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Lahontan Regional Water Quality Control Board

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**COMMENTS ON WORKPLAN FOR MANGANESE INVESTIGATION, PG&E COMPRESSOR STATION, HINKLEY, SAN BERNARDINO COUNTY (INVESTIGATIVE ORDER NO. R6V-2012-0060) AND NEW INVESTIGATIVE ORDER NO. R6V-2013-0026**

Lahontan Water Board (Water Board) staff has reviewed the document "Byproduct Plume Monitoring in IRZ Areas" for the PG&E Compressor Station in Hinkley. The Workplan, prepared by Arcadis, was prepared in response to Investigative Order No. R6V-2012-0060 requiring additional byproduct plume delineation in the upper aquifer. The Workplan proposes two sampling and monitoring well installation layouts and recommends the one proposing the fewer monitoring wells. The Workplan also proposes a tracer test in the Source Area IRZ to begin four months after Water Board approval of the Workplan. Investigation results will be presented in a technical report upon completion of the tasks. Water Board staff accepts the Workplan with the following modifications in response to discussions with PG&E and the Hinkley public.

This letter acknowledges PG&E's full compliance with the requirements of Investigative Order No. R6V-2012-0060.

Water Board staff has the following comments, direction, and modifications concerning the Workplan. This letter also contains a new Investigative Order requiring PG&E to submit additional technical information and modified Byproduct Investigative Reports.

## Monitoring Well Layout

1. The first proposed sampling and monitoring well installation layout is accepted for Areas 3 (southwest) and 5 (east).
2. The first proposed sampling and monitoring well installation layout is modified as described:
    a. Area 1 (north) – Install two monitoring well pairs that are outside the capture influence and either between or south of extraction wells EX-21

and EX-22. If neither situation is possible, install just one monitoring well pair between EX-21 and EX-22.

b. Area 2 (west) – Install proposed monitoring well pairs E1 and F1 to close the gap in this area.
c. Area 4 (south) – Install monitoring wells in the deep zone of the upper aquifer to compliment shallow zone wells MW-17 and MW-39. These additional monitoring wells should be able to detect if a southern-migrating byproduct plume or tracer is being acted upon by ten water supply wells used for the Compressor Station and remediation purposes.

3. Monitoring wells installed in the deep zone of the upper aquifer shall have a screen length of no more than 15 feet.

**Tracer Test 1**

The Workplan proposes to conduct a tracer test in the southernmost injection wells on the Compressor Station property to evaluate byproduct migration. Water Board staff concurs with the proposed tracer test to evaluate the potential threat of byproducts to domestic wells located west of the facility property. The following comments are provided to either clarify the tracer test monitoring program or to specifically identify or clarify tasks not mentioned in the Workplan.

1. Tracer testing in the Source Area IRZ shall be consistent with past tracer tests conducted in terms of volume or mass injected in October 2007.
2. The detection limit for tracers in groundwater shall be set at less than 10 ppb (<10 ppb).
3. If rehabilitation of wells SA-RW-11 and SA-RW-12 does not achieve the past injection capacity of at least 10 gpm, tracer injections shall be moved north to the row of wells containing SA-RW-5, SA-RW-6, and SA-RW-7.
4. Add the following southern monitoring wells to evaluate potential tracer migration southward towards water supply wells: MW-39, MW-78S/D, and the two new deep zone monitoring wells in Area 4.
5. Should monitoring detect tracer in any of the proposed northern monitoring wells (SA-SM-08, SA-SM-04, or SA-SM-11), monitoring shall be stepped out to the next row of monitoring wells to the north. If tracer is detected in the next row containing well SA-RW-05S/D, monitoring shall continue to be stepped out northward.
6. Should monitoring detect tracer along the western facility boundary in new well pairs H or G or in well SA-MW-26S/D, monitoring shall be stepped out to the west to domestic well 02-02A.
7. If tracer is detected in either SA-MW-26S/D or SA-MW-16S/D, monitoring shall continue to be stepped out northward and westward.
8. Should tracer be detected in SA-SM-28S/D, monitoring shall continue to be stepped out northward and westward.
9. Should tracer be detected in any of these western monitoring well pairs, SA-MW-28S/D, MW-67, SC-MW-11S/D, or SC-MW-12S/D, monitoring shall be stepped out to the west to include domestic wells 35-03 and 35-04.

**Tracer Test 2**

Water Board staff request a second tracer test be implemented in the western area of the SCRIA to evaluate bulging of byproducts that potentially threaten domestic wells on Mountain View Road. The second tracer test should be implemented on the west end of injection wells containing SC-IW-32 since there are no existing monitoring wells located to the west to detect potential bulging. This test can began following installation on proposed monitoring wells E and F in proposed Area 2. If tracer is detected in either proposed monitoring well pair E1 or F1, step out monitoring to the north and west directions.

**Tracer Test Monitoring**

The Workplan states that following implementation of the tracer injections, sampling will be conducted on a quarterly basis. Water Board staff believes this sampling frequency is not frequent enough or consistent with prior tracer tests.

The Water Board is requiring that PG&E comply with the following monitoring program for both tracer tests:

A. Maintain a log of the date, volume and concentration of the tracers (fluorescein and/or eosine) injected to groundwater. Record the volume of distilled water injected for dilution of initial injected concentration, if used. Calculate the diluted concentration of tracers following distilled water injection. Southern tracer test should be started by July 5, 2013. Northern tracer test should begin by July 26, 2013.

B. During tracer testing, maintain a log recording the date, time, monitoring or extraction well location, and measured tracer concentration from field probes or note color observation.

C. Collect monthly groundwater samples for the first three months after tracer injection to groundwater. Sample collection can be reduced to a quarterly frequency (once every three months).

