2023 National Atmospheric Deposition Program Site Audit Program Annual Report

Prepared for:
Contract No. GF-10F-075AA

U.S. Environmental Protection Agency
Office of Atmospheric Protection
Clean Air and Power Division

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Table of Contents

List of Appendices

List of Tables

List of Figures

List of Acronyms and Abbreviations

ACM	Aerochem Metrics
AIRMoN	Atmospheric Integrated Research Monitoring Network
AMNet	Atmospheric Mercury Network
AMoN	Ammonia Monitoring Network
CAL	Central Analytical Laboratory
CASTNET	Clean Air Status and Trends Network
DC	direct current
DVM	Digital multi-meters
EEMS	Environmental, Engineering & Measurement Services, Inc.
EPA	U.S. Environmental Protection Agency
FORF	Field Observation Report Form
FSSD	Field Site Audit Database
HAL	Hg (Mercury) Analytical Laboratory
MDN	Mercury Deposition Network
NADP	National Atmospheric Deposition Program
NAL	NADP Analytical Laboratory
NIST	National Institute of Standards and Technology
NOS	Network Operations Subcommittee
NTN	National Trends Network
PDA	Personal Digital Assistant
PO	Program Office
QA	Quality Assurance
QAAG	Quality Assurance Advisory Group
QAPP	Quality Assurance Project Plan
QC	Quality Control
QR	quality rating
RTD	Resistive Temperature Detector
SOP	Standard Operating Procedures
USGS	United States Geological Service
WAAS	Wide Area Augmentation System
WSLH	Wisconsin State Laboratory of Hygiene

Executive Summary

Under US EPA contract number GS-10F-075AA, Support for Conducting Systems and Performance Audits of CASTNET and NADP Monitoring Stations, Environmental, Engineering & Measurement Services, Inc. (EEMS) has executed an annual independent evaluation and assessment site audit program for the purpose of enhancing the quality assurance of the networks of the National Atmospheric Deposition Program (NADP). The NADP is a cooperative, multi-agency organization, which measures precipitation chemistry and estimates atmospheric wet deposition for various pollutant ions and atmospheric concentrations of ammonia and mercury. The NADP networks are: the National Trends Network (NTN), the Mercury Deposition Network (MDN), the Atmospheric Mercury Network (AMNet), and the Ammonia Monitoring Network (AMoN). Audits of AMoN sites are limited to siting criteria data collection when sites are collocated with an existing NADP wet-deposition network or a Clean Air Status and Trends Network (CASTNET) site as part of this contract. No information is collected for AMNet sites. EPA has provided long-standing support for the operation of NADP monitoring sites, and recurring funding for the chemical analysis and coordination for several wet deposition sites, in addition to the support for the audit and quality assurance programs of the NADP networks.

To understand the impact of emissions reductions on the environment, scientists and policy makers use data collected from long-term national monitoring networks such as the CASTNET and the NADP to quantify changes in pollutant deposition. These networks are complementary in many ways and provide information on a variety of indicators necessary for tracking temporal and spatial trends in regional air quality and atmospheric deposition.

Work performed under this contract includes the audit of sites associated with the NADP. Site audits include:

- Maintenance, evaluation, and quality assurance assessment of site instruments.
- Evaluation of site operator proficiency and technique.
- Reinforcement of NADP protocols and training.
- Photograph catalog to include all the equipment related to the site along with siting conditions and any findings that should be recorded.

Independent audits provide accountability for the program and help ensure sites are being operated consistently following the NADP Quality Assurance Project Plan (QAPP). The reported audit results are used to validate data provided by the individual sites.

The results of those audits performed during the reporting period are presented in this report.

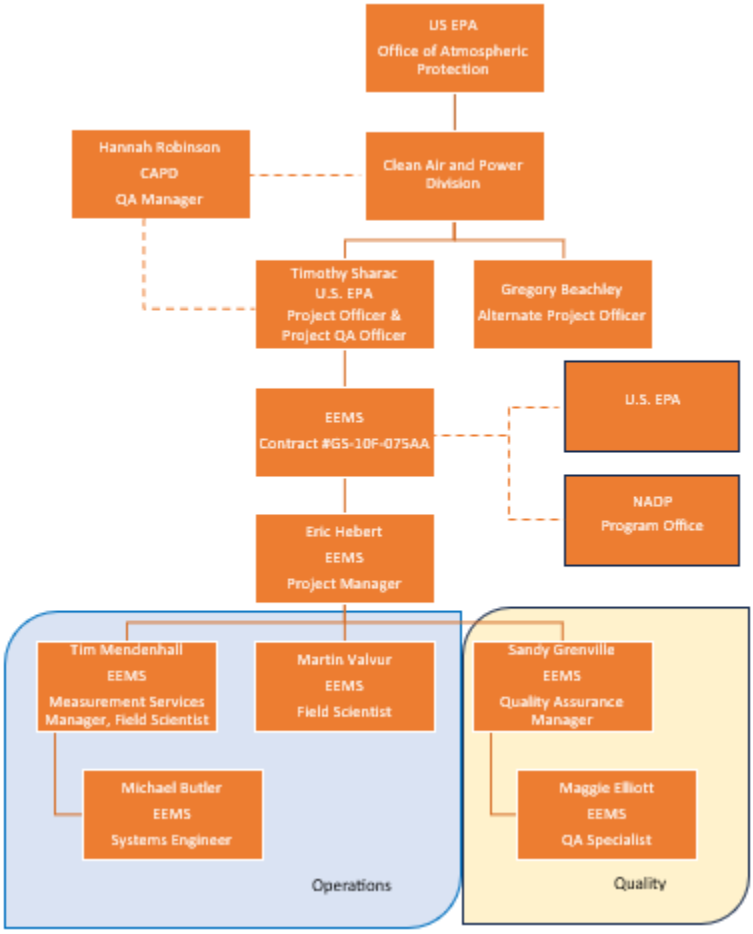
1.0 Introduction / Background

The NADP Site Audit Program is an independent and unbiased Quality Assurance (QA) program of systems and performance audits to assess and document the conditions and operations of the collective sites of the NADP. The conditions and operations pertain to the siting, sample collection and handling, equipment operation and maintenance, recordkeeping, reporting, and field laboratory procedures.

Ongoing QA programs are an essential part of, and add credence to, any long-term monitoring program. The external evaluations provided by this program verify, and support the established procedures and criteria of the NADP and its networks, and ensures they are maintained. The site audit program affords a higher level of confidence in the data reported by the NADP by verifying that each site operator is following the field Standard Operating Procedures (SOP). The audit program complements the QA/QC procedures followed by the Program Office (PO) and the NADP Analytical Laboratory (NAL).

Quality assurance and quality control (QC) activities for these networks improve overall data quality and ensure field measurements remain accurate and precise. Stringent QA and QC are essential for obtaining unbiased and representative atmospheric deposition measurements, and for maintaining the integrity of the sample during collection, handling, and analysis. These QA and QC activities strengthen the reliability and overall quality of the data that the agency uses for policy decisions and for measures of accountability. Figure 1-1 shows the 2023/2024 organization chart for the NADP Site Audit Program.

Figure 1-1. Organization Chart of the NADP Site Audit Program



Audits of the NADP sites are performed under contract GF-10F-075AA. Eric Hebert fulfills the role of Project Manager which includes contract issues, reports, and database administrator, Sandy Grenville, as the QA Manager, is responsible for reviewing all the data gathered in the field. Eric Hebert, as the Audit Team Leader, is responsible for the scheduling as well as directing the Audit Team Members in the performance of the site audits. Martin Valvur and Tim Mendenhall are the field technicians that perform the audits along with Eric Hebert. Both the Project Manager and Audit Team Leader maintain close contact with the NADP PO, and Network Operations Subcommittee (NOS) and participate in Quality Assurance Advisory Group (QAAG) meetings.

NADP site audits are accomplished by visiting approximately 25% of the total precipitation (or wet deposition) NADP sites each year. The operation of the site instrumentation is checked, maintenance is performed as needed, the site operator is observed while performing the routine site activities, technical and training support are provided, and the results are reported during each audit. More details of the activities are provided in the following key tasks.

1. Scheduling sites to be audited. This task is coordinated with the EPA Project Officer, the NADP Program Office, network liaison, site operators, supervisors, and sponsors. Approximately 90 NADP sites (co-located are considered separate sites) are usually scheduled for audits during each contract period. The schedule is developed based on the elapsed time since the previous site audit (priority given to longest time since previous audit), inclusion of sites that have not been audited, and consideration for efficient and cost-effective travel.

2. Preparing for field site audits. During audit preparation, available site data are compiled and reviewed. A current year site file is created. The necessary materials and standards for each site audit are checked and shipped if necessary. The operators of the sites scheduled for audits are contacted to finalize the audit arrangements.

3. Performing site audits. During each site audit a comprehensive qualitative and quantitative assessment is performed. The site assessment consists of:
   - Verifying site contact information.
   - Verifying the NADP collector location using a WAAS GPS.
   - Qualitatively evaluating the site regarding the current NADP siting criteria that can be found at: https://nadp.slh.wisc.edu/wp-content/uploads/2022/01/NADP-2010_Site_Selection_and_Installation_Manual_v1.pdf
   - Qualitatively assessing the site surroundings regarding obstructions which could impact data collection and quality. Documenting the site surroundings with at least 8 digital photographs taken in the cardinal directions of N, NE, E, SE, S, SW, W, and NW. The photographs should be taken within 5 -10 meters of the NADP collector with the direction referenced.
   - Qualitatively assessing the instruments and equipment with regard to function, maintenance, and condition. Documenting equipment malfunctions and signs of wear on the audit forms and with photographs as necessary.
   - Qualitatively evaluating the site personnel regarding the methods and procedures used for sample handling, calibrations, cleaning, maintenance, recordkeeping, reporting, and material storage. Confirming that the site operator has access to current versions of NADP manuals and documentation currently found on line.
   - Quantitatively assessing the accuracy of the NADP instrumentation responses to QA standards. These include standard weights for rain gauge tests and mass determinations.
   - Recording all data on standardized hard copy forms. Printing additional forms from the database, if required, in order to record all data. Comparing the observations to the pre-populated values from the previous audit, verifying and correcting any discrepancies, and confirming with the site personnel as needed.

4. Performing minor repairs, maintenance, adjustments, and guidance. With the consent of the site personnel and the approval of the appropriate liaison:
   - Perform any necessary minor repair, maintenance, adjustment, and calibration to restore proper function in accordance with the Network Operations Subcommittee (NOS) procedures. These tasks can include items such as leveling and stabilizing the instrument, correcting the collector orientation, and correcting event recorder wiring.
   - Record all actions on the appropriate audit form.
   - Provide technical assistance, instruction, and training regarding the maintenance of the site and equipment, sample collection and handling, and site operation procedures, consistent with the NADP Quality Assurance Project Plan (QAPP), and standard operating procedures (SOP) specific to the network.

5. Transferring observations from audit forms to audit database. Entering the audit information obtained in the steps above into the audit database and reviewing for significant differences using the automated verification feature, and entry/exit rules.

6. Conducting an exit interview with the site personnel. This task includes the preparation and delivery of an exit/spot report summarizing any equipment deficiencies or failures, audit results, activities, adjustments, and any aspects that are, or could potentially affect data quality. The report is provided to the site operator, supervisor, NADP QA Manager, and the EPA Project Officer. The report is then archived in perpetuity in the site file on the EEMS server.
7. Providing a quarterly data set (final site audit report) in the form of tables. This final data set includes all the information gathered during the site audits conducted in the previous three months. The data for each site consists of:
   - Audit results that have been subjected to duplicate entry and internal QA review.
   - Digital photographs.
   - Any additional pertinent supporting information.

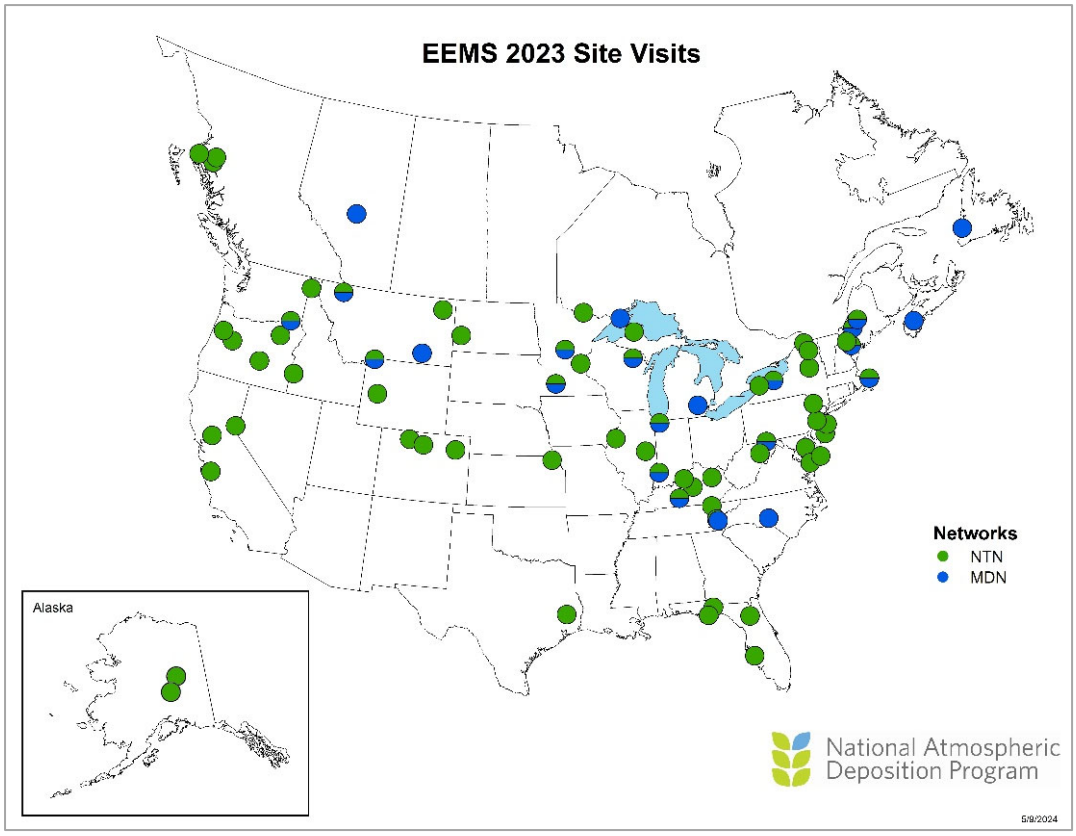
2.0 Status of Sites Audited

2.1 Sites Audited

This annual report includes site audits performed from January through December of 2023.

A total of 88 NADP collectors (this number includes co-located sites) were audited during the period covered by this report at 72 distinct locations. These include 25 MDN sites and 63 NTN sites. Figure 2-1 is a map of the sites visited during 2023. Table 2-1 is a list of the sites audited and includes the network, site name, audit date, and equipment.

Figure 2-1. Site Audit Locations in 2023



2.2 General Status of Sites Audited and Equipment Encountered

Overall, the sites audited during this reporting period were found in good condition and collecting data that meet NADP quality objectives. All of the 72 precipitation rain gauges audited (co-located sites usually use the same rain gauge) were electronic rain gauges, either ETI NOAH IV (43 rain gauges), or the OTT PLUVIO (29 rain gauges).

Of the 88 collectors audited, 36 sites operated N-CON collectors. The 52 remaining collectors were AeroChem Metrics (ACM) type, manufactured by either AeroChemetrics or Loda Electronics Company.

Twenty-seven locations visited operate backup rain gauges of various types. Only assessments related to siting criteria of the backup rain gauges are evaluated during audits, not the rain gauge accuracy.

The qualitative evaluation of the site personnel with respect to their ability to follow NADP protocols and operate the site instrumentation, found the overwhelming majority of site operators to be capable, knowledgeable, and committed to maintaining quality throughout the sample and data collection process. They demonstrated both enthusiasm and conscientiousness concerning the operation of their sites by their willingness to receive instruction from the audit team regarding improvements to their sample handling technique and equipment maintenance.

Specific audit findings that impact, or could impact data quality, are discussed in Section 3.0. The list of sites audited during 2023 and the equipment found at the sites is shown in Table 2-1.

Table 2-1. Sites Audited from January through December 2023 and Equipment Found

Site ID	Site Name	Network	Audit Date	Collector Type	Rain gauge Type	Backup Rain gauge Type
AB14	Genesee	MDN	4/6/2023	N-CON	ETI	Tipping Bucket
AK01	Poker Creek	NTN	10/10/2023	ACM	ETI	N/A
AK03	Denali National Park-Mt. Mckinley	NTN	10/11/2023	ACM	ETI	Tipping Bucket
BC22	Haul Road Station	NTN	4/4/2023	N-CON	OTT	N/A
BC23	Lakese Lake	NTN	4/4/2023	N-CON	OTT	N/A
BC24	Port Edward	NTN	4/3/2023	N-CON	OTT	N/A
CA50	Sagehen Creek	NTN	9/19/2023	N-CON	OTT	OTHER
CA66	Pinnacles National Park-Bear Valley	NTN	9/22/2023	NO	ETI	Tipping Bucket
CA88	Davis	NTN	11/14/2023	N-CON	OTT	Tipping Bucket
CO80	Akron	NTN	8/22/2023	N-CON	OTT	Tipping Bucket
CO93	Buffalo Pass - Dry Lake	NTN	9/5/2023	ACM	OTT	Tipping Bucket
CO98	Rocky Mountain National Park-Loch Vale	NTN	7/5/2023	ACM	ETI	NOAH IV
FL00	Austin-Cary Forest	NTN	7/18/2023	ACM	OTT	N/A
FL14	Quincy	NTN	2/23/2023	N-CON	OTT	N/A
FL23	Sumatra	NTN	2/22/2023	ACM	ETI	N/A
FL41	Verna Well Field	NTN	6/1/2023	N-CON	OTT	STICK
ID02	Priest River Experimental Forest	NTN	10/17/2023	ACM	ETI	N/A
ID11	Reynolds Creek	NTN	10/16/2023	N-CON	OTT	N/A
IL11	Bondville	NTN	8/4/2023	ACM	OTT	OTT
IL78	Monmouth	NTN	4/4/2023	N-CON	OTT	OTT

Site ID	Site Name	Network	Audit Date	Collector Type	Rain gauge Type	Backup Rain gauge Type
IIN22	Southwest Purdue Agriculture Center	MDN	9/26/2023	ACM	OTT	N/A
		NTN		N-CON	OTT	
IN34	Indiana Dunes National Lakeshore	MDN	8/1/2023	ACM	OTT	STICK
		NTN				
KS97	Kickapoo Tribe	NTN	4/5/2023	ACM	ETI	N/A
KY03	Mackville	NTN	9/22/2023	N-CON	ETI	N/A
KY10	Mammoth Cave National Park-Houchin Meadow	NTN	2/21/2023	ACM	ETI	Tipping Bucket
		MDN				
KY19	Cannons Lane	NTN	9/21/2023	N-CON	OTT	N/A
KY35	Clark State Fish Hatchery	NTN	9/25/2023	N-CON	OTT	N/A
MA01	North Atlantic Costal Lab	MDN	7/14/2023	ACM	ETI	N/A
		NTN				
MD08	Piney Reservoir	NTN	5/16/2023	ACM	ETI	N/A
		MDN				
MD13	UM Wye Center	NTN	5/10/2023	ACM	ETI	BELFORT
MD15	Smith Island	NTN	5/8/2023	ACM	OTT	N/A
MD18	Assateague Island National Seashore-	NTN	5/9/2023	ACM	ETI	N/A
ME02	Bridgton	NTN	6/26/2023	ACM	ETI	N/A
		MDN				
ME04	Carrabassett Valley	MDN	6/28/2023	N-CON	ETI	N/A
		NTN		ACM		
ME08	Gilead	NTN	6/27/2023	N-CON	OTT	N/A
ME09	Greenville Station	MDN	6/29/2023	ACM	ETI	N/A
		NTN				
MI52	Ann Arbor	MDN	10/20/2023	ACM	ETI	N/A
MI99	Chassell	NTN	1/6/2023	ACM	OTT	BELFORT
MN01	Cedar Creek	NTN	5/8/2023	N-CON	ETI	N/A
MN23	Camp Ripley	NTN	10/12/2023	N-CON	OTT	N/A
		MDN		ACM		
MN27	Lamberton	MDN	5/9/2023	ACM	ETI	N/A
		NTN		N-CON		
MN32	Voyageurs National Park-Sullivan Bay	NTN	10/10/2023	ACM	ETI	N/A
MN97	Grand Portage Band of Chippewa	MDN	10/9/2023	N-CON	ETI	N/A
MT05	Glacier National Park - Fire Weather Station	NTN	10/18/2023	ACM	ETI	Tipping Bucket
		MDN				
MT95	Badger Peak	MDN	8/15/2023	N-CON	ETI	N/A
MT96	Polar River	NTN	10/19/2023	ACM	OTT	N/A
NC26	Candor	MDN	12/22/2023	N-CON	ETI	N/A
ND00	Theodore Roosevelt National Park -	NTN	10/13/2023	ACM	ETI	Tipping Bucket
NF19	Stephenville	MDN	7/10/2023	N-CON	OTT	N/A
NJ00	Edwin B. Forsythe National Wildlife	NTN	5/12/2023	ACM	ETI	N/A

Site ID	Site Name	Network	Audit Date	Collector Type	Rain gauge Type	Backup Rain gauge Type
NJ39	Cattus Island	NTN	5/15/2023	ACM	ETI	N/A
NJ99	Washington Crossing	NTN	5/17/2023	ACM	ETI	N/A
NS01	Kejimkujik National Forest	MDN	7/4/2023	N-CON	OTT	OTHER
NY22	Akwesasne Mohawk-Fort Covington	NTN	7/17/2023	ACM	ETI	N/A
NY28	Piseco Lake	NTN	7/19/2023	N-CON	ETI	N/A
NY43	Rochester	MDN	11/13/2023	N-CON	ETI	N/A
		NTN				
NY92	Amherst	NTN	7/20/2023	N-CON	ETI	N/A
NY93	Paul Smith's	NTN	7/18/2023	N-CON	ETI	N/A
OR07	Burns Sagebrush	NTN	7/31/2023	N-CON	OTT	N/A
OR10	H.J. Andrews Experimental Forest	NTN	8/7/2023	ACM	ETI	N/A
OR18	Starkey Experimental Forest	NTN	8/9/2023	N-CON	OTT	N/A
OR97	Hyslop Farm	NTN	8/8/2023	ACM	ETI	N/A
PA72	Milford	NTN	6/13/2023	N-CON	OTT	N/A
TN04	Speedwell	NTN	12/5/2023	ACM	ETI	N/A
TN11	Great Smoky Mountains National Park-Elkmont	MDN	9/19/2023	ACM	ETI	BELFORT
		NTN				
TN12	Great Smoky Mountains National Park-	MDN	9/19/2023	ACM	OTT	Tipping Bucket
TX41	Alabama-Coushatta	NTN	2/27/2023	N-CON	OTT	N/A
WA04	Confederated Tribes of the Umatilla Indian Reservation	MDN	8/10/2023	N-CON	ETI	N/A
		NTN		ACM		
WI10	Potawatomi	MDN	10/5/2023	ACM	ETI	N/A
		NTN				
WV18	Parsons	NTN	8/8/2023	ACM	ETI	STICK
WY06	Pinedale	MDN	10/31/2023	N-CON	ETI	N/A
WY08	Yellowstone National Park-Tower Falls	NTN	5/17/2023	N-CON	ETI	STICK
		MDN		ACM		

A total of 54 AMoN sites were included in the site audits, and they are listed in Table 2-2. The sampler mounting height is measured and photographs (directional and overview) are taken of the sampler during the AMoN site audit.

