CTMRD Program 2022 Q4
Groundwater Monitoring Report

May 2023

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1. REPORT ORGANIZATION

This quarterly report includes the following five sections that summarize the Washoe County Community Services Department (WCCSD) Central Truckee Meadows Remediation District (CTMRD) Groundwater Monitoring Program (GMP) activities performed each quarter:

- Section 2: Describes the field activities, data quality, and records management activities conducted during the current quarter;
- Section 3: Describes the laboratory analytical program for the current quarter and presents the results of the Quality Assurance/Quality Control (QA/QC) data review and validation activities.
- Section 4: Presents results of the preliminary data evaluation of regional-scale groundwater elevation and tetrachloroethylene (PCE) and trichloroethylene (TCE) concentration contour maps, and the observed vertical groundwater gradients map between the shallow and deep zones.
- Section 5: Presents results and potentially significant findings from the statistical analysis of well-specific groundwater elevation, PCE concentration, and TCE concentration data.
- Section 6: Identifies planned and unplanned changes to the groundwater monitoring program for the quarter, and presents a summary of the action and noted items from the current and previous quarters with recommendations for follow-up.

Throughout this report, and all quarterly GMP reports, the terms “this quarter” and “this quarterly” refer to the calendar quarter identified by the report title.

GMP data are maintained in the CTMRD GMP electronic database in Microsoft Access on the WCCSD network, referred to as the “electronic database” in this report.

2. FIELD METHODS AND DATA COLLECTION ACTIVITIES

Quarterly field data collection consists of the following:

- Monthly field measurement of static groundwater elevation below monitoring well measuring point top of casing (TOC);
- Quarterly field measurement of physical parameters: pH, specific conductance, dissolved oxygen, temperature, oxidation-reduction potential, and turbidity; and
- Quarterly and opportunistic groundwater quality sample collection and laboratory analysis for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B for target analytes listed in the GMP Quality Assurance Project Plan (QAPP) (WCCSD, 2023).

Monthly groundwater elevation monitoring is generally performed during the first or second week of each month and quarterly groundwater quality sampling is generally performed during the last month of the quarter but may begin during the second month of the quarter. Groundwater elevation and water quality monitoring at each well is conducted either as a scheduled occurrence, an opportunistic occurrence (for wells that are periodically inaccessible), or “not sampled” because of inaccessibility or other unanticipated circumstances. Opportunistic samples can be collected from monitoring wells or municipal water supply wells at any time during the quarter as deemed appropriate by WCCSD.

Electronic copies of quarterly laboratory and field forms/logs are maintained in the WCCSD GMP network hard drive.

2.1 Groundwater Elevation Monitoring

Monthly groundwater elevation data are collected by WCCSD from monitoring wells in the Central Truckee Meadows (CTM) and by Truckee Meadows Water Authority (TMWA) from their municipal water supply and monitoring wells; the TMWA data are typically provided to WCCSD on a bi-annual or annual basis. The data sets are uploaded to the electronic database typically within days of being submitted to the WCCSD.

2.2 Water Quality Monitoring

Quarterly groundwater monitoring activities include collection of water quality samples and field measurement of the sample physical parameters.

3. DATA QUALITY ASSURANCE / QUALITY CONTROL

Laboratory analyses of groundwater samples are performed by Alpha Analytical, Inc., located in Sparks, Nevada (Nevada Division of Environmental Protection [NDEP] certification NV16). Quarterly laboratory analysis results and field-measured static groundwater elevations undergo QA and statistical data review and validation by a third party consulting firm (Broadbent), who provides WCCSD CTMRD Program staff with results from the reviews. WCCSD then amends or revises the data as necessary, and uploads the final data to the electronic database. Data review and validation are conducted in accordance with the GMP QAPP (WCCSD, 2023).

The purpose of the third party QA review and validation of laboratory data is to identify potential QA/QC issues that compromise data quality or reliability, including, though not limited to:

- Detection of a target analyte in a method blank sample;
- A recovery percentage or relative percent difference outside acceptable QC limits in laboratory quality control samples;
- Elevated reporting limits that exceed the specified concentrations; and
- Exceedance of holding times.

The purpose of the third party statistical analysis is to identify significant changes in water elevations and PCE and TCE concentrations, including:

- Detections of PCE and TCE in previously uncontaminated wells, identified as first detections;
- Well-specific new maximum and new minimum PCE and TCE concentrations;
- Well-specific new maximum and minimum groundwater elevations; and
- Changes in PCE or TCE concentration, or groundwater elevation by more than two standard deviations compared to the most recent measurement.

Laboratory *data quality assurance* review is performed for each work order (100% of all sample sets) by evaluating QC Level II data provided by the laboratory. Laboratory *data validation* is performed on approximately 10% of the total samples analyzed by evaluating QC Level IV data provided by the laboratory. A summary of work orders, QC data package type, and number of samples analyzed for VOCs in each laboratory work order for this quarter are maintained in the GMP folder on the network hard drive. **Table 3.1** summarizes the results from the data review and data validation, identifies QC Level IV data, and documents whether QAPP frequency and acceptance criteria were met. Detailed descriptions of laboratory data QA/QC are included in **Appendix 2** of this quarterly report.

4. MONITORING DATA RESULTS

Groundwater elevation and PCE concentration data for the shallow zone and the deep zone are depicted on **Figure 4.1** and **Figure 4.2**, respectively. Vertical groundwater elevation differences that represent inferred vertical hydraulic gradients between the shallow zone and deep zone are provided on **Figure 4.3**. Groundwater elevation and TCE concentration data for the shallow zone and deep zone are shown on **Figure 4.4** and **Figure 4.5**, respectively. Figures 4.1, 4.2, 4.4, and 4.5 are also printed as large-scale hardcopy maps and stored in flat files external to this report.

Each data set from this quarterly reporting period is compared to the previous quarter's results. Detailed data analysis and interpretation are incorporated into conceptual site models, external to quarterly reports.

4.1 Groundwater Elevation Data

Groundwater elevations for wells measured monthly during this quarterly reporting period (along with summary data for each well, including subregion location, and deep/shallow zone designation) are provided in the electronic database.

4.1.1 Shallow Zone Groundwater Elevations

Figure 4.1 presents shallow zone groundwater elevation contours developed using groundwater elevation measurements from this quarter.

Shallow zone groundwater elevation contours are developed at 5 foot intervals over the CTM. Shallow zone groundwater elevations, including gradients and flow direction trends are assessed and discussed in the conceptual site models for each subregion.

4.1.2 Deep Zone Groundwater Elevations

Figure 4.2 presents deep zone groundwater elevation contours developed using groundwater elevation measurements from this quarter.

Deep zone groundwater elevation contours are developed at 5 foot intervals over the CTM. Deep zone groundwater elevations, including gradients and flow direction trends are assessed and discussed in the conceptual site models for each subregion.

4.1.3 Vertical Groundwater Gradients

Figure 4.3 presents vertical groundwater elevation differences as a color-flood map that depicts vertical direction, relative magnitude, and distribution of vertical hydraulic gradients for this quarter using the most recent groundwater elevation measurements for this quarterly reporting period. Vertical groundwater elevation differences in the CTM aquifer system are calculated by subtracting a grid developed from the contoured shallow zone groundwater elevation data from a grid developed from the contoured deep zone groundwater elevation data. Vertical gradients and distribution are assessed and discussed in the conceptual site models for each subregion.

4.2 PCE and TCE Concentration Data

PCE concentration data for wells sampled during this quarter (along with summary data for each sampled well, including subregion location, deep/shallow zone designation, and additional information that characterize the GMP PCE concentration records for each well) are provided in the CTMRD GMP electronic database. TCE data are also compiled, reviewed, and managed in the same manner as PCE data.

Field parameter data collected during this quarterly reporting period are also provided in the electronic database. Electronic versions of field sampling information for individual samples are stored in the GMP folder on the network hard drive.

4.2.1 Shallow Zone PCE and TCE Distribution

Figure 4.1 presents the shallow zone PCE concentration contours for this quarter. **Figure 4.4** presents the shallow zone TCE concentration contours for this quarter.

4.2.2 Deep Zone PCE and TCE Distribution

Figure 4.2 presents the deep zone PCE concentration contours for this quarter. **Figure 4.5** presents the deep zone TCE concentration contours for this quarter.

5. WELL-SPECIFIC SIGNIFICANT CHANGES

This section compares the groundwater elevation, PCE, and TCE concentration results for this quarter to previous GMP results, using cumulative statistics for each well. The objective of these comparisons is to identify potentially significant temporal changes at each well that could result from:

- A data quality or procedural problem (such as a laboratory error, data entry error, or sample ID transposition) that may require corrective action; or
- A physical water quality change that may indicate potentially significant PCE or TCE concentration dynamics and/or groundwater flow dynamics.

'Potentially significant changes' include new groundwater elevation maxima and minima, new PCE or TCE concentration maxima and minima, statistically significant concentration changes, or first detections.

5.1 Well-Specific Groundwater Elevations

Table 5.1 lists those wells with at least one year of monthly groundwater elevation measurements that exhibited, for this quarter, a new maximum or minimum groundwater elevation, and a determination whether the elevation change is considered statistically significant. Table 5.1 is a subset of Table A1.1 (Appendix A), which provides statistics results for all of the GMP wells that were monitored this quarter. Spreadsheets in the GMP folder on the network hard drive were used to perform the statistics analysis for groundwater elevations.

5.2 Well-Specific PCE Concentration Results

Table 5.2 lists those wells where PCE concentrations from this quarter represent a new maximum or minimum concentration, and a determination whether any concentration change is considered statistically significant. Table 5.2 is a subset of Table A1.2 (Appendix A), which provides statistics results for all of the GMP wells that were monitored this quarter. Spreadsheets in the GMP folder on the network hard drive were used to perform the statistics analysis for PCE concentrations.

5.3 Well-Specific TCE Concentration Results

Table 5.3 lists those wells where TCE concentrations from this quarter represent a new maximum or minimum concentration, and a determination whether any concentration change is considered statistically significant. Table 5.3 is a subset of Table A1.3 (Appendix A), which provides statistics results for all of the GMP wells that were monitored this quarter. Spreadsheets in the GMP folder on the network hard drive were used to perform the statistics analysis for TCE concentrations.

6. GMP CHANGES, NOTED ITEMS, AND ACTION ITEMS

Table 6.1 provides a summary of noted items and action items identified during this quarter and previous quarters.

Changes to the GMP from the previous quarter are summarized in **Table 6.2,** and may include, but are not limited to:

- Sampling frequency;
- Sampling methods;
- Field procedures;
- Construction of new wells;
- Modification or removal of existing wells; and
- Data management.

For example, the sampling frequency might be adjusted at wells (as deemed appropriate by WCCSD) to cost-effectively obtain the necessary data. An example of well removal might be to remove well(s) from the program when the wells are determined to be unnecessary, redundant, or when (if not owned by WCCSD) they become unavailable for sampling.

Table 6.3 provides a summary of routine quarterly data quality-assurance measures that were conducted, including issues encountered, actions taken to resolve issues, and who conducted the actions.

7. REFERENCES

WCCSD, 2018, *Groundwater Monitoring Plan for the Central Truckee Meadows Remediation District Program, APPENDIX A - Quality Assurance Project Plan*. 2018 Revision.

Tables

Table 3.1 **2022 Q4 Summary of QA/QC Review**

Review Item	QAPP Frequency Achieved	QAPP Acceptance Criteria Met	Comments	Associated Samples	Qualified Analyis
Level II					
Analytical Reports and Chain-of-Custody Documentation	Yes	Yes	--	--	None
Preservation and Hold Times	Yes	Yes	--	--	None
Analytical Methods and Reporting Limits	Yes	Yes	Work Orders WCW2211165 and WCW2212265 reported PCE with "*" qualifier, which indicated the "Sample was analyzed a second time for the compound to be within its calibration, while achieving the lowest possible reporting limits for the other compounds." This was due to a necessary dilution of the field sample. No impact to data; no corrective action necessary.	GW-CTM144A-M-111522 GW-CTM134B-M-111522 GW-CTM137-L-121922 GW-1A-L1-121922	None
Field Duplicate Samples	Yes	Yes	--	--	None
Rinsate Blank Samples	No	Yes	--	--	None
Trip Blank Samples	Yes	Yes	--	--	None
Laboratory Method Blank Samples	Yes	Yes	--	--	None
Laboratory Control Samples (LCS)	Yes	Yes	--	--	None

Table 3.1 **2022 Q4 Summary of QA/QC Review**

Review Item	QAPP Frequency Achieved	QAPP Acceptance Criteria Met	Comments	Associated Samples	Qualified Analyis
Level II					
Matrix Spike/Matrix Spike Duplicate Samples (MS/MSD)	Yes	Yes	Work Order WCW2211208 reported Chloroethane RPD (23%) and target compound trans-1,2-Dichloroethene RPD (30%) with "R" flag in MSD sample, which indicated that the lab RPD criteria of 22.9 and 19.2%, respectively, was not met. The QAPP criteria of <30% was met for Chloroethane but was not met for trans-1,2-Dichloroethene. The parent sample result for the target compound trans-1,2-Dichloroethene should be considered estimated ("UJ" qualified), but is acceptable for project use. **Trans-1,2-Dichloroethene** should be reported as **< 1.0 UJ ug/L**.	GW-CTM145B-L-111622	Trans-1,2-Dichloroethene @ < 1.0 UJ ug/L
Matrix Spike/Matrix Spike Duplicate Samples (MS/MSD)	Yes	Yes	Work Order WCW2212182 reported target compound Vinyl chloride with "R" qualifier for the MS/MSD samples, which indicated the result RPD of 36% was greater than the laboratory RPD criteria of 23.9% and the QAPP (Table 1) RPD criteria of 30%; therefore, non-detect results for the associated compound should be considered estimated ("UJ" qualified) in the parent sample. **Vinyl chloride** should be reported as **< 1.0 UJ ug/L**. No corrective action required.	GW-CTM98-L-121322 GW-1A-L1-121322	Vinyl chloride @ < 1.0 UJ ug/L

Table 3.1 **2022 Q4 Summary of QA/QC Review**

Review Item	QAPP Frequency Achieved	QAPP Acceptance Criteria Met	Comments	Associated Samples	Qualified Analyis
Level II					
Matrix Spike/Matrix Spike Duplicate Samples (MS/MSD)	Yes	Yes	Work Order WCW2212265 reported target compound PCE with "S" qualifier for the MS sample, which indicated the result recovery of 31.0% was less than the laboratory %R criteria of 45.9 to 138% (low bias). The %R result for PCE was greater than the expanded lower acceptance limit of 30% (QAPP, Table 1); therefore, results for the associated compound should be considered estimated ("J" qualified) in the parent sample. **PCE** should be reported as **96 J ug/L** for **GW-CTM137-L-121922** and **81 J ug/L** for **GW-1A-L1-121922**. No corrective action required.	GW-CTM137-L-121922 GW-1A-L1-121922	GW-CTM137-L-121922 PCE @ 96 J ug/L and GW-1A-L1-122922 PCE @ 81 J ug/L
Laboratory Duplicate Samples	Yes	Yes	--	--	None
Field QA/QC	Yes	Yes	--	--	None
Completeness	Yes	Yes	--	--	None

