

---

# **2016 National Atmospheric Deposition Program Site Survey Program Annual Report**

**Prepared for:**

**U.S. Environmental Protection Agency  
Office of Atmospheric Programs**

**Prepared by:**



**1128 NW 39<sup>th</sup> Drive  
Gainesville, FL 32605**

**Contract No.: EP-W-12-019**

**April 2017**

---

## Table of Contents

<b>1.0 Introduction / Background.....</b>	<b>1-1</b>
<b>2.0 Status of Sites Surveyed.....</b>	<b>2-1</b>
2.1 Sites Surveyed.....	2-1
2.2 General Status of Sites Surveyed and Equipment Encountered.....	2-2
<b>3.0 Specific Problems Encountered and Frequency .....</b>	<b>3-1</b>
3.1 Findings Likely to Impact Data Quality.....	3-1
3.2 Survey Results for Sites with Second or Third Survey Visits.....	3-6
3.3 Findings Related to the Wind Shield at Sites Surveyed.....	3-8
<b>4.0 Field Site Survey Results .....</b>	<b>4-1</b>
4.1 Electronic Raingage Accuracy.....	4-1
4.2 Sensor Heater Tests.....	4-1
<b>5.0 Recommendations to the NADP Program Office .....</b>	<b>5-1</b>
5.1 Documentation.....	5-1
5.2 Equipment and Procedures.....	5-2
5.2.1 ACM Type Collector.....	5-2
5.2.2 MDN Collectors .....	5-3
5.2.3 N-CON MDN Heaters.....	5-3
5.2.4 N-CON NTN Single Bucket Collector.....	5-3
5.2.5 Electronic Raingage .....	5-4
5.2.6 Belfort Raingage .....	5-5
<b>6.0 Results of Field Laboratory and Procedure Assessments.....</b>	<b>6-1</b>
6.1 Sample Weighing.....	6-1
6.2 pH and Conductivity Measurements.....	6-3
6.3 MDN Sample Handling.....	6-3
<b>7.0 Data Quality Information.....</b>	<b>7-1</b>
7.1 Quality Assurance Project Plan.....	7-1
7.2 Field Team Training and Internal QA Audits .....	7-1
7.3 Duplicate Data Entry.....	7-2
7.4 Identifiable Areas of Improvement to the Survey Program .....	7-2
7.4.1 Site Survey Questionnaire.....	7-2
7.4.2 Internal QA.....	7-3
7.5 Survey Equipment Certification.....	7-4

## List of Appendices

- Appendix A** Assessments Determined to Impact Data Quality
- Appendix B** Findings Most Likely to Impact Data Quality
- Appendix C** Comparison between Surveys of Findings Most Likely to Impact Data Quality
- Appendix D** Transfer Standard Instrument Certifications

## List of Tables

Table 2-1. Sites Surveyed from January through December 2016 and Equipment Found .....	2-2
Table 2-2. AMoN Sites Visited in 2016 .....	2-7
Table 3-1. Collector, Raingage and Siting Meeting Criteria .....	3-1
Table 3-2. Percent of Non-compliant Findings .....	3-3
Table 3-3. Sites Surveyed by EEMS for the First Time .....	3-6
Table 3-4. Percent of Non-compliant Items for Sites Surveyed more than Once .....	3-6
Table 3-5. Status of Surveyed Sites Requiring Raingage Shields .....	3-9
Table 4-1. ACM Activated Sensors for Each Temperature Range and Time Elapsed .....	4-4
Table 6-1. Average Percent Difference for Site Scales .....	6-1
Table 6-2. Difference in pH and Conductivity Readings between Target and Measured Values .....	6-3
Table 7-1. 2016 Internal QA Results for Duplicate Entry Errors .....	7-3

## List of Figures

Figure 2-1. Site Survey Locations in 2016 .....	2-1
Figure 4-1. Electronic Raingage Accuracy – 93 Raingages .....	4-1
Figure 4-2. Inactivated Sensor Temperature .....	4-2
Figure 4-3. Activated Sensor Temperature Increase and Elapsed Time .....	4-3

## 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
FSSD	Field Site Survey Database
HAL	Hg (Mercury) Analytical Laboratory
MDN	Mercury Deposition Network
NADP	National Atmospheric Deposition Program
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
QAPP	Quality Assurance Project Plan
QC	Quality Control
QR	quality rating
SOP	Standard Operating Procedures
USGS	United States Geological Service
WAAS	Wide Area Augmentation System

## Executive Summary

Under US EPA contract number EPW12019, Support for Conducting Systems and Performance Audits of CASTNET and NADP Monitoring Stations, Environmental, Engineering & Measurement Services, Inc. (EEMS) has implemented an independent evaluation and assessment site survey 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 Atmospheric Integrated Research Monitoring Network (AIRMoN), the Mercury Deposition Network (MDN), the Atmospheric Mercury Network (AMNet), and the Ammonia Monitoring Network (AMoN). Surveys of AMoN sites are limited to siting criteria data collection when sites are collocated with an existing NADP wet-deposition network or a CASTNET site as part of this contract, and 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 survey 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 Clean Air Status and Trends Network (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 survey of sites associated with the NADP. Site surveys 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.

Site surveys afford the necessary checks and balances for site operations and serve to independently validate data provided by the sites in the network.

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

## 1.0 Introduction / Background

The National Atmospheric Deposition Program (NADP) Site Survey Program is an independent and unbiased Quality Assurance (QA) program of systems and performance surveys 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 network. 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 survey program provides a higher level of confidence in the data reported by the NADP.

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 activities strengthen the reliability and overall quality of the data the agency uses for policy decisions and for measures of accountability.

NADP site surveys are accomplished by visiting each site, checking the operation of the site instrumentation, performing maintenance as needed, observing the site operator while performing the routine site activities, providing technical and training support, and reporting the results. More details of the activities are provided in the following key tasks.

1. Scheduling sites to be surveyed. This task is coordinated with the EPA Project Officer, the NADP Program Office, network liaisons, site operators, supervisors, and sponsors. Approximately 100 NADP sites (co-located are not considered separate sites) are scheduled for surveys during each contract period. The schedule is developed based on the elapsed time since the previous site survey (priority given to longest time since previous survey), inclusion of sites that have not been surveyed, and consideration for efficient and cost effective travel.
2. Preparing for field site surveys. During survey preparation, available site data are compiled and reviewed creating the site file. The necessary materials and standards for each site survey are checked and shipped if necessary. The site operators scheduled for surveys are contacted to finalize the survey arrangements.
3. Performing site surveys. During each site survey 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 <http://nadp.isws.illinois.edu/>.
  - 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 survey forms and with photographs as necessary.
  - Qualitatively evaluating the site personnel regarding the methods and procedures used for sample handling, field analytical technique (AIRMoN), calibrations, cleaning, maintenance, recordkeeping, reporting, and material storage. Confirming that the current versions of NADP manuals and documentation are accessible.
  - Quantitatively assessing the accuracy of the NADP instrumentation responses to QA standards. These include standard weights for raingage tests and mass determinations, and analytical standards for pH and conductivity meter tests (AIRMoN sites only).
  - Recording all data on the hard copy forms provided in the site file. Printing additional forms from the database, if required, in order to record all data. Comparing the observations to the pre-populated values, 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 survey 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 SOP specific to the network.

5. Transferring observations from survey forms to survey database. Enter the survey information obtained in the steps above into the survey database and review 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, survey 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 included in the site file with the appropriate document control number.
  
