



**Region 2 Caribbean Environmental Protection Division
Multimedia Permits and Compliance Branch**

CAA Inspection Report

Inspection Date: 5/1/2024

Facility Name: El Coqui Landfill

Facility Address: PR-923, Km 2.5, Buena Vista Ward, Humacao, PR 00741

EPA Lead Inspector: Gloria Diaz-Galarza, 787-977-5882, diaz-galarza.gloria@epa.gov

EPA Asst. Inspector: Alex Rivera, 787-977-5845, rivera.alex@epa.gov
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Katherine Marmanides, 212-637-4063, marmanides.katherine@epa.gov
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Facility Contact: Gamaliel De La Mata, Landfill Operation Manager, 787-417-7063 ext. 276, gdelamata@ecwaste.com

This report is a summary of observations and information gathered from the facility at the time of the inspection. The information provided does not constitute a final decision on compliance with Clean Air Act ("CAA") regulations or applicable permits, nor is it meant to be a comprehensive summary of all activities and processes conducted at the facility.

Summary of Onsite Observations

A. Opening Conference

The representatives of the United States Environmental Protection Agency (EPA), Gloria Diaz-Galarza, Alex Rivera, Katherine Marmanides, Victor Tu, Maria Malave, Daniel Heins, and Steve Rapp, arrived at El Coquí Landfill Company, LLC ("ECL," or "facility") located at PR-923, Km 2.5, Buena Vista Ward in Humacao, PR at approximately 10:40 am. The EPA representatives ("the inspectors") were met upon arrival by Mr. Gamaliel De La Mata, Landfill Operation Manager. Mr. De La Mata led the inspectors to a conference room to start the opening meeting and inspection. The inspectors presented their identification credentials and provided an overview and scope of the inspection.

As part of the opening conference, the inspectors asked Mr. De La Mata a variety of questions. The following is a summary of the conversation with Mr. De La Mata:

1. Landfill operations – Mr. De La Mata used the landfill drawings/layout to describe the different sections of the landfill, active and inactive areas, wells, etc.
2. Surface emissions monitoring (“SEM”) – The facility has three (3) employees in charge of the operation of the facility gas collection and control system (“GCCS”) and SEM, one (1) manager and two (2) technicians. At the time of the inspection, all three (3) were out of the office. The facility added that SEM activities are conducted in-house, and that the team uses an equipment similar to IRWin/SEM 5000. The facility representative mentioned that there are no areas excluded from monitoring. EPA as a follow-up asked about the coverage shown in the NSPS semi-annual reports, noting that large swaths of the vegetated north has very limited coverage in the SEM survey maps. Mr. De La Mata acknowledged that surveys in those areas may be limited to the access roads/paths and not traverse through the fully vegetated areas. He also acknowledged on follow-up that active areas were excluded for safety reasons.
3. Cover material – Mr. De La Mata informed that the type of cover material used is soil and as alternative cover the facility uses tarps, but just for the active area. The thickness of the covers are 6-8 inches for slopes and 1 foot for the deck.
4. Safety – Mr. De La Mata added that there were no dangerous areas to be aware of (health and safety considerations/concerns) that could affect the SEM inspection aside from the active area, and informed that the only challenge would be related to slippery areas due to past and current rain events.
5. Active areas – Mr. De La Mata informed that the current active areas for waste disposition, at the time of the inspection, were the area near cells 5B and 9B (towards central portion of the landfill).
6. Final cover – Mr. De La Mata stated that there was one capped area on the northwest slope of the landfill, covered with dirt, liner, and protective cover. The thickness of the covers is approximately four (4) feet in total.
7. Areas where waste has been in place fewer than 5 years – Mr. De La Mata indicated that there are areas with GCCS where the waste has been in place fewer than five (5) years and those are 9A, 9B, cell 8; cell/area 9B2 is two (2) years.
8. Type of landfill gas collection wells – There are approximately 132 wells and only two (2) horizontals in HC8 and HC9.
9. Types of waste – In terms of dedicated areas, Mr. De La Mata added that there are areas of the property dedicated to storing special wastes, such as white goods and recycling. Construction debris is managed mixed while vegetative material is managed separate. The main landfill hill does not have cells dedicated to specific waste types.
10. GCCS status – Mr. De La Mata informed that at the time of the inspection there were approximately five (5) wells disconnected from the GCCS. Also, he added that they have been disconnected for less than a month and will be back to normal in approximately a month from the day of the inspection. The facility collects around 1,700 cfm of landfill gas.
11. Vegetation on the cover / cover maintenance – According to Mr. De La Mata, the site manages vegetation on the cover by clearing areas to create trails to access the wells and conduct SEM.

