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MEMORANDUM

TO: Mr. Jeff Lux DATE: July 27, 2022

FROM: Brad Brittain Phone: 405-623-8840
Chuck Beatty Phone: 412-716-3701

SUBJECT: Review of CERT Groundwater Gauging Spreadsheet

Background: This memorandum documents the quality review of the CERT Groundwater Gauging spreadsheet in response to correspondence received from the U.S. NRC dated May 18, 2022. The correspondence discussed the following issues:

- Likely errors in the formulae for monitoring wells TMW-19 and TMW-24 during the July 31, 2017 gauging event.
- Anomalous groundwater elevations in monitoring wells 02W21, 02W22, 02W23 and 1373 during 2016 and 2017.
- Likely transposition of the elevations for wells GE-BA1-01 and GE-WA-01.

Results: The entire spreadsheet was carefully checked cell by cell to ensure that all formulae were correct. Errors were noted on sheet 'TMW Wells' where cells Y5 and Y6 (groundwater elevation data for TMW-19 and -24 from the 7/31/22 event) were referencing the incorrect cell. The formulae were corrected.

The formulae for 02W21, 02W22, 02W23 and 1373 were found to be correct. The groundwater levels observed in these wells do appear anomalous. However, the observed values were within two standard deviations of the arithmetic mean; it is no longer possible to determine if the recorded measurements were inaccurate, and the values were not changed.

After confirmation from the Trustee Project Manager that the values had been transposed, the elevations for GE-BA1-01 and GE-WA-01 were corrected.

Two additional errors were noted on the spreadsheet. The incorrect top of casing elevation was used for monitoring wells 02W50 and T-92R. These values were corrected.

Digitally signed by Brad
Brittain
Date: 2022.07.27 15:54:55
-05'00'

Preparer: Brad Brittain

Charles Beatty
Jr.
Digitally signed by Charles
Beatty Jr.
Date: 2022.07.27 17:09:20
-04'00'

Reviewer: Chuck Beatty

Table with columns for Well, To (ft. bgs), Loc. (ft. AMSL), and monthly data for DTW and GW Elev. (ft. AMSL) from December 2012 to July 2022. Includes summary statistics at the bottom.

Well	TD (ft. bgs)
02W03	17.4
02W04	18.35
02W05	18.8
02W06	24.04
02W07	24.88
02W08	26.6
02W11	28.12
02W12	28.07
02W14	22.48
02W15	15.51
02W16	19.8
02W17	24.95
02W18	28.68
02W19	25.1
02W21	26.82
02W22	No Access
02W23	25
02W24	27.86
02W32	23.75
02W33	No Access
02W34	27.7
02W35	28.85
02W36	26.92
02W37	26.7
02W38	25.8
02W43	
02W44	29.2
02W45	30.82
02W62	28.35
02W25	32.46
02W27	22.44
02W30	25.53
02W40	32.38
02W41	30.65
02W42	31.06
02W47	32.38
02W50	35.9
02W51	36.93
02W52	36.57
02W53	21.74
02W48	57.7
02W01	20.5
02W02	20.15
02W09	25
02W10	22.7
02W13	25.73
02W20	25.62
02W26	27.09
02W28	25.65
02W39	25
1342	
1343	25.4
1344	25.7
1361	32.5
1362	30.4
1363	32.08
1364	30.62
1365	31.4
1366	32
1367	31.3
1368	33.3
1369	30.65
1370	30.91
1371	28.2
1372	29.5
1373	27.73
1311	44.8
1312	41.12
1313	40.85
1319A-1	
1319A-2	
1319A-3	
1320	48.1

1322	
1324	36.2
1325	
1326	
1327B	
1329	
1330	
1331	9.28
1333	
1334	
1335A	42.3
1336A	34.56
1337	37.7
1340	34
1347	42.1
1348	38.23
1349	
1350	22.55
1351	17.54
1352	24.5
1353	
1354	33.1
1355	40.51
1356	22.42
1357	30.04
1358	26.69
1359	19.61
1360	12.02
1374	
1375	
1376	
1377	30.22
1378	22.94
1379	23.02
1380	
1381	34.25
1383	50
1385	40.1
1387	22.92
1389	32.9
1393	39.33
1314	52.05
1315R	26.85
1316R	27.25
1319B-1	83.5
1319B-2	
1319B-3	83.44
1319B-4	84.6
1319B-5	
1338	62.75
1341	36.7
1345	68.45
1346	61.8
1382	67.8
1384	68.4
1386	68.15
1388	50.95
1390	60.2
1391	48
1392	67.7
1394	70.72
1319C-1	
1319C-2	
1319C-3	
1321	
1323	
1328	
1332	
1339	
1395	29.41
1396	27.52
1397	27.9
1398	31.3
1399	34.42
1400	24.5
1401	44.42