7. Providing a quarterly data set (final site survey report) in the form of tables. This final data set includes all the information gathered during the site surveys conducted in the previous three months. The data for each site consists of:
  - Survey results that have been subjected to duplicate entry and internal QA review.
  - Digital photographs.
  - Scanned raingage chart (if applicable).
  - Any additional pertinent supporting information.



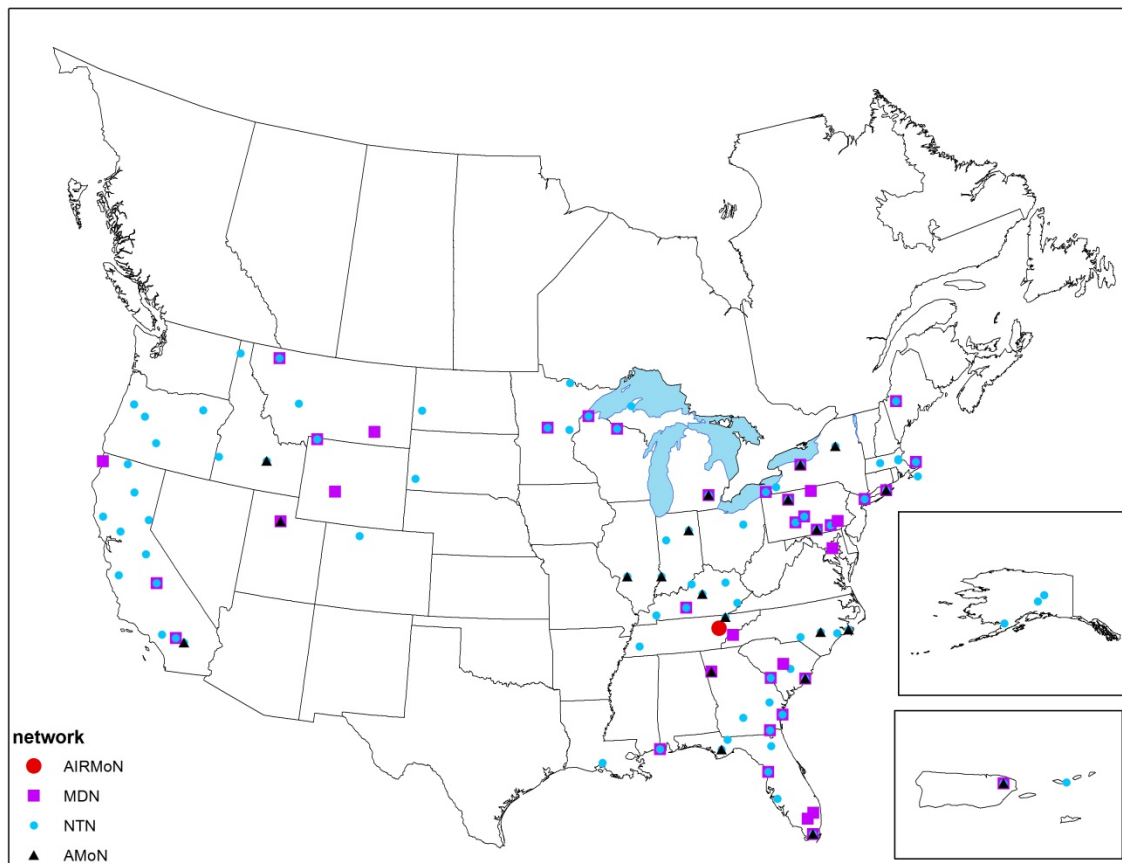
## 2.0 Status of Sites Surveyed

### 2.1 Sites Surveyed

This annual report includes site surveys performed from January through December of 2016.

A total of 127 NADP collectors (this number includes co-located sites) were surveyed during the period covered by this report at 98 distinct locations<sup>1</sup>. These include 40 MDN sites, 86 NTN sites, and one AIRMoN site. Figure 2-1 is a map of the sites visited during 2016. AMoN sites are also included in the map, however only the siting criterial is checked for these samplers. Table 2-1 is a list of the sites surveyed and includes the network, site name, survey date, and equipment found.

Figure 2-1. Site Survey Locations in 2016



Source – NADP Program Office

<sup>1</sup> 71OH-NTN, operated by the USGS QA Program, is included in the total number of collectors surveyed.

## 2.2 General Status of Sites Surveyed and Equipment Encountered

Overall the sites surveyed during this reporting period were found in good condition and collecting data that meet NADP quality objectives. Most of the 98 precipitation raingages surveyed (co-located sites usually use the same raingage) were electronic raingages either ETI NOAH IV (61 raingages) or the OTT PLUVIO (32 raingages). Only five Belfort mechanical raingages were surveyed and found to be operating reasonably well.

Of the 127 collectors (sites) surveyed, 57 sites operated N-CON collectors. The 70 remaining collectors were AeroChem Metrics (ACM) type, manufactured by either AeroChem Metrics or Loda Electronics Company.

Forty locations visited operate backup raingages of various types. Only assessments related to siting criteria are evaluated during surveys, not the performance of the backup raingages.

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 them 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 survey team regarding improvements to their sample handling technique and equipment maintenance.

Specific survey findings that impact, or could impact data quality, are discussed in Section 3.0. The list of sites surveyed during 2016 and the equipment found at the sites is shown in Table 2.1.

