July 8, 2024 *Via Email:kgork@ph.lacounty.gov*

Karen Gork
Chief Environmental Health Specialist
Los Angeles County Department of Public Health
5050 Commerce Drive
Baldwin Park, California 91706

Subject: Chiquita Canyon Landfill (19-AA-0052) Review - Mitigation Measure No. 5, Carbon Monoxide and Hydrogen Reading Summary, dated June 6, 2024

Dear Mrs. Gork:

CalRecycle staff are providing this letter in response to your June 10, 2024, request for technical assistance in reviewing Chiquita Canyon Landfill's (CCL) Carbon Monoxide and Hydrogen Reading Summary Report dated June 6, 2024, which was submitted in accordance with the Local Enforcement Agency's (LEA's) Directive No. 5.

The following comments are provided to the Los Angeles County Department of Public Health [Local Enforcement Agency (LEA)] as assistance to support the program in carrying out its responsibilities on permitted disposal sites. The final determination as to the comments to be provided to the responsible party is within the sole purview of the LEA, acting within the parameters of its discretion, in accordance with its vested authority under its certification as defined in Title 14, California Code of Regulations (14 CCR), Division 7, 27 CCR, Division 2, Subdivision 1 (Section 20005 et seq.), and Division 30 of the Public Resources Code.

Analysis of Presented Data

According to the CCL, the landfill's Reaction Committee reviews the data monthly to determine whether the boundaries of the Reaction Area, as defined in Condition 9(a) of the Stipulated Order for Abatement with the South Coast Air Quality Management District (SCAQMD), have changed. The Reaction Committee uses the following criteria to determine the estimated boundary of the reaction area:

- Landfill gas (LFG) wellhead temperatures more than approximately 160F.

- Poor gas quality (defined as methane levels of less than 30 percent) in conjunction with methane-to-carbon dioxide (CH4:CO2) ratios less than 1.0.
- The concentration of hydrogen (H2) in the LFG measured greater than 2 percent by volume.
- Accelerated settlement of the landfill surface, defined as approximately 6 inches or greater within a 60-day period, and observable cracks in the landfill soil cover.
- First-hand observations of the engineering, construction, and/or operations and maintenance field personnel who are on-site related to:
  1) Atypical excess leachate quantities (presence and quantity of liquids);
  2) Instances of pressurized liquids emitting from the landfill surface, from boreholes during drilling, and from LFG wells; and/or,
  3) The characteristics of the odors originating from the select areas of the waste footprint (often described as “chemical-like” and distinctly different from typical LFG or landfill working face odors).
- Observations of subsurface waste conditions and characteristics as noted on borehole drilling logs for recently installed new wells and/or Temperature Monitoring Probes (TMPs).
- Initial subsurface temperatures recorded for in-situ waste when the TMPs were installed in April 2024

Using the landfill’s data summarized in the aforementioned report, past settlement rates, fissure reports, drilling logs, TMP data, field observations, odor data, LFG data, and other factors, there are three distinct areas of concern: the main reaction (as reported by CCL) and two other newly identified smaller reaction areas. The data also indicates that the main reaction area is larger than the CCL reported but does not indicate that the reaction is expanding at this point.

Recommendations for LEA Consideration

The difference in the estimation of the main reaction area is how the data is being evaluated to determine the reaction boundary. Attachment 2 is my revised map identifying the three areas of concern with red dashed lines. The area to the northeast was added due to the high temperature and carbon monoxide (CO) level in CV-113 and other wells in this area, along with the high hydrogen (H2) readings. The most concerning data point the CCL did not address was the high temperature (i.e., 195F) in horizontal well H-1403W. This horizontal well is significantly to the south and outside of the reaction area identified by the CCL. Since H-1403W is a horizontal well and not a vertical point, I suggest that the LEA require the horizontal location of piping to be identified on the next map and have the CCL estimate where the high temperature is most likely occurring.

Carbon monoxide (CO) is a key indicator of the reaction/smolder activity level in each area. I recommend that the LEA advise the Reaction Committee to include CO

concentrations of more than 1,500 ppm as a criterion in determining the estimated boundary of the reaction area.

To appropriately monitor the reaction areas, I recommend the LEA require the CCL to provide the locations of 18 wells (CV-24002, CV-24003, CV-24007, CV-24017, CV-24053, CV-24055, CV-24065, CV-24071, CV-24075, CV-24077, CV-24079, CV-24082, CV-24083, CV-24088, CV-24095, CV-24096, CV-24097, and CV-24098) on the site map. These wells were inadvertently left off the site map in the Directive #5 submittal.