Table 2-2. AMoN Sites Visited in 2023

Site ID	Station Name	Date Visited
AL99	Sand Mountain Research & Extension Center	12/6/2023
AR03	Caddo Valley	9/15/2023
CO10	Gothic	7/26/2023
CO80	Akron 4E	8/22/2023
CO88	Rocky Mountain National Park-Longs Peak	8/29/2023

Site ID	Station Name	Date Visited
CT15	Abington	7/13/2023
FL11	Everglades NP Research Center	2/14/2023
FL19	Indian River	3/20/2023
FL23	Sumatra	2/22/2023
GA41	Georgia Station	4/25/2023
ID07	Nez Perce	8/11/2023
IL11	Bondville	8/4/2023
IL37	Stockton	10/29/2023
IN22	Southwest Purdue Agriculture Center	9/26/2023
KS31	Konza Prairie	10/10/2023
KS97	Kickapoo Tribe-Powhattan	4/5/2023
KS97	Kickapoo Tribe-Powhattan	11/28/2023
KY03	Mackville	9/22/2023
KY29	Crockett	9/25/2023
MD06	Blackwater NWR	5/11/2023
MD08	Piney Reservoir	5/16/2023
MD99	Beltsville	8/15/2023
MI51	Unionville	10/19/2023
MI95	Hoxeyville	10/19/2023
MS30	Coffeeville	9/11/2023
NC06	Beaufort	11/15/2023
NC25	Coweeta	12/26/2023
NE98	Santee	11/27/2023
NJ99	Washington Crossing	5/17/2023
NS01	Kejimkujik National Park	7/4/2023
NY67	Ithaca	11/8/2023
NY94	Nick's Lake	11/11/2023
NY98	Whiteface Mountain	11/9/2023
OH09	Oxford	9/27/2023
OH99	Quaker City	9/26/2023
OK99	Stilwell	9/13/2023
PA00	Arendtsville	6/12/2023
PA29	Kane Experimental Forest	6/13/2023
PA56	M. K. Goddard	6/14/2023
PA97	Laurel Hill	6/15/2023
TN04	Speedwell	12/5/2023
TN07	Edgar Evins	9/10/2023
TX41	Alabama- Coushatta	2/27/2023

Site ID	Station Name	Date Visited
TX43	Palo Duro	3/3/2023
UT09	Canyonlands NP - Island in the Sky	3/16/2023
VA13	Horton's Station	8/7/2023
VA24	Prince Edward	8/25/2023
WA04	Confederated Tribes of the Umatilla Indian Reservation	8/10/2023
WI35	Perkinstown	4/2/2023
WV18	Parsons	8/8/2023
WY06	Pinedale	5/15/2023
WY06	Pinedale	10/31/2023
WY93	Basin - Big Horn	11/9/2023
WY94	Grand Tetons National Park	5/15/2023

3.0 Specific Problems Encountered and Frequency

Each site audit consists of evaluating the existing conditions relating to NADP siting criteria, performance and condition of the equipment (collector and primary rain gauge), status of supplies, site operator's performance, and other general information relating to the site. Once the evaluations are completed and recorded on a standardized questionnaire, the information is entered into a relational database by the field auditor and summary reports are created. The number of checks performed during an audit will vary depending on the network and the type of equipment present at the site.

3.1 Findings Likely to Impact Data Quality

The evaluations considered by EEMS to have the most impact on data quality can be categorized by four elements and are listed in terms of relative importance as:

- Sample handling
- Collector operation
- Compliance with siting criteria rules and guidelines, and
- Rain gauge performance.

Table 3-1 presents the number of collectors, rain gauges and sites that meet the assessment criteria, chosen from these categories that are deemed likely to impact data quality.

Table 3-1. Collector, Rain Gauge, and Sites Meeting Criteria

	Audited	Meeting all Assessments	Percent Meeting all Assessment
Collectors	88	63	71.59%
Number of NTN ACM – type	37	25	67.57%
Number of MDN ACM – type	15	13	86.67%
Number of NTN N-CON	26	18	69.23%
Number of MDN N-CON	10	7	70.00%
Rain gauges	72	64	88.89%
Electronic Rain gauges	72	64	88.89%
Siting Criteria (only rules considered)			
Rain gauge Specific	72	63	87.50%

	Audited	Meeting all Assessments	Percent Meeting all Assessment
Collector Specific	88	71	80.68%
Other Siting Criteria			
NTN Sites	63	44	69.84%
MDN Sites	25	18	72.00%
Siting Criteria (rules and guidelines considered)			
Rain gauge Specific	72	58	80.56%
Collector Specific	88	55	62.50%
Other Siting Criteria			
NTN Siting Criteria	63	39	61.90%
MDN Siting Criteria	25	17	68.00%

All site operators were found to maintain sample media quality; however, gloves were not consistently used by all operators. The proper protocol regarding glove use was stressed during the audit visits.

In the past, EEMS has used both rules and guidelines as requirements for sites to comply with, and has made no distinctions between the two, given that both rules and guidelines are part of the site audit questionnaire. This approach was used when preparing the Annual Reports with the consequence that very few sites met all the siting criteria. Beginning with the 2021 NADP Annual Report, Table 3-1 now includes the siting criteria taking into account only rules as well as a combination of rules and guidelines.

For this 2023 NADP Annual Report, EEMS is taking into account the fact that some of the siting criteria rules have been redesignated as guidelines since it was established that the impact these rules have on data quality are not statistically significant. The following siting criteria rules are considered guidelines going forward:

- Objects greater than one meter in height within a five meters radius from the collector
- Vegetation greater than 0.6 meters in height within a five meters radius from the collector
- Use of herbicides and fertilizers within a 20 meters radius from the collector

As can be observed in Table 3-1, with these three changes, and only considering siting criteria rules, the percentage of collectors meeting all the siting criteria assessments in 2023 was 80.68%.

The majority of the assessments not meeting criteria were related to the 45-degree cone rule and collector orientation.

Table 3-2 presents the siting criteria assessments indicating whether a given assessment is a rule (R) or a guideline (G) and includes these three changes recently introduced.

EEMS applied the same methods used historically to assess siting criteria. It is EEMS' understanding that accurately completing the site audit questionnaire is the method to obtain a good description of the condition of a site. Making this information available in a searchable database allows users to extract desired data, and answer potential questions.

Appendix A contains the complete list (2023 list) of current audit assessments of siting criteria. EEMS considers siting criteria as one of the most critical criteria that could directly impact data quality. The remainder of this section and the following tables focus on the audit data that describes only the assessments that did ***not*** meet NADP criteria during this reporting period.

Modifications to the site audit questionnaire will be implemented beginning in 2024, to generate a more precise description of a site, allowing certain information to be less generic and more quantitative as well as qualitative when possible.

Table 3-2 presents the non-compliant audit data (R = rule, G = guideline) for the different sites. EEMS cannot report with any level of confidence that siting or operation for the entire NADP has improved or declined during the period of site audit performance. However, summarizing this information allows any elevated number of observed assessment failures to be quickly and easily identified. Items with a non-compliant percentage greater than 20% are identified in Table 3-2 and discussed in more detail in other sections of this report.

Table 3-2. Percent of Non-compliant Findings

	Siting and Performance Checks	Number of Assessments	Number Found non-compliant	Percent (%) non-compliant
Sample Handling				
Is sampling media quality maintained?		72	0	0
Siting Criteria Assessments				
R	Is the orifice of the collector +/- .3 m of rain gauge (elevation)?	88	8	9.09
R	45-degree rule met (rain gauge)	72	20	27.78
G	30-degree guideline for trees met (rain gauge)	72	26	36.11
R	30-degree rule for buildings met (rain gauge)	72	0	0.00
G	No objects > 1 m height inside 5 m radius (rain gauge)	72	24	33.33
G	No fences > 1 m height inside 2 m radius (rain gauge)	72	11	15.28

	Siting and Performance Checks	Number of Assessments	Number Found non-compliant	Percent (%) non-compliant
G	No vegetation height > 0.6 m within 5 m radius (rain gauge)	72	21	29.17
R	Collector oriented properly	88	8	9.09
R	45-degree rule met (collector)	88	16	18.18
G	30-degree guideline for trees met (collector)	88	33	37.50
R	30-degree rule for buildings met (collector)	88	0	0.00
G	No objects > 1 m height within 5 m radius (collector)	88	25	28.41
R	No fences > 1 m height inside 5 m radius (collector)	88	16	18.18
G	No vegetation height > 0.6 m within 5 m radius (collector)	88	27	30.68
G	No treated lumber inside 5 m radius (collector)	88	23	26.14
G	No galvanized metal inside 5 m radius collector (MDN)	25	7	28.00
R	No pastures and ag. activity within 20 m radius	88	4	4.55
G	No herbicides and fertilizers used within 20 m radius	88	9	10.23
R	Roads meet NADP siting criteria	88	3	3.41
R	Waterways meet NADP siting criteria	88	0	0.00
R	Airports meet NADP siting criteria	88	0	0.00
R	Animal operations meet NADP siting criteria (NTN)	63	0	0.00
R	Combustion sources meet NADP siting criteria	25	0	0.00
G	Parking lots and maintenance areas meet NADP siting criteria	88	5	5.68
G	Storage areas (fertilizers, road salt, manure, etc.) meet NADP siting criteria	88	0	0.00
G	Metalworking operations meet NADP siting criteria (MDN only)	25	0	0.00
ACM-type Collector Assessments				
Dry side bucket is clean (NTN)		37	4	10.81
Dry side bag installed correctly (MDN)		15	0	0.00
Does lid seal properly		52	3	5.77
Lid liner in good condition		52	0	0.00
Fan in good condition (MDN)		15	0	0.00
Cooling fan thermostat in good condition (MDN)		15	0	0.00
Heater in good condition (MDN)		15	0	0.00
Heater thermostat in good condition (MDN)		15	0	0.00
Has flush wall filter mount been installed (MDN)		15	2	13.33
Filter in good condition (MDN)		15	1	6.67
Max / min thermometer within acceptable limits (MDN)		15	0	0.00
ACM sensor operates properly		52	0	0.00
Motor box operates within acceptable limits		52	1	1.92
N-CON Collector Assessments				
N-CON fan in good condition (MDN)		10	1	10.00
N-CON cooling fan thermostat in good condition (MDN)		10	0	0.00

Siting and Performance Checks	Number of Assessments	Number Found non-compliant	Percent (%) non-compliant
N-CON heater in good condition (MDN)	10	0	0.00
N-CON heater thermostat in good condition (MDN)	10	0	0.00
N-CON max / min thermometer in acceptable limits (MDN)	10	1	10.00
N-CON sensor respond to 5 passes of the hand	36	2	5.56
N-CON lid seals properly	36	0	0.00
N-CON lid liner in good condition	36	1	2.78
N-CON arms and motor box do not require tightening	36	13	36.11
Electronic Rain Gauge Assessments			
Rain gauge operates properly (electronic gage)	72	4	5.56
Does datalogger receive event signals form all collectors (electronic gage)	72	2	2.78
Does optical sensor respond to "blocking" of light beam (ETI)	72	7	9.72
Does optical sensor respond to mist of water (ETI)	72	8	11.11

Appendix A includes the assessments of siting criteria, which are considered to be one of the areas that may impact data quality the most.

The data indicate that most of the non-compliant findings for the collectors are related to the 30-degree guideline for trees, and the objects greater than 1m tall and 5cm wide within 1m of the collector guideline. Additionally, non-compliant findings related to the guidelines for treated lumber and galvanized metal (MDN) within 5m of the collector were recorded at 26% and 28%, respectively.

The data indicate that most of the non-compliant findings for the rain gauges are related to the 45-degree rule horizontal angel, the 30-degree guideline for trees-horizontal angle, and objects greater than 1 meter tall and 5cm wide within 1m of the rain gauge.

Other assessments shown to have a high number of sites out of compliance are related to vegetation. These assessments are expected to vary depending on the season in which the audit was conducted. Early and late in the year the vegetation will be shorter, in the middle of the growing season it will be taller. Therefore, this assessment is not very useful for trend evaluation. It is also worthwhile to consider some work presented in the Open-File Report 2011-1170 by the USGS titled ***Four Studies on Effects of Environmental Factors on the Quality of National Atmospheric Deposition Program Measurements*** where it is shown that taller vegetation near the collector and rain gauge may increase collection efficiency. Vegetation height was considered in detail during the re-evaluation of siting criteria rules during the 2022 fall meeting. Changes to the siting criteria have been incorporated for assessments and reporting.

Four sites audited have experienced some changes since the last visit (i.e., to the question "No significant changes to local site conditions within 500 meters of the collector since previous audit", the response was "NO"):

- KY03-NTN: New soy bean fields are present approximately 200 meters southwest of the site.
- ME09-MDN/NTN: The site has been moved to a new location at the Greenville airport since the previous survey. The collectors are just over 100 meters from the runway. The survey leader considers the new location to be rural rather than isolated and suggests that the NADP PO review the designation.
- OR10-NTN: The met tower and some surrounding trees violate the 45- and 30-degree rules for both the collector and gauge. Many trees previously surrounding the site have been removed. The new electrical panel board is within 5 m of the gauge. The previous electrical box is within 5 m of the collector and gauge.
- OR97-NTN: New solar panels were installed at the site since the previous audit. The new solar panels are 5 m to the north of the collector and approximately 12 feet tall violating the 45-degree rule for the collector.

3.2 Audit Results for Sites with Multiple Audit Visits

Of the 88 sites audited in 2023, 82 had been previously visited by EEMS. The majority of the sites were audited in 2019 and 2020, with 31 and 41 sites respectively. In 2017 two sites were audited. In 2018 five sites were audited and one site was audited in 2021. Most of these sites have been visited four or five times by EEMS.

Six sites were audited in 2023 for the first time. Newly visited sites were MN97-MDN, OR07-NTN, TX41-NTN, WA04-MDN WA04-NTN, and WY06-MDN. Comparisons of the percent non-compliant results for successive audits are presented in Table 3-3. For those sites with more than two audits, only the last two visits were considered (i.e., audit conducted in 2023 and 2019 or 2020 for most sites).

Table 3-3. Percent of Non-compliant Items for Sites Audited more than Once

Siting and Performance Checks	% Non-compliant During 2023	% Non- compliant During Previous Audit
Is sampling media quality maintained?	0.00%	0.00
R - Is the orifice of the collector +/- .3 m of rain gauge (elevation)?	9.09	14.81
R - 45-degree rule met (rain gauge)	27.78	22.22
G - 30-degree guideline for trees met (rain gauge)	36.11	44.44
R - 30-degree rule for buildings met (rain gauge)	0.00	1.23

Siting and Performance Checks	% Non-compliant During 2023	% Non- compliant During Previous Audit
G - No vegetation height > 0.6 m within 5 m radius (rain gauge)	33.33	39.51
R - No fences > 1 m height inside 2 m radius (rain gauge)	15.28	13.58
G - No vegetation height > 0.6 m within 5 m radius (rain gauge)	29.17	16.05
R - Collector and sensor oriented properly	9.09	4.94
R - 45-degree rule met (collector)	18.18	17.28
G - 30-degree guideline for trees met (collector)	37.50	44.44
R - 30-degree rule for buildings met (collector)	0.00	0.00
G - No objects > 1 m height within 5 m radius (collector)	28.41	37.04
R - No fences > 1 m height inside 5 m radius (collector)	18.18	17.28
G - No vegetation height > 0.6 m within 5 m radius (collector)	30.68	16.05
G - No treated lumber inside 5 m radius (collector)	26.14	33.75
G - No galvanized metal inside 5 m radius collector (MDN)	28.00	22.73
R - No pastures and ag. activity within 20 m radius	4.55	3.75
G - No herbicides and fertilizers used within 20 m radius	10.23	8.75
R - Roads meet NADP siting criteria	3.41	7.41
R - Waterways meet NADP siting criteria	0.00	1.23
R - Airports meet NADP siting criteria	0.00	1.23
R - Animal operations meet NADP siting criteria (NTN)	0.00	0.00
R - Combustion sources meet NADP siting criteria (MDN only)	0.00	0.00
G - Parking lots and maintenance areas meet NADP siting criteria	5.68	9.88
G - Storage areas (fertilizers, road salt, manure, etc.) meet NADP siting criteria	0.00	0.00
G - Metalworking operations meet NADP siting criteria (MDN only)	0.00	4.55
ACM-type Collector Assessments		
Dry side bucket is clean (NTN)	10.81	9.80
Dry side bag installed correctly (MDN)	0.00	0.00
Does lid seal properly	5.77	0.00
Lid liner in good condition	0.00	5.88
Fan in good condition (MDN)	0.00	0.00
Cooling fan thermostat in good condition (MDN)	0.00	0.00
Heater in good condition (MDN)	0.00	0.00
Heater thermostat in good condition (MDN)	0.00	0.00
Has flush wall filter mount been installed (MDN)	13.33	0.00
Filter in good condition (MDN)	6.67	0.00
Max / min thermometer within acceptable limits (MDN)	0.00	0.00
ACM sensor operates properly	0.00	1.96

Siting and Performance Checks	% Non-compliant During 2023	% Non- compliant During Previous Audit
Motor box operates within acceptable limits	1.92	0.00
N-CON Collector Assessments		
N-CON fan in good condition (MDN)	10.00	28.57
N-CON cooling fan thermostat in good condition (MDN)	0.00	0.00
N-CON heater in good condition (MDN)	0.00	28.57
N-CON heater thermostat in good condition (MDN)	0.00	0.00
N-CON max / min thermometer in acceptable limits (MDN)	10.00	0.00
N-CON sensor responds to 5 passes of the hand	5.56	11.11
N-CON lid seals properly	0.00	20.00
N-CON lid liner in good condition	2.78	10.00
Arms and motor box do not require tightening	36.11	62.50
Electronic Rain gauge Assessments		
Rain gauge operates properly (electronic gage)	5.56	2.63
Does datalogger receive event signals form all collectors (electronic gage)	2.78	14.47
Does optical sensor respond to "blocking" of light beam (ETI)	9.72	22.64
Does optical sensor respond to mist of water (ETI)	11.11	21.57

Four rain gauges were flagged during the audits as “not operating properly”. Those gauges were BC24, NJ00, NJ39, and OR97. After review and QA of the rain gauge audit data, the initial reported problems were found to be related to optical sensor, or incorrect scaling of the audit standards used to assess the gauges. All gauges were in fact operating properly.

Table 3-3 shows a new item added to the N-CON questionnaire in 2019 to properly record which N-CON collectors required the motor box arms to be tightened. During 2023, 36.11% of N-CON collectors required adjustments, a dramatic improvement from 2019 and 2020, during which 62.5% of the collectors at the same sites required tightening.

Table 3-3 shows a continued decline in non-compliance of the optical sensors of the ETI rain gauge, as well as a decline in non-compliance with respect to the 30-degree guideline for trees.

Comparing data from one audit to another indicates that the number of compliant parameters increases at some sites, and decreases at other sites. Therefore, it is difficult to determine whether there has been an overall improvement to the network operation. A better assessment of network operation might be tracking the increase or decrease in sample quality codes as assigned by the laboratory responsible for evaluating and analyzing the samples. It can be assumed that as all site audit findings are addressed (siting criteria, equipment maintenance, operator procedures, etc.) there will be a quantifiable effect on sample quality.

Furthermore, not all of these performance checks have the same impact on the quality of the sample. Allowing vegetation to grow may impact sample quality less than not maintaining a clean dry-side bucket. Since most of the items found out of compliance are related to siting criteria, significant improvements in data quality may not be realized by only improvements to siting. Overall sample lab and processing cleanliness, and operator procedures, may have a greater influence on sample quality than changes in the surrounding area, including industrial or agricultural sources, obstructions, or vegetation. However, all factors may impact the overall data trend. It was noted that there were improvements overall of the ETI gage and NCON collector conditions and functionality.

3.3 Findings Related to the Wind Shield at Sites Audited

Data provided by the NADP PO indicate that rain gauges located at elevations greater than 1000 meters are encouraged to have a wind shield installed, as well as at sites where more than 20 percent of the annual precipitation is frozen. Table 3-4 presents the assessments of wind shields at the sites audited during the period covered by this annual report, and whether a shield was present at the time of the previous audit. Forty-two of the 72 rain gauges audited during the reporting period covered by this report were identified as potentially required to have a wind shield.