Table 3.1 **2022 Q4 Summary of QA/QC Review**

Review Item	QAPP Frequency Achieved	QAPP Acceptance Criteria Met	Comments	Associated Samples	Qualified Analyis
Level IV					
Initial Calibration	Yes	Yes	--	TB-1A-Q1-122722 GW-CTM105-L-122722 GW-CTM12D-L-122722 GW-CTM11S-L-122722 GW-CTM39S-L-122722 GW-CTM38D-L-122722 GW-CTM107-L-122722 GW-CTM18S-L-122722 GW-CTM106-L-122722	None
Initial Calibration Verification Analysis	Yes	Yes	--	TB-1A-Q1-122722 GW-CTM105-L-122722 GW-CTM12D-L-122722 GW-CTM11S-L-122722 GW-CTM39S-L-122722 GW-CTM38D-L-122722 GW-CTM107-L-122722 GW-CTM18S-L-122722 GW-CTM106-L-122722	None
Continuing Calibration Standard Analysis	Yes	Yes	--	TB-1A-Q1-122722 GW-CTM105-L-122722 GW-CTM12D-L-122722 GW-CTM11S-L-122722 GW-CTM39S-L-122722 GW-CTM38D-L-122722 GW-CTM107-L-122722 GW-CTM18S-L-122722 GW-CTM106-L-122722	None
Instrument Tune	Yes	Yes	--	TB-1A-Q1-122722 GW-CTM105-L-122722 GW-CTM12D-L-122722 GW-CTM11S-L-122722 GW-CTM39S-L-122722 GW-CTM38D-L-122722 GW-CTM107-L-122722 GW-CTM18S-L-122722 GW-CTM106-L-122722	None

Table 3.1 **2022 Q4 Summary of QA/QC Review**

Review Item	QAPP Frequency Achieved	QAPP Acceptance Criteria Met	Comments	Associated Samples	Qualified Analyis
Internal Standards	Yes	Yes	--	TB-1A-Q1-122722 GW-CTM105-L-122722 GW-CTM12D-L-122722 GW-CTM11S-L-122722 GW-CTM39S-L-122722 GW-CTM38D-L-122722 GW-CTM107-L-122722 GW-CTM18S-L-122722 GW-CTM106-L-122722	None

Notes:

-- Not applicable
DNQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
ICAL - Initial Calibration
LCS - Laboratory Control Sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate
ND - Non-Detect
QA/QC - Quality Assurance/Quality Control
QAPP - Quality Assurance Project Plan, 2018
%D - Percent Difference
%R - Percent Recovery
RB - Rinsate Blank
RF - Response Factor
RL - Reporting Limit
RPD - Relative Percent Difference
RSD - Relative Standard Deviation
WO - Work Order

(J) The associated detected value is an estimated quantity.
(J-) The associated detected value is an estimated quantity with a low bias.
(J+) The associated detected value is an estimated quantity with a high bias.
(U) The analyte was not detected above the associated limitation value The associated limitation value is either the sample reporting limit or sample detection limit.
(UJ) The analyte was not detected above the associated limitation value. The associated limitation value is an estimate.
(R) The data are unusable (Analyte may or may not be present).

Table 5.1: Groundwater Elevation Statistics for CTMRD GMP Wells with Potentially Significant Elevation Changes During 2022 Q4

		Screen Position	Current Results	Previous Results and Comparisons		Statistically Significant Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter				
Well ID[1]	Subregion[2]	Deep Zone/ Shallow Zone[3]	Water Level Elevation[4] 2022 Q4	Water Level Elevation 2022 Q3	Water Level Change[5] Prior Quarter to Current Quarter (ft)	New Maximum/ Minimum[6][8]	Statistical Significance of Elevation Change from Previous Quarter[7]	No. of Months Measured	First Month Measured (YYYY/MM)	Elevation Minimum	Elevation Maximum	Elevation Standard Deviation
CTM103	DR	D	4,416.0	4,414.4	1.6	**Max 4416.1 (12)**	0.09	41	2012/10	4,378.6	4,414.9	8.88
CTM104	MK	S	4,416.4	4,415.1	1.3	**Max 4416.4 (10)**	0.10	41	2012/10	4,389.0	4,415.6	6.40
CTM10D	DR	D	4,421.0	4,418.7	2.3	**Max 4421.8 (12)**	0.04	41	2012/10	4,327.7	4,418.9	28.18
CTM22D	DR	D	4,423.5	4,420.9	2.6	**Max 4424.8 (12)**	0.05	41	2012/10	4,339.7	4,421.6	25.42
CTM37S	DR	S	4,459.1	4,457.9	1.2	**Max 4459.2 (12)**	0.45	39	2012/10	4,453.7	4,459.0	1.35
CTM4D	DR	D	4,477.6	4,482.8	-5.2	--	**-1.15**	40	2012/10	4,474.5	4,484.3	2.26
CTM79	DR	D	4,472.9	4,471.8	1.1	**Max 4472.9 (10)**	0.14	40	2012/10	4,456.1	4,472.8	3.94
CTM81	DR	D	4,426.3	4,423.0	3.3	**Max 4428.3 (12)**	0.09	41	2012/10	4,359.0	4,423.9	17.68
CTM84	DR	D	4,413.7	4,412.3	1.4	**Max 4413.7 (10)**	0.07	41	2012/10	4,371.5	4,413.6	9.45
CTM9S	MK	S	4,416.8	4,415.6	1.2	**Max 4416.8 (10)**	0.11	39	2012/10	4,397.9	4,416.2	5.25
VP34B	SR	S	4,432.9	4,433.1	-0.2	**Max 4435.4 (11)**	-0.17	17	2018/10	4,431.0	4,433.1	0.60
VP37B	SR	S	4,431.1	4,433.6	-2.5	**Min 4431.1 (10)**	**-1.77**	14	2019/07	4,431.2	4,434.3	0.71
WMMW3	DR	S	4,424.3	4,422.2	2.1	**Max 4425.1 (12)**	0.20	39	2012/10	4,404.3	4,423.9	5.30

Notes:

(1) Only wells with at least 12 monthly measurements are included in table

(2) Subregion designations as follows:

DR = Downtown Reno
DR-DS = Downtown Reno-Downtown Sparks overlap area
DR-SR = Downtown Reno-South Reno overlap area
DS = Downtown Sparks
SR = South Reno
UNK = Unknown
ER = El Rancho
J = Joule
MK = Mill/Kietzke
MK-SR = Mill/Kietzke-South Reno overlap area
DR-ER = Downtown Reno-El Rancho overlap area
Other = Located outside of currently defined subregions

(3) Wells completed in the shallow zone are designated with an S and wells completed in the deep zone with a D.

(4) Feet above mean sea level (msl)

(5) Difference in feet between current elevation value and previous period's elevation value.

(6) New Max exceeds the GMP period of record maximum elevation for the prior 10 years. New Min is below the GMP period of record minimum elevation for the prior 10 years.

(7) Absolute values greater than 1 indicates that the water level elevation measurement from current quarter minus the elevation from the previous quarter is more than two times the standard deviation for the GMP period of record starting 10 years prior to the beginning of the current quarter. A positive value indicates that the current quarter increased relative to the previous period. A negative value indicates a decrease relative to the previous period. For the purposes of the quarterly report, absolute values that are > 1 indicate a statistically significant change in the current water level elevation results compared to the previous quarter.

(8) The number in parenthesis shows which month in the quarter had the new minimum or maximum elevation measurement (e.g., "New Min (7)" means the new minimum occurred in July).

NM = Not Measured.

-- = No data available.

Table 5.2: PCE Statistics for CTMRD GMP Wells with Potentially Significant PCE Concentration Changes During 2022 Q4

		Screen Position	Current Results	Previous Results		Criteria for Identifying Potentially Significant Changes in PCE Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter						
Well ID	Subregion[1]	Deep Zone/ Shallow Zone[2]	[PCE][3] Current Quarter (2022 Q4)	[PCE][3] Most Recent Previous Sampled Quarter	Date of Most Recent Previous Sample	New[4] Maximum/ Minimum	Statistical[5] Significance Compared to Most Recent Previous Sampled Quarter	No. of Prior Quarters Sampled	First Quarter Sampled	[PCE] Minimum	[PCE] Maximum	[PCE] Mean	[PCE] Standard Deviation	[PCE] Coefficient of Variation
ARCO6018MW11	MK	S	97.00	88.00	09/27/2022	**New Max**	0.20	34	2012 Q4	<0.5	88.00	24.42	22.02	0.90
ARCO6018MW12	MK	S	94.00	47.00	09/19/2022	**New Max**	**1.49**	37	2012 Q4	1.70	64.00	16.96	15.81	0.93
CTM102	DR	S	9.30	7.20	09/16/2022	**New Max**	0.91	39	2012 Q4	2.70	8.30	5.94	1.16	0.19
CTM127A	MK	S	43.00	48.00	07/31/2019	**New Min**	-0.06	7	2013 Q2	48.00	190.00	101.14	43.81	0.43
CTM127B	MK	S	4.00	8.50	08/04/2022	**New Min**	-0.01	37	2012 Q4	8.50	1,200.00	161.30	247.39	1.53
CTM129	DR	S	0.50	0.58	08/16/2022	**New Min**	0.00	35	2012 Q4	0.58	130.00	18.85	30.78	1.63
CTM130A	MK	S	26.00	56.00	07/30/2019	**New Min**	**-1.13**	5	2017 Q2	51.00	84.00	63.40	13.23	0.21
CTM133B	MK	S	4.70	13.00	08/03/2022	**New Min**	-0.02	34	2014 Q1	13.00	1,080.00	306.39	266.93	0.87
CTM143A	MK	S	41.00	NS		**1st Sample**	1st Smpl			41.00	41.00	--	--	--
CTM144A	MK	S	10.00	NS		**1st Sample**	1st Smpl			10.00	10.00	--	--	--
CTM144B	MK	S	0.97	1.60	08/09/2022	**New Min**	-0.14	7	2021 Q1	1.00	7.70	2.34	2.22	0.95
CTM145A	MK	S	0.73	2.00	08/10/2022	--	**-1.42**	11	2019 Q1	<0.5	2.00	0.77	0.45	0.58
CTM145B	MK	S	0.63	2.50	08/10/2022	**New Min**	-0.05	15	2019 Q1	0.81	59.00	11.82	18.51	1.57
CTM148	DR	S	1.10	1.30	08/16/2022	**New Min**	-0.14	13	2019 Q3	1.30	4.40	2.72	0.71	0.26
CTM39S	MK-SR	S	2.60	1.30	09/15/2022	**New Max**	**1.52**	38	2012 Q4	<0.5	1.80	0.77	0.43	0.56
CTM98	SR	D	31.00	3.80	09/13/2022	**New Max**	**2.72**	38	2012 Q4	1.20	23.00	9.55	5.01	0.52

Notes:

(1) Subregion designations as follows:

DR = Downtown Reno
DR-DS = Downtown Reno-Downtown Sparks overlap area
DR-SR = Downtown Reno-South Reno overlap area
DS = Downtown Sparks
SR = South Reno
UNK = Unknown
ER = El Rancho
J = Joule
MK = Mill/Kietzke
MK-SR = Mill/Kietzke-South Reno overlap area
DR-ER = Downtown Reno-El Rancho overlap area
Other = Located outside of currently defined subregions

(2) Wells completed in the shallow zone are designated with an S and wells completed in the deep zone with a D.

(3) All Tetrachloroethene (PCE) values are reported in µg/L. A value of <1.0 or <0.50 = PCE not detected at noted reporting limit. When there are more than one analytical result in a quarter, the highest current quarter's result and lowest previous quarter's results are used.

(4) New Max exceeds the previous GMP period of record maximum for the prior 10 years. New Min is below the previous GMP period of record minimum for the prior 10 years.

(5) Absolute values greater than 1 indicates that the PCE result from current quarter minus the most recently sampled previous quarter is more than two times the standard deviation for the GMP period of record starting 10 years prior to the beginning of the current quarter. A positive value indicates that the current quarter increased relative to the previous period. A negative value indicates a decrease relative to the previous period. For the purposes of the quarterly report, absolute values that are > 1 indicate a statistically significant change in the current PCE results compared to the most recent previously sampled quarter.

-- = No Data Available

NA = Not Applicable

NS = Not Sampled

Table 5.3: TCE Statistics for CTMRD GMP Wells with Potentially Significant TCE Concentration Changes During 2022 Q4

		Screen Position	Current Results	Previous Results		Criteria for Identifying Potentially Significant Changes in TCE Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter						
Well ID	Subregion[1]	Deep Zone/ Shallow Zone[2]	[TCE][3] Current Quarter (2022 Q4)	[TCE][3] Most Recent Previous Sampled Quarter	Date of Most Recent Previous Sample	New[4] Maximum/ Minimum	Statistical[5] Significance Compared to Most Recent Previous Sampled Quarter	No. of Prior Quarters Sampled	First Quarter Sampled	[TCE] Minimum	[TCE] Maximum	[TCE] Mean	[TCE] Standard Deviation	[TCE] Coefficient of Variation
CTM103	DR	D	<0.5	0.99	09/16/2022	--	**-2.43**	37	2012 Q4	<0.5	0.99	0.31	0.15	0.49
VP34B	SR	S	0.80	<0.5	08/23/2022	**New Max**	**4.50**	17	2018 Q3	<0.5	0.51	0.27	0.06	0.23

Notes:

(1) Subregion designations as follows:

DR = Downtown Reno
DR-DS = Downtown Reno-Downtown Sparks overlap area
DR-SR = Downtown Reno-South Reno overlap area
DS = Downtown Sparks
SR = South Reno
UNK = Unknown
ER = El Rancho
J = Joule
MK = Mill/Kietzke
MK-SR = Mill/Kietzke-South Reno overlap area
DR-ER = Downtown Reno-El Rancho overlap area
Other = Located outside of currently defined subregions

(2) Wells completed in the shallow zone are designated with an S and wells completed in the deep zone with a D.

(3) All Trichloroethene (TCE) values are reported in µg/L. A value of <1.0 or <0.50 = TCE not detected at noted reporting limit. When there are more than one analytical result in a quarter, the highest current quarter's result and lowest previous quarter's results are used.

(4) New Max exceeds the previous GMP period of record maximum for the prior 10 years. New Min is below the previous GMP period of record minimum for the prior 10 years.

(5) Absolute values greater than 1 indicates that the TCE result from current quarter minus the most recently sampled previous quarter is more than two times the standard deviation for the GMP period of record starting 10 years prior to the beginning of the current quarter. A positive value indicates that the current quarter increased relative to the previous period. A negative value indicates a decrease relative to the previous period. For the purposes of the quarterly report, absolute values that are > 1 indicate a statistically significant change in the current TCE results compared to the most recent previously sampled quarter.

-- = No Data Available

NA = Not Applicable

NS = Not Sampled

TABLE 6.1: Well-specific Noted Items for Current Quarter

Subregion	Well ID	Sample Frequency	Key Statistic	PCE / TCE (µg/L)	Mann-Kendall Trend	Observations	Threat Level	Followup? Comments
Mill Kietzke	CTM134A	Quarterly	PCE max. of 45 ug/L in 2022Q3.	26	None. Insufficient temporal data.	Nearest supply well, MILL, is about 1400 ft downgradient.	**LOW**	Yes. Continue to monitor on quarterly basis.
			Not sampled 2020Q4 thru 2022Q1	NA	Same as above	Insufficient water to sample during these quarters, screen bottom at 44 ft bgs.	**LOW**	Yes. Continue to monitor quarterly.
South Reno	CTM98	Quarterly	New max. Old max of 20 ug/L in 2022Q2.	31	Decreasing (10 years)	Increasing PCE concentration since 2016. CTM98 well screen 239 - 254 ft. **Nearest supply well: TERMINAL**, 340' east, screened 330 - 665 ft. PCE measured from Terminal well at 0.73 ug/L on 8/31/21.	**INTERMED.**	Yes. Continue to monitor on quarterly basis. TMWA informed.
South Reno	VP34B	Quarterly	PCE max. 100 ug/L in 2022Q1.	39	None. Insufficient temporal data.	Threat to nearest supply wells: CORBETT and MILL; each ~5,800 ft east and northeast, respectively. Nearest non-treatment supply well: TERMINAL, ~7,200 ft east. Trend: Insufficient sampling events for a MK trend assessment, though limited data indicates an increasing trend. Nearby VP39B is on this list.	**LOW**	Yes. Continue to monitor on quarterly basis.
South Reno	VP-39B	Quarterly	PCE max. 9 ug/L in 2022Q2.	7.1	None. Insufficient temporal data.	See above for VP34B.	**LOW**	Yes. Continue to monitor on quarterly basis.
Downtown Sparks	Sparks (supply well)	NA	PCE 11 ug/L in 2021Q3.	NA	None	**Inactive Supply Well.** 2021Q3 high PCE value historically, level drops as seen with time sequence sampling.	**LOW**	Yes. Continue to monitor per supply and demand, coordinated with TMWA.

