wells plot farther from the LMWL indicating possible mixing with produced wastewater from the McKittrick 1 & 1-3 ponds. MW-148I plots still farther to the right of the LMWL. From 2006 to 2017, data for CYM-21D1 shows consistent movement away from the LMWL and towards the data associated with the Valley Water Mickittrick 1 & 1-3 Upper Tulare Formation wells CYM-19H1, CYM-17N1, CYM-17K1, CYM-17M1, CYM-17Q1, and CYM-19H1. The quality of groundwater in these wells reflects primarily the quality of produced wastewater discharged to the McKittrick 1 & 1-3 Facility ponds. Isotope data for the produced wastewater from the Mickittrick 1 & 1-3 Facility ponds is included in Attachment K.2 for reference. As expected, it is generally farther to the right and away from the LMWL. The isotope results of the groundwater samples CYM-21D1 and from Clean Harbors' wells MW-102RL, MW-148I, and MW-149I show that produced wastewater is mixing with groundwater in the upper and deeper Tulare sands, at least as far down gradient as Clean Harbors. .

The ionic composition of the minerals dissolved in a water (wastewater, unaffected groundwater, or a combination of both) can be used to classify the water based on the dominant dissolved anions (negatively charged) and cations (positively charged). The ionic composition of the water is expressed in milliequivalents per liter (meq/L). A milliequivalent is a measurement of the molar concentration of the ion, normalized by the ionic charge of the ion. The dominant dissolved ion must be greater than 50 percent of the total. For example, water classified as a sodium-bicarbonate-type water contains more than 50 percent of the total cation milliequivalents as sodium and more than 50 percent of the total anion milliequivalents as bicarbonate. If no cation or anion is dominant (greater than 50 percent), the water is classified as mixed and the two most common cations or anions in decreasing order of abundance are used to describe the water type. For example, a water containing 45 percent sodium, 35 percent calcium, and 20 percent magnesium, and 55 percent bicarbonate, 30 percent sulfate, and 15 percent chloride would be classified as a sodium-calcium-bicarbonate-type water. Stiff and Piper diagrams can be used to illustrate the ionic composition of water samples (e.g., wastewater, unaffected groundwater, or a combination of both.) and, with sufficient data, how the composition changes over time.

Stiff diagrams provide a graphical representation of geochemical data and are often used when qualitative comparison of many analyses is needed. A polygonal shape is created by plotting major cation and anion concentrations in milliequivalents on parallel horizontal lines with anions plotted to the right of a vertical zero line and cations plotted to the left.

Stiff diagrams presented on Attachments L.1 – L.4 show recent water quality of the Facility produced wastewater, water quality of wells that appear to be unaffected by the produced wastewater (which is date dependent), and water quality in Valley Water and Clean Harbors groundwater monitoring wells that have been impacted by produced wastewater. The Stiff diagrams indicate that the Valley Water monitoring wells between the Facility ponds and the Clean Harbors groundwater monitoring wells have been affected by produced wastewater when compared to the unaffected water quality. Well CYM-21D1 (Attachment L.4) has shown a steady increase in some cations and anions and primarily sodium and chloride, indicative of increasing impacts over time from produced wastewater. Significant impacts are also appearing in some of the Clean Harbors facility monitoring wells down gradient of the Valley Water groundwater monitoring well network. The primary source of produced wastewater is

discharges from the Facility ponds.

For the attached Piper diagrams, cation and anion concentrations for each of the produced wastewater and groundwater samples have been converted to total meq/L and plotted as percentages of their respective totals in two triangles (Attachments M.1-M.4). The cation and anion relative percentages in each triangle are then projected into a quadrilateral polygon that describes the water type. The attached Piper diagrams provide graphical representations of the major cations and anions for Valley Water's produced wastewater ponds, waters that appear to be unaffected by infiltrated produced wastewater, and waters that have been impacted by produced wastewater over timeappear to show a progressive mixing over time between the two types (CYM-21D1).

These diagrams show that the Valley Water produced wastewater is dominated by sodium and chloride (Attachment M.1). Better quality water that appears to be largely unaffected by the produced wastewater is more sulfate-rich, consistent with groundwater typical of the west side of the San Joaquin Valley, and here represented by wells MW-170L, MW-149I, Belridge 16, and CYM-21D [in 2006]) on Attachment M.2). Piper diagrams for several wells show mixing of produced wastewater with better quality water (Attachment M.3), or in the case of well CYM-21D1, increasing impacts over time from produced wastewater (Attachment M.4), which clearly shows a shift from a sulfate type water to a chloride type water with time.

Notwithstanding the above, the October 2017 Report concludes that Valley Water's discharges from its McKittrick 1 & 1-3 Facility ponds have not impacted groundwater in Clean Harbors' upgradient monitoring wells and proffers the following arguments:

- Groundwater levels in the Clean Harbors' wells have been decreasing while levels in the Valley Water wells are increasing. The report states, therefore, the wells are not hydraulically connected.

- Boron concentrations have been increasing in the Valley Water monitoring wells and show no trends in Clean Harbors' wells.

- The calculated groundwater flow velocity shows that the produced water constituents could not have reached the Clean Harbors' wells at this time.

- The pH of the water from the Valley Water monitoring well CYM-21D1 is more acidic (6.6 to 6.8) than the groundwater from the nearest Clean Harbors groundwater monitoring wells, which are more alkaline (7.5 to 8.1). The report states, therefore, the wells are not hydraulically connected.

The arguments posited by WSP USA on Valley Water's behalf are not persuasive. Valley Water has provided no evidence of a geologic structure that would impede or isolate the produced wastewater discharged into and from the McKittrick 1 & 1-3 Facility ponds from the Clean Harbors' facility monitoring wells. Further, the Clean Harbors' facility is down structure from and much closer to large areas of irrigated agriculture than the McKittrick 1 & 1-3 Facility ponds. The decrease in the Clean Harbors' groundwater monitoring well water levels is likely due to

increased pumping of groundwater for irrigation during the recent current drought conditions. The increases in the groundwater levels in the Valley Water monitoring wells are probably due to the large volume of percolated produced wastewater that is moving through the formations tapped by the groundwater monitoring wells.

That boron concentrations in samples from the Clean Harbors' groundwater monitoring wells are not increasing is not unexpected. Boron tends to be mobile in sands and gravels, but readily adsorbs to finer grained soils such as silts and clays. Therefore, the boron front of a plume typically moves slower through the subsurface than more conservative constituents, such as chloride. As mentioned, chloride concentrations have been increasing in samples from Clean Harbors' groundwater monitoring wells.

Lastly, the groundwater flow velocity calculation presented in the October 2017 Report assumes a consistent flow gradient, employs a hydraulic conductivity value derived from the analysis of one soil sample, and uses an assumed effective porosity. The report gives no consideration to the heterogeneous nature of the local hydrogeology. For example, produced wastewater that finds its way into a subterranean channel comprised of coarse sand or gravel will travel much faster than calculated.

The pH in CYM-21D1 has ranged from 7.73 to 10.7 pH units. The pH in the Clean Harbors wells historically ranged from 7.5 to 8.1 pH units. The pH range for CYM-21D1 overlaps the pH range reported for the Clean Harbors wells, which contradicts the assertion made in the October 2017 Report.

**Downgradient Groundwater Quality and Beneficial Uses**

The beneficial uses of groundwater in the Cymric area designated by the Basin Plan are: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), and Industrial Service Supply (IND). In many instances, the quality of groundwater to the east of the McKittrick 1 & 1-3 Facility ponds is of sufficient quality to meet water quality objectives for MUN, AGR, and IND.

Attachment N shows the locations of select Clean Harbors monitoring wells and existing water supply wells, mostly agricultural wells, downgradient of the McKittrick 1 & 1-3 ponds. As described above, TDS and chloride concentrations in MW-148I and MW-102RL have increased over time. The historical quality in MW-148I was suitable for MUN and AGR. It now appears to be unsuitable for both.

Attachment N shows several agricultural wells operated primarily by Starrh Family Farms, LP (Starrh Farms) to the north of the McKittrick 1 & 1-3 Facility and the Clean Harbors facility. Starrh Farms well Belridge 7 had a TDS of 2,700 mg/L in 2013 when it was last sampled by AMEC, Foster, Wheeler. The sampling notes indicate that at the time of sample collection the well was actively pumping, and presumably irrigating crops. Other agricultural wells in the area have TDS values ranging from 2,300 mg/L to 6,800 mg/L. The agricultural well closest to the Valley Water Facility had a TDS of 18,000 mg/L. The better quality wells contain TDS and chloride concentrations that do not require dilution prior to use on salt-tolerant crops. The wells

with higher TDS concentrations can be blended with higher quality surface water to irrigate a variety of crops. On 26 January 2018, Starrh Farms communicated to Board staff that these wells are very important to its operations when surface water allocations are short.

Attachment N also shows TDS concentrations for many agricultural wells to the east of the McKittrick 1 & 1-3 Facility and Clean Harbors. The TDS values for these wells range from 391 mg/L to 5,952 mg/L. Data for these wells is old but do demonstrate that high quality groundwater has existed, and presumably exists today, down gradient of the McKittrick 1 & 1-3 Facility.

**Additional Groundwater Monitoring Well Installation Work Plan**

On November 2014, Kennedy/Jenks Consultants and Schlumberger Water Services, on behalf of Valley Water submitted a report titled, *Monitoring Well Installation Work Plan for the McKittrick Ponds, Cymric Oil Field, California* (Work Plan). Kennedy/Jenks then met with Board staff on 6 January 2015 to discuss the Work Plan. On January 2015, Kennedy/Jenks submitted a proposed modification to the Work Plan. The Work Plan proposed to drill three to four borings and install at least two, and possibly four monitoring wells to further characterize the vadose zone and groundwater. The work plan proposed to drill in two phases. In the first phase, two wells would be drilled "soon" (CYM-19H2 and CYM-21D2) and two borings (CYM-17H1 and CYM-17H2) would be drilled later because they were proposed in an area of protected species habitat. CYM-19H2 would be installed as a deep groundwater monitoring well. CYM-21D2 would be installed as a shallow monitoring well or if water was not encountered, as a sentinel well. If groundwater quality changed in the CYM-21D1 well (CYM-21D1 is now impacted), then CYM-17H2 would be installed as a deep groundwater monitoring well.

On January 2015, Board staff issued a letter to Valley Water generally concurring with the Work Plan. Staff requested a second monitoring be installed above the Upper Tulare Clay, and that CYM-17H1 be installed.

As of January 2018, Valley Water has not implemented the proposed work plan.

On April 2016, Valley Water submitted a report titled *Biological Report for the Valley Water Management Cymric Water Monitoring Well Project* (Biological Report). The Biological Report concluded that well 17H1 and well 17H2 could be installed but that the other proposed wells were in endangered species habitat. It also stated that it there is enough room near a Clean Harbors monitoring well location for a drilling rig. Further, the Biological Report stated, "As for the other monitoring wells that were proposed near the McKittrick pond facility, it appears that we will have to obtain a "take" in permit prior to the installation of those wells. A "take" permit currently requires at least six months and more likely one year to obtain a permit."

As of January 2018, Valley Water has not provided an update on whether it sought or acquired a "take" permit (or whether one was denied) for the installation of CYM-19H2 and CYM-21D2 monitoring wells, nor if the 17H1 and well 17H2 wells have been installed.

**Groundwater Monitoring Conclusions**

Several lines of evidence, including but not limited to, increasing water levels in Valley Water's groundwater wells, increasing concentrations of TDS and chloride in Valley Water's CYM-21D1 and Clean Harbors' MW-148I and MW-102RL groundwater monitoring wells, and isotope data support the conclusion produced wastewater from the Valley Water McKittrick 1 & 1-3 ponds has migrated and continues to migrate down-structure through the previously unsaturated sediments of the upper Tulare and has also impacted groundwater quality in the regional aquifer in the deeper Tulare.

Existing information indicates the waste constituents have migrated at least 2.2 miles (well MW-148I) down gradient from the Facility in the upper Tulare and 1.9 miles (well MW-102RL) down gradient in the deeper Tulare, which is generally thought to be connected to the regional aquifer. Water Board staff believe the discharge is adversely affecting, to the point of pollution groundwater, that has designated beneficial uses of MUN, AGR, and IND, and existing beneficial uses of AGR. Valley Water has only completed one monitoring well in the deeper Tulare making it difficult to adequately assess aquifer characteristics and the dynamics of the wastewater plume. The information also demonstrates that the Alluvium, upper Tulare, and deeper Tulare units are hydraulically connected. Given the nature of the local depositional environment, the existing groundwater monitoring well network is not sufficient to characterize the downgradient extent of the produced wastewater plume. The heterogeneity inherent in alluvial/fluvial systems produces preferential pathways through the sediment that are difficult to capture with a handful of sampling points spread over four or five square miles. Staff believes there is a good chance that produced wastewater traveling through channels of course grained materials has migrated far beyond the Clean Harbors facility, but it has not been detected due to limitations associated with the existing groundwater monitoring network.

Additional hydrogeologic investigation and expansion of the groundwater monitoring well network is needed to collect more data on groundwater movement and aquifer characteristics. Also, a regulated monitoring program is required to ensure consistency in reporting and data quality. A thorough evaluation of the aquifer systems east of the Valley Water ponds is needed to fully understand the extent and dynamics of the percolated wastewater plume.

**MONITORING AND REPORTING PROGRAM (MRP) R5-2017-0806 AND PROPOSED MRP**

Central Valley Water Board staff prepared a draft Monitoring and Reporting Program for the Facility and made it available, as a courtesy, to Valley Water on 3 October 2016. Valley Water submitted comments on the draft MRP on 26 October 2016 and Monitoring and Reporting Program No. R5-2017-0806 was issued 26 June 2017 under authority delegated to the Executive Officer by the Board.

The intent, in part, of the MRP was to compel Valley Water to fully characterize its discharge to the McKittrick 1 & 1-3 Facility and fully delineate the plume of wastewater migrating from beneath its ponds. Additionally, the intent was also to ensure that the Board had an enforceable

mechanism in place to ensure the timely submittal of quality self-monitoring reports. As mentioned earlier, submitted reports sometimes were missing materials referenced therein.

On 5 July 2017, Valley Water submitted a request to rescind the MRP (Attachment O). The rescission request made the following points:

1. Since MRPs are indentd to be a part of WDRs, it should be subjected to public notice and comment periods for WDRs described under Water Code section 13167.(a)(1);
2. Since the MRPs are intended to be a part of WDRs, issuance of MRPs cannot be delegated to the Executive Officer; and
3. Staff had not an provided an explanation with respect to Water Code section 13267(b)(1) which states in part "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."

The recession request also Valley Water's interest to discuss potential regulatory coverage for the Facility by one of the General Orders for Oil field Discharges to Land. On 1 September 2017, the Executive Officer rescinded MRP R5-2017-0806 and notified Valley Water that a revised MRP would be prepared for Board consideration.

Water Code section 13267 authorizes the Central Valley Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the State. This authority is independent of Water Code section 13263, which provides the Board the authority to issue WDRs. Water Code section 13167.5(a)(1) specifically cites the types of orders to which a 30-day public notice and comment period are required and monitoring and reporting programs issued pursuant to Water Code section 13267 is not cited.

The proposed MRP Order includes Facility inspections, maintenance requirements, effluent monitoring, and groundwater monitoring. The MRP would require Valley Water to report on the quantity and quality of produced wastewater before it is discharged to the ponds, the quality of produced wastewater while it resides in the ponds, and the quality of monitoring well water.

The MRP would require Valley Water to install additional monitoring wells to delineate the vertical and lateral extent of the produced wastewater plume to help to ensure the protection of designated beneficial uses of groundwater.

The MRP requires wastes (solids, liquid, and semi-solids) and groundwater to be analyzed for a wide range of constituents that are defined in MRP Table 1. Monitoring reports would be required to include full laboratory reports.

Some of the more important MRP requirements are outlined below:

- The submittal of information regarding the use of all chemicals used during well drilling, installation, operation, and maintenance activities associated with each well generating waste materials (liquids and solids) that are discharged to the McKittrick 1 & 1-3 Facility ponds.

- The submittal of a Monitoring Well Installation and Sampling Plan (MWISP) within 60 days of MRP issuance. The MWISP would provide for the installation of an appropriate number of upgradient/up-structure dip groundwater monitoring wells to identify background water quality and an appropriate number of downgradient/down-structure and cross gradient/cross-structure dip wells to delineate the plume of produced wastewater emanating from the Facility ponds in both the shallow and deep groundwater zones.

- The submittal of a Monitoring Well Installation Completion Report (MWICR) within 90 days of installation of a groundwater monitoring well(s).

- The submittal of Quarterly monitoring reports whether or not there is a discharge.

The MRP issued on 26 June 2017, and the MRP now proposed, are very similar to those in General Order Number One and General Order Number Two. With respect to Water Code section 13267(b)(1) requirements, Valley Water owns and operates the Facility. Facility discharges have migrated and continue to migrate to the east and are adversely affecting groundwater in the regional aquifer, which is designated for MUN, AGR, and IND, and is used nearby for AGR. The monitoring requirements contained in the MRP are necessary to fully characterize the discharge and the lateral and vertical extent of the groundwater plume emanating from the Facility and inform an effective strategy to protect water quality. The related costs are similar to those carried by other dischargers under General Order Number One and General Order Number Two and are reasonable considering the magnitude of known and potentially ongoing impacts to water quality.

**PROPOSED RESOLUTION**

In addition to the proposed MRP, staff has prepared a resolution seeking guidance from the Central Valley Water Board on how to regulate the Facility given Valley Water's request to have the McKittrick 1 & 1-3 Facility discharges covered under General Order Number Three. General Order Number Three does not require groundwater monitoring, and as shown, the Facility is responsible for an undefined plume of produced wastewater that is migrating northeast polluting groundwater with both designated and existing beneficial uses.

The following options are apparent:

1. Enroll the Facility under one of the General Orders for oil field discharges to land,

2. Prepare a order to compel Valley Water to bring discharges from its McKittrick 1 & 1-3 Facility into compliance with Resolution No. 69-199 or to cease discharge,

3. Require Valley Water to submit a report of waste discharge to receive an updated set of individual waste discharge requirements (This option would probably also require a schedule to come into compliance or cease discharge.).

***Option 1***

Valley Water has asked in meetings to have the discharges from the McKittrick 1 & 1-3 Facility covered under General Order Three, which does not require groundwater monitoring. The primary reason expressed is that implementing the MRP for General Order Number Three is less expensive because it does not require groundwater monitoring.

Board staff does not believe coverage under any of the General Orders is appropriate for the following reasons:

1. General Order Number One requires discharges to comply with the Basin Plan effluent limits for EC, chloride, and boron. As described earlier, Valley Water's discharges greatly exceed these limits and, therefore, cannot comply with them.
2. General Order Number Two requires discharges to comply with the State Anti-degradation Policy. As Valley Water's discharge comingles with better quality groundwater down gradient, given its high salinity, it will caused degradation, and likely pollution. Therefore, the discharge cannot comply with General Order Number Two.
3. General Order Three requires dischargers to either demonstrate that there is no groundwater beneath the discharge areas and that produced wastewater and constituents associated with other approved wastes discharged will not migrate into areas that there is groundwater with designated beneficial uses, or if there is first encountered groundwater underlying the discharge location, demonstrate that the current Basin Plan groundwater beneficial uses are eligible for de-designation. There is first encountered groundwater underlying the Facility and within the influence of the Facility discharges; however, in Board staff's opinion the beneficial uses likely are not eligible for de-designation because locally the quality of this groundwdater is suitable for its designated beneficial uses and groundwater is beneficially used within a short distance from the Facility. Valley Water's monitoring reports indicate that its discharges are likely polluting groundwater in the regional aquifer (CYM-21D1 and MW-148I), which has an active beneficial use of AGR. Additionally, the produced wastewater has migrated to the east and beyond the Facility groundwater monitoring well network. To date, the extent of plume migration has not been fully characterized, but given the local hydrogeology, it is expected to remain uncontained and continue to migrate eastward. Therefore, the discharge likely cannot comply with General Order Number Three.

## Option 2

Another option would be for Board staff to prepare for Board consideration an Order that provides Valley Water a time schedule to come into compliance with Waste Discharge Requirements Resolution No. 69-199 (Resolution). The Resolution issued to Valley Water states:

1. The discharge shall not cause a pollution of ground or surface waters.

Under the Explanation of Requirements section of the resolution, it states:

1. The Discharge shall not cause a pollution of ground or surface waters.

   Pollution means an impairment of the quality of waters of the state by sewage or other waste to a degree which does not create an actual hazard to the public health, but which does adversely and unreasonably affect such waters for domestic, industrial, agricultural, navigational, recreational, or other beneficial use.

As described above, data indicate that the produced wastewater migrating from the McKittrick 1 & 1-3 Facility ponds is polluting or threatening to pollute downgradient groundwater.

Water Code section 13300 states:

> Whenever a regional board finds that a discharge of waste is taking place or threatening to take place that violates or will violate requirements prescribed by the regional board, or the state board, or that the waste collection, treatment, or disposal facilities of a discharger are approaching capacity, the board may require the discharger to submit for approval of the board, with such modifications as it may deem necessary, a detailed time schedule of specific actions the discharger shall take in order to correct or prevent a violation of requirements.

Water Code section 13301 states:

> When a regional board finds that a discharge of waste is taking place, or threatening to take place, in violation of requirements or discharge prohibitions prescribed by the regional board or the state board, the board may issue an order to cease and desist and direct that those persons not complying with the requirements or discharge prohibitions (a) comply forthwith, (b) comply in accordance with a time schedule set by the board, or (c) in the event of a threatened violation, take appropriate remedial or preventive action. In the event of an existing or threatened violation of waste discharge requirements in the operation of a community sewer system, cease and desist orders may restrict or prohibit the volume, type, or concentration of waste that might be added to that system by dischargers who did not discharge into the system prior to the issuance of the cease and desist order. Cease and desist orders may be issued directly by a board, after notice and hearing.

Given the hydrogeology of the Facility site and surrounding area, the large volume of highly saline water that has been, and continues to be, released into underlying aquifers; and the existing beneficial uses of groundwater just to the northeast of the Facility, the preparation for Board consideration of a compliance schedule under Water Code section 13300 (Time Schedule Order) or 13301 (Cease and Desist Order) could be appropriate.

## Option 3

Another option would be for Board staff to require Valley Water to submit a report of waste discharge supporting an updated set of individual waste discharge requirements (WDRs) pursuant to Water Code Section 13263. Given the nature of the discharge and Facility, Valley Water's discharges at the Facility would not likely be able to comply with updated WDRs, so a compliance schedule similar to that discussed for Option 2 would likely be necessary.

**Other Valley Water Facilities**

Valley Water operates or has operated three other nearby facilities (McKittrick 1-1 facility, McKittrick 6, 6A, & 6B facility; and the McKittrick 7 facility), as shown on Attachment P. The McKittrick 1-1 facility is active. Central Valley Water Board records indicate a flow of about 96,000 bbls/day in 2015. The average of flow is about 22,500 bbls/day. The McKittrick 6, 6A, and 6B facility and the McKittrick 7 facility have been inactive since 2014. Prior to the cessation of discharge, average flows of 90,000 bbls/day and 29,000 bbl/day, respectively were documented for these facilities. Current and historic subsurface discharges from these facilities could potentially be adding to the plume associated with the McKittrick 1 and 1-3 Facility. The Central Valley Water Board's direction regarding the proposed MRP and the proposed Resolution will inform Board staff on how to proceed with these facilities and others like them.

**CONCLUSIONS AND RECOMMENDATIONS**

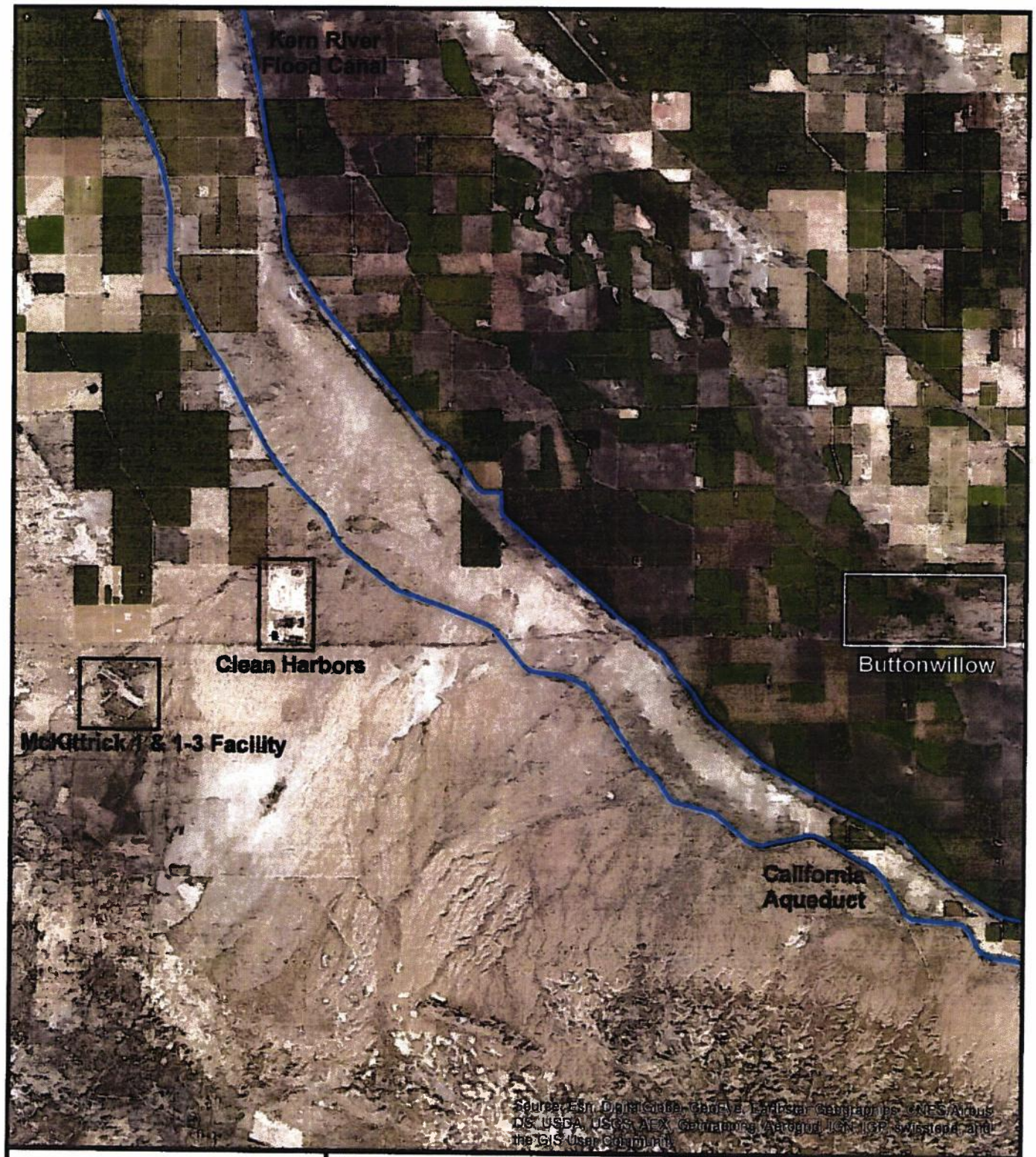
Valley Water's McKittrick 1 & 1-3 Facility ponds are the source of a plume of very saline produced wastewater that exceeds for several constituents water quality objectives necessary to support locally designated beneficial uses of MUN, AGR, and IND. AGR is an existing beneficial use in the area. Staff believes the plume has migrated beyond Valley Water's groundwater monitoring well network and downgradient and down-structure at least 2.2 miles (well MW-148I) in the upper Tulare sand and 1.9 miles (well MW-102RL) in the deeper Tulare sand. The plume has caused the water in MW-148I to exceed MUN and AGR water quality objectives for TDS and chloride and water in MW-102RL to exceed MUN water quality objectives for chloride. These wells are screened in aquifers that supply local agricultural wells a short distance from the Facility. The plume threatens to impair the existing beneficial uses of these local wells.

The nature of the local depositional environment indicates that it is likely that the Alluvium, the upper Tulare sand, and the deeper Tulare sand contain stringers of coarser channel deposits that allow the preferential migration of produced wastewater down gradient and down structure. The heterogeneity inherent in these alluvial/fluvial systems makes it difficult to capture these deposits with a handful of sampling points spread over four or five square miles. Staff believes there is a good chance that produced wastewater traveling through channels of course grained materials has migrated from the Valley Water Facility far beyond the Clean Harbors facility, but it has not been detected due to limitations associated with the existing groundwater monitoring network.

Board staff believe the proposed monitoring and reporting program is necessary to fully characterize the discharge and ensure the completion of additional hydrogeologic investigation and expansion of the groundwater monitoring well network to fully define the lateral and vertical extent of the Facility plume and recommend adoption by the Board.

Valley Water has requested coverage under General Order Number Three. Given the Facility location, geographically and geologically, relative to groundwater with an existing AGR beneficial use, the nature of the depositional environment, and the unknown expanse of the

plume migrating to the northeast, Board staff do not believe the Facility discharge meets the requirements to be regulated under the General Orders for Oil Field Discharges to Land. Therefore, Board staff has proposed for Board consideration a Resolution soliciting Board direction on how to best bring discharges from the Facility into compliance with existing or updated waste discharge requirements.




N

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**EXTENDED VIEW OF THE MCKITTRICK 1 & 1-3 FACILITY**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT A**

N

0 0.25 0.5 1 Miles

**SITE MAP OF THE MCKITTRICK 1 & 1-3 FACILITY AND PROXIMITY TO OIL FIELDS**

STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT B**

a. WSP USA. October 2017. Valley Water Management Company, Cymric Area Sampling and Analysis Report, First Semi-Annual 2017.
b. Valley Water Management Company. July 2017. Request For Rescission of Monitoring and Reporting Program Order No. R5-2017-0806.
c. WSP | Parsons Brinckerhoff. January 2017. Valley Water Management Company, 2016 Second Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
d. Schlumberger Water Services. September 2016. Valley Water Management Company, 2016 First Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
e. Schlumberger Water Services. April 2016. Valley Water Management Company, 2015 Second Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
f. Schlumberger Water Services. August 2015. Valley Water Management Company, 2015 First Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
g. South Valley Biological Consulting LLC. January 2016. Biological Report for the Valley Water Management Cymric Water Monitoring Well Project.
h. Valley Water Management Company. December 2015. Letter: Response to Notice of Violation (NOV) regarding the 13267 Order.
i. Central Valley Water Board Staff. November 2015. Notice of Violation - Failure to Furnish Complete Technical Report, Valley Water Management Company.
j. Valley Water Management Company. June 2015. Technical report a summary table presenting analytical data as required by Central Valley Regional Water Quality Control Board's order (Order) under the California Water Code Directive Pursuant to Section 13267, dated April 1, 2015 and received by Valley Water Management Company on April 6, 2015.
k. Central Valley Water Board Staff. April 2015. California Water Code Directive Pursuant to Section 13267.
l. Schlumberger Water Services. February 2015. Valley Water Management Company, 2014 Second Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
m. Central Valley Water Board Staff, January 2015. Review of Modified Monitoring Well Installation Work Plan.
n. Kennedy/Jenks Consultants. January 2015. Proposed Modifications to the McKittrick Ponds – Cymric Oil Field Work Plan.
o. Kennedy/Jenks Consultants and Schlumberger Water Services. November 2014. Monitoring Well Installations Work plan for the McKittrick Ponds, Cymric Oil Field. California.
p. Schlumberger Water Services. February 2014. Valley Water Management Company, 2013 Second Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
q. Schlumberger Water Services. October 2013. Valley Water Management Company, First Semi-Annual 2013 Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
r. Schlumberger Water Services. October 2012. Valley Water Management Company, 2012 Second Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
s. Schlumberger Water Services. August 2012. Valley Water Management Company, First Semi-Annual 2012 Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
t. Schlumberger Water Services. October 2011. Valley Waste Disposal Company, Second Semi-Annual 2011 Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.