Table 3-4. Status of Audited Sites Requiring Rain Gauge Shields

Site ID	Network	Condition in 2023	Previous Audit	Site ID	Network	Condition in 2023	Previous Audit
AB14	MDN	Installed	Installed	MN32	NTN	Installed	Installed
BC22	NTN	Installed	Installed	MN97	MDN	Installed	New Site
BC23	NTN	Installed	Installed	MT05	NTN, MDN	Installed	Installed
BC24	NTN	Installed	Installed	MT95	MDN	Installed	Installed
CA50	NTN	Installed	Installed	NTN	YES	Installed	Installed
CO93	NTN	Installed	Installed	ND00	NTN	Installed	Installed
CO98	NTN	Installed	Installed	NF19	MDN	Installed	Installed
ID02	NTN	Installed	Installed	NS01	MDN	Installed	Installed
ID11	NTN	Installed	Installed	NY22	NTN	Installed	Installed
IN34	NTN, MDN	Installed	Installed	NY28	NTN	Installed	Installed

Site ID	Network	Condition in 2023	Previous Audit
KS97	NTN	Installed	Installed
MD08	NTN, MDN	Installed	Installed
ME02	NTN, MDN	Installed	Installed
ME04	NTN, MDN	Installed	Installed
ME08	NTN	Installed	Installed
ME09	NTN, MDN	Installed	Installed
MI52	MDN	Not Present	Not Present
MI99	NTN	Not Present	Not Present
MN01	NTN	Installed	Installed
MN23	NTN, MDN	Installed	Installed
MN27	NTN, MDN	Installed	Installed

Site ID	Network	Condition in 2023	Previous Audit
NY43	NTN, MDN	Installed	Installed
NY92	NTN	Installed	Installed
NY93	NTN	Installed	Installed
OR07	NTN	Installed	New Site
OR10	NTN	Installed	Installed
OR18	NTN	Installed	Installed
WA04	NTN, MDN	Installed	New Site
WI10	NTN, MDN	Installed	Installed
WY06	MDN	Installed	New Site
WV18	NTN	Installed	Installed
WY08	NTN, MDN	Installed	Installed

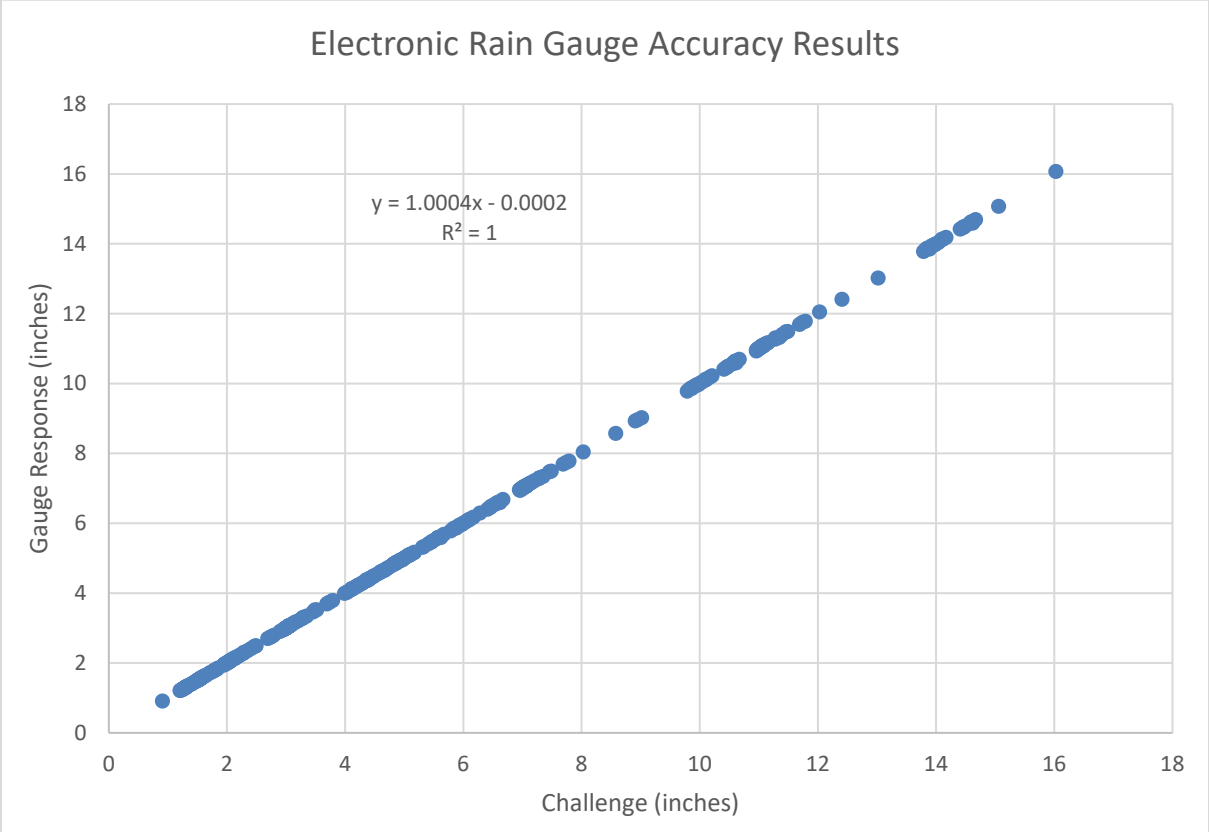
4.0 Field Site Audit Results

This section summarizes the quantifiable audit data relating to rain gauge accuracy tests and ACM collector sensor heater performance. Seventy-two rain gauges were audited during this reporting period, all of which were electronic rain gauges. All were found to be operating within NADP acceptance limits. Accuracy details are provided in the following subsections.

4.1 Electronic Rain Gauge Accuracy

The results of the accuracy tests for the 72 gauges are presented in Figure 4-1. As demonstrated by the graph, the rain gauges report the weight of the standards added very accurately for the entire span. Other issues encountered are discussed in Section 5.0. Electronic Rain Gauge Accuracy – 72 Rain Gauges

Figure 4-1. Electronic Rain Gauge Accuracy



As discussed, and presented during the NADP Spring Meeting, EEMS is developing a rain gauge challenge that more closely represents the "real-world" operation of the rain gauge. The intent of

the new test is to better determine the accuracy of rain gauge data during normal precipitation events.

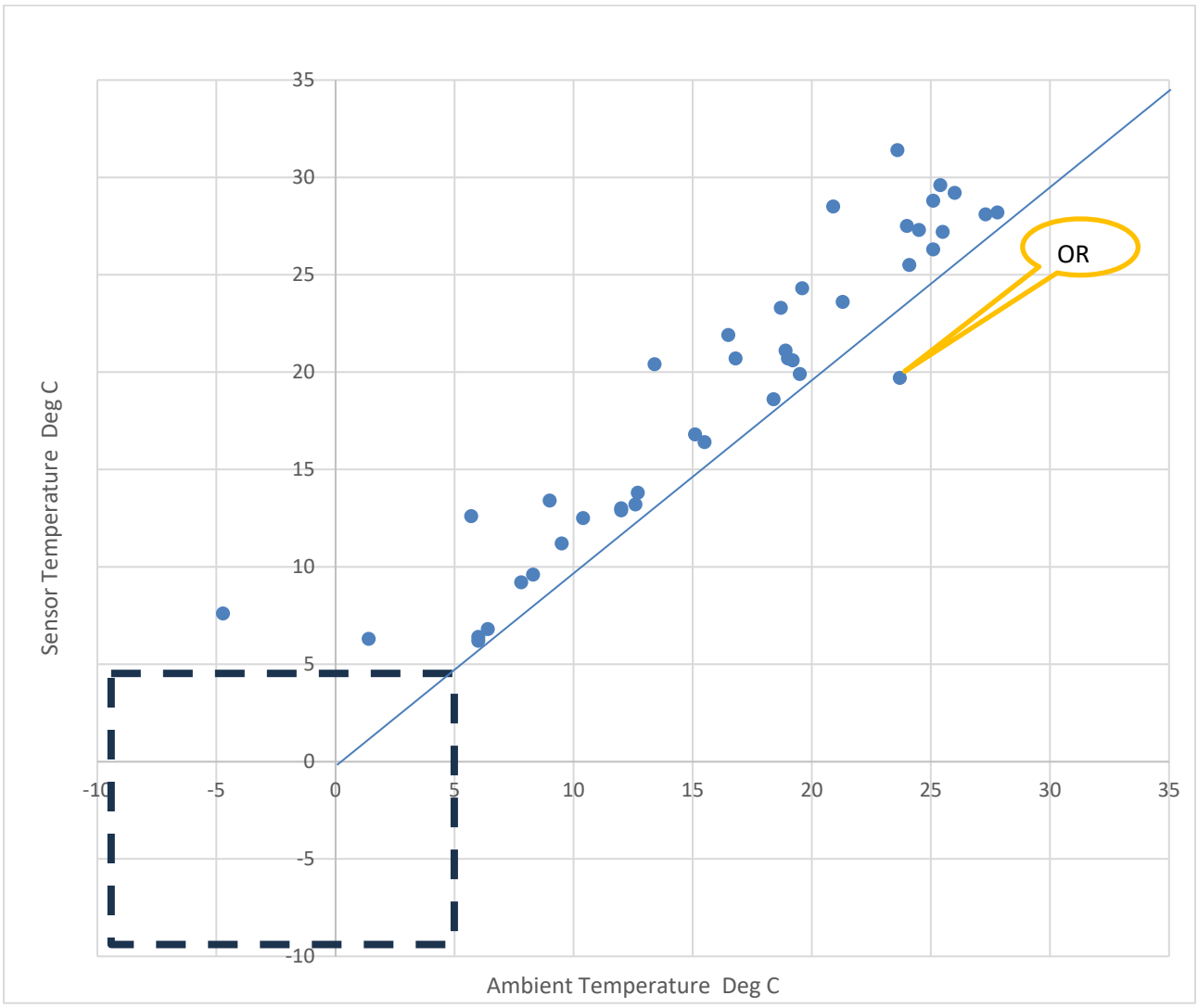
4.2 ACM Sensor Heater Tests

The ACM type collectors used throughout the networks of the NADP utilize a contact grid sensor. Two types of sensors are operated, one with 7 grids, and one with 11 grids which allows for smaller size precipitation to activate the sensor. When precipitation bridges the gap between the grid and the sensor plate the sensor is "activated" and the collector opens. In order to optimize that operation, the sensor is heated at a low level when the ambient temperature is below approximately 4˚C during dry conditions. This provides sufficient heat to melt frozen precipitation and bridge the gap quickly when a snow or ice event occurs. The manufacturer states that when the ambient temperature is above 4˚C and the conditions are dry, the sensor is not heated.

When the sensor is activated, the sensor is heated at a high level to evaporate the precipitation from the grid surface quickly when the event ends. The intent is to minimize exposure to dry deposition that can occur when the collector is open with no precipitation. The nominal temperature range of an activated sensor is approximately 60˚C within 10 minutes of activation.

The inactive sensor temperature tests are conducted using a thermocouple with the sensor shaded immediately after measuring the ambient temperature with the same device. The thin thermocouple is placed directly on the sensor plate between the sensor grids without making contact with the grid. The test results are presented in Figure 4-4.

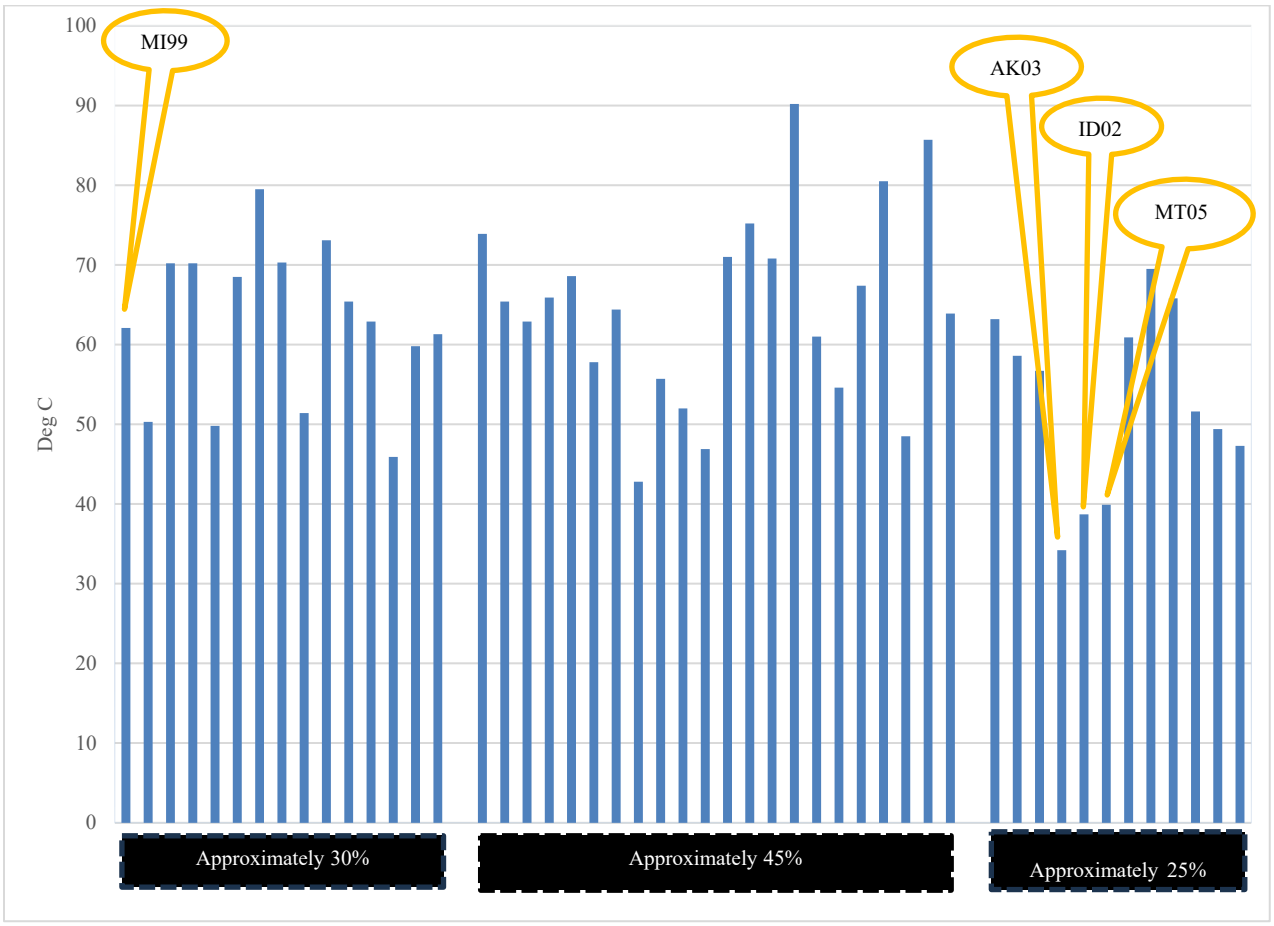
Figure 4-2. Inactivated ACM Sensor Temperature



The results indicate that low temperature sensor heaters were functioning properly, and were keeping the sensors above freezing at low ambient temperatures. Temperature measurements of the ambient and inactive sensor at OR97 may have been measured at different times, resulting in poor comparison.

Figure 4-5 presents the maximum temperature reached by each sensor when activated, and the time required for each sensor to reach that temperature. There is some variability between sensors for maximum temperature, but most sensors are between 50˚C and 80˚C within 10 minutes of activation.

Figure 4-3. Activated ACM Sensor Temperature Increase and Elapsed Time



The conditions (light rain) during the audit at MI99 caused the sensor to be activated prior to testing and therefore was at the maximum temperature upon arrival and the time to maximum temperature of zero minutes. The thermocouple standard used for ID02 and MT05 was broken and an RTD was used instead which may not have responded accurately to the sensor heat due to poor contact with the surface. Ambient temperatures and wind may have affected the maximum temperature measurement at AK03.

Sensor test data indicate that the ACM heated grid sensors in the network are functioning as expected throughout the network. Based on the evaluations performed on the sensors during the site audits, (checks on the temperature of the plate and one water drop sensitivity test), it cannot be determined whether or not there is any difference in the performance of the 7-grid and the 11-grid sensor.

4.3 Thies Sensor Tests

The N-CON collectors in the networks use an open-path sensor manufactured by Thies to detect precipitation and activate the collector. Thies sensors are evaluated by counting the number of

passes of a pen through the open-path required to activate the collector. The NADP has prescribed that the sensor sensitivity be set to 5 passes through the sensor. A few sensors responded after only 3 passes through the sensor.

Other sensor evaluations include inspection of the sensor housing to ensure there are no cracks that would allow moisture to enter the sensor. None of the sensors inspected during 2023 were reported to exhibit any cracks.

4.4 N-CON Motor/Lid-Arm Set Screws

EEMS continues to tighten lid arm setscrews and apply Loctite when necessary. During this process the lids are adjusted to seal properly and the site operator is instructed as to how to evaluate the collector to maintain proper adjustment. During 2023, 36 N-CON collectors were audited. Out of the 36 collectors, 13 required the set screws and lid arms bolts to be adjusted and tightened. Given that N-CON collectors are now being audited once every three to four years, emphasis should be placed to ensure site operators are aware of this problem, and that they have proper written instructions and tools to perform the necessary adjustments.

In order to answer the question of whether or not the lid seals properly, EEMS tests how easy it is to lift the lid a little by gently pushing the lid upward with a finger. If the lid is easily lifted, showing as a small gap between the lid seal and the bucket/chimney, similar to what a gust of wind would cause, then the collector would be flagged as having a "poor lid seal". However, there are instances when, although the arms may need adjusting, the lid remains tightly in place, and no gap appears when trying to lift the lid. In such case the collector would not be flagged as having a "poor lid seal". Proper lid seal is a ***direct indicator*** of data quality. Loose lid arms ***may be*** an indicator of compromised data quality.

Data collected since the introduction of N-CON single bucket collectors to the NTN network beginning around 2011 indicate that a significant percentage of collectors had a poor lid seal. It can also be seen in Figure 4-6 that the number of collectors that need adjustment correlates with the total number of collectors observed. Some of the collectors visited have been adjusted and tightened during repeat visits, meaning that the initial repair with Loctite did not last between audit visits. This indicates the design flaw in the lid arms is likely to continue to be a problem with the collector going forward.

Figure 4-4. N-CON Collectors Audited and Adjusted per Audit Year

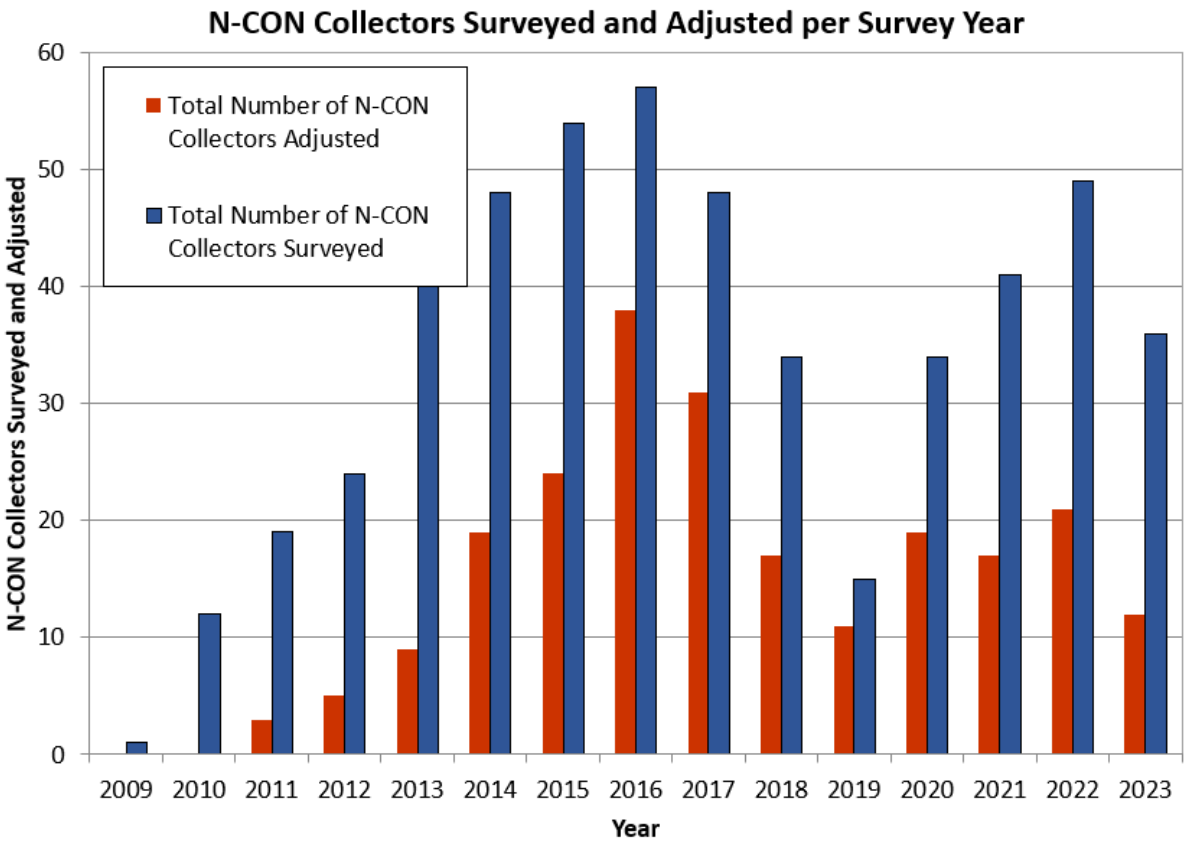
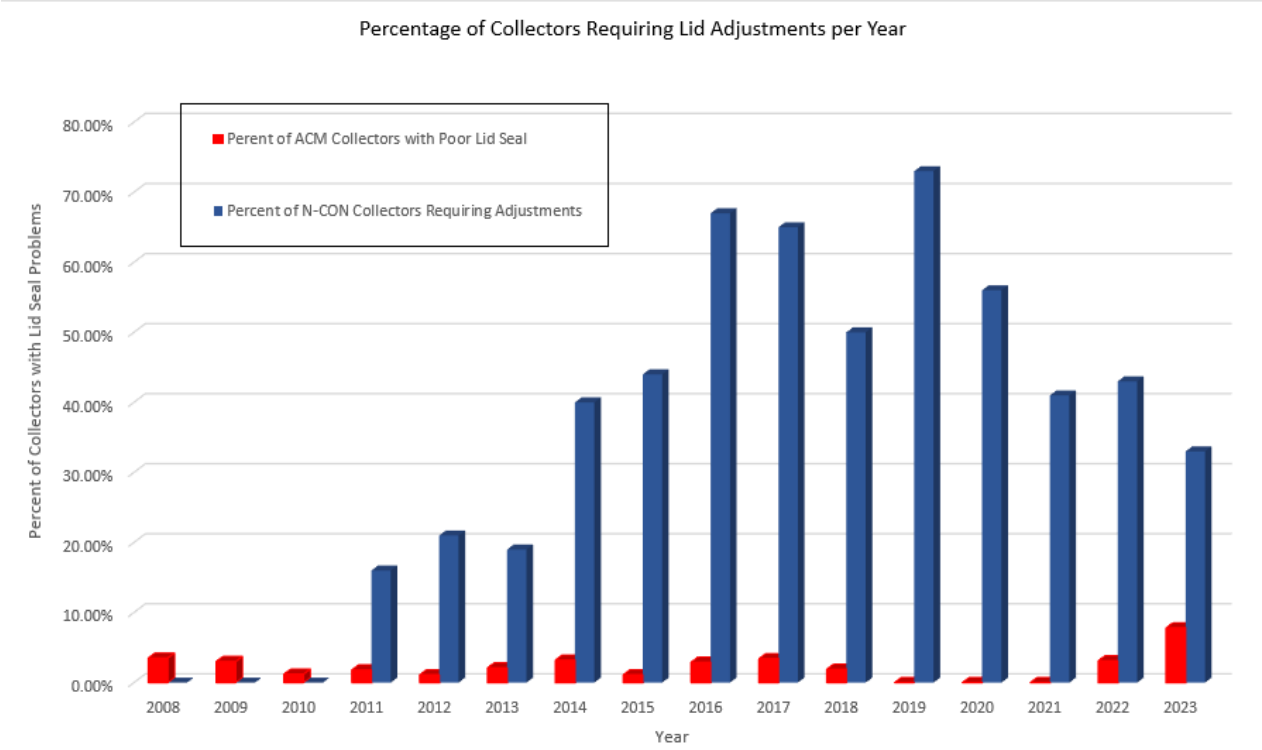


Figure 4-7 is a comparison of ACM-type collector lid seal compared to the percentage of N-CON collectors that required lid arm adjustments. It is clear that poor lid seal condition increased with the introduction of N-CON collectors to the network.