Notes:

NO THREAT AT THIS TIME	**No action required at this time. May or may not require continued monitoring.**
LOW	**At minimum, requires continued monitoring.**
INTERMEDIATE	**May require immediate Plan of Action to address the threat.**
HIGH	**Requires immediate Plan of Action and action implementation to address the threat.**

Ref. Source: CTMRD PCE Plume Threat Assessment
Active template: PCE-ThreatAssessment-TEMPLATE~140917, R:\GMP\GMP-DataAnalysis\GMP-DataAnalysis-ThreatAssessment

Table 6.2: Summary of GMP Changes for Current and Future Quarters	
Groundwater Monitoring, Sampling or Data Changes	
	RATIONALE FOR CHANGE
None	----

Table 6.3: Summary of GMP Quarterly QA

Data Mng Process Flow Chart Cross-Ref	Data Mng QA Step	Frequency	Responsible	QA Criteria	Results / Issues	Actions	Completed (initial & date)	Followup? (yes or no)
A. WATER QUALITY DATA MANAGEMENT AND QA								
1A	**RO Water QA check.** Review lab water quality report for sampled RO water.	Quarterly	Rick	Lab results of tested RO water are non-detect for all analytes, at the QAPP-prescribed reporting limits.	RO sample collected 12/19/2022	No actions Required	SB 2/28/2023	No
5A	**External Data QA of lab reports.** Consultant 24-hour QA review and report on lab report and weekly data statistics report.	Ongoing during quarterly sampling	Scott: Consultant Data QA Reporting	**Consultant's 24-hour Lab Report QA:**				
				1. Consutant's QA criteria were met; all data were "acceptable" for use.	Yes; all data were acceptable for use.	No actions Required	SB 2/28/2023	No
				2. Addition of qualifier(s) (if necessary) was conducted.	J qualifiers (2) applied for lab Workorder 2212265. UJ qualifier applied for lab Workorder 2211208. UJ qualifier applied to lab Workorder 2212182.	No actions Required	SB 2/28/2023	No
				3. Re-analysis (if necessary) was conducted.	No re-analysis was necessary, no impact to data.	No actions Required	SB 2/28/2023	No
				4. Re-sampling (if necessary) was conducted.	No re-sampling was necessary.	No actions Required	SB 2/28/2023	No
				Consultant's Weekly Data Statistics Report:				
				5. Re-analysis (if necessary) was conducted to verify significant change.	No re-analysis was necessary.	No actions Required	SB 2/28/2023	No
				6. Re-sampling (if necessary) was conducted to verify significant change.	No re-sampling was necessary.	No actions Required	SB 2/28/2023	No
7A	**Internal Data QA**	Quarterly	Scott or Brian	1. Are all scheduled samples on the Sample Schedule accounted for in GuMP (SQL Field Parameters table) and on the EDDs received list? If no, state reason(s) such as "dry well - no sample" etc.	No; seven (7) not sampled due to insufficient water or dry.	No actions Required	SB 2/28/2023	No
9A	**QA comparison of SQL Sample Results with Sample Events.** Compare Results and Events temp tables to ensure corresponding fields have matching data.	Quarterly	Bonnie	1. Does each "Sys_Sample_Code" from Sample Events table match the respective "Sys_Sample_Code" in the Sample Results table. All cells have information (not blank)	Each "Sys_Sample_Code" from Sample Events table match the respective "Sys_Sample_Code" in the Sample Results table.	No actions Required	BW 3/10/2023	No
B. FIELD PARAMETERS DATA MANAGEMENT AND QA								
4B	QA review of updated SQL Field Parameters table. Review data for each sample to ensure validity of data.	Quarterly	Scott or Brian	1. For "Stability_Attained" samples (value=1), do the three "key" parameters (pH, DO, SC) have values?	Yes	No actions Required	SB 2/28/2023	No
				2. For non-stable samples (key parameter(s) missing values), is the "Stability_Attained" value=0?	No non-stable samples.	No actions Required	SB 2/28/2023	No
				3. Are "Field_Qualifier"s explained in the "Remarks"?	No field qualifiers.	No actions Required	SB 2/28/2023	No
				4. For monitoring well samples with "Dry_Indicator" value=0 and "Inaccesible" value=0, is a "DTW" value provided?	Yes	No actions Required	SB 2/28/2023	No
				5. For monitoring well samples with "Dry_Indicator" value=1, is DTW= -999? ...With "Inaccesible" value=1, is "DTW"= -111?	Yes	No actions Required	SB 2/28/2023	No
				6. Does the "Sampling_device" correspond correctly with the "Sampling_method"?	Yes	No actions Required	SB 2/28/2023	No
C. SAMPLE EVENTS DATA MANAGEMENT AND QA								
4C	**QA review of updated SQL Sample Events table.** Review data for each sample to ensure validity of data.	Quarterly	Bonnie	1. Do all cells have information (not blank)?	Yes.	No actions Required	BW 3/10/2023	No
				2. Are the sample type codes and sample matrix codes correct for each sample?	Yes.	No actions Required	BW 3/10/2023	No
				3. Are the sampling methods and sampling device correct for each sample?	Yes	No actions Required	BW 3/10/2023	No

Figures

FIGURE 4.1

Water Level and PCE Concentration in Shallow Zone Wells July-December 2022

WELL TYPE

- PRODUCTION WELL (PCE TREATED) - TMWA
- PRODUCTION WELL
- DOMESTIC WELL
- MONITORING WELL - OTHER
- MONITORING WELL - TMWA
- MONITORING WELL - WCCSD
- WATER LEVEL ELEVATION CONTOURS
- GROUNDWATER FLOW DIRECTION
- CREEK
- DITCH

SAMPLE RESULTS

- DETECTED AT GREATER THAN THE 0.50 µG/L PCE REPORTING LIMIT

Values plotted only for wells that were sampled. Data from production wells are from samples collected under pumping conditions unless otherwise stated. Values plotted that are less than 0.50 µg/L are either noted as non-detect (ND) or indicate a value provided by the lab.

- ND — BELOW ANALYTICAL REPORTING LIMIT
- ? — INSUFFICIENT DATA FOR ESTIMATING LATERAL EXTENT OF CONTAMINATION
- PCE CONCENTRATION AREAS
- PCE CONCENTRATION CONTOURS
- PCE CONCENTRATION CONTOURS - INFERRED

Actual lateral extent of contamination uncertain.

> 0.05	ug/L	> 20	ug/L
> 5	ug/L	> 40	ug/L
> 10	ug/L	> 80	ug/L

NOTES:

The scale and configuration of all information shown hereon are approximate only and are not intended as a guide for design or survey work. Reproduction is not permitted without prior written permission from the Washoe County Community Services Department.

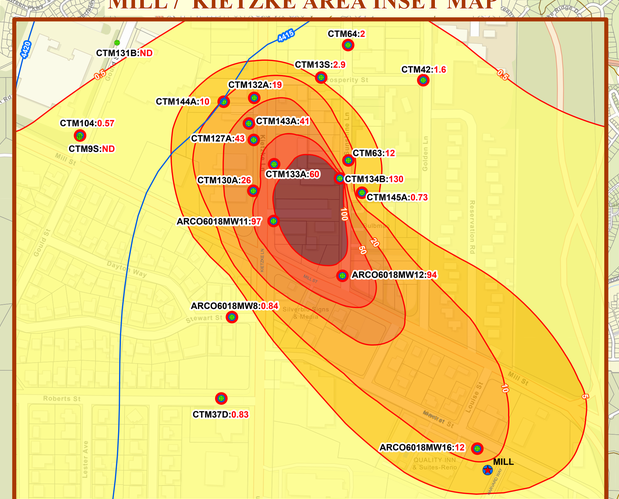
PCE/TCE contours reflect data from the time range noted. Where such data were not collected, the most-recent data for those locations were used. Contours may not represent the exact extent of contaminant in groundwater. Water elevation contours associated with pumping or recharging wells are dynamic and may not reflect actual piezometric surface over the entire time range noted.

-SCALE-

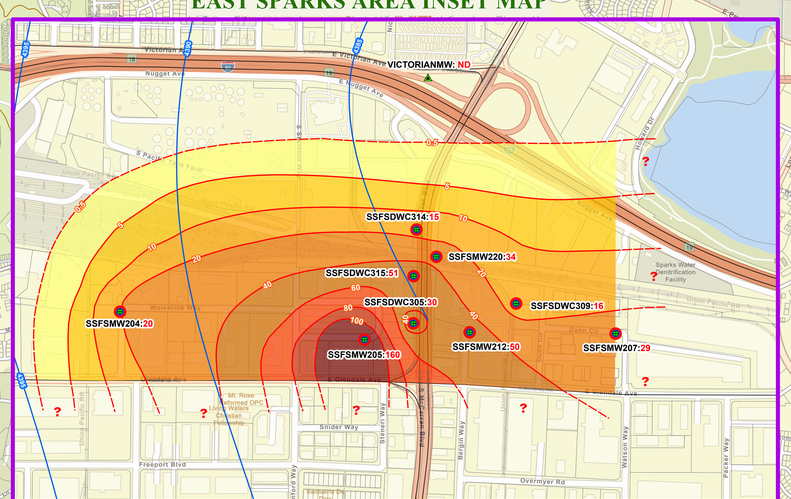
1,000 Feet

Central Truckee Meadows Remediation District Program

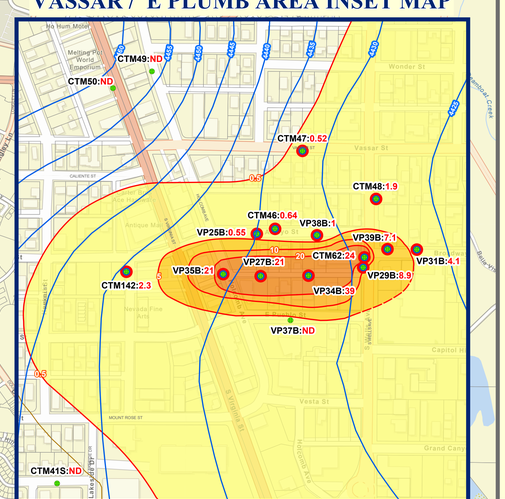
MILL / KIETZKE AREA INSET MAP



EAST SPARKS AREA INSET MAP



VASSAR / E PLUMB AREA INSET MAP



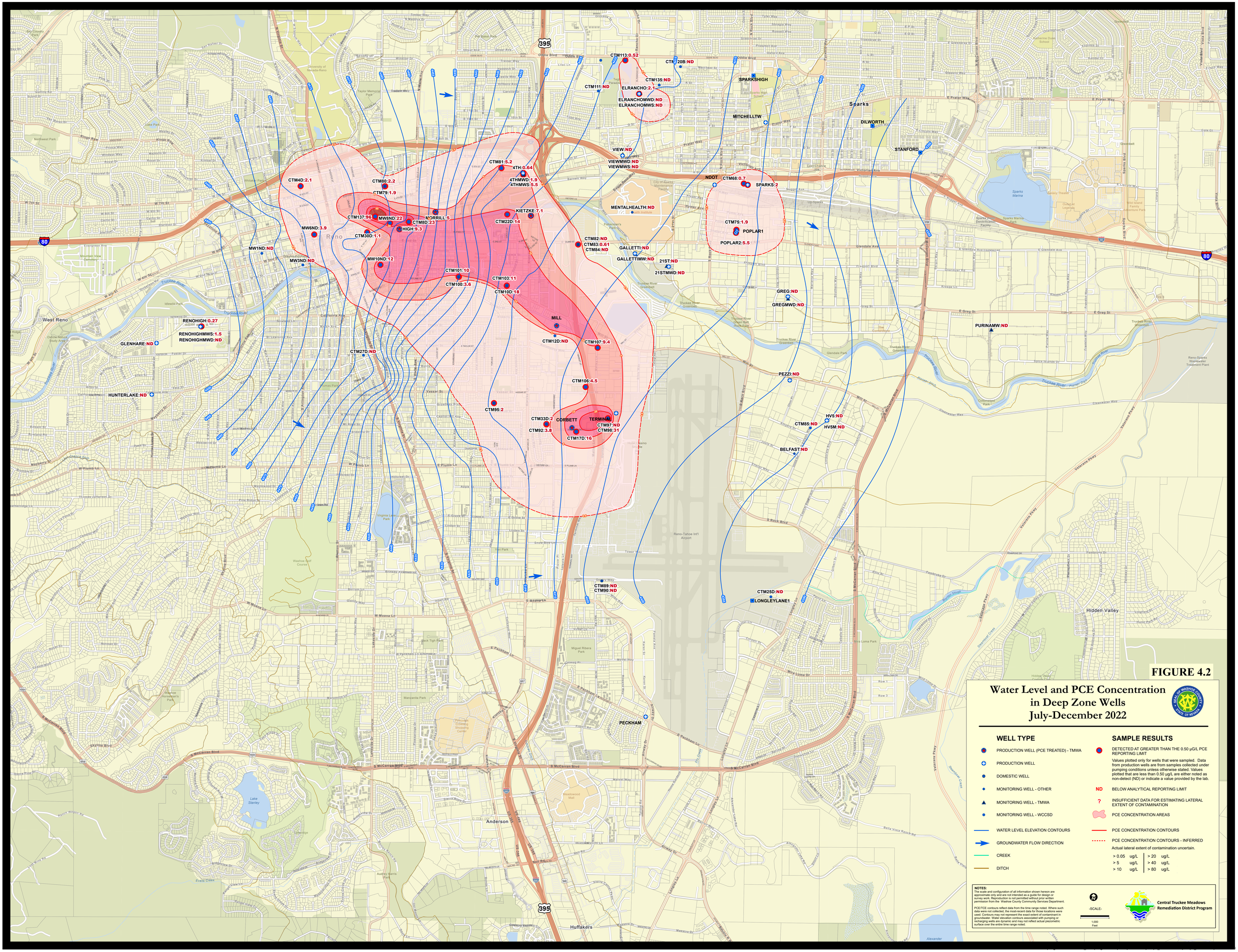


FIGURE 4.2

Water Level and PCE Concentration in Deep Zone Wells July-December 2022

WELL TYPE

- PRODUCTION WELL (PCE TREATED) - TMWA
- PRODUCTION WELL
- DOMESTIC WELL
- MONITORING WELL - OTHER
- MONITORING WELL - TMWA
- MONITORING WELL - WCCSD
- WATER LEVEL ELEVATION CONTOURS
- GROUNDWATER FLOW DIRECTION
- CREEK
- DITCH

SAMPLE RESULTS

- DETECTED AT GREATER THAN THE 0.50 µG/L PCE REPORTING LIMIT

Values plotted only for wells that were sampled. Data from production wells are from samples collected under pumping conditions unless otherwise stated. Values plotted that are less than 0.50 µg/L are either noted as non-detect (ND) or indicate a value provided by the lab.