I recommend the LEA consider releasing the 44 horizontal wells highlighted in Attachment 1 from Directive #5 because the gas and temperature are collected over hundreds of linear feet at a single depth. For historical purposes, a few horizontal wells may be sampled to observe carbon monoxide and temperature fluctuations over time. Currently, I recommend the LEA require the CCL to continue to sample eight horizontal wells (H1403W, H1560S, H-1753S, H-1770N, H-1774S, H-1962A, H-2165 and H-2273W). Other wells may be included later depending on the next data submission.

I recommend that the LEA add an additional 20 vertical wells to the sampling protocols. Each new well is highlighted in Attachment 1. I also recommend that 40 wells be sampled for VOCs by method TO-15 next month. The sampling results should be presented in a separate letter report with the appropriate discussion, tables, QA/QC, and methods and signed by a registered professional.

I recommend the LEA require the CCL to collect down well temperatures at 34 wells identified in Attachment 1 per the New Source Performance Standards (NSPS) requirement to confirm the gas wellhead temperature readings.

I recommend the LEA require the CCL to submit the settlement/heat map, like the example provided for May 2024 (Attachment 3), with the next submittal. The CCL should submit the earliest heat map data they have for each month until August 2024. The topographic maps should show 2-foot contour intervals, if possible.

Finally, I want to stress to the LEA that the CCL should be required to limit the oxygen (O2) to less than 2 percent in all interior wells. As indicated in Attachment 1, the CCL reported 14 wells exceeding 5 percent O2 and 27 wells exceeding 2 percent O2. High O2 levels increase the likelihood of pre-combustion and smoldering events.

Please do not hesitate to contact me by telephone at (916) 341-6356 or by email at Todd.Thalhamer@Calrecycle.ca.gov if you have comments or questions.

Sincerely,



Todd Thalhamer, P.E.
Senior Waste Management Engineer
Engineering Support Branch

Attachments

1. Sampling Criteria for CCL Gas Wells for the Month of August 2024
2. Revised Reaction Area Map for CCL
3. Example of May 2024 Settlement Map

Cc Via Email:

Shikari Nakagawa-Ota, Los Angeles County Department of Public Health (sota@ph.lacounty.gov)

Jeff Lindberg California Air Recourses Board (jeff.lindberg@arb.ca.gov)

Vanessa Aguila, California Air Resources Board (vanessa.aguila@arb.ca.gov)

Terrence Mann, South Coast Air Quality Management District (tmann@aqmd.gov)

Larry Israel, South Coast Air Quality Management District (lisrael@aqmd.gov)

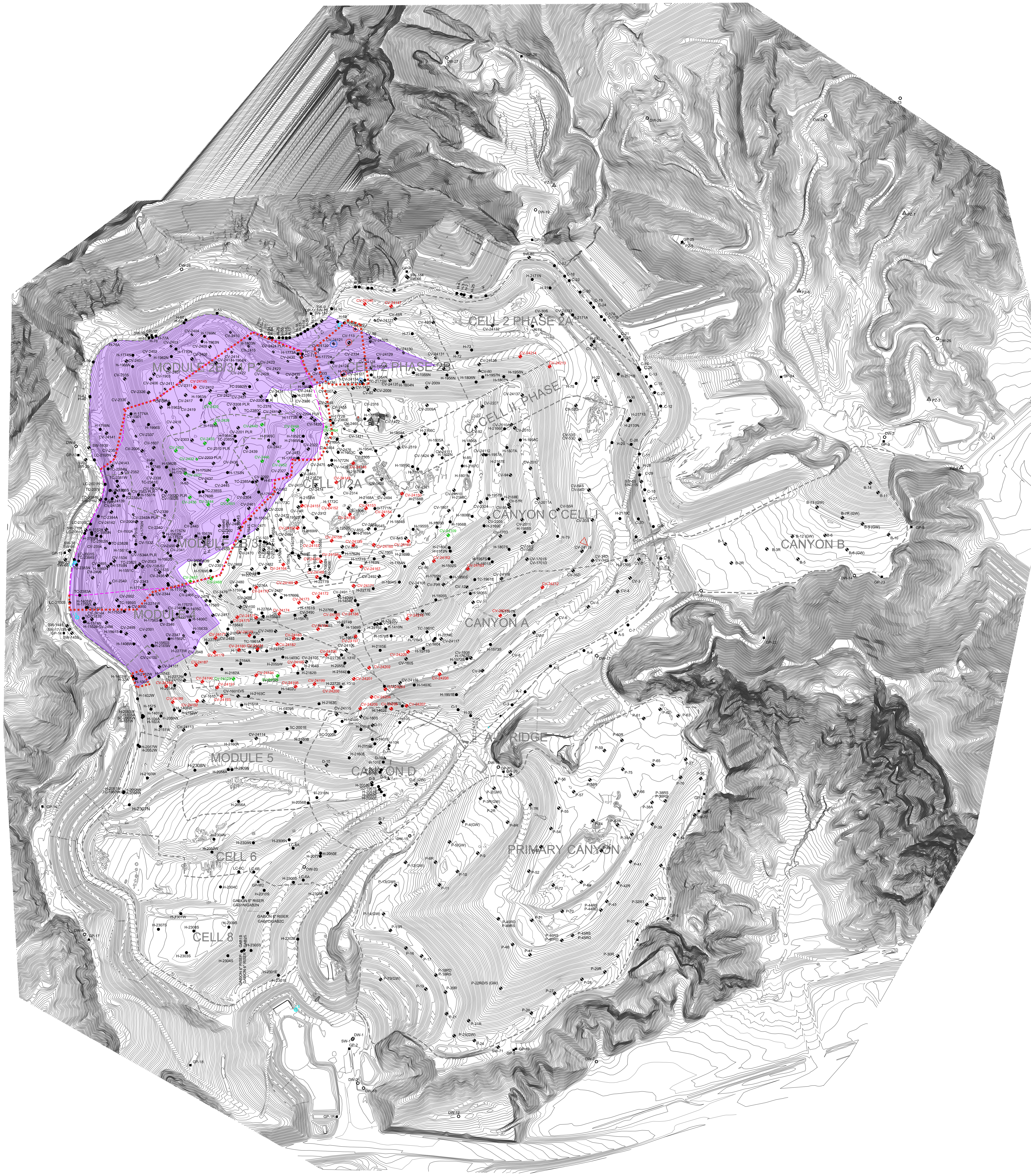
Jenny Newman, Los Angeles Regional Water Quality Control Board (Jenny.Newman@waterboards.ca.gov)