Figure 4-5. Percentage of N-CON and ACM-type Collectors Requiring Lid Adjustments



EEMS continues to install the upgrade plastic spacer, or closed-cell foam, that is placed on the collector motor (inside the collector housing) and holds the motor more securely against the lid of the collector housing. The intention is to limit the movement of the motor when the collector is opening/closing which should in turn help to keep the sets screws from loosening.

Sites with spacers installed still sometimes require adjustment of the arms. The upgrade may increase the length of time between adjustments, but it is not a pemanent solution. The 2023 data indicate that there has been an improvement in N-CON lid seals for the same sites visited, which could be due to the combination of previous tightening and the adding spacers to the motor box.

5.0 Recommendations to the NADP Program Office

The following subsections provide recommendations that, in the opinion of EEMS, would help to improve the operation of the sites and quality of data collected by the NADP.

5.1 Siting Criteria

Following the fall 2022 joint meeting in Knoxville, the NADP revised the siting criteria. EEMS has made the changes and improvements to the site audit procedures to document and report the conditions as they relate to the revised siting criteria.

As was the case in previous years, most of the assessments that were found to be non-compliant are related to siting criteria. Particularly:

- 30-degree guideline for trees
- guideline for vegetation taller than 0.6 meters
- the guideline for objects taller than 1 meter, within 5 meters of the collector or rain gauge.

The latter two were recently designated as guidelines rather than rules.

It has previously been suggested that the list of assessments that are critical to the operation of the sites and data quality continue to be refined. In addition, research that has been conducted by the USGS and others that relate siting criteria to sample quality should be used to determine if assessments can be removed or added to the site audits.

Although qualitative information is important, further refinement of the assessments should include more quantitative information that might be more useful and valuable. For example, the effect of trees within a 30-degree cone of the collector on data quality should be further investigated, as it directly effects the laboratory results. If it is found that the effect of the trees truly has an adverse effect on data validity, more proactive efforts should be implemented to remove, or mitigate, the number or height of trees with in the 30-degree, or 45-degree cone.

The same may be true for the actual effects on data quality of objects taller than 1m and 5cm wide within 5m of the orifice. It may be economically feasible to make these minor changes to improve data quality and the usefulness of it.

In a USGS Open-File Report “Four Studies on Effects of Environmental Factors on the Quality of National Atmospheric Deposition Program Measurements” by Gregory Wetherbee et al, that taller vegetation near the collector may actually improve collection efficiency and therefore could be considered to be positive and not a negative influence.

While the 45-degree rule criterion for older sites may be less attainable, at least economically, efforts should be made to accomplish this goal when installing new sites or relocating sites.

Further discussions by the Quality Assurance Advisory Group (QAAG) have addressed some of these issues. It is expected that future reports will address those decisions and refinements. Once this is accomplished and a smaller list of items that are significant to site operation and data quality is identified, more detailed tracking of site conditions and improvements may lead to trends in data as to specific improvements at individual sites.

5.2 Documentation and Training

Training for all networks is an essential function for maintaining NADP data quality. EEMS will continue to be informed of the changes and ensure site operators are made aware of available resources on the NADP website.

It is important to continue to modify and update site operation reference documentation and distribute that documentation to the operators, supervisors, and data users. EEMS is aware that this process has been ongoing at the NADP PO and updated manuals and procedures are made available on the NADP website as they are completed and approved. Links to the manuals and training information (support tab) has been added to the home page of the NADP website:

- https://nadp.slh.wisc.edu/siteops/#ntn
- https://nadp.slh.wisc.edu/siteops/#mdn

This process should continue and will continue to improve the field training for new site operators. This is an improvement over the distribution of hardcopy documents that have been produced in the past.

Further improvements could be realized through interactive web-based forms. This could not only reduce some costs, but may engage the site operators and increase interest and participation in data and site evaluation.

5.3 Equipment and Procedures

The following subsections pertain to problems observed with equipment and suggestions for improvement to equipment and procedures used to collect NADP data.

5.3.1 ACM Type Collector

In general, the ACM Type Collector function has improved, either through better site operator awareness and participation, or improved maintenance efforts during the site audits.

Sensor Temperature

Improvement was observed regarding site operators testing the sensor heater before activating the motor box (see Section 4.0). EEMS continues to review the proper operation of the sensors with the site operators, and stresses the importance of testing the sensors each week.

Sensor Response Tests

All of the ACM sensor assessments were in compliance. The program office has updated the components used when rebuilding and repairing sensors which seems to have also improved sensor operation.

5.3.2 ACM Collectors in General

During this reporting period a minimal number of assessments fell below criteria:

- lid seal (3) or 5.77%
- dry side bucket cleaned or changed (4) or 10.81%
- flush wall filter mount (2) or 13%
- motor box operation (1) or 2%

Instructions are given to site operators during every site audit regarding ongoing and annual maintenance procedures. One motor box failure is a remarkable improvement.

As reported previously, it was observed that there is some lack of consistency regarding sealing of the unused MDN sample train chimney. The collectors were originally approved and provided with a plastic funnel and hose to allow precipitation to pass through the chimney and out the bottom of the collector. Some of the older collectors have been in the field long enough that the funnel or hose, or both have deteriorated causing leaks into the collector housing. Most site operators have corrected the leaks using various materials to seal the opening of the chimney.

It is suggested that second chimney funnel and drain hose be added to the requested supplies section of the field data form so operators can request approved materials for the repair of their collectors.

5.3.3 N-CON MDN Heaters

Once operation of the heated N-CON collector for MDN began, it was determined that improved operation could be achieved by modifying the passive heater to include a fan to actively circulate the air inside the collector and chimney. Photos of collectors taken during audits indicate collectors have been modified to include the circulating fan.

All of the heaters assessed during this reporting period were in compliance.

5.3.4 N-CON NTN Bucket Collector

Generally, the N-CON collectors function well and are easy to operate and are an improvement to the network. The problems documented during the previous reporting period are well known and are being addressed. They include:

- Motor/lid-arm adapters that become loose and need adjustment either after shipping or operation of the collector.
- High power consumption and not well suited for direct current (DC) operation.

During this reporting period, 13 NCON lid-arm adjustments were required, a substantial improvement to the previous audit visits at the same sites. This is likely due to the previous adjustments, education of site operators to perform the adjustments, and the addition of motor box spacers. It is anticipated that the frequency of non-compliance will continue to decline.

Additionally, solar power improvements have been implemented over the last four years.

5.3.5 Electronic Rain gauge

After years of transitioning from Belfort to electronic rain gauges, during 2023 no Belfort gages were audited. Though electronic gages are an improvement, some of the ETI NOAH IV rain gauges that have been operating for several year, exhibit excessive corrosion around the connections for the sensors and the batteries, as well as corrosion of the shell screws. As part of the audit, all connectors are cleaned and dielectric grease is applied by the auditor. The screws and batteries are replaced as needed. So far, the OTT Pluvio electronic rain gauges have not exhibited problems.

In general, improvements have been made in regard to the incidence of sensor failures. In 2023, the number of sensor failures to "blocking of light beam" was 7 or 9.7%, and failures to "responding to mist" was 8 or 11.11%. Sometimes, cleaning the optical sensors of debris/spider webs, etc., has resolved the issue. However, a lack of replacement shell cover availability has been an ongoing problem.

5.3.6 Data Download and Transmission

Of the 72 rain gauges audited in 2023, one operator is still utilizing a PDA to download rain gauge data.

The Campbell Scientific Firmware in the rain gauge data logger was updated at most sites, and the Bluetooth dongle was replaced. With this modification the PDA can still be used, but an Android phone loaded with the Campbell Scientific Logger Link App is most often used by the site operator to interface with the rain gauge and download data. Thirty-five of the seventy-two site rain gauges utilize the Logger Link App with an Android phone.

Twenty-one rain gauge dataloggers utilized the SC115 devices, similar to USB thumb drives that connect directly to the logger serial port and data are transferred to the device automatically. The thumb drive is then transported to an internet connected computer where the data files are uploaded to the PO. Within minutes of this step, data are automatically posted, and are available on the PO website for site operators to view.

This process works very well. The only disadvantage noted is the lack of the ability to observe any of the rain gauge or collector parameters while at the site. Site operators are not able to troubleshoot the equipment and determine if adjustments or repairs are needed to correct any operational problems.

Fifteen rain gauge dataloggers use telemetry to transmit near real-time data.

6.0 Results of Field Laboratory and Procedure Assessments

The field site audit results have been presented and discussed in other sections of this report. Current field laboratory procedures are limited to sample weighing and decanting at NTN sites. This section will focus on weighing and decanting the NTN samples, and sample handling at MDN sites.

All site operators were observed to be proficient with sample weighing and decanting procedures. During the audits, training procedures were reinforced regarding not mixing the sample prior to decanting. One suggestion that may be of value would be to move the field lab as close to the sample site as possible to help eliminate sample loss or mixing while transporting the sample to the lab. This is most practical at sites co-located with CASTNET sites, since there is usually space available for the lab equipment.

6.1 Sample Weighing

Although very accurate and easy to use, electronic scales require routine and regular maintenance. This is usually provided by a service contractor that visits the lab and certifies the scale. Scales that are determined to be functioning poorly during the site audits should be identified as action items and require some follow-up from the NAL. This could include replacing the scale with a surplus instrument. Table 6-1 presents results for the scales audited when challenged with four standard Belfort weights (from approximately 830g to 3400g). An average error of 0.5% or more was used as the accuracy tolerance.

Table 6-1. Average Percent Difference for Site Scales

Site Id	Scale Type	Average % Diff	Site Id	Scale Type	Average % Diff
AK01	Mettler Toledo ME4001 TE/00 digital	0.03%	ME04	Ohaus Triple Beam	0.03%
AK03	Sartorius CPA62025 Digital	0.03%	ME08		0.03%
BC22	AE Adam Model CKT16 Digital	0.09%	ME09	Ohaus Model 1900	0.09%
BC23	AE Adam Model CKT16	0.09%	MI99		0.09%
BC24	AE Adam model GBC35A	-0.38%	MN01	And Model EK-12KA	-0.38%
CA50	Sartorius AQ Gottingen Digital	-0.12%	MN23		-0.12%
CA66	Bonvoisin (digital)	0.05%	MN27	Sartorius Model Combics 2	0.05%
CA88		0.11%	MN32		0.11%
CO80	Ohaus Explorer	0.02%	MT05		0.02%
CO93	Ohaus Heavy Duty Solution Balance	0.06%	MT96		0.06%
CO98	Sartorius CPA6202P Digital	0.04%	ND00		0.04%

Site Id	Scale Type	Average % Diff
FL00	Ohaus Navigator Digital	0.00%
FL14		0.00%
FL23	Ohaus/Champ	-0.22%
FL41		-0.02%
ID02		-0.19%
ID11		0.00%
IL11	Denver Instruments S-8001	0.01%
IL78	Ohaus Triple Beam	0.03%
IN22	Sartorius 16000	0.19%
IN34	Adam Model CKT8	0.02%
KS97	Adam CBK 8a	0.05%
KY03		-0.02%
KY10		0.15%
KY19		-0.06%
KY35		0.05%
MA01	Mettler Toledo XA3001S digital	-25.27%
MD08	Ohaus Digital Scout	0.06%
MD13	Digiatal Mettler PC4000	0.09%
MD15	Ohaus Digital Scout	-0.07%
MD18	Ohaus Adventurer Pro 3000 g	0.05%
ME02		0.01%

Site Id	Scale Type	Average % Diff
NJ00	Acculab VA Series	0.00%
NJ39	Ohaus Heavy Duty Solution Balance	0.00%
NJ99	Ohaus Heavy Duty Solution Balance	-0.22%
NY22	Ohaus Precision Std. digital	-0.02%
NY28	AdamCBK16AH digital	-0.19%
NY43		0.00%
NY92	AdamCBK16AH digital	0.01%
NY93	AdamCBK16AH digital	0.03%
OR07	Ohaus Explorer	0.19%
OR10	Mettler PE24 digital	0.02%
OR18	Ohaus Heavy Duty Solution Balance	0.05%
OR97	SR16001 Delta Range	-0.02%
PA72		0.15%
TN04		-0.06%
TN11		0.05%
TX41	AE Adam CKT16 Digital	-25.27%
WA04	Ohaus Explorer	0.06%
WI10		0.09%
WV18	Mettler PM 30	-0.07%
WY08		0.05%

6.2 MDN Sample Handling

Although all site operators observed while exchanging MDN sample trains were careful to maintain sample quality and avoid contamination, some did not use gloves, or change gloves as often during the procedure as recommended by the NAL. Other observations of the procedures include:

- Not capping or securing the sample prior to removing the used sample train
- Not prioritizing the sample and sample bottle contamination above the used sample train cleanliness
- Not maintaining the new sample bottle lid on the bottle until placement in the sampler

The SOP procedures were emphasized during the audits. It is suggested that the SOP procedures, especially those observed to have been lax in the field, also be stressed during the MDN sample change-out webinars or any new training programs implemented by the NAL.

7.0 Data Quality Information

Several procedures are in place to help ensure audit data quality. Foremost, a comprehensive QAPP was developed prior to collecting audit data. Field audit team training was provided to ensure consistency of methods. Duplicate entry of audit data is implemented to help detect and correct typographic errors. Ongoing review of results for accuracy and consistency is provided by the EEMS' QA Manager, who is not involved with the field data collection.

7.1 Quality Assurance Project Plan

Improvement to procedures for collecting audit data, recording data in the audit database, and reporting audit results is an ongoing process. As improvements are identified, suggested changes are submitted for approval by the EPA Project Officer, and the NADP QA Manager. Once the suggested changes are approved the Site Audit QAPP and associated SOPs can be updated. The project QAPP was revised in August 2021, and more recently in April 2024. The 2024 QAPP was submitted, comments were received and reviewed and the final draft is in production.

7.2 Field Team Training and Internal QA Audits

Initial audit team training took place while performing two audits in Indiana in December 2007. Audit team members routinely share experiences through regular communication which helps to clarify questions that may arise the first time a problem is encountered. This is an ongoing process that will continue, thereby expanding the knowledge base of the team and maintaining consistency of methods.

Whenever possible, all audit teams meet and cooperatively complete a site audit. In the past this was accomplished at site IL11 since that site operates all NADP networks and allows the greatest exchange of information and methods among the team members. The most recent cooperative site audit at KY10 (MDN & NTN) was performed in February, 2023. This was very beneficial for the most recently hired audit member. The EEMS QA manager attended the audit and training activities. The next cooperative site audit is scheduled for February 2024 and will be conducted at GA09 (MDN & NTN).

Site operator questionnaires, soon to be renamed, the Customer Satisfaction Survey, are provided to each site operator following a site audit. The information gathered is used to improve the site audit program. It is anticipated that refinement of the questionnaires, with input from the NADP PO and laboratories will take place in the near future with the goal of further improvements to the audit program. Planned enhancements are to eliminate paper copies, include more pertinent questions, and to provide a link for the site operator to submit the survey electronically. By use of the electronic copy, any problems at the site following the audit can be relayed to and addressed by

the auditor himself. This enhancement is valuable in maintaining data quality and collection, as well as providing an ongoing record of the site auditors' performance. Common mistakes will be revealed and can be incorporated into training materials.

7.3 Training Class Attendance and Webinar Participation

In order to keep up with changes to the NADP procedures and protocols, EEMS audit team members have attended past site operator training classes provided by the former, Mercury Analytical Laboratory (HAL), Central Analytical Laboratory (CAL), and Program Office and participate in past webinars. The laboratories have been combined to form the NAL.

EEMS understands that implementation of a training program is in flux since the PO and laboratories transitioned to the WSLH. The training program allowed the audit team members to stay current with procedures and changes to site equipment. It has also allowed EEMS to provide the NADP PO with feedback and suggestions to improve the site operator training classes. EEMS intends to participate in future training webinars, when scheduling permits, to remain up to date with any changes. EEMS personnel also attend NADP/NOS and participate in QAAG to stay current on any changes and provide feedback on any proposed changes having QA impacts at sites.

7.4 Duplicate Data Entry

A routine procedure utilized as part of the EEMS QA program for audit data, is duplicate data entry. Field personnel enter audit data results into the Field Site Audit Database (FSSD) after completing the audit. An initial spot report is generated using this raw data. After completing approximately three audits, the database is sent electronically to the EEMS office. The original hardcopy field forms are sent to the EEMS office via FedEx.

Upon receipt of the field forms, a second set of data tables are populated independently using the original hardcopy forms. The QA Manager then compares the two sets of tables. Discrepancies are identified and investigated to determine the intended entry. In some cases, this requires contacting the field personnel to verify or confirm a result. If necessary, after the QA process and acceptance by the QA Manager, a revised spot report is generated from the set of tables populated at the office. This preserves the original set of tables populated in the field, and provides review, tracking, and edit documentation for the audit results and reports. The photos taken during the site audit are scrutinized during the QA process to ensure that the data recorded is in agreement with the photos.

Once data have been approved by the QA Manager, appropriate tables are generated and sent to the EPA Project Officer. This procedure is performed each quarter.

7.5 Identifiable Areas of Improvement to the Audit Program

As with all programs, continuous efforts are underway within the audit program to provide improvements to techniques and procedures in an attempt to deliver useful and meaningful information to the EPA and NADP PO. Those efforts have been described in the previous sections. As a direct result, the improvements summarized in the following subsections are being implemented.

7.5.1 Site Audit Questionnaire

Despite considerable effort on the part of both EEMS and the NADP PO, some of the questions contained in the Site Audit Questionnaire remain ambiguous. This has led to some audit field personnel interpreting some questions one way, while another team member might interpret the same question differently. Additionally, some audit questions are redundant or impossible to answer accurately during the field site audit. In the past, as cases were discovered during review of the audit reports, additional clarification was requested from the NADP PO regarding the intent of the question. This information was then shared with the audit team members to eliminate confusion and maintain consistency.

Another, substantial, revision of the Site Audit Questionnaire was developed and approved by the NADP PO at the end of the year. It includes more questions and those that are more pertinent and straight forward, less ambiguous. Additionally, the field forms are generated from the electronic questionnaire and so therefore can be very site specific as well as equipment type specific. This should improve data management/QA substantially in the areas of double entry, compilation data review and data submission.

Refinement and improvement to the information collected during a site audit will continue. It is expected that feedback regarding the audit data will be provided on an annual basis from the NADP PO and other data users so that EEMS can continue to collect data that are meaningful and useful to the NADP.

7.6 Audit Equipment Certification

The instruments used by the audit team are maintained and certified by the EEMS Audit Team Leader. Most undergo annual certification by various sources. Digital multi-meters (DVM) are certified National Institute of Standards and Technology (NIST) traceable by a third party. The DVMs are used to measure temperature with a thermocouple input which is certified with a NIST-traceable Resistive Temperature Detector (RTD).

The weights used to challenge the weighing rain gauges and site scales are certified annually on a NIST-traceable electronic scale at the EEMS facility in Gainesville, FL.

The compass used to determine the azimuth of objects near the collector is certified as NIST-traceable annually by a third party.

All certification documentation is provided in Appendix C.