D. Collect groundwater samples from monitoring wells for laboratory confirmation of fluorescein and eosine. The reporting limit for each constituent shall be 8 ppb for eosine and 2 ppb for fluorescein.

E. Following injection of tracers, concentrations will be monitored in the first row of downgradient monitoring wells. If tracers are detected, additional downgradient and cross-gradient monitoring wells must be sampled in the subsequent sampling event until the non-detect boundary line is defined. Where detected, tracers must continue to be monitored in subsequent sampling events, until the concentrations decline below 10 micrograms per liter for at least two consecutive quarterly sampling events.

**Reporting**

1. The minimum font size on figures and tables shall be 9 points.
2. Future site conceptual models shall not depict the Lockhart Fault as being on the ground surface since it is not an active fault with known surface features[1]. Dashed lines can be used with an explanation that the fault trace is inferred.
3. All references to manganese data in text or on figures must be shown in tables.
4. Future geologic cross-sections must be consistent in data depicted. For instance, if a well containing detected manganese concentration is shown in the cross section, then all wells within that same distance of the cross section line shall be depicted.
5. Maps showing domestic well locations must also show well numbers.
6. Show the location of domestic wells west of the Compressor Station and north of Aquarius Road when showing tracer injection and monitoring well locations.
7. Provide a description of the capture influence of extraction wells EX-21 and EX-22 and rationale for location of monitoring well pair(s) installed in Area 1.
8. Maps showing contour lines around manganese data points in all IRZ areas shall combine downgradient points of 390 ppb manganese or greater within 500 feet if there are no data points in between having lesser concentrations.
9. Tri-linear diagrams be included to compare the water quality data within the IRZ project and outside the IRZ project near residences having high concentrations of manganese in well water.

**Byproduct Sampling in Monitoring Wells**

The Workplan makes no mention that byproducts are being analyzed in existing monitoring well samples as required in Investigative Order R6V-2012-0060. However, in discussions between PG&E and Water Board staff, it was implied that such sampling and analyses are in fact occurring. Therefore, in the technical reports required below, describe the status and findings from byproduct analyses in the monitoring wells listed in the Investigative Order.

**Schedule**

The schedule proposed in the Workplan lists two months to install monitoring wells and lists implementing the tracer tests at four months following Water Board approval.

Water Board staff believe that the proposed schedule can be tightened up by conducting some tasks concurrently. For instance, monitoring well installation on the Compressor Station property can be implemented immediately after biological clearance is given in that area rather than wait until all off-site biological clearance is completed. In addition, the southern tracer test can be implemented (by July 5) following installation and development of monitoring wells to be located at the Compressor

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[1] *2001, Statmos et al., USGS, Simulation of Ground-Water Flow in the Mojave River Basin, California*

Station in Areas 3, 4, and 5, rather than wait for monitoring wells to be installed at further locations in Areas 1 and 2. Implementing these actions concurrently will reduce the schedule by about four weeks, allowing for the start of the tracer in three months after approval rather than 4 months.

**Directives**

Pursuant to section 13267 of the California Water Code, PG&E is directed to submit the following Byproduct Investigative technical reports:

1. **By August 10, 2013**, submit a letter report describing the status of byproduct investigation as modified by this Order, including reporting monitoring well installation dates and the dates tracer injections occurred. The letter report shall describe all byproduct investigation activities conducted to date and list planned activities for the next three months.

2. **By November 20, 2013,** submit a technical report describing investigation tasks and water results for the byproduct investigation. The report must include well designs and boring logs for all new monitoring wells. The report must also include laboratory results of byproducts in water samples collected from all upper aquifer monitoring well locations and applicable domestic wells. Present byproduct results on a map and in a cross section showing contour lines. The report shall describe the status of tracer tests and show the extent of tracer detections as contour lines on a map. Tracer information shall continue to be submitted in quarterly IRZ monitoring reports.

3. Beginning with the fourth quarter 2013 monitoring report for in-situ remediation activities, **due by January 15, 2014**, submit tracer information in quarterly reports. Information shall include sampling results, a discussion of on-going tracer monitoring, and a map showing location of detected tracers at or exceeding 10 ppb. Calculate the estimated movement of tracer compounds in groundwater at each tracer test location. Describe whether step-out monitoring locations will be added to the sampling program to continue to evaluate tracer movement in groundwater.

**Enforcement**

Technical reports required by this Investigative Order are necessary to investigate the water quality in the Hinkley basin during PG&E's ongoing cleanup of chromium pursuant to Cleanup and Abatement Order R6V-2008-0002 and amendments, based on Water Board's findings that:

- PG&E performs IRZ chromium remediation in the Hinkley basin,
- IRZ chromium remediation necessarily changes the groundwater chemistry and produces byproducts of metals (primarily arsenic and manganese) that dissolve into the groundwater,

- These metals byproducts may persist, temporally and spatially, in groundwater beyond expectations and unintentionally impair water quality in domestic wells,
- Technical reports are required to evaluate this potential threat to water quality.

The need for this investigation outweighs the burden on PG&E to produce the information for defining the manganese plume in groundwater will assist in evaluating potential threats to public health.

Pursuant to section 13268 of the Water Code, a violation of Water Code Section 13267 requirement may subject you to civil liability of up to $1,000 per day for each day in which the violation occurs.

If you have any questions concerning this matter, please contact Lisa Dernbach at (530) 542-5424 or ldernbach@waterboards.ca.gov.

Lauri Kemper

LAURI KEMPER, P.E.
ASSISTANT EXECUTIVE OFFICER

cc: PG&E Technical Mailing List

LSD/adw/T: PG&E Mn workplan comm and 13267 order 3-13 (ld)
Send to file: WDID 6B369107001 (VVL)