Douglas Cross, Los Angeles Regional Water Quality Control Board (dcross@waterboards.ca.gov)

Katherine Butler, Department of Toxic Substances Control (Katherine.Butler@dtsc.ca.gov)

Thanne Berg, United States Environmental Protection Agency (berg.thanne@epa.gov)

Ben Castellana, United States Environmental Protection Agency (castellana.ben@epa.gov)



N

GRAPHIC SCALE

200 100 0 200 400 600

SCALE: 1"=200'

LEGEND

1150	TOPOGRAPHIC CONTOUR
	EXISTING CELL LIMITS (APPROXIMATE)
CV-XX	EXISTING LFG VERTICAL EXTRACTION WELL
CV-XX PLR	EXISTING LFG VERTICAL EXTRACTION WELL - PRESSURIZED LEACHATE RELEASE
SW-XX	EXISTING SOIL VAPOR EXTRACTION WELL
CV-XX	EXISTING LFG VERTICAL EXTRACTION WELL BELOW-GRADE
H-XX	EXISTING HORIZONTAL WELLS
GP-XX	EXISTING PERIMETER MIGRATION PROBE
DW-XX	EXISTING DETECTION WELL
DW-XX	EXISTING PIEZOMETER
LS-XX	EXISTING LEACHATE MANAGEMENT SUMP
CV-XX	PROPOSED LFG VERTICAL EXTRACTION WELL
CV-XX	PROPOSED LFG VERTICAL EXTRACTION WELL (SOFA)
	CAPPING LIMITS
	REACTION AREA BOUNDARY (APPROXIMATE) - BASED ON DATA REVIEW

GENERAL DRAWING NOTES:

1. EXISTING TOPOGRAPHIC SURVEY INFORMATION SHOWN WAS PROVIDED BY PROPELLOR. AERIAL PHOTOGRAPHY DATED JANUARY 16, 2024.
2. NORTH ARROW SHOWN HERE IS REFERENCE TO THE CALIFORNIA STATE PLANE ZONE V COORDINATE SYSTEM, NAD 83.
3. THE LOCATION OF ANY EXISTING PIPING, VALVES, TIE-IN LOCATIONS AND OTHER FEATURES ARE APPROXIMATE AND SHOULD BE USED FOR INFORMATION PURPOSES ONLY. ACTUAL FIELD CONDITIONS MAY VARY AND SUBJECT TO CHANGE BASED ON FUTURE FILL OPERATIONS, WASTE PLACEMENT, TOPOGRAPHIC FEATURES, AND OTHER SITE-SPECIFIC FACTORS.
4. EXISTING GCCS AS-BUILT DATED MAY 31, 2024.