**Table 2-1. Sites Surveyed from January through December 2016 and Equipment Found**

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
AK01	Poker Creek	NTN	7/11/2016	ACM-type	ETI	N/A
AK03	Denali National Park-Mt. McKinley	NTN	7/7/2016	ACM-type	ETI	Belfort
AK97	Katmai National Park-King Salmon	NTN	7/5/2016	ACM-type	ETI	N/A
CA20	Yurok Tribe-Requa	MDN	5/6/2016	ACM-type	Belfort	N/A
CA42	Tanbark Flat	NTN	3/31/2016	ACM-type	ETI	Belfort
CA45	Hopland	NTN	5/17/2016	N-CON	OTT	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
CA50	Sagehen Creek	NTN	5/11/2016	N-CON	ETI	Other
CA66	Pinnacles National Park-Bear Valley	NTN	4/4/2016	ACM-type	ETI	Tipping Bucket
CA67	Joshua Tree National Park-Black Rock	NTN	3/29/2016	ACM-type	ETI	Tipping Bucket
CA75	Sequoia National Park-Giant Forest	NTN/MDN	5/10/2016	ACM-type	ETI	Tipping Bucket
CA76	Montague	NTN	5/13/2016	N-CON	OTT	N/A
CA88	Davis	NTN	4/5/2016	N-CON	ETI	Tipping Bucket
CA94	Converse Flats	MDN/NTN	3/30/2016	ACM-type	ETI	N/A
CA96	Lassen Volcanic National Park-Manzanita Lake	NTN	5/12/2016	ACM-type	ETI	Tipping Bucket
CA99	Yosemite National Park-Hodgdon Meadow	NTN	5/9/2016	ACM-type	ETI	Tipping Bucket
CO93	Buffalo Pass - Dry Lake	NTN	7/26/2016	ACM-type	OTT	Tipping Bucket
FL03	Bradford Forest	NTN	2/26/2016	ACM-type	OTT	N/A
FL05	Chassahowitzka National Wildlife Refuge	MDN/NTN	2/29/2016	ACM-type	ETI	N/A
FL11	Everglades National Park - Research Center	MDN/NTN	2/17/2016	ACM-type	ETI	Tipping Bucket
FL14	Quincy	NTN	3/1/2016	N-CON	OTT	Stick
FL23	Sumatra	NTN	3/1/2016	ACM-type	ETI	N/A
FL41	Verna Well Field	NTN	2/16/2016	N-CON	OTT	Stick
FL95	Everglades-South Palm Beach County	MDN	2/19/2016	ACM-type	ETI	N/A
FL97	Everglades-Western Broward County	MDN	2/19/2016	ACM-type	ETI	Other
GA09	Okefenokee National Wildlife Refuge	MDN/NTN	11/15/2016	ACM-type	ETI	Stick
GA20	Claxton	NTN	2/23/2016	ACM-type	ETI	N/A
GA33	Sapelo Island	MDN/NTN	11/30/2016	ACM-type/ N-CON	ETI	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingeage Type	Backup Raingeage Type
GA40	Yorkville	MDN	10/25/2016	N-CON	ETI	N/A
GA99	Chula	NTN	10/25/2016	N-CON	OTT	Stick
ID02	Priest River Experimental Forest	NTN	8/5/2016	ACM-type	ETI	N/A
ID03	Craters Of The Moon National Monument	NTN	8/2/2016	ACM-type	ETI	N/A
ID11	Reynolds Creek	NTN	8/3/2016	N-CON	OTT	N/A
IL46	Alhambra	NTN	7/21/2016	ACM-type	ETI	N/A
IN20	Roush Lake	NTN	7/19/2016	N-CON	OTT	N/A
IN22	Southwest Purdue Agriculture Center	NTN	7/22/2016	N-CON	OTT	N/A
IN41	Agronomy Center For Research	NTN	7/19/2016	ACM-type	OTT	N/A
KY03	Mackville	NTN	3/11/2016	N-CON	ETI	N/A
KY10	Mammoth Cave National Park-Houchin Meadow	MDN/NTN	3/14/2016	ACM-type	ETI	Tipping Bucket
KY19	Seneca Park	NTN	3/11/2016	N-CON	OTT	N/A
KY22	Lilley Cornett Woods	NTN	4/15/2016	N-CON	OTT	Belfort
KY35	Clark State Fish Hatchery	NTN	3/29/2016	N-CON	OTT	N/A
KY99	Mulberry Flat	NTN	3/15/2016	ACM-type	ETI	N/A
LA12	Iberia Research Station	NTN	3/3/2016	ACM-type	ETI	N/A
MA01	North Atlantic Coastal Lab	MDN/NTN	5/17/2016	ACM-type	ETI	N/A
MA08	Quabbin Reservoir	NTN	5/19/2016	ACM-type	ETI	N/A
MA14	Nantucket	NTN	5/18/2016	N-CON	ETI	N/A
MA22	Boston University	NTN	9/14/2016	N-CON	ETI	Tipping Bucket
MA98	Arnold Arboretum	NTN	9/14/2016	N-CON	ETI	Tipping Bucket

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
MD00	Smithsonian Environmental Research Center	MDN	11/15/2016	ACM-type	ETI	Tipping Bucket
ME04	Carrabassett Valley	MDN/NTN	10/4/2016	N-CON/ ACM-type	ETI	N/A
MI52	Ann Arbor	MDN/NTN	8/15/2016	ACM-type	ETI	N/A
MI99	Chassell	NTN	8/22/2016	ACM-type	Belfort	Other
MN23	Camp Ripley	MDN/NTN	8/30/2016	ACM-type/ N-CON	OTT	N/A
MN28	Grindstone Lake	NTN	8/31/2016	N-CON	ETI	N/A
MN32	Voyageurs National Park- Sullivan Bay	NTN	8/29/2016	ACM-type	ETI	N/A
MS12	Grand Bay Nerr	MDN/NTN	2/18/2016	ACM-type	ETI	N/A
MT05	Glacier National Park-Fire Weather Station	MDN/NTN	9/26/2016	ACM-type	ETI	Tipping Bucket
MT07	Clancy	NTN	9/28/2016	N-CON	OTT	N/A
MT95	Badger Peak	MDN	9/29/2016	N-CON	ETI	N/A
NC06	Beaufort	NTN	11/10/2016	ACM-type	ETI	N/A
NC29	Hofmann Forest	NTN	11/9/2016	ACM-type	OTT	N/A
NC35	Clinton Crops Research Station	NTN	11/9/2016	ACM-type	OTT	N/A
NC36	Jordan Creek	NTN	11/8/2016	ACM-type	OTT	N/A
ND00	Theodore Roosevelt National Park-Painted Canyon	NTN	8/23/2016	ACM-type	ETI	Tipping Bucket
NY06	Bronx	MDN/NTN	9/13/2016	N-CON	ETI	Other
NY10	Chautauqua	NTN	9/27/2016	N-CON	OTT	N/A
NY43	Rochester	MDN/NTN	9/28/2016	N-CON	ETI	Tipping Bucket
NY94	Nick's Lake	NTN	9/29/2016	N-CON	OTT	N/A
NY96	Cedar Beach, Southold	MDN/NTN	5/23/2016	N-CON	ETI	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
OH71/71OH	Wooster	NTN	9/26/2016	N-CON	OTT	Stick
OR09	Silver Lake Ranger Station	NTN	8/11/2016	N-CON	OTT	N/A
OR10	H. J. Andrews Experimental Forest	NTN	8/9/2016	ACM-type	ETI	N/A
OR18	Starkey Experimental Forest	NTN	8/4/2016	N-CON	OTT	N/A
OR97	Hyslop Farm	NTN	8/10/2016	ACM-type	ETI	N/A
PA00	Arendtsville	MDN/NTN	10/16/2016	ACM-type	ETI	N/A
PA13	Allegheny Portage Railroad National Historic Site	MDN/NTN	8/21/2016	N-CON	OTT	Stick
PA29	Kane Experimental Forest	MDN/NTN	8/16/2016	N-CON/ ACM-type	ETI	N/A
PA30	Erie	MDN/NTN	8/15/2016	N-CON	OTT	Stick
PA42	Leading Ridge	MDN/NTN	8/22/2016	N-CON	OTT	Stick
PA47	Millersville	MDN/NTN	9/12/2016	N-CON	OTT	N/A
PA60	Valley Forge	MDN	9/18/2016	N-CON	OTT	Stick
PA90	Hills Creek State Park	MDN	8/18/2016	N-CON	OTT	Stick
PR20	El Verde	MDN/NTN	2/25/2016	N-CON/ ACM-type	ETI	Tipping Bucket
SC03	Savannah River	MDN/NTN	2/23/2016	N-CON	ETI	Other
SC05	Cape Romain National Wildlife Refuge	MDN/NTN	10/26/2016	ACM-type	ETI	N/A
SC06	Santee National Wildlife Refuge	NTN	11/21/2016	ACM-type	OTT	N/A
SC19	Congaree Swamp	MDN	10/26/2016	ACM-type	OTT	Other
SD04	Wind Cave National Park-Elk Mountain	NTN	8/24/2016	ACM-type	Belfort	Tipping Bucket
TN00	Walker Branch Watershed	AIRMoN	3/13/2016	ACM-type	ETI	N/A
TN04	Speedwell	NTN	3/12/2016	ACM-type	ETI	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
TN12	Smoky Mountains National Park - Clingmans Dome	MDN	10/27/2016	ACM-type	Belfort	Tipping Bucket
TN14	Hatchie National Wildlife Refuge	NTN	4/5/2016	N-CON	OTT	N/A
UT97	Salt Lake City	MDN	10/24/2016	N-CON	ETI	N/A
VI01	Virgin Islands National Park-Lind Point	NTN	2/22/2016	ACM-type	ETI	N/A
WI08	Brule River	MDN/NTN	8/23/2016	N-CON	ETI	N/A
WI36	Trout Lake	MDN/NTN	8/23/2016	N-CON	ETI	N/A
WY08	Yellowstone National Park-Tower Falls	MDN/NTN	11/8/2016	ACM-type	ETI	Stick
WY26	Roundtop Mountain	MDN	6/20/2016	N-CON	ETI	Tipping Bucket

A total of 20 AMoN sites were included in the site surveys, and they are listed in Table 2-2. The height is measured and photographs (directional and overview) are taken of the sampler during the AMoN site survey.