1402	42.32
1403	33.9
1404	24.65
1405	29
1406	26.34
1407	13.04
1408	13.3
1409	28.3
T-100	30.9
T-101	12.61
T-102	30.89
T-103	30.02
T-51	22.04
T-52	29.25
T-53	28.19
T-54	16.78
T-55	18.16
T-56	17.25
T-57	21.11
T-58	22.75
T-59	29.03
T-60	29.64
T-61	26.22
T-62	21.95
T-63	26.2
T-64	19.87
T-65	24.84
T-66	31.94
T-67	31.95
T-68	31.26
T-69	30.21
T-70R	30.1
T-72	30.21
T-73	30.14
T-74	29.9
T-75	34.75
T-76	30.28
T-77	29.8
T-78	30.08
T-79	29.11
T-81	30.13
T-82	31.48
T-83	28.92
T-84	30.09
T-85	34.09
T-86	30.14
T-87	31.64
T-88	30.37
T-89	34.52
T-90	31.83
T-91	30.14
T-92R	30.97
T-93	32.17
T-94	30.78
T-95	29.97
T-96	29.75
T-97	12.96
T-98	31.89
T-99	31.92
TMW-13	20.83
TMW-19	13.08
TMW-24	28.9
TMW-01	29.3
TMW-02	33.4
TMW-08	28
TMW-18	19.7
TMW-20	17.42
TMW-21	25.05
TMW-25	26.15
TMW-17	48.82
TMW-23	40.15
TMW-05	26.28
TMW-06	19.72
TMW-07	17.75
TMW-09	22.3
GE-WA-01	

MWWA-03	17.19
MWWA-09	16.14
TR-01	32.33
TR-02	33.54
TR-03	26.6
TR-04	33.45
TR-05	32.8
TR-06	30.2
TR-07	30.22
TR-08	26.36
TR-09	27.3
TR-10	27.07

Table with columns for Well ID, TO (ft), TWC (ft), and monthly/quarterly data for Groundwater Elevation (ft) from December 2012 to July 2022. Includes sub-sections for ALLUVA WELLS, SANDSTONE & MUD, and SANDSTONE & SAND.

