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Central Valley Regional Water Quality Control Board

7 March 2018

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COMMENTS ON THE CAWELO WATER DISTRICT COALITION'S GROUNDWATER TREND MONITORING WORK PLAN

Thank you for submitting your coalition-specific Groundwater Trend Monitoring Work Plan (GQTMP), required by Waste Discharge Requirements General Order R5-2013-0120 (Order). Subsequent to its submission, the Central Valley Regional Water Quality Control Board adopted a revision to the Order allowing the formation of a regional trend monitoring group. The Cawelo Water District Coalition (Cawelo Coalition), along with ten others, joined together with the Central Valley Groundwater Monitoring Collaborative (CVGMC) and submitted a conceptual work plan for a collaborative trend monitoring effort on 31 October 2017. Following conditional approval of the conceptual work plan, the CVGMC submitted a schedule for completion of the final Technical Work Plan by 16 May 2018. Both the CVGMC and Regional Board staff are committed to begin trend monitoring by Fall of 2018.

Staff has reviewed your GQTMP and provided comments in the enclosed memorandum addressing the Cawelo Coalition's trend monitoring requirements within the framework of the regional collaborative effort. These comments also provide direction for matters that will be addressed collaboratively in the CVGMC Technical Work Plan. Several issues, such as coordinating schedules for various aspects of the program remain unresolved. Staff comments should be addressed in a revised plan submitted with the CVGMC Technical Work Plan. Specifically, phasing and implementation of this plan should be integrated with proposals by other coalitions within the CVGMC. Sampling should begin no later than fall of 2018.

If you have any questions regarding this letter, please contact me at (559) 445-6279 or by email at david.sholes@waterboards.ca.gov.

DAVID A. SHOLES
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Enclosure: Central Valley Water Board Staff Review Memorandum of the Coalition's GTMW

cc: Sue McConnell, Central Valley Water Board, Rancho Cordova

Central Valley Regional Water Quality Control Board

TO: David Sholes, PG 4321 *DS*
Senior Engineering Geologist
Irrigated Lands Regulatory Program

FROM: Marcus Ellison *ME*
Engineering Geologist
Irrigated Lands Regulatory Program

DATE: 7 March 2018

**SUBJECT: REVIEW OF THE CAWELO WATER DISTRICT COALITION GROUNDWATER
QUALITY TREND MONITORING WORK PLAN**

On 6 January 2017, the Central Valley Regional Water Quality Control Board received the Cawelo Water District Coalition's Groundwater Quality Trend Monitoring Work Plan (GQTMP). Section VIII.D.3 of the Waste Discharge Requirements for Growers within the Tulare Lake Basin Area that are Members of the Third-Party Group" (Order R5-2013-0120 or "General Order") requires the development of a GQTMP, one year after written approval of the Groundwater Quality Assessment Report (GAR) by the Executive Officer.

After submission of the GQTMP, the Central Valley Water Board adopted an amendment to the General Order which allowed multiple coalitions to join together in a regional trend monitoring effort. The Coalition has joined a collaborative group and some trend monitoring requirements discussed below will be addressed in the regional plan. Staff comments provide guidance on issues, whether they are addressed by the Coalition or in a regional plan prepared by the collaborative group.

The overall objectives of groundwater trend monitoring are to determine current groundwater quality conditions relevant to irrigated agriculture and develop long-term groundwater quality information that can be used to evaluate the regional effects of irrigated agricultural practices. The GQTMP describes the Cawelo Coalition's approach for the trend monitoring objectives.

Table 1 (see page 5 of this memorandum) lists the General Order's requirements for the GQTMP and identifies where in the document they have been addressed. A summary of the Cawelo Coalition's approach and staff recommendations are discussed below.

Summary of Cawelo Coalition's GQTMP Approach

The primary purpose of the groundwater trend monitoring network design in the Cawelo Coalition area is to use an established network of monitoring wells that has and will continue to provide regional representation of long-term groundwater quality trends as they relate to potential influences of nitrate concentrations from irrigated agriculture, and regional changes to agricultural practices.

The GQTMP takes into account the different types of agricultural commodities produced within the Cawelo Coalitions' boundaries, the areas identified in the GAR as contributing significant groundwater recharge and municipal supply, and the conditions identified in the GAR related to

the vulnerability prioritization and areas deemed vulnerable. Since less than half of all the coverage area within the Cawelo basin is categorized as highly vulnerable, a network of wells to cover both high and low vulnerability areas has been proposed.

The Cawelo Coalition has prepared the GQTMP as a two phase work plan. The initial phase outlines considerations for monitoring areas and wells. The second phase will verify specific wells for the monitoring network and will describe implementation of the groundwater sampling schedule provided in phase 1.