The inspectors explained that during the facility tour, they would capture digital images of the facility wells and any other operation using a digital point and shoot camera. The facility representatives did not express any concerns with the inspectors' capturing photos.

B. Walkthrough/SEM

At approximately 11:25 AM, Mr. De La Mata led the inspectors on a tour of ECL. EPA inspectors used an Elkins IRwin to perform method 21 to measure surface methane concentrations and a Forward Looking Infrared (FLIR) optical gas imaging camera to document landfill gas emissions. The facility has approximately 90 wells that have dual extraction for gas and leachate. The walkthrough used access trails to perform a limited survey of the northern, vegetated portion of the landfill, primarily focusing on monitoring accessible penetrations. Limited attempts to monitor off the trail were made, but the thick vegetation prevented a more thorough monitoring. The walkthrough continued to the un-vegetated central southern portion of the landfill, including in areas where collection was offline. After returning to the office, the Inspectors and Mr. De La Mata then drove to the western side of the landfill to monitor leachate risers and other penetrations near the western edge of the facility. Inspectors sometimes walked and sometimes drove between risers/wells during this portion of the survey.

During the walkthrough the inspectors observed extensive cover integrity issues, including leachate breakouts, erosion gulleys with exposed waste, exposed waste in general through the landfill, and impenetrable vegetation full of trees with woody roots. Inspectors observed an abandoned well venting landfill gas from an open-ended hose, as well as another well venting from a sample port. Inspectors documented emissions associated with rusted infrastructure and poorly sealed leachate risers. Inspectors found high methane readings associated with the wells offline, both at the penetrations and in the surrounding areas. In total, EPA inspectors marked 55 exceedances above 500 ppm, of which 6 were above the lower explosive limit for methane. The facility walkthrough was completed at 3:50 PM and the bump check was completed by the inspectors at 3:56 PM. Before completing the bump check, the inspectors asked if the facility wanted to see a bump check of the EPA equipment, but the facility staff declined. After the bump check, the inspectors proceeded to have an internal discussion prior to the closeout meeting. See Appendix A (SEM Data), Appendix B (SEM Map), Appendix C (Photo Log), Appendix D (Instrument & Calibration Data) and closing meeting discussion summary for further details about the SEM findings and observations.

C. Closing Conference

At approximately 4:10 PM, the group returned to the conference room for a closing conference with Mr. De La Mata. The inspectors thanked the facility representative for his time and cooperation during the inspection. As agreed during the inspection opening meeting, the inspectors discussed with Mr. De La Mata the main findings and observations during the SEM, the following is a summary of the conversation:

- Although the monitoring activity did not cover the entire extent of the facility SEM plan, the inspectors were able to find 55 different locations with surface concentrations of methane over 500 ppm.
 - This was significantly more than the facility's own surveys, which typically find 0 exceedances. The inspectors noted that while no technicians were available to be interviewed, this discrepancy indicates likely shortcomings in training.
 - Most exceedances were significantly above the standard, and a handful were at flammable concentrations.
- Inspectors noted that large areas were not being monitored at all due to the thick vegetation.
 - Inspectors highlighted that there was still the requirement to both traverse at 30-meter intervals and to monitor all penetrations and areas with visual indicators of elevated gas.
 - With cover as thin as 6 inches, tree roots penetrate the cover and create paths for gas to escape, and a full SEM survey should be monitoring *all* cover penetrations.
 - The limited surveys in the vegetated areas give a misleading impression of the emissions situation – EPA found that the paths with compacted cover typically had low emissions, but background levels increased, and exceedances were observed when venturing off the trails into the thicker vegetation, particularly at trees.
 - Thick vegetation was extensive across the northern half and western slope of the landfill.
- In addition to the unmanaged vegetation, there were extensive cover integrity issues in the bare dirt cover areas.
 - There was extensive exposed waste, including in areas where it was clearly not associated with recent rains.
 - Erosion rills were widespread.
 - Mr. De La Mata noted that the rainy season makes it hard to make timely corrective actions.
 - Inspectors noted that other landfills in high rain areas take more pro-active steps to reduce/prevent erosion from stormwater, including use of tarps, seeding, thicker cover, and conveyances to control and direct stormwater.
- Lack of collection near the active area was found.
 - This area was still subject to gas collection requirements (with at least some of the waste having been in place for five years or more).
 - Instead of re-routing headers, installing horizontal collectors, or other potential options, the facility opted to fully disconnect the area from gas collection.
 - This resulted extremely high SEM readings at the wellheads and exceedances/generally elevated readings throughout the area.
- Inspectors observed significant emissions via the FLIR camera and Method 21 at the leachate risers, which also had visual signs of poor maintenance.
- Gas was additionally observed to be venting out of a sample port on one well and out an open hose from another well.
- In summary, the specific areas of concern expressed by the inspectors were the following:
 - SEM program
 - Venting gas/poor maintenance on gas and leachate infrastructure

- Lack of gas collection coverage/offline wells
- Cover integrity
- Unmanaged vegetation
- The inspectors informed Mr. De La Mata that the SEM data along with other supplemental documentation such as maps will be shared via email as soon as possible¹. The inspectors also informed Mr. De La Mata that corrective actions should be coordinated as soon as the SEM data becomes available to the facility, and that SEM corrections should be documented and incorporated into their semi-annual reporting.
- Additionally, the inspectors mentioned to Mr. De La Mata that in November 2021 a site inspection was conducted with the purpose of discussing ECL's request for higher operating values (HOVs) for the operation of several gas extraction wells. During the November 2021 inspection, ECL agreed on providing EPA updated data, including carbon monoxide (CO) data for each of the wells in need of HOVs, but such submission remains pending. Mr. De La Mata requested the inspectors to share a copy of the inspection report and agreed on following up with the pending matter².
- The inspectors also informed Mr. De La Mata that an inspection report will be prepared by EPA and shared within approximately 45-60 days.

The inspectors concluded the inspection and departed from the facility at approximately 4:35 PM.

Appendices

Appendix A - SEM Data

Appendix B - SEM Map

Appendix C - Photo Log

Appendix D - Instrument & Calibration Data

End of Report

Lead Inspector's Name: Gloria Diaz-Galarza

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Supervisor's Name: Nancy Rodríguez

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¹ On May 2, 2024, EPA's Daniel Heins sent the SEM documentation to EC Waste's Gamaliel De La Mata via email.

² On May 2, 2024, EPA's Alex Rivera shared with EC Waste's Gamaliel De La Mata EPA's November 18, 2021, inspection report and follow up communications via email.

Appendix A: SEM Data

Table #1: SEM Exceedances

ID	Description	Time	Reading (ppm)	Latitude	Longitude
A1	Leachate pipe	11:27	4744	18.128724	-65.806713
A2	Main valve flares	11:35	10028	18.129244	-65.805808
A3	Second valve to flares penetration and from pipe top	11:36	60000 at pipe top; 3280 at base	18.129260	-65.805951
A4	GW01	11:40	1303	18.129511	-65.806011
A5	GW38	11:43	2776	18.129316	-65.806492
A6	Vegetation with leak	11:46	3523	18.129471	-65.806280
A7	GW05	12:00	2026	18.130127	-65.805912
A8	Trees off side of access path	12:13	681	18.131364	-65.808453
A9	Vent on GW141 (just top)	12:19	594 (top)	18.130634	-65.808182
A10	GW138 - venting disconnected pipe, also base	12:26	100000 at top; 3085 at base	18.130308	-65.809113
A11	GW130	12:33	8198	18.129571	-65.809979
A12	Exposed waste / distressed vegetation	12:40	2938	18.129012	-65.810448
A13	Exposed waste / disconnected well	12:43	67042	18.128461	-65.810520
A14	Disconnected well with exposed waste	12:45	15149	18.128475	-65.810971
A15	Disconnected well with exposed waste	12:48	44743	18.128101	-65.811226
A16	Disconnected well with exposed waste	12:50	82877	18.127622	-65.811357
A17	Exposed waste	12:51	1454	18.127448	-65.811606
A18	Disconnected well	12:53	1237	18.127402	-65.811843
A19	Exposed waste	12:59	2919	18.127140	-65.811419
A20	Active well (unlabeled) on top deck	13:01	17580	18.127400	-65.810999
A21	Active well (unlabeled) on top deck, also seal gap	13:03	26602	18.127645	-65.810514
A22	Active well (unlabeled) on top deck	13:05	12344	18.128042	-65.810341
A23	Active well (unlabeled) on top deck	13:09	22746	18.127460	-65.810006
A24	GW159	13:12	217025	18.127001	-65.810374
A25	Exposed waste (multiple hits in area)	13:19	998	18.127052	-65.810770
A26	Well on top of landfill	13:20	12276	18.126808	-65.810947