NO.	REVISION	DATE

SHEET TITLE: EXISTING GCCS MAP - LFG VERTICAL EXTRACTION WELLS, HORIZONTAL COLLECTOR WELLS, AND GAS AND GROUND WATER MONITORING PROBES

PROJECT TITLE: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

CLIENT: CHIQUITA CANYON LANDFILL CASTAIC, CALIFORNIA

SCS ENGINEERS
ENVIRONMENTAL CONSULTANTS
3900 KILROY AIRPORT WAY, SUITE 100
LONG BEACH, CA 90806
PH. (562) 426-9544

PROJ. NO. 01204123.35	DWN. BY: AEK
DSN. BY: JH	CHK. BY: WCH/SRM
ACAD FILE: F:\ENGINEERS	APP. BY: -

DATE: 06/06/2024

SCALE: AS SHOWN

C:\Users\akarram\Desktop\Work\Chiquita\CCL MASTER GCCS & LMS ASBUILT AK_2024-06-06.dwg Jun 06, 2024 - 5:24pm By: akarram

ATTACHMENT 1

Well Number	Date Sampled	Date Analyzed	Carbon Dioxide (%)	Oxygen (%)	Nitrogen (%)	Methane (%)	CH4:CO2 ratio	Hydrogen (%)	Carbon Monoxide (ppm)	Wellhead Temperature (F)	August 2024 Down well Temp Monitoring	August 2024 Fixed Gas CH4, O2, CO2	August 2024 CO	August 2024 H2	August 2024 VOC (TO-15)	Comments
H-1403W	4/24/2024	4/25/2024	36.76	2.64	9.40	50.12	1.36	ND	163.0	192.5	N/A	Yes	Yes	Yes	Yes	Horizontal Well. Show the location of horizontal well on map/High Temp.
CV-100	4/19/2024	4/20/2024	48.79	2.12	7.27	39.05	0.80	1.51	ND	191.1	Yes	Yes	Yes	Yes	Yes	
CV-103	4/24/2024	4/25/2024	40.99	1.22	3.94	51.76	1.26	0.58	2,280.0	178.2	Yes	Yes	Yes	Yes	Yes	
CV-108-52	4/29/2024	4/30/2024	55.79	1.92	7.98	27.64	0.50	3.75	1,560.0	175.5	Yes	Yes	Yes	Yes	Yes	
CV-113	5/2/2024	5/3/2024	54.59	0.24	1.06	40.60	0.74	ND	4,210.0	175.3	Yes	Yes	Yes	Yes	Yes	
CV-1532	4/29/2024	4/30/2024	43.28	2.93	11.68	37.66	0.87	1.81	2,895.0	162.4	Yes	Yes	Yes	Yes	Yes	
CV-1532A	4/29/2024	4/30/2024	58.51	2.59	10.40	11.13	0.19	12.57	ND	160.3	Yes	Yes	Yes	Yes	Yes	
H-1560S	4/24/2024	4/25/2024	56.42	1.95	6.93	32.86	0.58	ND	276.0	151.0	N/A	Yes	Yes	Yes	Yes	Horizontal Well. Changed from CV to H in spreadsheet.
CV-1535	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	5.63	815.0	151.0	Yes	Yes	Yes	Yes	Yes	
CV-1902A	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	15.27	368.0	140.1	Yes	Yes	Yes	Yes	Yes	
CV-2001	4/24/2024	4/25/2024	38.94	6.63	23.93	27.39	0.70	4.53	3,440.0	139.9	Yes	Yes	Yes	Yes	Yes	
CV-2002	4/29/2024	4/30/2024	43.08	0.89	5.72	48.07	1.12	0.33	1,940.0	139.4	Yes	Yes	Yes	Yes	Yes	
CV-2007	5/2/2024	5/3/2024	67.35	0.44	1.88	28.54	0.42	0.16	602.0	137.8	Yes	Yes	Yes	Yes	Yes	
CV-2202	4/18/2024	4/19/2024	46.61	2.97	9.81	37.96	0.81	1.59	2,870.0	133.9	Yes	Yes	Yes	Yes	Yes	
CV-2301	4/29/2024	4/30/2024	44.99	6.31	25.73	4.14	0.09	15.82	4,440.0	133.3	Yes	Yes	Yes	Yes	Yes	