**Table 2-2. AMoN Sites Visited in 2016**

Site ID	Site Name	Survey Date
CA67	Joshua Tree National Park-Black Rock	3/29/2016
CT15	Abington	9/17/2016
FL11	Everglades National Park - Research Center	2/17/2016
FL23	Sumatra	3/1/2016
GA40	Yorkville	10/25/2016
IL11	Bondville	9/24/2016
IL46	Alhambra	7/21/2016
IL73	Stockton	7/20/2016
KY03	Mackville	3/11/2016
MS30	Coffeeville	2/28/2016
NC06	Beaufort	11/10/2016
NC25	Coweeta	5/4/2016

<b>Site ID</b>	<b>Site Name</b>	<b>Survey Date</b>
NY67	Connecticut Hill	10/15/2016
NY96	Cedar Beach, Southold	5/23/2016
OH59	Oxford	4/16/2016
PA29	Kane Experimental Forest	8/17/2016
PR20	El Verde	2/25/2016
SC05	Cape Romain National Wildlife Refuge	10/27/2016
TN04	Speedwell	3/12/2016
UT97	Salt Lake City	10/24/2016



### 3.0 Specific Problems Encountered and Frequency

Each site survey consists of evaluating the existing conditions relating to NADP siting criteria, performance and condition of the equipment (collector and primary raingage), status of supplies, site operator’s performance, and other general information relating to the site. Once the evaluations (questionnaire) are completed, the information is entered into a relational database and summary reports are created.

The number of checks performed during a survey will vary depending on the network and the type of equipment present at the site. This can range from 148 checks for an NTN site operating an N-CON collector, electronic raingage and no backup raingage to 239 checks for an NTN site operating an ACM-type collector, along with a Belfort raingage and a backup gage.

#### 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
- Raingage performance.

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

**Table 3-1. Collector, Raingage and Siting Meeting Criteria**

	Surveyed	Meeting all Assessments <sup>2</sup>	Percent Meeting all Assessment
<b>Collectors</b>	127	91	72 %
Number of NTN ACM – type	50	31	62 %
Number of MDN ACM – type	20	12	60 %
Number of MDN N-CON	20	17	85 %
Number of NTN N-CON	37	31	84 %

<sup>2</sup> Meeting all assessments “as found”.

	Surveyed	Meeting all Assessments <sup>2</sup>	Percent Meeting all Assessment
<b>Raingages</b>	98	82	84 %
Belfort Raingages	5	3	60 %
Electronic Raingages	93	79	85 %
<b>Siting Criteria</b>	127	15	12 %
NTN Sites Meeting All Siting Criteria	86	13	15 %
MDN Sites Meeting All Siting Criteria	40	2	5 %
AIRMoN Sites Meeting All Siting Criteria	1	0	0 %

All sites 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 survey visits.

Due to the high goals set by the NADP for siting criteria elements, achievement is difficult for most sites. Adhering to the strict interpretation of all the siting criteria rules and guidelines for every site in the networks is unlikely. As indicated in Table 3-2 this results in a low percentage of sites meeting all the siting criteria requirements.

Appendix A contains the complete list of current survey assessments that EEMS considers could directly impact data quality. The remainder of this section and the following tables focus on the survey data that describes only the assessments that did ***not*** meet NADP criteria during this reporting period.

Table 3-4 presents the non-compliant survey data 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 survey performance since this would require multiple visits for every site in the program. However, summarizing this information allows any high number of observed assessment failures to be quickly and easily identified. Items with a non-compliant percentage greater than 20% are identified in Table 3-4 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 <sup>3</sup>	Found Non-Compliant	Percent (%) Non-Compliant
<b>Sample Handling</b>			
Is sampling media quality maintained?	126	3	2.4
Are samples stored and shipped properly	1	0	0.0
<b>Siting Criteria Assessments</b>			
Is the orifice of the collector +/- .3 m of raingage (elevation)	127	9	7.1
30 degree rule for buildings met (raingage)	98	1	1.0
No objects > 1 m height inside 5 m radius (raingage)	98	41	41.8
No fences > 1 m height inside 2 m radius (raingage)	98	11	11.2
No vegetation height > 0.6 m within 5 m radius (raingage)	98	27	27.6
Collector and sensor oriented properly	127	11	8.7
45 degree rule met (collector)	127	27	21.3
30 degree rule for trees met (collector)	127	54	42.5
30 degree rule for buildings met (collector)	127	0	0.0
No objects > 1 m height within 5 m radius (collector)	127	45	35.4
No fences > 1 m height inside 5 m radius (collector)	127	20	15.7
No vegetation height > 0.6 m within 5 m radius (collector)	127	28	22.0
No treated lumber inside 5 m radius (collector)	127	21	16.5
No galvanized metal inside 5 m radius collector (MDN)	40	13	32.5
No pastures and ag. activity within 20 m radius	127	9	7.1
No herbicides and fertilizers used within 20 m radius	127	9	7.1
Roads meet NADP siting criteria	127	8	6.3
Waterways meet NADP siting criteria	127	2	1.6
Airports meet NADP siting criteria	127	0	0.0
Animal operations meet NADP siting criteria (NTN and AIRMoN)	87	1	1.1
Combustion sources meet NADP siting criteria (MDN only)	40	0	0.0
Parking lots and maintenance areas meet NADP siting criteria	127	6	4.7
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria	127	0	0.0

<sup>3</sup> The number of assessments varies depending on the number of observations made. The breakdown of the number of assessments for each check is presented in Table 3-2. For example: 40 MDN sites were surveyed, so the siting criteria assessment specific to MDN sites is 40. Of the 40 MDN sites, 20 operate an ACM-type collector and 20 operate an N-CON collector. Of the 20 ACM-type MDN collector one did not have a fan, so only 19 fans were assessed.