The GQTMP proposes 19 monitored wells, (one well per 3.7 square miles). Fifteen of the proposed wells are to come from the existing WDR Study Wells¹. The remaining four wells will be new additions to the groundwater quality monitoring network where there are currently no groundwater quality monitoring wells. Priority will be given to those wells nearest to a community or a public water system within each township and in areas identified in the GAR as contributing significant recharge to urban and rural communities where groundwater serves as a supply source. Wells considered for the groundwater monitoring network will be selected from existing domestic wells within the Cawelo Coalition's coverage area, or a shallow agricultural well will be selected if a domestic well does not exist. Wells will also be selected based on construction characteristics (well depth, screened interval, seal presence), historical data, well accessibility, and general well condition.

Groundwater samples will be collected from the monitoring wells annually, in summer months, and analyzed for the following analytes: electrical conductivity (EC), pH, dissolved oxygen (DO), nitrate as nitrogen, and temperature. Depth to groundwater will be measured twice per year, during the spring (seasonal high) and in the fall (seasonal low). In addition to the annual sampling, the following constituents will be analyzed every five years: total dissolved solids (TDS), major anions (carbonate, bicarbonate, chloride, and sulfate) and major cations (boron, calcium, sodium, magnesium, and potassium).

Summary of Staff Recommendations

Central Valley Water Board staff has reviewed the GQTMP to determine compliance with the General Order. Based on staff review, additional information is needed. This memorandum provides staff comments and recommendations for areas of the GQTMP that require additions/revisions. Item numbers presented below are referenced from Table 1.

Items 4, 4a, 4b, 4c. Work Plan Approach

Attachment B, Section IV.E.1 of the General Order requires that the Trend Monitoring Work Plan must provide details regarding the rationale for the number of proposed wells to be monitored and their locations. The rationale needs to consider: the variety of agricultural commodities produced within the third party's boundaries, the conditions identified in the GAR related to the vulnerability prioritization within the coalition area, and the areas identified in the GAR that contribute significant recharge to urban and rural communities where groundwater serves as a significant source of supply. Staff comments on the work plan approach, relative to the General Order, are provided below.

¹ WDR Study Wells -"The District has been monitoring groundwater for over 20 years and has developed a wide ranging data set that includes nitrates, electrical conductivities and general minerals that have been collected from over 50 different wells throughout the CWDC area. This well network, referred to as the WDR Well Study monitoring network, was established to address requirements of WDR Orders R5-2012-0058 and R5-2012-0059. To take advantage of this existing data set, the GQTMP includes consideration of this existing monitoring network and will incorporate appropriate existing monitoring wells to satisfy the requirements of the General Order."

The GQTMP states in Section X (D5): “The GQTMP proposes to establish a network of 19 monitoring wells with 9 wells established near the eastern boundary of CWDC and the remaining 10 near the western boundary of CWDC. The proposed 19 wells provide a monitoring coverage density of 1 well for every 3.7 square miles. See Figure 27 for potential well selection location. Fifteen of the proposed well monitoring locations are targeted to select an existing WDR Study Well. The targeted wells will be evaluated for well construction and appropriateness for the GQTMP. This includes verification of location of casing perforations and average static water levels to ensure groundwater samples are extracted from the upper elevations of the aquifer. The remaining 4 well locations will target wells that will be a new addition to a groundwater quality monitoring network. In this general region there are no WDR Study Wells and new existing wells will need to be incorporated and undergo the same evaluation for appropriateness for the GQTMP.” When forming the rationale for the trend monitoring work plan, the existing and proposed groundwater trend monitoring network considered crop variation, vulnerability designation, groundwater recharge, proximity to domestic or public use wells, and subsurface groundwater flows, among other factors.

Staff Comment: Staff finds this rationale to be sufficient to satisfy the requirements of the General Order and to proceed with the initial trend monitoring effort.

Item 5. Well Details

Attachment B, Section IV.E.2 of the General Order states that the Trend Monitoring Work Plan must provide details for wells proposed for trend monitoring.

The GQTMP states in Section X (D6): “As part of the evaluation and selection of wells, a minimum of the following information will be provided:

- State identification number if available
- Well location and GPS coordinates
- Well construction information including perforation zone
- Well operating condition and accessibility
- Well or Driller’s log if available
- Current static water level and historic levels if available.”

The GQTMP states in Section X (F): “CWDC will evaluate well candidates and submit a proposed final well monitoring network, along with evaluation criteria used to determine final well selections, within 15 months of the Regional Board’s approval of the GQTMP.”

Staff Recommendation: Well details must be provided with the CVGMC’s Technical Work Plan to be submitted no later than May 16, 2018.

Item 6. Proposed Sampling Schedule

Attachment B, Section IV.E.3 of the General Order states that the Trend Monitoring Work Plan must provide details regarding the proposed sampling schedule. Trend monitoring wells will be sampled, at a minimum, annually, at the same time of the year for the indicated parameters identified in Table 3 (within the General Order, Attachment B).

Staff Recommendation: Table 3 provides the minimum constituents to be monitored in the Trend Monitoring Program. However, agricultural chemicals not currently being assessed by DPR that have the potential to impact groundwater, such as 1, 2, 3-TCP and DBCP, should be added to the list of constituents to be sampled in the first year of Trend monitoring (2018). Staff anticipate additional discussions will be needed with the Cawelo Coalition and the Central

Valley Groundwater Monitoring Collaborative regarding the range of ag-related compounds to be tested, the frequency of long term sampling, and the appropriate areas to be monitored.