CV-2302	5/2/2024	5/3/2024	48.49	1.19	4.91	42.22	0.87	0.99	2,350.0	131.4	Yes	Yes	Yes	Yes	Yes	
CV-2303	5/10/2024	5/11/2024	36.46	11.42	41.12	2.66	0.07	0.65	1,880.0	130.5	Yes	Yes	Yes	Yes	Yes	
CV-2305	5/2/2024	5/3/2024	55.00	0.40	1.76	37.00	0.67	3.37	15.3	130.2	No	Yes	Yes	Yes	No	
CV-2312	5/2/2024	5/3/2024	77.80	0.21	0.84	7.57	0.10	10.57	2,480.0	129.0	Yes	Yes	Yes	Yes	Yes	
CV-2314	5/2/2024	5/3/2024	46.35	0.50	2.07	46.12	1.00	2.46	165.0	128.4	No	Yes	Yes	Yes	No	
CV-2315	5/2/2024	5/3/2024	75.60	0.24	1.02	13.78	0.18	6.51	1,820.0	127.8	Yes	Yes	Yes	Yes	Yes	
CV-2328	5/2/2024	5/3/2024	64.19	1.51	6.17	20.66	0.32	4.46	112.0	126.2	No	Yes	Yes	Yes	No	
CV-2341	4/18/2024	4/19/2024	70.00	ND	ND	22.90	0.33	7.40	582.0	125.6	Yes	Yes	Yes	Yes	No	
CV-2344	4/18/2024	4/19/2024	76.50	ND	ND	22.10	0.29	1.93	52.5	125.3	No	Yes	Yes	Yes	No	
CV-2345	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	0.47	46.1	125.1	No	Yes	Yes	Yes	No	
CV-2346	4/18/2024	4/19/2024	62.90	ND	ND	19.10	0.30	5.49	198.0	125.0	No	Yes	Yes	Yes	No	
CV-2347	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	0.85	21.3	124.6	No	Yes	Yes	Yes	No	
CV-2348	4/18/2024	4/19/2024	48.90	ND	ND	44.90	0.92	0.47	190.0	124.1	No	Yes	Yes	Yes	No	
CV-2349	4/29/2024	4/30/2024	65.97	2.69	10.83	13.72	0.21	3.79	107.0	124.1	No	Yes	Yes	Yes	No	
CV-2350	4/29/2024	4/30/2024	63.98	0.36	1.75	24.26	0.38	6.51	2,060.0	124.0	Yes	Yes	Yes	Yes	Yes	
CV-2351	4/29/2024	4/30/2024	48.02	8.15	30.65	5.37	0.11	4.21	2,070.0	122.1	Yes	Yes	Yes	Yes	Yes	
CV-2352	4/18/2024	4/19/2024	64.62	2.20	8.66	1.83	0.03	16.23	104.0	122.1	Yes	Yes	Yes	Yes	No	
CV-2354	4/29/2024	4/30/2024	51.38	4.68	19.63	13.60	0.26	7.63	30.5	121.7	No	Yes	Yes	Yes	No	
CV-2353	4/29/2024	4/30/2024	68.46	0.86	3.61	1.93	0.03	18.67	142.0	121.7	Yes	Yes	Yes	Yes	No	
CV-24002	5/2/2024	5/3/2024	61.44	0.33	1.63	33.84	0.55	ND	162.0	121.4	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24003	4/18/2024	4/19/2024	62.90	ND	ND	31.60	0.50	1.29	23.8	120.4	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24007	4/18/2024	4/19/2024	72.30	ND	ND	27.70	0.38	1.65	3,390.0	120.1	Yes	Yes	Yes	Yes	Yes	Missing Location on Map. Need to update.
CV-24017	5/2/2024	5/3/2024	72.66	0.40	2.39	13.48	0.19	7.68	2,470.0	119.9	Yes	Yes	Yes	Yes	Yes	Missing Location on Map. Need to update.
CV-24055	5/2/2024	5/3/2024	57.93	0.30	6.00	30.52	0.53	2.82	22.4	119.3	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24053	4/30/2024	5/1/2024	63.29	1.77	5.26	26.32	0.42	2.00	1,210.0	119.3	Yes	Yes	Yes	Yes	Yes	Missing Location on Map. Need to update.