A27	Erosion rill	13:22	1810	18.126501	-65.811069
A28	GW57	13:25	5072	18.126334	-65.810953
A29	Erosion rill	13:28	2016	18.126400	-65.810786
A30	Erosion/exposed waste	13:30	3791	18.126456	-65.810518
A31	Exposed waste by well 65	13:34	658	18.126348	-65.810262
A32	Erosion rill	13:36	1204	18.126671	-65.810268
A33	Erosion rill	13:38	744	18.126805	-65.809914
A34	GW161	13:40	3303	18.126853	-65.809518
A35	Erosion rill	13:44	4614	18.127322	-65.809430
A36	GW77 + area	13:46	46654	18.127480	-65.809242
A37	Rill on slope + surrounding area	13:49	795	18.127886	-65.809375
A38	Rill at top of slop near well	13:51	3760	18.128061	-65.809512
A39	Rills on slope	13:53	2978	18.128245	-65.809373
A40	GW71	13:55	3747	18.128646	-65.809104
A41	Rill on slope + surrounding area	13:58	6495	18.129096	-65.808865
A42	GW73	14:06	18705	18.128073	-65.808442
A43	GW75	14:09	909	18.127375	-65.808495
A44	GW74	14:12	567	18.127612	-65.808306
A45	Leachate riser 5B (seal and penetration)	14:19	13251	18.127172	-65.807935
A46	Leachate pipe and marking pipe nearby	14:20	1875 at leachate pipe; 700 at marker pipe	18.127165	-65.808007
A47	Leachate manhole and collection penetration	14:26	3873 at manhole; 800 at penetration	18.126601	-65.807787
A48	Well phase/cell 8	15:02	14498	18.126829	-65.814065
A49	GW90	15:06	2761	18.127128	-65.813403
A50	Leachate riser / seal	15:15	2021	18.127276	-65.813832
A51	Soil near leachate pipe	15:19	1029	18.128134	-65.813329
A52	Top of fitting, sample port, and at base	15:24	257924 at port; 528 at base	18.129080	-65.812904
A53	GW96R - both base and bad seal on pump	15:29	5725 at bad seal; 3100 at penetration	18.129118	-65.812630
A54	Leachate riser / pipe	15:33	14387	18.129916	-65.812429
A55	Ground by leachate riser R-6A	15:40	16616	18.130532	-65.811962

Probe tip was fixed on a hiking pole 8 cm from the base of the pole, all readings taken from 8 to 10 cm from the ground with the exception of the secondary readings as noted in the table and at A9, which was only observed above 500 ppm at pipe top.

Background readings:

Upwind: 0 ppm

Downwind: 0 ppm

55 exceedances total:

500 – 1,000 ppm: 8

1,000 – 5,000: 23

5,000 – 10,000: 4

10,000 – 50,000: 14

50,000 – 100,000: 3

>100,000: 3

Appendix B: Map



Red lines trace monitoring path. Exceedances are plotted and labeled as described in Appendix B. Path on western perimeter includes some stretches in vehicle driving between risers/wells. Coverage on the northern vegetated areas was primarily limited to access road/paths due to thick vegetation.

The survey covered less than 40 acres of the landfill.