**DOCUMENTS LIST**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT C**

u. Schlumberger Water Services. July 2011. Valley Waste Disposal Company, 2011 Semiannual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
v. Schlumberger Water Services. September 2010. Valley Water Waste Disposal Company, 2010 Semi-Annual Sampling and Analysis Report, McKittrick 1 and 1-3 Ponds Cymric Area.
w. Central Valley Water Board Staff, December 2009. Review of Sampling and Analysis for Pond Water and Groundwater Monitoring Wells Located at the Cymric Study area.
x. Schlumberger Water Services. February 2010. Sampling and Analysis Plan for Pond water and Groundwater Monitoring Wells Located at the Cymric Study Area, Operated by Valley Waste Disposal Company.
y. Central Valley Water Board Staff, August 2009. Review of Phase II Hydrogeologic Characterization Report.
z. Geomega Inc. April 2007. Phase II Hydrogeologic Characterization Report Valley Waste Disposal Company, Cymric Field Study area.
aa. Central Valley Water Board Staff, March 2005. Review of Phase II Hydrogeologic Characterization work plan.
bb. Geomega Inc. March 2005. Revised Borehole/ Monitoring Well Locations, Valley Waste Disposal Company, Cymric Field Phase II Hydrogeologic Investigation.
cc. Geomega Inc. February 2005. Workplan – Phase II Hydrogeologic Characterization Valley Waste Disposal Company, Cymric Field (Phase II Workplan).
dd. Central Valley Water Board Staff, August 2004. Review of Hydrogeologic Characterization Report.
ee. Geomega Inc. September 2003. Hydrogeologic Characterization Report Valley Waste Disposal Company, Cymric Field Study area (Phase I).
ff. RWQCB Staff. August 2001. Review of: Hydrogeologic Characterization Workplan, Valley Waste Disposal Company, Cymric Field.
gg. Geomega Inc. June 2001. Hydrogeologic Characterization Workplan, Valley Waste Disposal Company, Cymric Field (Phase I Workplan).
hh. Valley Waste Disposal Company. April 2001. Fax Re: Cymric / McKittrick Plots
ii. RWQCB Staff. April 2001. Review memo of: Surface Geophysical Survey Report – McKittrick 1 & 1-3, Ponds (Sec. 19/R29S/T22E), Kern County, California.
jj. Strata Geophysical, Inc. November 2000. Electrical Geophysical Survey, Valley Waste Disposal Company, Percolation Ponds McK 1 & McK 1-3, Kern County, California.

Other Documents evaluated for this project were:

kk. Clean Harbors Buttonwillow, LLC. Quarterly Monitoring reports from third quarter 2005 through third quarter 2017 prepared by Cameron-Cole.
ll. GeoTracker GAMA (Groundwater Information System), Water Supply Well KERN-23, USGS Data Display.

**DOCUMENTS LIST**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT C**

mm. Aera Energy LLC

Belridge Area, Structure Map, Top of 22K Sand (Color, 32" x 38")
Belridge Area, Structure Map, Base of Upper Tulare Clay (Color, 24" x 32")
Southern Belridge Area, Structure Map, Top of 22K Sand (Color, 18" x 30")
Geophysical Logs from Starrh and Starrh Cotton Growers (SSCG) water supply wells WW-1, WW-2, WW-3, WW-4, WW-6, WW-7, and WW-9
Geophysical Log for monitoring well MW-2
Table of SSCG Well Completions Information [DLW's approx. Lat/Long and Ground Elevation of the SSCG wells determined using Google Earth Pro has been added to the Table because the surveyed location and elevation coordinates for the SSCG wells are not available]

nn. California Department of Water Resources

Well Completion Reports for SSCG wells WW-1, WW-2, WW-3, WW-4, WW-6, WW-7, and WW-9

oo. Belridge Water Storage District

Table 2 (Wells Sampled in May 2013) from *Westside Districts Groundwater Study*

pp. Westside Water Quality Coalition

Table 4 (Historical Analytical Results for Mineral/Metal Constituents in Unconfined/Semi-Confined Groundwater) from *Basin Plan Amendment Work Plan*

qq. Defendant's Exhibit from Kern County Superior Court, SSCG versus Aera Energy LLC

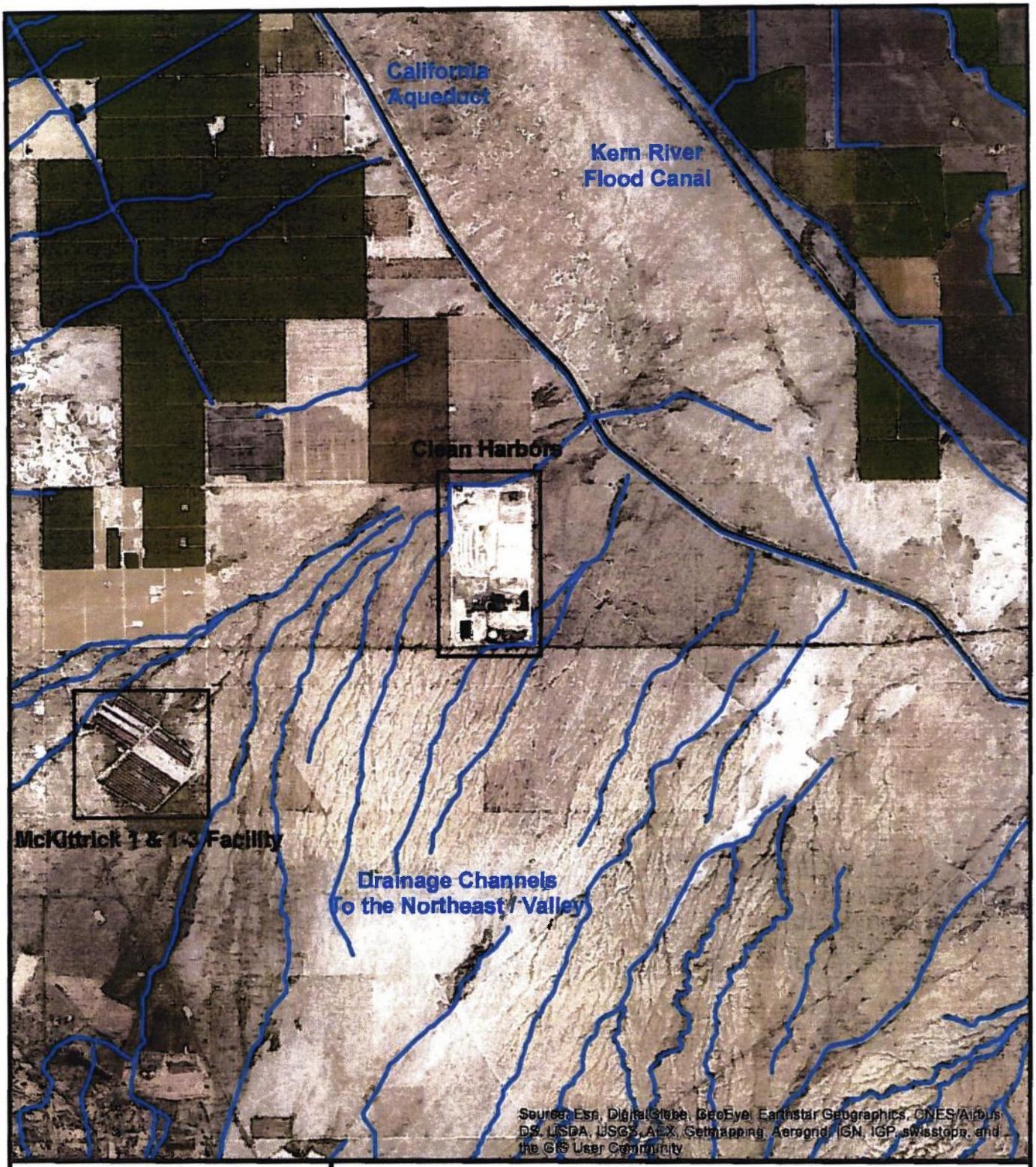
Defendant's Exhibit # 2001 (SSCG Irrigation and Monitoring Wells – Summary of 2003-2004 Analytical Results)

rr. Clean Harbors, Buttonwillow

Figure W-1 (Facility Map with well locations) 1987 Hydro-Geologic Assessment Report
Geophysical Logs for wells MW-S, MW-P, MW-G, West Side Water Well V, MW-F, MW-J, and MW-A (the approx. location of MW-S is on Figure 4 below)
Plate 2 (Facility Map with well locations) 1991
Plate 3 (Cross Sections B-B' and C-C') 1991
Figure 4 (Cross Sections Location Map) 1991
Geophysical Logs for wells/borings P-101, B-114, P-154L, P-156L, and MW-149I
Color Soil Boring/Well Construction Log for well MW-PRL, drilled in 2010

**DOCUMENTS LIST**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT C**




Drainage Data Originates From The Department of Water Resources

N

0 0.375 0.75 1.5 Miles

**MAP OF SURFACE DRAINAGE CHANNELS TO THE VALLEY**

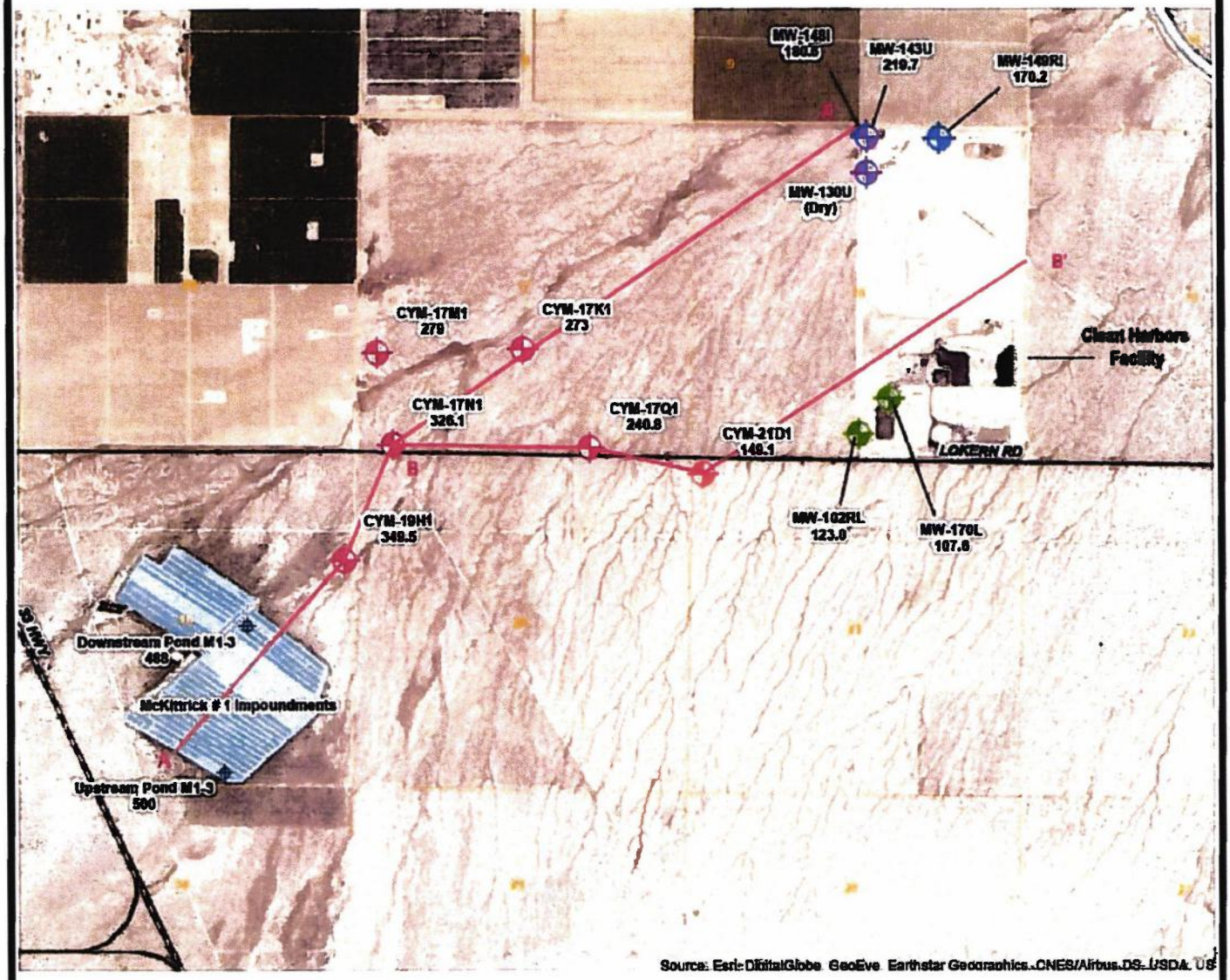
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT D**

| Facility | Data Source | Document Date | Volumes (barrels / day) |
|---|---|---|---|
| McKittrick 1 & 1-3 | Valley Water Management Company First Semi-Annual Monitoring Report (2017) | October 2017 | 42,000 |
| | Valley Water Management Company Second Semi-Annual Monitoring Report (2016) | January 2017 | 66,000 |
| | Valley Water Management Company Second Semi-Annual Monitoring Report (2014) | February 2015 | 105,000 |
| | Central Valley Water Board Inspection Report | May 16, 2014 | 101,000 |
| | Valley Water Management Company Second Semi-Annual Monitoring Report (2013) | February 2014 | 60,000 |
| | Valley Water Management Company First Semi-Annual Monitoring Report (2013) | October 2013 | 60,000 |
| | Central Valley Water Board Inspection Report | April 6, 2012 | 60,000 |
| | Valley Water Management Company Second Semi-Annual Monitoring Report (2012) | October 2012 | 60,000 |
| | Valley Water Management Company First Semi-Annual Monitoring Report (2012) | August 2012 | 60,000 |
| | Central Valley Water Board Inspection Report | April 8, 2011 | 60,000 |
| | Valley Water Management Company Second Semi-Annual Monitoring Report (2012) | October 2011 | 50,000 |
| | Valley Water Management Company First Semi-Annual Monitoring Report (2011) | July 2011 | 50,000 |
| | Central Valley Water Board Inspection Report | March 26, 2010 | 65,000 |
| | Valley Water Management Company First Semi-Annual Monitoring Report (2010) | September 2010 | 65,000 |
| | Central Valley Water Board Inspection Report | March 27, 2009 | 115,000 |
| | Central Valley Water Board Inspection Report | April 11, 2008 | 100,000 |
| | Central Valley Water Board Inspection Report | March 30, 2007 | 100,000 |
| | Central Valley Water Board Inspection Report | April 21, 2006 | 100,000 |
| | Central Valley Water Board Inspection Report | May 13, 2005 | 100,000 |
| | Central Valley Water Board Inspection Report | March 23, 2004 | 45,000 |
| | Central Valley Water Board Inspection Report | April 11, 2003 | 65,000 |
| | Central Valley Water Board Inspection Report | May 10, 2002 | 65,000 |
| | Valley Water Management Company Fax to the Central Valley Water Board | April 19, 2001 | 70,000 |
| | Central Valley Water Board Inspection Report | April 27, 2001 | 5,000 |
| | Central Valley Water Board Inspection Report | June 19, 1998 | 7,000 |

**FACILITY REPORTED FLOWS AND SOURCES**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT E**



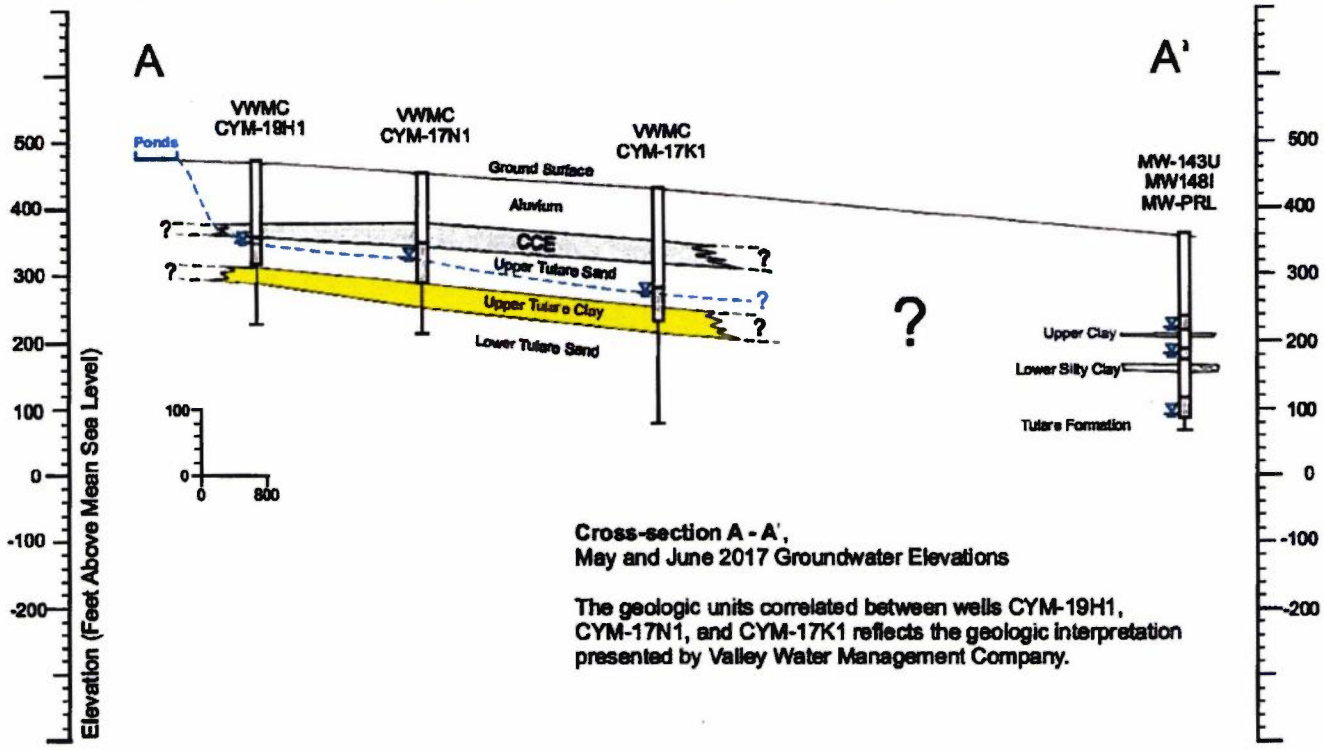

Source of Map:
Cymric Area Sampling and Analysis Report (First Semi-Annual 2012)
By WSP USA

N

0 0.1 0.2 0.4 0.6 0.8 Miles

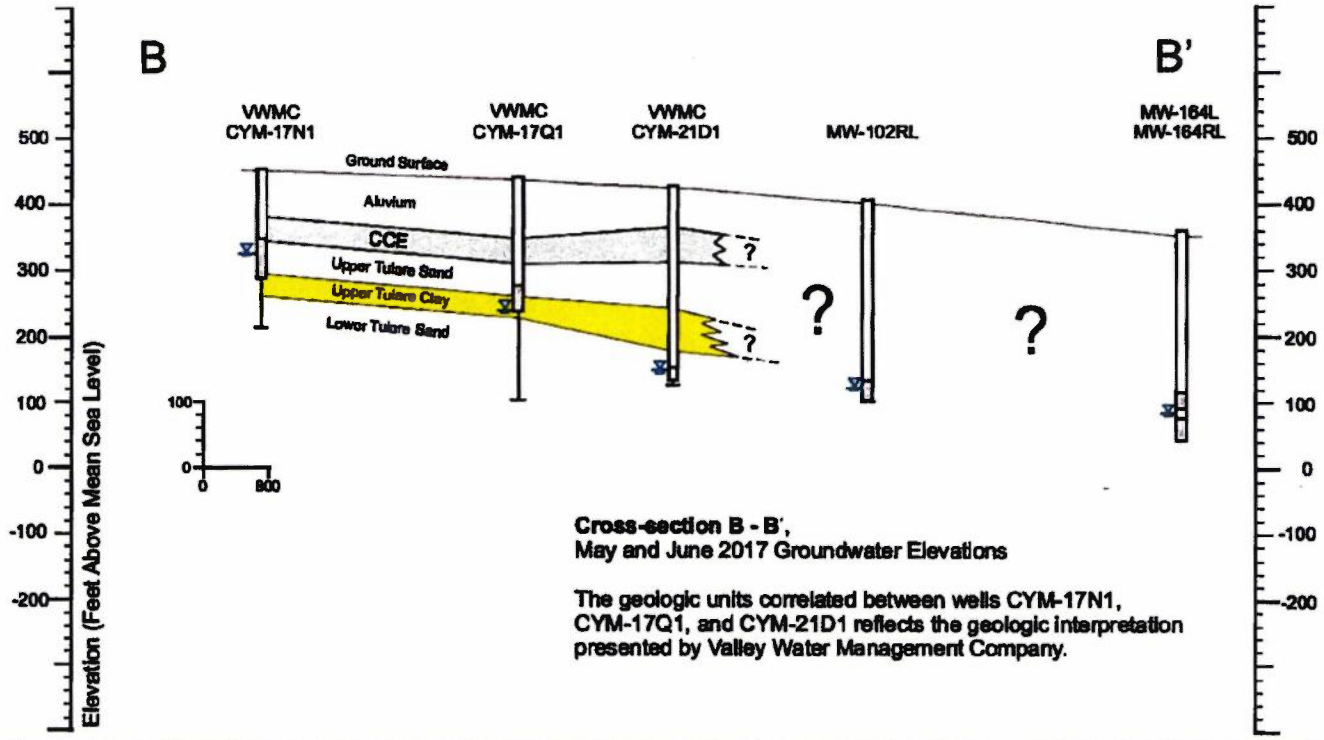
**SITE PLAN OF WELLS DOWNSTREAM OF THE MCKITTRICK 1 & 1-3 FACILITY**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT F.1**




**Cross-section A - A',**
May and June 2017 Groundwater Elevations

The geologic units correlated between wells CYM-19H1, CYM-17N1, and CYM-17K1 reflects the geologic interpretation presented by Valley Water Management Company.



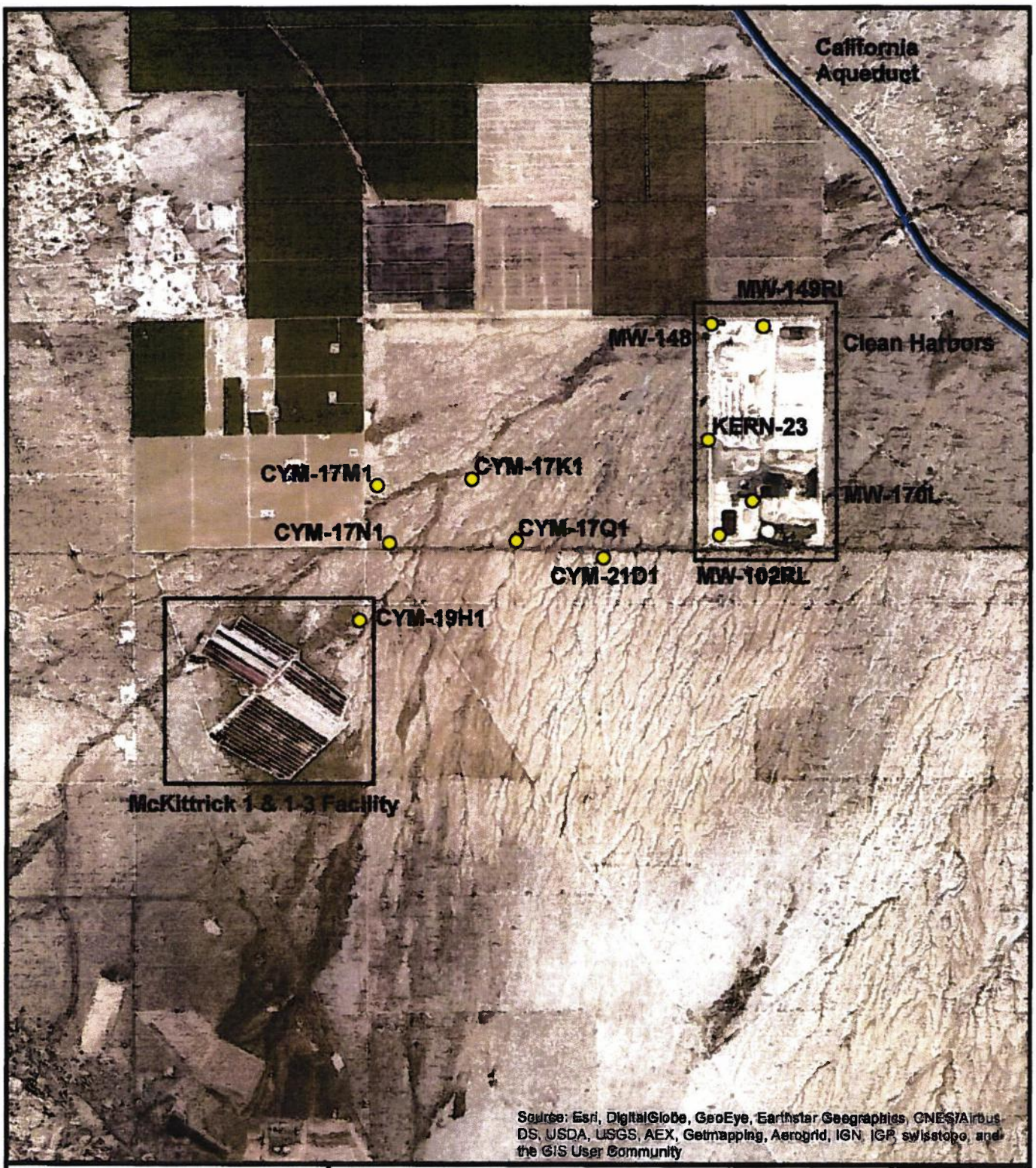

**Cross-section B - B',**
May and June 2017 Groundwater Elevations

The geologic units correlated between wells CYM-17N1, CYM-17Q1, and CYM-21D1 reflects the geologic interpretation presented by Valley Water Management Company.

Data Originates From Groundwater Self-Monitoring Reports Prepared By WSP USA On Behalf Of Valley Water Management Company

**CROSS SECTION OF THE MCKITTRICK 1 & 1-3 FACILITY**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT F.2**



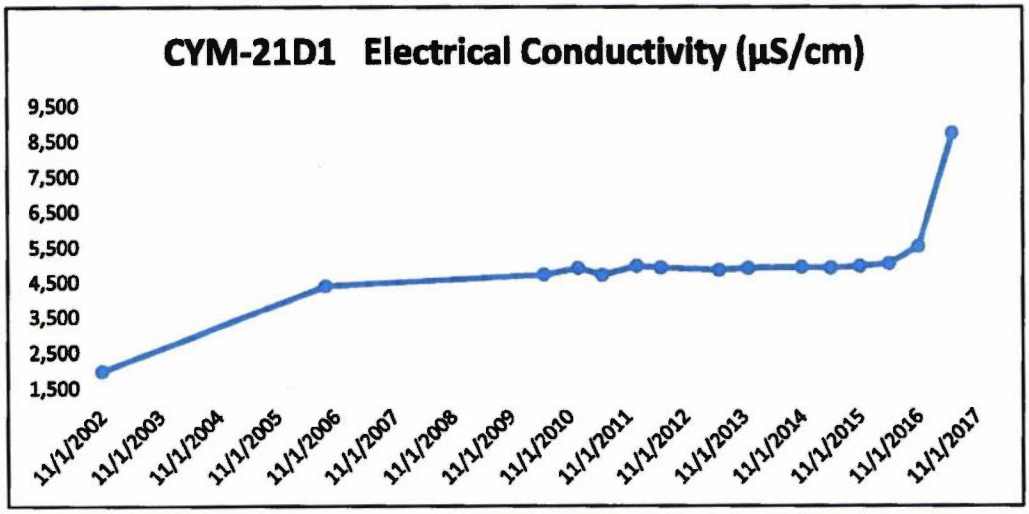

N

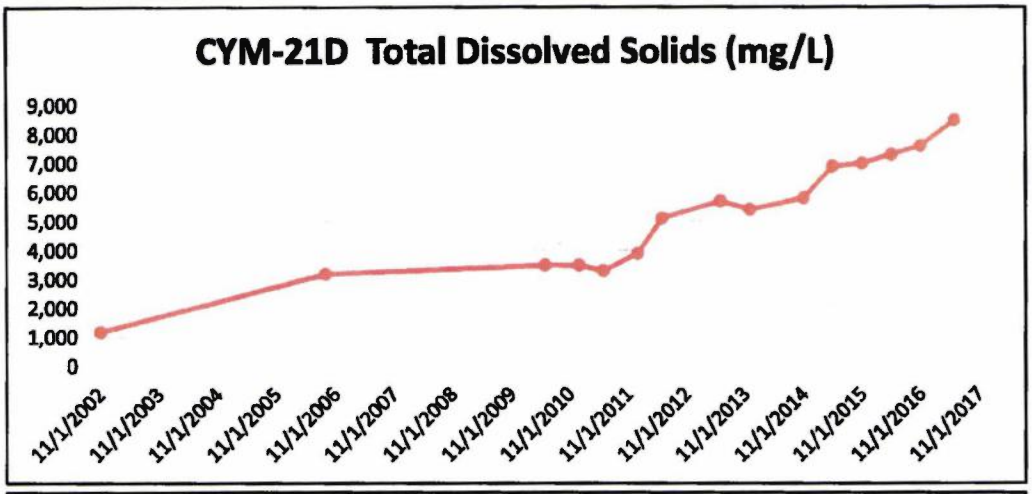
0 0.25 0.5 1 Miles

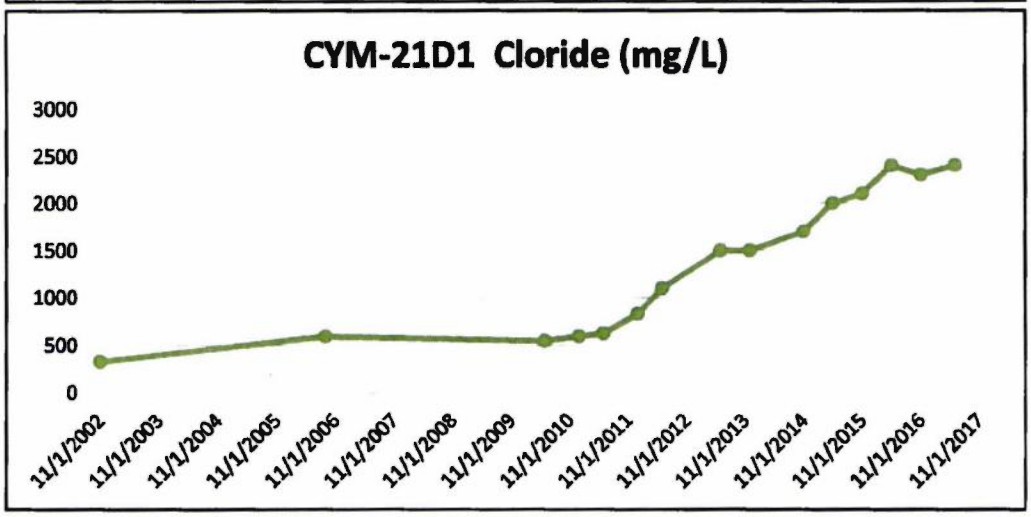
**MCKITTRICK 1 & 1-3 MONITORING WELL NETWORK, CLEAN HARBORS MONITORING WELLS, AND WATER WELL KERN-23**

STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT G**



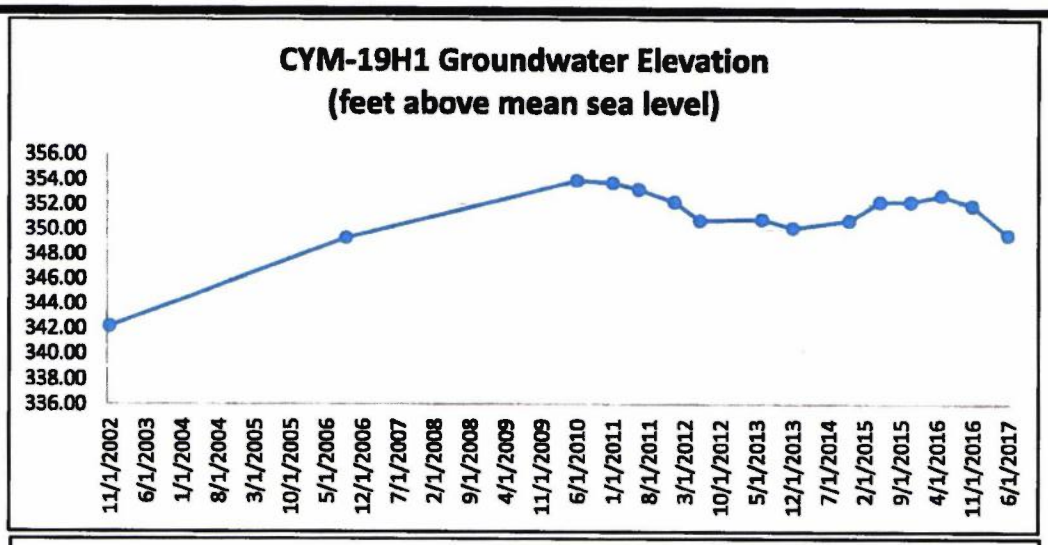



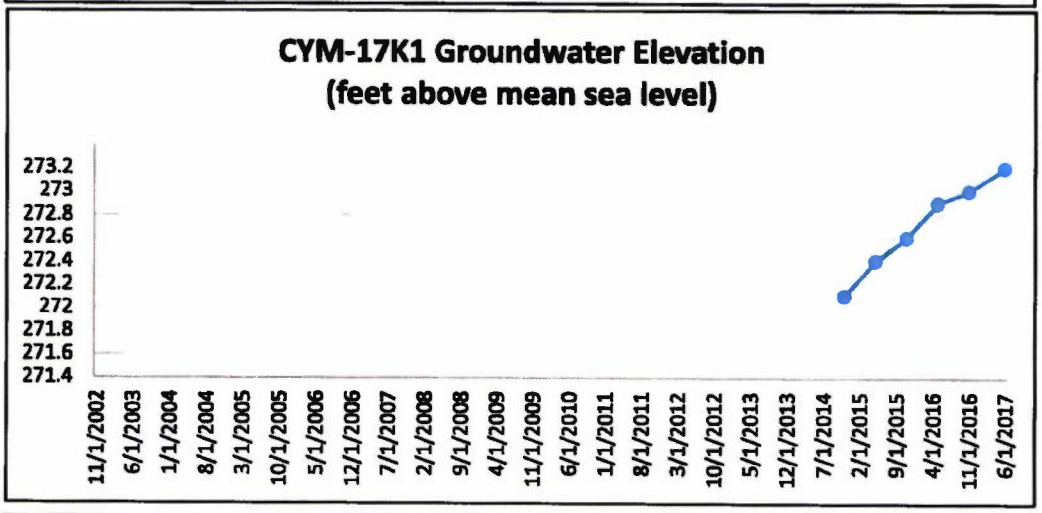



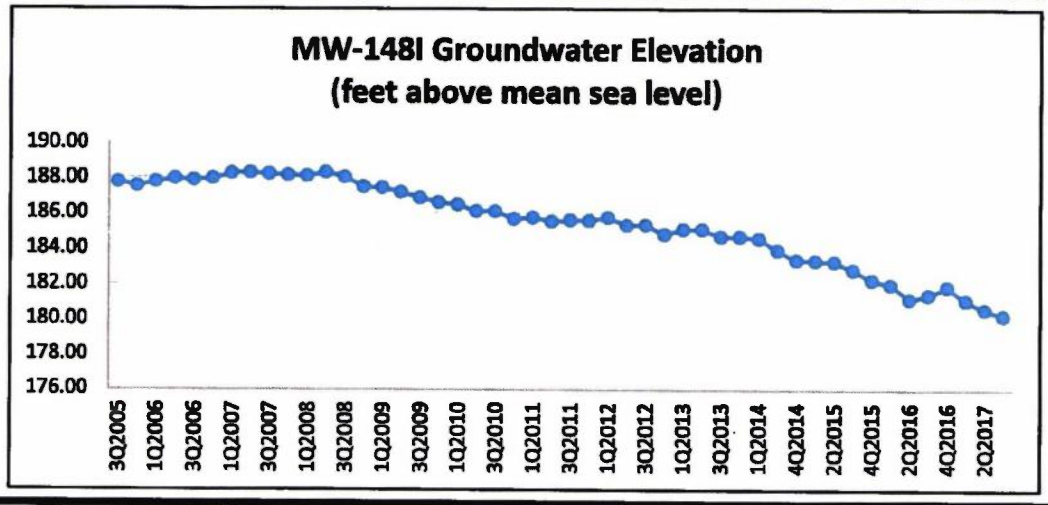

Data Originates From
Self-Monitoring Reports
Prepared By WSP USA
On Behalf Of
Valley Water Management
Company

**VALLEY WATER MANAGEMENT COMPANY CHEMICAL CONCENTRATION TRENDS FOR CYM-21D1**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT H**



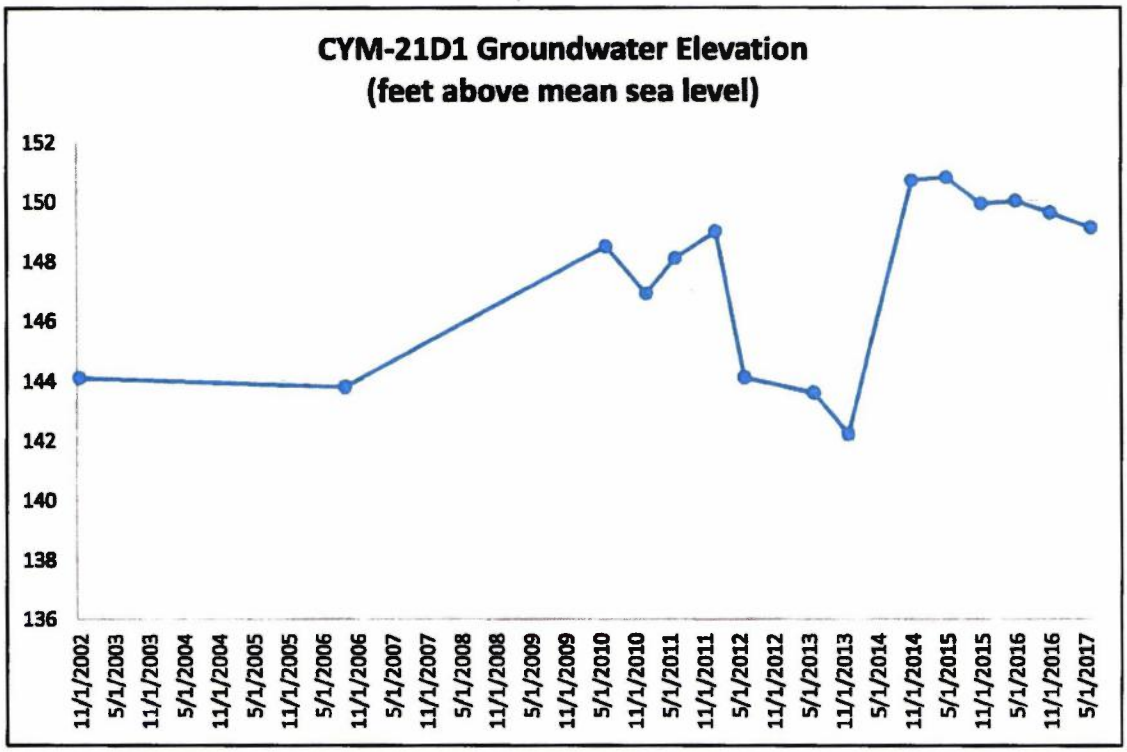



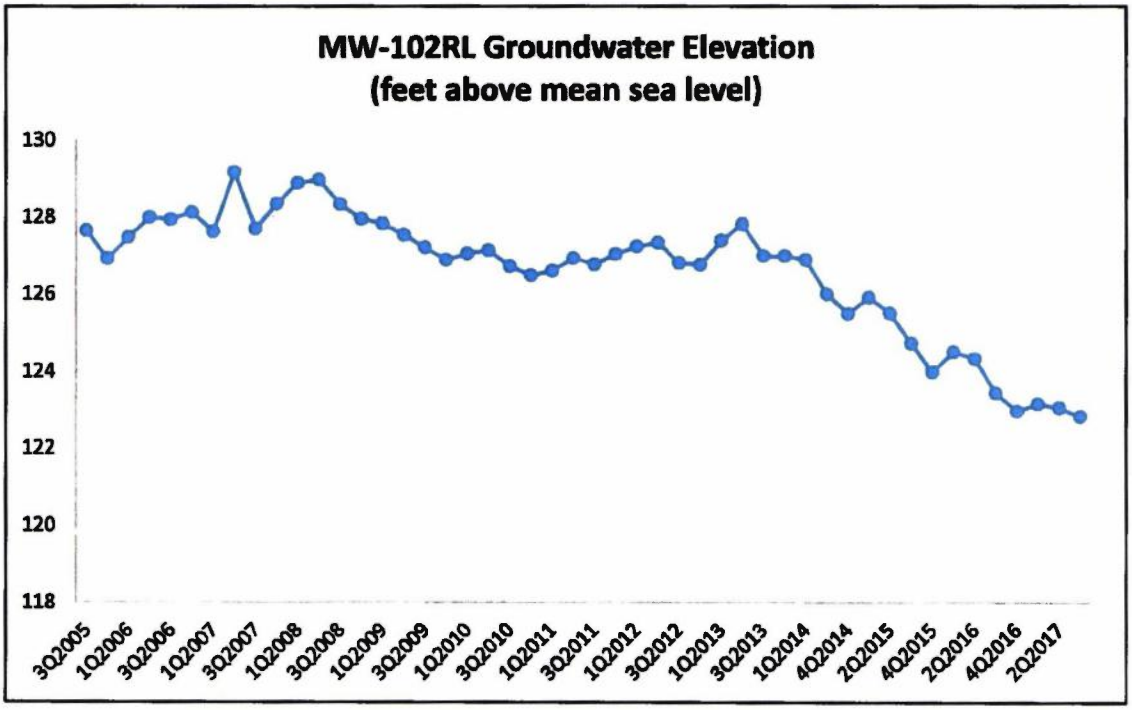




Data Originates From
Self-Monitoring Reports
Prepared By WSP USA
On Behalf Of
Valley Water Management
Company

**SHALLOW GROUNDWATER DEPTH TRENDS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT I.1**

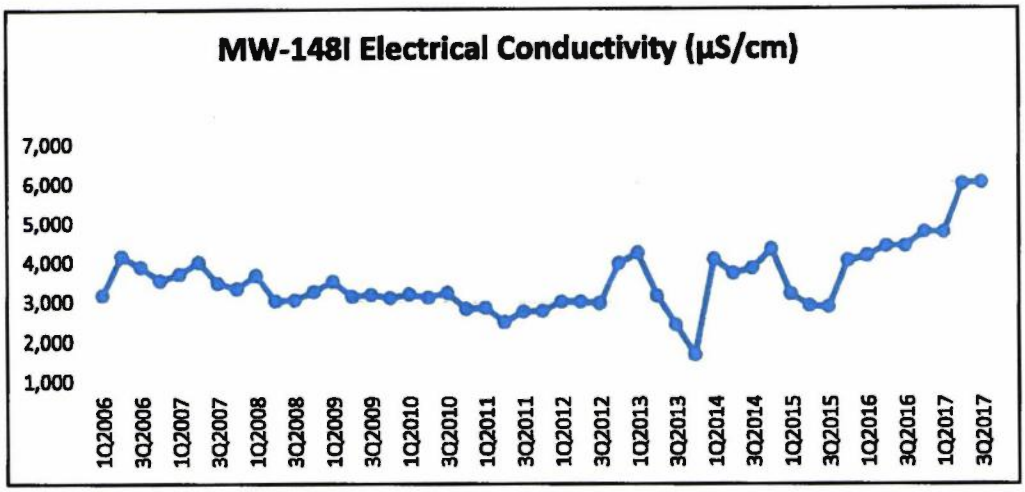


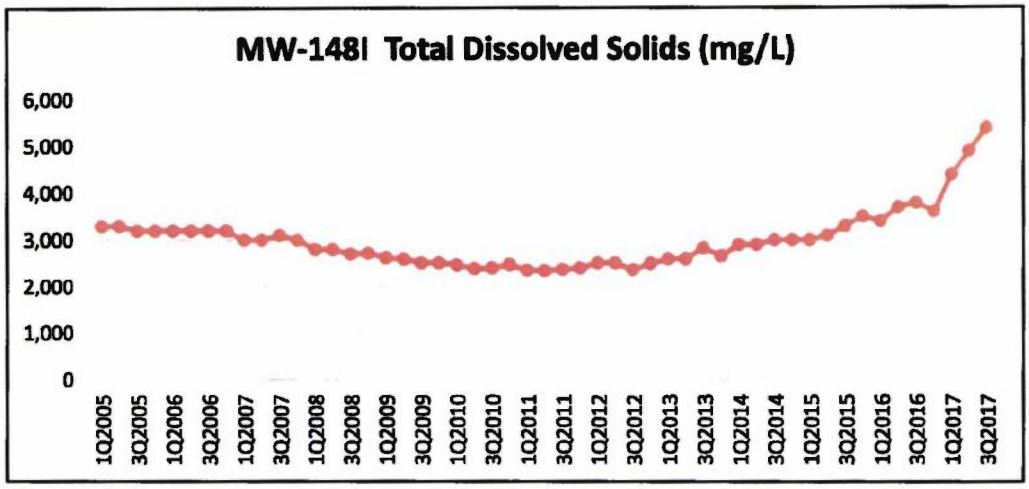



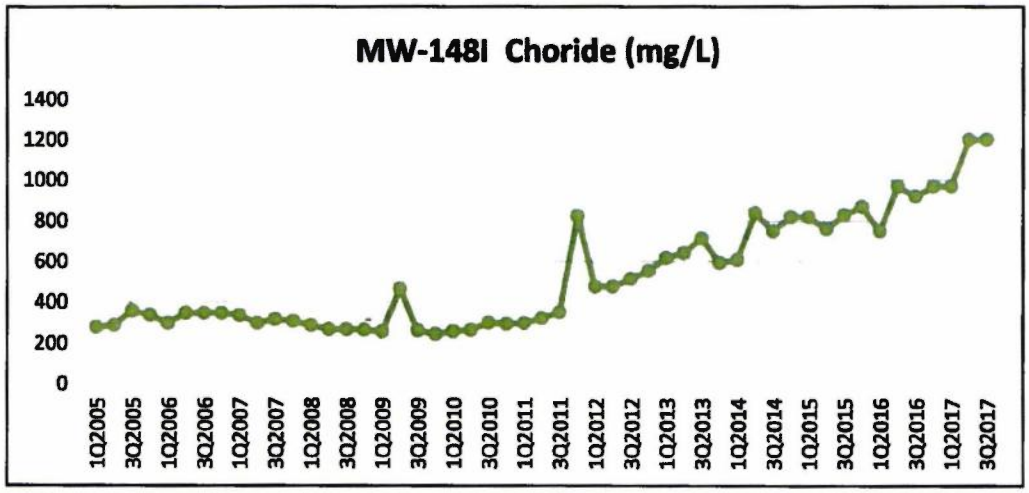

Data Originates From
Self-Monitoring Reports
Prepared By WSP USA
On Behalf Of
Valley Water Management
Company

**DEEP GROUNDWATER DEPTH TRENDS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT I.2**



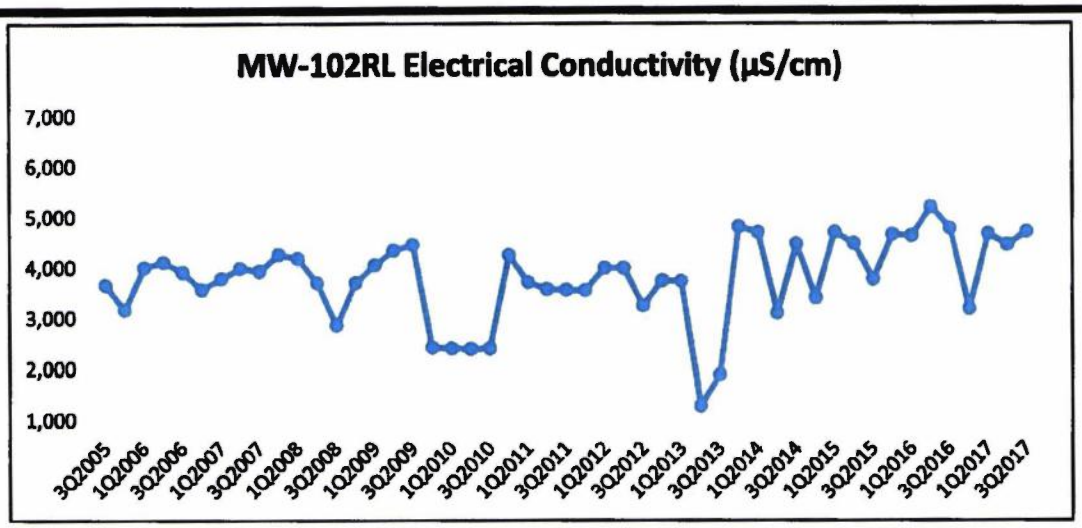



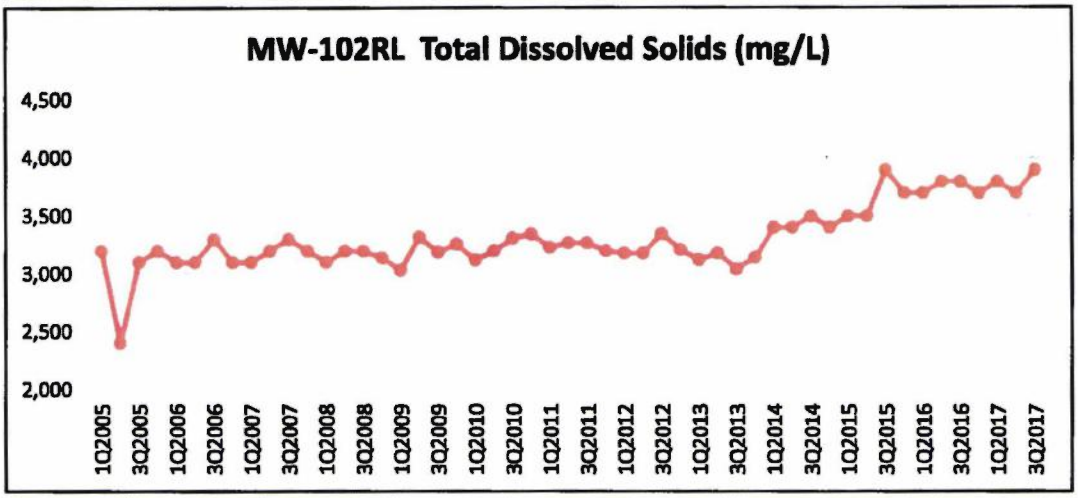



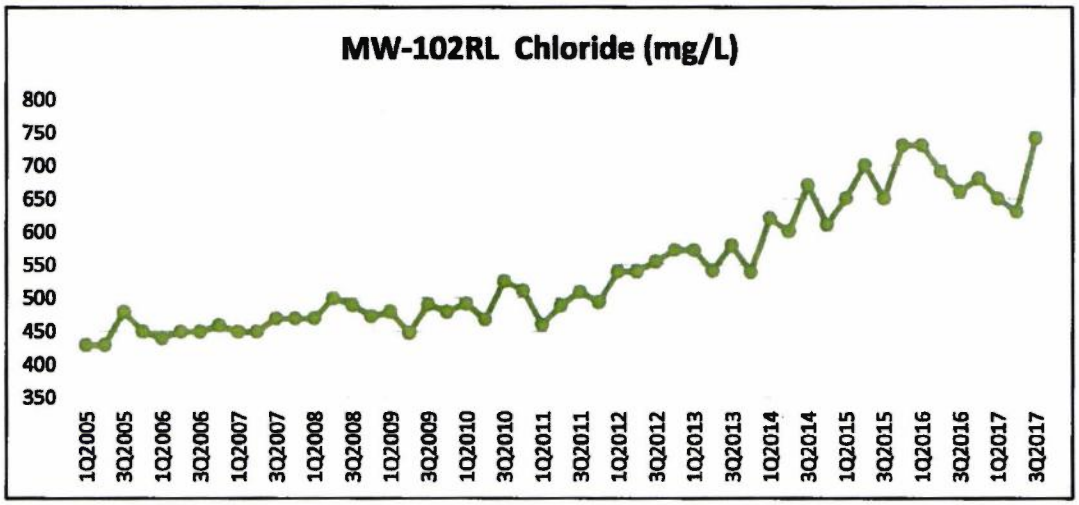

Data Originates From
Self-Monitoring Reports
Prepared By WSP USA
On Behalf Of
Valley Water Management
Company

**CLEAN HARBORS CHEMICAL CONCENTRATION TRENDS FOR MW-148I**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT J.1**



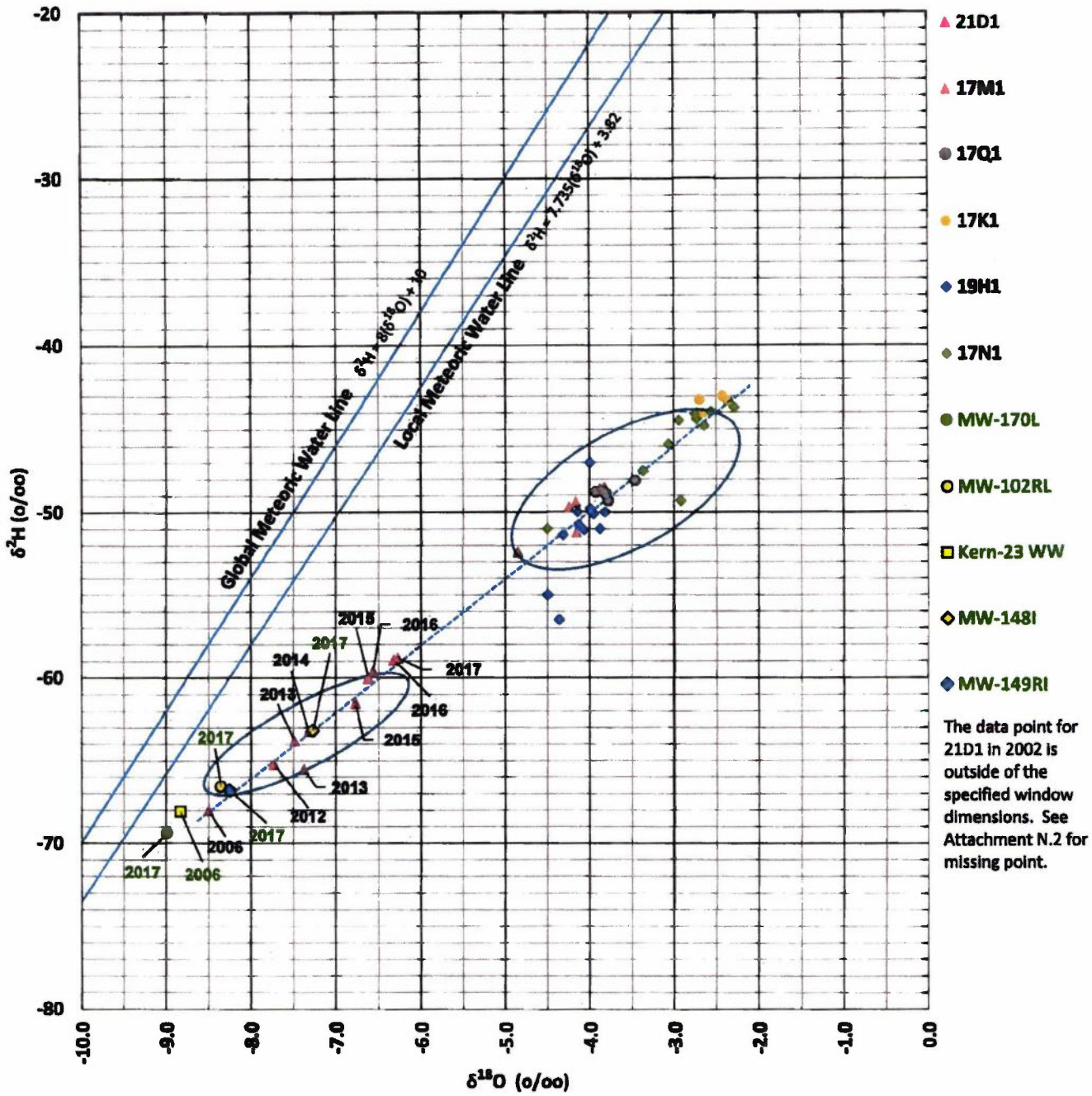

Data Originates From
Self-Monitoring Reports
Prepared By WSP USA
On Behalf Of
Valley Water Management
Company

**CLEAN HARBORS CHEMICAL CONCENTRATION TRENDS FOR MW-102RL**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT J.2**

## Valley Water Management Company, McKittrick 1 and 1-3 Ponds

**Oxygen and Hydrogen Stable Isotopes for Six Monitoring Wells with Five Clean Harbors Wells**




The data point for 21D1 in 2002 is outside of the specified window dimensions. See Attachment N.2 for missing point.

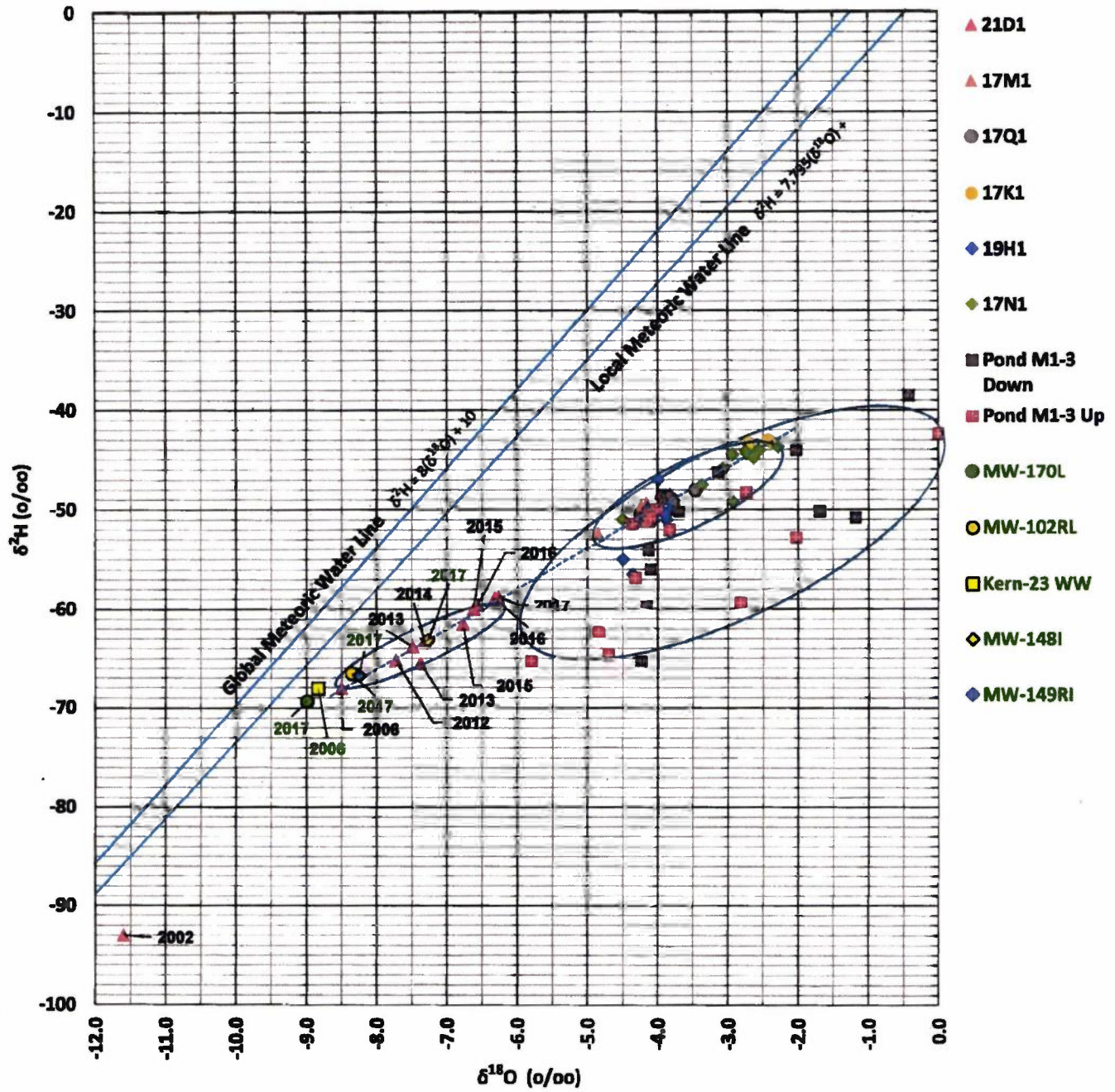
Local Meteoric Water Line determined from stable isotope data for 47 wells in *GroundWater Quality Data in the Kern County Subbasin Study Unit, 2006 - Results from the California GAMA Program:* US Geological Survey Data Series 337

**STABLE ISOTOPE FIGURE OF GROUNDWATER WELLS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT K.1**

## Valley Water Management Company, McKittrick 1 and 1-3 Ponds

**Oxygen and Hydrogen Stable Isotopes for Ponds and Six Monitoring Wells with Five Clean Harbors Wells**




Local Metoeric Water Line determined from stable isotope data from 47 wells in *Ground-Water Quality Data in the Kern County Subbasin Study Unit, 2006-Results from the California GAMA Program:* US Geological Survey Data Series 337

**STABLE ISOTOPE FIGURE OF PRODUCED WASTEWATER AND GROUNDWATER WELLS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT K.2**