APPENDIX A

All Siting Criteria Assessments

StationId	Network	SiteType	SameHeight	GageDistance	GageMounting	GageHeight	GageGroundCove	Gage45DegreeRul	Building30Degree	e30DegreeTreeR	30DegreeBuildin	e5mRadius1mHe	2mRadiusFenceH	GageVegeHeight	ageShieldRequire	GageShieldOk	GageShieldType
AB14	MDN	RURAL	YES	5.7	PLATFORM	2.7	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
AK01	NTN	ISOLATED	YES	11	PLATFORM	1.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
AK03	NTN	RURAL	YES	5.6	OTHER	1.15	NATURAL	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
BC22	NTN	RURAL	YES	5.1	PLATFORM	1.59	NATURAL & ARTI	NO	NOT APPLICABLE	YES	YES	NO	YES	NO	YES	YES	ALTER TYPE
BC23	NTN	RURAL	YES	2.5	BUILDING	4.4	NATURAL & ARTI	YES	YES	YES	YES	NO	YES	YES	YES	YES	ALTER TYPE
BC24	NTN	RURAL	YES	5.6	OTHER	1.36	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	NO	YES	YES	YES	ALTER TYPE
CA50	NTN	RURAL	YES	7.8	PLATFORM	3.5	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
CA66	NTN	ISOLATED	NO	5.8	OTHER	0.82	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
CA88	NTN	SUBURBAN	YES	5.7	OTHER	1.23	NATURAL		NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
CO80	NTN	RURAL	YES	6.98	OTHER	1.53	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
CO93	NTN	RURAL	NO	5.4	PLATFORM	3.5	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
CO98	NTN	ISOLATED	YES	15	PLATFORM	2.2	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
FL00	NTN	RURAL	YES	7.5	OTHER	1.3	NATURAL	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	NO	NOT APPLICABLE	NONE
FL14	NTN	RURAL	YES	6.3	OTHER	1.53	NATURAL	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
FL23	NTN	ISOLATED	NO	2.8	PLATFORM	1.19	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	NO	YES	NO	NO	NOT APPLICABLE	NONE
FL41	NTN	RURAL	YES	7.1	OTHER	1.28	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
ID02	NTN	ISOLATED	YES	6	PLATFORM	1.7	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
ID11	NTN	ISOLATED	NO	28	OTHER	2.25	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	OTHER
IL11	NTN	SUBURBAN	YES	6.2	OTHER	1.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	NO	YES	NO	NO	NOT APPLICABLE	NONE
IL78	NTN	RURAL	YES	5.84	OTHER	1.36	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
IN22	NTN	RURAL	YES	5.5	OTHER	1.17	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
IN22	MDN	RURAL	NO	5.5	OTHER	1.17	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	NONE
IN34	MDN	SUBURBAN	YES	6.04	OTHER	1.47	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
IN34	NTN	SUBURBAN	YES	10.97	OTHER	1.47	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
KS97	NTN	RURAL	YES	6.93	PLATFORM	1.65	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
KY03	NTN	RURAL	NO	5.76	OTHER	0.9	NATURAL	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
KY10	MDN	RURAL	YES	6.23	OTHER	1.16	NATURAL & ARTI	NO	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
KY10	NTN	RURAL	YES	7.13	OTHER	1.16	NATURAL & ARTI	NO	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
KY19	NTN	URBAN	YES	5.71	OTHER	1.47	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
KY35	NTN	RURAL	YES	5.57	OTHER	1.33	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	NO	YES	YES	NO	NOT APPLICABLE	NONE
MA01	MDN	RURAL	YES	9.07	OTHER	1.04	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	NO	YES	NO	NO	NOT APPLICABLE	NONE
MA01	NTN	RURAL	YES	7.7	OTHER	1.04	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	NO	YES	NO	NO	NOT APPLICABLE	NONE
MD08	NTN	ISOLATED	YES	3.95	PLATFORM	1.2	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
MD08	MDN	ISOLATED	YES	8	PLATFORM	1.2	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
MD13	NTN	RURAL	YES	6	GROUNDLEVEL	0.82	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	NO	YES	NO	NOT APPLICABLE	NONE
MD15	NTN	ISOLATED	YES	6	OTHER	1.25	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
MD18	NTN	RURAL	NO	6.2	OTHER	0.9	NATURAL	YES	NOT APPLICABLE	NO	YES	NO	YES	YES	NO	NOT APPLICABLE	NONE
ME02	MDN	RURAL	YES	5.12	OTHER	1.2	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
ME02	NTN	RURAL	YES	5.25	OTHER	1.2	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
ME04	NTN	RURAL	NO	10.8	PLATFORM	2.07	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
ME04	MDN	RURAL	NO	10.2	PLATFORM	2.07	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
ME08	NTN	ISOLATED	YES	5.44	PLATFORM	2.3	NATURAL	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
ME09	MDN	ISOLATED	YES	9.14	OTHER	1.58	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
ME09	NTN	ISOLATED	YES	5.6	OTHER	1.58	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
MI52	MDN	SUBURBAN	NO	5.88	GROUNDLEVEL	0.86	NATURAL & ARTI	NO	NOT APPLICABLE	YES	YES	NO	YES	YES	YES	NOT APPLICABLE	NONE
MI99	NTN	RURAL	YES	5.65	OTHER	1.18	NATURAL	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES	NOT APPLICABLE	NONE
MN01	NTN	RURAL	YES	5.3	PLATFORM	1.73	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE

StationId	Network	SiteType	SameHeight	GageDistance	GageMounting	GageHeight	GageGroundCove	Gage45DegreeRul	Building30Degree	e30DegreeTreeR	30DegreeBuildin	e5mRadius1mHe	2mRadiusFenceH	GageVegeHeight	ageShieldRequire	GageShieldOk	GageShieldType
MN23	NTN	RURAL	YES	6.24	OTHER	1.55	NATURAL	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
MN23	MDN	RURAL	YES	6.9	OTHER	1.55	NATURAL	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
MN27	MDN	ISOLATED	NO	5.6	PLATFORM	1.27	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
MN27	NTN	ISOLATED	YES	6.9	PLATFORM	1.27	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
MN32	NTN	ISOLATED	NO	8.75	GROUNDLEVEL	1	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
MN97	MDN	RURAL	NO	5.59	PLATFORM	0.95	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES	NOT APPLICABLE	NONE
MT05	NTN	ISOLATED	YES	5.3	OTHER	1.1	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	NO	NO	NO	YES	YES	ALTER TYPE
MT05	MDN	ISOLATED	YES	8.6	OTHER	1.1	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	NO	NO	NO	YES	YES	ALTER TYPE
MT95	MDN	ISOLATED	NO	1.46	BUILDING	4.1	NATURAL & ARTI	YES	YES	YES	YES	NO	NO	NO	YES	NOT APPLICABLE	NONE
MT96	NTN	ISOLATED	YES	8.1	PLATFORM	1.46	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
NC26	MDN	RURAL	YES	4.8	OTHER	1.47	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	NO	NOT APPLICABLE	NONE
ND00	NTN	ISOLATED	YES	6.2	OTHER	1.15	NATURAL & ARTI	NO	NOT APPLICABLE	YES	YES	NO	YES	NO	YES	NO	ALTER TYPE
NF19	MDN	RURAL	YES	5.64	OTHER	1.63	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
NJ00	NTN	SUBURBAN	YES	5.6	OTHER	1	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
NJ39	NTN	SUBURBAN	YES	5.1	OTHER	1.27	NATURAL	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	NO	NOT APPLICABLE	NONE
NJ99	NTN	URBAN	YES	4.35	OTHER	1.19	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	NO	YES	YES	NO	NOT APPLICABLE	NONE
NS01	MDN	ISOLATED	YES	7.12	OTHER	1.55	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
NY22	NTN	RURAL	YES	6.35	PLATFORM	1.27	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
NY28	NTN	RURAL	YES	3.2	BUILDING	0.86	NATURAL & ARTI	YES	YES	YES	YES	NO	NO	YES	YES	YES	ALTER TYPE
NY43	MDN	URBAN	NO	4.84	PLATFORM	2.35	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	NO	NO	YES	YES	YES	ALTER TYPE
NY43	NTN	URBAN	NO	2.37	PLATFORM	2.35	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	NO	NO	YES	YES	YES	ALTER TYPE
NY92	NTN	URBAN	YES	3.6	PLATFORM	2.52	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	NO	NO	YES	YES	YES	ALTER TYPE
NY93	NTN	RURAL	YES	4.1	PLATFORM	1.74	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	YES	YES	ALTER TYPE
OR07	NTN	ISOLATED	YES	11.5	OTHER	1.57	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	ALTER TYPE
OR10	NTN	ISOLATED	YES	7.4	PLATFORM	1.05	NATURAL	NO	NOT APPLICABLE	NO	YES	NO	YES	NO	YES	YES	ALTER TYPE
OR18	NTN	ISOLATED	YES	7.8	OTHER	2.47	NATURAL	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES	YES	ALTER TYPE
OR97	NTN	SUBURBAN	YES	6.37	PLATFORM	1.21	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
PA72	NTN	RURAL	YES	4.68	OTHER	1.41	NATURAL & ARTI	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
TN04	NTN	RURAL	YES	5.85	OTHER	0.9	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
TN11	MDN	RURAL	YES	11.7	OTHER	1.33	NATURAL	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
TN11	NTN	RURAL	YES	6.09	OTHER	1.33	NATURAL	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
TN12	MDN	ISOLATED	YES	5.9	OTHER	1.26	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
TX41	NTN	RURAL	YES	5.7	OTHER	1.27	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO	NOT APPLICABLE	NONE
WA04	NTN	RURAL	YES	4.7	PLATFORM	1.25	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
WA04	MDN	RURAL	YES	5.45	PLATFORM	1.25	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
WI10	MDN	ISOLATED	YES	5.7	PLATFORM	1.75	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
WI10	NTN	ISOLATED	YES	11.5	PLATFORM	1.75	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
WV18	NTN	RURAL	YES	5.75	OTHER	1	NATURAL	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
WY06	MDN	RURAL	NO	6.2	PLATFORM	1.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	ALTER TYPE
WY08	NTN	ISOLATED	YES	4.2	PLATFORM	1.65	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	NO	NO	YES	YES	YES	ALTER TYPE
WY08	MDN	ISOLATED	YES	4.5	PLATFORM	1.65	NATURAL & ARTI	YES	NOT APPLICABLE	NO	YES	NO	NO	YES	YES	YES	ALTER TYPE

StationId	Network	CollectorMountin	CollectorHeight	llectorGroundCo	ollectorOrientatio	orOrientationCo	llector45DegreeR	orBuilding30Degr	ctor30DegreeTre	or30DegreeBuild	tor5mRadius1mi	or5mRadiusFenc	ollectorVegeHeig	atedLumberPres
AB14	MDN	PLATFORM	2.7	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
AK01	NTN	PLATFORM	1.8	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
AK03	NTN	OTHER	1.1	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
BC22	NTN	PLATFORM	1.46	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
BC23	NTN	BUILDING	4.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	YES
BC24	NTN	OTHER	1.37	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	NO	YES	YES
CA50	NTN	PLATFORM	3.5	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	NO
CA66	NTN	GROUNDLEVEL	1.21	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
CA88	NTN	OTHER	1.1	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	NO	YES	YES
CO80	NTN	OTHER	1.4	NATURAL & ARTI	NO	NO	YES	NOT APPLICABLE	YES	YES	YES	NO	YES	YES
CO93	NTN	PLATFORM	4.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
CO98	NTN	GROUNDLEVEL	1.56	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
FL00	NTN	OTHER	1.34	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
FL14	NTN	OTHER	1.5	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
FL23	NTN	PLATFORM	1.58	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	NO	YES	NO	NO
FL41	NTN	OTHER	1.14	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
ID02	NTN	PLATFORM	1.74	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
ID11	NTN	OTHER	1.8	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
IL11	NTN	OTHER	1.4	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	NO	YES
IL78	NTN	OTHER	1.37	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
IN22	NTN	OTHER	1.47	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
IN22	MDN	GROUNDLEVEL	1.24	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
IN34	MDN	PLATFORM	1.62	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
IN34	NTN	PLATFORM	1.53	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
KS97	NTN	PLATFORM	1.66	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	NO
KY03	NTN	OTHER	1.42	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
KY10	MDN	GROUNDLEVEL	1.2	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	NO	YES	YES
KY10	NTN	OTHER	1.12	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
KY19	NTN	OTHER	1.41	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
KY35	NTN	OTHER	1.35	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
MA01	MDN	GROUNDLEVEL	1.27	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
MA01	NTN	GROUNDLEVEL	1.02	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
MD08	NTN	GROUNDLEVEL	1.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	NO	YES
MD08	MDN	GROUNDLEVEL	1.29	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
MD13	NTN	GROUNDLEVEL	1.16	NATURAL & ARTI	NO	YES	YES	NOT APPLICABLE	YES	YES	NO	NO	YES	YES
MD15	NTN	OTHER	1.27	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	NO
MD18	NTN	GROUNDLEVEL	1.4	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	NO	YES	YES	NO

StationId	Network	CollectorMountin	CollectorHeight	llectorGroundCo	ollectorOrientatio	orOrientationCo	llector45DegreeR	orBuilding30Degr	ctor30DegreeTre	or30DegreeBuild	ctor5mRadius1mi	or5mRadiusFenc	ollectorVegeHeig	atedLumberPres
ME02	MDN	GROUNDLEVEL	1.15	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
ME02	NTN	GROUNDLEVEL	1.25	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
ME04	NTN	PLATFORM	2.55	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
ME04	MDN	OTHER	1.77	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
ME08	NTN	PLATFORM	2.5	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	NO
ME09	MDN	OTHER	1.45	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	NO
ME09	NTN	OTHER	1.45	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	NO
MI52	MDN	GROUNDLEVEL	1.23	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	NO	NO	NO	YES
MI99	NTN	OTHER	1.44	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
MN01	NTN	PLATFORM	1.61	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
MN23	NTN	OTHER	1.34	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
MN23	MDN	PLATFORM	1.8	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
MN27	MDN	GROUNDLEVEL	1.32	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
MN27	NTN	PLATFORM	1.42	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	YES
MN32	NTN	GROUNDLEVEL	1.31	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
MN97	MDN	OTHER	1.76	NATURAL & ARTI	NO	YES	YES	NOT APPLICABLE	NO	YES	YES	YES	NO	YES
MT05	NTN	GROUNDLEVEL	1.24	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	NO	NO	NO	YES
MT05	MDN	GROUNDLEVEL	1.3	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	NO	NO	YES
MT95	MDN	BUILDING	4.5	NATURAL & ARTI	NO	NO	YES	YES	YES	YES	NO	YES	NO	YES
MT96	NTN	GROUNDLEVEL	1.3	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
NC26	MDN	OTHER	1.48	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	YES
ND00	NTN	GROUNDLEVEL	1.23	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	YES	YES	NO	NO	NO	YES
NF19	MDN	OTHER	1.66	NATURAL & ARTI	NO	YES	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
NJ00	NTN	OTHER	1.35	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
NJ39	NTN	OTHER	1.39	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	YES
NJ99	NTN	GROUNDLEVEL	1.29	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	NO	NO	YES	YES
NS01	MDN	OTHER	1.72	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
NY22	NTN	GROUNDLEVEL	1.2	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
NY28	NTN	BUILDING	1.14	NATURAL & ARTI	NO	NO	YES	YES	YES	YES	NO	NO	YES	YES
NY43	MDN	PLATFORM	3.3	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	NO	NO	YES	NO
NY43	NTN	PLATFORM	2.98	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	NO	NO	YES	NO
NY92	NTN	PLATFORM	2.38	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	NO	NO	YES	YES
NY93	NTN	OTHER	1.7	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	NO	YES	YES	YES
OR07	NTN	OTHER	1.42	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
OR10	NTN	PLATFORM	1.85	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	NO	YES	YES	YES
OR18	NTN	PLATFORM	1.8	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	NO	YES	YES	NO
OR97	NTN	GROUNDLEVEL	1.3	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	YES	YES	YES	YES	YES	YES

StationId	Network	CollectorMountin	CollectorHeight	llectorGroundCo	ollectorOrientatio	orOrientationCo	llector45DegreeR	orBuilding30Degr	ctor30DegreeTre	or30DegreeBuild	tor5mRadius1mi	or5mRadiusFenc	ollectorVegeHeig	atedLumberPres
PA72	NTN	OTHER	1.36	NATURAL & ARTI	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
TN04	NTN	GROUNDLEVEL	0.99	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
TN11	MDN	GROUNDLEVEL	1.31	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
TN11	NTN	GROUNDLEVEL	1.22	NATURAL	YES	NOT APPLICABLE	NO	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
TN12	MDN	OTHER	1.37	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	YES	YES	YES	YES
TX41	NTN	OTHER	1.41	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
WA04	NTN	GROUNDLEVEL	1.3	NATURAL	NO	YES	YES	NOT APPLICABLE	YES	YES	YES	YES	NO	YES
WA04	MDN	OTHER	1.32	NATURAL & ARTI	NO	YES	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
WI10	MDN	PLATFORM	1.55	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
WI10	NTN	PLATFORM	1.55	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
WV18	NTN	GROUNDLEVEL	1.1	NATURAL	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	YES
WY06	MDN	PLATFORM	1.8	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	YES	YES	YES	YES	YES	NO
WY08	NTN	PLATFORM	1.97	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	NO	NO	YES	NO
WY08	MDN	PLATFORM	1.8	NATURAL & ARTI	YES	NOT APPLICABLE	YES	NOT APPLICABLE	NO	YES	NO	NO	YES	NO

StationId	Network	GalvPresent	AgInside20m	erbFertWithin20	ctorSnowRoofPr	ollectorSnowRoo	NadpRoad	NadpWaterway	NadpAirport	dpAnimalOperati	NadpCombustion	pParkingMainten	NadpStorageArea	adpMetalworkin
AB14	MDN	NO	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
AK01	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
AK03	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
BC22	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	NO	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
BC23	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
BC24	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
CA50	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
CA66	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
CA88	NTN	NOT APPLICABLE	NO	NO	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
CO80	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
CO93	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
CO98	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
FL00	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
FL14	NTN	NOT APPLICABLE	YES	NO	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
FL23	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
FL41	NTN	NOT APPLICABLE	YES	NO	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
ID02	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
ID11	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
IL11	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
IL78	NTN	NOT APPLICABLE	NO	NO	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
IN22	NTN	NOT APPLICABLE	YES	NO	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
IN22	MDN	YES	YES	NO	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
IN34	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
IN34	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
KS97	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
KY03	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
KY10	MDN	NO	YES	NO	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
KY10	NTN	NOT APPLICABLE	YES	NO	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
KY19	NTN	NOT APPLICABLE	YES	NO	NO	NOT APPLICABLE	NO	YES	YES	YES	NOT APPLICABLE	NO	YES	NOT APPLICABLE
KY35	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MA01	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MA01	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MD08	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MD08	MDN	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MD13	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MD15	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MD18	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE

StationId	Network	GalvPresent	AgInside20m	erbFertWithin20	ctorSnowRoofPr	ollectorSnowRoo	NadpRoad	NadpWaterway	NadpAirport	dpAnimalOperati	NadpCombustion	pParkingMainten	NadpStorageArea	adpMetalworkin
ME02	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
ME02	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
ME04	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
ME04	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
ME08	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
ME09	MDN	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
ME09	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MI52	MDN	NO	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MI99	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MN01	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MN23	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MN23	MDN	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MN27	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MN27	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MN32	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MN97	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MT05	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
MT05	MDN	NO	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MT95	MDN	NO	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
MT96	NTN	NOT APPLICABLE	NO	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
NC26	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
ND00	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
NF19	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
NJ00	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
NJ39	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	NO	YES	NOT APPLICABLE
NJ99	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	NO	YES	NOT APPLICABLE
NS01	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
NY22	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
NY28	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
NY43	MDN	NO	YES	YES	NO	NOT APPLICABLE	NO	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
NY43	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	NO	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
NY92	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	NO	YES	NOT APPLICABLE
NY93	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
OR07	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
OR10	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
OR18	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
OR97	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE

StationId	Network	GalvPresent	AgInside20m	erbFertWithin20	ctorSnowRoofPr	ollectorSnowRoo	NadpRoad	NadpWaterway	NadpAirport	dpAnimalOperati	NadpCombustion	pParkingMainten	NadpStorageArea	adpMetalworkin
PA72	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
TN04	NTN	NOT APPLICABLE	NO	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
TN11	MDN	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
TN11	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
TN12	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
TX41	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
WA04	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
WA04	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
WI10	MDN	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
WI10	NTN	NOT APPLICABLE	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
WV18	NTN	NOT APPLICABLE	YES	YES	YES	YES	YES	YES	YES	YES	NOT APPLICABLE	YES	YES	NOT APPLICABLE
WY06	MDN	YES	YES	YES	NO	NOT APPLICABLE	YES	YES	YES	NOT APPLICABLE	YES	YES	YES	YES
WY08	NTN	NOT APPLICABLE	YES	YES	YES	YES	NO	YES	YES	YES	NOT APPLICABLE	NO	YES	NOT APPLICABLE
WY08	MDN	NO	NOT APPLICABLE	NOT APPLICABLE	YES	YES	NO	YES	YES	NOT APPLICABLE	YES	NO	YES	YES

StationId	Network	Latitude	Longitude	Altitude	GpsAccuracyMeter	SignificantChang	SitingCriteriaMemo
AB14	MDN	53.301542	-114.201562	827	2	YES	Chain link fence 2m to the west and 2.2 m to the south.
AK01	NTN	65.154971	-147.490999	562	2	YES	Platform for collector is made of treated lumber. Aged.
AK03	NTN	63.723261	-148.967476	663	3	YES	Collector information is for NCON as the ACM will be discontinued following the site visit. Trees to the east and north violate the 30 degree rule.
BC22	NTN	54.029303	-128.701826	12	2	YES	Met Tower / Power pole violate the 45 degree rule for both the gauge and collector. Vegetation to the north is within 5 m of the gauge.
BC23	NTN	54.377279	-128.577589	102	2	YES	Inlets,power pole,winch and antenna on the roof are within 5 m of both the gauge and collector. All are within 2 m.
BC24	NTN	54.222516	-130.269931	109	2	YES	Chainlink fence at 1.3 meters from gauge at 1.5 meters tall. To the south. Chainlink fence at 1 meter from colector at 1.5 m tall. To the north.
CA50	NTN	39.431533	-120.239703	1936	3	YES	Met tower to the west violates the 45 degree rule for both the gauge and collector. Trees surrounding the area violate the 30 degree rule for both the gauge and collector. Platforms for both the gauge and collector made from treated lumber. Aged.
CA66	NTN	36.483416	-121.156952	321	4	YES	No comments
CA88	NTN	38.534298	-121.776346	14	2	YES	Enclosure fence at 4.4 m from collector. Site surrounded on three sides by agricultural activity. Herbicides and pesticides used.
CO80	NTN	40.155154	-103.14171	1385	2	YES	Collector orientation not corrected because sensor would hit fence. Operator said the fence is going to be moved 30 ft north and when that is done the orientation will be corrected. Rotated 180 degrees.
CO93	NTN	40.534605	-106.781131	2544	2	YES	Platform posts for both collector and gauge are of treated wood. Aged.
CO98	NTN	40.287833	-105.662954	3164	4	YES	Small pine bush/tree is 2.3 m from the collector to the north.