CIMARRON ENVIRONMENTAL RESPONSE TRUST
2020 Groundwater Gauging Evaluation

Well	TD (ft. bgs)	TOC Elev (ft. AMSL)	December 2012		August 8, 2013		November 15, 2013		March 18, 2015		February 15, 2016		May 6, 2016		August 8, 2016		October 14, 2016		February 6, 2017		April 17, 2017		July 31, 2017		November 6, 2017		February 5, 2018		May 7, 2018		August 20, 2018		November 5, 2018		August 23, 2019		July 20, 2020		July 9, 2021		July 11, 2022		Evaluation of July 2022 Data				
			DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	DTW (ft)	GW Elev (ft AMSL)	Recheck?	Mean	Standard Deviation (σ)
T-100	29.0	940.69							12.47	928.22	12.47	928.22	11.09	929.60	13.64	927.05	12.29	928.40	12.26	928.43	11.60	929.09	12.70	927.99	12.34	928.35	12.50	928.19	12.59	928.10	11.28	929.41	11.08	929.61	12.57	928.12	12.78	927.91	10.42	930.27	13.10	927.59	OK	11.19	0.82	10.54	13.84
T-101	26.8	940.69							12.65	928.04	11.67	929.02	10.72	929.97	12.70	928.32	12.42	928.27	11.60	929.09	12.75	927.94	12.20	928.49	12.56	928.13	12.61	928.08	11.85	928.84	10.92	929.77	10.92	928.77	12.41	928.28	12.55	928.14	9.73	930.96	13.12	927.57	OK	12.05	0.88	10.28	13.81
T-102	27.9	938.77							10.47	928.30	8.55	930.22	7.18	931.59	10.08	928.69	10.24	928.53	10.30	928.47	9.42	929.35	10.05	928.72	9.16	929.61	10.14	928.63	10.03	928.74	10.05	928.72	6.34	932.43	9.51	929.26	10.08	928.69	5.92	932.85	10.57	928.20	OK	9.30	1.45	6.39	12.20
T-103	27.1	939.52							11.21	928.31	7.84	931.68	5.86	933.66	10.66	928.86	11.18	928.34	11.05	928.47	9.97	929.55	10.77	928.75	8.89	930.63	10.52	929.00	10.08	929.44	11.00	928.52	5.78	933.74	9.98	929.54	10.44	929.08	4.58	934.94	10.72	928.80	OK	9.44	2.12	5.20	13.68
T-51	19.5	940.30	11.55	928.75	8.67	931.63	10.59	929.71	11.18	929.12	10.12	930.18	9.12	931.18	10.90	929.40	10.97	929.33	11.18	929.12	10.30	930.00	10.86	929.44	10.75	929.55	11.26	929.04	11.30	929.00	10.73	929.57	7.85	932.45	10.39	929.91	11.08	929.22	7.80	932.50	11.07	929.23	OK	10.38	1.12	8.13	12.63
T-52	27.0	931.88	10.33	928.65	7.43	931.55	9.39	929.59	10.00	928.98	8.86	930.12	7.88	931.10	9.65	928.33	9.78	929.20	9.88	929.00	9.12	929.86	9.62	928.36	9.47	929.51	10.03	928.95	10.05	928.63	9.57	929.41	6.45	932.53	9.13	929.85	9.83	929.15	6.52	932.46	9.85	929.13	OK	8.15	1.16	6.83	11.46
T-53	27.0	938.49	9.98	928.51	7.04	931.45	9.03	929.46	9.94	928.55	8.32	930.17	7.36	931.13	9.29	929.20	9.49	929.00	9.60	928.89	8.78	929.71	9.22	929.27	8.96	929.53	9.61	928.88	9.61	929.88	9.31	929.18	5.66	932.83	8.68	929.81	9.46	929.03	5.99	932.50	9.44	929.05	OK	8.74	1.25	6.23	11.24
T-54	16.0	940.11	11.02	929.09	8.18	931.93	9.75	930.36	10.63	929.48	10.63	929.48	7.63	932.48	10.21	929.90	10.71	929.40	10.65	929.46	9.84	930.27	10.05	930.06	9.44	930.67	10.24	929.87	10.20	929.91	10.70	929.41	4.51	935.60	9.22	930.89	10.15	929.96	5.99	934.12	10.29	929.82	OK	9.50	1.70	6.11	12.90
T-55	16.0	938.57	9.71	928.86	6.82	931.75	8.48	930.09	9.32	929.25	7.36	931.21	6.17	932.40	10.11	928.46	9.45	929.12	9.35	929.22	8.50	930.07	8.91	929.66	8.02	930.55	8.90	929.67	8.80	929.77	9.45	929.12	3.89	930.58	9.04	929.53	4.18	934.39	9.00	929.57	OK	8.17	1.72	4.74	11.61		
T-56	15.0	937.76	8.95	928.81	6.10	931.66	7.87	929.89	8.68	929.08	6.55	931.21	5.23	932.53	10.01	927.75	8.85	928.91	8.70	929.06	7.80	929.96	8.25	929.51	7.20	930.56	8.23	929.53	8.03	929.73	8.78	928.98	4.15	933.61	7.42	930.34	8.30	929.46	3.15	934.61	8.37	929.39	OK	7.53	1.72	4.10	10.96