- ND — BELOW ANALYTICAL REPORTING LIMIT
- ? — INSUFFICIENT DATA FOR ESTIMATING LATERAL EXTENT OF CONTAMINATION
- PCE CONCENTRATION AREAS
- PCE CONCENTRATION CONTOURS
- PCE CONCENTRATION CONTOURS - INFERRED

Actual lateral extent of contamination uncertain.

> 0.05	ug/L	> 20	ug/L
> 5	ug/L	> 40	ug/L
> 10	ug/L	> 80	ug/L

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PCE/TCE contours reflect data from the time range noted. Where such data were not collected, the most-recent data for those locations were used. Contours may not represent the exact extent of contaminant in groundwater. Water elevation contours associated with pumping or recharging wells are dynamic and may not reflect actual piezometric surface over the entire time range noted.

-SCALE-
1,000 Feet

Central Truckee Meadows Remediation District Program

FIGURE 4.3

2022 Q4 Groundwater Vertical Potentiometric Difference October 2022

Well Type
Includes shallow and deep wells

- PRODUCTION WELL (PCE TREATED) - TMWA
- PRODUCTION WELL
- MONITORING WELL - TMWA
- MONITORING WELL - WCCSD
- MONITORING WELL - OTHER
- DOMESTIC WELL

Surface Waters

- Ditch/Canal/Drain
- Rivers/Creeks/Slough
- Water Bodies

Partial Flow Barrier
Dashed where Inferred

- Deep and Shallow Zone
- Deep Zone Only
- CSB Crystal Springs Barrier
- HWB Harvard Way Barrier
- Virginia Lake Fault Zone (VLFZ)

Groundwater Potentiometric Difference

- Upward : > 10 Feet
- Downward : > -10 Feet

NOTES:

1) Groundwater potentiometric differences in the alluvial aquifer are calculated by subtracting the contoured water level elevation in the shallow zone from the contoured water level elevation in the deep zone.

2) Accuracy of potentiometric differences is variable: groundwater zones are generalized, and accuracy decreases in areas where water level data in either shallow or deep zones are absent or widely distributed.

3) The small uncolored areas in the eastern part of the basin are bedrock outcrops.

4) Locations of municipal water supply wells are included (existing and proposed), however, no water levels from these supply wells are used in this quarter's study.

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0 1,300 2,600 Feet

Area of Interest

Document Path: R:\CMP\GMP-Sampling Events\2022\Q4_Sampling\GIS\MapTemplates\FloodMap_2022Q4\FloodMap_2022Q4.aprx

FIGURE 4.4

Water Level and TCE Concentration in Shallow Zone Wells July- December 2022

WELL TYPE

- PRODUCTION WELL (PCE TREATED) - TMWA
- PRODUCTION WELL
- DOMESTIC WELL
- MONITORING WELL - OTHER
- MONITORING WELL - TMWA
- MONITORING WELL - WCCSD
- WATER LEVEL ELEVATION CONTOURS
- GROUNDWATER FLOW DIRECTION
- CREEK
- DITCH

SAMPLE RESULTS

- DETECTED AT GREATER THAN THE 0.50 µG/L PCE REPORTING LIMIT

Values plotted only for wells that were sampled. Data from production wells are from samples collected under pumping conditions unless otherwise stated. Values plotted that are less than 0.50 µg/L are either noted as non-detect (ND) or indicate a value provided by the lab.

- ND — BELOW ANALYTICAL REPORTING LIMIT
- ? — INSUFFICIENT DATA FOR ESTIMATING LATERAL EXTENT OF CONTAMINATION
- TCE CONCENTRATION AREAS
- TCE CONCENTRATION CONTOURS
- TCE CONCENTRATION CONTOURS - INFERRED

Actual lateral extent of contamination uncertain.

> 0.05	ug/L	> 20	ug/L
> 5	ug/L	> 40	ug/L
> 10	ug/L	> 80	ug/L

NOTES:

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PCE/TCE contours reflect data from the time range noted. Where such data were not collected, the most-recent data for those locations were used. Contours may not represent the exact extent of contaminant in groundwater. Water elevation contours associated with pumping or recharging wells are dynamic and may not reflect actual piezometric surface over the entire time range noted.

-SCALE-

1,000 Feet

Central Truckee Meadows Remediation District Program

EAST SPARKS AREA INSET MAP

MILL/KIETZKE INSET MAP

VASSAR E PLUMB INSET MAP

MILL / KIETZKE AREA INSET MAP

EAST SPARKS AREA INSET MAP

VASSAR / E PLUMB AREA INSET MAP

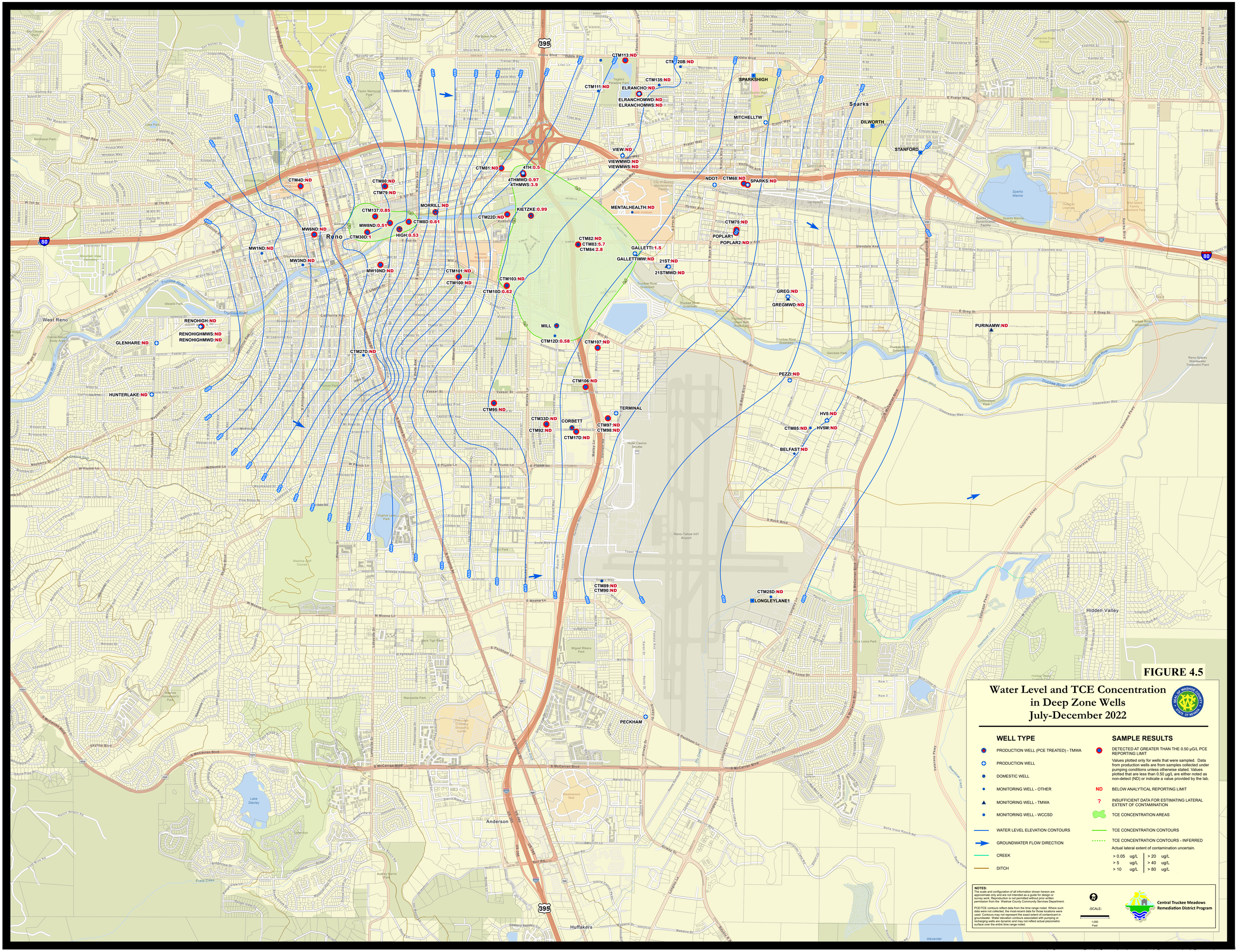

FIGURE 4.5

Water Level and TCE Concentration in Deep Zone Wells July-December 2022

WELL TYPE

- PRODUCTION WELL (PCE TREATED) - TMWA
- PRODUCTION WELL
- DOMESTIC WELL
- MONITORING WELL - OTHER
- MONITORING WELL - TMWA
- MONITORING WELL - WCCSD
- WATER LEVEL ELEVATION CONTOURS
- GROUNDWATER FLOW DIRECTION
- CREEK
- DITCH

SAMPLE RESULTS

- DETECTED AT GREATER THAN THE 0.50 µG/L PCE REPORTING LIMIT

Values plotted only for wells that were sampled. Data from production wells are from samples collected under pumping conditions unless otherwise stated. Values plotted that are less than 0.50 µg/L are either noted as non-detect (ND) or indicate a value provided by the lab.

- ND — BELOW ANALYTICAL REPORTING LIMIT
- ? — INSUFFICIENT DATA FOR ESTIMATING LATERAL EXTENT OF CONTAMINATION
- TCE CONCENTRATION AREAS
- TCE CONCENTRATION CONTOURS
- TCE CONCENTRATION CONTOURS - INFERRED

Actual lateral extent of contamination uncertain.

> 0.05	ug/L	> 20	ug/L
> 5	ug/L	> 40	ug/L
> 10	ug/L	> 80	ug/L

NOTES:
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PCE/TCE contours reflect data from the time range noted. Where such data were not collected, the most-recent data for those locations were used. Contours may not represent the exact extent of contaminant in groundwater. Water elevation contours associated with pumping or recharging wells are dynamic and may not reflect actual piezometric surface over the entire time range noted.

-SCALE-
1,000 Feet

Central Truckee Meadows Remediation District Program

Appendix 1 Well-Specific Statistical Summaries

Table A1.1: Groundwater Elevation Statistics for GMP Wells This Quarter

Table A1.2: PCE Statistics for GMP Wells This Quarter

Table A1.3: TCE Statistics for GMP Wells This Quarter

Table A1.1: Water Level Statistics for All CTMRD GMP and TMWA Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results and Comparisons		Statistically Significant Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter				
Well ID[1]	Subregion[2]	Deep Zone/ Shallow Zone[3]	Water Level Elevation[4] 2022 Q4	Water Level Elevation 2022 Q3	Water Level Change[5] Prior Quarter to Current Quarter (ft)	New Maximum/ Minimum[6][8]	Statistical Significance of Elevation Change from Previous Quarter[7]	No. of Months Measured	First Month Measured (YYYY/MM)	Elevation Minimum	Elevation Maximum	Elevation Standard Deviation
ARCO6018MW11	MK	S	4,413.3	4,411.5	1.8	--	0.27	39	2012/10	4,401.4	4,417.6	3.38
ARCO6018MW12	MK	S	4,411.9	4,411.1	0.8	--	0.13	40	2012/10	4,399.6	4,416.2	3.20
ARCO6018MW16	MK	S	4,411.1	4,410.2	0.9	--	0.15	40	2012/10	4,399.0	4,414.9	2.93
ARCO6018MW8	MK	S	4,411.9	4,411.0	0.9	--	0.17	38	2012/10	4,401.9	4,414.6	2.69
BELFAST	J	D	4,394.5	4,394.3	0.2	--	0.08	41	2012/10	4,389.8	4,395.5	1.28
C03	SR	S	4,405.5	4,405.2	0.3	--	0.12	36	2013/06	4,401.4	4,406.3	1.20
COR10	DR	S	4,476.1	4,475.8	0.3	--	0.14	39	2012/10	4,472.3	4,476.9	1.07
COR8A	DR	S	4,468.2	4,468.2	0.0	--	0.00	40	2012/10	4,464.8	4,468.9	0.88
CORWSSMW1	DR	S	4,457.9	4,459.1	-1.2	--	-0.22	40	2012/10	4,449.6	4,461.3	2.68
CTM100	DR	D	4,449.8	4,449.0	0.8	--	0.05	40	2012/10	4,423.8	4,450.7	7.41
CTM101	DR	D	4,441.2	4,440.5	0.7	--	0.09	40	2012/10	4,426.0	4,444.0	3.96
CTM102	DR	S	4,441.0	4,435.2	5.8	--	0.75	41	2012/10	4,426.0	4,443.8	3.89
CTM103	DR	D	4,416.0	4,414.4	1.6	**Max 4416.1 (12)**	0.09	41	2012/10	4,378.6	4,414.9	8.88
CTM104	MK	S	4,416.4	4,415.1	1.3	**Max 4416.4 (10)**	0.10	41	2012/10	4,389.0	4,415.6	6.40
CTM105	MK-SR	S	4,411.3	4,410.3	1.0	--	0.13	41	2012/10	4,394.3	4,414.5	3.97
CTM106	SR	D	4,408.7	4,407.8	0.9	--	0.10	41	2012/10	4,390.5	4,411.1	4.52
CTM107	DR-SR	D	4,411.0	4,409.5	1.5	--	0.09	41	2012/10	4,377.7	4,413.2	8.24
CTM10D	DR	D	4,421.0	4,418.7	2.3	**Max 4421.8 (12)**	0.04	41	2012/10	4,327.7	4,418.9	28.18
CTM111	ER	D	4,415.7	4,415.6	0.1	--	0.00	40	2012/10	4,336.7	4,426.5	20.39
CTM112	ER	S	4,420.2	4,419.6	0.6	--	0.03	40	2012/10	4,384.6	4,424.3	10.15
CTM113	ER	D	4,416.4	4,416.3	0.1	--	0.00	40	2012/10	4,353.3	4,425.1	17.92
CTM114	ER	S	4,418.7	4,418.2	0.5	--	0.03	40	2012/10	4,380.3	4,424.1	9.93
CTM11S	MK-SR	S	4,411.1	4,410.2	0.9	--	0.15	41	2012/10	4,397.0	4,414.6	2.99
CTM120A	ER	S	4,414.6	4,414.4	0.2	--	0.03	38	2013/08	4,399.4	4,417.0	3.62
CTM120B	ER	D	4,414.2	4,413.8	0.4	--	0.02	38	2013/08	4,378.4	4,418.7	9.42
CTM121A	ER	S	4,413.4	4,413.8	-0.4	--	-0.01	38	2013/08	4,364.2	4,420.6	13.64
CTM125	(Other)	S	4,397.6	4,397.4	0.2	--	0.06	38	2013/07	4,390.2	4,398.7	1.74
CTM126	(Other)	S	4,391.5	4,391.5	0.0	--	0.00	38	2013/07	4,388.8	4,395.6	0.73
CTM127A	MK	S	4,414.0	4,412.6	1.4	--	0.40	19	2014/06	4,410.4	4,416.9	1.74
CTM127B	MK	S	4,413.9	4,413.0	0.9	--	0.10	41	2012/10	4,395.2	4,418.1	4.69
CTM128	DR	S	4,496.3	4,496.9	-0.6	--	-0.41	39	2012/10	4,495.9	4,498.5	0.73
CTM129	DR	S	4,496.1	4,496.8	-0.7	--	-0.14	39	2012/10	4,485.2	4,498.7	2.44
CTM12D	DR-SR	D	4,416.1	4,414.6	1.5	--	0.03	41	2012/10	4,323.8	4,436.9	29.72
CTM130A	MK	S	4,412.8	4,411.7	1.1	--	0.45	27	2014/02	4,410.5	4,415.5	1.24
CTM130B	MK	S	4,413.3	4,412.4	0.9	--	0.08	37	2013/10	4,389.9	4,415.1	5.42
CTM131B	MK	S	4,416.5	4,415.4	1.1	--	0.07	35	2013/12	4,398.2	4,455.8	7.97
CTM132A	MK	S	4,414.4	4,413.7	0.7	--	0.21	22	2016/11	4,411.5	4,417.9	1.64
CTM132B	MK	S	4,415.2	4,414.2	1.0	--	0.08	35	2014/04	4,390.8	4,416.3	6.05
CTM133A	MK	S	4,413.1	4,412.3	0.8	--	0.22	29	2014/05	4,409.7	4,415.9	1.78
CTM133B	MK	S	4,413.9	4,413.0	0.9	--	0.09	35	2014/04	4,392.1	4,416.0	5.23
CTM134A	MK	S	4,412.8	4,412.0	0.8	--	0.22	30	2014/04	4,409.0	4,415.9	1.82
CTM134B	MK	S	4,412.8	4,412.1	0.7	--	0.07	35	2014/04	4,393.4	4,415.5	4.97
CTM135	ER	D	4,413.0	4,414.0	-1.0	--	-0.04	35	2014/04	4,360.4	4,421.2	14.06
CTM136A	DS	S	4,414.5	4,413.8	0.7	--	0.19	29	2015/01	4,408.0	4,418.1	1.88
CTM136B	DS	S	4,412.5	4,412.6	-0.1	--	-0.01	33	2014/09	4,399.5	4,417.6	3.69
CTM137	DR	D	4,474.1	4,473.6	0.5	--	0.19	41	2012/10	4,469.2	4,475.3	1.33
CTM137A	DS	S	4,413.3	4,413.1	0.2	--	0.05	27	2015/05	4,409.0	4,416.5	1.90
CTM137B	DS	S	4,411.1	4,411.5	-0.4	--	-0.06	34	2014/09	4,398.8	4,415.3	3.29
CTM138	DR	S	4,474.4	4,474.4	0.0	--	0.00	39	2012/10	4,471.8	4,475.1	0.60
CTM138A	DS	S	4,411.0	4,410.8	0.2	--	0.04	30	2015/01	4,407.6	4,417.5	2.37
CTM138B	DS	S	4,410.0	4,410.5	-0.5	--	-0.07	34	2014/09	4,397.4	4,414.8	3.45
CTM139A	DS	S	4,411.7	4,410.9	0.8	--	0.33	28	2015/05	4,408.6	4,413.8	1.22
CTM139B	DS	S	4,410.9	4,410.2	0.7	--	0.11	33	2014/09	4,397.5	4,413.7	3.27
CTM13S	MK	S	4,414.1	4,413.5	0.6	--	0.07	40	2012/10	4,398.9	4,419.9	4.22
CTM140A	ER	S	4,416.0	4,415.5	0.5	--	0.12	26	2016/05	4,411.2	4,419.1	2.03
CTM140B	ER	S	4,415.5	4,415.1	0.4	--	0.06	28	2015/12	4,400.4	4,418.9	3.24
CTM142	SR	S	4,438.0	4,437.8	0.2	--	0.08	17	2018/10	4,433.6	4,438.3	1.32
CTM145A	MK	S	4,412.6	4,411.9	0.7	--	0.18	16	2019/02	4,407.3	4,414.5	1.89