CV-24071	5/2/2024	5/3/2024	51.24	0.98	4.06	38.95	0.76	1.35	529.0	118.8	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24065	5/2/2024	5/3/2024	61.67	0.23	1.17	33.90	0.55	0.60	2,390.0	118.8	Yes	Yes	Yes	Yes	Yes	Missing Location on Map. Need to update.
CV-24075	5/2/2024	5/3/2024	79.56	0.24	0.98	4.20	0.05	11.47	6.7	118.5	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24077	5/2/2024	5/3/2024	56.90	0.37	1.83	38.15	0.67	0.66	376.0	118.3	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24079	5/2/2024	5/3/2024	54.54	4.04	21.51	17.27	0.32	0.78	22.2	117.9	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24082	5/2/2024	5/3/2024	57.50	0.23	1.27	37.35	0.65	0.52	303.0	117.4	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24083	5/2/2024	5/3/2024	54.83	1.21	5.85	32.99	0.60	1.86	28.7	117.3	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24088	5/2/2024	5/3/2024	54.54	0.24	0.99	40.12	0.74	0.47	27.3	117.0	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24095	4/29/2024	4/30/2024	48.43	2.24	9.13	36.13	0.75	0.34	1,410.0	115.4	Yes	Yes	Yes	Yes	Yes	Missing Location on Map. Need to update.
CV-24096	4/29/2024	4/30/2024	40.80	0.32	1.37	55.07	1.35	ND	44.4	114.9	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24097	4/29/2024	4/30/2024	43.55	1.80	7.46	45.09	1.04	ND	108.0	113.4	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24098	4/24/2024	4/25/2024	45.68	1.66	5.84	44.77	0.98	ND	116.0	113.1	Pending	Unknown	Location			Missing Location on Map. Need to update.
CV-24100	5/2/2024	5/3/2024	49.39	1.77	7.16	36.50	0.74	1.43	17.8	112.6	No	Yes	Yes	Yes	No	Next to highest reported temperature of 192.5F at H-1403W.
CV-24101	5/2/2024	5/3/2024	30.14	6.49	34.36	25.65	0.85	0.36	122.0	112.5	Yes	Yes	Yes	Yes	Yes	Next to highest reported temperature of 192.5F at H-1403W.
CV-24102	5/2/2024	5/3/2024	42.91	0.21	0.86	52.57	1.23	0.53	25.7	112.1	No	Yes	No	No	No	
CV-24121	5/2/2024	5/3/2024	74.01	0.37	1.57	7.61	0.10	11.56	243.0	112.0	No	Yes	Yes	Yes	No	
CV-24122	5/2/2024	5/3/2024	42.41	0.27	1.06	51.22	1.21	0.53	2,950.0	111.5	Yes	Yes	Yes	Yes	Yes	
CV-24123	5/2/2024	5/3/2024	42.67	1.12	5.42	45.46	1.07	1.31	53.9	111.3	No	Yes	No	No	No	
CV-24126	5/2/2024	5/3/2024	55.43	0.27	1.62	34.78	0.63	4.57	36.3	111.2	No	Yes	No	No	No	
CV-24127	5/2/2024	5/3/2024	67.14	0.31	1.31	21.30	0.32	7.74	1,890.0	110.9	Yes	Yes	Yes	Yes	Yes	
CV-24134	5/2/2024	5/3/2024	47.60	1.61	6.40	39.24	0.82	2.13	79.4	109.8	No	Yes	No	No	No	
CV-24138	4/18/2024	4/19/2024	40.10	8.90	ND	10.60	0.26	6.61	2,295.0	109.4	Yes	Yes	Yes	Yes	Yes	