Appendix C: Photo Log

El Coqui Humacao Landfill Digital Image Log:

Date	Time	Digital image number	Description
5/1/2024	11:09:00 AM	P5010001.JPG	Map of the El Coqui landfill
5/1/2024	11:26:00 AM	P5010002.JPG	Flare station
5/1/2024	11:27:00 AM	P5010003.JPG	Leachate pipe
5/1/2024	11:31:00 AM	P5010004.JPG	Tree on cover of landfill
5/1/2024	11:35:00 AM	P5010005.JPG	Main valve to flares
5/1/2024	11:36:00 AM	P5010006.JPG	Second valve to flares penetration and from pipe top
5/1/2024	11:40:00 AM	P5010007.JPG	EW-01
5/1/2024	11:43:00 AM	P5010008.JPG	EW-38
5/1/2024	11:46:00 AM	P5010009.JPG	Vegetation with leak
5/1/2024	12:00:00 PM	P5010010.JPG	EW-05
5/1/2024	12:02:00 PM	P5010011.JPG	Tall, dense vegetation
5/1/2024	12:13:00 PM	P5010012.JPG	Trees off side of access path
5/1/2024	12:22:00 PM	P5010013.JPG	Hills in background near landfill
5/1/2024	12:22:00 PM	P5010014.JPG	Ocean in background near landfill
5/1/2024	12:26:00 PM	P5010015.JPG	EW138 - venting disconnected pipe, also base
5/1/2024	12:28:00 PM	P5010016.JPG	Working face
5/1/2024	12:30:00 PM	P5010017.JPG	Open hose at EW-138
5/1/2024	12:33:00 PM	P5010018.JPG	EW-130
5/1/2024	12:35:00 PM	P5010019.JPG	Working area
5/1/2024	12:40:00 PM	P5010020.JPG	Exposed waste / distressed vegetation
5/1/2024	12:43:00 PM	P5010021.JPG	Disconnected well with exposed waste
5/1/2024	12:45:00 PM	P5010022.JPG	Disconnected well with exposed waste
5/1/2024	12:47:00 PM	P5010023.JPG	Gas bubbles through water
5/1/2024	12:48:00 PM	P5010024.JPG	Disconnected well with exposed waste
5/1/2024	12:50:00 PM	P5010025.JPG	Disconnected well with exposed waste
5/1/2024	12:51:00 PM	P5010026.JPG	Exposed waste
5/1/2024	12:53:00 PM	P5010027.JPG	Disconnected well
5/1/2024	12:59:00 PM	P5010028.JPG	Exposed waste
5/1/2024	1:00:00 PM	P5010029.JPG	Disconnected well
5/1/2024	1:01:00 PM	P5010030.JPG	Active well (unlabeled) on top deck
5/1/2024	1:03:00 PM	P5010031.JPG	Active well (unlabeled) on top deck, also gap in top seal
5/1/2024	1:05:00 PM	P5010032.JPG	Gap in seal
5/1/2024	1:05:00 PM	P5010033.JPG	Active well (unlabeled) on top deck
5/1/2024	1:09:00 PM	P5010034.JPG	Active well (unlabeled) on top deck with exposed waste at base
5/1/2024	1:12:00 PM	P5010035.JPG	EW-159
5/1/2024	1:19:00 PM	P5010036.JPG	Exposed waste (multiple hits in area)
5/1/2024	1:20:00 PM	P5010037.JPG	Well on top of landfill (unlabeled)
5/1/2024	1:22:00 PM	P5010038.JPG	Erosion rill
5/1/2024	1:25:00 PM	P5010039.JPG	EW-57 with exposed waste at base
5/1/2024	1:28:00 PM	P5010040.JPG	Erosion rill
5/1/2024	1:30:00 PM	P5010041.JPG	Erosion/exposed waste