<b>Siting and Performance Checks</b>	<b>Number of Assessments<sup>3</sup></b>	<b>Found Non-Compliant</b>	<b>Percent (%) Non-Compliant</b>
Metalworking operations meet NADP siting criteria (MDN only)	40	0	0.0
<b>ACM-type Collector Assessments</b>			
Dry side bucket is clean (NTN and AIRMoN)	50	14	28.0
Dry side bag installed correctly (MDN)	20	3	15.0
Does lid seal properly	70	2	2.9
Lid liner in good condition	70	0	0.0
Fan in good condition (MDN)	19	3	15.8
Cooling fan thermostat in good condition (MDN)	17	0	0.0
Heater in good condition (MDN)	15	0	0.0
Heater thermostat in good condition (MDN)	15	0	0.0
Has flush wall filter mount been installed (MDN)	19	1	5.3
Filter in good condition (MDN)	13	0	0.0
Max / min thermometer within acceptable limits (MDN)	20	3	15.0
ACM sensor operates properly	70	5	7.1
Motor-box operates within acceptable limits	70	2	2.9
<b>N-CON Collector Assessments</b>			
N-CON fan in good condition (MDN)	20	1	5.0
N-CON cooling fan thermostat in good condition (MDN)	20	0	0.0
N-CON heater in good condition (MDN)	20	0	0.0
N-CON heater thermostat in good condition (MDN)	20	0	0.0
N-CON max / min thermometer in acceptable limits (MDN)	20	0	0.0
N-CON sensor respond to a 5 passes	57	0	0.0
N-CON lid seals properly	57	6	10.5
N-CON lid liner in good condition	57	4	7.0
<b>Belfort Raingage Assessments</b>			
Was the 'as found' turn-over set properly	5	2	40.0
<b>Electronic Raingage Assessments</b>			
Raingage operates properly (electronic gage)	93	0	0.0
Does datalogger receive event signals form all collectors (electronic gage)	93	12	12.9
Does optical sensor respond to "blocking" of light beam (ETI)	60	4	6.7
Does optical sensor respond to mist of water (ETI)	57	3	5.3

Tables B-1 through B-5 in Appendix B present EEMS’s findings regarding the assessments of siting criteria, raingage and collector condition, and site operator proficiency (assessed as “sampling media quality maintained”) which are considered to be the areas that may most impact data quality. As described in survey Task #3, the assessment of site operator proficiency includes the qualitative evaluation of the site personnel regarding the methods and procedures used for sample handling, recordkeeping, reporting, equipment cleaning, maintenance, and material storage.

The data indicate that most of the non-compliant findings are related to the 30 degree tree guidance violations for collectors and to objects within the 5 meter radius of the raingage and/or collector, and followed by galvanized metal near the MDN collector.

Three assessments shown to have a high number of sites out of compliance are related to vegetation. These include the height of the vegetation near the raingage and collector and the height of nearby trees. As expected the number of trees violating the 30 degree guideline increased as the trees grew between survey visits.

The other two vegetation assessments are the height of the vegetation near the raingage and near the collector. This assessment is expected to vary depending on the season in which the survey was conducted. Early and late in the year the vegetation would be shorter, in the middle of the growing season it would be taller. Therefore this assessment is not very useful for trend evaluation. It is also worthwhile to consider some recent 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 raingage may increase collection efficiency.

Two sites surveyed have experienced 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 survey” the response was “NO”):

- KY19-NTN is now situated next to an NCORE site that is adjacent to the parking lot of a closed vehicle inspection station.
- TN14-NTN was moved from its original location to a new location by the U.S. Fish and Wildlife Service visitor center building.

The sites included in Table 3-4 were surveyed by EEMS for the first time during this reporting period:

**Table 3-3. Sites Surveyed by EEMS for the First Time**

Site ID	Network	Site Name
71OH <sup>4</sup>	NTN	Wooster
FL95	MDN	Everglades – South Palm Beach County
LA12	NTN	Iberia Research Station
MA14	NTN	Nantucket
MA22	NTN	Boston University
MA98	NTN	Arnold Arboretum
MI52	MDN	Ann Arbor
NY94	NTN	Nick’s Lake
NY96	MDN	Cedar Beach, Southold
PR20	MDN	El Verde
TN12	MDN	Smoky Mountains National Park - Clingmans Dome
WI08	NTN	Brule River

### 3.2 Survey Results for Sites with Second or Third Survey Visits

One hundred and fifteen (115) of the 127 sites surveyed in 2016 had been previously visited by EEMS. Most of these sites have been visited three or four times. Tables presenting the survey assessments for successive visits can be found in Appendix C. Comparisons of the percent non-compliant results for successive surveys are presented in Table 3-5. The percentages presented in this table are based on the 115 sites that were previously surveyed, and do not include those sites where a network was added recently and had not previously been surveyed. For those sites with more than two surveys, only the last two visits were considered (i.e., survey conducted in 2016 and 2013, but not the survey conducted in 2010).

**Table 3-4. Percent of Non-compliant Items for Sites Surveyed more than Once**

Siting and Performance Checks	% Non-compliant During 2016	% Non-compliant During Previous Survey
Is sampling media quality maintained?	2.6%	1.8%
Is the orifice of the collector +/- .3 m of raingage (elevation)	12%	12%
No objects > 1 m height inside 5 m radius (raingage)	43%	44%
No fences > 1 m height inside 2 m radius (raingage)	11%	10%
No vegetation height > 0.6 m within 5 m radius (raingage)	28%	17%
Collector and sensor oriented properly	4.3%	7.8%

<sup>4</sup> 71OH-NTN is a collocated temporary site operated by the USGS QA program.

<b>Siting and Performance Checks</b>	<b>% Non-compliant During 2016</b>	<b>% Non-compliant During Previous Survey</b>
45 degree rule met (collector)	23%	23%
30 degree rule for trees met (collector)	45%	37%
No objects > 1 m height within 5 m radius (collector)	35%	42%
No fences > 1 m height inside 5 m radius (collector)	16%	13%
No vegetation height > 0.6 m within 5 m radius (collector)	21%	16%
No treated lumber inside 5 m radius (collector)	17%	12%
No galvanized metal inside 5 m radius collector (MDN)	29%	28%
No pastures and ag. activity within 20 m radius	7.0%	7.0%
No herbicides and fertilizers used within 20 m radius	7.0%	8.7%
Roads meet NADP siting criteria	7.0%	9.6%
Airports meet NADP siting criteria	0.0%	0.0%
Parking lots and maintenance areas meet NADP siting criteria	5.2%	4.3%
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria	0.0%	0.9%
Dry side bucket is clean	23%	13%
Does lid seal properly	3.0%	2.1%
Lid liner in good condition	0.0%	1.4%
Fan in good condition	12%	0.0%
Heater in good condition	0.0%	0.0%
Has flush wall filter mount been installed	5.9%	5.6%
Filter in good condition	0.0%	0.0%
Max / min thermometer in acceptable limits	12%	22%
ACM sensor operates properly	7.6%	4.2%
Motorbox operates within acceptable limits	3.0%	1.4%
N-CON lid seals properly	10%	7.0%
N-CON lid liner in good condition	6.1%	4.7%
N-CON cooling fan thermostat in good condition	0.0%	0.0%
N-CON max / min thermometer in acceptable limits	0.0%	5.9%
Was the 'as found' turn over set properly (Belfort gage)	25%	44%
Raingage operates properly (electronic gage)	0.0%	1.2%
Does datalogger receive event signals form all collectors (electronic gage)	16%	7.5%
Does optical sensor respond to "blocking" of light beam (electronic gage)	7.0%	2.2%
Does optical sensor respond to mist of water (electronic gage)	5.6%	2.4%

However there are two items (treated lumber and galvanized metal) that require further discussion. Interpretation of the intent of these two assessments is somewhat subjective and has been applied differently during multiple surveys by different survey teams. There have been cases where the survey team member determined that the presence of the material was not significant. Other evaluations were performed with strict adherence to the criteria, noting the presence of any material regardless of the age of the treated wood or surface area of the material. It seems that the presence of treated lumber and galvanized metal within five meters of the collector can be open to interpretation, and therefore the intent of the assessment should be investigated and defined to make the survey data less subjective. Evaluations of these and other assessments are discussed in Section 5.0 of this report.