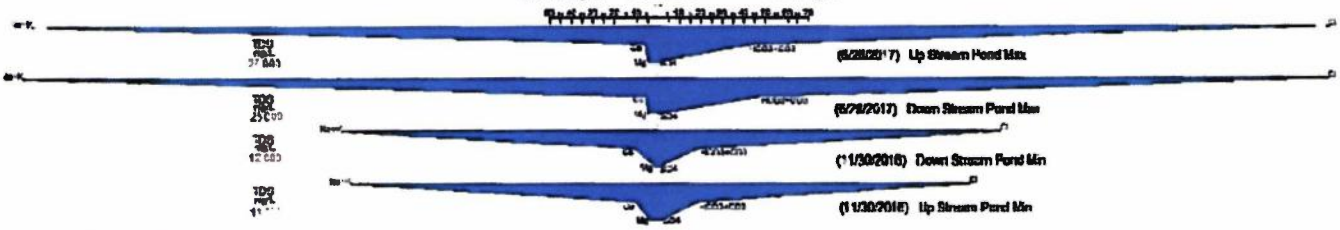
Stiff Diagrams

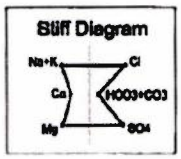
**Valley Water Management Company**

**Produced Wastewater**

Cations Anions

50 meq/L 0 meq/L 70 meq/L




**STIFF DIAGRAMS OF VALLEY WATER MANAGEMENT COMPANY PRODUCED WASTEWATER**

STAFF REPORT

FOR

VALLEY WATER MANAGEMENT COMPANY

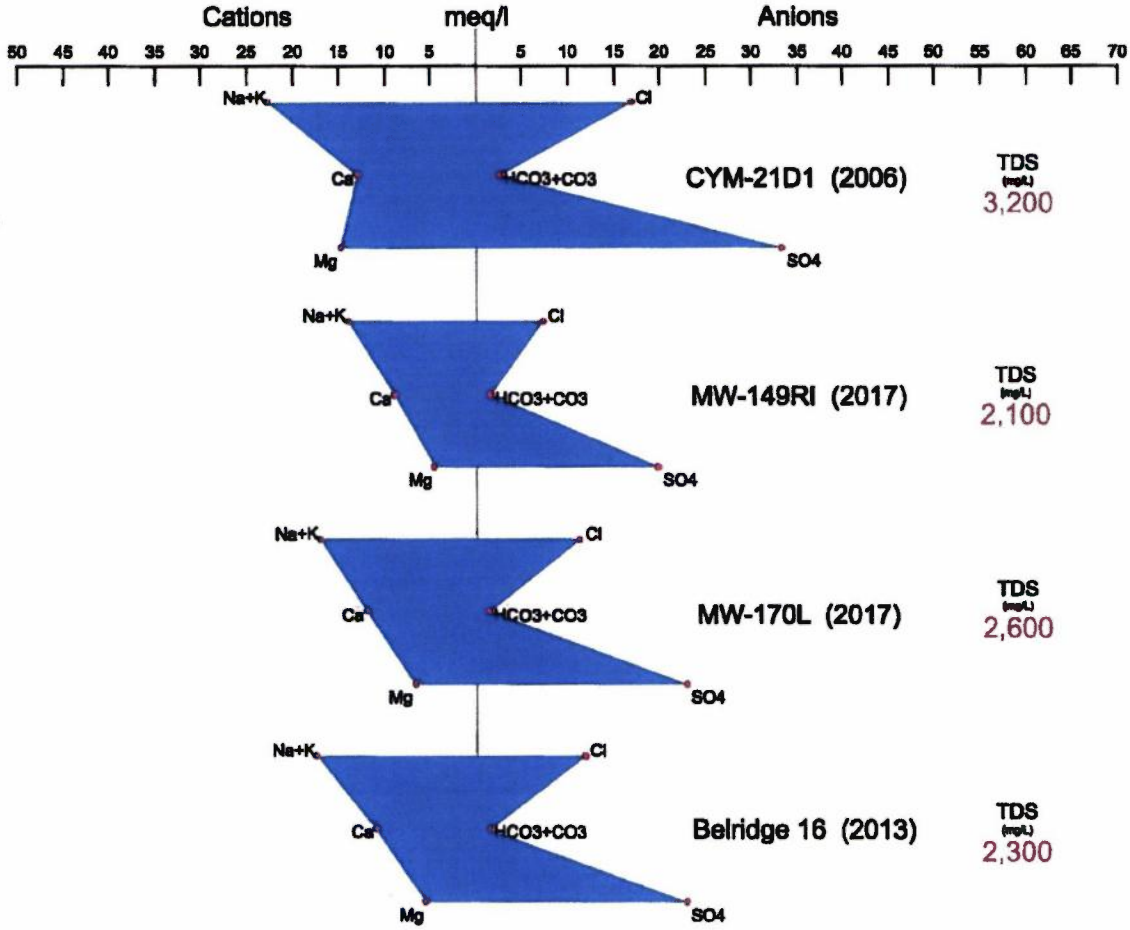
MCKITTRICK 1 & 1-3 FACILITY

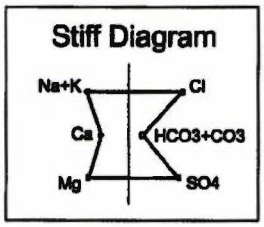
KERN COUNTY

**ATTACHMENT L.1**

Stiff Diagrams

## Wells that appear to be unaffected by Produced Wastewater
## Sample date ranges 2006 - 2017



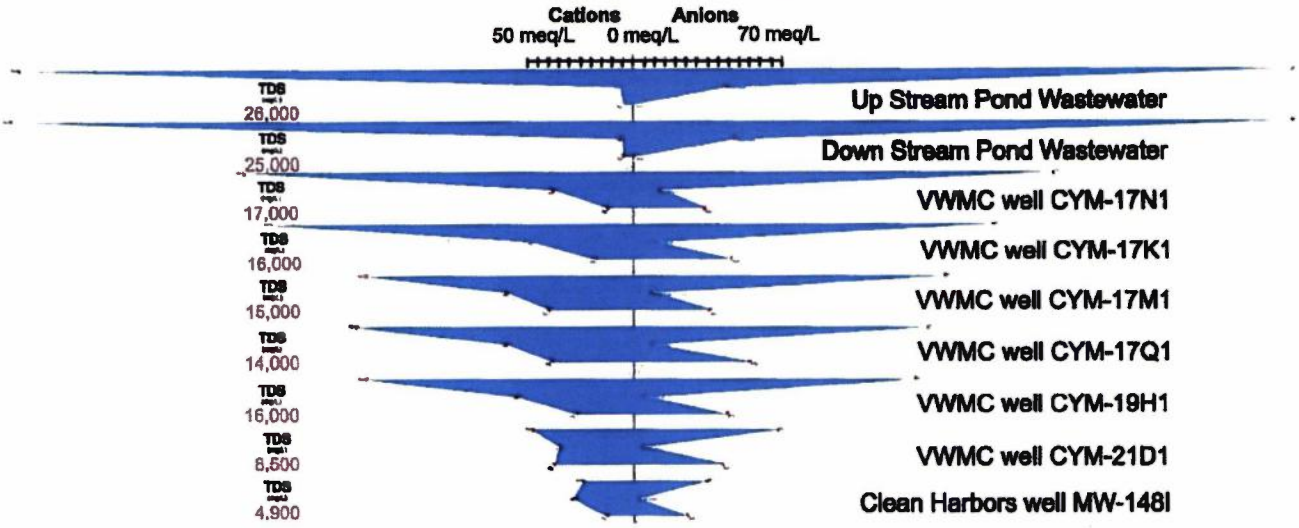



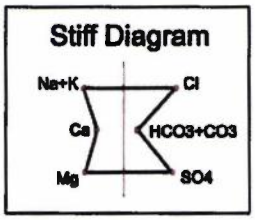

**STIFF DIAGRAMS ON UNAFFECTED MONITORING WELLS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT L.2**

Stiff Diagrams

## Valley Water Management Company and Clean Harbors Facility
## Produced Wastewater and Well Water
### Sample Dates: May and June 2017




**STIFF DIAGRAMS OF PRODUCED WASTEWATER AND GROUNDWATER FROM VALLEY WATER MANAGEMENT COMPANY AND CLEAN HARBORS FACILITY**

STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

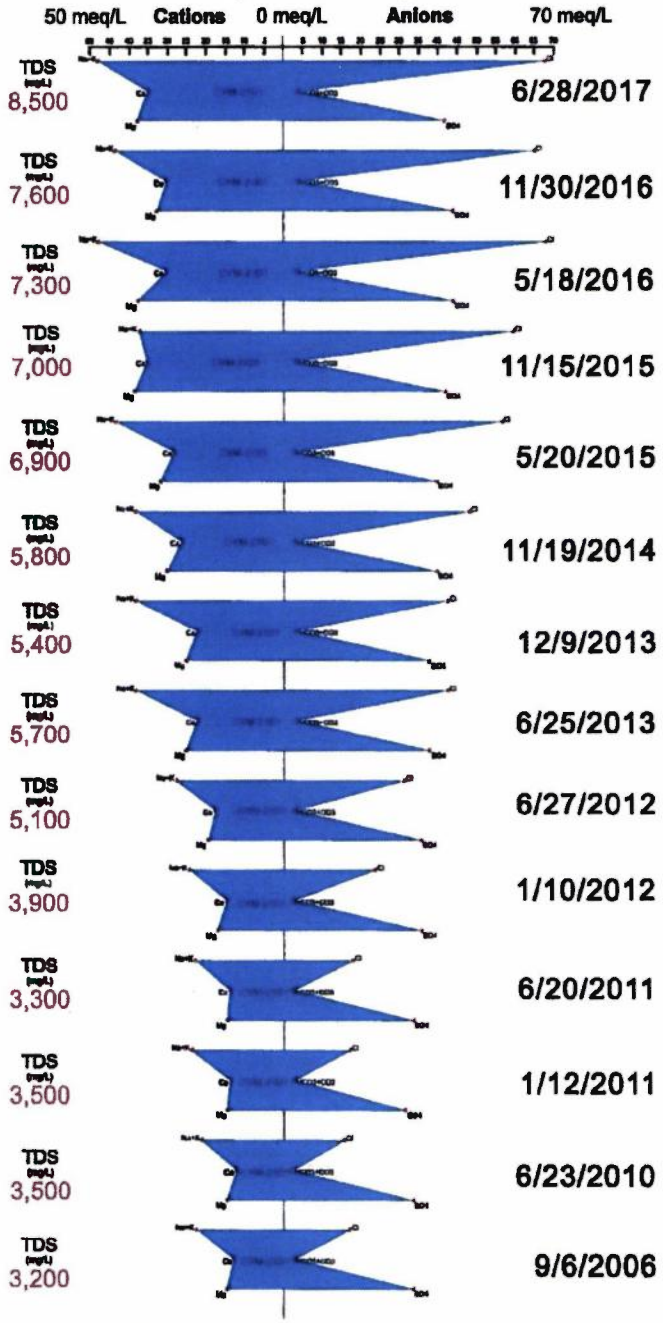
**ATTACHMENT L.3**

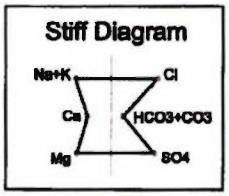
Stiff Diagrams

## Groundwater Monitoring Well CYM-21D1

**Sample dates: September 2006 through June 2017**

Progressive Mixing

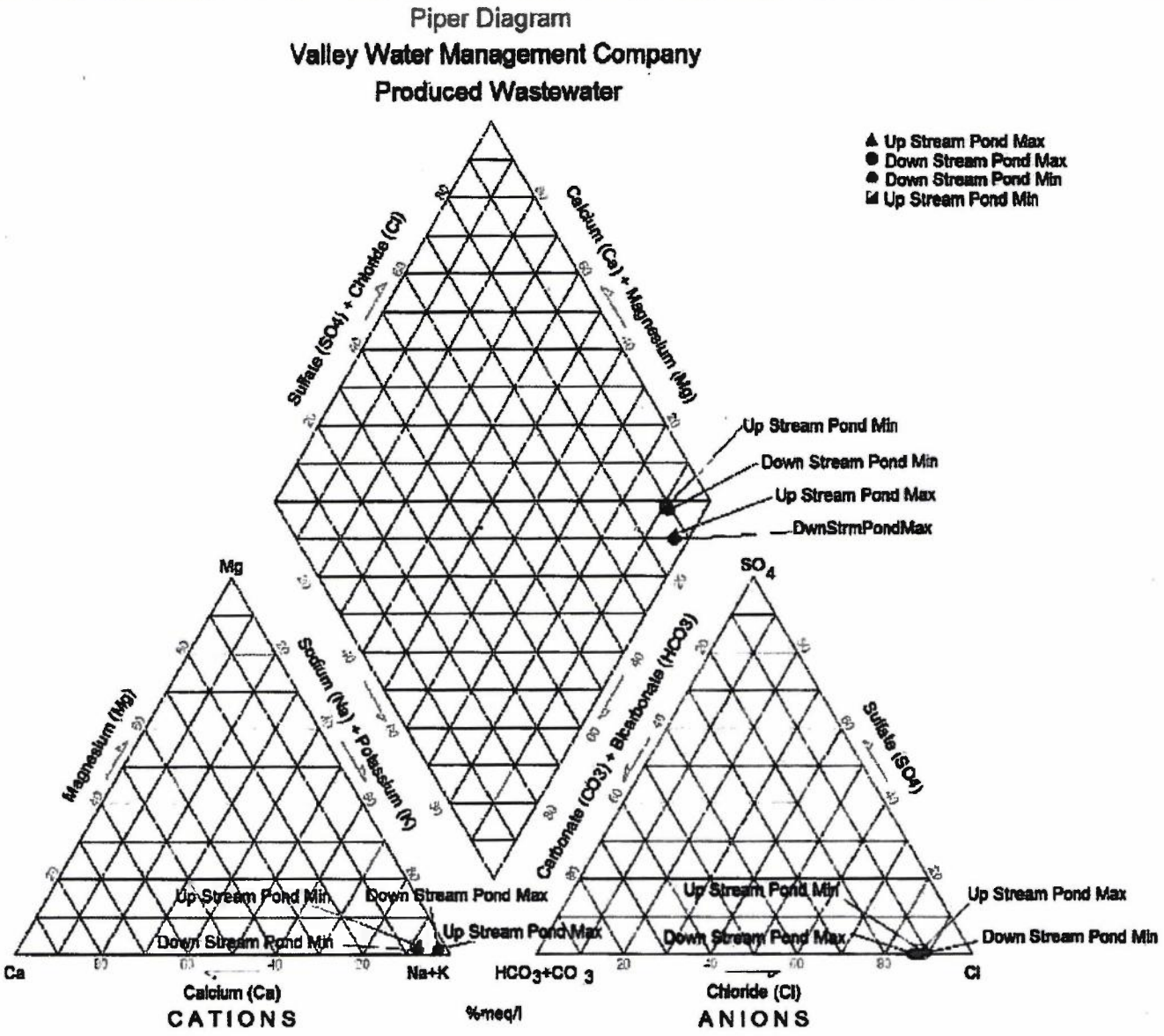



**STIFF DIAGRAMS OF GROUNDWATER RESULTS FROM MONITORING WELL CYM-21D1**

STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT L.4**




**PIPER DIAGRAM OF VALLEY WATER MANAGEMENT COMPANY PRODUCED WASTEWATER**

STAFF REPORT

FOR

VALLEY WATER MANAGEMENT COMPANY

MCKITTRICK 1 & 1-3 FACILITY

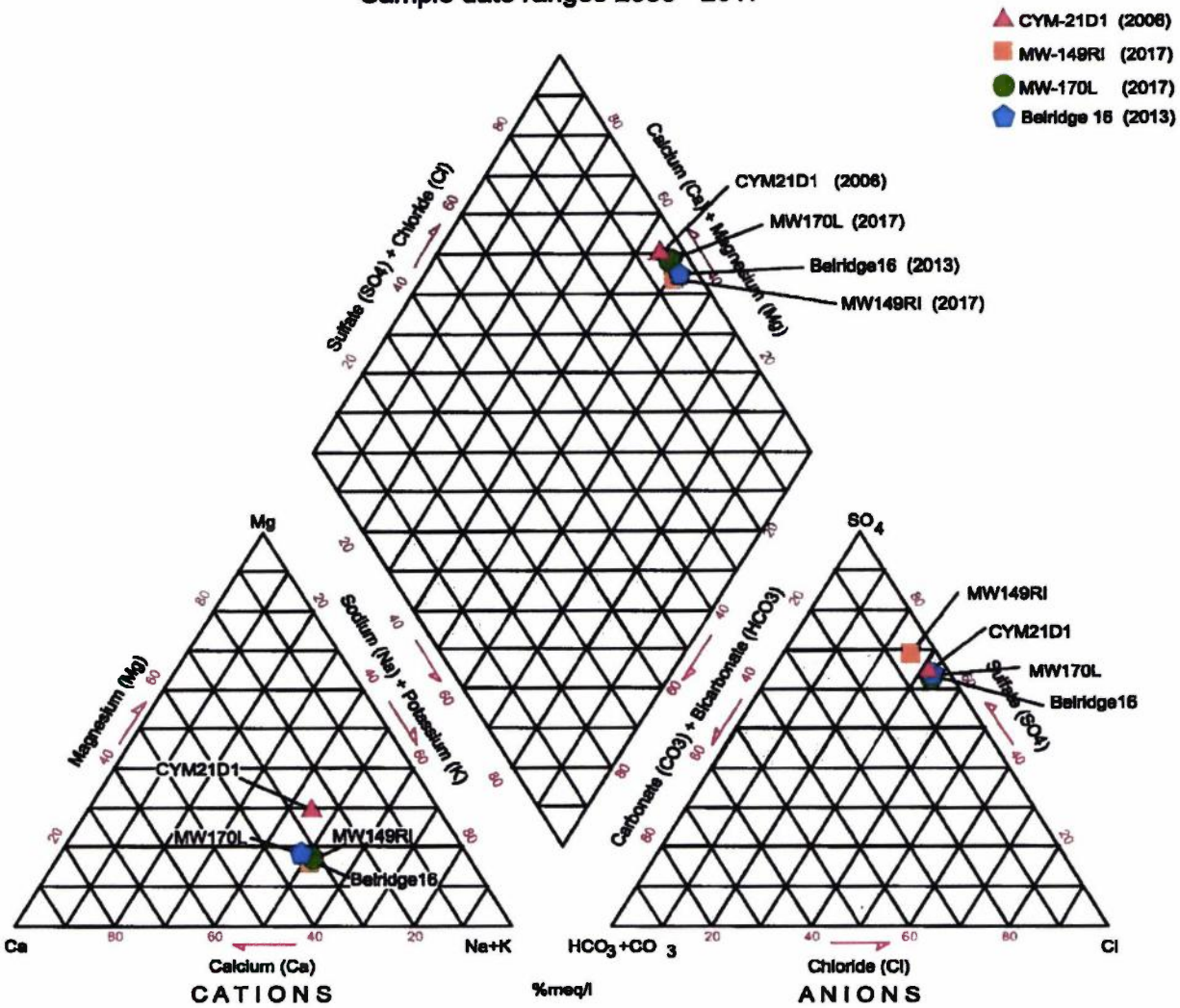
KERN COUNTY

**ATTACHMENT M.1**

Piper Diagram

## Wells that appear to be unaffected by Produced Wastewater

**Sample date ranges 2006 - 2017**

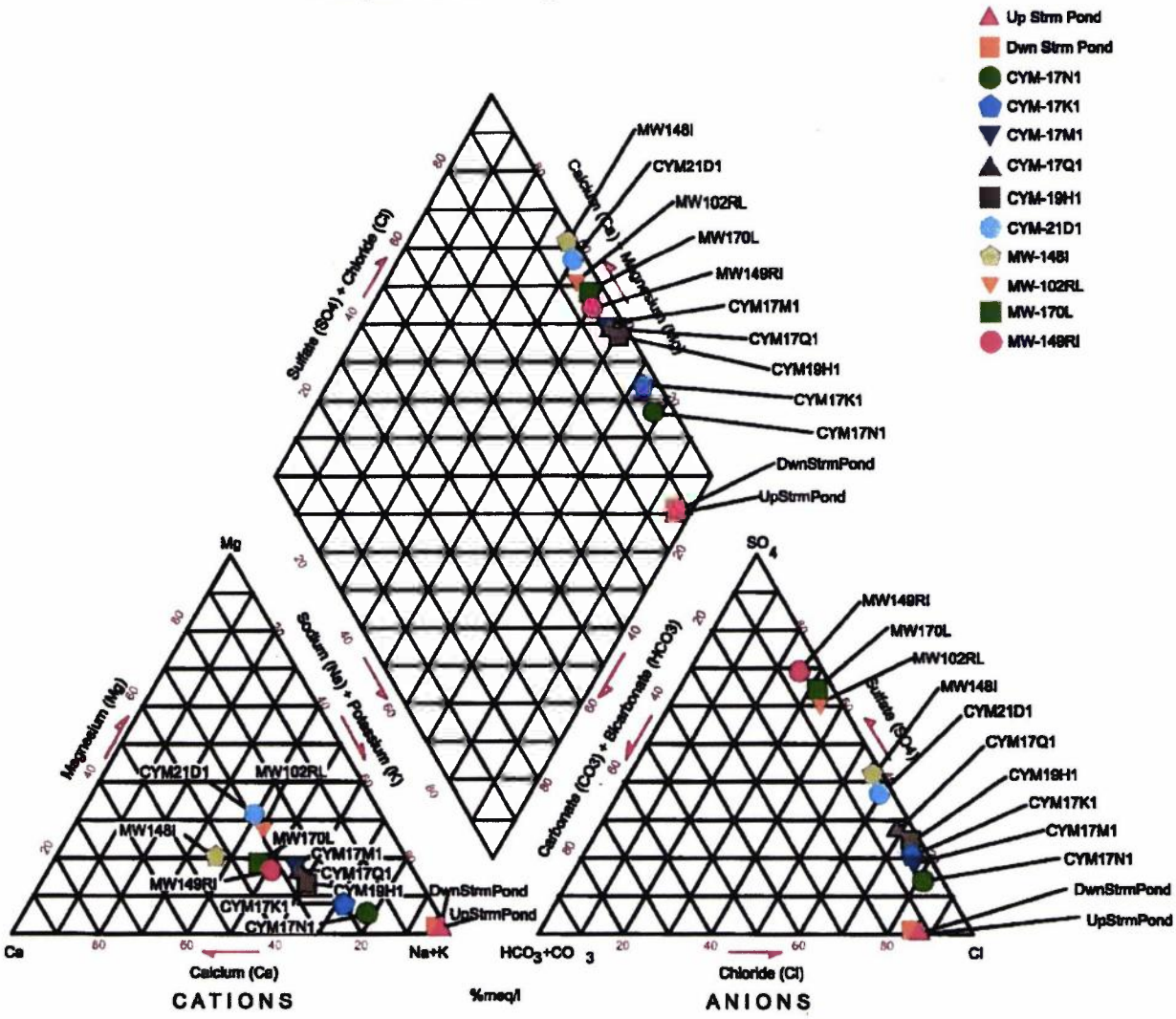



**PIPER DIAGRAM ON UNAFFECTED MONITORING WELLS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT M.2**

Piper Diagram

## Valley Water Management Company and Clean Harbors Facility
## Produced Wastewater and Well Water
### Samples Dates: May and June 2017




**PIPER DIAGRAM OF PRODUCED WASTEWATER AND GROUNDWATER FROM VALLEY WATER MANAGEMENT COMPANY AND CLEAN HARBORS FACILITY**

STAFF REPORT

FOR

VALLEY WATER MANAGEMENT COMPANY

MCKITTRICK 1 & 1-3 FACILITY

KERN COUNTY

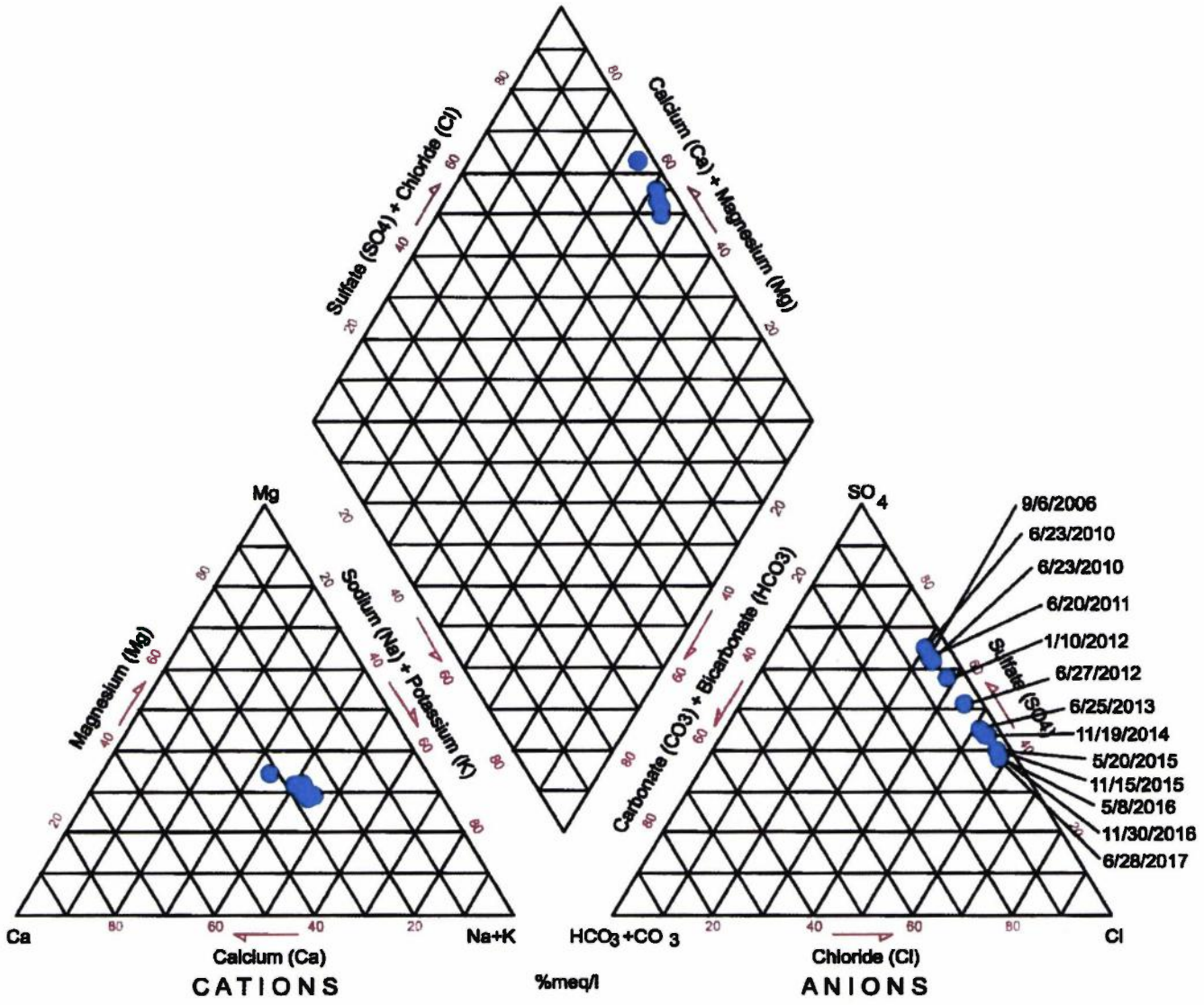
**ATTACHMENT M.3**

Piper Diagram

## Groundwater Monitoring Well CYM-21D1

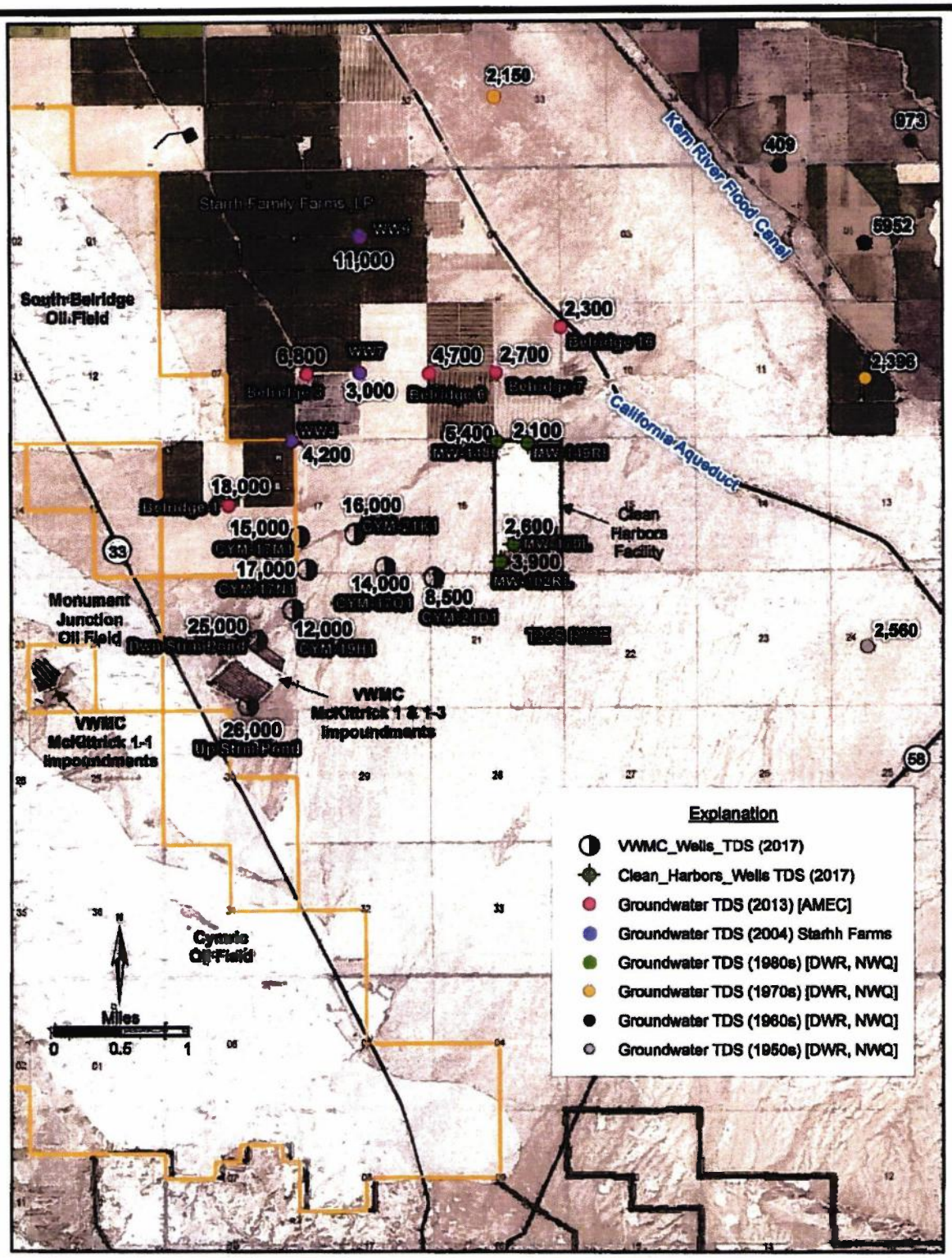
**Sample dates: September 2006 through June 2017**

Progressive Mixing




**PIPER DIAGRAM OF GROUNDWATER RESULTS FROM MONITORING WELL CYM-21D1**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT M.4**




**PRODUCED WASTEWATER AND GROUNDWATER WELL RESULTS FOR TOTAL DISSOLVED SOLIDS**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT N**

The Valley Water Management Company Letter is available directly after this page

**VALLEY WATER MANAGEMENT COMPANY REQUEST TO RESCIND MONITORING AND REPORTING PROGRAM ORDER NO. R5-2017-0806**
STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT O**

SJH

TELEPHONE (661) 410-7500 FAX (661) 410-7506

**VALLEY WATER MANAGEMENT COMPANY**
7500 MEANY AVE.
BAKERSFIELD, CALIFORNIA 93308

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FRESNO, CALIF.