StationId	Network	Latitude	Longitude	Altitude	GpsAccuracyMeter	SignificantChang	SitingCriteriaMemo
FL00	NTN	29.753661	-82.20083	52	2	YES	The collector wet bucket is oriented within 45 degrees of west, and facing southwest. There is a tall pine to the southwest and gum trees to the northwest that are nearing a 45 degree rule violation.
FL14	NTN	30.548626	-84.600365	58	2	YES	A large row of trees is located near the site causing the 30 degree and 45 degree rule to fail. Herbicides have been used near the rain gage and the collector. The site operator will weed eat in the future instead of using herbicides.
FL23	NTN	30.110555	-84.990166	8	2	YES	Some vegetation is growing above 1 meter in height within 5 meters of both the collector and the gage. This was discussed with the operator who indicated that he would clear the surrounding area to 5 meters from the site.
FL41	NTN	27.380106	-82.283088	16	2	YES	One small branch from a bush is within five meters of the collector and greater than 0.6 meters in height. The collector currently meets the 45 degree rule for trees, but a tree at the site will likely cause it to be in violation in the next year or two. The site operator does not do the mowing at the site, the City of Sarasota does. It looks like the city is applying herbicide around the collector and raingage. The site operator will request that the city does not use herbicide at the site in the future.
ID02	NTN	48.351543	-116.839733	720	3	YES	No comments
ID11	NTN	43.20481	-116.750304	1201	2	YES	Equipment storage/parking is 41.5 meters from the collector. Active parking is > 100 meters away.
IL11	NTN	40.052774	-88.371841	223	2	YES	Grass is mowed around the site, however grass taller than 1 meter is within 5 meters to the west of the collector and rain gage.
IL78	NTN	40.933446	-90.723317	237	2	YES	No comments
IN22	NTN	38.740555	-87.484776	138	2	YES	No comments
IN22	MDN	38.740582	-87.484811	137	2	YES	No comments
IN34	MDN	41.631721	-87.088084	214	2	YES	The collector platform is constructed from wood that may have been treated at one time, but has long been deteriorated and no longer a source. There is a paved basketball court within 30 meters of the collector to the west. There is a backup power generator exhaust discharge approximately 45 meters to the SW. The combustion fuel for the generator is not known.
IN34	NTN	41.631793	-87.08807	214	2	YES	The collector platform is constructed from wood that may have been treated at one time, but has long been deteriorated and no longer a source. There is a paved basketball court within 30 meters of the collector to the west. There is a backup power generator exhaust discharge approximately 45 meters to the southwest. The generator combustion source is unknown.

StationId	Network	Latitude	Longitude	Altitude	GpsAccuracyMeter	SignificantChang	SitingCriteriaMemo
KS97	NTN	39.760412	-95.635898	367	2	YES	No comments
KY03	NTN	37.704559	-85.048625	287	3	NO	New soy bean fields are present approximately 200 meters southwest of the site.
KY10	MDN	37.131632	-86.148026	237	2	YES	Unsure of fertilizer-application distance from collector. The fence to the west is within 5 m of collector. The chain link fence is galvanized metal and is less than 5 m from the collector.
KY10	NTN	37.131664	-86.147984	237	2	YES	There is a chain-link fence within five meters of the collector, however the posts are less than five centimeters in diameter. Unsure on fertilizer application distance from the site. Removed ACM collector. Installed NCON collector. Siting criteria listed are for the NCON collector.
KY19	NTN	38.229019	-85.654333	163	2	YES	Herbicide has been applied around the base of the collector and the base of the gage. The site operator will ask the grounds keepers not to use herbicides around the collector and gage in the future.
KY35	NTN	38.118284	-83.547008	203	2	YES	Vegetation right at the base of the collector is approaching 0.6 meters in height.
MA01	MDN	41.975876	-70.024056	40	2	YES	Vegetation taller than .6 m to the north and east of gauge. Old Belfort within 2 m of gauge and to the north. Vegetation taller than .6 m to the north of collector
MA01	NTN	41.97585	-70.024091	40	2	YES	Vegetation taller than .6 m to the north and east of the gauge. Old Belfort within 2 m of gauge to the north. Vegetation greater than .6 m to the north and east of collector.
MD08	NTN	39.705385	-79.012096	763	2	YES	Vegetation to the south within 5 m of gaguge and collector. Higher than 0.6 m. Minimal amount.
MD08	MDN	39.70539	-79.012209	763	2	YES	Tree to the west violates the 30 degree rule for the collector. Vegetation to the south within 5 m for both gauge and collector. Minimal.
MD13	NTN	38.912868	-76.151856	3	2	YES	Wooden enclosure fence within 2 m to gauge on the south side. Trees violate the 30 degree rule for the gauge. Wooden enclosure fence within 5 m of collector to the east. Plastic posts around the evaporation collector within 5 m. To the
MD15	NTN	37.992481	-76.034467	1	3	YES	Collector decking has treated lumber posts that are approximately 1 m in height within 5 m of collector.
MD18	NTN	38.250919	-75.159402	1	3	YES	Power post for gage is within 5 m. Power post for collector is within 5 m of collector and is of treated lumber. Very weathered.

StationId	Network	Latitude	Longitude	Altitude	GpsAccuracyMeters	SignificantChang	SitingCriteriaMemo
ME02	MDN	44.107558	-70.729146	226	2	YES	The height of the grass within 5 meters of the equipment was discussed with the operator. The site is in a hay field which is harvested at least once per year.
ME02	NTN	44.107537	-70.729197	230	2	YES	The height of the grass within 5 meters of the equipment was discussed with the operator. The site is in a hay field which is harvested at least once per year.
ME04	NTN	45.080226	-70.21197	264	2	YES	Some new construction has taken place since the last time EOH visited the site. It appears as though it was complete since the last survey. There have been no changes since the new operator took over.
ME04	MDN	45.080177	-70.211815	261	2	YES	Some new construction has taken place since the last time EOH visited the site. It appears as though it was complete since the last survey. There have been no changes since the new operator took over.
ME08	NTN	44.40036	-71.00981	213	2	YES	Nearly constant large dump truck traffic within 65 meters to the west.
ME09	MDN	45.463087	-69.555694	420	2	NO	The site has been moved to a new location at the Greenville airport since the previous survey. The collectors are just over 100 meters from the runway. The survey leader considers the new location to be rural rather than isolated and suggests that the NADP PO review the designation.
ME09	NTN	45.463115	-69.55559	422	2	NO	The site has been moved to a new location at the Greenville airport since the previous survey. The collectors are just over 100 meters from the runway. The survey leader considers the new location to be rural rather than isolated and suggests that the NADP PO review the designation.
MI52	MDN	42.416662	-83.902107	273	2	YES	Given the space available and the nature of the land use by the university, it is unlikely that siting criteria can be improved.
MI99	NTN	47.104631	-88.551587	278	2	YES	No comments
MN01	NTN	45.401989	-93.203124	284	2	YES	The collector is mounted on a platform constructed with treated lumber, however it is very weathered and not likely impacting data quality.
MN23	NTN	46.250072	-94.497472	412	2	YES	Some trees have grown to violate the 45 degree rule. The site operator indicated that she would investigate having them cut.
MN23	MDN	46.250028	-94.497524	414	2	YES	Some trees have grown to violate the 45 degree rule. The site operator indicated that she would investigate having them cut.
MN27	MDN	44.236919	-95.300895	343	2	YES	There is an Ethanol production facility within 1km of the site to the south.
MN27	NTN	44.236893	-95.301011	344	2	YES	There is an Ethanol production facility within 1 km to the south of the site.
MN32	NTN	48.41319	-92.830395	427	2	YES	Some trees were removed since the previous visit. Cutting the vegetation that is beginning to encroach on the equipment was discussed with the operator.
MN97	MDN	47.964059	-89.651747	189	2	YES	This was the first site audit visit. The site classification as "rural" should be verified by the program office. The collector was rotated 90 degrees clockwise to meet siting criteria.
MT05	NTN	48.510445	-113.996661	974	3	YES	The IMPROVE samplers have been relocated 25 meters to the southwest.
MT05	MDN	48.510415	-113.996732	981	4	YES	The IMPROVE samplers have been relocated 25 meters to the southwest.
MT95	MDN	45.649216	-106.557306	1331	2	YES	The collector orientation is not easily changed due to the roof railing it is mounted on and the orientation of the building. Vegetation is > 0.6 meters near the building, however it is lower than the collector and the gage. The same is true for the fence around the building.
MT96	NTN	48.307808	-105.10195	642	2	YES	The site is fenced, however cattle are able to graze within 5.2 meters of the collector.

StationId	Network	Latitude	Longitude	Altitude	GpsAccuracyMete	SignificantChang	SitingCriteriaMemo
NC26	MDN	35.263318	-79.836505	174	2	YES	No comments
ND00	NTN	46.894867	-103.377881	849	2	YES	Grass inside a 5 meter radius is above 0.6 meters. The old met tower causes both the collector and the rain gage to fail the 45 degree rule. The tower is still used for scene monitoring.
NF19	MDN	48.561283	-58.565464	66	2	YES	The collector was oriented approximately 50 degrees to the east of siting criteria. It was adjusted during the survey.
NJ00	NTN	39.47282	-74.436952	1	2	YES	Collector out of level in the W E orientation.
NJ39	NTN	39.98957	-74.134129	1	2	YES	2 T Posts next to the gauge and 2 next to the collector within a half meter. Over 1 m tall. Used by Ocean County parks to rope off collector and guage during events.
NJ99	NTN	40.315397	-74.85363	73	2	YES	Trees to the north violate the 45 degree rule and the 30 degree rule for trees for both the collector and the gauge. Old ACM collectors (2) and old Belfort are within 5 m of the gauge. Old Belfort is within 5 m of the collector. Enclosure fence is within 5 m of the collector to the E, S and W. Mentioned to operator he could remove the old ACM's and Belfort.
NS01	MDN	44.402927	-65.202739	126	2	YES	No comments
NY22	NTN	44.939627	-74.505108	66	2	YES	Some weeds at the base of the gauge are greater than .6 m tall.
NY28	NTN	43.449581	-74.51623	517	2	YES	Collector and SO2 and O3 air inlet within 5 m of gauge and gauge is within 5 m of collector. Building railing within 2 m of both gauge and collector.
NY43	MDN	43.146146	-77.548264	138	2	YES	No comments
NY43	NTN	43.146182	-77.548282	138	2	YES	No comments
NY92	NTN	42.993286	-78.771646	182	2	YES	Collector within 5 m of gauge and gauge within 5 m of collector. Platform railing within 2 m of both collector and gauge. Trees to the west violate the 30 degree rule for trees.
NY93	NTN	44.434194	-74.245865	495	2	YES	Collector is within 5 m of gauge and gauge is within 5 m of collector.

StationId	Network	Latitude	Longitude	Altitude	GpsAccuracyMete	SignificantChang	SitingCriteriaMemo
OR07	NTN	43.4711	-119.690296	1397	2	NOT APPLICABLE	Sage brush surrounding the collector and gauge is greater than .6 m tall and within 5 m.
OR10	NTN	44.211822	-122.255768	434	3	NO	Met tower and some surrounding trees violate the 45- and 30-degree rules for both the collector and gauge. Many trees previously surrounding the site have been removed. Much more open now. Look at past photos. The new electrical panel board is within 5 m of the gauge. The previous electrical box is within 5 m of the collector and gauge. There is one bush within 5 m of the gauge >.6 m.
OR18	NTN	45.229646	-118.513114	1257	2	YES	Trees to the south violate the 30-degree rule for collector and gauge. Platform to the north of collector, 1 foot away, is made of treated lumber. Aged. Old temperature shelter is within 5 m of collector and about 2 m tall.
OR97	NTN	44.634547	-123.190189	68	2	NO	The new solar panels are 5 m to the north of the collector and approximately 12 feet tall violating the 45-degree rule for the collector. The significant change to the site is the installation of the solar panels.
PA72	NTN	41.327334	-74.819901	205	2	YES	No comments
TN04	NTN	36.469781	-83.826465	369	2	YES	Fence posts made from treated lumber one is at 4.8m from collector. Area outside fenced area is used to graze cattle.
TN11	MDN	35.664404	-83.590378	650	4	YES	A snow roof has been added to the collector since the previous survey.
TN11	NTN	35.664383	-83.590365	633	3	YES	A snow roof has been added to the collector since the previous survey.
TN12	MDN	35.561817	-83.497594	2029	2	YES	No comments
TX41	NTN	30.701472	-94.673948	103	2	YES	No comments
WA04	NTN	46.20301	-117.954619	678	3	YES	New site never surveyed before.
WA04	MDN	46.203188	-117.954673	678	3	YES	No comments
WI10	MDN	45.56489	-88.808275	566	2	YES	There is a 4x4 electrical outlet mounting post within 5 meters of the collector.
WI10	NTN	45.564802	-88.808321	571	2	YES	There is a treated 4x4 electrical outlet mounting post within 5 meters of the collector.
WV18	NTN	39.089882	-79.662207	512	2	YES	The snow roof is present year-round. It is not heated, but there is heat tape around the wet side bucket holder.
WY06	MDN	42.929148	-109.78757	2398	2	YES	Platform for collector constructed from treated lumber.
WY08	NTN	44.916553	-110.420327	1884	2	YES	A log fence surrounds the area. No objects within a 5 meter radius are taller than the collector.
WY08	MDN	44.916499	-110.420324	1883	2	YES	A log fence surrounds the area. The fence is 1.13 meters from the collector and is 1.25 meters tall, however it is lower than the collector.

APPENDIX B

List of Site Funding and Sponsoring Agencies

network	siteID	orgName
MDN	06WI	Wisconsin State Laboratory of Hygiene
NTN	06WI	Wisconsin State Laboratory of Hygiene
MDN	AB14	Jacques Whitford Stantec Axys Limited
NTN	AB32	Wood Buffalo Environmental Association
NTN	AB34	Wood Buffalo Environmental Association
AMoN	AB35	Alberta Ministry of Environment and Parks
NTN	AK01	U.S. Forest Service
NTN	AK02	U.S. Forest Service
NTN	AK03	NPS-Air Resources Division
AMoN	AK96	U.S. Bureau of Land Management
MDN	AK96	University of Alaska Fairbanks
NTN	AK96	University of Alaska Fairbanks
NTN	AK97	NPS-Air Resources Division
NTN	AL10	U.S. Geological Survey
AMON	AL99	U.S. Environmental Protection Agency - Clean Air Markets
NTN	AL99	U.S. Environmental Protection Agency - Clean Air Markets
NTN	AR02	U.S. Geological Survey
AMON	AR03	U.S. Environmental Protection Agency - Clean Air Markets
NTN	AR03	U.S. Geological Survey
AMON	AR09	U.S. Department of Agriculture - Agricultural Research Service
AMON	AR15	U.S. Department of Agriculture - Agricultural Research Service
NTN	AR16	NPS-Air Resources Division
NTN	AR27	U.S. Geological Survey
NTN	AZ03	NPS-Air Resources Division
NTN	AZ06	NPS-Air Resources Division
NTN	AZ97	NPS-Air Resources Division
AMON	AZ98	NPS-Air Resources Division
NTN	AZ98	U.S. Environmental Protection Agency - Clean Air Markets
NTN	AZ99	U.S. Geological Survey
MDN	BC16	Environment Canada
NTN	BC22	Rio Tinto
NTN	BC23	Rio Tinto
NTN	BC24	Prince Rupert Port Authority
NTN	CA28	USFS - Pacific Southwest Research Station
NTN	CA42	U.S. Forest Service
AMON	CA44	NPS-Air Resources Division
NTN	CA45	U.S. Geological Survey
NTN	CA50	U.S. Geological Survey
NTN	CA66	NPS-Air Resources Division
AMON	CA67	NPS-Air Resources Division
NTN	CA67	NPS-Air Resources Division
MDN	CA75	NPS-Air Resources Division
NTN	CA75	NPS-Air Resources Division
NTN	CA76	U.S. Geological Survey
AMON	CA83	NPS-Air Resources Division
NTN	CA88	U.S. Geological Survey
MDN	CA94	U.S. Forest Service
NTN	CA94	U.S. Forest Service
NTN	CA96	NPS-Air Resources Division
NTN	CA99	NPS-Air Resources Division
NTN	CAN5	U.S. Geological Survey

NTN	CO00	U.S. Geological Survey
NTN	CO01	U.S. Geological Survey
NTN	CO02	INSTAAR-University of Colorado
NTN	CO02	National Science Foundation
NTN	CO06	City and County of Denver
NTN	CO08	U.S. Environmental Protection Agency - Clean Air Markets
NTN	CO09	U.S. Bureau of Land Management
AMON	CO10	U.S. Environmental Protection Agency - Clean Air Markets
NTN	CO10	U.S. Environmental Protection Agency - Clean Air Markets
NTN	CO11	U.S. Geological Survey
AMON	CO13	U.S. Environmental Protection Agency - Clean Air Markets
NTN	CO13	U.S. Geological Survey
NTN	CO15	U.S. Bureau of Land Management
NTN	CO19	NPS-Air Resources Division
NTN	CO21	U.S. Forest Service
NTN	CO22	Colorado Department of Public Health & Environment
NTN	CO22	NPS-Air Resources Division
NTN	CO84	U.S. Geological Survey
NTN	CO85	Colorado Department of Public Health & Environment
NTN	CO86	U.S. Fish and Wildlife Service
NTN	CO87	Colorado Department of Public Health & Environment
AMON	CO88	NPS-Air Resources Division
NTN	CO90	INSTAAR-University of Colorado
NTN	CO90	National Science Foundation
NTN	CO91	U.S. Forest Service
NTN	CO92	U.S. Environmental Protection Agency - Clean Air Markets
NTN	CO93	U.S. Forest Service
NTN	CO94	U.S. Environmental Protection Agency - Clean Air Markets
MDN	CO96	U.S. Bureau of Land Management
NTN	CO96	U.S. Forest Service
MDN	CO97	U.S. Forest Service
NTN	CO97	U.S. Forest Service
AMON	CO98	NPS-Air Resources Division
NTN	CO98	U.S. Geological Survey - Biological Resources Division
NTN	CO98	Colorado State University
MDN	CO99	NPS-Air Resources Division
NTN	CO99	U.S. Geological Survey
AMON	CT15	U.S. Environmental Protection Agency - Clean Air Markets
NTN	CT15	U.S. Environmental Protection Agency - Clean Air Markets
NTN	FL00	University of Florida-State Agricultural Experiment Station
NTN	FL03	U.S. Environmental Protection Agency - Clean Air Markets
MDN	FL05	USFWS-Air Quality Branch
NTN	FL05	USFWS-Air Quality Branch
AMON	FL11	NPS-Air Resources Division
MDN	FL11	South Florida Water Management District
NTN	FL11	NPS-Air Resources Division
NTN	FL14	U.S. Geological Survey
AMON	FL19	U.S. Environmental Protection Agency - Clean Air Markets
AMON	FL23	U.S. Environmental Protection Agency - Clean Air Markets
NTN	FL23	U.S. Environmental Protection Agency - Clean Air Markets
NTN	FL41	U.S. Geological Survey
MDN	FL95	South Florida Water Management District

MDN	FL97	South Florida Water Management District
MDN	GA09	USFWS-Air Quality Branch
NTN	GA09	USFWS-Air Quality Branch
NTN	GA20	U.S. Environmental Protection Agency - Clean Air Markets
AMON	GA41	U.S. Environmental Protection Agency - Clean Air Markets
NTN	GA41	University of Georgia-State Agricultural Experiment Station
NTN	GA99	U.S. Geological Survey
NTN	IA08	U.S. Geological Survey
NTN	IA23	U.S. Geological Survey
NTN	ID02	U.S. Forest Service
AMON	ID03	NPS-Air Resources Division
NTN	ID03	NPS-Air Resources Division
AMON	ID07	U.S. Environmental Protection Agency - Clean Air Markets
NTN	ID11	U.S. Geological Survey
AMON	IL11	U.S. Environmental Protection Agency - Clean Air Markets
MDN	IL11	Lake Michigan Air Directors Consortium
MDN	IL11	Midwest Regional Climate Center
NTN	IL11	U.S. Environmental Protection Agency - Clean Air Markets
AMON	IL37	U.S. Environmental Protection Agency - Clean Air Markets
AMON	IL46	U.S. Environmental Protection Agency - Clean Air Markets
NTN	IL46	U.S. Environmental Protection Agency - Clean Air Markets
NTN	IL78	U.S. Geological Survey
AMON	IN20	U.S. Environmental Protection Agency - Clean Air Markets
NTN	IN20	U.S. Geological Survey
MDN	IN21	Lake Michigan Air Directors Consortium
AMON	IN22	U.S. Environmental Protection Agency - Clean Air Markets
MDN	IN22	Lake Michigan Air Directors Consortium
NTN	IN22	U.S. Geological Survey
MDN	IN34	Lake Michigan Air Directors Consortium
NTN	IN34	NPS-Air Resources Division
NTN	IN41	Purdue University-State Agricultural Experiment Station
AMON	IN99	U.S. Environmental Protection Agency - Clean Air Markets
AMON	KS03	Kansas Department of Health and Environment
MDN	KS03	Kansas Department of Health and Environment
MDN	KS05	Kansas Department of Health and Environment
NTN	KS07	U.S. Geological Survey
MDN	KS24	Kansas Department of Health and Environment
AMON	KS31	U.S. Environmental Protection Agency - Clean Air Markets
NTN	KS31	Kansas State University-State Agricultural Experiment Station
MDN	KS32	Kansas Department of Health and Environment
NTN	KS32	U.S. Geological Survey
AMON	KS97	U.S. Environmental Protection Agency - Clean Air Markets
NTN	KS97	Kickapoo Tribe
AMON	KY03	U.S. Environmental Protection Agency - Clean Air Markets
NTN	KY03	U.S. Geological Survey
MDN	KY10	NPS-Air Resources Division
NTN	KY10	NPS-Air Resources Division
NTN	KY19	U.S. Geological Survey
NTN	KY22	U.S. Geological Survey
AMON	KY29	U.S. Environmental Protection Agency - Clean Air Markets
NTN	KY35	U.S. Geological Survey
AMON	KY98	U.S. Environmental Protection Agency - Clean Air Markets