Closer investigation of the other results in Table 3-5 reveals that many of these changes relate to the installation of new equipment at some of these sites. Six N-CON collectors were installed at the sites considered here between the two latest surveys and one Belfort raingage were replaced with electronic raingage.

Comparing data from one survey 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 gauge of network operation might be tracking the increase or decrease in sample quality codes as assigned by the laboratories responsible for evaluating and analyzing the samples. It can be assumed that as all site survey 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 may be unlikely.

### **3.3 Findings Related to the Wind Shield at Sites Surveyed**

Data provided by the NADP PO indicate that raingages 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 3-6 presents the assessments of wind shields at the sites surveyed during the period covered by this annual report, and whether a shield was present at the time of the previous survey. Forty three of the 89 raingages surveyed during the reporting period covered by this report were identified as potentially required to have a wind shield.



**Table 3-5. Status of Surveyed Sites Requiring Raingage Shields**

Site ID	Network	Condition in 2016	Previous Survey	Site ID	Network	Condition in 2016	Previous Survey
AK01	NTN	Not Present	Not Present	MT05	MDN/NTN	Installed	Installed
AK03	NTN	Not Present	Not Present	MT07	NTN	Not Present	Not Present
AK97*	NTN	Installed	Installed	MT95	MDN	Installed	Installed
CA20*	MDN/NTN	Not Present	Not Present	ND00	NTN	Installed	Installed
CA50	NTN	Installed	Installed	NY06*	MDN/NTN	Installed	Installed
CA75	MDN/NTN	Installed	Installed	NY10	NTN	Not Present	Not Present
CA76**	NTN	Installed	Installed	NY43*	MDN/NTN	Installed	Installed
CA96	NTN	Installed	Installed	NY94*	NTN	Installed	--
CA99	NTN	Installed	Installed	OH71**	NTN	Installed	Installed
CO93	NTN	Installed	Installed	OR09	NTN	Installed	Installed
ID02	NTN	Installed	Installed	OR10**	NTN	Installed	Installed
ID03	NTN	Not Present	Not Present	OR18	NTN	Installed	Installed
ID11	NTN	Installed	Installed	PA13	MDN/NTN	Not Present	Not Present
MA01	MDN/NTN	Not Present	Not Present	PA29	MDN/NTN	Installed	Installed
MA08	NTN	Installed	Installed	PA30	MDN/NTN	Not Present	Not Present
MA14*	NTN	Not Present	Not Present	PA42	MDN/NTN	Not Present	Not Present
MA22*	NTN	Installed	Installed	PA90	MDN	Not Present	Not Present
MA98*	NTN	Installed	Installed	SD04	NTN	Not Present	Not Present
ME04	MDN/NTN	Installed	Installed	UT97	MDN	Installed	Installed
MI99	NTN	Not Present	Not Present	WI08	MDN/NTN	Installed	Installed
MN23	MDN/NTN	Not Present	Not Present	WI36	MDN/NTN	Installed	Installed
MN28	NTN	Not Present	Not Present	WY08	MDN/NTN	Installed	Installed
MN32	NTN	Not Present	Not Present	WY26*	MDN	Installed	Installed

\* Indicates it is unknown whether the site requires a shield

\*\* Indicates sites not required to install a shield, but nonetheless have one installed

-- Indicates site not previously surveyed by EEMS.

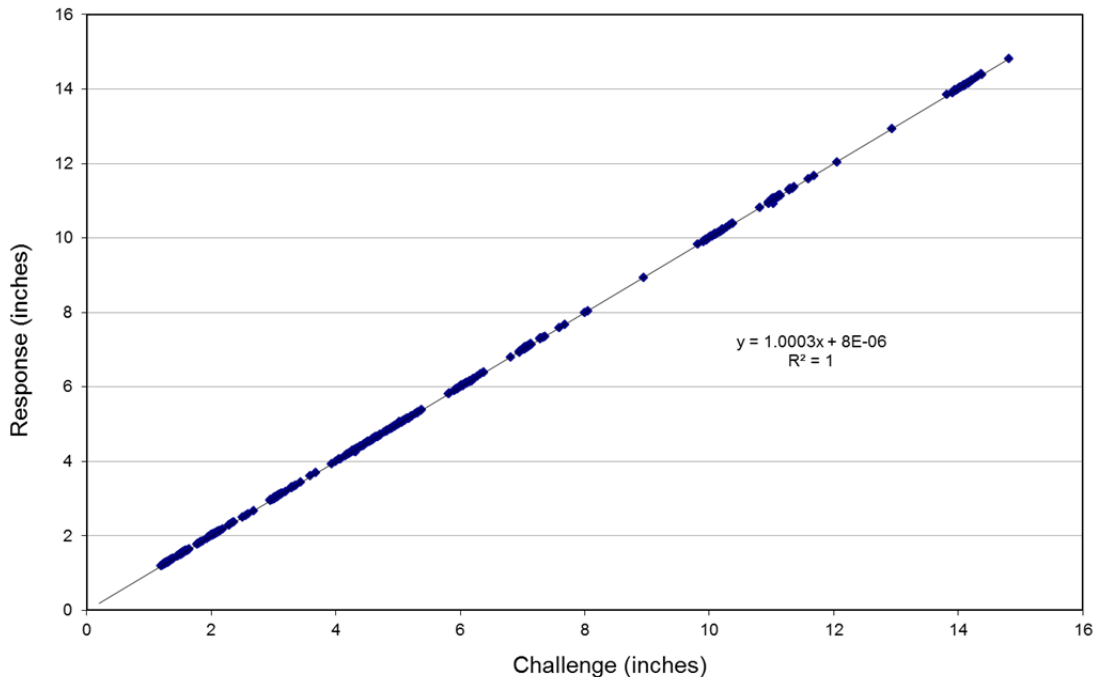
## 4.0 Field Site Survey Results

This section summarizes the quantifiable survey data relating to raingage accuracy tests and ACM collector sensor heater performance. Ninety eight raingages were surveyed during this reporting period most of which operate electronic raingages. With only five Belfort mechanical raingages surveyed, this report does not include a sub-section dedicated to the performance of Belfort mechanical raingages.

### 4.1 Electronic Raingage Accuracy

The results of the accuracy tests for the 93 electronic raingages challenged during the period covered by this report are presented in Figure 4-1. As demonstrated by the graph the raingages report the weight of the standards added very accurately for the entire span. No problems with the electronic raingages were encountered. The only issues with the electronic raingage operation are related to the Personal Digital Assistant (PDA) and the required interfacing software. This is discussed further in Section 5.0.

Figure 4-1. Electronic Raingage Accuracy – 93 Raingages



### 4.2 ACM Sensor Heater Tests

The ACM type collectors used throughout the networks of the NADP utilize a contact grid 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 the time the collector is open with no precipitation occurring. 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 4-2. The results indicate that most sensor heaters were functioning properly. CA42-NTN exhibited an ambient temperature that was higher than that of the inactivated sensor. This is unusual, and the likely explanation is that the ambient temperature and sensor temperature were not measured at the same time and the ambient temperature had increased prior to the measurement. The data were reviewed, but no comments were provided by the survey team member.