T-57	19.5	939.31	10.10	929.21	7.03	932.28	8.80	930.51	9.68	929.63	7.82	931.49	6.71	932.60	9.08	930.23	9.23	929.59	9.75	929.56	8.96	930.35	9.00	930.31	8.68	930.63	9.41	929.90	9.38	929.93	9.71	929.60	8.15	931.16	9.14	930.17	5.40	933.01	9.15	930.16	OK	8.51	1.51	5.48	11.53		
T-58	20.0	939.88	10.65	929.23	7.61	932.27	9.33	930.55	10.23	929.65	8.46	931.42	7.29	932.59	9.46	930.42	10.16	929.72	10.33	929.55	9.52	930.36	9.33	930.55	9.33	930.55	10.04	929.84	9.91	929.97	10.17	929.71	5.45	934.43	8.50	931.38	9.70	930.18	6.06	933.82	9.57	930.31	OK	9.06	1.43	6.20	11.91
T-59	27.0	938.00	9.59	928.41	6.57	931.43	8.57	929.43	9.27	928.73	7.66	930.34	6.66	931.34	8.82	929.18	9.11	928.89	9.17	928.83	8.39	929.61	8.70	929.30	8.30	929.70	8.00	929.70	8.00	929.70	9.00	929.00	4.72	933.28	8.13	929.87	8.93	929.07	5.18	933.82	8.91	929.09	OK	8.19	1.36	5.46	10.92
T-60	27.0	937.84	9.44	928.40	6.24	931.60	8.36	929.48	9.10	928.74	7.03	930.81	5.82	932.02	8.64	929.20	9.06	928.78	9.05	928.79	8.22	929.62	8.54	929.30	7.70	930.14	8.71	929.13	8.61	929.23	8.95	928.89	3.87	933.97	8.40	929.44	8.66	929.18	4.45	933.39	8.62	929.22	OK	7.87	1.58	4.72	11.03
T-61	25.0	937.94	9.77	928.17	6.35	931.59	8.70	929.24	9.43	928.51	6.87	931.07	5.38	932.56	8.91	929.03	9.40	928.54	9.30	928.64	8.51	929.43	8.90	929.04	7.59	930.35	8.95	928.99	8.66	929.28	9.30	928.64	4.04	933.90	8.14	929.80	8.89	929.05	6.99	933.85	8.89	929.05	OK	8.00	1.74	4.51	11.49
T-62	19.8	941.85	11.78	929.38	8.67	932.49	10.40	930.76	11.33	929.83	9.40	931.76	8.10	933.06	10.47	930.69	11.25	929.91	11.45	929.71	10.65	930.51	10.35	930.61	11.15	930.01	11.08	930.08	11.15	930.01	6.96	934.20	9.54	931.62	10.85	930.31	7.10	934.06	10.53	930.63	OK	10.14	1.41	7.31	12.96		
T-63	23.8	940.51	11.23	929.28	8.21	932.30	9.88	930.63	10.77	929.74	9.00	931.51	7.82	932.69	10.01	930.50	10.71	929.80	10.88	929.63	10.10	930.41	9.87	930.64	9.70	930.81	10.61	929.90	10.53	929.98	10.70	929.81	6.29	934.22	9.07	931.44	10.30	930.21	6.63	933.88	10.03	930.48	OK	9.62	1.39	6.84	12.40
T-64	17.5	943.54	14.05	929.49	10.98	932.56	12.62	930.92	13.59	929.95	11.42	932.12	10.16	933.38	12.69	930.85	13.49	930.05	13.63	929.91	12.95	930.59	12.61	930.93	12.81	930.73	13.38	930.16	13.20	930.34	13.55	929.99	9.36	934.18	11.74	931.80	13.06	930.48	9.21	934.33	12.77	930.77	OK	12.36	1.43	9.51	15.22
T-65	22.5	941.06	DRY	DRY	8.66	932.40	10.37	930.69	11.30	929.76	9.45	931.61	8.26	932.80	10.41	930.65	11.17	929.89	11.36	929.70	10.62	930.44	10.30	930.76	10.51	930.55	11.35	929.91	11.00	930.06	11.16	929.90	6.90	934.16	9.52	931.54	10.74	930.32	7.21	933.85	10.50	930.56	OK	10.03	1.36	7.32	12.75
T-66	30.0	940.03	10.77	929.26	7.74	932.29	9.43	930.60	10.32	929.71	8.60	931.43	7.44	932.59	9.50	930.53	10.22	929.81	10.40	929.63	9.68	930.35	9.35	930.68	9.55	930.48	10.18	929.85	10.10	929.93	10.20	929.83	5.91	934.12	8.61	931.42	9.85	930.18	6.30	933.73	9.36	930.67	OK	9.18	1.36	6.48	11.89
T-67	29.0	940.55	11.26	929.29	8.19	932.36	9.90	930.65	10.81	929.74	9.10	931.45	7.89	932.66	9.94	930.61	10.71	929.84	10.92	929.63	10.15	930.40	9.80	930.65	10.05	930.50	10.67	929.88	10.60	929.95	11.67	928.88	6.92	933.63	9.07	931.48	10.33	930.22	6.78	933.77	10.03	930.52	OK	9.74	1.36	7.03	12.47
T-68	27.8	939.92	10.83	929.09	7.81	932.11	9.58	930.34	10.37	929.55	8.95	930.97	7.84	932.08	9.67	930.25	10.21	929.71	10.44	929.48	9.67	930.25	9.60	930.32	9.72	930.20	10.35	929.5																			