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July 5, 2017

BY EMAIL AND U.S. MAIL

Ms. Pamela Creedon (pamela.creedon@waterboards.ca.gov)
Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

Mr. Clay Rodgers (clay.rodgers@waterboards.ca.gov)
Assistant Executive Officer
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

**REQUEST FOR RESCISSION OF MRP ORDER NO. R5-2017-0806**

Dear Ms. Creedon and Mr. Rodgers:

On October 21, 2016, Valley Water Management Company ("Valley") submitted comments on the administrative draft of the Monitoring and Reporting Program ("MRP") for Valley's McKittrick 1 and 1-3 Facility in the Belgian Anticline Oil Field in Kern County. Valley also provided a redline version of the Valley MRP with additional editorial changes.

Valley was very disappointed that none of the changes suggested in Valley's letter were made, and most of the suggested substantive redline changes were ignored. Making matters even worse, the MRP issued on June 26, 2017 by the Central Valley Regional Water Quality Control Board ("Regional Board") contained many new substantive provisions never seen by Valley, all of which ostensibly became immediately applicable upon signature of the MRP.

Since MRPs are intended to be part of Waste Discharge Requirements ("WDRs"), MRPs such as the Valley MRP should be subjected to the public notice and comment periods set forth in Water Code section 13167.5(a)(1). In addition, because MRPs are intended to be used to determine compliance with and be a part of the WDRs, as is the norm for Regional Board issued permits, MRPs cannot be delegated to the Executive Officer. State law prohibits the Regional Board from delegating its authority to issue or modify waste discharge requirements. *See* Water Code §13223(a)(2). Since the MRP is intended to determine compliance with the WDRs, modifications to the WDRs cannot be made by the Executive Officer. *See San Francisco Baykeeper v. SFRWQCB*, San Francisco Superior Court, Consolidated Case No. 500527, Order Granting Petition for Writ of

Mandate and Statement of Decision (2003), at pages 3-4. The Valley MRP was, therefore, issued by the Regional Board's Executive Officer without authority to do so.

To the extent the Regional Board attempts to claim authority under Water Code section 13267, that authority is also misplaced. Section 13267 allows the Regional Board to "investigate the quality of any waters of the state." See Water Code §13267(b). In conducting such an investigation, the Regional Board may require any person discharging waste to furnish the Regional Board with technical or monitoring program reports required by the Regional Board. *Id.* The burden of these reports, including cost, must "bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports." *Id.* In requiring such reports, the Regional Board must provide a written explanation as to the necessity of the reports, and must identify the evidence that supports the requirement to provide the reports. *Id.; see also In the Matter of Napa Sanitation District, Bay Area Clean Water Agencies, and San Francisco BayKeeper,* State Board/OCC Files A-1318, A-1318(a), A-1318(b) (Dec. 5, 2001), at page 55 (requiring Regional Boards to include written findings and evidence in administrative orders issued pursuant to Water Code section 13267, setting forth the required analysis and rationale).

In this case, the Regional Board failed to provide any analysis or written explanation with respect to the <u>burden</u> of the requested report, <u>including cost</u>, and did not assess whether a reasonable relationship exists between the need for the requested report and the benefits to be obtained from the report. *See* Water Code §13267. Thus, there is no evidence that the Regional Board made the requisite determinations that the water quality monitoring report requested in the Valley MRP is reasonably required and/or bears a reasonable relationship to the need for the information and/or actions.

The Regional Board's failure to include such information violates the clear mandates of Water Code section 13267(b). Further, orders not supported by the findings or findings not supported by the evidence constitute an abuse of discretion. *See Topanga Association for a Scenic Community v. County of Los Angeles*, 11 Cal.3d 506, 515 (1974); *California Edison v. SWRCB*, 116 Cal. App. 751, 761 (4th Dist. 1981); *see also In the Matter of the Petition of City and County of San Francisco, et al.*, State Board Order No. WQ-95-4 at 10 (Sept. 21, 1995).

In this case, the requirements contained in the MRP are not supported by findings, or the findings contained in the MRP about wastewater plumes, characterizations, and water movement are not supported by any evidence. The requirements contained in the MRP are also not reasonable, considering all of the related circumstances.

As noted above, the Regional Board's request for additional monitoring and reporting is unreasonable and not supported by the evidence in this case. The purpose of monitoring is to determine compliance with WDR's requirements and the WDR does not require compliance with many of the monitored constituents.

Conducting the newly required monitoring is also a time-consuming and costly undertaking. Expending the resources necessary to conduct the new monitoring for essentially no scientific or

analytical benefit is clearly unreasonable, unsupported, and unwarranted given the long duration and history of the discharge, and the lack of an existing MUN use of the underlying groundwater.[1]

In sum, the Regional Board failed to consider or enunciate in findings supported by evidence in the administrative record detailing the reasonableness, utility, cost, and benefit of the actions mandated by the MRP prior to its issuance. For this reason, the Regional Board's action in issuing the Valley MRP was not supported by the findings, the findings were not supported by the evidence, and the request and timeframes included therein were clearly unreasonable.

For the foregoing reasons, Valley requests the Regional Board immediately **rescind** the MRP until the Regional Board complies with the Water Code, including section 13267(b).

Valley would also like to request a meeting to discuss potential requirements of an MRP further and/or coverage under one of the General Orders for this facility. One of the important topics is the inability of Valley to force its users to provide oil field chemical and additive data, which can often be characterized as confidential or proprietary information.

Because of the importance of these issues to our members, we would like to set a meeting with you and your staff before July 21, 2017 to discuss our concerns. Please contact me at (661) 763-0081 or charlie@trcopco.com to set up a meeting at your earliest convenience.

Sincerely,

Charles H. Comfort
President, Board of Directors
Valley Water Management Company

cc: Dale Harvey and Ron Holcomb, CVRWQCB (Dale.Harvey@waterboards.ca.gov, Ronald.Holcomb@waterboards.ca.gov)
Patrick Pulupa, CVRWQCB (Patrick.Pulupa@waterboards.ca.gov)
Russell Emerson, Manager, Valley Water Management Company (remerson@valleywatermanagement.org)
Melissa Thorme, Downey Brand LLP (mthorme@downeybrand.com)

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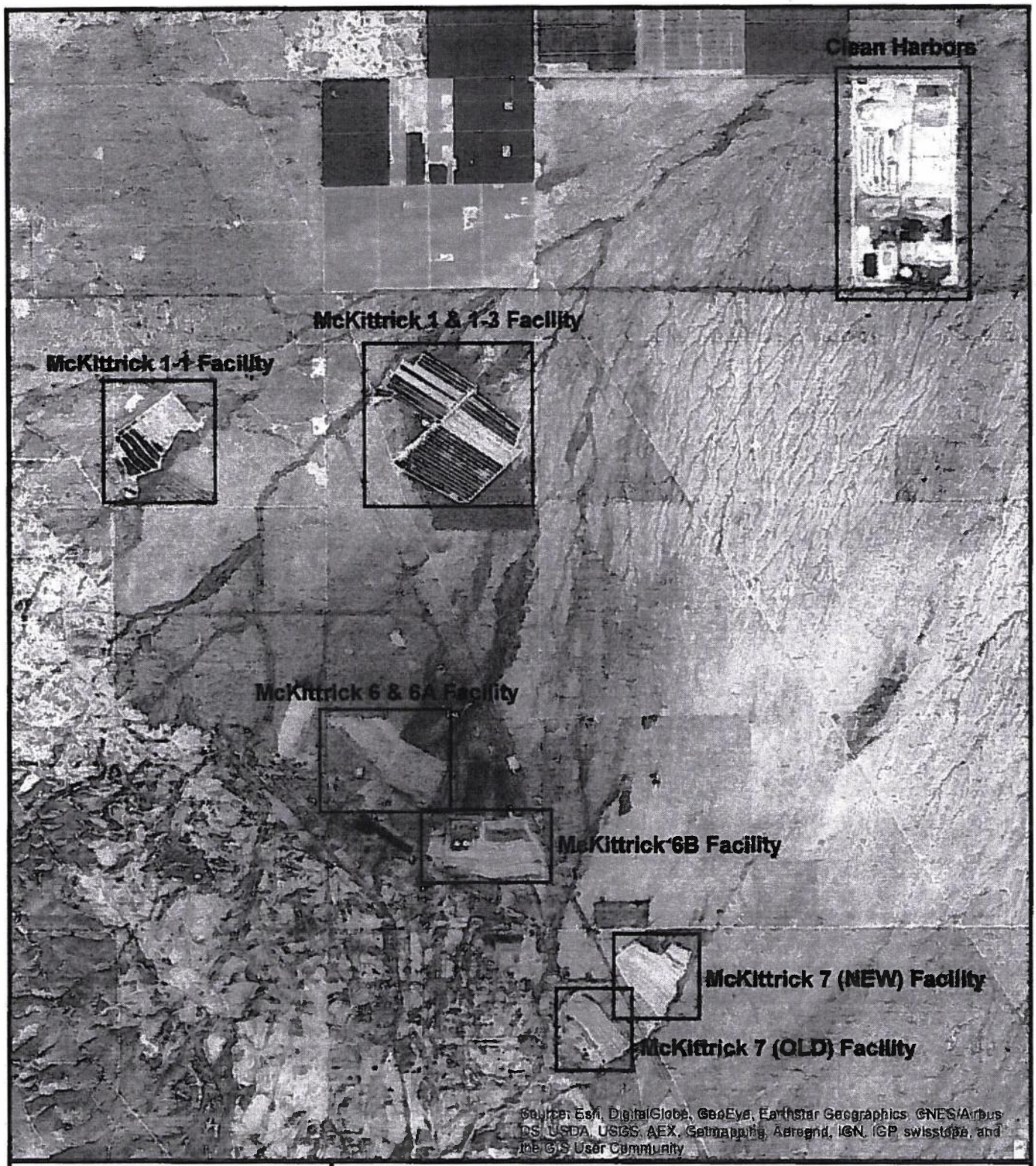
[1] As stated in the WDR, "usable ground waters in this area are confined to the Little Santa Maria Valley and other small alleviated valleys in the Belgian Anticline Oil Field south of McKittrick and to the area generally east of the Buena Vista Slough some seven miles northeast of the disposal sumps." Regional Board Resolution No. 69-189. "Underground movement of percolating waste waters from the disposal sumps towards the trough of the San Joaquin Valley is restricted by a structurally high ridge formed by the south plunging nose of South Belridge Oil Field and the north plunging nose of Elk Hills Oil Field." *Id.*




N

0 0.3 0.6 1.2 Miles

**NEARBY VALLEY WATER MANAGEMENT COMPANY**
**DISPOSAL POND FACILITIES**

STAFF REPORT
FOR
VALLEY WATER MANAGEMENT COMPANY
MCKITTRICK 1 & 1-3 FACILITY
KERN COUNTY

**ATTACHMENT P**

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

RESOLUTION R5-2017-0031

DIRECTING STAFF TO PREPARE AN APPROPRIATE ORDER
FOR
VALLEY WATER MANAGEMENT COMPANY'S MCKITTIRICK 1 & 1-3 FACILITY
TO
COMPLY WITH
WASTE DISCHARGE REQUIREMENTS RESOLUTION NO. 69-199
KERN COUNTY

Tentative

WHEREAS, the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) finds that:

1. Valley Water Management Company (Valley Water) owns and operates an oil field produced wastewater disposal pond system named the McKittrick 1 & 1-3 Facility (Facility) approximately 8.7 miles west of the community of Buttonwillow.

2. Valley Water has been accepting since the 1950s up to 115,000 barrels (bbls) per day of produced wastewater at the Facility for disposal by evaporation and percolation. The produced wastewater is saline, with reported total dissolved solids concentrations from 7,772 mg/L to 26,000 mg/L, chloride concentrations from 4,100 mg/L to 16,000 mg/L and boron concentrations from 42.5 mg/L to 130 mg/L. These concentrations exceed applicable State drinking water maximum contaminant levels (MCLs) and exceed applicable agricultural water quality objectives. The produced water also contains volatile organic compounds. Reported benzene and toluene concentrations, for example, range from 4.9 to 400 ug/L and 7.2 to 1000 ug/L, respectively. The State drinking water MCLs for benzene and toluene are 1.0 ug/L 150 ug/L respectively.

3. Valley Water's discharges to the produced wastewater disposal ponds are regulated under Waste Discharge Requirements Resolution No. 69-199 (Resolution), adopted by the Central Valley Water Board (Board) on 14 February 1969. The Resolution prohibits the discharges from creating pollution and nuisance. The Resolution issued to Valley Water states in relevant part:

    1. The discharge shall not cause a pollution of ground or surface waters.

4. The *Water Quality Control Plan for the Tulare Lake Basin* (Revised 2016) (Basin Plan) designations of beneficial uses of groundwater for the Cymric Area include: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), and Industrial Service Supply (IND).

5. There is agricultural land 1,500 feet north of the Facility and to the east of the Facility. Agricultural wells in the vicinity that are downgradient of the Facility have total dissolved solids (TDS) concentrations ranging from 2,300 mg/L to 6,800 mg/L. One agricultural well that appears to be impacted by oil field operations has a TDS of 18,000 mg/L. Starrh Family Farms LP owns and operates these wells, and they are reportedly important for operations when surface water deliveries are short. The existence and use of these wells establishes an existing AGR beneficial use of groundwater down gradient from the Facility.

6. Valley Water installed a groundwater monitoring well network in 2002 to investigate whether wastewater discharged to its ponds was migrating down structure to the northeast. Two wells (CYM-19H1 and CYM-17N1) were installed in what is called in Valley Water documents the upper Tulare sand, and one well (CYM-21D1) was installed in the what is called the deeper Tulare sand or aquifer, the location of the regional aquifer. The upper Tulare and deeper Tulare sequences are separated by a silt/clay layer called the Corcoran Clay Equivalent. The network was expanded in 2006 with the addition of three wells (CYM-17K1, CYM-17M1, CYM-17Q1) in the Upper Tulare Formation down gradient of the original wells. These three wells were positioned to be sentinel wells and were reportedly dry at the time of installation. Field notes in Valley Water's self-monitoring reports indicate the sentinel wells may have contained produced wastewater from the ponds as early as 2010 and sampling in 2014 confirmed the presence of produced water from the ponds. Valley Water's 2017 self-monitoring report demonstrates high salinity produced wastewater has migrated beyond the sentinel wells and also impacted groundwater at CYM-21D1 in the Lower Tulare Formation, which contains the regional aquifer.

7. From 2002 to 2017, the TDS concentrations in CYM-21D1 have increased from about 1,200 mg/L to 8,500 mg/L, and the chloride concentrations have increased from 334 mg/L to 2,400 mg/L. The TDS and chloride concentrations now exceed State drinking water MCLs and AGR water quality objectives, indicating a condition of pollution.

8. Clean Harbors Buttonwillow LP (Clean Harbors) operates a Class I hazardous waste disposal facility approximately 1.5 miles to the north-northeast and down structure and down gradient of the Facility. At least two of Clean Harbors' upgradient groundwater monitoring wells have been showing increasing concentrations of TDS and chloride for many years. TDS concentrations in MW-148I have increased from 2,340 mg/L to 5,400 mg/L from 2011 to 2017. Chloride concentrations in MW-148I have increased from about 246 mg/L to 1,200 mg/L from 2009 to 2017. MW-148I appears to be screened in the upper Tulare sand. TDS concentrations in MW-102RL have increased from about 3,040 mg/L to 3,900 mg/L from 2013 to 2017. Chloride concentrations in MW-102RL have increased from about 450 mg/L to 740 mg/L from 2007 to 2017. MW-102RL is screened in the deeper Tulare sand. Given its location directly upgradient, the Facility is the most likely source of the observed TDS and chloride concentrations in the Clean Harbors' groundwater monitoring wells.

9. The information in Findings 2 through 8 indicate that:

   a. There is a plume of produced wastewater migrating from the Facility ponds toward the northeast and east-northeast,

   b. The plume has moved beyond the Facility groundwater monitoring network and likely caused a condition of TDS and chloride pollution in CYM-21D1, which draws from the regional aquifer that is used for AGR, and

Tentative

c. The plume likely has caused degradation of at least two of Clean Harbors' upgradient groundwater monitoring wells and likely caused a condition of TDS and chloride pollution in MW-148I.

10. The Central Valley Water Board adopted three Wasted Discharge Requirements General Orders for Oil Field Discharges to Land (General Orders) on 6 April 2017. The General Orders address three specific scenarios:

    a. General Order Number One – The discharge meets the Basin Plan effluent limits for TDS, chloride, and boron of 1000 umhos/cm, 200 mg/L, and 1 mg/L, respectively.

    b. General Order Number Two – The discharge exceeds the Basin Plan effluent limits, but will not substantially affect water quality nor cause a violation of water quality objectives; it must meet the requirements of the State Anti-degradation Policy.

    c. General Order Number Three – The discharge must be confined to an area where the first encountered groundwater is of poor quality or there is no first encountered groundwater, or the first encountered groundwater does not support the following beneficial uses identified in the Basin Plan: MUN, ARG, IND, and PRO.

11. Valley Water has requested that discharges from the Facility be regulated under General Order Number Three. General Order Number Three does not require groundwater monitoring, which generally reduces a discharger's costs.

12. Regulation of the Facility's discharges under the General Orders is likely inappropriate for the following reasons:

    a. General Order Number One requires discharges to comply with the Basin Plan effluent limits for EC, chloride, and boron. Valley Water's discharges greatly exceed these limits and, therefore, cannot comply with them.

    b. General Order Number Two requires discharges to comply with the State Anti-degradation Policy. Valley Water's high salinity discharge comingles with better quality groundwater down gradient, and likely will cause degradation of groundwater. Discharges at the Facility likely has already caused pollution in CYM-21D1 and MW-148I. Therefore, the discharges cannot comply with General Order Number Two.

    c. General Order Three requires dischargers to either demonstrate that there is no groundwater beneath the discharge areas and that produced wastewater and constituents associated with other approved wastes discharged will not migrate into areas that there is groundwater with designated beneficial uses, or if there is first encountered groundwater underlying the discharge location, demonstrate that the current Basin Plan groundwater beneficial uses are eligible for de-designation.

    There is first encountered groundwater underlying the Facility and within the influence of the Facility discharges; however, the beneficial uses likely are not eligible for de-designation because locally the quality of this groundwdater is suitable for its designated beneficial uses and is beneficially used within a short distance from the

Tentative

Facility. Valley Water's monitoring reports indicate that its discharges are likely polluting groundwater in the regional aquifer (CYM-21D1 and MW-148I), which has an active beneficial use of AGR. Additionally, the produced wastewater has migrated to the east and beyond the Facility groundwater monitoring well network. To date, the extent of plume migration has not been fully characterized, but given the local hydrogeology, it is expected to remain uncontained and continue to migrate eastward. Therefore, the discharge likely cannot comply with General Order Number Three.

**THEREFORE BE IT RESOLVED that:**

The Central Valley Water Board directs staff to take appropriate action to compel Valley Water to come into compliance with existing requirements, to submit for the Board's consideration a report of waste discharge to receive an updated set of individual waste discharge requirements issued under Water Code section 13263, or to cease discharging. Compliance options may include the development of a Cease and Desist Order pursuant to Water Code section 13301 for the Board's consideration or the issuance of a Time Schedule Order under Water Code section 13300, either of which would provide a detailed time schedule of specific actions that Valley Water must take in order to ensure the appropriate protection of underlying groundwater.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Central Valley Region, on __ April 2018.

PAMELA C. CREEDON, Executive Officer

Tentative

TELEPHONE (661) 410-7500 FAX (661) 410-7506

**VALLEY WATER MANAGEMENT COMPANY**
7500 MEANY AVE.
BAKERSFIELD, CALIFORNIA 93308

February 13, 2018

Ms. Pamela Creedon, Executive Officer - Pamela.Creedon@waterboards.ca.gov
Mr. Clay Rodgers, Assistant Executive Officer – Clay.Rodgers@waterboards.ca.gov
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

Dear Ms. Creedon and Mr. Rodgers,

Valley Water Management Company (Valley Water) has received and reviewed the proposed Monitoring and Reporting Program (MRP), Staff Report, and draft Resolution No. R5-2017-0031. We believe the timing of adoption of this proposed MRP and Resolution is premature, particularly in light of the work we are currently undertaking with your staff. Continued collaboration with your staff on the final key issues over the next few months is required for effective decision-making in this matter. Additional information currently being compiled will make consideration of the appropriate MRP and Resolution far more fact-based and would not place groundwater quality at further risk. In order to discuss this issue further, we would like to meet with you and your staff prior to February 26th to continue discussion and resolution of the key issues in a timely manner.

Based on the outcome of our last productive meeting with you and your staff in January, we are very surprised by what we consider premature regulatory actions that cannot be fully informed until we have resolution of certain key issues that we discussed. We agreed at that meeting that there would be continued review and dialogue on three items, including:

1. Discussions with CVRWQCB staff member Doug Wachtell to iron out any differences in stratigraphic interpretation,
2. Review of the geochemistry from wells at the Clean Harbors site to firm up an interpretation of any potential impact, and
3. Discussion of what parameters might need to be better defined in our Cymric flow model.

In the short time since our January 10, 2018 meeting, Valley obtained geological and stratigraphic data from your staff, reviewed that information, and worked with Doug Wachtell to come to an agreement on the stratigraphic relationships between Valley Water Cymric shallow stratigraphy and Clean Harbors Cymric shallow stratigraphy. The outcome of that agreement is attached to this letter and represents what can happen when there is positive collaboration between Valley and the RWQCB staff: the facts are in both hands, which allows for mutual review, dialogue, and agreement.

We believe the same productive and efficient process will lead to resolution of the geochemical data. We have reviewed more recent geochemical data collected at Clean Harbors and still conclude that there is no produced water influence on the perched groundwater zones in the upper and intermediate zones and no indication of any influence in the lower Tulare zone. This subject was discussed extensively in our semiannual report submitted in October 2017. We

would like to determine the basis for your staff concluding otherwise, and discuss this key issue with an eye towards coming to agreement as we did with the stratigraphic question.

The results of Valley Water's reporting in 2017 bears repeating. Since that report was written, additional data has been reviewed. Nothing in the new data changes our interpretation of the results from 2017.

- The radial extent of the produced water mound flowing northeast from the Cymric Facility is approximately one mile long within the Upper Tulare Sand and extends just past Valley Water wells CYM-17K1, CYM-17M1, and CYM-17Q1. Groundwater in Clean Harbors (CH) Upper Perched Zone wells MW-130U and MW-143U, located in the northwest corner of the CH facility only, is not affected by the produced water plume. A different source of perched water, most likely related to the adjacent irrigated agricultural fields just to the north, appears to be affecting these wells and the CH Intermediate Perched Zone well MW-148I. Higher nitrate concentrations found in MW-148I are typically indicative of agricultural runoff and infiltration. This is a key component of our interpretation of the geochemical data.

- CH wells MW-130U and MW-143U contained perched groundwater continuously from 2005 to 2015, and from 2005 to 2017, respectively. Valley Water wells CYM-17K1, CYM-17M1, and CYM-17Q1 did not contain groundwater from 2006 to 2014, indicating a totally different source of perched groundwater. Groundwater levels declined 12 to 15 feet in CH Upper Perched Zone wells MW-130U and MW-143U between 2005 and 2017 with well MW-130U now dry and well MW-143U containing only two feet of water in 2017. In contrast, water levels in Valley Water Upper Tulare Sand wells have remained constant during this time providing further evidence of a different source of perched water.

- The groundwater level in CH Intermediate Zone wells MW-148I and 149RI have decreased 7 to 17 feet from 2005 to 2017. This decreasing trend is consistent with the decreasing trend in the Upper Perched Zone, indicating a similar source of perched water.

- The groundwater level in Valley Water's Lower Tulare Sand well CYM-21D1 has increased significantly, roughly five feet, since the June 2013 sampling event. The groundwater level in CH Lower Water Table wells MW-102RL and MW-170L has declined five to six feet during this time. This indicates a lack of connection between these wells.

- Groundwater velocities were calculated using hydraulic conductivity and effective porosity values derived from field and laboratory testing completed by Geomega in 2004 and hydraulic gradient values calculated from recent sampling/monitoring events. Groundwater velocities ranged from 0.21 to 1.4 ft/day near the ponds in the Upper Tulare Sand unit. Therefore, approximately 41 years would be required for groundwater to flow from Valley Water well CYM-17K1 to CH well MW-143U.

- Groundwater velocity in the Lower Tulare Sand/Lower Water Table Zone was calculated to be 0.01 ft/day. Therefore, 600 years would be required for groundwater to flow from Valley Water well CYM-21D1 to CH well MW-102RL.

- At the present time, CYM-17K1 and CYM-17N1 appear to be monitoring an historical slug of more saline, more fractionated water migrating through the groundwater system. It is estimated that this water was disposed in the ponds well over 25 years ago. An explanation for the more saline/fractionated slug present today is that Valley Water was accepting more Diatomite Formation produced water than Tulare Formation water during the 1980s and 1990s.

- The presence of groundwater in formerly dry (prior to May 2014) sentinel wells CYM-17K1, CYM-17M1, and CYM-17Q1 with water chemistries similar to those found in the ponds and CYM-17N1 indicates the continued migration of pond water to the northeast and east of the Cymric produced water ponds and likely represents historic pond water disposed of approximately 40 years ago.

- Chloride and Total Dissolved Solids (TDS) concentrations have been increasing in CH Upper Perched Zone wells MW-130U and MW-143U beginning in 2012 and 2013, prior to groundwater being encountered in Valley Water sentinel wells CYM-17K1, CYM-17M1, and CYM-17Q1. This timing along with the decreasing water levels in MW-130U and MW-143U indicates a completely different source of perched water. Additionally, boron concentrations in wells MW-130U and MW-143U range from 4.7 to 12 mg/L and have not increased along with the chloride and TDS values reinforcing a different source of perched water. Finally, the pH value in MW-143 U was 7.5, which is significantly different from the 6.6 to 6.8 range found in the Valley Water Upper Tulare Sand wells.

- Chloride and subsequent TDS concentrations have been increasing in CH Intermediate Perched Zone well MW-148I beginning in 2017, however boron concentrations have not increased. This indicates vertical migration from the overlying Upper Perched Zone and not from produced water. Additionally, nitrate concentrations in MW-148I were 58 mg/L in 2017 versus 13 to 15 mg/L in Valley Water Upper Tulare Sand wells. In addition, pH values were 8.1, which is substantially higher than the 6.6 to 6.8 found in Valley Water's wells.

- The overall trend of increasing concentrations of chloride, magnesium, sodium, and boron at Valley Water Lower Tulare Sand well CYM-21D1 continued with the June 2017 sampling event with concentrations of chloride of 2,400 mg/L and TDS of 8,500 mg/L. The boron concentration in June 2017 was 22 mg/L. These concentrations may indicate some influence from produced water mixing with the lower Tulare groundwater.

- All monitoring wells at the site have been sampled and analyzed for the presence of organic petroleum derivatives. No petroleum hydrocarbon components have been detected above laboratory method detection limits for groundwater samples collected and analyzed at the Cymric site through June 2017. In January 2018, monitoring well CYM-17K1 detected GRO at a concentration of 77 µg/L, just above the detection limit of 50 µg/L in January 2018. No BTEX or GRO concentrations were detected in any of the other monitoring wells and BTEX was not detected in CYM-17K1 in January 2018.

- TDS concentrations in CH Lower Water Table Zone well MW-102RL were stable between 2005 and 2014 and ranged between 3,100 and 3,400 mg/L, slightly increased to 3,700 mg/L in 2015, and have remained stable through 2017. TDS concentrations in downgradient well MW-170L slightly increased to 3,400 mg/L in 2007 and have been

generally decreasing to a concentration of 2,600 mg/L in 2017. Boron concentrations in CH Lower Water Table Zone wells MW-102RL and MW-170L ranged from 8.4 to 11 mg/L between 2005 and 2017 with no trends. Additionally, the pH value in CH Lower Water Table Zone well MW-102RL was 8.27 versus 7.4 in Valley Water well CYM-21D1. This indicates no influence on CH wells from groundwater in well CYM-21D1.

- On the bilinear diagram of O/H stable isotopes, wells CYM-17K1, CYM-17M1, CYM-17N1, CYM-17Q1, and CYM-19H1 plot near the pond water and far to the right of the groundwater found in CH wells MW-148I, MW-149RI, MW-102RL and MW-170L. Well CYM-21D1 plots between well CYM-19H1 and the CH wells. This indicates a mixture of Upper Tulare groundwater and produced water was encountered at the Valley Water Upper Tulare Sand wells CYM-17K1, CYM-17M1, CYM-17N1, CYM-17Q1 and CYM-19H1 locations with a smaller element of produced water in the Valley Water Lower Tulare Sand well CYM-21D1. This also indicates that CH Intermediate Perched and Lower Water Table Zone wells have a different source than Valley Water Upper and Lower Tulare Sand wells.

- The results of our evaluation indicate that CH Upper Perched, Intermediate Perched, and Lower Water Table Zone wells are not affected by migrating produced water.

Resolution of both the key stratigraphic and the geochemical issues will inform any required modification to the Valley flow model boundary and initial conditions. We also look forward to further discussion with the Board about other model questions, so that we can resolve them and do final model runs that reflect consensus between Valley Water and the Regional Board.

Because we are working cooperatively at the moment to address these technical issues, we believe the currently scheduled hearing on the draft MRP and Resolution is premature and should be removed from the April Board meeting and deferred to a later date. Valley Water has done considerable work on the issues outlined above, many of which are the same types of issues being discussed in the context of CV-SALTS. Valley Water firmly believes that continued collaboration and dialogue with your staff is appropriate over the next few months and will not lead to any detrimental impact to the beneficial uses of ground waters in the Cymric area.

As stated above, we would also like to meet with you and your staff prior to the current end of the public comment period on the propose MRP and Resolution. Please send us available meeting dates and times prior to February 26, 2018.

Thank you for your consideration of this request.

Sincerely,

Russell Emerson

Russell Emerson
Valley Water Manager

Attachment

cc: Melissa Thorme, Downey Brand LLP
Jim Waldron

TELEPHONE (661) 410-7500 FAX (661) 410-7506

**VALLEY WATER MANAGEMENT COMPANY**
7500 MEANY AVE.
BAKERSFIELD, CALIFORNIA 93308

February 26, 2018

Mr. Clay Rodgers (Clay.Rodgers@waterboards.ca.gov)
Ms. Alejandra Lopez (Alejandra.Lopez@waterboards.ca.gov)
Central Valley Regional Water Quality Control Board
1685 E Street
Fresno, CA 93706

Dear Mr. Rodgers and Ms. Lopez,

Valley Water Management Company (Valley Water) submits this letter to provide comments to Proposed Resolution R5-2017-0031 and the proposed Monitoring and Reporting Program (MRP). We believe these orders are premature at this point, because Valley Water has been working cooperatively with the Central Valley Regional Water Quality Control Board (Regional Board) and has voluntarily been monitoring for many years. Valley Water is also currently engaged with your staff and is in the process of coming to agreement on the technical basis for moving forward with a sampling plan, but we are not yet at that point. We believe that the technical basis will be enhanced once Valley Water and Regional Board Staff have agreement on underlying technical issues. Until then, this matter is premature and should not be brought to the Regional Board for a hearing until there is a firmer grounding in fact.