NTN	KY99	Murray State University
NTN	KY99	U.S. Forest Service
NTN	LA12	U.S. Geological Survey
NTN	LA30	U.S. Geological Survey
MDN	MA01	National Park Service-Cape Cod National Seashore
NTN	MA01	NPS-Air Resources Division
NTN	MA08	Northeast States for Coordinated Air Use Management
NTN	MA14	Nantucket Land Council, Inc.
NTN	MA22	Boston University
NTN	MA98	Boston University
MDN	MD00	Smithsonian Environmental Research Center
MDN	MD00	Maryland Department of Natural Resources
AMON	MD06	U.S. Environmental Protection Agency - Clean Air Markets
AMNet	MD08	State of Maryland
AMON	MD08	Maryland Department of Natural Resources
MDN	MD08	University of Maryland - Appalachian Laboratory
MDN	MD08	Maryland Department of Natural Resources
NTN	MD08	Maryland Department of Natural Resources
NTN	MD13	University of Maryland-State Agricultural Experiment Station
NTN	MD15	National Oceanic and Atmospheric Administration - Air Resources Laboratory
NTN	MD18	Maryland Department of Natural Resources
AMNet	MD98	U.S. Environmental Protection Agency
AMNet	MD98	National Oceanic and Atmospheric Administration
AMNet	MD99	U.S. Environmental Protection Agency
AMNet	MD99	National Oceanic and Atmospheric Administration
AMON	MD99	Maryland Department of Natural Resources
MDN	MD99	University of Maryland
MDN	MD99	Maryland Department of Natural Resources
NTN	MD99	Maryland Department of Natural Resources
MDN	ME00	EPA/Maine Dept. of Environmental Protection
NTN	ME00	U.S. Environmental Protection Agency
NTN	ME00	Maine Department of Environmental Protection
MDN	ME02	Maine Department of Environmental Protection
MDN	ME02	U.S. Environmental Protection Agency
NTN	ME02	U.S. Environmental Protection Agency
NTN	ME02	Maine Department of Environmental Protection
MDN	ME04	Maine Department of Environmental Protection
NTN	ME04	Maine Department of Environmental Protection
NTN	ME08	U.S. Geological Survey
MDN	ME09	U.S. Environmental Protection Agency
MDN	ME09	Maine Department of Environmental Protection
NTN	ME09	Maine Department of Environmental Protection
NTN	ME09	U.S. Environmental Protection Agency
AMON	ME93	U.S. Environmental Protection Agency - Clean Air Markets
NTN	ME94	Passamaquoddy Tribe
NTN	ME94	U.S. Environmental Protection Agency
MDN	ME96	Maine Department of Environmental Protection
MDN	ME96	U.S. Environmental Protection Agency
NTN	ME96	Maine Department of Environmental Protection
NTN	ME96	U.S. Environmental Protection Agency
MDN	ME98	Acadia National Park
MDN	ME98	U.S. Environmental Protection Agency

MDN	ME98	Maine Department of Environmental Protection
NTN	ME98	NPS-Air Resources Division
MDN	MI09	Lake Michigan Air Directors Consortium
NTN	MI09	Michigan State University-State Agricultural Experiment Station
NTN	MI26	Michigan State University-State Agricultural Experiment Station
MDN	MI48	USFWS-Air Quality Branch
NTN	MI48	USFWS-Air Quality Branch
AMON	MI51	U.S. Environmental Protection Agency - Clean Air Markets
NTN	MI51	U.S. Environmental Protection Agency - Clean Air Markets
AMON	MI52	U.S. Environmental Protection Agency - Clean Air Markets
MDN	MI52	Lake Michigan Air Directors Consortium
NTN	MI52	U.S. Environmental Protection Agency - Clean Air Markets
NTN	MI53	U.S. Forest Service
AMON	MI95	U.S. Environmental Protection Agency - Clean Air Markets
AMON	MI96	U.S. Environmental Protection Agency - Clean Air Markets
NTN	MI99	U.S. Forest Service
NTN	MN01	Minnesota Pollution Control Agency
AMON	MN02	U.S. Environmental Protection Agency - Clean Air Markets
MDN	MN06	Leech Lake Band of Ojibwe
NTN	MN08	Minnesota Pollution Control Agency
MDN	MN16	Minnesota Pollution Control Agency
MDN	MN16	Northern Research Station
NTN	MN16	U.S. Forest Service
AMON	MN18	U.S. Environmental Protection Agency - Clean Air Markets
MDN	MN18	Minnesota Pollution Control Agency
NTN	MN18	U.S. Environmental Protection Agency - Clean Air Markets
MDN	MN23	Minnesota Pollution Control Agency
NTN	MN23	U.S. Geological Survey
MDN	MN27	Minnesota Pollution Control Agency
NTN	MN27	Minnesota Pollution Control Agency
NTN	MN28	Minnesota Pollution Control Agency
NTN	MN32	NPS-Air Resources Division
NTN	MN99	Minnesota Pollution Control Agency
NTN	MO03	U.S. Geological Survey
NTN	MO05	U.S. Geological Survey
MDN	MO46	U.S. Fish and Wildlife Service
NTN	MS10	U.S. Geological Survey
AMNet	MS12	National Oceanic and Atmospheric Administration
MDN	MS12	Mississippi Department of Environmental Quality
MDN	MS12	National Oceanic and Atmospheric Administration - Air Resources Laboratory
NTN	MS12	National Oceanic and Atmospheric Administration - Air Resources Laboratory
NTN	MS19	National Oceanic and Atmospheric Administration - Air Resources Laboratory
AMON	MS30	U.S. Environmental Protection Agency - Clean Air Markets
NTN	MS30	U.S. Forest Service
NTN	MT00	U.S. Geological Survey
MDN	MT05	NPS-Air Resources Division
NTN	MT05	NPS-Air Resources Division
NTN	MT07	U.S. Geological Survey
MDN	MT95	Northern Cheyenne Tribe
NTN	MT96	Fort Peck Assiniboine & Sioux Tribes
NTN	MT97	U.S. Forest Service
NTN	MT98	U.S. Geological Survey

AMON	NC02	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NC03	North Carolina State University
AMON	NC06	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NC06	U.S. Environmental Protection Agency - Clean Air Markets
MDN	NC08	North Carolina Department of Environment and Natural Resources, Division of Air Quality
AMON	NC25	U.S. Environmental Protection Agency - Office of Research & Development
NTN	NC25	U.S. Forest Service
AMON	NC26	U.S. Environmental Protection Agency - Office of Research & Development
MDN	NC26	North Carolina Department of Environment and Natural Resources, Division of Air Quality
NTN	NC29	North Carolina State University
AMON	NC30	U.S. Environmental Protection Agency - Office of Research & Development
NTN	NC34	North Carolina State University
AMON	NC35	U.S. Environmental Protection Agency - Office of Research & Development
NTN	NC35	North Carolina State University
NTN	NC36	U.S. Geological Survey
NTN	NC41	North Carolina State University
NTN	NC45	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NC45	North Carolina State University
AMoN	NC98	U.S. Environmental Protection Agency - Clean Air Markets
NTN	ND00	NPS-Air Resources Division
MDN	ND01	U.S. Fish and Wildlife Service
NTN	ND08	U.S. Geological Survey
NTN	ND11	U.S. Geological Survey
AMON	NE09	National Park Service
MDN	NE15	Nebraska Department of Environmental Quality
NTN	NE15	University of Nebraska-State Agricultural Experiment Station
AMON	NE98	U.S. Environmental Protection Agency - Clean Air Markets
MDN	NE98	Santee Sioux Nation of Nebraska
MDN	NE98	U.S. Environmental Protection Agency
NTN	NE99	U.S. Geological Survey
MDN	NF19	Environment Canada
AMON	NH02	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NH02	U.S. Forest Service
NTN	NJ00	USFWS-Air Quality Branch
AMNet	NJ30	State of New Jersey
MDN	NJ30	New Jersey Department of Environmental Protection
NTN	NJ39	U.S. Environmental Protection Agency - Clean Air Markets
AMNet	NJ54	State of New Jersey
AMON	NJ98	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NJ99	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NM07	NPS-Air Resources Division
NTN	NM08	U.S. Geological Survey
AMON	NM98	U.S. Environmental Protection Agency - Clean Air Markets
AMON	NM99	U.S. Environmental Protection Agency - Clean Air Markets
AMON	NS01	Environment Canada
MDN	NS01	Environment Canada
NTN	NV03	U.S. Geological Survey
NTN	NV05	NPS-Air Resources Division
NTN	NY01	U.S. Geological Survey
AMNet	NY06	State of New York
MDN	NY06	New York State Department of Environmental Conservation
NTN	NY06	New York State Energy Research & Development Authority

NTN	NY08	Cornell University
NTN	NY10	U.S. Geological Survey
AMON	NY16	Cary Institute
AMNet	NY20	New York State Energy Research & Development Authority
AMON	NY20	U.S. Environmental Protection Agency - Clean Air Markets
MDN	NY20	U.S. Environmental Protection Agency
MDN	NY20	New York State Energy Research & Development Authority
NTN	NY20	New York State Energy Research & Development Authority
NTN	NY22	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NY28	New York State Energy Research & Development Authority
MDN	NY43	New York State Energy Research & Development Authority
NTN	NY43	New York State Energy Research & Development Authority
NTN	NY52	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NY59	New York State Energy Research & Development Authority
AMON	NY67	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NY67	National Oceanic and Atmospheric Administration - Air Resources Laboratory
MDN	NY68	New York State Energy Research & Development Authority
NTN	NY68	U.S. Geological Survey
AMON	NY91	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NY92	New York State Energy Research & Development Authority
NTN	NY93	New York State Energy Research & Development Authority
AMON	NY94	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NY94	New York State Energy Research & Development Authority
MDN	NY96	New York State Energy Research & Development Authority
NTN	NY96	U.S. Environmental Protection Agency
NTN	NY96	County of Suffolk-Department of Health Services-Peconic Estuary Program
AMON	NY98	U.S. Environmental Protection Agency - Clean Air Markets
NTN	NY98	U.S. Geological Survey
NTN	NY99	U.S. Geological Survey
AMON	OH02	U.S. Environmental Protection Agency - Clean Air Markets
MDN	OH02	Lake Michigan Air Directors Consortium
AMON	OH09	U.S. Environmental Protection Agency - Clean Air Markets
NTN	OH09	U.S. Geological Survey
NTN	OH17	U.S. Forest Service
AMON	OH27	U.S. Environmental Protection Agency - Clean Air Markets
NTN	OH49	U.S. Geological Survey
AMNet	OH52	Lake Michigan Air Directors Consortium
MDN	OH52	Lake Michigan Air Directors Consortium
AMON	OH54	U.S. Environmental Protection Agency - Clean Air Markets
NTN	OH54	U.S. Environmental Protection Agency - Clean Air Markets
NTN	OH71	U.S. Geological Survey
AMON	OH99	U.S. Environmental Protection Agency - Clean Air Markets
NTN	OK00	U.S. Geological Survey
MDN	OK01	Oklahoma Department of Environmental Quality
MDN	OK04	Oklahoma Department of Environmental Quality
MDN	OK06	Oklahoma Department of Environmental Quality
NTN	OK17	National Oceanic and Atmospheric Administration - Air Resources Laboratory
NTN	OK29	U.S. Geological Survey
MDN	OK31	Oklahoma Department of Environmental Quality
AMON	OK98	U.S. Environmental Protection Agency
AMON	OK99	U.S. Environmental Protection Agency - Clean Air Markets
MDN	OK99	U.S. Environmental Protection Agency

MDN	OK99	Cherokee Nation
MDN	ON07	Environment Canada
NTN	OR09	U.S. Geological Survey
NTN	OR10	U.S. Forest Service
NTN	OR18	U.S. Geological Survey
NTN	OR97	U.S. Environmental Protection Agency - Clean Air Markets
AMON	PA00	U.S. Environmental Protection Agency - Clean Air Markets
NTN	PA00	U.S. Environmental Protection Agency - Clean Air Markets
MDN	PA13	NPS-Air Resources Division
NTN	PA13	NPS-Air Resources Division
NTN	PA13	Pennsylvania Department of Environmental Protection
NTN	PA13	Pennsylvania State University
NTN	PA15	Pennsylvania Game Commission
NTN	PA15	National Oceanic and Atmospheric Administration - Air Resources Laboratory
NTN	PA18	U.S. Geological Survey
AMON	PA29	U.S. Environmental Protection Agency - Clean Air Markets
NTN	PA29	U.S. Forest Service
MDN	PA30	Pennsylvania Department of Environmental Protection
MDN	PA30	Pennsylvania State University
NTN	PA30	Pennsylvania Department of Environmental Protection
NTN	PA30	Pennsylvania State University
NTN	PA42	Pennsylvania State University-State Agricultural Experiment Station-
AMON	PA56	U.S. Environmental Protection Agency - Clean Air Markets
NTN	PA72	U.S. Forest Service
AMON	PA96	U.S. Environmental Protection Agency - Clean Air Markets
AMON	PA97	U.S. Environmental Protection Agency - Clean Air Markets
AMON	PR20	U.S. Forest Service
MDN	PR20	U.S. Geological Survey
NTN	PR20	U.S. Forest Service
AMON	SC05	U.S. Environmental Protection Agency - Clean Air Markets
MDN	SC05	USFWS-Air Quality Branch
NTN	SC05	USFWS-Air Quality Branch
NTN	SC06	U.S. Geological Survey
MDN	SC19	South Carolina Department of Health and Environmental Control
NTN	SD04	NPS-Air Resources Division
NTN	SD08	U.S. Geological Survey
MDN	SD18	U.S. Environmental Protection Agency
MDN	SD18	Cheyenne River Sioux Tribe Environmental Protection Department
NTN	SD99	U.S. Geological Survey
NTN	SK20	Saskatchewan Ministry of Environment
NTN	SK21	Saskatchewan Ministry of Environment
MDN	SK27	Environment Canada
NTN	SK30	Saskatchewan Ministry of Environment
NTN	SK31	Saskatchewan Ministry of Environment
NTN	TN00	National Oceanic and Atmospheric Administration - Air Resources Laboratory
AMON	TN01	NPS-Air Resources Division
AMON	TN04	U.S. Environmental Protection Agency - Clean Air Markets
NTN	TN04	U.S. Environmental Protection Agency - Clean Air Markets
AMON	TN07	U.S. Environmental Protection Agency - Clean Air Markets
MDN	TN11	NPS-Air Resources Division
NTN	TN11	NPS-Air Resources Division
MDN	TN12	NPS-Air Resources Division

NTN	TN14	U.S. Geological Survey
AMNet	TW01	EPA Taiwan
NTN	TX02	U.S. Geological Survey
NTN	TX03	U.S. Geological Survey
NTN	TX04	NPS-Air Resources Division
NTN	TX10	U.S. Geological Survey
NTN	TX16	U.S. Geological Survey
NTN	TX22	U.S. Geological Survey
AMON	TX41	U.S. Environmental Protection Agency - Clean Air Markets
AMON	TX43	U.S. Environmental Protection Agency - Clean Air Markets
NTN	TX43	U.S. Environmental Protection Agency - Clean Air Markets
NTN	TX56	U.S. Geological Survey
AMON	UT01	Utah Department of Environmental Quality
NTN	UT01	U.S. Geological Survey
AMON	UT09	NPS-Air Resources Division
NTN	UT09	NPS-Air Resources Division
NTN	UT95	U.S. Forest Service
AMON	UT97	Utah Department of Environmental Quality
NTN	UT98	U.S. Geological Survey
NTN	UT99	NPS-Air Resources Division
NTN	VA00	U.S. Geological Survey
AMON	VA13	U.S. Environmental Protection Agency - Clean Air Markets
NTN	VA13	U.S. Environmental Protection Agency - Clean Air Markets
AMON	VA24	U.S. Environmental Protection Agency - Clean Air Markets
NTN	VA24	U.S. Environmental Protection Agency - Clean Air Markets
MDN	VA28	NPS-Air Resources Division
NTN	VA28	NPS-Air Resources Division
NTN	VA99	USFS - Air Program
NTN	VI01	NPS-Air Resources Division
NTN	VT01	U.S. Geological Survey
AMON	VT99	U.S. Environmental Protection Agency - Clean Air Markets
MDN	VT99	National Oceanic and Atmospheric Administration - Air Resources Laboratory
MDN	VT99	University of Vermont - Rubinstein School of Environment & Natural Resources
NTN	VT99	U.S. Geological Survey
MDN	WA03	NPS-Air Resources Division
NTN	WA14	NPS-Air Resources Division
NTN	WA19	U.S. Geological Survey
NTN	WA21	U.S. Environmental Protection Agency - Clean Air Markets
NTN	WA24	U.S. Geological Survey
NTN	WA98	USFS - Pacific Northwest Region
AMON	WA99	NPS-Air Resources Division
NTN	WA99	NPS-Air Resources Division
AMoN	WI06	Wisconsin State Laboratory of Hygiene
NTN	WI06	Wisconsin State Laboratory of Hygiene
AMON	WI07	U.S. Environmental Protection Agency - Clean Air Markets
MDN	WI08	Wisconsin Department of Natural Resources
NTN	WI08	Wisconsin Department of Natural Resources
MDN	WI10	Forest County Potawatomi Community
MDN	WI10	U.S. Environmental Protection Agency
NTN	WI10	Forest County Potawatomi Community
NTN	WI19	Wisconsin Department of Natural Resources
MDN	WI31	Wisconsin Department of Natural Resources

NTN	WI31	Wisconsin Department of Natural Resources
AMON	WI35	U.S. Environmental Protection Agency - Clean Air Markets
NTN	WI35	U.S. Environmental Protection Agency - Clean Air Markets
MDN	WI36	Wisconsin Department of Natural Resources
NTN	WI36	Wisconsin Department of Natural Resources
NTN	WI37	U.S. Forest Service
NTN	WV04	U.S. Geological Survey
AMON	WV05	U.S. Environmental Protection Agency - Clean Air Markets
NTN	WV05	U.S. Environmental Protection Agency - Clean Air Markets
AMON	WV18	U.S. Environmental Protection Agency - Clean Air Markets
NTN	WV18	U.S. Forest Service
NTN	WY00	U.S. Forest Service
NTN	WY02	U.S. Bureau of Land Management
AMON	WY06	U.S. Environmental Protection Agency - Clean Air Markets
NTN	WY06	U.S. Bureau of Land Management
MDN	WY08	Wyoming Department of Environmental Quality
NTN	WY08	NPS-Air Resources Division
MDN	WY26	Wyoming Department of Environmental Quality
AMON	WY93	U.S. Bureau of Land Management
AMON	WY93	Air Resource Specialists
AMON	WY94	NPS-Air Resources Division
NTN	WY94	Wyoming Department of Environmental Quality
AMON	WY95	U.S. Environmental Protection Agency - Clean Air Markets
NTN	WY95	U.S. Forest Service
NTN	WY97	Bridger-Teton National Forest
NTN	WY98	Bridger-Teton National Forest
NTN	WY99	U.S. Bureau of Land Management

APPENDIX C

Transfer Standard Instrument Certifications

EEMS # 01265

Van 2

Page 1 of 1

Warren-Knight Instrument Company
2045 Bennett Road
Philadelphia, PA 19116
Phone: 215-464-9300; Fax: 215-464-9303
Web: http://www.warrenind.com

Calibration Data Record			Temperature: 70°	Humidity: 39%
Customer Name	EEMS INC.	Item Name	USHIKATA	
Manufacturer		Model	S-25	
Serial Number	190037	Calibration Date	2-27-23	2/27/2023
Calibration Frequency		Job Card Number	S-26945	
Customer Reference Number		Date of Certification	2-27-23	

Measurement Standards

Theodolite Wild T-3 S/N 18801 Calibration 01/05/2023 Due 01/05/2024 NIST Number 738/229329-83 738/223398

Optical Wedge K&E 71-7020 S/N 5167 Calibration; 01/16/2019 Due 01/16/2024, NIST Number 731/244084-89 731/221617

Initial Report

Vanes		Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights	☐ Pass ☐ Fail	0	+/- 30	
Needle		45	+/- 30	
Pivot Sharpness	☐ Pass ☐ Fail	90	+/- 30	
Straightness (+/-15 Minutes)	☐ Pass ☐ Fail	135	+/- 30	
Balance	☐ Pass ☐ Fail	180	+/- 30	
Lifter Function	☐ Pass ☐ Fail	225	+/- 30	
Azimuth Ring		270	+/- 30	
Control Knob Function	☐ Pass ☐ Fail	315	+/- 30	
Pinion Gear	☐ Pass ☐ Fail			
Graduation Clarity	☐ Pass ☐ Fail			
Graduation less than 1 minute in any position	☐ Pass ☐ Fail			
Level Bubble				
Bubble in Level	☐ Pass ☐ Fail			
Physical Condition	☐ Pass ☐ Fail			

Pass/Repair/Replace

Pass	N/A	Replace	Repair	
☐	☐	☐	☐	Needle ☐ Sharpen ☐ Magnetize
☐	☐	☐	☐	Cap with Jewel
☐	☐	☐	☐	Pivot ☐ Sharpen
☐	☐	☐	☐	Level ☐ Remount
☐	☐	☐	☐	North Sight
☐	☐	☐	☐	North Sight Block
☐	☐	☐	☐	South Sight
☐	☐	☐	☐	South Sight Block
☐	☐	☐	☐	Vane Spring
☐	☐	☐	☐	Drive
☐	☐	☐	☐	Control Knob Assembly
☐	☐	☐	☐	Cover Glass
☐	☐	☐	☐	Cover Glass Gasket
☐	☐	☐	☐	Clamp Screw
☐	☐	☐	☐	Pinion Gear
☐	☐	☐	☐	Compass Ring

Final Report

Vanes		Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights	☑ Pass ☐ Fail	0	+/- 30	30
Needle		45	+/- 30	30
Pivot Sharpness	☑ Pass ☐ Fail	90	+/- 30	30
Straightness (+/-15 Minutes)	☑ Pass ☐ Fail	135	+/- 30	30
Balance	☑ Pass ☐ Fail	180	+/- 30	30
Lifter Function	☑ Pass ☐ Fail	225	+/- 30	30
Azimuth Ring		270	+/- 30	30
Control Knob Function	☑ Pass ☐ Fail	315	+/- 30	30
Pinion Gear	☑ Pass ☐ Fail			
Graduation Clarity	☑ Pass ☐ Fail			
Graduation less than 1 minute in any position	☑ Pass ☐ Fail			
Level Bubble				
Bubble in Level	☑ Pass ☐ Fail			
Physical Condition	☑ Pass ☐ Fail			

Certification

Joseph Dalogn	
Repair Technician	John Noga, Quality Assurance

Warren-Knight Instrument Company
2045 Bennett Road
Philadelphia, PA 19116
Phone: 215-464-9300; Fax: 215-464-9303
Web: http://www.warrenind.com