Table A1.1: Water Level Statistics for All CTMRD GMP and TMWA Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results and Comparisons		Statistically Significant Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter				
Well ID[1]	Subregion[2]	Deep Zone/ Shallow Zone[3]	Water Level Elevation[4] 2022 Q4	Water Level Elevation 2022 Q3	Water Level Change[5] Prior Quarter to Current Quarter (ft)	New Maximum/ Minimum[6][8]	Statistical Significance of Elevation Change from Previous Quarter[7]	No. of Months Measured	First Month Measured (YYYY/MM)	Elevation Minimum	Elevation Maximum	Elevation Standard Deviation
CTM145B	MK	S	4,412.6	4,411.8	0.8	--	0.19	16	2019/02	4,404.7	4,414.3	2.07
CTM146	DR	S	4,432.4	4,432.4	0.0	--	0.00	14	2019/07	4,430.3	4,432.8	0.65
CTM147	DR	S	4,469.1	4,468.5	0.6	--	0.45	14	2019/07	4,466.3	4,469.4	0.66
CTM148	DR	S	4,498.3	4,498.5	-0.2	--	-0.16	14	2019/07	4,497.0	4,499.7	0.63
CTM149	DR	S	4,477.4	4,477.1	0.3	--	0.04	14	2019/07	4,475.5	4,493.4	3.39
CTM14S	SR	S	4,467.2	4,467.1	0.1	--	0.08	40	2012/10	4,464.6	4,468.4	0.65
CTM15S	SR	S	4,437.2	4,436.6	0.6	--	0.10	40	2012/10	4,425.4	4,439.3	2.96
CTM16S	SR	S	4,417.3	4,416.7	0.6	--	0.28	40	2012/10	4,414.1	4,419.0	1.09
CTM17D	SR	D	4,408.0	4,406.5	1.5	--	0.07	41	2012/10	4,372.6	4,408.4	10.72
CTM18S	SR	S	4,408.5	4,407.9	0.6	--	0.12	41	2012/10	4,398.2	4,410.7	2.51
CTM19S	ES	S	4,395.6	4,395.8	-0.2	--	-0.05	38	2012/10	4,388.4	4,399.8	1.88
CTM1S	DR	S	4,499.9	4,500.8	-0.9	--	-0.22	39	2012/10	4,489.6	4,502.5	2.05
CTM20S	J	S	4,397.3	4,398.2	-0.9	--	-0.27	40	2012/10	4,392.2	4,400.8	1.69
CTM22D	DR	D	4,423.5	4,420.9	2.6	Max 4424.8 (12)	0.05	41	2012/10	4,339.7	4,421.6	25.42
CTM25D	(Other)	D	4,395.6	4,395.4	0.2	--	0.05	39	2012/10	4,386.2	4,396.7	2.06
CTM27D	SR	D	4,468.1	4,467.9	0.2	--	0.10	40	2012/10	4,463.9	4,469.5	0.98
CTM28S	DR	S	4,491.6	4,491.8	-0.2	--	-0.05	39	2012/10	4,482.5	4,494.0	2.12
CTM29S	DR	S	4,500.6	4,500.9	-0.3	--	-0.07	39	2012/10	4,489.9	4,503.1	2.22
CTM30D	DR	D	4,470.2	4,469.6	0.6	--	0.10	40	2012/10	4,458.7	4,471.2	2.93
CTM31S	DR	S	4,477.4	4,477.3	0.1	--	0.03	41	2012/10	4,471.8	4,478.8	1.62
CTM33D	SR	D	4,428.9	4,428.2	0.7	--	0.18	37	2012/10	4,421.0	4,429.9	1.91
CTM37D	MK	S	4,413.0	4,411.9	1.1	--	0.10	41	2012/10	4,389.6	4,416.2	5.47
CTM37S	DR	S	4,459.1	4,457.9	1.2	Max 4459.2 (12)	0.45	39	2012/10	4,453.7	4,459.0	1.35
CTM38D	MK-SR	S	4,409.4	4,408.7	0.7	--	0.11	41	2012/10	4,396.4	4,412.2	3.10
CTM39S	MK-SR	S	4,409.2	4,408.6	0.6	--	0.11	41	2012/10	4,398.4	4,412.1	2.78
CTM3S	DR	S	4,477.9	4,477.8	0.1	--	0.04	39	2012/10	4,472.8	4,479.5	1.42
CTM41S	SR	S	4,442.6	4,443.6	-1.0	--	-0.29	39	2012/10	4,436.4	4,443.9	1.70
CTM42	MK	S	4,413.8	4,413.2	0.6	--	0.08	39	2012/10	4,399.7	4,417.2	3.81
CTM46	SR	S	4,434.0	4,433.8	0.2	--	0.06	41	2012/10	4,427.4	4,435.2	1.65
CTM47	SR	S	4,430.4	4,430.2	0.2	--	0.06	41	2012/10	4,424.4	4,432.1	1.54
CTM48	SR	S	4,426.7	4,426.6	0.1	--	0.04	41	2012/10	4,421.9	4,428.5	1.30
CTM49	SR	S	4,457.5	4,457.4	0.1	--	0.47	41	2012/10	4,457.1	4,457.6	0.11
CTM4D	DR	D	4,477.6	4,482.8	-5.2	--	-1.15	40	2012/10	4,474.5	4,484.3	2.26
CTM5	DR	S	4,482.0	4,482.3	-0.3	--	-0.07	41	2012/10	4,474.2	4,483.8	2.25
CTM50	SR	S	4,459.8	4,459.8	0.0	--	0.00	39	2012/10	4,459.2	4,460.6	0.21
CTM51	SR	S	4,424.1	4,423.6	0.5	--	0.24	40	2012/10	4,420.7	4,425.7	1.05
CTM52	SR	S	4,423.5	4,423.2	0.3	--	0.18	40	2012/10	4,420.7	4,425.1	0.86
CTM53	SR	S	4,422.9	4,422.6	0.3	--	0.16	40	2012/10	4,419.3	4,424.5	0.91
CTM57	DR	S	4,504.6	4,504.7	-0.1	--	-0.04	37	2012/10	4,499.9	4,507.4	1.26
CTM60	SR	S	4,425.1	4,424.6	0.5	--	0.12	39	2012/10	4,422.5	4,440.6	2.07
CTM62	SR	S	4,429.5	4,429.5	0.0	--	0.00	41	2012/10	4,422.6	4,430.1	1.74
CTM63	MK	S	4,413.0	4,412.3	0.7	--	0.10	40	2012/10	4,400.5	4,418.0	3.56
CTM64	MK	S	4,414.8	4,414.2	0.6	--	0.05	41	2012/10	4,392.1	4,417.6	5.50
CTM65	DS	S	4,407.0	4,408.3	-1.3	--	-0.28	40	2012/10	4,396.8	4,408.6	2.31
CTM66	DS	S	4,406.8	4,406.6	0.2	--	0.04	40	2012/10	4,395.2	4,409.4	2.46
CTM67	DS	S	4,406.8	4,406.6	0.2	--	0.04	40	2012/10	4,395.0	4,409.5	2.56
CTM68	DS	D	4,409.1	4,407.5	1.6	--	0.04	40	2012/10	4,326.7	4,413.7	19.61
CTM69	DS	S	4,408.0	4,408.1	-0.1	--	-0.02	40	2012/10	4,395.4	4,410.3	2.54
CTM6S	DR	S	4,469.2	4,467.3	1.9	--	0.35	37	2012/10	4,455.9	4,469.3	2.70
CTM70	DS	S	4,405.1	4,405.5	-0.4	--	-0.10	40	2012/10	4,396.3	4,406.8	1.94
CTM71	DS	S	4,407.1	4,407.1	0.0	--	0.00	38	2012/10	4,396.4	4,409.7	2.48
CTM72	DS	S	4,407.0	4,407.0	0.0	--	0.00	41	2012/10	4,369.2	4,410.0	4.60
CTM73	DS	S	4,406.6	4,406.8	-0.2	--	-0.04	40	2012/10	4,394.8	4,409.3	2.57
CTM74	DS	S	4,406.3	4,406.6	-0.3	--	-0.05	40	2012/10	4,393.9	4,409.0	2.95
CTM75	DS	D	4,405.0	4,406.7	-1.7	--	-0.06	41	2012/10	4,348.4	4,412.2	15.01
CTM76	DS	S	4,407.6	4,407.4	0.2	--	0.04	40	2012/10	4,398.4	4,410.8	2.32
CTM77	DS	S	4,406.9	4,406.9	0.0	--	0.00	40	2012/10	4,398.9	4,409.9	2.20
CTM78	DS	S	4,406.4	4,406.4	0.0	--	0.00	41	2012/10	4,397.9	4,409.2	2.25