Similarly, this regulatory action is premature because the Regional Board is poised to adopt new Basin Plan amendments in the next few months designed to deal with the exact types of salinity issues being addressed in the proposed Resolution. The proposed regulatory actions ignore the fact that Valley Water has been actively participating for many years in CV-SALTS and the Central Valley Salinity Coalition, which seek reasonable and feasible means to address the salinity issues in the Central Valley over the long term. In addition, the proposed regulatory actions not only make the Alternative Salinity Permitting Strategies being proposed for adoption in the near future irrelevant, but also create yet another permitting/regulatory construct outside of the three oil and gas General Orders (GOs) that were supposed to address facilities such as Valley Water's McKittrick facility.

With regard to the technical issues still outstanding, four principal facts are being currently being addressed with your staff, particularly in relation to the Clean Harbors facility downgradient from Valley Water's McKittrick facility. These facts are resolvable, and are a necessary precondition to considering the topic of the Resolution. The following is a list of the main issues we are seeking to resolve with Regional Board Staff:

1. A shared understanding of the stratigraphy in the area and how it affects fate and transport of produced water and irrigation water. The Resolution contains mistakes that staff has already agreed should be changed, which directly affect the Resolution. For example, the Corcoran Clay Equivalent (CCE) does not separate the upper and deeper Tulare Formations at Valley Water's facility, as suggested in Finding 6. This mistakenly claims that perched water at Valley Water's facility may be equivalent to perched water at Clean Harbors. This is incorrect. A correct understanding of the stratigraphy makes it clear that it is not possible for produced water from McKittrick to travel upwards and be found above the CCE at Clean Harbors. The downgradient flow to the Upper Zone at Clean Harbors is a central concern of the Resolution, but the facts (already agreed to by Valley Water and Regional Board staff) belie this conclusion.

2. A shared understanding of the comparative groundwater geochemistry between that beneath Valley Water, and that beneath Clean Harbors. Proposed Resolution Findings 8 and 9 completely rely on Total Dissolved Solids (TDS) and chloride to conclude that produced water from Valley has affected Upper Zone and Intermediate Zone water beneath Clean Harbors. The associated staff report incorrectly concludes that boron (which is relatively abundant in produced water) is not a conservative tracer and, therefore, dismisses further consideration. However, the fact is that perched water at Clean Harbors is most notably associated with relatively high concentrations of nitrogen compounds, and relatively low concentrations of boron. Taken together, the geochemistry indicates that the limited area of perched water at Clean Harbors is not impacted by produced water. Rather, it appears to be impacted by irrigation in adjacent fields just to the north. The Resolution does not consider these key facts: the timing of the occurrence of perched water at Clean Harbors, which was found at times when three sentinel wells in Section 17 indicated that produced water was still a mile away from Clean Harbors, the presence of perched water at Clean Harbors in a formation above that affected at McKittrick, and the agricultural character of the water beneath Clean Harbors.

3. A shared understanding of the location of beneficial uses of area groundwater. The Resolution wrongly implies that an agricultural well with 18,000 mg/L TDS was affected by Valley Water; in fact, this well was the subject of litigation between Aera and Starrh Farms, and is located far from Valley Water's area of influence. Proposed Resolution Finding 5 also implies that agricultural *land* is equivalent to a well, and that cross-gradient wells (owned by Starrh Farms) are down gradient wells. The Resolution does not mention that the aquifers used by agricultural wells are deeper, and in different aquifers, than the perched produced water beneath McKittrick. The distinctions here are very significant, because the Proposed Resolution implies a condition of imminent threat, when

this may not actually be the case.

4. Valley's draft groundwater model was discussed with you, Pamela Creedon, and your staff to add any components that Regional Board staff would like to see addressed by the model. Valley Water has already worked with Regional Board staff to develop a draft groundwater model, and presented the draft results on January 10, 2018. We expressed full willingness to work with Board staff to ensure that the model parameters are agreeable to Board staff. Clearly, this area would benefit from quantification of the existing conditions, as a basis to predict potential future conditions. However, we believe premature consideration of this Proposed Resolution by the Regional Board would forestall development of a quantitative tool to support fact-based decisions.

Because these four items are fundamental to future considerations of the facility, and because there is active work to better describe these considerations, we believe a Regional Board vote on the matter is premature and should be postponed temporarily.

The Resolution itself states:

*"The Central Valley Water Board directs staff to take appropriate action to compel Valley Water to come into compliance with existing requirements, to submit for the Board's consideration a report of waste discharge to receive an updated set of individual waste discharge requirements issued under Water Code section 13263, or to cease discharging. Compliance options may include the development of a Cease and Desist Order pursuant to Water Code section 13301 for the Board's consideration or the issuance of a Time Schedule Order under Water Code section 13300, either of which would provide a detailed time schedule of specific actions that Valley Water must take in order to ensure the appropriate protection of underlying groundwater."*

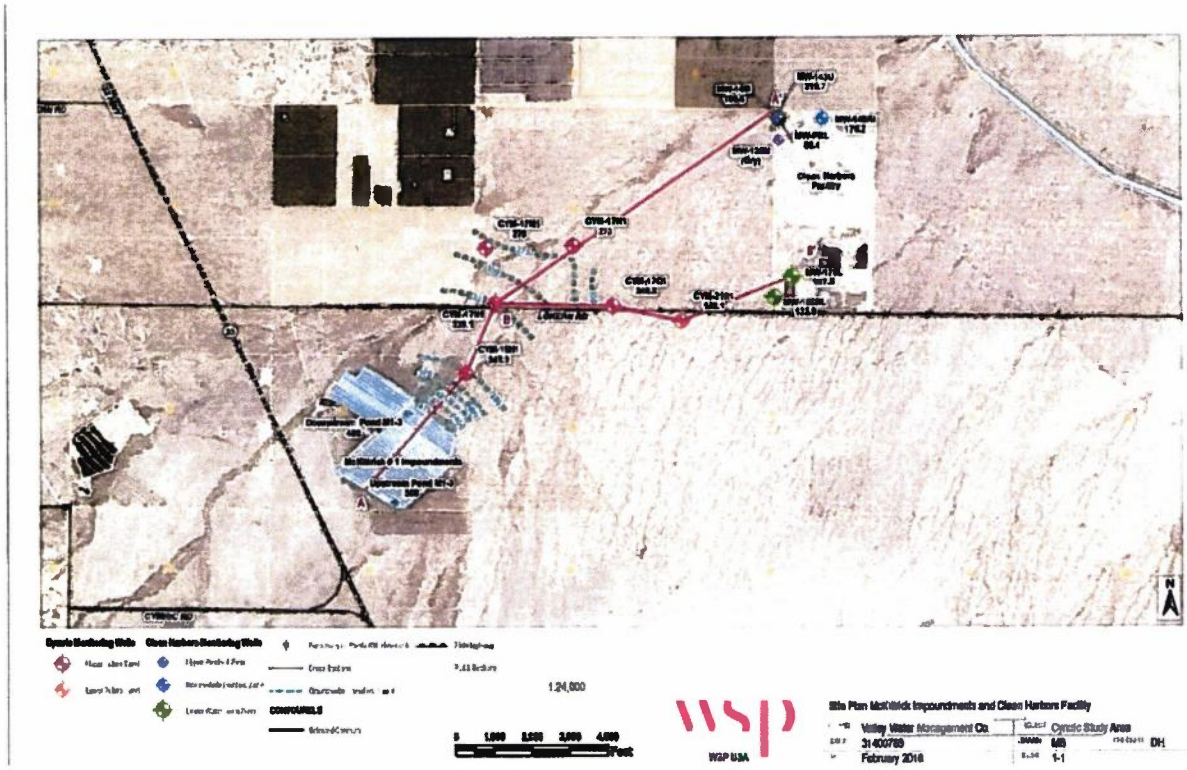
Once we arrive at a shared understanding of the key site features and modify the groundwater model to address Regional Board staff concerns, Valley Water would support an update of the Waste Discharge Requirements at the facility, consistent with the Alternative Salinity Permitting strategy scheduled to be adopted by the Regional Board in May.

The remainder of this comment letter addresses the key components of the technical basis for the Proposed Resolution.

## Stratigraphy

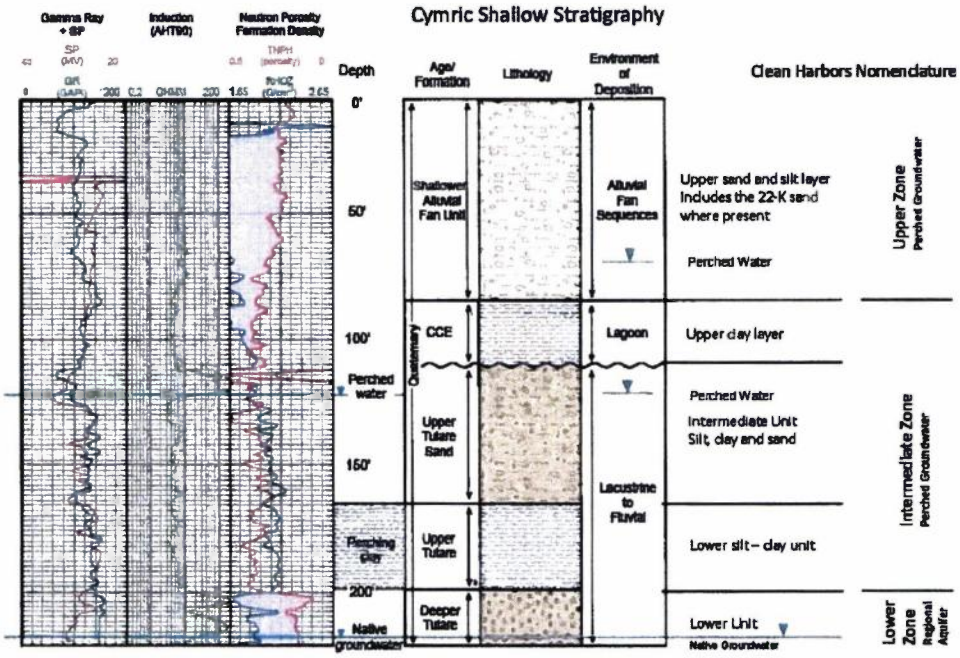
During our meeting with the Regional Board on January 10, 2018, the subject of the area stratigraphy was discussed. Valley reviewed additional data, and worked with Board staff member Doug Wachtell to address the relative stratigraphy between the Valley facility and the downgradient Clean Harbors facility at the locations shown in Figure 1.

**Figure 1: Valley and Clean Harbors facilities**




Valley Water submitted a comparative stratigraphic column (Figure 2) for review, and received verbal concurrence on the interpretation. As shown in Figure 2, the "Upper Alluvium" alluvial fan sequence beneath Valley is termed the "Upper Perched Zone" beneath Clean Harbors. Both alluvial units overlay the "Corcoran Clay Equivalent (CCE)." Beneath McKittrick, the CCE is predominantly silty and, therefore, does not significantly impede the downward flow of water. Groundwater does not perch above the CCE beneath the McKittrick facility and the upper alluvium is dry. In contrast, beneath the northwest portion of the Clean Harbor facility, the CCE is more clay-rich and does act to allow water to perch beneath the Clean Harbor facility. The Upper Perched Zone under the northwest portion of the Clean Harbors facility is saturated while the Upper Alluvium beneath the McKittrick facility is not saturated. The source of recharge to the Upper Perched Zone under the northwest portion of the Clean Harbors facility appears to be agricultural infiltration.

**Figure 2: Comparative Stratigraphic Column**




Hydrogeologic sections A-A' and B-B' in Figures 3 and 4 have been revised based on the updated stratigraphic correlation and reveal the connection between the Upper Perched Zone under the northwest portion of Clean Harbors facility and the Upper Alluvium under the McKittrick facility.

This change in stratigraphic correlation is highly significant in determining whether water in the Upper Perched Zone beneath Clean Harbors may be from McKittrick. There is no known physical mechanism whereby water from Valley, which first occurs *beneath* the CCE, could travel downgradient to Clean Harbors, and then migrate upwards *through* the CCE.

**Figure 3: Hydrogeologic Section A-A'**

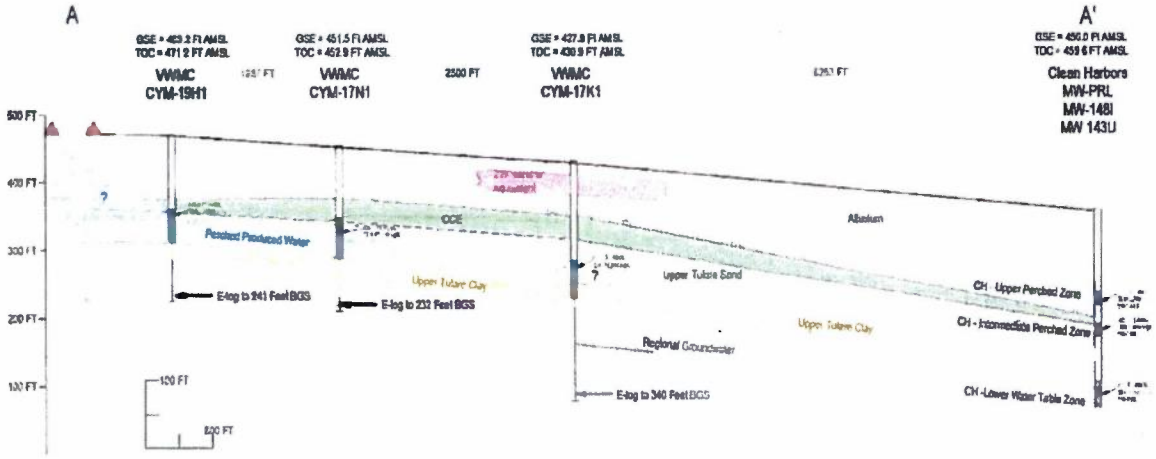
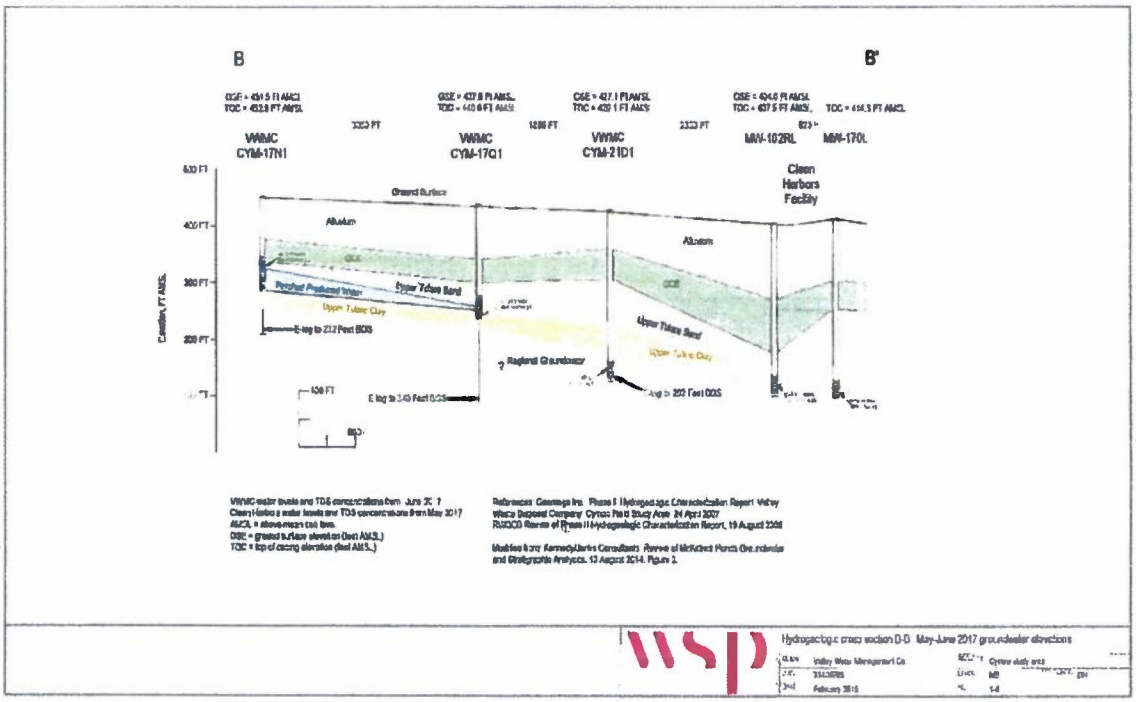



**Figure 4: Hydrogeologic Section B-B'**

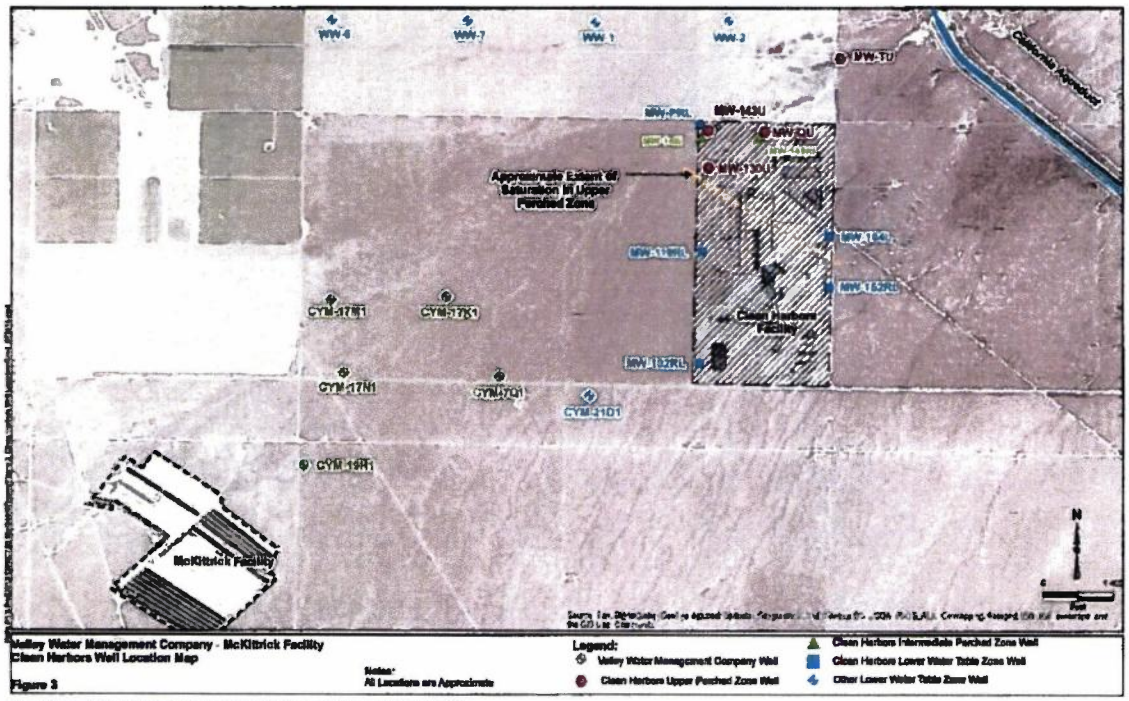



The "Upper Tulare Sand" beneath McKittrick corresponds to the "Intermediate Perched Zone" beneath Clean Harbors. Both of these units underlay the CCE, and are perched above a prominent clay layer that is laterally continuous. This unit contains water beneath both McKittrick and Clean Harbors. These units are in a lacustrine to fluvial (relatively still water) environment, compared to the Upper Alluvium/Upper Perched Zone, which is in an alluvial fan environment that may have very heterogeneous

deposits. Lacustrine to fluvial units are more homogeneous, and would be expected to be laterally continuous as observed here.

As described more fully below, under *Groundwater Geochemistry*, beneath the McKittrick facility the water in the Upper Tulare Sand contains produced waters from the overlying ponds, while beneath Clean Harbors facility, the water in the Intermediate Perched Zone appears to be from local irrigation infiltration. Figure 5 shows the location of the facilities, and the only water in the Clean Harbors Upper Perched Zone and Intermediate Zone is adjacent to the irrigated agriculture northwest of the facility. The water found in both zones of Clean Harbors is relatively rich in nitrate (as expected from irrigation return water) and poor in boron (boron is a good indicator of produced water, and does not appear to be elevated beneath Clean Harbors).

**Figure 5: Location of Perched Water Beneath Clean Harbors**




Source: Quarterly Groundwater Monitoring Report (4Q 2013), Prepared By Cameron-Cole, Alameda, CA

As can be seen in Figure 5, the perched water beneath Clean Harbors is in the area closest to the irrigated lands. The water found in the Upper Perched Zone beneath Clean Harbors cannot be from the McKittrick facility (as described above), but does contain compounds that implicate irrigated water. The water found in the Intermediate Perched Zone beneath Clean Harbors resembles that in the Upper Perched Zone and, therefore, is most likely to be Upper Perched Zone water that has seeped through the CCE to perch above the Upper Tulare perching clay/lower silt-clay unit (Figures 2 and 3).

Based on the stratigraphy recently developed between Valley Water and Regional Board staff, the water encountered in the Upper Perched Zone beneath Clean Harbors cannot be from or impacted by the McKittrick facility, and that similar water encountered in the Intermediate Perched Zone is almost certainly derived from the overlying Upper Perched Zone by infiltration through the CCE.

## Groundwater Geochemistry

Valley Water has described the groundwater geochemistry and its implications for produced water from McKittrick possibly having reached beneath the Clean Harbors facility, most recently in Cymric Area Sampling and Analysis Report, First Semi-Annual 2017. We have also reviewed the Staff Report accompanying the Proposed Resolution. While the Staff Report is a good summary of the data, some very key points relevant to the Proposed Resolution must be corrected.

**Constraints on Past Location of Valley Plume and Perched Water Beneath Valley Facilities.** Groundwater quality has been regularly measured beneath the McKittrick facility. From 2006 to 2017, Valley "sentinel wells" CYM-17K1, CYM-17M1, and CYM-17Q1 did not contain groundwater. After 2014, these wells contained water with geochemical characteristics similar to those found in the McKittrick ponds; these data are a strong indicator that water from McKittrick reached these wells no earlier than 2014.

However, water has been in Clean Harbors Upper Perched Zone wells since at least 1990 and, therefore, could not have originated from Valley because the McKittrick water was still upgradient of the sentinel wells. As described in the Stratigraphy section of this letter, the water in the Upper Perched Zone beneath Clean Harbors corresponds to a dry layer (upper alluvium) beneath McKittrick, further indicating the water beneath Clean Harbors (CH) must have a different source.

Groundwater levels declined 12 to 15 feet in CH Upper Perched Zone wells MW-130U and MW-143U between 2005 and 2017 with well MW-130U now dry and well MW-143U containing only two feet of water in 2017. In contrast, water levels in VWMC Upper Tulare Sand well CYM-17N1 have remained constant during this time and water levels in sentinel wells CYM-17K1, 17M1, and 17Q1 have remained constant from 2014 to 2017 providing further evidence of a different source of perched water.

The groundwater level in CH Intermediate Perched Zone wells MW-148I and 149RI have decreased 7 to 17 feet from 2005 to 2017. This decreasing trend is consistent with the decreasing trend in the Upper Perched Zone, indicating a similar source of perched water.

**Chloride, TDS, and Boron.** Chloride and TDS concentrations had been increasing in Clean Harbors Upper Perched Zone wells MW-130U and MW-143U beginning in 2012 and 2013, prior to groundwater being encountered in VWMC sentinel wells CYM-17K1,

CYM-17M1, and CYM-17Q1. This timing indicates a completely different source of perched water.

Chloride and TDS concentrations have been increasing in CH Intermediate Perched Zone well MW-148I beginning in 2017, but boron concentrations have not increased. This indicates influence from the overlying Upper Perched Zone and not from produced water.

TDS concentrations in Clean Harbors Lower Water Table Zone well MW-102RL were stable between 2005 and 2014, when there was no water in the Valley Water sentinel wells, indicating that the Clean Harbors water was not from McKittrick. During this time, TDS beneath Clean Harbors ranged between 3,100 and 3,400 mg/L, slightly increased in 2015, and has remained stable through 2017. TDS concentrations in downgradient well MW-170L slightly increased in 2007, and have been generally decreasing since then. TDS concentrations in Valley Water's Lower Tulare Sand well CYM-21D1 increased from 2006 to 2017 with a concentration of 8,500 mg/l in 2017. This indicates that groundwater from Valley well CYM-21D1 has not reached Clean Harbors well MW-102RL.

Boron is a good indicator of produced water and is relatively high in Valley Water wells, ranging between 55 and 95 mg/L and between 30 and 70 mg/L in Valley Water's Upper Tulare Zone wells, indicating the influence of produced water. Boron is relatively low beneath Clean Harbors, supporting a different water source. Boron concentrations in Clean Harbors Upper Perched Zone wells MW-130U and MW-143U range from 4.7 to 12 mg/L and have not increased along with the chloride and TDS values, reinforcing a different source of perched water. Boron concentrations in CH Lower Water Table Zone wells MW-102RL and MW-170L ranged from 8.4 to 11 mg/L between 2005 and 2017 with no apparent trends. As noted by staff, boron concentrations have been increasing in VWMC well CYM-21D1.

The Staff Report accompanying the Proposed Resolution suggests that boron is not a conservative tracer, so that its low concentrations beneath Clean Harbors may not indicate a separate source. However, according to Hem[1], in natural waters, boron tends to be in the uncharged ionic state and, therefore, boron is not likely to be adsorbed on mineral surfaces. Supporting this finding that boron is a conservative tracer in this area is that water in the Valley Water well screened in the deeper Tulare Formation (CYM-21D1) has boron levels consistent with produced water. This means that produced water had to have migrated through the substantial perching clay, without appreciable loss of boron.

[1] Hem, J. (1989) Study and Interpretation of the Chemical Characteristics of Natural Water, USGS Water Supply Paper 2254.

**Nitrate Concentrations.** Nitrate concentrations in MW-148I were 58 mg/L in 2017 versus 13 to 15 mg/L in Valley Water's Upper Tulare Sand wells. Nitrate is a very good indicator of a water source from the irrigated agricultural fields adjacent to the limited part of the Clean Harbors facility that contains perched groundwater (see Figure 2).

## Location of Beneficial Uses of Area Groundwater

The Proposed Resolution states in Finding 5:

*"There is agricultural land 1,500 feet north of the Facility and to the east of the Facility. Agricultural wells in the vicinity that are downgradient of the Facility have total dissolved solids (TDS) concentrations ranging from 2,300 mg/L to 6,800 mg/L. One agricultural well that appears to be impacted by oil field operations has a TDS of 18,000 mg/L."*

The groundwater flow direction in this area is towards the northeast and the agricultural wells are cross-gradient to Valley. As such, potential threats to those wells are much less than for downgradient wells. As discussed in the next section, Valley suggests that the groundwater model commissioned for the McKittrick facility would be the appropriate tool for assessing potential threats. In addition, Valley believes that the agricultural wells must be screened in the regional aquifer, which is located beneath the perching clay upon which the produced water rests. This clay further protects the native groundwater.

With respect to the "*one agricultural well that appears to be impacted by oil field operations has a TDS of 18,000 mg/L*" it bears repeating that Valley Water believes Board staff is referring to a well located in Section 36 that was the subject of litigation between Starrh Farms and Aera in the South Belridge Field. The subject well is <u>not</u> downgradient of the McKittrick facility.

For agricultural wells located downgradient from the McKittrick facility, the comments in previous sections demonstrating that the water beneath Clean Harbors is not sourced nor impacted from Valley Water's ponds also applies to supply wells located further downgradient from Clean Harbors. If water from McKittrick has not reached Clean Harbors, it has certainly not reached wells further downgradient.

## Modifications to Draft Groundwater Model

Valley Water is in the process of working with Regional Board staff in the development of a groundwater model of the vicinity of the McKittrick facility. We presented the draft results in a January 10, 2018 meeting in the Regional Board's office. The interaction was very productive, and focused on the need to come to consensus on stratigraphy, downgradient groundwater geochemistry, and locations of beneficial use of groundwater (both depth of sources and distance from the facility). Valley Water requests that this amicable process continue so that the resulting model will reflect a consensus view on the site, and be a valuable guide to future decision-making regarding the site. The results of the model would be very useful in determining the most effective and efficient

locations for additional monitoring, if the Monitoring and Reporting Program can be modified to include this element instead of some of the other prescriptive monitoring requirements being proposed.

Valley Water also takes issue with many of the findings and conclusions contained in the MRP, which discuss wells being impacted by produced water. For the same reasons discussed above, these findings are inaccurate and do not belong in an MRP. In addition, the MRP seems to cherry pick data and not provide all data, since some may not support the conclusions being made. If an MRP is being proposed, Valley Water suggests that a clean copy without specific findings and conclusions, such as the MRP for one of the GOs for Oil and Gas facilities be used instead to be less inflammatory and controversial. In addition, many of the MRP's requirements, including the following appear unnecessary:

- Pg. 7 - Requiring flow in both million gallons per day (MGD) and barrels/day
- Pg. 8 – Requiring mass and volume in gallons and kilograms
- Pg. 9 – Requiring new solid waste sampling not contained in the GOs.
- Pg. 10 – Requiring a well survey for 2.5 miles out, instead of 1 mile under the GOs,

Finally, we reiterate our position that bringing this matter before the Board at this time is premature, because the findings supporting the Proposed Resolution are currently inaccurate and should be modified based on the new information and productive discussions being had between Valley Water and Regional Board staff. As previously stated, Valley Water would support an update of the Waste Discharge Requirements at the McKittrick facility, including a Time Schedule Order to establish clear steps with scheduled completion times that would allow Valley to come into compliance with the revised WDR once the proposed Basin Plan amendments designed to address salinity permitting are adopted and included therein.

Sincerely,

Russell Emerson
Manager, Valley Water Management Company

cc: Jean Pledger, VWMC General Counsel
Melissa Thorme, Downey Brand LLP
Jim Waldron

California Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

Central Valley Regional Water Quality Control Board

1 March 2018

RECEIVED
MAR 5 2018
VALLEY WATER MANAGEMENT

Mr. Russell Emerson, Manager
Valley Water Management Company
7500 Meany Avenue
Bakersfield, CA 93308

**MONITORING AND REPORTING PROGRAM AND RESOLUTION, MCKITTRICK 1 & 1-3 FACILITY, KERN COUNTY**

Thank you for your 13 February 2018 letter regarding the subject documents that are calendared for consideration at the 5/6 April 2018 meeting of the Central Valley Regional Water Quality Control Board (Central Valley Water Board or Board). The letter expresses Valley Water Management Company's (Valley Water) belief that consideration of the Monitoring and Reporting Program (MRP) and Resolution for the McKittrick 1 & 1-3 Facility (Facility) by Central Valley Water Board at its April meeting is premature. The letter states that Valley Water's 2017 reporting and review of additional data collected has not changed Valley Water's interpretation of the lateral extent of the plume of saline water from the Facility ponds. The letter notes that Valley Water has been working cooperatively with Board staff and requests a meeting prior to 26 February to discuss Facility issues.

As Clay Rodgers, of my staff, and I discussed with Mellissa Thorme, your legal counsel, and Jim Waldron, your technical consultant, at the 15 February 2018 CV-SALTS meeting, we intend to proceed with consideration of the subject items at the 5/6 April 2018 meeting of the Central Valley Water Board. Board staff will provide responses to comments in your 13 February letter and your 26 February letter along with any additional comments received by the comment deadline, as stated with the Notice of Public Hearing issued on 2 February 2018.

Please submit the additional data mentioned in paragraph 1 and paragraph 4 on page 1, and paragraph 2 on page 2, of your 13 February letter **by 9 March 2018**.

Regarding the request in the letter to meet, to schedule a meeting with Board staff contact Alejandra Lopez at the telephone number below. I encourage Valley Water to continue to work cooperatively on the issues at the subject site.