**Figure 4-2. Inactivated ACM Sensor Temperature**

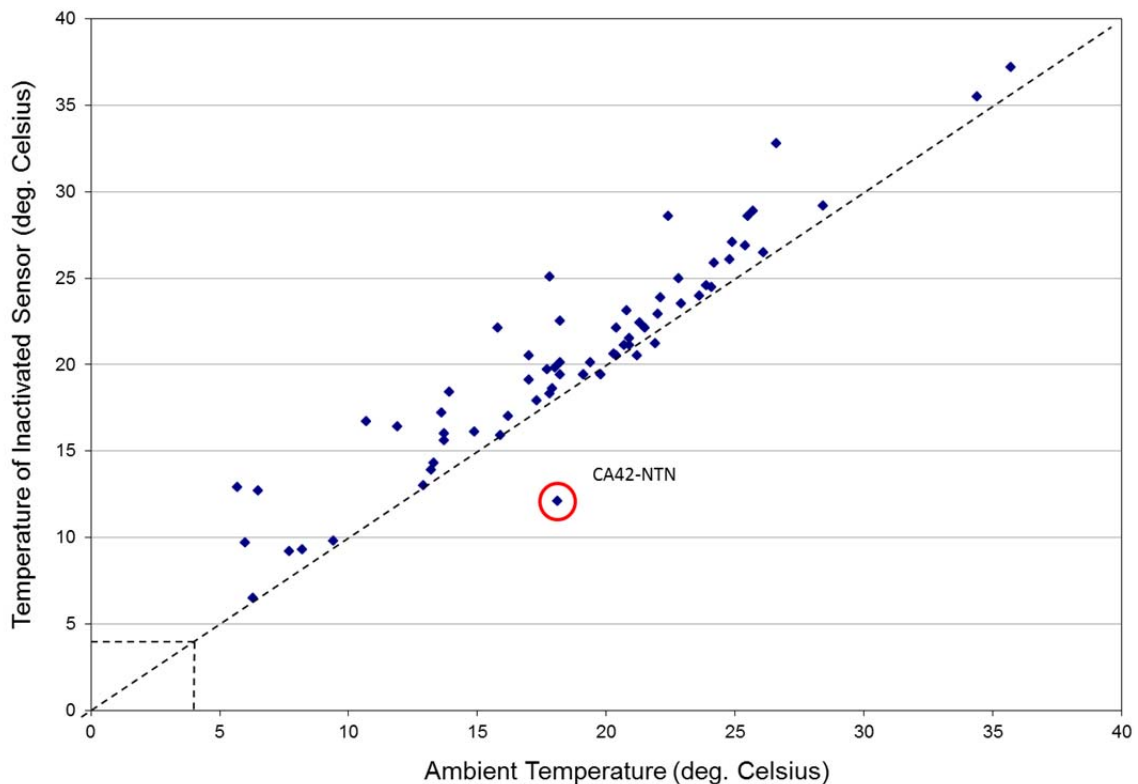
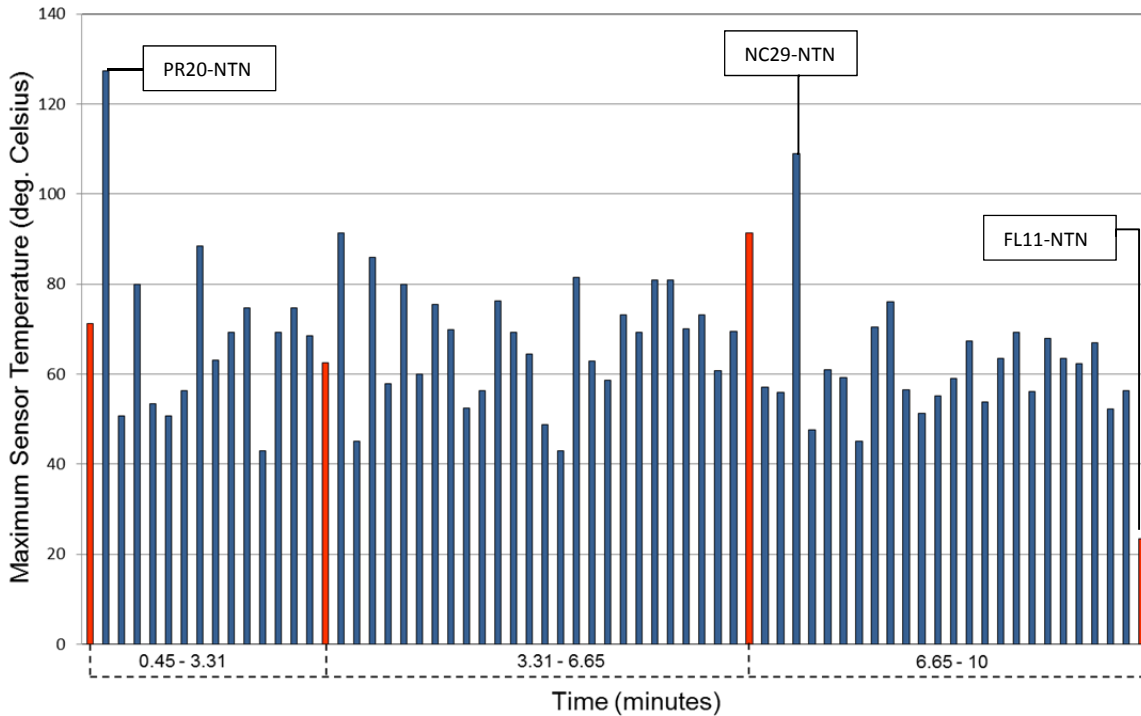


Figure 4-3 presents the maximum temperature reached by each sensor when activated, and the time required for each sensor to reach that temperature. There is some variability between sensors for maximum temperature, but most sensors are between 50°C and 70°C within 10 minutes of activation. A few sensors did not reach 50°C, but most were reported to be functioning properly. The fact that the 50°C mark was not reached may be due to windy and cool conditions at the sites. The sensors at NC29-NTN and FL11-NTN were found to be not functioning properly and were replaced during the site survey. Though the sensor at PR20-NTN is always activated at a high temperature, recommendations for a replacement over the successive surveys have not been followed, which leads to the conclusion that this problem is more than likely not affecting the sample collection and quality.

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



Further evaluation of the data presented in Figure 4-3 is provided in Table 4-1, which includes the number of sensors that reached the maximum temperature within each 10 degree range above 30 degrees.

**Table 4-1. ACM Activated Sensors for Each Temperature Range and Time Elapsed**

Temperature Range	Number of Sensors	Time to Maximum Temperature	Number of Sensors
< 30.0° C	1	< 3 min	9
30.0° to 40.0° C	0	3.0 – 4.0 min	15
40.1° to 50.0° C	6	4.1 – 5.0 min	7
50.1° to 60.0° C	19	5.1 – 6.0 min	7
60.1° to 70.0° C	22	6.1 – 7.0 min	5
70.1° to 80.0° C	11	7.1 – 8.0 min	5
80.1° to 90.0° C	5	8.1 – 9.0 min	11
> 90.1° C	4	> 9.1 min	9

Based on the evaluations performed on the sensors during the site surveys, (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 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. Other sensor evaluations include inspection of the sensor housing to ensure there are no cracks that would allow moisture to enter the sensor. Three of the sensors inspected during 2016 exhibited small cracks.