Table A1.1: Water Level Statistics for All CTMRD GMP and TMWA Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results and Comparisons		Statistically Significant Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter				
Well ID[1]	Subregion[2]	Deep Zone/ Shallow Zone[3]	Water Level Elevation[4] 2022 Q4	Water Level Elevation 2022 Q3	Water Level Change[5] Prior Quarter to Current Quarter (ft)	New Maximum/ Minimum[6][8]	Statistical Significance of Elevation Change from Previous Quarter[7]	No. of Months Measured	First Month Measured (YYYY/MM)	Elevation Minimum	Elevation Maximum	Elevation Standard Deviation
CTM79	DR	D	4,472.9	4,471.8	1.1	Max 4472.9 (10)	0.14	40	2012/10	4,456.1	4,472.8	3.94
CTM7S	DR	S	4,464.8	4,465.1	-0.3	--	-0.05	40	2012/10	4,455.4	4,469.0	2.91
CTM80	DR	D	4,466.0	4,465.0	1.0	--	0.07	41	2012/10	4,424.7	4,466.3	7.15
CTM81	DR	D	4,426.3	4,423.0	3.3	Max 4428.3 (12)	0.09	41	2012/10	4,359.0	4,423.9	17.68
CTM82	DR	D	4,416.6	4,415.0	1.6	--	0.04	41	2012/10	4,336.1	4,417.6	21.64
CTM83	DR	D	4,414.9	4,413.3	1.6	--	0.06	41	2012/10	4,359.2	4,414.9	13.40
CTM84	DR	D	4,413.7	4,412.3	1.4	Max 4413.7 (10)	0.07	41	2012/10	4,371.5	4,413.6	9.45
CTM85	J	D	4,395.0	4,394.9	0.1	--	0.03	39	2012/10	4,387.2	4,396.6	1.93
CTM86	J	S	4,395.2	4,395.1	0.1	--	0.03	40	2012/10	4,388.5	4,397.3	1.65
CTM87	J	S	4,396.6	4,396.5	0.1	--	0.03	41	2012/10	4,390.7	4,398.4	1.51
CTM89	(Other)	D	4,407.0	4,405.3	1.7	--	0.14	39	2012/10	4,383.1	4,408.1	6.09
CTM8D	DR	D	4,454.3	4,453.4	0.9	--	0.03	41	2012/10	4,409.3	4,460.7	14.83
CTM90	(Other)	D	4,402.2	4,401.9	0.3	--	0.06	40	2012/10	4,383.1	4,403.1	2.63
CTM91	(Other)	S	4,402.0	4,401.7	0.3	--	0.09	40	2012/10	4,396.3	4,402.9	1.72
CTM92	SR	D	4,426.6	4,425.9	0.7	--	0.20	39	2012/10	4,418.5	4,426.7	1.75
CTM93	SR	S	4,411.5	4,410.8	0.7	--	0.17	40	2012/10	4,403.2	4,413.3	2.12
CTM94	SR	D	4,435.1	4,435.2	-0.1	--	-0.02	39	2012/10	4,424.7	4,437.3	2.79
CTM95	SR	D	4,428.6	4,428.0	0.6	--	0.15	40	2012/10	4,420.6	4,429.9	2.01
CTM96	SR	S	4,414.0	4,413.2	0.8	--	0.21	40	2012/10	4,404.7	4,416.4	1.87
CTM97	SR	D	4,410.1	4,408.5	1.6	--	0.05	41	2012/10	4,351.5	4,410.5	15.49
CTM98	SR	D	4,407.9	4,406.1	1.8	--	0.11	41	2012/10	4,376.7	4,409.9	8.18
CTM99	SR	S	4,406.7	4,406.3	0.4	--	0.09	41	2012/10	4,397.9	4,408.3	2.15
CTM9S	MK	S	4,416.8	4,415.6	1.2	Max 4416.8 (10)	0.11	39	2012/10	4,397.9	4,416.2	5.25
GALLETTIMW	DR-DS	D	4,410.2	4,408.3	1.9	--	0.06	37	2012/10	4,350.0	4,416.8	14.89
GLOBALMW1	J	S	4,398.2	4,397.9	0.3	--	0.06	40	2012/10	4,390.0	4,400.6	2.43
GREGMWD	(Other)	D	4,392.1	4,393.2	-1.1	--	-0.04	37	2012/10	4,335.8	4,403.9	12.91
HV5M	J	D	4,398.1	4,389.5	8.6	--	0.63	40	2012/10	4,370.9	4,399.8	6.87
LEGENDS	DS	S	4,408.4	4,408.2	0.2	--	0.03	41	2012/10	4,393.0	4,411.1	3.21
LINCOLNWAYMW	ES	S	4,389.7	4,390.1	-0.4	--	-0.22	27	2012/10	4,386.5	4,392.0	0.89
MENTALHEALTH	DS	D	4,412.7	4,411.3	1.4	--	0.06	41	2012/10	4,360.8	4,415.6	12.56
MW10ND	DR	D	4,469.2	4,468.8	0.4	--	0.11	41	2012/10	4,460.3	4,469.9	1.83
MW1ND	DR	D	4,484.8	4,484.8	0.0	--	0.00	39	2012/10	4,475.9	4,493.8	2.85
MW2NS	DR	S	4,491.1	4,491.4	-0.3	--	-0.05	39	2012/10	4,477.6	4,493.6	3.21
MW3ND	DR	D	4,479.5	4,478.9	0.6	--	0.14	39	2012/10	4,469.6	4,485.0	2.20
MW4NS	DR	S	4,487.5	4,487.5	0.0	--	0.00	39	2012/10	4,472.3	4,490.1	2.21
MW6ND	DR	D	4,479.0	4,478.7	0.3	--	0.08	40	2012/10	4,471.4	4,480.4	1.97
MW7NS	DR	S	4,468.1	4,467.9	0.2	--	0.05	41	2012/10	4,460.5	4,470.3	2.04
MW8ND	DR	D	4,454.3	4,453.6	0.7	--	0.03	41	2012/10	4,414.2	4,465.7	12.56
MW9NS	DR	S	4,468.4	4,468.2	0.2	--	0.10	40	2012/10	4,464.1	4,469.4	1.04
NVAIRGRDMW17	SR	S	4,401.4	4,401.1	0.3	--	0.15	26	2016/04	4,397.7	4,401.9	1.03
PURINAMW	(Other)	D	4,381.4	4,381.3	0.1	--	0.06	32	2012/10	4,380.1	4,384.7	0.81
RETRACB13	DR	S	4,501.0	4,501.4	-0.4	--	-0.07	40	2012/10	4,487.1	4,503.2	3.03
RETRACB14	DR	S	4,489.1	4,489.4	-0.3	--	-0.05	39	2012/10	4,478.1	4,491.0	2.73
RETRACMWE	DR	S	4,486.3	4,485.9	0.4	--	0.08	39	2012/10	4,477.4	4,487.8	2.53
RETRACMWE1	DR	S	4,486.5	4,486.3	0.2	--	0.05	39	2012/10	4,478.2	4,488.3	2.03
RETRACMWG	DR	S	4,480.1	4,480.0	0.1	--	0.02	40	2012/10	4,472.5	4,482.2	2.19
RETRACP2	DR	S	4,471.7	4,472.4	-0.7	--	-0.22	39	2012/10	4,465.5	4,473.2	1.56
RPDMW6	DR	S	4,461.5	4,461.4	0.1	--	0.05	40	2012/10	4,458.5	4,465.2	1.09
USGSGREG	(Other)	S	4,402.6	4,402.6	0.0	--	0.00	38	2012/10	4,358.2	4,404.9	5.24
USGSHOLCOMB	SR	S	4,462.3	4,461.9	0.4	--	0.38	40	2012/10	4,460.4	4,462.6	0.53
USGSLISTON	SR	S	4,416.9	4,416.3	0.6	--	0.21	40	2012/10	4,413.1	4,422.6	1.46
USGSWCYARD	(Other)	S	4,390.9	4,391.1	-0.2	--	-0.25	41	2012/10	4,390.4	4,393.0	0.40
USGSWOOSTER	SR	S	4,408.1	4,407.5	0.6	--	0.16	41	2012/10	4,401.0	4,409.3	1.82
VICTORIANMW	ES	S	4,382.7	4,383.4	-0.7	--	-0.41	36	2012/10	4,380.5	4,384.6	0.86
VP23A	SR	S	4,432.4	4,431.7	0.7	--	0.37	34	2014/04	4,429.7	4,433.6	0.94
VP23B	SR	S	4,432.3	4,431.6	0.7	--	0.37	34	2014/04	4,429.6	4,433.5	0.96
VP25B	SR	S	4,434.8	4,434.4	0.4	--	0.18	33	2014/04	4,430.7	4,437.3	1.11
VP27B	SR	S	4,434.2	4,433.9	0.3	--	0.17	33	2014/04	4,430.6	4,435.1	0.88

Table A1.1: Water Level Statistics for All CTMRD GMP and TMWA Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results and Comparisons		Statistically Significant Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter				
Well ID[1]	Subregion[2]	Deep Zone/ Shallow Zone[3]	Water Level Elevation[4] 2022 Q4	Water Level Elevation 2022 Q3	Water Level Change[5] Prior Quarter to Current Quarter (ft)	New Maximum/ Minimum[6][8]	Statistical Significance of Elevation Change from Previous Quarter[7]	No. of Months Measured	First Month Measured (YYYY/MM)	Elevation Minimum	Elevation Maximum	Elevation Standard Deviation
VP29B	SR	S	4,429.7	4,429.7	0.0	--	0.00	34	2014/04	4,425.7	4,435.1	1.27
VP31B	SR	S	4,425.8	4,425.8	0.0	--	0.00	35	2014/04	4,422.4	4,426.5	0.94
VP34B	SR	S	4,432.9	4,433.1	-0.2	**Max 4435.4 (11)**	-0.17	17	2018/10	4,431.0	4,433.1	0.60
VP35B	SR	S	4,435.9	4,435.9	0.0	--	0.00	16	2019/02	4,433.4	4,437.0	0.76
VP37B	SR	S	4,431.1	4,433.6	-2.5	**Min 4431.1 (10)**	**-1.77**	14	2019/07	4,431.2	4,434.3	0.71
VP38B	SR	S	4,431.3	4,431.3	0.0	--	0.00	14	2019/07	4,429.2	4,431.3	0.45
VP39B	SR	S	4,428.9	4,428.9	0.0	--	0.00	16	2019/02	4,425.8	4,429.3	0.83
WMMW3	DR	S	4,424.3	4,422.2	2.1	**Max 4425.1 (12)**	0.20	39	2012/10	4,404.3	4,423.9	5.30

Notes:

(1) Only wells with at least 12 monthly measurements are included in table

(2) Subregion designations as follows:

DR = Downtown Reno
DR-DS = Downtown Reno-Downtown Sparks overlap area
DR-SR = Downtown Reno-South Reno overlap area
DS = Downtown Sparks
SR = South Reno
UNK = Unknown
ER = El Rancho
J = Joule
MK = Mill/Kietzke
MK-SR = Mill/Kietzke-South Reno overlap area
DR-ER = Downtown Reno-El Rancho overlap area
Other = Located outside of currently defined subregions

(3) Wells completed in the shallow zone are designated with an S and wells completed in the deep zone with a D.

(4) Feet above mean sea level (msl)

(5) Difference in feet between current elevation value and previous period's elevation value.

(6) New Max exceeds the GMP period of record maximum elevation for the prior 10 years. New Min is below the GMP period of record minimum elevation for the prior 10 years.

(7) Absolute values greater than 1 indicates that the water level elevation measurement from current quarter minus the elevation from the previous quarter is more than two times the standard deviation for the GMP period of record starting 10 years prior to the beginning of the current quarter. A positive value indicates that the current quarter increased relative to the previous period. A negative value indicates a decrease relative to the previous period. For the purposes of the quarterly report, absolute values that are > 1 indicate a statistically significant change in the current water level elevation results compared to the previous quarter.

(8) The number in parenthesis shows which month in the quarter had the new minimum or maximum elevation measurement (e.g., "New Min (7)" means the new minimum occurred in July).

NM = Not Measured.

-- = No data available.

Table A1.2: PCE Statistics for All CTMRD GMP Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results		Criteria for Identifying Potentially Significant Changes in PCE Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter						
Well ID	Subregion[1]	Deep Zone/ Shallow Zone[2]	[PCE][3] Current Quarter (2022 Q4)	[PCE][3] Most Recent Previous Sampled Quarter	Date of Most Recent Previous Sample	New[4] Maximum/ Minimum	Statistical[5] Significance Compared to Most Recent Previous Sampled Quarter	No. of Prior Quarters Sampled	First Quarter Sampled	[PCE] Minimum	[PCE] Maximum	[PCE] Mean	[PCE] Standard Deviation	[PCE] Coefficient of Variation
ARCO6018MW11	MK	S	97.00	88.00	09/27/2022	New Max	0.20	34	2012 Q4	<0.5	88.00	24.42	22.02	0.90
ARCO6018MW12	MK	S	94.00	47.00	09/19/2022	New Max	1.49	37	2012 Q4	1.70	64.00	16.96	15.81	0.93
ARCO6018MW16	MK	S	12.00	13.00	09/15/2022	--	-0.19	36	2012 Q4	<0.5	13.00	1.86	2.58	1.39
C03	SR	S	1.80	2.20	09/28/2022	--	-0.37	28	2013 Q2	1.50	4.20	2.34	0.55	0.23
CTM101	DR	D	10.00	13.00	09/16/2022	--	-0.90	39	2012 Q4	5.50	14.00	9.61	1.67	0.17
CTM102	DR	S	9.30	7.20	09/16/2022	New Max	0.91	39	2012 Q4	2.70	8.30	5.94	1.16	0.19
CTM103	DR	D	11.00	18.00	09/16/2022	--	-0.85	37	2012 Q4	2.00	18.00	8.82	4.11	0.47
CTM105	MK-SR	S	3.00	3.20	09/15/2022	--	-0.07	39	2012 Q4	2.00	7.10	3.66	1.37	0.37
CTM106	SR	D	4.50	4.80	09/15/2022	--	-0.16	39	2012 Q4	2.50	6.30	4.59	0.92	0.20
CTM107	DR-SR	D	9.40	4.30	09/15/2022	--	0.50	39	2012 Q4	4.30	26.00	15.02	5.14	0.34
CTM10D	DR	D	18.00	35.00	09/16/2022	--	-0.46	37	2012 Q4	9.50	89.00	44.51	18.39	0.41
CTM11S	MK-SR	S	1.40	1.30	09/15/2022	--	0.03	37	2012 Q4	0.51	8.40	2.49	1.90	0.76
CTM121A	ER	S	0.68	0.55	09/06/2022	--	0.25	36	2013 Q3	<0.5	1.50	0.38	0.26	0.68
CTM127A	MK	S	43.00	48.00	07/31/2019	New Min	-0.06	7	2013 Q2	48.00	190.00	101.14	43.81	0.43
CTM127B	MK	S	4.00	8.50	08/04/2022	New Min	-0.01	37	2012 Q4	8.50	1,200.00	161.30	247.39	1.53
CTM129	DR	S	0.50	0.58	08/16/2022	New Min	0.00	35	2012 Q4	0.58	130.00	18.85	30.78	1.63
CTM12D	DR-SR	D	<0.5	<0.5	09/15/2022	--	--	38	2012 Q4	<0.5	18.00	--	--	--
CTM130A	MK	S	26.00	56.00	07/30/2019	New Min	-1.13	5	2017 Q2	51.00	84.00	63.40	13.23	0.21
CTM130B	MK	S	10.00	15.00	08/01/2022	--	-0.08	36	2013 Q3	1.30	170.00	21.12	30.82	1.46
CTM132A	MK	S	19.00	23.00	08/01/2022	--	-0.13	7	2017 Q2	6.30	59.00	28.04	15.61	0.56
CTM132B	MK	S	1.10	1.90	08/01/2022	--	-0.21	34	2014 Q1	1.10	8.10	3.12	1.86	0.60
CTM133A	MK	S	60.00	68.00	08/03/2022	--	-0.26	10	2014 Q2	57.00	110.00	76.50	15.62	0.20
CTM133B	MK	S	4.70	13.00	08/03/2022	New Min	-0.02	34	2014 Q1	13.00	1,080.00	306.39	266.93	0.87
CTM134A	MK	S	26.00	45.00	08/10/2022	--	-0.76	12	2014 Q2	1.40	45.00	13.54	12.50	0.92
CTM134B	MK	S	130.00	160.00	08/10/2022	--	-0.19	33	2014 Q1	6.60	410.00	60.58	80.35	1.33
CTM137	DR	D	96.00	58.00	09/19/2022	--	0.79	39	2012 Q4	58.00	170.00	92.43	23.94	0.26
CTM13S	MK	S	2.90	1.90	09/19/2022	--	0.15	37	2012 Q4	<0.5	19.00	2.76	3.37	1.22
CTM142	SR	S	2.30	2.30	09/06/2022	--	0.00	17	2018 Q3	1.70	4.20	2.36	0.65	0.28
CTM143A	MK	S	41.00	NS		1st Sample	1st Smpl			41.00	41.00	--	--	--
CTM143B	MK	S	2.90	2.40	08/02/2022	--	0.03	7	2021 Q1	2.40	25.00	7.10	7.39	1.04
CTM144A	MK	S	10.00	NS		1st Sample	1st Smpl			10.00	10.00	--	--	--
CTM144B	MK	S	0.97	1.60	08/09/2022	New Min	-0.14	7	2021 Q1	1.00	7.70	2.34	2.22	0.95
CTM145A	MK	S	0.73	2.00	08/10/2022	--	-1.42	11	2019 Q1	<0.5	2.00	0.77	0.45	0.58
CTM145B	MK	S	0.63	2.50	08/10/2022	New Min	-0.05	15	2019 Q1	0.81	59.00	11.82	18.51	1.57
CTM146	DR	S	<0.5	<0.5	08/29/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
CTM147	DR	S	1.60	1.20	08/16/2022	--	0.46	13	2019 Q3	1.20	2.80	1.81	0.43	0.24
CTM148	DR	S	1.10	1.30	08/16/2022	New Min	-0.14	13	2019 Q3	1.30	4.40	2.72	0.71	0.26
CTM149	DR	S	1.20	1.30	08/16/2022	--	-0.06	13	2019 Q3	0.89	3.60	2.17	0.85	0.39
CTM17D	SR	D	16.00	15.00	09/15/2022	--	0.14	39	2012 Q4	3.40	23.00	8.95	3.60	0.40
CTM18S	SR	S	1.70	1.70	09/15/2022	--	0.00	39	2012 Q4	0.72	2.50	1.37	0.41	0.30
CTM1S	DR	S	0.59	0.59	09/21/2022	--	0.00	36	2012 Q4	<0.5	1.60	0.48	0.30	0.62
CTM22D	DR	D	14.00	7.70	09/20/2022	--	0.85	38	2012 Q4	7.70	26.00	14.67	3.71	0.25
CTM28S	DR	S	2.20	1.30	09/21/2022	--	0.02	35	2012 Q4	1.20	100.00	17.08	25.10	1.47
CTM30D	DR	D	1.10	1.80	09/20/2022	--	-0.02	36	2012 Q4	<0.5	58.00	20.94	19.52	0.93
CTM31S	DR	S	3.10	3.10	09/21/2022	--	0.00	39	2012 Q4	2.30	9.70	4.80	1.79	0.37
CTM33D	SR	D	2.00	2.10	09/27/2022	--	-0.19	27	2012 Q4	0.99	2.10	1.53	0.27	0.17
CTM37D	MK	S	0.83	0.77	09/16/2022	--	0.01	38	2012 Q4	<0.5	13.00	1.75	2.32	1.33
CTM38D	MK-SR	S	1.50	1.70	09/15/2022	--	-0.17	37	2012 Q4	0.95	3.20	1.81	0.60	0.33
CTM39S	MK-SR	S	2.60	1.30	09/15/2022	New Max	1.52	38	2012 Q4	<0.5	1.80	0.77	0.43	0.56
CTM3S	DR	S	36.00	47.00	09/21/2022	--	-0.33	36	2012 Q4	5.40	64.00	21.73	16.70	0.77
CTM46	SR	S	0.64	0.80	09/26/2022	--	-0.09	38	2012 Q4	<0.5	3.70	1.16	0.85	0.73
CTM47	SR	S	0.52	0.74	09/26/2022	--	-0.15	38	2012 Q4	<0.5	3.00	1.45	0.75	0.51
CTM48	SR	S	1.90	1.90	09/26/2022	--	0.00	38	2012 Q4	1.10	6.90	2.80	1.24	0.44
CTM49	SR	S	<0.5	<0.5	09/26/2022	--	--	38	2012 Q4	<0.5	27.00	--	--	--
CTM5	DR	S	4.60	4.60	09/21/2022	--	0.00	39	2012 Q4	3.50	20.00	9.61	4.45	0.46
CTM51	SR	S	4.60	6.20	09/27/2022	--	-0.40	37	2012 Q4	1.80	9.80	4.54	1.98	0.44
CTM52	SR	S	4.20	1.60	09/27/2022	--	0.46	34	2012 Q4	1.50	13.00	5.87	2.85	0.49
CTM53	SR	S	4.00	2.80	09/27/2022	--	0.21	37	2012 Q4	1.30	12.00	4.20	2.81	0.67
CTM62	SR	S	24.00	27.00	09/26/2022	--	-0.07	37	2012 Q4	14.00	95.00	38.25	20.58	0.54
CTM63	MK	S	12.00	8.70	09/27/2022	--	0.23	37	2012 Q4	0.77	29.00	5.86	7.19	1.23
CTM65	DS	S	0.53	<0.5	09/01/2022	--	0.37	40	2012 Q4	<0.5	1.40	0.56	0.38	0.67
CTM66	DS	S	1.80	0.89	09/01/2022	--	0.72	40	2012 Q4	0.79	3.10	1.77	0.63	0.36
CTM67	DS	S	22.00	13.00	09/01/2022	--	0.52	39	2012 Q4	13.00	55.00	29.90	8.74	0.29