ATTACHMENT 1

Well Number	Date Sampled	Date Analyzed	Carbon Dioxide (%)	Oxygen (%)	Nitrogen (%)	Methane (%)	CH4:CO2 ratio	Hydrogen (%)	Carbon Monoxide (ppm)	Wellhead Temperature (F)	August 2024 Down well Temp Monitoring	August 2024 Fixed Gas CH4, O2, CO2	August 2024 CO	August 2024 H2	August 2024 VOC (TO-15)	Comments
CV-24139	4/18/2024	4/19/2024	70.19	0.42	1.83	2.83	0.04	ND	ND	109.3	Yes	Yes	Yes	Yes	Yes	
CV-24139	4/29/2024	4/30/2024	ND	ND	ND	ND	0.00	17.88	68.6	109.1	No	Yes	Yes	Yes	No	
CV-24140	4/18/2024	4/19/2024	71.71	0.29	1.23	4.85	0.07	ND	339.0	109.0	No	Yes	Yes	Yes	Yes	
CV-24140	4/29/2024	4/30/2024	ND	ND	ND	ND	0.00	16.01	49.9	108.8	No	Yes	Yes	Yes	No	
CV-24141	4/29/2024	4/30/2024	9.11	18.96	68.44	1.72	0.19	0.76	70.5	108.2	No	Yes	Yes	Yes	No	
CV-24142	4/18/2024	4/19/2024	73.60	0.98	4.02	10.57	0.14	ND	15.7	106.4	No	Yes	Yes	Yes	Yes	
CV-24142	5/2/2024	5/3/2024	ND	ND	ND	ND	0.00	14.70	134.0	106.0	No	Yes	Yes	Yes	No	
CV-24143	4/29/2024	4/30/2024	20.71	14.83	54.97	0.84	0.04	5.23	567.0	104.9	Yes	Yes	Yes	Yes	Yes	
CV-24144	4/24/2024	4/25/2024	4.79	19.78	70.83	4.48	0.94	ND	247.0	103.9	No	Yes	No	No	No	
CV-2484	4/28/2024	4/29/2024	53.58	2.60	8.54	33.86	0.63	0.14	54.8	103.8	No	Yes	No	No	No	
CV-2499	4/24/2024	4/25/2024	53.94	2.48	8.83	32.72	0.61	0.14	56.0	103.8	No	Yes	No	No	No	
H-102A	4/24/2024	4/25/2024	37.63	1.54	5.41	54.04	1.44	ND	ND	103.6	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-101W	4/24/2024	4/25/2024	24.29	12.61	45.65	16.52	0.68	ND	511.0	103.6	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-104A	4/24/2024	4/25/2024	3.53	19.38	69.99	5.76	1.63	ND	279.0	103.5	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1401W	4/24/2024	4/25/2024	38.84	1.11	3.76	54.48	1.40	ND	121.0	103.3	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1405C	4/18/2024	4/19/2024	49.50	1.10	ND	32.00	0.65	0.39	228.0	102.9	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1405E	4/17/2024	4/18/2024	70.60	1.73	6.09	10.68	0.15	9.34	348.0	101.3	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1406W	4/24/2024	4/25/2024	34.07	3.08	11.27	49.45	1.45	ND	112.0	101.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1408W	4/24/2024	4/25/2024	34.07	3.38	22.28	38.79	1.14	0.13	161.0	98.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1563N	4/18/2024	4/19/2024	50.80	ND	ND	49.20	0.97	0.14	13.9	97.1	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1563S	4/18/2024	4/19/2024	47.30	0.80	ND	45.70	0.97	0.29	ND	94.8	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1564N	4/17/2024	4/18/2024	70.61	1.58	5.77	10.91	0.15	9.80	7.4	94.5	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1565C	4/25/2024	4/26/2024	49.54	1.07	3.50	43.11	0.87	0.84	340.0	93.8	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1574S	4/24/2024	4/25/2024	30.18	1.60	41.61	24.71	0.82	0.59	83.1	93.4	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1574W	4/24/2024	4/25/2024	38.63	2.25	7.91	49.22	1.27	ND	ND	92.5	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1575	4/24/2024	4/25/2024	37.21	1.88	6.66	52.79	1.42	ND	143.0	92.4	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1753N	5/6/2024	5/7/2024	48.65	2.31	7.94	39.57	0.81	0.54	8.8	92.1	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1752N	5/7/2024	5/8/2024	56.09	1.45	4.60	36.58	0.65	0.18	7.0	92.1	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1753S	4/20/2024	4/21/2024	44.97	1.89	6.39	42.30	0.94	2.48	1,290.0	91.9	N/A	No	No	No	No	Horizontal Well. Monitor under Directive 5.
H-1754N	5/5/2024	5/6/2024	75.89	2.62	7.97	8.13	0.11	4.58	19.7	91.4	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1754S	4/23/2024	4/24/2024	41.73	3.19	10.83	42.34	1.01	0.79	ND	90.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1756S	4/18/2024	4/19/2024	66.10	ND	ND	33.90	0.51	0.60	61.9	90.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1757S	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	0.74	5.1	89.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1758N	4/21/2024	4/22/2024	44.93	1.82	6.03	45.84	1.02	0.20	1,870.0	87.6	N/A	Yes	Yes	Yes	Yes	Horizontal Well - Released from Directive 5 sampling requirements.
H-1760N	4/26/2024	4/27/2024	68.49	2.10	7.35	20.73	0.30	0.40	435.0	87.2	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1769B	5/4/2024	5/5/2024	44.48	4.59	16.59	32.26	0.73	0.65	10.8	86.7	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1770A	5/11/2024	5/12/2024	54.27	2.25	7.57	33.83	0.62	1.20	13.5	86.4	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1770N	4/18/2024	4/19/2024	79.40	ND	ND	15.60	0.20	11.70	1,340.0	86.3	N/A	Yes	Yes	Yes	Yes	Horizontal Well. Monitor under Directive 5.