If you have further comments or questions please contact Alejandra Lopez at (559) 445-6071 or by electronic mail at Alejandra.Lopez@waterboards.ca.gov

Clay L. Rodgers

for Pamela C. Creedon
Executive Officer

cc: Patrick Pulupa, State Water Resources Control Board, OCC, Sacramento (via email)
Stephanie Yu, State Water Resources Control Board, OCC, Sacramento (via email)
John Borkovich, State Water Resources Control Board, DWQ, Sacramento (via email)
Chris Reedy, Valley Water Management Company, Staff Engineer, Bakersfield (via email)
Pamela Clevinger, Valley Water Management Company, Operations and Compliance Technician, Bakersfield (via email)
Jim Waldron, Technical Consultant, San Clemente (via email)
Melissa Thorme, Counsel, Downey Brand LLP, Sacramento (via email)

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

**Central Valley Regional Water Quality Control Board**

26 March 2018

RECEIVED
MAR 30 2018
VALLEY WATER MANAGEMENT

Mr. Russel Emerson, General Manager
Valley Water Management Company
7500 Meany Avenue
Bakersfield, CA 93308

**CENTRAL VALLEY WATER BOARD AGENDA AVAILABILITY**

**ITEM NO. 13: MONITORING AND REPORTING PROGRAM AND RESOLUTION PROVIDING STAFF DIRECTION, MCKITTIRICK 1 & 1-3 FACILITY, KERN COUNTY**

The Central Valley Water Board will consider adopting a Monitoring and Reporting Program and a Resolution that would provide direction to staff on how to regulate the subject facility moving forward at its meeting on 5/6 April 2018. A copy of the agenda is enclosed. As noted on the Agenda, this item has been scheduled as a contested item. If you plan to attend the 5/6 April 2018 Board meeting to discuss this item, please notify our office immediately using the contact information listed at the end of this letter.

In order to conserve paper and reduce mailing costs, the full text of the agenda package will be available on the Central Valley Water Board's web site at:

https://www.waterboards.ca.gov/centralvalley/board_decisions/tentative_orders/1804/index.shtml#13

under the heading of "Agenda Items" for the 5/6 April 2018 meeting.

Anyone without access to the Internet who needs a paper copy of the agenda package should contact Alejandra Lopez at (559) 445-6071 or alejandra.lopez@waterboards.ca.gov.

RONALD E. HOLCOMB
Senior Engineering Geologist
PG No. 6725

Attachments: Native American Tribal Government Consultation List, Kern County Concerned Persons and Agencies List

Enclosure: Agenda

cc w/o enc: David Albright, Drinking Water Protection Section, USEPA Region 9, San Francisco
Katherine Moore, Consultant, California Senate Natural Resources and Water Committee, Sacramento
Patrick Pulupa, State Water Resources Control Board, OCC, Sacramento (via email)
Stephanie Yu, State Water Resources Control Board, OCC, Sacramento (via email)
John Borkovich, State Water Resources Control Board, DWQ, Sacramento (via email)
Concerned Persons and Agencies List (see attached Concerned Persons and Agencies List)
Native American Contacts (see attached Native American Tribal Government Consultation List for Kern County)

**Concerned Persons and Agencies List**

| |
|---|
| U.S. Department of the Interior, Bureau of Land Management, Bakersfield |
| Kelvin Yamada, California Department of Public Health, Environmental Management Branch, Sacramento (via email) |
| Andy Gordus, California Department of Fish and Wildlife, Fresno (via email) |
| Bill Bartling, California Department of Natural Resources, Division of Oil, Gas and Geothermal Resources, Bakersfield (via email) |
| California Department of Water Resources, Fresno |
| California Department of Toxic Substance Control, Clovis |
| California Office of Historic Preservation, Sacramento |
| County of Kern, Public Health Services Department, Environmental Health Program, Bakersfield |
| County of Kern, Planning and Community Development Department, Bakersfield |
| Kern Mosquito and Vector Control District, Bakersfield |
| West Side Mosquito and Vector Control District, Taft |
| Abby Affuant, Chevron North America Exploration and Production Company, Bakersfield (via email) |
| Mike Glavin, California Resources Corporation, Bakersfield (via email) |
| David Chapin, Aera Energy, Bakersfield (via email) |
| Kenneth Bork, Sentinel Peak Resources (via email) |
| Christopher Reedy, Valley Water Management Company, Bakersfield (via email) |
| Mellissa Thorme, Downey Brand, Sacramento (via email) |
| Vern Goehring, Sacramento (via email) |
| Robert J. Gore, The Gualco Group, Inc., Sacramento (via email) |
| Rock Zierman, California Independent Producers Association, Sacramento (via email) |
| Suzanne Noble, Western States Petroleum Association, Bakersfield (via email) |
| Hollin Kretzmann, Center for Biological Diversity, San Francisco (via email) |
| Center on Race, Poverty and the Environment, Oakland (via email) |
| Gustavo Aguirre, Center on Race, Poverty and the Environment, Delano (via email) |
| Juan Flores, Center on Race, Poverty and the Environment, Delano (via email) |
| Jennifer Clary, Clean Water Action, Oakland (via email) |
| Miriam Gordon, Clean Water Action, Oakland (via email) |
| Rosanna Esparza, , Clean Water Action, Oakland (via email) |
| Andrew Grinberg, Clean Water Action, Washington D.C. (via email) |
| Keith Nakatani, Clean Water Action, Oakland (via email) |
| Jhon Arbelaez, Earthworks, Oakland (via email) |
| Holly Pearen, Environmental Defense Fund, Boulder, CO (via email) |
| Bill Allayaud, Environmental Working Group, Sacramento (via email) |
| Kyle Jones, Sierra Club, San Francisco (via email) |
| Ms. Mary Kay Benson (via email) |
| State Board Oil & Gas Groundwater Monitoring (SB4) lyris list |
| State Board Food Safety/Oil Field Wastewater Reuse lyris list |

**Native American Heritage Commission**
**Native American Contacts**
**1/18/2018**

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Kern Valley Indian Community
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**This list is current only as of the date of this document and is based on the information available to the Commission on the date it was pr oduced.**

**Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.**

**This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed: RWQCB Tribal Consultation List Update for Kern County.**

**Native American Heritage Commission**
**Native American Contacts**
**1/18/2018**

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Tule River Indian Tribe
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Porterville , CA 93258
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Wuksache Indian Tribe/Eshom Valley Band
Kenneth Woodrow. Chairperson
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Salinas , CA 93906 Mono
kwood8934@aol.com Wuksache

(831) 443-9702

**This list is current only as of the date of this document and is based on the information available to the Commission on the date it was pr oduced.**

**Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.**

**This list is only applicable for contacting local Native American Tribes with regard to cultural resources assessments for the proposed: RWQCB Tribal Consultation List Update for Kern County.**

**AGENDA**

**Public Meeting**
**Central Valley Regional**
**Water Quality Control Board**

**BOARD MEETING**
**Thursday, April 5, 2018 – 9:00 a.m.**
**Friday, April 6, 2018-8:30 a.m.**
**Central Valley Water Board**
**1685 E. Street, Fresno, CA 93706**

**THIS MEETING WILL NOT BE WEBCAST**

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The Central Valley Board strives to conduct accessible, orderly, and fair meetings. The Board abides by the following rules when conducting its meetings:

- No person is required to register their name or provide other information to the Board in order to attend a Board meeting. Completing an attendance card is voluntary, unless you wish to testify before the Board.
- Anyone speaking to the Board will be requested to complete an attendance card.
- Anyone testifying in permit and enforcement actions will be required to complete an attendance card and affirm that any testimony that they provide is the truth by taking an oath.
- Items on this Agenda are numbered for identification purposes only; the Board may consider these items out of their listed order.
- Any item scheduled for the first day of a multi-day Board meeting may be delayed or continued to the next day, and items may also be moved from the second day to the first day. The Board may remove items from this Agenda without prior notice.
- If the Board lacks a quorum, the Board may conduct a hearing as a Panel Hearing. However, the Board will not take final action on such an item until a quorum of the Board is present.

Copies of the items to be considered by the Central Valley Water Board are posted on the Board's website at: http://www.waterboards.ca.gov/centralvalley/board_decisions/tentative_orders/

Board agendas and the minutes of prior meetings are posted on the Board's website at: http://www.waterboards.ca.gov/centralvalley/board_info/meetings/

Questions regarding individual items should be directed to the Board staff person whose name and phone number are indicated with the agenda item. If no staff person is listed, or for general questions, please contact Ms. Kiran Lanfranchi-Rizzardi at (916) 464-4839 or klanfranchi@waterboards.ca.gov

The Board meeting will be conducted at a facility that is accessible to people with disabilities. Individuals requiring special accommodations are asked to contact Ms. Lanfranchi-Rizzardi at (916) 464-4839 at least 5 working days prior to the meeting. TTY users may contact the California Relay Service at 1-800-735-2929 or voice line at 1-800-735-2922.

A list of applications for Water Quality Certifications, which the Board issues pursuant to Section 401 of the Clean Water Act, can be found at: http://www.waterboards.ca.gov/centralvalley/public_notices/
or can be obtained by calling the Board at: (916) 464-3291.

**ELECTRONIC PRESENTATIONS**

**PowerPoint and other electronic presentations are frequently presented at the Board Meetings. Please e-mail presentations to the Board's Webmaster at webmaster5@waterboards.ca.gov at least 24 hours in advance, or bring your files either on a USB Flash Drive or CD-ROM and give them to Board Staff prior to the start of the meeting.**

## THURSDAY, APRIL 5, 2018 9:00 A.M.

1. Introductions, Pledge of Allegiance
2. Meeting Rules and Procedures
3. Board Member Communications – Board Members and the State Board Liaison Member may discuss meetings, communications, correspondence, or other items of general interest relating to matters within the Board's jurisdiction. There will be no voting or formal action taken
4. Public Forum – Any member of the public may address the Board on any matter within the Board's jurisdiction and not scheduled for consideration at this meeting, or pending before the Board
5. State Board Liaison Update
6. Executive Officer's Report (http://www.waterboards.ca.gov/centralvalley/board_info/exec_officer_reports/)

**LOCAL AREA MANAGEMENT PLANS (LAMPS)**

7. Tulare County Resource Management Agency and Tulare County Environmental Health Division, Tulare County – *Consideration of Resolution to Approve Local Agency Management Program* [Katie Carpenter, (559) 445-5551]
8. Tuolumne County Environmental Health Division, Tuolumne County – *Consideration of Resolution to Approve Local Agency Management Program* [Katie Carpenter, (559) 445-5551]

**NPDES PERMITS/ENFORCEMENT**

9. Cutler-Orosi Joint Powers Wastewater Authority, Wastewater Treatment Facility, Tulare County – *Consideration of NPDES Permit Renewal (NPDES No. CA0081485)* [Nicolette Dentoni, (559) 444-2505]
10. City of Colfax, Wastewater Treatment Plant, Placer County – *Consideration of NPDES Permit Renewal (NPDES Permit No. CA0079529)* [Elizabeth Thayer (916) 464-4671]
11. City of Jackson, Wastewater Treatment Plant, Amador County – *Consideration of an Order Amending Time Schedule Order R5-2015-0003-02* [Brian Taylor (916) 464-4662]

**WASTE DISCHARGE REQUIREMENTS**

12. Kern County Sheriff's Office, Kern County Lerdo Campus, Wastewater Treatment Facility, Kern County - *Consideration of Waste Discharge Requirements* [Jeff Pyle, (559) 445-5145]

**OTHER BUSINESS**

13. Valley Water Management Company, McKittrick 1 & 1-3 Facility, Kern County – *Consideration of a Monitoring and Reporting Program and consideration of a Resolution Directing Staff to Prepare an Appropriate Order for Valley Water Management Company's McKittrick 1 & 1-3 Facility* [Alejandra Lopez, (559) 445-6071]

## FRIDAY, APRIL 6, 2018 – 8:30 A.M.

14. Introductions, Pledge of Allegiance
15. Meeting Rules and Procedures
16. Board Member Communications – Board Members and the State Board Liaison Member may discuss meetings, communications, correspondence, or other items of general interest relating to matters within the Board's jurisdiction. There will be no voting or formal action taken
17. Public Forum – Any member of the public may address the Board on any matter within the Board's jurisdiction and not scheduled for consideration at this meeting, or pending before the Board
18. Executive Officer's Report (http://www.waterboards.ca.gov/centralvalley/board_info/exec_officer_reports/)
19. The Board will be asked to approve items 24 through 28 with no discussion if no one is here to testify about them.

**ENFORCEMENT**

20. Konark Ranches LLC, Kern County – *Consideration of Administrative Civil Liability* [Marcus Ellison (559) 445-5565]

**OTHER BUSINESS**

21. Safe and Affordable Drinking Water for Disadvantaged Communities-*Informational Item Only* [Joe Karkoski (916) 341-5618]
22. Center for Collaborative Policy presentation on public participation and outreach contract findings- addressing undeserved communities and dischargers- *Informational Item Only* [Stephanie Lucero (916) 628-1042]
23. Informational Item Regarding a Time Schedule Order for Combined Effluent from the City of Lemoore Wastewater Treatment Facility and Leprino Foods Company to Land Owned by Westlake Farms, Inc., and Sandridge Partners, LP – *Informational Item Only* [Scott Hatton (559) 444-2502]

**UNCONTESTED CALENDAR**
(Cal. Code Regs., tit. 23, § 647.2, subd. (f).)
Uncontested items are those items that are not being contested at the Board Meeting and will be acted on without discussion. If any person or Board Member requests discussion, the item may be removed from the Uncontested Calendar and taken up in the regular agenda in an order determined by the Board Chair.

24. **WAIVER**

*Consideration of a Revision of Conditional Waiver of Waste Discharge Requirements for Disaster-Related Wastes During a State of Emergency within the Central Valley Region,* (Order R5-2013-0026) [Bill Brattain, 916-464-4622]

25. **NPDES PERMITS AND ENFORCEMENT**

a. City of Colusa, Wastewater Treatment Plant, Colusa County – *Consideration of an Order Amending Waste Discharge Requirements Order R5-2016-0062 (NPDES Permit No. CA078999) and Rescission of Time Schedule Order R5-2016-0075*

b. Original Sixteen to One Mine, Inc., Sixteen to One Mine, Sierra County – *Consideration of an Order Amending Time Schedule Order R5-2015-0035*

## 26. WASTE DISCHARGE REQUIREMENTS AND ENFORCEMENT

a. Amador County, Buena Vista Landfill, Amador County – (WDRs Order R5-2011-0062) *(Revision)*
b. Calaveras County Water District, Copper Cove Wastewater Treatment Plant, Calaveras County, (WDRs Order R5-2010-0070) *Amendment*
c. Chevron USA, Incorporated, Midway Solid Waste Disposal Site, San Luis Obispo County, Order R5-2005-0101 *(Revision)*
d. City of Lathrop, Lathrop Consolidated Treatment Facility, San Joaquin County –WDRs Order R5-2016-0028) *(Amendment)*
e. City of Newman, City of Newman Wastewater Treatment and Recycling Facility, Stanislaus County *(Revision)*
f. County of Modoc, Alturas Class III Municipal Solid Waste Landfill, *Proposed (New)*
g. Delicato Vineyards, Delicato Family Vineyards, San Joaquin County - (WDRs Order R5-2013-0028) *(Amendment)*
h. Recology Auburn Placer, Auburn Landfill, Placer County –WDRs Order R5-2004-0086) *(Amendment)*
i. Riverdale Public Utility District, Wastewater Treatment Facility, Fresno County, Order 85-252 *(Revision)*
j. Sierra Pacific Industries, Anderson Division, Shasta County, *(New)*
k. Southern Minnesota Beet Sugar Cooperative, Spreckels Sugar Company, Inc., and Meyers Farming LLC, Former Spreckels Mendota Facility, Fresno County (WDRs Resolution 61-147) *(Revision)* and Cleanup and Abatement Order *(New)*

## 27. WASTE DISCHARGE REQUIREMENTS/NPDES PERMITS/TIME SCHEDULE ORDER RESCISSIONS

a. Fairway Oaks at Butte Creek Home Owner's Association, Butte County, Order 5-00-229
b. Mike and Monica Schwenne, Golden Hills Mobile Home Park, Mariposa County, Order 86-230
c. Franklin Construction, Butte County, Order 90-108
d. Lamanuzzi & Pantaleo, LLC, Plant No.1, Fresno County, Order 94-350
e. Crane Mills, Tehama County, Order 95-266
f. East Bay Municipal Utility District, Pardee Center Wastewater Treatment Plant, Calaveras County, R5-2003-0119.
g. Sierra Nevada Cheese Company, Glenn County, Order R5-2015-0114
h. Shasta Renewable Resources, LLC, Shasta County, Order R5-2016-0034

## 28. CHANGE OF NAME AND OR/OWNERSHIP

a. Burton A. Ellison, DC Unit Lease, Deer Creek Oil Field, Tulare County, 5-00-16301
b. Valley Water Management Company, Kern Front No. 2 Facility, Kern Front Oil Field, Kern County, R5-2012-0059
c. Quincy Community Services District, Quincy Wastewater Treatment Plant, Plumas County WDRs Order R5-2016-0049, and TSO Order R5-2016-0050

## CLOSED SESSION

The Board may meet in closed session to consider personnel matters (Gov. Code, § 11126 subd. (a), to deliberate on a decision to be reached based upon evidence introduced in a hearing (Gov. Code §, 11126, subd. (c)(3).), or to discuss matters in litigation, including discussion of initiated litigation, significant exposure to litigation, or decisions to initiate litigation (Gov. Code, § 11126, subd. (e).). Current litigation involving the Board:

**Litigation filed against the Central Valley Water Board and/or the State Water Board:**

a. Cleanup and Abatement Order issued for the Cleanup of Dixon Park in 2005 – *ConAgra Foods and Monfort, Inc. v. Central Valley Water Board* (Solano County Sup. Ct., Case No. FCS027420)
b. Administrative Civil Liability Orders R5-2011-0068, R5-2012-0070, R5-2013-0091, R5-2014-0119, R5-2015-0065, R5-2016-0063, and R5-2017-0038, Cease and Desist Order R5-2017-0039, General Order R5-2013-0122, and 13267 Order Requiring Monitoring of the Sweeney Dairy – *James G. Sweeney, et al. v. State Water Board, et al.* (Fresno County Sup. Ct. Case Nos. 15CECG02063, 17CECG00146, 16CECG03035, 17CECG03030, and 17CECG02994)
c. Administrative Civil Liability Order issued for Mandatory Minimum Penalties to Malaga County Water District in 2013 – *Malaga County Water District v. Central Valley Water Board et al.* (5th Dist. Ct. of App., Case No. F075868; Fresno County Sup. Ct., Case No. 14-CECG-03576, removed to Madera County Sup. Ct., Case No. MCV071280)
d. Dairy General Waste Discharge Requirements, Reissued in 2013 – *Asociación de Gente Unida por el Agua et al. v. Central Valley Water Board* (3rd Dist. Ct. of App., Case No. C066410; Sacramento County Sup. Ct., Case No. 34-2008-00003604)
e. Cleanup and Abatement Order issued for Cleanup of Walker Mine in 2014 – *Atlantic Richfield Company v. Central Valley Water Board* (Sacramento County Sup. Ct., Case No. 34-2014-80001875)
f. NPDES Permit and Cease and Desist Order issued to Malaga County Water District in 2014 – *Malaga County Water District v. State Water Resources Control Board, et al.* (5th Dist. Ct. of App., Case No. F075851; Fresno County Sup. Ct., Case No. 14-CECG-03919, removed to Madera County Sup. Ct., Case No. MCV071279)
g. Administrative Civil Liability Order issued to Malaga County Water District in 2016 – *Malaga County Water District v. Central Valley Regional Water Quality Board, et al.* (Fresno County Sup. Ct., Case No. 16-CECG-03036)

**Litigation filed by the Central Valley Water Board against other parties:**

h. Aerojet Cleanup – Central Valley Water Board et al. v. Aerojet-General Corp. et al. (Sacramento County Sup. Ct., Case No. 286073, consolidated with Case Nos. 288302 and 291981); Central Valley Water Board et al. v. Aerojet-General Corp. et al. (EDCal, Case No. CIV-S-86-0064-EJG) consolidated with U.S. v. Aerojet-General Corp. et al., (EDCal, Case No. CIV-S-86-0063-EJG)
i. Bonzi Landfill – Central Valley Water Board v. Ma-Ru Holding Company et al. (Stanislaus County Sup. Ct., Case No. 643740)
j. Orland Sand and Gravel Facility – People ex rel. Central Valley Water Board, Dept. of Fish and Wildlife v. Orland Sand and Gravel Corp.et al. (Glenn County Sup. Ct., Case No. 15CV01436)
k. Greener Globe Landfill – People ex rel. Central Valley Water Board v. A Greener Globe Corporation (Placer County Sup. Ct., Case No. SCV13231)

**Petitions for Review of Central Valley Water Board Actions filed with State Water Board:**

l. Eastern San Joaquin Irrigated Lands General Waste Discharge Requirements, Order R5-2012-0116 – Petitions filed by California Sportfishing Alliance et al.; San Joaquin County Resource Conservation District et al.; and Asociación de Gente Unida por el Agua (AGUA) et al. (State Water Board File Nos. A-2239(a) through (c))
m. Irrigated Lands General Waste Discharge Requirements for Individual Growers, Order R5-2013-0100 – Petition filed by Kern River Watershed Coalition Authority and Paramount Farming Company, LLC (State Water Board File No. A-2269)
n. Tulare Lake Basin Area Irrigated Lands General Waste Discharge Requirements, Order R5-2013-0120 – Petitions filed by Southern San Joaquin Valley Water Quality Coalition et al., Michael and Yvonne LaSalle, and Asociación de Gente Unida por el Agua (AGUA) et al. (State Water Board File Nos. A-2278(a) through (c))
o. City of Stockton, WDRs Order R5-2014-0070 [NPDES No. CA0079138] and Time Schedule Order R5-2014-0071 (State Water Board File No. A-2315)
p. Sacramento River Watershed Irrigated Lands General Waste Discharge Requirements, Order R5-2014-0030 – Petition filed by California Sportfishing Alliance et al. (State Water Board File No. A-2302)
q. San Joaquin County and Delta Area Irrigated Lands General Waste Discharge Requirements, Order R5-2014-0029 – Petition filed by California Sportfishing Alliance et al. (State Water Board File No. A-2301)
r. West San Joaquin River Watershed Irrigated Lands General Waste Discharge Requirements, Order R5-2014-0002 – Petition filed by California Sportfishing Alliance et al. (State Water Board File No. A-2292)
s. Valley Water Management Company, Cease and Desist Order R5-2015-0093 – Petitions filed by Valley Water Management Company, Clean Water Action, and the Central California Environmental Justice Network (State Water Board File Nos. A-2148(a), A-2148(b), and A-2148(c))
t. CMC Land Holdings, LLC, ACL Order R5-2016-0084 – Petition filed by CMC Land Holdings, LLC (State Water Board File No. A-2517)
u. 13267 Order Directing Participation in the Delta Regional Monitoring Program – Petitions filed by the Cities of Ceres, Patterson, Turlock, Ripon, and Riverbank and by the Counties of Stanislaus and Colusa (State Water Board File Nos. A-2540(a) through (g))
v. Waste Discharge Requirements for Municipal Wastewater Dischargers, Order No. R5-2017-0085 – Petition filed by Friends of the North Fork (State Water Board File No. A-2573)
w. Original Sixteen to One Mine, Inc., ACL Order R5-2017-0115 – Petition filed by Original Sixteen to One Mine, Inc. (State Water Board File No. A-2586)

## MEETING PROCEDURES

**The Central Valley Water Board circulates item-specific Notices and/or Hearing Procedures along with drafts of its Orders and Amendments. If there is a conflict between an item-specific Notice or Hearing Procedure and the Meeting Procedures in this Agenda, the item-specific Notice or Hearing Procedure will control. Please contact Board staff if you do not know whether there is a Notice or Hearing Procedure for a specific item.**

The statutes and regulations that govern the Central Valley Water Board's meetings can be found at http://www.waterboards.ca.gov/laws_regulations/

All persons may speak at a Central Valley Water Board meeting, and are expected to orally summarize their written submittals. Oral presentations will be limited in time by the Board Chair, and a timer may be used. Where speakers can be grouped by affiliation or interest, such groups are expected to select a spokesperson and to not be repetitive. The Board will accommodate spokespersons by granting additional time if other group members will not also be speaking.

Written materials that are received after deadlines set by item-specific Notices and/or Hearing Procedures will not generally be admitted. Any person requesting to submit late materials must demonstrate good cause, and the Chair must find that the admission of the late materials would not prejudice the Central Valley Water Board or any designated party. The Chair may modify this rule to avoid severe hardship.

## PROCEDURE FOR HEARINGS IN ADJUDICATIVE MATTERS

*(Including the issuance of Waste Discharge Requirements, NPDES Permits, Conditional Waivers, and certain Enforcement Orders, including Cleanup and Abatement and Administrative Civil Liability Orders)*

The regulations for adjudicative proceedings are found in California Code of Regulations, title 23, sections 648 et seq. An adjudicative proceeding is a hearing to receive evidence for the determination of facts pursuant to which the Board formulates and issues a decision.

Evidence: Adjudicative hearings are not conducted according to the technical rules of evidence; the Board will accept any evidence that is reasonably relevant. It is the policy of the Board to discourage the introduction of surprise testimony and exhibits. Hearsay evidence may be used to supplement or explain other evidence.

Designated Parties: Designated Parties are persons named in a proposed order, anyone who requests designated party status and is so designated by the Board, and, for prosecutorial matters, the Board's Prosecution Team. Designated Parties have the right to call and examine witnesses, receive witness lists from other Designated Parties, introduce exhibits, cross-examine opposing witnesses, rebut evidence, make or oppose evidentiary objections, and make opening and/or closing statements.

Interested Persons: All persons who wish to participate in the hearing but who are not Designated Parties are Interested Persons. Interested Persons may present non-evidentiary policy statements or comments, either orally or in writing, but will not be subject to cross-examination. Interested Parties may be asked to respond to clarifying questions from the Board, staff, or others.

Order of Proceeding: for adjudicative hearings, the proceeding will be generally be conducted in the following order, unless modified by the Board Chair or specified differently in an item-specific Notice or Hearing Procedure:

- Testimony by Board staff, followed by testimony by Designated Parties named in the Order or Permit, followed by testimony of other Designated Parties
- Cross-examination of Board staff, followed by cross-examination of Designated Parties named in the Order or Permit, followed by cross-examination of other Designated Parties
- Statements of Interested Persons
- Closing statement by Designated Parties other than those named in the Order or Permit, then closing statement by Designated Parties named in the Order or Permit, followed by closing statement by Board staff
- Recommendation by the Board's Executive Officer (as appropriate)
- Close of the Hearing, followed by deliberation and voting by the Board

Closing statements are not to be used to introduce new evidence or testimony. Persons wishing to introduce exhibits (i.e., maps, charts, photographs) must leave them with the Board.

## PROCEDURE FOR RULEMAKING AND INFORMATIONAL PROCEEDINGS

*(Including Basin Planning, Rulemaking, Setting of Policy, and Workshops)*

The regulations for rulemaking and informational proceedings are found in California Code of Regulations, title 23, sections 649 et seq. Rulemaking proceedings include hearings designed for the adoption, amendment, or repeal of any rule, regulation, or standard of general application. Informational proceedings include any hearings designed to gather and assess facts, opinions, and other information relevant to any matters within the jurisdiction of the Boards and whose primary purposes are to assist the Boards in the formulation of policy or guidelines for future Board action, to inform the public of Board policies, reports, orders, plans, or findings, and to obtain public comment and opinion with respect to such policies, reports, orders, plans, or findings, or to adopt such policies, reports, orders plans, or findings.

For rulemaking and informational proceedings, the Board does not distinguish between Designated Parties and Interested Persons; the Board will accept any evidence that is reasonably relevant, provided that it is submitted in accordance with any item-specific Notice or Hearing Procedure.

Order of Proceeding: for rulemaking and informational proceedings, the proceeding will be generally be conducted in the following order, unless modified by the Board Chair or specified differently in an item-specific Notice or Hearing Procedure:

- Opening statement by the Board summarizing the subject matter and purpose of the proceeding
- Presentation by Board staff
- Presentations by all other persons
- Recommendation by the Board's Executive Officer (as appropriate)
- Close of the Hearing, followed by deliberation and voting by the Board (as appropriate)

## PETITION PROCEDURE

Any person aggrieved by an action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of the issuance of the Order, except that if the thirtieth day following the issuance of the 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 applicable to filing petitions may be found at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

## CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
## CENTRAL VALLEY REGION

The primary duty of the Central Valley Water Board is to protect the quality of the waters within the Central Valley Region for all beneficial uses. This duty is implemented by formulating and adopting water quality plans for specific ground or surface water basins and by prescribing and enforcing requirements on all agricultural, domestic, and industrial waste discharges. Specific responsibilities and procedures of the Boards and the State Water Resources Control Board are contained in the Porter-Cologne Water Quality Control Act.

| BOARD MEMBERS | CITY OF RESIDENCE | TERM EXPIRES |
|---|---|---|
| Jon Costantino | Grass Valley | 9/30/2019 |
| Carmen L. Ramirez* | Atwater | 9/30/2021 |
| Karl E. Longley | Fresno | 9/30/2021 |
| Robert Schneider | Davis | 9/30/2018 |
| Denise Kadara | Allensworth | 9/30/2018 |
| Raji Brar | Bakersfield | 9/30/2020 |
| Daniel B. Marcum | Fall River Mills | 9/30/2019 |

*Public member in accordance with Water Code section 13201(c)

Pamela C. Creedon, ***Executive Officer***
Patrick Pulupa, ***Special Consultant (Incoming Executive Officer)***

Kiran Lanfranchi-Rizzardi, ***Administrative Assistant II/Clerk to the Board***

Stephanie Yu, ***Attorney III***
David Lancaster ***Attorney I***

**SACRAMENTO OFFICE**
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114
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**Assistant Executive Officers:**
Adam Laputz
Andrew Altevogt
Linda Bracamonte

**Supervisors:**
Bob Chow
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SECRETARY FOR
ENVIRONMENTAL PROTECTION

**Central Valley Regional Water Quality Control Board**

27 July 2018

Russell Emerson, Manager
Valley Water Management Company
7500 Meany Ave
Bakersfield, CA 93308

**DOCUMENT REVIEW, MONITORING WELL ISTALLATION AND SAMPLING PLAN, MCKITTRICK 1 & 1-3 FACILITY, KERN COUNTY**

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) received a Monitoring Well Installation and Sampling Plan (MWISP) dated 4 June 2018, and titled "*Monitoring Well Installation and Sampling Plan for the Valley Water Management Company McKittrick Ponds Facility, Cymric Oil Field*", for the McKittrick 1 & 1-3 Facility (Facility) in Kern County. The MWISP was prepared by Kennedy/Jenks Consultants on behalf of Valley Water. Valley Water submitted the MWISP in response to the requirements of Monitoring and Reporting Program Order R5-2018-0808.

Central Valley Water Board staff (Staff) has reviewed the MWISP and our comments are presented in the enclosed memorandum. The MWISP proposes the installation of six additional monitoring wells to extend the existing groundwater monitoring network and delineate the plume of produced wastewater emanating from the Facility ponds. Given the complex hydrogeology of the site, and the extent of the wastewater constituent plume, the number of proposed monitoring wells that would be added to the six existing wells seems to be inadequate to define the lateral and vertical extent of wastewater constituents in the groundwater. However, Valley Water can proceed with the proposed MWISP, provided that the following recommendations are incorporated into the MWISP:

- Proposed monitoring well CYM-17A1 is installed whether or not well CYM-17H1 is completed in unsaturated sediments;
- All new monitoring wells are logged using geophysical methods; and
- The process for determining the screened interval for a well is included in the MWISP.