Table A1.2: PCE Statistics for All CTMRD GMP Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results		Criteria for Identifying Potentially Significant Changes in PCE Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter						
Well ID	Subregion[1]	Deep Zone/ Shallow Zone[2]	[PCE][3] Current Quarter (2022 Q4)	[PCE][3] Most Recent Previous Sampled Quarter	Date of Most Recent Previous Sample	New[4] Maximum/ Minimum	Statistical[5] Significance Compared to Most Recent Previous Sampled Quarter	No. of Prior Quarters Sampled	First Quarter Sampled	[PCE] Minimum	[PCE] Maximum	[PCE] Mean	[PCE] Standard Deviation	[PCE] Coefficient of Variation
CTM68	DS	D	0.70	<0.5	09/01/2022	--	0.61	38	2013 Q1	<0.5	2.20	0.57	0.37	0.64
CTM69	DS	S	0.50	<0.5	09/01/2022	--	0.35	38	2012 Q4	<0.5	1.30	0.59	0.35	0.60
CTM6S	DR	S	15.00	7.80	09/20/2022	--	0.93	36	2012 Q4	0.61	16.00	9.70	3.87	0.40
CTM70	DS	S	3.70	2.40	09/01/2022	--	0.24	40	2012 Q4	1.00	12.00	5.50	2.76	0.50
CTM75	DS	D	1.90	4.80	09/07/2022	--	-0.54	39	2012 Q4	1.80	12.00	4.71	2.67	0.57
CTM81	DR	D	5.20	4.00	09/20/2022	--	0.40	39	2012 Q4	3.20	10.00	6.00	1.50	0.25
CTM83	DR	D	0.61	<0.5	09/08/2022	--	0.85	39	2012 Q4	<0.5	1.40	0.32	0.21	0.66
CTM84	DR	D	<0.5	<0.5	09/08/2022	--	--	39	2012 Q4	<0.5	1.30	--	--	--
CTM86	J	S	0.57	<0.5	09/12/2022	--	0.40	40	2012 Q4	<0.5	1.40	0.67	0.41	0.61
CTM87	J	S	1.90	2.50	09/19/2022	--	-0.33	39	2012 Q4	1.10	4.40	2.54	0.92	0.36
CTM8D	DR	D	23.00	12.00	09/20/2022	--	0.65	38	2012 Q4	3.40	43.00	23.96	8.47	0.35
CTM92	SR	D	3.80	3.60	09/27/2022	--	0.20	27	2012 Q4	2.10	3.90	3.01	0.49	0.16
CTM93	SR	S	2.10	1.90	09/27/2022	--	0.13	36	2012 Q4	1.30	4.40	2.28	0.76	0.33
CTM96	SR	S	1.70	1.60	06/27/2022	--	0.04	36	2012 Q4	1.00	5.70	2.72	1.26	0.46
CTM98	SR	D	31.00	3.80	09/13/2022	**New Max**	**2.72**	38	2012 Q4	1.20	23.00	9.55	5.01	0.52
CTM99	SR	S	2.90	1.70	09/13/2022	--	0.49	39	2012 Q4	1.70	7.30	4.16	1.23	0.30
ELRANCHO	ER	D	2.10	2.60	09/07/2022	--	-0.26	12	2013 Q1	<0.5	3.20	1.09	0.95	0.87
MW10ND	DR	D	12.00	13.00	09/22/2022	--	-0.09	38	2012 Q4	9.50	32.00	19.18	5.69	0.30
MW6ND	DR	D	3.90	3.30	09/22/2022	--	0.14	39	2012 Q4	2.60	11.00	5.61	2.08	0.37
MW7NS	DR	S	2.30	2.00	10/04/2022	--	0.22	35	2012 Q4	<0.5	2.50	1.17	0.68	0.58
MW8ND	DR	D	22.00	15.00	10/04/2022	--	0.44	36	2012 Q4	12.00	48.00	28.24	8.00	0.28
USGSLISTON	SR	S	5.40	4.60	09/26/2022	--	0.40	37	2012 Q4	3.60	7.20	5.26	1.00	0.19
USGSWOOSTER	SR	S	4.90	5.50	09/15/2022	--	-0.17	39	2012 Q4	2.20	10.00	6.17	1.82	0.29
VP27B	SR	S	21.00	15.00	08/23/2022	--	0.03	31	2014 Q1	14.00	495.00	70.16	87.00	1.24
VP29B	SR	S	8.90	5.30	08/22/2022	--	0.31	32	2014 Q1	2.50	30.00	12.94	5.75	0.44
VP31B	SR	S	4.10	3.30	08/22/2022	--	0.24	32	2014 Q1	1.60	9.30	4.60	1.70	0.37
VP34B	SR	S	39.00	44.00	08/23/2022	--	-0.13	17	2018 Q3	13.00	100.00	40.88	19.98	0.49
VP35B	SR	S	21.00	12.00	08/23/2022	--	0.40	15	2019 Q1	12.00	58.00	36.33	11.16	0.31
VP37B	SR	S	<0.5	<0.5	08/24/2022	--	--	13	2019 Q3	<0.5	0.83	--	--	--
VP38B	SR	S	1.00	0.70	08/24/2022	--	0.23	13	2019 Q3	<0.5	2.50	1.32	0.66	0.50
VP39B	SR	S	7.10	5.10	08/23/2022	--	0.64	15	2019 Q1	3.20	9.00	6.12	1.55	0.25

Notes:

(1) Subregion designations as follows:

DR = Downtown Reno
DR-DS = Downtown Reno-Downtown Sparks overlap area
DR-SR = Downtown Reno-South Reno overlap area
DS = Downtown Sparks
SR = South Reno
UNK = Unknown
ER = El Rancho
J = Joule
MK = Mill/Kietzke
MK-SR = Mill/Kietzke-South Reno overlap area
DR-ER = Downtown Reno-El Rancho overlap area
Other = Located outside of currently defined subregions

(2) Wells completed in the shallow zone are designated with an S and wells completed in the deep zone with a D.

(3) All Tetrachloroethene (PCE) values are reported in µg/L. A value of <1.0 or <0.50 = PCE not detected at noted reporting limit. When there are more than one analytical result in a quarter, the highest current quarter's result and lowest previous quarter's results are used.

(4) New Max exceeds the previous GMP period of record maximum for the prior 10 years. New Min is below the previous GMP period of record minimum for the prior 10 years.

(5) Absolute values greater than 1 indicates that the PCE result from current quarter minus the most recently sampled previous quarter is more than two times the standard deviation for the GMP period of record starting 10 years prior to the beginning of the current quarter. A positive value indicates that the current quarter increased relative to the previous period. A negative value indicates a decrease relative to the previous period. For the purposes of the quarterly report, absolute values that are > 1 indicate a statistically significant change in the current PCE results compared to the most recent previously sampled quarter.

-- = No Data Available

NA = Not Applicable

NS = Not Sampled

Table A1.3: TCE Statistics for All CTMRD GMP Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results		Criteria for Identifying Potentially Significant Changes in TCE Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter						
Well ID	Subregion[1]	Deep Zone/ Shallow Zone[2]	[TCE][3] Current Quarter (2022 Q4)	[TCE][3] Most Recent Previous Sampled Quarter	Date of Most Recent Previous Sample	New[4] Maximum/ Minimum	Statistical[5] Significance Compared to Most Recent Previous Sampled Quarter	No. of Prior Quarters Sampled	First Quarter Sampled	[TCE] Minimum	[TCE] Maximum	[TCE] Mean	[TCE] Standard Deviation	[TCE] Coefficient of Variation
ARCO6018MW11	MK	S	1.00	1.00	09/27/2022	--	0.00	34	2012 Q4	<0.5	1.10	0.30	0.19	0.63
ARCO6018MW12	MK	S	<0.5	<0.5	09/19/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
ARCO6018MW16	MK	S	<0.5	<0.5	09/15/2022	--	--	36	2012 Q4	<0.5	<0.5	--	--	--
C03	SR	S	<0.5	<0.5	09/28/2022	--	--	28	2013 Q2	<0.5	<0.5	--	--	--
CTM101	DR	D	<0.5	<0.5	09/16/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM102	DR	S	<0.5	<0.5	09/16/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM103	DR	D	<0.5	0.99	09/16/2022	--	**-2.43**	37	2012 Q4	<0.5	0.99	0.31	0.15	0.49
CTM105	MK-SR	S	<0.5	<0.5	09/15/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM106	SR	D	<0.5	<0.5	09/15/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM107	DR-SR	D	<0.5	<0.5	09/15/2022	--	--	39	2012 Q4	<0.5	0.51	--	--	--
CTM10D	DR	D	0.62	1.30	09/16/2022	--	-0.87	37	2012 Q4	<0.5	2.10	1.21	0.39	0.32
CTM11S	MK-SR	S	<0.5	<0.5	09/15/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
CTM121A	ER	S	<0.5	<0.5	09/06/2022	--	--	36	2013 Q3	<0.5	<0.5	--	--	--
CTM127A	MK	S	<0.5	<0.5	07/31/2019	--	--	7	2013 Q2	<0.5	0.82	--	--	--
CTM127B	MK	S	<0.5	<0.5	08/04/2022	--	--	37	2012 Q4	<0.5	12.00	--	--	--
CTM129	DR	S	<0.5	<0.5	08/16/2022	--	--	35	2012 Q4	<0.5	<0.5	--	--	--
CTM12D	DR-SR	D	0.58	<0.5	09/15/2022	--	0.06	38	2012 Q4	<0.5	13.00	2.14	2.58	1.21
CTM130A	MK	S	<0.5	<0.5	07/30/2019	--	--	5	2017 Q2	<0.5	<0.5	--	--	--
CTM130B	MK	S	<0.5	<0.5	08/01/2022	--	--	36	2013 Q3	<0.5	2.40	--	--	--
CTM132A	MK	S	<0.5	<0.5	08/01/2022	--	--	7	2017 Q2	<0.5	<0.5	--	--	--
CTM132B	MK	S	<0.5	<0.5	08/01/2022	--	--	34	2014 Q1	<0.5	<0.5	--	--	--
CTM133A	MK	S	0.71	0.72	08/03/2022	--	-0.01	10	2014 Q2	<0.5	2.50	0.64	0.65	1.02
CTM133B	MK	S	<0.5	0.58	08/03/2022	--	-0.07	34	2014 Q1	<0.5	11.00	3.27	2.32	0.71
CTM134A	MK	S	<0.5	<0.5	08/10/2022	--	--	12	2014 Q2	<0.5	<0.5	--	--	--
CTM134B	MK	S	<0.5	<0.5	08/10/2022	--	--	33	2014 Q1	<0.5	1.26	--	--	--
CTM137	DR	D	0.85	0.77	09/19/2022	--	0.07	39	2012 Q4	<0.5	2.80	1.56	0.61	0.39
CTM13S	MK	S	<0.5	<0.5	09/19/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
CTM142	SR	S	<0.5	<0.5	09/06/2022	--	--	17	2018 Q3	<0.5	<0.5	--	--	--
CTM143A	MK	S	<0.5	NS		--	1st Smpl			<0.5	<0.5	--	--	--
CTM143B	MK	S	<0.5	<0.5	08/02/2022	--	--	7	2021 Q1	<0.5	<0.5	--	--	--
CTM144A	MK	S	0.67	NS		--	1st Smpl			0.67	0.67	--	--	--
CTM144B	MK	S	<0.5	<0.5	08/09/2022	--	--	7	2021 Q1	<0.5	<0.5	--	--	--
CTM145A	MK	S	<0.5	<0.5	08/10/2022	--	--	11	2019 Q1	<0.5	<0.5	--	--	--
CTM145B	MK	S	<0.5	<0.5	08/10/2022	--	--	15	2019 Q1	<0.5	<0.5	--	--	--
CTM146	DR	S	<0.5	<0.5	08/29/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
CTM147	DR	S	<0.5	<0.5	08/16/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
CTM148	DR	S	<0.5	<0.5	08/16/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
CTM149	DR	S	<0.5	<0.5	08/16/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
CTM17D	SR	D	<0.5	<0.5	09/15/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM18S	SR	S	<0.5	<0.5	09/15/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM1S	DR	S	<0.5	<0.5	09/21/2022	--	--	36	2012 Q4	<0.5	<0.5	--	--	--
CTM22D	DR	D	<0.5	<0.5	09/20/2022	--	--	38	2012 Q4	<0.5	0.74	--	--	--
CTM28S	DR	S	<0.5	<0.5	09/21/2022	--	--	35	2012 Q4	<0.5	<0.5	--	--	--
CTM30D	DR	D	1.00	1.10	09/20/2022	--	-0.01	36	2012 Q4	<0.5	18.00	1.86	3.56	1.91
CTM31S	DR	S	<0.5	<0.5	09/21/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM33D	SR	D	<0.5	<0.5	09/27/2022	--	--	27	2012 Q4	<0.5	<0.5	--	--	--
CTM37D	MK	S	<0.5	<0.5	09/16/2022	--	--	38	2012 Q4	<0.5	<0.5	--	--	--
CTM38D	MK-SR	S	<0.5	<0.5	09/15/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
CTM39S	MK-SR	S	<0.5	<0.5	09/15/2022	--	--	38	2012 Q4	<0.5	<0.5	--	--	--
CTM3S	DR	S	<0.5	0.66	09/21/2022	--	-0.28	36	2012 Q4	<0.5	3.80	0.60	0.73	1.21
CTM46	SR	S	<0.5	<0.5	09/26/2022	--	--	38	2012 Q4	<0.5	<0.5	--	--	--
CTM47	SR	S	<0.5	<0.5	09/26/2022	--	--	38	2012 Q4	<0.5	0.71	--	--	--
CTM48	SR	S	<0.5	<0.5	09/26/2022	--	--	38	2012 Q4	<0.5	<0.5	--	--	--
CTM49	SR	S	<0.5	<0.5	09/26/2022	--	--	38	2012 Q4	<0.5	3.70	--	--	--
CTM5	DR	S	<0.5	<0.5	09/21/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM51	SR	S	<0.5	<0.5	09/27/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
CTM52	SR	S	<0.5	<0.5	09/27/2022	--	--	34	2012 Q4	<0.5	<0.5	--	--	--
CTM53	SR	S	<0.5	<0.5	09/27/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
CTM62	SR	S	<0.5	<0.5	09/26/2022	--	--	37	2012 Q4	<0.5	1.50	--	--	--
CTM63	MK	S	<0.5	<0.5	09/27/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
CTM65	DS	S	<0.5	<0.5	09/01/2022	--	--	40	2012 Q4	<0.5	<0.5	--	--	--
CTM66	DS	S	<0.5	<0.5	09/01/2022	--	--	40	2012 Q4	<0.5	<0.5	--	--	--
CTM67	DS	S	<0.5	<0.5	09/01/2022	--	--	39	2012 Q4	<0.5	0.76	--	--	--