H-1770S	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	0.15	15.3	86.2	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1774S	4/18/2024	4/19/2024	1.10	21.00	ND	0.20	0.18	ND	1,660.0	86.0	N/A	Yes	Yes	Yes	Yes	Horizontal Well. Monitor under Directive 5.
H-1962A	4/17/2024	4/18/2024	35.58	7.31	38.29	18.25	0.51	ND	1,130.0	85.9	N/A	No	No	No	No	Horizontal Well. Monitor under Directive 5.
H-1964C	5/1/2024	5/2/2024	70.76	2.18	7.37	4.17	0.06	14.39	40.8	85.2	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1964S	4/22/2024	4/23/2024	42.42	4.47	16.86	34.61	0.82	0.43	8.2	83.1	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1965C	5/9/2024	5/10/2024	52.72	1.45	7.62	34.25	0.65	3.65	168.0	82.9	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-1965S	4/27/2024	4/28/2024	7.12	18.29	65.48	8.16	1.15	ND	316.0	82.6	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2053W	4/24/2024	4/25/2024	35.02	2.52	8.93	51.68	1.48	0.23	25.0	82.5	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2059W	4/24/2024	4/25/2024	41.01	1.30	4.99	50.80	1.24	0.38	20.9	82.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2161W	4/24/2024	4/25/2024	38.18	1.96	6.89	51.33	1.34	0.32	138.0	80.7	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2162W	4/24/2024	4/25/2024	40.91	1.53	5.37	50.56	1.24	0.31	91.6	79.3	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2163W	4/24/2024	4/25/2024	43.57	2.31	8.29	43.72	1.00	0.32	ND	78.5	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2165W	4/24/2024	4/25/2024	57.31	1.20	4.19	35.50	0.62	0.42	2,370.0	78.3	N/A	Yes	Yes	Yes	Yes	Horizontal Well. Monitor under Directive 5.
H-2166W	4/29/2024	4/30/2024	59.56	1.60	5.23	32.60	0.55	0.21	214.0	77.5	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2273W	4/18/2024	4/19/2024	61.50	ND	ND	38.00	0.62	1.18	1,750.0	76.6	N/A	Yes	Yes	Yes	Yes	Horizontal Well. Monitor under Directive 5.
H-2274W	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	0.28	45.7	72.1	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2275W	4/18/2024	4/19/2024	50.60	0.70	ND	47.60	0.94	0.23	9.2	70.9	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-2277W	4/18/2024	4/19/2024	ND	ND	ND	ND	0.00	0.97	548.0	70.9	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
H-67	5/3/2024	5/4/2024	43.99	2.63	9.01	40.86	0.93	2.22	128.0	70.0	N/A	No	No	No	No	Horizontal Well - Released from Directive 5 sampling requirements.
SC-2001W	4/24/2024	4/25/2024	36.06	1.70	6.03	54.77	1.52	ND	5.9	67.1	No	Yes	No	No	No	
TC-2383S	4/24/2024	4/25/2024	30.41	2.34	29.53	36.46	1.20	ND	ND	64.9	No	Yes	No	No	No	
TC-2385A	5/2/2024	5/3/2024	58.12	1.46	4.88	31.91	0.55	1.85	1,520.0	62.0	Yes	Yes	Yes	Yes	Yes	
TC-2385S	5/8/2024	5/9/2024	51.96	1.03	4.01	41.99	0.81	0.71	ND	49.7	No	Yes	No	No	No	
CV-99	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.

ATTACHMENT 1

Well Number	Date Sampled	Date Analyzed	Carbon Dioxide (%)	Oxygen (%)	Nitrogen (%)	Methane (%)	CH4:CO2 ratio	Hydrogen (%)	Carbon Monoxide (ppm)	Wellhead Temperature (F)	August 2024 Down well Temp Monitoring	August 2024 Fixed Gas CH4, O2, CO2	August 2024 CO	August 2024 H2	August 2024 VOC (TO-15)	Comments
CV-114	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-1420	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-1423	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2332	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2333	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2334	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2337	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2449	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2455	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2462	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2463	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2464	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2466	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2469	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2470	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-2471	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-24120	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-24125	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.
CV-24128	New	Selection									Pending	Yes	Yes	Yes	No	New selection. Down well monitoring depends on wellhead temperature. Next round.

Notes:

Reaction Criteria / Operational Concern	
Carbon Monoxide	> 1,500 ppm
	> 1,000 ppm
Wellhead Temp	>170 F
	>150 F
Methane	<15%
	< 20%
Hydrogen	> 2%
	>1.9%
Oxygen	>5%
	>2%
CH4:CO2 Ratio	<0.8