5/1/2024	1:34:00 PM	P5010042.JPG	Exposed waste by well EW-65
5/1/2024	1:36:00 PM	P5010043.JPG	Erosion rill
5/1/2024	1:38:00 PM	P5010044.JPG	Erosion rills
5/1/2024	1:40:00 PM	P5010045.JPG	EW-161
5/1/2024	1:44:00 PM	P5010046.JPG	Erosion rill
5/1/2024	1:46:00 PM	P5010047.JPG	EW-77 + area
5/1/2024	1:49:00 PM	P5010048.JPG	Rill on slope
5/1/2024	1:51:00 PM	P5010049.JPG	Rill at top of slope near well
5/1/2024	1:53:00 PM	P5010050.JPG	Rills on slope
5/1/2024	1:55:00 PM	P5010051.JPG	EW-71 with exposed waste at base
5/1/2024	1:58:00 PM	P5010052.JPG	Rill on slope with exposed waste
5/1/2024	2:06:00 PM	P5010053.JPG	EW-73
5/1/2024	2:09:00 PM	P5010054.JPG	EW-75 with exposed waste in surrounding area
5/1/2024	2:12:00 PM	P5010055.JPG	EW-74
5/1/2024	2:12:00 PM	P5010056.JPG	Well head EW-74
5/1/2024	2:19:00 PM	P5010057.JPG	Leachate riser 5B
5/1/2024	2:20:00 PM	P5010058.JPG	Leachate pipe
5/1/2024	2:22:00 PM	P5010059.JPG	Leachate pipe
5/1/2024	2:26:00 PM	P5010060.JPG	Leachate manhole and collection penetration
5/1/2024	2:28:00 PM	P5010061.JPG	Leachate collection area
5/1/2024	3:02:00 PM	P5010062.JPG	Well phase/cell 8
5/1/2024	3:06:00 PM	P5010063.JPG	EW-90
5/1/2024	3:15:00 PM	P5010064.JPG	Leachate riser 5A
5/1/2024	3:19:00 PM	P5010065.JPG	Soil near leachate pipe
5/1/2024	3:24:00 PM	P5010066.JPG	Top of fitting and sample port
5/1/2024	3:29:00 PM	P5010067.JPG	EW-96R and piping
5/1/2024	3:30:00 PM	P5010068.JPG	EW-96R and piping with corroded flange
5/1/2024	3:33:00 PM	P5010069.JPG	Leachate riser and pipe, pump on ground
5/1/2024	3:40:00 PM	P5010070.JPG	Ground by leachate riser R-6A



P5010003.JPG



P5010004.JPG



P5010005.JPG



P5010006.JPG



P5010007.JPG



P5010008.JPG



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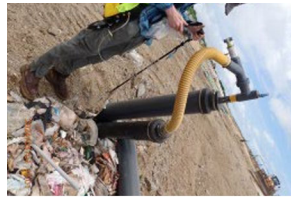
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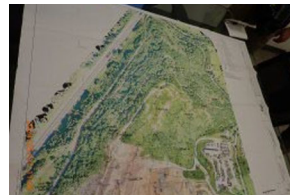
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P5010070.JPG



P5010001.JPG



P5010002.JPG

Appendix D: Instrument & Calibration Data

The survey was conducted using an Inficon IRwin device using the Elkins Earthworks software, held by EPA Region 2 with Property Tag # B38121. Daniel Heins operated the instrument.

Calibration Checks

Date/Time	Gas Concentration (ppm)	R2 IRwin Reading (ppm)
2024-05-01 09:55	500	500
2024-05-01 16:00	500	400

The instrument was calibrated according to Method 21 and manufacturer instructions with zero gas and 500 ppm methane. Bump checks were conducted before and after the survey.

Pre-survey bump checks show successful calibration. Post-survey bump check shows downward drift, possibly resulting in false negatives (i.e., missed exceedances) and potential underestimation of the severity of measured exceedances.

Response Time and Precision Check

Trial	Calibration Gas ppm	R2 IRwin	
		Reading (ppm)	Time (s)
1	500	500	5
2	500	500	5
3	500	490	4

The instrument was calibrated and checked for response time and precision on 4/30/24 at 10am using the 0 air and 500 ppm from the same cylinders as during the inspection. All readings are within 10% of the known calibration value. Response times are approximately 4-5 seconds, under the maximum of 30 seconds.

Calibration Gas

Composition	Manufacturer	Lot Number	Expiration Date
Zero air <1 ppm total hydrocarbon	Airgas	304-402941563-1	2/23/2028
500 ppm methane in air	Airgas	304-402960982-1	2/2/2028

These were used for the calibration and bump checks on May 1, 2024, for the inspection and during the response time and precision checks on April 30, 2024.