The GQTMP states in Section X (E): “As earlier discussed, heavy metals are of interest when considering groundwater quality and specifically arsenic levels are a concern for potential drinking water sources. There are known elevated arsenic levels in the Kern County sub basin area and the RPW [recycled oilfield produced water], regulated by WDR Order No. R5 2012 0058 and R5 2012 0059, has detected levels of arsenic. The arsenic levels in the RPW that is blended with irrigation water are monitored by WDR Order No. R5 2012 0058 and R5 2012 0059 and therefore not included as part of the GQTMP.”

Staff Comment: The coalition should consider monitoring for arsenic in selected wells when analyzing for general minerals (every five years).

The GQTMP states in Section X (F): “After submission of the selected wells, all available corresponding GQTMP well data and water quality data will be reported in the subsequent Annual Report provide to Regional Board. Water quality analysis will be performed per the schedules described in this GQTMP. Data will include any previous water quality data that is available for the corresponding well and the latest GQTMP water quality analysis.”

Staff Recommendation: The Central Valley Groundwater Monitoring Collaborative has proposed to begin sampling by fall of 2018. The Coalition’s proposal to conduct annual groundwater sampling in July (starting in July 2018) should coincide with the regional effort.

Item 3 and 7. Work Plan Implementation and Analysis

Attachment B, Section IV.E.4 of the General Order states that the Trend Monitoring Work Plan must provide details regarding the proposed methods to be used to evaluate trends in the groundwater monitoring data over time.

The GQTMP states in Section X (G): “Trend analysis will include existing historical data where appropriate and data will be charted over time for a graphical trend representation of each monitoring well. Additionally, the variance of the latest data point from the historical averages will be indicated spatially on a GIS map of the CWDC area. Corresponding information and discussion regarding the number of valid data points and validity of any presented trend will be included in the Annual Report.”

Staff Recommendation: If inferential statistical methods are used, then the potential limitation of those methods should also be discussed. Methods may need to be revisited at some future time when sufficient data has been collected to understand the type of statistical analysis required to infer possible trends.

Attachments:

Table 1. Components of the Groundwater Quality Trend Work Plan

Table 1. Components of the Groundwater Quality Trend Monitoring Work Plan

Item No.	Required Component	Location in GTMW
Groundwater Quality Trend Monitoring		
As required by General Order Attachment B, Section IV.C		
1	Objectives: Identification of objectives for Groundwater Quality Trend Monitoring being:	
1a	1) to determine current water quality conditions of groundwater relevant to irrigated agriculture	Sec IV (B1), Sec IX (C), Fig 8, 9, 10, 11, 12, Tab 2, Fig 18, 19, 20, 21, 22
1b	2) to develop long-term groundwater quality information that can be used to evaluate the regional effects of irrigated agriculture and its practices.	Sec X (A, B, C) Fig 23, 24
2	Implementation: Identification of developed groundwater monitoring network that will:	
2a	1) be implemented over both high and low vulnerability areas	Sec X (A, B) Fig 24
2b	2) employ wells that consist of shallow wells or existing wells and monitoring networks	Sec X (A, B, C)
3	Reporting: Results of trend monitoring including map of sampled wells, tabulation of analytical data, time concentration charts, and evaluation of data trends.	Sec X (E, F, G, H) incomplete
Trend Monitoring Work Plan		
As required by General Order Attachment B, Section IV.E		
4	Work Plan approach: Provide discussion of the rationale for the number of proposed wells to be monitored and their locations. Rational discussion needs to consider:	Sec X (C)
4a	1) the variety of agricultural commodities produced with the third-party boundaries	Sec X (C1, D) Fig 25
4b	2) the conditions discussed/ identified in the GAR related to the vulnerability prioritization within the third-party area	Sec X (B,D) Fig 24
4c	3) the areas identified in the GAR as contributing significant recharge to urban and rural communities where groundwater serves as a significant supply source.	Sec X (C2, D) Fig 16
5	Well details: Provide details for wells proposed for trend monitoring, including: GPS coordinates, physical address of the property where well is located, California State well number, well depth, top and bottom perforation depths, copy of water well drillers log, depth of standing (static) water level, and well seal information.	Sec X (D6, F) incomplete
6	Proposed sampling schedule: Identify when trend monitoring wells will be sampled. Sampling, at a minimum, should occur annually at the same time of the year for the constituents and indicator parameters lay out in Table 3 of Section IV.E. of the MRP Order R5-2013-0120.	Sec X (E, F) incomplete
7	Work plan implementation and analysis: Discussion of proposed method(s) to be used to evaluate trends in the groundwater monitoring data over time.	Sec X (E, F, G, H) incomplete

Reporting Requirements		
8	Section 6735(a) of the California Business and Professions Code requires that all final civil engineering calculations and reports shall bear the signature and seal or stamp of the licensee and the date of signing and sealing or stamping.	provided
9	Reporting provisions of the General Order require a certification statement for each person signing a report.	provided