**By 27 August 2018,** Valley Water needs to submit a revised MWISP addressing the above-mentioned staff comments and recommendations. Valley Water should proceed immediately with the installation of the proposed wells while it is preparing the revised MWISP.

If you have any questions, please contact Alejandra Lopez of this office at (559) 445- 6071 or via e-mail at Alejandra.Lopez@waterboards.ca.gov

Clay L. Rodgers

for Patrick Pulupa
Executive Officer

Enclosure: 27 July 2018 Memorandum

cc: Bill Bartling, California Division of Oil, Gas, and Geothermal Resources, Bakerfield (via email)
Jim Waldron, Valley Water Management Company, 2303 Via Clavel, San Clemente (via email)
Hollin Kretzmann, Center for Biological Diversity, San Francisco (via email)
Andrew Grinberg, Clean Water Action, Oakland (via email)

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ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

**TO:** Ronald E. Holcomb
Senior Engineering Geologist
PG No. 6725

**FROM:** Alejandra Lopez
Engineering Geologist

**DATE:** 27 July 2018

**SUBJECT:** **DOCUMENT REVIEW, MONITORING WELL ISTALLATION AND SAMPLING PLAN, MCKITTRICK 1 & 1-3 FACILITY, KERN COUNTY**

A Monitoring Well Installation and Sampling Plan (MWISP) for the McKittrick 1 & 1-3 Facility (Facility) was submitted by Valley Water Management Company (Valley Water) via the GeoTracker database on 4 June 2018. The MWISP, titled *Monitoring Well Installation and Sampling Plan for the Valley Water Management Company McKittrick Ponds Facility, Cymric Oil Field, California* and dated 4 June 2018, was prepared by Kennedy/Jenks Consultants on behalf of the Valley Water. The MWISP was prepared in response to Monitoring and Reporting Program Order No. R5-2018-0808 (MRP), which was issued by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) on 4 April 2018.

## BACKGROUND

Valley Water owns and operates the Facility which is located in Section 19, Township 29S, Range 22E, Mount Diablo Base and Meridian (MDB&M), in Kern County. The Facility consists of two side-by-side, interconnected pond systems which have been used for the disposal of produced wastewater via evaporation and percolation since the late 1950s. The McKittrick 1 pond system occupies the west side of the Facility and is slightly higher in elevation than the McKittrick 1-3 pond system that occupies the east side of the Facility. At the McKittrick 1 pond system, incoming wastewater is discharged into six netted oil and water cleaning ponds, eight pass-through ponds, and 14 evaporation and percolation ponds. Pipelines that discharge into the cleaning ponds are owned and operated by California Resources Corporation (CRC) and Sentinel Peak Resources California LLC (SPR). At the McKittrick 1-3 pond system, incoming wastewater is discharged into three netted oil and water cleaning ponds, 23 pass-through ponds, and 29 evaporation and percolation ponds. The pipeline that discharges into the McKittrick 1-3 cleaning ponds is owned and operated by SPR.

Wastewater can gravity flow from the first two McKittrick 1 evaporation and percolation ponds to 11 evaporation and percolation ponds in the McKittrick 1-3 system. For both pond systems, wastewater usually flows through their respective evaporation and percolation ponds in parallel. However, the pass-through ponds adjacent to the larger evaporation and percolation ponds can control the flow into the evaporation and percolation ponds. Therefore, each evaporation and percolation pond in each pond system can be operated independently or jointly in series.

The current produced wastewater volume discharged to the Facility is approximately 58,000 barrels per day. Produced wastewater discharged to the Facility percolates and has produced a saline water mound emanating from the disposal ponds. The Facility has an existing groundwater monitoring network comprised of six monitoring wells located east-northeast of the Facility. Previously provided groundwater quality data indicates that the wastewater plume has extended beyond all Valley Water's monitoring wells and additional monitoring wells are required. The Clean Harbors Class I Landfill Facility (Clean Harbors) is hydraulically downgradient of the McKittrick 1 & 1-3 Facility ponds.

Regional Well Survey

The MWISP has an aerial map of wells within 1, 2.5, and 10 miles downgradient of the McKittrick 1 & 1-3 ponds. No water supply wells were identified within a one-mile radius of the Facility. Six irrigation water supply wells belonging to Starrh farms were identified within approximately 2.5 miles of the Facility. These wells will not be sampled because they are outside the required one-mile radius sampling zone. Downgradient of the Facility and within approximately 10 miles, 18 irrigation water supply wells were identified.

Hydrogeology

The MWISP briefly describes the local hydrogeology. Two cross sections and a generalized description of local stratigraphy were provided. These cross sections show the generalized stratigraphy of the area and the approximate depth to groundwater. In addition to the cross sections, a generalized description of the stratigraphic relationships between Valley Water and Clean Harbors is included.

In 2002, two monitoring wells (CYM-19H1 and CYM-17M1) were installed to monitor the Upper Tulare Sands beneath the Corcoran Clay Equivalent (CCE) and above the Upper Tulare Clay (UTC). One monitoring well (CYM-21D1) was installed to monitor the Lower Tulare Sands below the UTC, which is the regional aquifer. Groundwater encountered below the CCE and above the UTC near the McKittrick 1 & 1-3 ponds has water quality similar to produced water discharged from the ponds. The produced wastewater percolates through the CCE, is perched above the UTC, and moves to the northeast along the dip of sediments through the Upper Tulare sands. In 2006, monitoring wells CYM-17Q1, CYM-17M1, and CYM 17K1 were installed downgradient of CYM-19H1 and CYM-17M1 and screened above the UTC to act as sentinel wells. Valley Water sampled the three sentinel wells for the first time in May 2014, and reported that produced water had not been encountered in these wells before that time. Valley Water estimates the gradient in the upper Tulare sand zone to be 105 feet per mile.

Catalyst Environmental Solutions, using a computer model to analyze the movement of moisture through the vadose zone, predicted that produced water in the upper Tulare sands zone would move relatively slowly, about 100 feet per year. The modeling analysis also predicts that the historical produced wastewater discharges to the McKittrick Ponds could be contained in the vadose zone. The MWISP states that, evaluation of the data collected with the proposed new monitoring wells is necessary to validate the modeling results.

Beginning with the third quarter 2018, water samples will be collected in accordance with the 2018 MRP. Figure 1 shows the location of seven Clean Harbors monitoring wells that will be

included in the groundwater monitoring program for Valley Water. Table 1 shows Clean Harbors monitoring well construction details.

Area Biological Assessment

Proposed monitoring well locations are tentative and may be moved based on a future habitat survey evaluation by a biologist. All locations are within the Kern Water Bank Master Permit Zone where credits could possibly be purchased to compensate for incidental take. Due to the confirmed presence of federally listed endangered species, this process may take a long time and, if the Blunt Nose Leopard Lizard is found in the area, then no incidental take will be allowed and access for drilling will not be granted.

## WELL INSTALLATION AND SAMPLING PLAN SUMMARY

Installation of Monitoring Wells

The monitoring well installation program will include constructing four to five additional wells with five-inch casings. Borings for shallow monitoring wells will be drilled with mud-rotary drilling equipment. Shallow borings will be drilled to a depth of 100 feet into saturated sediment or ten feet below the top of the UTC. Borings for deep monitoring wells will be drilled using air rotary drilling equipment and will be continuously cored from ground surface to first-encountered groundwater. Deeper monitoring wells will be drilled 40 feet into saturated sediments in the Lower Tulare Sands for well installation. Groundwater samples will be collected from boreholes at first encountered groundwater and analyzed for the parameters listed in Table II of the MRP. Core samples will be collected from specific depths in each boring. Monitoring wells that are completed above the UTC will monitor first encountered groundwater in the Upper Tulare Sand zone. Monitoring wells that are completed below the UTC will monitor the regional aquifer or Lower Tulare Sands. Table 2 shows estimated drilling depths for proposed wells and Figure 1 shows proposed locations.

One shallow monitoring well, CYM-21D2, will be drilled on the same pad as existing well CYM-21D1, if feasible, and will be completed in first encountered groundwater, if any, above the UTC and will serve as a sentinel well if no groundwater is encountered. Monitoring wells CYM-17H1 and CYM-17H2 will be installed approximately half-way between existing Valley Water monitoring wells and Clean Harbors monitoring wells. Monitoring well CYM-17H1 will be screened in the Upper Tulare Sands and monitoring well CYM-17H2 will be screened below the UTC in the regional aquifer. These two wells will be installed on the same well pad. Monitoring well CYM-17A1 will be installed upgradient of Clean Harbors and will be the furthest downgradient monitoring well owned by Valley Water. If neighboring monitoring well CYM-17H1 is completed in Upper Tulare Sands saturated sediments, then CYM-17A1 will also be completed in the Upper Tulare Sands. However, if CYM-17H1 is completed in dry sediments, then CYM-17A1 will not be installed. Monitoring well CYM-25B1 will be southwest of the McKittrick 1 & 1-3 ponds, south-southeast and cross gradient of the McKittrick 1-1 ponds, and will be completed in the regional aquifer. CYM-25B1 will be the only upgradient monitoring well. According to groundwater infiltration modeling done by Catalyst Environmental Solutions, monitoring well CYM-25B1 would be located outside of the estimated wastewater plume emanating from the ponds. Valley Water does not propose to install upgradient groundwater monitoring wells to monitor the Upper Tulare Sand zone.

Soil Sample Collection

Soil cores from deeper monitoring wells CYM-17H2 and CYM-25B1 will be retrieved in 5-foot barrels and will be preserved in marked core boxes for additional analyses, if warranted. Borings from monitoring wells CYM-21D2, CYM-17H1, and CYM-17A1 will not be cored, but cuttings will be retained and logged. Soil samples will be collected from each borehole at 10-foot intervals. Samples will be retrieved as the drilling mud is discharged into the mud pit. Samples will be washed, described by the field geologist, and a borehole log of the sample descriptions will be completed for each borehole. Select samples representative of the lithologies present in the borehole will be stored for further description and interpretation. The borings will be logged and documented under the supervision of a professional geologist or engineer.

Geophysical Logging

Geophysical logs will be generated for the deep boreholes for monitoring wells CYM-17H2 and CYM-25B1. Open hole logging runs at each location will be performed in two stages. The shallow zone will be logged first, down to the depth of the top of the UTC. Once protective surface casing has been cemented into place, drilling will continue to total depth. A second geophysical open hole logging run will be performed to capture the deeper section of the borehole. Resistivity, spontaneous potential, natural gamma ray, caliper, bulk density, neutron porosity, and acoustic logs will be obtained. Log curves will be used to identify lithologies, the presence of groundwater, aquifer-like zones capable of transmitting groundwater, potential aquitards and to select the appropriate screened interval for each monitoring well. These logs will also be used to correlate the shallow stratigraphy with the available well logs in the study area.

Well Installation

Shallow monitoring wells CYM-21D2, CYM-17H1, and CYM-17A1, will be completed across the water table and screened up to 60 feet. Deep monitoring wells CYM-25B1 and CYM-17H2, will be drilled 40 feet into saturated Lower Tulare Sands and will be constructed with at least 20 feet of screen. All monitoring wells will be constructed with 5-inch diameter, polyvinyl chloride (PVC) casing and will contain 0.02-inch slotted screens. The screens of all monitoring wells will approximately straddle the water table in the targeted zone to allow for groundwater fluctuations. Monitoring well filter packs will extend from total depth to 5 feet above the top of the well screen. For wells targeting the regional aquifer zone, the filter pack will not extend into the UTC confining layer. New monitoring wells will be constructed on a 4-foot by 4-foot concrete pad and will sit in a protective locking steel standpipe lock over the PVC casing.

State of California monitoring well standards from Bulletin 74-90 (California DWR, 1991) will be strictly followed during well construction and development.

Well Development

Not less than 48 hours after well completion, the monitoring wells will be developed using a combination of bailing, swabbing and pumping (by airlift and submersible pump, if sufficient groundwater is present) to remove drilling mud and fine-grained material from the well screen

and filter pack. During well development, field parameters including pH, temperature, and specific conductance (EC) will be monitored and recorded. Monitoring wells will not be considered fully developed until the field parameters from three consecutive measurements stabilize as follows: temperature is within ±1 degree Celsius (°C), pH is within ±5% of the previously measured value, and EC is within ±5% of the previously measured value. Monitoring wells that sustain an adequate groundwater flow will be developed until turbidity reaches five nephelometric turbidity units (ntu), or until 10 wet casing volumes have been purged, whichever is first.

Monitoring Wells Groundwater Sampling and Analysis

Groundwater sampling procedures and protocols followed during previous Cymric studies will be followed for this investigation. After the monitoring wells have been properly developed and allowed to recharge, representative groundwater samples will be collected using a submersible pump or bailer after purging a minimum of three casing volumes.

Static water levels and total well depths will be measured during the sampling event. Each sample will be properly labeled to document well number, date, time, and sampler. Samples will be stored in an insulated container at 0 to 6°C. The containers will be transported under appropriate chain of custody to state-certified laboratories. The chains of custody will be provided by the analytical laboratory and will contain the proper identification, sample date, matrix, and analysis to be completed for each sample. State accepted groundwater sampling procedures, which are currently in use at the site, will continue to be followed.

Water levels and samples will also be collected from the McKittrick 1 & 1-3 ponds and the six existing groundwater monitoring wells at the site during this investigation and analyzed for the constituents listed in the 2018 issued MRP.

## COMMENTS

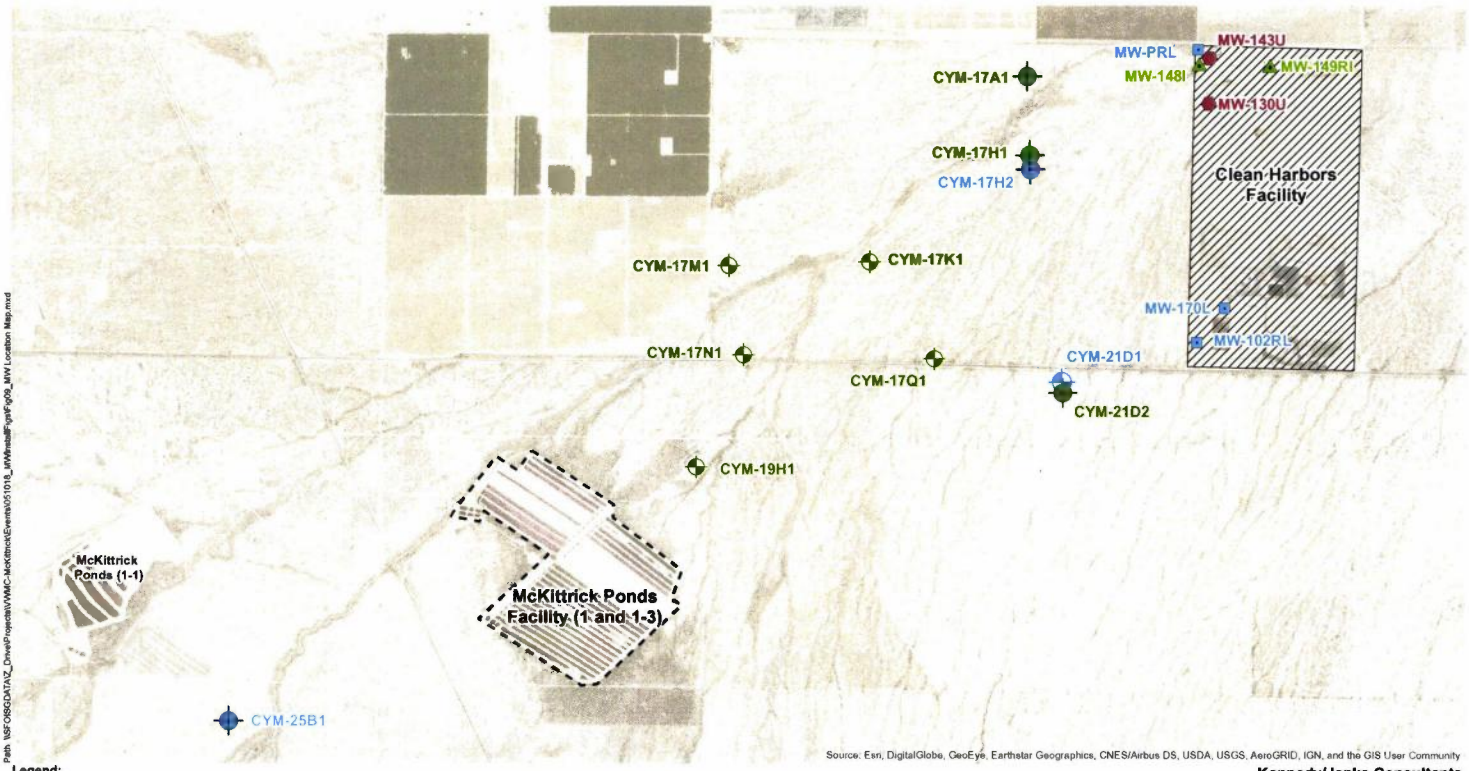
The MWISP proposes different lengths for the screened intervals of the wells completed above the UTC and the wells to be completed below the UTC. Also, geophysical logs are proposed for the deeper wells, but not the shallow wells. Valley water needs to provide justification for how the screened intervals are determined. Given the complex hydrogeology of the site, and the extent of the wastewater constituent plume, all proposed monitoring wells need to be logged using geophysical methods.

The MWISP proposes installation of monitoring well CYM-17A1 as an option depending on whether monitoring well CYM-17H1 is completed in saturated or unsaturated sediments. The area affected by the percolation of wastewater covers more than seven square miles and involves at least two distinct saturated zones. The number of proposed monitoring wells that would be added to the six existing wells seems to be inadequate to define the lateral and vertical extent of wastewater constituents in the groundwater. Proposed monitoring well CYM-17A1 needs to be constructed whether or not well CYM-17H1 is completed in unsaturated sediments. Also, additional monitoring wells may be required if the waste constituents in the groundwater are not adequately characterized.

**CONCLUSIONS AND RECOMMENDATIONS**

Valley Water should proceed, provided that the following recommendations are incorporated into the MWISP:

- Proposed monitoring well CYM-17A1 is installed whether or not well CYM-17H1 is completed in unsaturated sediments;
- All new monitoring wells are logged using geophysical methods; and
- The process for determining the screened interval for a well is included in an addendum to the MWISP.




**Legend:**

- Existing Valley Water Management Company Well (Upper Tulare Clay)
- Existing Valley Water Management Company Well (Lower Tulare Sands)
- Proposed Valley Water Shallow Well Location
- Proposed Valley Water Deep Well Location
- Clean Harbors Well (Alluvial Fan Upper Perched Zone)
- Clean Harbors Well (Upper Tulare Intermediate Perched Zone)
- Clean Harbors Well (Lower Tulare Water Table Zone)

N

0 1,600
Feet

**Kennedy/Jenks Consultants**

Valley Water Management Company
McKittrick Ponds Facility
Kern County, California

**Proposed Well Location Map**

K/J 1365027*02
June 2018

**Figure 1**

Path: \\SFOBSGDATA\Z_Drive\Projects\VWMC-McKittrickEvents\051018_MWInstallFigs\Fig09_MW Location Map.mxd

## Table 1: Monitoring Well Construction Details

| Well ID | Date Completed | Surface Elevation (ft amsl) | Total Depth (feet bgs) | 5" PVC Casing Elevation (ft amsl) | Screened Interval (ft bgs) | Well Construction Material | Stratigraphic Unit[b] |
|---|---|---|---|---|---|---|---|
| **Valley Water Monitoring Wells[a]** | | | | | | | |
| CYM -17K1 | 8/16/2006 | 427.9 | 210 | 430.9 | 150 - 200 | 5-Inch Sch 80 PVC 0.020 slot screen | Upper Tulare Sand (UTS) |
| CYM -17M1 | 9/8/2006 | 446.5 | 197 | 449.5 | 155 - 185 | 5-Inch Sch 80 PVC 0.020 slot screen | Upper Tulare Sand (UTS) |
| CYM-17Q1 | 8/23/2006 | 437.6 | 208 | 440.6 | 160 - 200 | 5-Inch Sch 80 PVC 0.020 slot screen | Upper Tulare Sand (UTS) |
| CYM-17N1 | 11/22/2002 | 451.5 | 240 | 452.9 | 105 - 165 | 5-Inch Sch 80 PVC 0.020 slot screen | Upper Tulare Sand (UTS) |
| CYM-19H1 | 11/9/2002 | 469.2 | 245 | 471.2 | 115 - 155 | 5-Inch Sch 80 PVC 0.020 slot screen | Upper Tulare Sand (UTS) |
| CYM-21D1 | 11/19/2002 | 427.1 | 300 | 429.1 | 274 - 294 | 5-Inch Sch 80 PVC 0.020 slot screen | Lower Tulare Sands (LTS) |
| **Clean Harbors Monitoring Wells[c]** | | | | | | | |
| MW-130U | 1987 | NA | 139 | 362.31 | 119-139 | - | Alluvial Fan Upper Perched Zone (Above UTS), dry as of 2016 |
| MW-143U | 1990 | NA | 142 | 359.72 | 122-142 | - | Alluvial Fan Upper Perched Zone (Above UTS) |
| MW148-I | 1990 | 358.7 | 188 | 360.04 | 171-186 | - | Upper Tulare Intermediate Perched Zone (UTS) |
| MW-149RI | 1991 | 346.2 | 223 | 348.01 | 206-221 | - | Upper Tulare Intermediate Perched Zone (UTS) |
| MW-102RL | - | NA | 303 | 407.50 | 273-303 | - | Lower Tulare Lower Water Table Zone (LTS) |
| MW-170L | 1996 | NA | 317 | 414.29 | 287-317 | - | Lower Tulare Lower Water Table Zone (LTS) |
| MW-PRL | 2010 | NA | 370 | 359.57 | 256-286 | - | Lower Tulare Lower Water Table Zone (LTS) |

**Notes:**

(a) Source: Geomega. 2007. Phase II Hydrogeologic Characterization Report: Valley Waste Disposal Company, Cymric Field Study Area. Submitted to the Central Valley Regional Water Quality Control Board, Fresno, California.

(b) Figures 3 and 5 show the correlation between Valley Water and Clean Harbors nomenclature.

(c) Source: WSP, 2018. Cymric Area Sampling and Analysis Report, Second Semi-Annual 2017, Valley Water Management Company. 5 March 2018.

ft amsl = feet above mean sea level

bgs = below ground surface

PVC = polyvinyl chloride

## Table 2: Approximate Drilling Depths for Proposed Wells

| Well ID | Ground Surface Elevation (ft amsl)[a] | Depth to UTC[b] (feet bgs)[c] | Estimated Depth to Groundwater (feet bgs) | Total Depth of Well (feet bgs) |
|---|---|---|---|---|
| CYM-21D2 | 427 | 200 | 278 | 200 |
| CYM-17H1 | 400 | 205 | 265 | 205 |
| **CYM-17H2 Deep** | 400 | 205 | 265 | 305 |
| CYM-17A1 | 379 | 200 | 270 | 200 |
| **CYM-25B1 Deep** | 550 | 245 | 312 | 352 |

**Notes:**

(a) ft amsl =feet above mean sea level

(b) UTC = Upper Tulare Clay

(c) feet bgs = Feet below ground surface

If neighboring CYM-17H1 is completed as a dry sentinel well, then CYM-17A1 will not be installed now.

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Central Valley Regional Water Quality Control Board

RECEIVED
SEP 17 2018
VALLEY WATER MANAGEMENT

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

13 September 2018

Russell Emerson, Manager
Valley Water Management Company
7500 Meany Ave
Bakersfield, CA 93308

**CERTIFIED MAIL**
**7018 0360 0000 1932 6129**

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

Valley Water Management Company (hereafter Valley Water) is the owner and operator of the McKittrick 1 & 1-3 Facility in Kern County.

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff have reviewed a Revised Monitoring Well Installation and Sampling Plan (Revised MWISP) dated 27 August 2018 and titled "*Revised Monitoring Well Installation and Sampling Plan for the Valley Water Management Company McKittrick Ponds Facility, Cymric Oil Field,*" for the McKittrick 1 & 1-3 Facility (Facility) in Kern County. The Revised MWISP was prepared by Kennedy/Jenks Consultants on behalf of Valley Water. Valley Water submitted the Revised MWISP in response to the requirements of Monitoring and Reporting Program (MRP) Order R5-2018-0808 and Central Valley Water Board staff letter dated 27 July 2018 and Central Valley Water Board email dated 23 August 2018.

The Revised MWISP proposes the installation of six additional monitoring wells to extend the existing groundwater monitoring network and delineate the plume of produced wastewater emanating from the Facility ponds. The Revised MWISP also proposes the installation of shallow well CYM-17A1 above the upper Tulare clay only if shallow well CYM-17H1 encounters perched water above the upper Tulare clay. The Revised MWISP states that the installation of both wells in the absence of groundwater would be redundant because CYM-17A1 will be downgradient of CYM-17H1. The Revised MWISP also appears to change the proposed groundwater purge and sample methods to low-flow purging and sampling. The MWISP does not contain an implementation schedule with specific dates for any proposed activities, but rather states that, "No site work will be scheduled until habitat and endangered species restrictions for well locations have been satisfactorily addressed." There is no date proposed for the initiation of site biological review and/or assessment, efforts Valley Water has taken to date, and when site work is expected to commence.

Given the complex hydrogeology of the site, and the extent of the wastewater constituent plume, the number of proposed monitoring wells that would be added to the six existing wells seems to be inadequate to define the lateral and vertical extent of wastewater constituents in the groundwater. However, in the interest of moving forward expeditiously, the Revised MWISP is conditionally approved provided Valley Water complies with the following:

1. Valley Water shall install proposed monitoring well CYM-17A1 regardless of whether well CYM-17H1 is completed in unsaturated sediments. As stated in our 23 August 2018 email on this subject, we believe installation is necessary to characterize groundwater conditions north of the stream channel that runs north of proposed monitoring well CYM-17H1. If no water is encountered above the upper Tulare clay during the drilling of CYM-17A1, it shall be completed deeper in first encountered groundwater. The location of CYM-17A1 may be moved closer north towards Delfern Road to minimize disturbance to habitat during installation and monitoring;

2. If the geophysical logging of well CYM-25B1 indicates the presence of perched water in the upper Tulare sands, Valley Water shall install a shallow well at this location at the time it is drilling CYM-25B1;

3. Valley Water shall provide with each monitoring report a demonstration that low-flow pump intakes are placed directly across preferential flow pathways (zone of higher permeability) within the wetted screen interval of each monitoring well each time it is sampled. The demonstration shall include the information below, in addition to that described in Revised MWISP Appendix C, and logs of all field readings demonstrating that there is low drawdown, that enough water has been purged, and that field parameters are stable, prior to sampling:

    a. Flow through cell size;
    b. Types of meters used, calibration records, and calibration checks;
    c. Types of pumps used;
    d. Brand of software used if using a multi-parameter meter;
    e. Tubing type, diameter, and length use;
    f. Purging flow rate and sampling flow rate;
    g. All field notes;
    h. Field parameter readings with corresponding time, water level, and purged volume; and
    i. Monitoring data readings (including data stored and recorded by field meters) shall be included for all monitoring wells;

4. Valley Water shall sample and analyze the selected Clean Harbors monitoring wells MW-148I, MW-149RI, MW-102RL, MW-170L, and MW-PRL as part of its obligations to comply with Order No. R5-2018-0808; and

5. Valley Water shall proceed forthwith with the installation of all proposed wells that are at existing well sites and that do not need additional biological review for endangered species issues.

In general, we are concerned about the number of iterations it has taken to complete the approval of the Revised MWISP, in particular Valley Water's apparent refusal to install CYM-17A1 following the direction in our 23 August 2018 email response and our 27 July 2018 staff letter response to the initial MWISP and the apparent failure of Valley Water to begin the environmental reconnaissance related to the installation of wells upon which we have reached agreement. The lack of a meaningful implementation schedule without proposed specific dates

is also concerning given the interest expressed at by the Central Valley Water Board at its April 2018 meeting to expeditiously collect additional data for the McKittrick 1 and 1-3 Facility. Given these conditions, we consider the Revised MWISP to be technically incomplete at this time, although we are hopeful that this conditional approval will provide the clarity Valley Water needs to move forward with its monitoring obligations.

**To address the vagueness of the schedule proposed in the MWISP and pursuant to Water Code section 13267[1], the Central Valley Water Board hereby orders Valley Water Management Company to provide technical and monitoring reports as follows:**

| Item | Description | Due Date |
|---|---|---|
| 1. | A technical report describing the results of an updated assessment completed by a qualified biologist of all proposed well locations and describing which well sites need additional biological review for endangered species prior monitoring well construction. | **3 October 2018** |
| 2. | A technical report demonstrating that Valley Water has initiated drilling of wells for which additional biological review for endangered species is deemed unnecessary pursuant to Item 1. | **28 November 2018** |
| 3. | A technical report containing the Monitoring Well Installation Completion Report information required by Monitoring and Reporting Program No. R5-2018-0808 for wells drilled pursuant to Item 2. | **Date 90 days from the completion of any groundwater monitoring well described in Item 2.** |
| 4. | A technical report demonstrating that biological review of well sites needing additional assessment has begun and proposing a time schedule with specific dates for completing the review, consulting with appropriate wildlife agencies, and obtaining take, or other, permits where necessary. | **28 November 2018** |
| 5. | Monthly detailed updates on the progress of biological review activities. | **By the 10th day of each month.** |
| 6. | A technical report containing the information required by the Monitoring Well Installation Completion Report section of Monitoring and Reporting Program (MRP) Order R5-2018-0808 for all wells associated with the MWISP, as conditionally approved herein. The technical report shall also contain sampling results for all parameters listed in the Groundwater Monitoring section of MRP Order R5-2018-0808. | **1 March 2019** |

[1] Valley Water should have proposed a reasonable schedule for the Regional Water Board's comment with both the MWISP and the Revised MWISP, subject to any regulatory approvals needed from other agencies.

The technical reports required herein are subject to the approval of the Executive Officer. In accordance with Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain work plans for investigations and studies, that describe the conduct of investigations and studies or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.

Failure to comply with this Order may subject Valley Water to administrative civil liabilities pursuant to Water Code section 13268.

By letter dated 27 August, Valley Water has requested that a combined MRP be issued for all three McKittrick 1-1 McKittrick 1 and 1-3 facilities. This request will be addressed under separate cover.

Any person aggrieved by this action may petition the State Water Board to review the action. The State Water Board must receive the petition 30 days after the date this Order is issued. Laws and regulations applicable to filing petitions:
http://www.waterboards.ca.gov/public_notices/petitions/water_quality

If you have any questions, please contact Alejandra Lopez of this office at (559) 445- 6071 or via e-mail at Alejandra.Lopez@waterboards.ca.gov

For-

Patrick Pulupa
Executive Officer

cc: Bill Bartling, California Division of Oil, Gas, and Geothermal Resources, Bakersfield (via email)
Jim Waldron, Valley Water Management Company, 2303 Via Clavel, San Clemente (via email)
Hollin Kretzmann, Center for Biological Diversity, San Francisco (via email)
Andrew Grinberg, Clean Water Action, Washington DC (via email)
Keith Nakatani, Clean Water Action, Oakland (via email)