Table A1.3: TCE Statistics for All CTMRD GMP Wells Monitored During 2022 Q4

		Screen Position	Current Results	Previous Results		Criteria for Identifying Potentially Significant Changes in TCE Results		Summary Statistics for the Prior 10 Years of the GMP Period of Record to the Current Quarter						
Well ID	Subregion[1]	Deep Zone/ Shallow Zone[2]	[TCE][3] Current Quarter (2022 Q4)	[TCE][3] Most Recent Previous Sampled Quarter	Date of Most Recent Previous Sample	New[4] Maximum/ Minimum	Statistical[5] Significance Compared to Most Recent Previous Sampled Quarter	No. of Prior Quarters Sampled	First Quarter Sampled	[TCE] Minimum	[TCE] Maximum	[TCE] Mean	[TCE] Standard Deviation	[TCE] Coefficient of Variation
CTM68	DS	D	<0.5	<0.5	09/01/2022	--	--	38	2013 Q1	<0.5	<0.5	--	--	--
CTM69	DS	S	<0.5	<0.5	09/01/2022	--	--	38	2012 Q4	<0.5	<0.5	--	--	--
CTM6S	DR	S	<0.5	<0.5	09/20/2022	--	--	36	2012 Q4	<0.5	<0.5	--	--	--
CTM70	DS	S	<0.5	<0.5	09/01/2022	--	--	40	2012 Q4	<0.5	<0.5	--	--	--
CTM75	DS	D	<0.5	<0.5	09/07/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM81	DR	D	<0.5	<0.5	09/20/2022	--	--	39	2012 Q4	<0.5	2.70	--	--	--
CTM83	DR	D	5.70	7.50	09/08/2022	--	-0.70	39	2012 Q4	2.00	7.50	3.90	1.29	0.33
CTM84	DR	D	2.80	2.90	09/08/2022	--	-0.02	39	2012 Q4	2.00	16.00	5.72	3.18	0.56
CTM86	J	S	<0.5	<0.5	09/12/2022	--	--	40	2012 Q4	<0.5	<0.5	--	--	--
CTM87	J	S	<0.5	<0.5	09/19/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
CTM8D	DR	D	0.61	<0.5	09/20/2022	--	0.43	38	2012 Q4	<0.5	2.00	0.93	0.42	0.45
CTM92	SR	D	<0.5	<0.5	09/27/2022	--	--	27	2012 Q4	<0.5	<0.5	--	--	--
CTM93	SR	S	<0.5	<0.5	09/27/2022	--	--	36	2012 Q4	<0.5	<0.5	--	--	--
CTM96	SR	S	<0.5	<0.5	06/27/2022	--	--	36	2012 Q4	<0.5	<0.5	--	--	--
CTM98	SR	D	<0.5	<0.5	09/13/2022	--	--	38	2012 Q4	<0.5	<0.5	--	--	--
CTM99	SR	S	<0.5	<0.5	09/13/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
ELRANCHO	ER	D	<0.5	<0.5	09/07/2022	--	--	12	2013 Q1	<0.5	<0.5	--	--	--
MW10ND	DR	D	<0.5	<0.5	09/22/2022	--	--	38	2012 Q4	<0.5	1.10	--	--	--
MW6ND	DR	D	<0.5	<0.5	09/22/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
MW7NS	DR	S	<0.5	<0.5	10/04/2022	--	--	35	2012 Q4	<0.5	<0.5	--	--	--
MW8ND	DR	D	0.51	0.70	10/04/2022	--	-0.16	36	2012 Q4	<0.5	2.50	1.46	0.58	0.40
USGSLISTON	SR	S	<0.5	<0.5	09/26/2022	--	--	37	2012 Q4	<0.5	<0.5	--	--	--
USGSWOOSTER	SR	S	<0.5	<0.5	09/15/2022	--	--	39	2012 Q4	<0.5	<0.5	--	--	--
VP27B	SR	S	<0.5	<0.5	08/23/2022	--	--	31	2014 Q1	<0.5	9.27	--	--	--
VP29B	SR	S	1.00	0.55	08/22/2022	--	0.20	32	2014 Q1	<0.5	5.60	1.83	1.14	0.62
VP31B	SR	S	<0.5	<0.5	08/22/2022	--	--	32	2014 Q1	<0.5	1.30	--	--	--
VP34B	SR	S	0.80	<0.5	08/23/2022	**New Max**	**4.50**	17	2018 Q3	<0.5	0.51	0.27	0.06	0.23
VP35B	SR	S	<0.5	<0.5	08/23/2022	--	--	15	2019 Q1	<0.5	<0.5	--	--	--
VP37B	SR	S	<0.5	<0.5	08/24/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
VP38B	SR	S	<0.5	<0.5	08/24/2022	--	--	13	2019 Q3	<0.5	<0.5	--	--	--
VP39B	SR	S	<0.5	<0.5	08/23/2022	--	--	15	2019 Q1	<0.5	<0.5	--	--	--

Notes:

(1) Subregion designations as follows:

DR = Downtown Reno
DR-DS = Downtown Reno-Downtown Sparks overlap area
DR-SR = Downtown Reno-South Reno overlap area
DS = Downtown Sparks
SR = South Reno
UNK = Unknown
ER = El Rancho
J = Joule
MK = Mill/Kietzke
MK-SR = Mill/Kietzke-South Reno overlap area
DR-ER = Downtown Reno-El Rancho overlap area
Other = Located outside of currently defined subregions

(2) Wells completed in the shallow zone are designated with an S and wells completed in the deep zone with a D.

(3) All Trichloroethene (TCE) values are reported in µg/L. A value of <1.0 or <0.50 = TCE not detected at noted reporting limit. When there are more than one analytical result in a quarter, the highest current quarter's result and lowest previous quarter's results are used.

(4) New Max exceeds the previous GMP period of record maximum for the prior 10 years. New Min is below the previous GMP period of record minimum for the prior 10 years.

(5) Absolute values greater than 1 indicates that the TCE result from current quarter minus the most recently sampled previous quarter is more than two times the standard deviation for the GMP period of record starting 10 years prior to the beginning of the current quarter. A positive value indicates that the current quarter increased relative to the previous period. A negative value indicates a decrease relative to the previous period. For the purposes of the quarterly report, absolute values that are > 1 indicate a statistically significant change in the current TCE results compared to the most recent previously sampled quarter.

-- = No Data Available

NA = Not Applicable

NS = Not Sampled

Appendix 2 Summary of Laboratory Data QC Review

Table A2.1: Summary of Laboratory Data QC Review

Table A2.1: Summary of Laboratory Data QC Review: Qalifiers & Flags

QAPP Attachment A Criteria: QC Data Review Qualifier Flags														
Work Order	**Sample ID**	**Analyte**	**Target Analyte**	**Reporting Limits (RL)**	**Holding Times**	**Blanks**	**Field Duplicates**	**Surrogate Spikes Recovery**	**Matrix Spike / MSD Recovery**	**Matrix Spike / MSD RPD**	**Lab Control Spike (LCS) Results**	**Lab Qualified**	**Data Usable**	**Comments**
WCW2210051	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2211140	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2211165	GW-CTM134B-M-111522	PCE	Yes	*	--	--	--	--	--	--	--	*	Yes	Work Order reported PCE with "*" qualifier, which indicated the "Sample was analyzed a second time for the compound to be within its calibration, while achieving the lowest possible reporting limits for the other compounds." This was due to a necessary dilution of the field sample. No impact to data; no corrective action necessary.
WCW2211165	GW-CTM144A-M-111522	Chloroform	Yes	*	--	--	--	--	--	--	--	*	Yes	Work Order reported Chloroform with "*" qualifier, which indicated the "Sample was analyzed a second time for the compound to be within its calibration, while achieving the lowest possible reporting limits for the other compounds." This was due to a necessary dilution of the field sample. No impact to data; no corrective action necessary.
WCW2211208	GW-CTM145B-L-111622	Chloroethane and trans-1,2-Dichloroethene	Yes	--	--	--	--	--	--	R	--	R	Yes	Work Order reported Chloroethane RPD (23%) and target compound trans-1,2-Dichloroethene RPD (30%) with "R" flag in MSD sample, which indicated that the lab RPD criteria of 22.9 and 19.2%, respectively, was not met. The QAPP criteria of <30% was met for Chloroethane but was not met for trans-1,2-Dichloroethene. The parent sample result for the target compound trans-1,2-Dichloroethene should be considered estimated ("UJ" qualified), but is acceptable for project use. **Trans-1,2-Dichloroethene** should be reported as **< 1.0 UJ ug/L**.
WCW2211263	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2212002	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2212182	GW-CTM98-L-121322 GW-1A-L1-121322	Vinyl chloride	Yes	--	--	--	--	--	--	R	--	R	Yes	Work Order reported target compound Vinyl chloride with "R" qualifier for the MS/MSD samples, which indicated the result RPD of 36% was greater than the laboratory RPD criteria of 23.9% and the QAPP (Table 1) RPD criteria of 30%; therefore, non-detect results for the associated compound should be considered estimated ("UJ" qualified) in the parent sample. **Vinyl chloride** should be reported as **< 1.0 UJ ug/L**. No corrective action required.
WCW2212199	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2212265	GW-CTM137-L-121922 GW-1A-L1-121922	PCE	Yes	--	--	--	--	--	S	--	--	S	Yes	Work Order reported target compound PCE with "S" qualifier for the MS sample, which indicated the result recovery of 31.0% was less than the laboratory %R criteria of 45.9 to 138% (low bias). The %R result for PCE was greater than the expanded lower acceptance limit of 30% (QAPP, Table 1); therefore, result for the associated compound should be considered estimated ("J" qualified) in the parent sample. **PCE** for **GW-CTM137-L-121922** should be reported as **96 J ug/L** and **PCE** for **GW-1A-L1-121922** should be reported as **81 J ug/L**. No corrective action required.
WCW2212265	GW-CTM137-L-121922 GW-1A-L1-121922	PCE	Yes	*	--	--	--	--	--	--	--	*	Yes	Work Order reported PCE with "*" qualifier, which indicated the "Sample was analyzed a second time for the compound to be within its calibration, while achieving the lowest possible reporting limits for the other compounds." This was due to a necessary dilution of the field sample. No impact to data; no corrective action necessary.

Table A2.1: Summary of Laboratory Data QC Review: Qalifiers & Flags

QAPP Attachment A Criteria: QC Data Review Qualifier Flags														
Work Order	**Sample ID**	**Analyte**	**Target Analyte**	**Reporting Limits (RL)**	**Holding Times**	**Blanks**	**Field Duplicates**	**Surrogate Spikes Recovery**	**Matrix Spike / MSD Recovery**	**Matrix Spike / MSD RPD**	**Lab Control Spike (LCS) Results**	**Lab Qualified**	**Data Usable**	**Comments**
WCW2210051	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2212311	--	--	--	--	--	--	--	--	--	--	--	--	Yes	--
WCW2212327	--	--	--	--	--	--	--	--	--	--	--	R	Yes	Work Order Reported an RPD exceedance with "R" flag for Toluene @ 24% in the MS/MSD samples (>18.3% lab RPD criteria); however, the QAPP RPD criteria is 30%, thus, no impact to the data or corrective action required.

QAPP Attachment B Criteria: QC Data Validation Qualifier Flags													
Work Order	**Sample ID**	**Analyte**	**Target Analyte**	**Initial Calibration**	**Calibration Verification**	**Instrument Tune**	**Internal Standard**	**Matrix Spike / MSD Recovery**	**Lab Control Spike (LCS) Results**			**Data Usable**	**Comments**
WCW2212327	TB-1A-Q1-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM105-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	There was an RPD exceedance with "R" flag for Toluene @ 24% in the MS/MSD samples (>18.3% lab RPD criteria); however, the QAPP RPD criteria is 30%, thus, no impact to the data or corrective action required.
	GW-CTM12D-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM11S-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM39S-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM38D-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM107-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM18S-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--
	GW-CTM106-L-122722	--	--	--	--	--	--	--	--	--	--	Yes	--

Notes:

-- Not applicable

DNQ - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

H - Sample was analyzed outside the 14-day hold time.

LRL - Low Reporting Limit, reported analytes are ND at half of the reporting limit.

MS/MSD - Matrix Spike/Matrix Spike Duplicate

ND - Non-Detect

QA/QC - Quality Assurance/Quality Control

QAPP - Quality Assurance Project Plan, 2018

%D - Percent Difference

%R -Percent Recovery

RL -Reporting Limit

RPD - Relative Percent Difference

RSD -Relative Standard Deviation

S - Spike Recovery outside accepted recovery limits.

(J) The associated detected value is an estimated quantity.

(J-) The associated detected value is an estimated quantity with a low bias.

(J+) The associated detected value is an estimated quantity with a high bias.

(U) The analyte was not detected above the associated limitation value The associated limitation value is either the sample reporting limit or sample detection limit.

(UJ) The analyte was not detected above the associated limitation value. The associated limitation value is an estimate.

(R) The data are unusable (Analyte may or may not be present).