No EEMS

Calibration Data Record			Temperature: 70° Humidity: 39%
Customer Name	EG&G MS INC	Item Name	USH/KAD
Manufacturer		Model	S-25
Serial Number	191832	Calibration Date	2-27-23
Calibration Frequency		Job Card Number	S-36946 2/27/2023
Customer Reference Number		Date of Certification	2-27-23

Measurement Standards

Theodolite Wild T-3 S/N 18801 Calibration 01/05/2023 Due 01/05/2024 NIST Number 738/229329-83 738/223398

Optical Wedge K&E 71-7020 S/N 5167 Calibration; 01/16/2019 Due 01/16/2024, NIST Number 731/244084-89 731/221617

Initial Report

Vanes		Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights	☐ Pass ☐ Fail	0	+/- 30	
Needle		45	+/- 30	
Pivot Sharpness	☐ Pass ☐ Fail	90	+/- 30	
Straightness (+/-15 Minutes)	☐ Pass ☐ Fail	135	+/- 30	
Balance	☐ Pass ☐ Fail	180	+/- 30	
Lifter Function	☐ Pass ☐ Fail	225	+/- 30	
Azimuth Ring		270	+/- 30	
Control Knob Function	☐ Pass ☐ Fail	315	+/- 30	
Pinion Gear	☐ Pass ☐ Fail			
Graduation Clarity	☐ Pass ☐ Fail			
Graduation less than 1 minute in any position	☐ Pass ☐ Fail			
Level Bubble				
Bubble in Level	☐ Pass ☐ Fail			
Physical Condition	☐ Pass ☐ Fail			

Pass/Repair/Replace

Pass	N/A	Replace	Repair	
☐	☐	☐	☐	Needle ☐ Sharpen ☐ Magnetize
☐	☐	☐	☐	Cap with Jewel
☐	☐	☐	☐	Pivot ☐ Sharpen
☐	☐	☐	☐	Level ☐ Remount
☐	☐	☐	☐	North Sight
☐	☐	☐	☐	North Sight Block
☐	☐	☐	☐	South Sight
☐	☐	☐	☐	South Sight Block
☐	☐	☐	☐	Vane Spring
☐	☐	☐	☐	Drive
☐	☐	☐	☐	Control Knob Assembly
☐	☐	☐	☐	Cover Glass
☐	☐	☐	☐	Cover Glass Gasket
☐	☐	☐	☐	Clamp Screw
☐	☐	☐	☐	Pinion Gear
☐	☐	☐	☐	Compass Ring

Final Report

Vanes		Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights	☑ Pass ☐ Fail	0	+/- 30	<30
Needle		45	+/- 30	<30
Pivot Sharpness	☑ Pass ☐ Fail	90	+/- 30	<30
Straightness (+/-15 Minutes)	☑ Pass ☐ Fail	135	+/- 30	<30
Balance	☑ Pass ☐ Fail	180	+/- 30	<30
Lifter Function	☑ Pass ☐ Fail	225	+/- 30	<30
Azimuth Ring		270	+/- 30	<30
Control Knob Function	☑ Pass ☐ Fail	315	+/- 30	<30
Pinion Gear	☑ Pass ☐ Fail			
Graduation Clarity	☑ Pass ☐ Fail			
Graduation less than 1 minute in any position	☑ Pass ☐ Fail			
Level Bubble				
Bubble in Level	☑ Pass ☐ Fail			
Physical Condition	☐ Pass ☐ Fail			

Certification

Joseph Paolozzi	
Repair Technician	John Noga, Quality Assurance

NVLAP®
CALIBRATION
NVLAP LAB CODE 200348-0

FLUKE®
Calibration

EEMS
01224

Certificate Of Calibration
Fluke Calibration, American Fork
Temperature Laboratory

Certificate Number:	4500033758		
Status:	As-Left: Pass	**Date of Calibration:**	26 Sep 2023
		Date Due:	
Manufacturer:	Fluke Calibration	**Temperature:**	21 to 25 °C
Model:	1551	**Relative Humidity:**	20 to 55 %rh
Serial Number:	6196002	**Pressure:**	83.5 to 88.5 kPa
Options:		**Issue Date:**	26 Sep 2023
Description:	STIK THERMOMETER		
Procedure:	AFC1024: Rev 001		
Customer:	NEW PRODUCT		

m = 1.0
b = 0.0

This calibration is traceable to the International System of Units (SI) through recognized national metrology institutes (NIST, NRC, PTB, NPL, etc.), ratiometric techniques, or natural physical constants and is in conformance with ISO/IEC 17025:2017. Calibration certificates without identification of the authorizing person are not valid. This certificate applies to only the item identified and shall not be reproduced except in full, without the specific written approval by Fluke Corporation. The calibration interval (date due) is the responsibility of the end user.

This certificate of calibration may contain data that is not covered by the Scope of Accreditation. The unaccredited measurement points are indicated by the # symbol or confined to clearly marked sections.

Measurement uncertainties at the time of calibration are given where applicable. They are calculated in accordance with the method described in the ISO Guide to the Expression of Uncertainty in Measurement (GUM). The reported expanded uncertainty of measurement is stated as the combined standard uncertainty of measurement multiplied by the coverage factor k such that the coverage probability corresponds to approximately 95 % and k=2.

Comments: This calibration certificate was reviewed and approved electronically.

FLUKE®
Calibration
Cert # : 4500033758
Cal Date: 26 Sep 2023
Due Date:
S/N : 6196002
877.355.3225 www.flukecal.com

Authorized By
Michael Coleman

Certificate Number
A4889484
Issue Date: 01/23/23

Certificate of Calibration

Van 2

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.
4577 E NW 6TH STREET
GAINESVILLE, FL 36209
352-262-0802

P.O. Number:

ID Number: EEMS 01226

Description:	DIGITAL STIK THERMOMETER
Manufacturer:	FLUKE
Model Number:	1551A EX
Serial Number:	2085085
Technician:	TAYLOR FLOYD
On-Site Calibration:	☐
Comments:	

Calibration Date:	01/23/2023
Calibration Due:	01/23/2024
Procedure:	FLUKE 1551A EX,52A EX Rev: 11/1/2010
Temperature:	71 °F
Humidity:	40 % RH
As Found Condition:	**IN TOLERANCE**
Calibration Results:	**IN TOLERANCE**

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/ IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/ IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

This certificate shall not be reproduced, except in full, without the written permission of Technical Maintenance, Inc.

Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
1621534	ACCUMAC	AM1710-12-ADT	12/15/2022	12/15/2023
660TL18010044	ADDITEL CORPORATION	ADT875PC-155	8/13/2022	8/13/2023

TMI Technical Maintenance, Inc.
12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637
Phone: 813-978-3054 Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate Number
A4889484
Issue Date: 01/23/23

Certificate of Calibration

Data Sheet

Parameter	Nominal	Minimum	Maximum	As Found	As Left	Unit	ADJ/FAIL
Temperature Accuracy	-25.00	-25.05	-24.95	-25.01	-25.01	°C	
Temperature Accuracy	0.00	-0.05	0.05	0.01	0.01	°C	
Temperature Accuracy	100.00	99.95	100.05	99.99	99.99	°C	
Temperature Accuracy	150.00	149.95	150.05	149.98	149.98	°C	

RTD EEMS # 01226

Van 2

m = 0.9998992

b = -0.001832

2/16/23

TMI Technical Maintenance, Inc.
12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637
Phone: 813-978-3054 Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate Number
A4889494
Issue Date: 01/23/23

Certificate of Calibration

Van 2

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.
4577 E NW 6TH STREET
GAINESVILLE, FL 36209
352-262-0802

P.O. Number:

ID Number: EEMS 01229

Description:	DIGITAL STIK THERMOMETER	Calibration Date:	01/23/2023
Manufacturer:	FLUKE	Calibration Due:	01/23/2024
Model Number:	1551A EX	Procedure:	FLUKE 1551A EX,52A EX Rev: 11/1/2010
Serial Number:	3275143	Temperature:	71 °F
Technician:	TAYLOR FLOYD	Humidity:	40 % RH
On-Site Calibration: ☐		**As Found Condition:**	**IN TOLERANCE**
Comments:		**Calibration Results:**	**IN TOLERANCE**

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/ IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/ IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

This certificate shall not be reproduced, except in full, without the written permission of Technical Maintenance, Inc.

Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
1621534	ACCUMAC	AM1710-12-ADT	12/15/2022	12/15/2023
660TL18010044	ADDITEL CORPORATION	ADT875PC-155	8/13/2022	8/13/2023

TMI Technical Maintenance, Inc.
12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637
Phone: 813-978-3054 Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate Number
A4889494
Issue Date: 01/23/23

Certificate of Calibration

Data Sheet

Parameter	Nominal	Minimum	Maximum	As Found	As Left	Unit	ADJ/FAIL
Temperature Accuracy	-25.00	-25.05	-24.95	-25.01	-25.01	°C	
Temperature Accuracy	0.00	-0.05	0.05	0.00	0.00	°C	
Temperature Accuracy	100.00	99.95	100.05	100.01	100.01	°C	
Temperature Accuracy	150.00	149.95	150.05	149.99	149.99	°C	

Van 2

RTD 01229

m = 1.0000153

b = -0.003359

EW 2/13/23

TMI Technical Maintenance, Inc.
12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637
Phone: 813-978-3054 Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Date

2/17/2023 - - **Calibration and verification of three RTD meters with most recent certification of EEMS RTD**

TMI Cert data -- 1/23/2023

	TMI STD	EEMS RTD 01229	diff	corrected
Cert #	A4889494			
	-25.00	-25.01	0.010	-25.006
	0.00	0.00	0.000	0.003
	100.00	100.01	-0.010	100.012
	150.00	149.99	0.010	149.991

RTD 01229

2023 correction: slope= 1.00001527

intercept= -0.0033588

corr= 1.0000000

EEMS RTD verification 2/17/2023

At EEMS	**Date 2/17/2023** RTD 01229		**RTD 01230 / 01231** EEMS AER		**RTD 01227 / 1** EEMS van3		**RTD 01228 / 3** EEMS van1	
raw	corrected		raw	corrected	raw	corrected	raw	corrected
0.06	0.06		0.07	0.05	0.20	0.03	0.03	-0.05
11.49	11.49		11.52	11.50	11.80	11.53	11.80	11.58
20.17	20.17		20.16	20.14	20.50	20.14	20.50	20.18
30.30	30.30		30.36	30.35	30.80	30.35	30.80	30.36
40.30	40.30		40.35	40.34	40.90	40.35	40.90	40.35
54.17	54.17		54.14	54.13	54.80	54.12	54.80	54.08
25.02	25.02		25.04	25.02	25.40	25.00	25.40	25.03
							25.99	25.61
		slope =	**0.999747**		**1.009449**		**1.011722**	
		intercept =	**0.022169**		**0.164845**		**0.081613**	
		correlation =	**1.0000**		**1.0000**		**1.0000**	

Date

2/17/2023 - - **Calibration and certification of fluke Thermocouples**

TMI Cert data -- 1/23/2023

	STD	EEMS RTD	diff	corrected
cert # =	A889494	01229		
	-25.00	-25.01	0.010	-25.01
	0.00	0.00	0.000	0.00
	100.00	100.01	-0.010	100.01
	150.00	149.99	0.010	149.99
			0.000	0.00
			0.000	0.00

01229

2023 correction: slope= 1.00001527

intercept= -0.0033588

1.0000000

Eric Hebert 2/17/2023

At EEMS	**Date 2/17/2023** RTD 01229	fluke =	01311		01312		01310	
			EEMS van3		EEMS van 2		EEMS van 1	
		thermo =	01236		01237		01238	
raw	corrected		raw	corrected	raw	corrected	raw	corrected
0.07	0.07		0.2	-0.31	0.2	-0.38	-0.4	0.01
82.95	82.95		83.3	82.87	83.7	82.90	82.9	83.01
71.89	71.89		72.3	71.86	72.6	71.83	71.8	71.95
60.82	60.82		61.3	60.85	61.6	60.86	60.6	60.79
51.26	51.26		51.7	51.24	51.9	51.19	50.9	51.12
25.78	25.78		26.4	25.92	26.6	25.95	25.4	25.72
12.86	12.86		13.7	13.21	13.9	13.29	12.7	13.06
	0.00			-0.51		-0.58		0.41
		Thermocouple offset =	-0.3		0.6		0.0	
POST CALIBRATION CHECK								
	0.00			-0.51		-0.58		0.41
		slope =	**0.999039**		**1.0026414**		**1.00363**	
		intercept =	**0.506414**		**0.5776872**		**-0.4084**	
		correlation =	**1.0000**		**1.0000**		**1.0000**	

Certificate Number
A4895500
Issue Date: 01/26/23

Certificate of Calibration

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.
4577 E NW 6TH STREET
GAINESVILLE, FL 36209
352-262-0802

P.O. Number: Van 1

ID Number: 01310

Description: ~~DIGITAL MULTIMETER~~
Manufacturer: FLUKE
Model Number: 187
Serial Number: 86590148
Technician: ~~XAVIER~~ MUNOZ

On-Site Calibration: ☐
Comments:

Calibration Date: 01/25/2023
Calibration Due: 01/25/2024
Procedure: METCAL FLUKE 187
Rev: 6/30/2020
Temperature: 73 °F
Humidity: 47 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/ IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/ IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

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Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
3834901	FLUKE	5522A/SC1100	9/13/2022	9/13/2023

TMI Technical Maintenance, Inc.
12530 TELECOM DR, TEMPLE TERRACE, FL 33637
Phone: Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate Number
A4895081
Issue Date: 01/25/23

Certificate of Calibration

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.
4577 E NW 6TH STREET
GAINESVILLE, FL 36209
352-262-0802

P.O. Number: Van 3

ID Number: EEMS 01311

Description: DIGITAL MULTIMETER
Manufacturer: FLUKE
Model Number: 287
Serial Number: 95740135
Technician: XAVIER MUNOZ

On-Site Calibration: ☐
Comments:

Calibration Date: 01/25/2023
Calibration Due: 01/25/2024
Procedure: METCAL FLUKE 287
Rev: 6/15/2015
Temperature: 73 °F
Humidity: 47 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/ IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/ IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

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Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
3834901	FLUKE	5522A/SC1100	9/13/2022	9/13/2023

TMI Technical Maintenance, Inc.
12530 TELECOM DR, TEMPLE TERRACE, FL 33637
Phone: Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate Number
A4895082
Issue Date: 01/25/23

Certificate of Calibration

Van 2

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES, INC.
4577 E NW 6TH STREET
GAINESVILLE, FL 36209
352-262-0802

P.O. Number:

ID Number: EEMS 01312

Description:	DIGITAL MULTIMETER
Manufacturer:	FLUKE
Model Number:	287
Serial Number:	95740243
Technician:	XAVIER MUNOZ
On-Site Calibration:	☐
Comments:	

Calibration Date:	01/25/2023
Calibration Due:	01/25/2024
Procedure:	METCAL FLUKE 287 Rev: 6/15/2015
Temperature:	73 °F
Humidity:	47 % RH
As Found Condition:	**IN TOLERANCE**
Calibration Results:	**IN TOLERANCE**

Limiting Attribute:

This instrument has been calibrated using standards traceable to the SI units through the National Institute of Standards and Technology (NIST) or other National Metrological Institute (NMI). The method of calibration is direct comparison to a known standard, derived from natural physical constants, ratio measurements or compared to consensus standards.

Reported uncertainties are expressed as expanded uncertainty values at an approximately 95% confidence level using a coverage factor of k=2. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement unless otherwise noted.

TMI's Quality System is accredited to ISO/ IEC 17025:2017 and ANSI/ NCSL Z540-1-1994. ISO/ IEC 17025:2017 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. This calibration complies with all the requirements of ANSI/ NCSL Z540-1-1994 and TMI's Quality Manual, QM-1.

Results contained in this document relate only to the item calibrated. Calibration due dates appearing on the certificate or label are determined by the client for administrative purposes and do not imply continued conformance to specifications.

Measurements not currently on TMI's Scope of Accreditation are identified with an asterisk.

WALLY GYNN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
3834901	FLUKE	5522A/SC1100	9/13/2022	9/13/2023

TMI Technical Maintenance, Inc.
12530 TELECOM DR, TEMPLE TERRACE, FL 33637
Phone: Fax 813-978-3758
www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
2/7/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	1500.00	1499.44	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	1000.00	999.64	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	500.00	499.81	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	200.00	199.92	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	100.00	99.95	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	50.00	49.97	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/7/2023	8028481064	BL2-0	Audit		999.2	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-1	Audit		822.5	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-2	Audit		820.0	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-3	Audit		823.9	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-4	Audit		824.5	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-5	Audit		822.8	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-6	Audit		823.5	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-7	Audit		822.9	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-8	Audit		822.8	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-9	Audit		823.0	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-10	Audit		823.1	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-11	Audit		822.9	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-12	Audit		823.6	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-a	Audit			SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-b	Audit		205.49	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-c	Audit		206.00	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	BL2-d	Audit		206.19	SEG	ETI/Belfort Set #2 - VAN2
2/7/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	1500.00	1499.44	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	1000.00	999.63	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	500.00	499.81	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	200.00	199.90	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 2/7/2023

Reviewer Signature: Date:

P2OTT2 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
2/7/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	1500.00	1499.44	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	1000.00	999.63	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	500.00	499.81	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	200.00	199.90	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	100.00	99.96	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
2/7/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/7/2023	8028481064	P2OTT2-1	Audit		1015.6	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-2	Audit		1016.4	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-3	Audit		1016.3	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-4	Audit		1016.2	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-5	Audit		1016.2	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-6	Audit		1016.7	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-7	Audit		1016.5	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-8	Audit		1014.9	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-9	Audit		1015.9	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-a	Audit		254.09	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-b	Audit		254.07	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-c	Audit		254.10	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	P2OTT2-d	Audit		254.10	SEG	Ott P2 Set #2 - VAN 2
2/7/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	1500.00	1499.44	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	1000.00	999.62	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	500.00	499.83	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	200.00	199.91	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	50.00	49.96	SEG	Post Balance Check
2/7/2023	8028481064	26677	Bal Post	0.00	-0.02	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 2/7/2023

Reviewer Signature: _____ Date: _____

BL1 And BL3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1500.00	1499.67	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1000.00	999.76	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	500.00	499.86	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	200.00	199.91	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	100.00	99.96	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	BL3-0	Audit		1000.4	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-1	Audit		824.0	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-2	Audit		823.2	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-3	Audit		824.9	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-4	Audit		823.6	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-5	Audit		823.6	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-6	Audit		822.9	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-7	Audit		823.4	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-8	Audit		824.5	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-9	Audit		824.0	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-10	Audit		820.7	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-11	Audit		823.8	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL3-12	Audit		823.0	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL1-a	Audit		207.35	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL1-b	Audit		207.03	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL1-c	Audit		206.95	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	BL1-d	Audit		207.34	SEG	ETI/Belfort Set #3 - VAN 3
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1500.00	1499.67	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1000.00	999.76	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	500.00	499.86	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	200.00	199.93	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	100.00	99.97	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature Sandy Grenvill Date: 2/17/202

Reviewer Signature Date:

BL4 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1500.00	1499.67	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1000.00	999.74	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	500.00	499.82	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	200.00	199.90	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	100.00	99.96	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	BL4-0	Audit		1033.9	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-1	Audit		824.6	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-2	Audit		823.3	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-3	Audit		824.3	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-4	Audit		824.4	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-5	Audit		822.9	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-6	Audit		824.6	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-7	Audit		823.7	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-8	Audit		824.0	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-9	Audit		824.8	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-10	Audit		823.3	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-11	Audit		823.7	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-12	Audit		823.8	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-a	Audit		207.32	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-b	Audit		207.33	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-c	Audit		207.48	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	BL4-d	Audit		207.57	SEG	ETI/Belfort Set #4 - VAN1
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1500.00	1499.67	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1000.00	999.74	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	500.00	499.86	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	200.00	199.93	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 2/17/2023

Reviewer Signature: _____ Date: _____

P2OTT1 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1500.00	1499.67	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1000.00	999.76	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	500.00	499.86	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	200.00	199.93	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	100.00	99.97	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	P2OTT1-1	Audit		1017.4	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-2	Audit		1017.7	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-3	Audit		1017.0	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-4	Audit		1017.8	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-5	Audit		1016.5	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-6	Audit		1016.7	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-7	Audit		1017.3	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-8	Audit		1016.2	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-9	Audit		1017.5	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-a	Audit		255.16	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-b	Audit		254.96	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-c	Audit		255.01	SEG	Ott P2 Set #1 - VAN 3
2/17/2023	8028481064	P2OTT1-d	Audit		255.35	SEG	Ott P2 Set #1 - VAN 3
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2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1500.00	1499.67	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1000.00	999.75	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	500.00	499.84	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	200.00	199.93	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	100.00	99.97	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature Sandy Grenvill Date: 2/17/202

Reviewer Signature Date:

P2OTT3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1500.00	1499.67	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	1000.00	999.74	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	500.00	499.86	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	200.00	199.93	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	100.00	99.96	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
2/17/2023	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
2/17/2023	8028481064	P2OTT3-1	Audit		193.78	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-2	Audit		193.76	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-3	Audit		193.75	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-4	Audit		193.73	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-5	Audit		193.75	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-6	Audit		193.08	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-7	Audit		193.80	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-8	Audit		193.57	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-9	Audit		193.07	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-10	Audit		193.71	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-a	Audit		254.70	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-b	Audit		255.06	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-c	Audit		255.41	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	P2OTT3-d	Audit		255.32	SEG	Ott P2 Set #3- VAN 1
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1500.00	1499.67	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	1000.00	999.76	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	500.00	499.86	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	200.00	199.91	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
2/17/2023	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 2/17/2023

Reviewer Signature: _____ Date: _____

EPA United States Environmental Protection Agency

Field Scientist Certification

Eric Hebert

Participated in

The US Environmental Protection Agency's
"National Performance Audit Program (NPAP) and
Performance Evaluation Program (PEP)
Field Scientist Workshop"

Office of Air Quality Planning and Standards
Research Triangle Park, NC
Course Dates: October 2-4, 2023

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EPA United States Environmental Protection Agency

Field Scientist Certification

Martin Valvur

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"National Performance Audit Program (NPAP) and
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