## 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.

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

It is 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 surveys. For example it has been shown 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.

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 ground cover assessment could be refined to include the presence of any buildings within 30 meters and the square footage of ground covered by un-natural materials if those items are deemed to be significant to sample quality. By improving the information gathered during surveys more meaningful interpretation of deposition data can be performed.

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.

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.

### 5.1 Documentation

The networks continue to benefit from the recent implementation of the online training sessions offered by both the CAL and the HAL. It was also observed during the site surveys that site operators were generally aware that past webinars were available to view online. No webinars were conducted in 2016. Although EEMS does not track attendance of the online training sessions, it may be beneficial to identify site operators and supervisors who have not participated in any webinars during each year and encourage those individuals to participate. Training for all networks is an essential function for maintaining NADP data quality.

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. A link to the site is provided here: <http://nadp.isws.illinois.edu/lib/manualsSOPs.aspx>. This process should continue and be a high priority for the CAL, HAL and PO. This 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.

The NADP website is a valuable tool for providing both data and documentation for data users, but it is sometimes not utilized by site operation personnel. Links to site operator procedures, tools, and training material should be available and more easily identified through the NADP PO website (<http://nadp.isws.illinois.edu>.)

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.

## **5.2 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.

### **5.2.1 ACM Type Collector**

Problems with the following items were frequently noted with the ACM type collectors during the surveys:

#### **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**

In addition to comparison of raingage catch tests, comparisons of the various collector sensors operating in the network should be more thoroughly evaluated. Ideally any approved sensor should respond identically in terms of response to all types of precipitation events. Currently this is not the case. Testing is currently underway to attempt to both qualify and quantify the operation of all types of approved sensors (optical and mechanical).

Probably the most significant improvement that could be made to the network as a whole would be to replace the various types of precipitation sensors with a single uniform sensor for all types of collectors. It is suggested that, if possible a single sensor, or combination of different types of sensors acting as one, be approved for use that can both trigger sample collection and indicate precipitation to be recorded by the electronic raingages.

### **5.2.2 MDN Collectors**

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.

### **5.2.3 N-CON MDN Heaters**

N-CON collectors for both MDN and NTN have been a welcome addition to the accepted list of approved NADP collectors. However, occasionally accepted equipment operation can be improved by additional modifications. The original N-CON collectors approved, purchased, and in operation for the MDN network fall into that category.

After 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 surveys indicate collectors have been modified to include the circulating fan.

### **5.2.4 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 DC operation.

All the collectors surveyed had been modified to accept “tall” and “short” buckets.



EEMS is continuing to tighten all set screws and lid arm bolts and apply Loctite. 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.

There is a recommended upgrade to the NTN N-CON collector that was installed at one site (WI36). The upgrade is a plastic spacer 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.

### **5.2.5 Electronic Raingage**

The introduction of the electronic raingages into the network is a great improvement. All site operators that are operating electronic raingages reported that they are happy with the improvement. However, it has been observed that ETI NOAH IV raingages have excessive corrosion around the connections for the sensors and batteries. As part of continuing improvements being implemented in the field, all connectors are being cleaned and dielectric grease is being applied.

### **PDA and Thumb Drives**

EEMS is aware that software development and testing requires time. Also the introduction of new electronic devices sometimes renders the older devices obsolete including PDA. The areas of software development and documentation has been observed during the surveys that took place during this year continued to improve and effort should stay focused as continued changes occur going forward.

At sites where PDA devices are used, EEMS is assisting in transitioning the sites to being able to use an Android phone to interface with the gage. The Campbell Scientific Firmware in the gage data logger is being updated and the Bluetooth dongle is being replaced. The PDA can still be used but an Android Phone loaded with the Campbell Scientific Loggerlink App can also be used by the site operator to interface with the gage and download data.

The efforts to standardize and improve the PDA operation should continue even though new raingage installations have required new methods of data collection and transfer. Since the PDAs have been used for a significant period at numerous stations, it is suggested that the PDA documentation include detailed references to the various versions of both hardware and software.

Recent interface and download methods have utilized 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 CAL. Within minutes of this step, data are automatically posted, and are available on the CAL 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 raingage 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.

The website where station precipitation data are posted is an excellent tool, but is not widely used by the site operators who are often busy when they return from the field and are no longer focused on the operation of the equipment. It is suggested that the website tool continue to be developed with some automatic data screening functions that can help to alert personnel at the CAL and site operators of potential equipment problems since the ability to interrogate equipment operation is limited at site without PDA communication.

The data logger date and time are routinely checked and documented at sites with electronic raingages. As part of this check, EEMS sets the clocks in the data loggers to GMT when the time is observed to be greater than one minute from GMT.

### **5.2.6 Belfort Raingage**

Five Belfort raingages were surveyed during this reporting period. They were all found to be operating well and measuring rainfall accurately through the first six inches. Two of the raingages had improper pen turnover and this was corrected. This turnover issue may be problematic depending on the amount of antifreeze being used for winterization of the raingage.

## 6.0 Results of Field Laboratory and Procedure Assessments

The field site survey 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. AIRMoN sites still require pH and conductivity measurements. This section will focus on weighing and decanting the NTN and AIRMoN samples, results of the pH and conductivity measurements at AIRMoN sites, and sample handing at MDN sites.

All site operators were observed to be proficient with sample weighing and decanting procedures. During the surveys, 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 surveys should be identified as action items and require some follow-up from the CAL. This could include replacing the scale with a surplus instrument. Table 6-1 presents results for the scales surveyed 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 % Difference	Site Id	Scale Type	Average % Difference
AK01	Mettler SB32000	-0.02%	AK03	Sartorius CPA6202S	-0.02%
AK97	Unknown	0.02%	CA42	GSE 450	0.06%
CA45	Ohaus 1119D	-0.05%	CA50	Unknown	0.12%
CA66	Ohaus 1119D	0.00%	CA67	AEADAM CBK35q 8642	0.01%
CA75	Ohaus 1119D	-0.12%	CA76	KTRON KS-1WM	-0.04%
CA88	Mettler PC16	-0.03%	CA94	Ohaus AVB101	0.05%
CA96	Unknown	-0.09%	CA99	Ohaus 1119D	0.07%
CO93	Ohaus 1119D	-0.01%	FL03	Mettler PT10N	0.10%
FL05	Ohaus 1119D	-0.09%	FL11	Ohaus 1119D	0.04%
FL14	Ohaus 1119D	-0.09%	FL23	Ohaus 1119D	0.24%

Site Id	Scale Type	Average % Difference
FL41	Ohaus 1119D	-0.12%
GA20	Ohaus 1119D	0.16%
GA99	Ohaus 1119D	-0.03%
ID03	Ohaus 1119D	0.16%
IL46	Ohaus 1119D	-0.01%
IN22	Sartorius 3862 M88-1	-0.11%
KY03	Ohaus 1119D	-0.17%
KY19	Sartorius AG	0.19%
KY35	Ohaus 1119D	0.01%
LA12	Ohaus 1119D	0.58%
MA08	Ohaus 1119D	-0.24%
MA22	Unknown	-0.02%
ME04	Ohaus	0.04%
MI99	Ohaus 1119D	-0.07%
MN28	And EK-12KA	0.11%
MS12	Denver DA Series	0.05%
MT07	Ohaus 1119D	-0.01%
NC29	Ohaus ES30R	-0.33%
NC36	Ohaus 1119D	-0.17%
NY06	Unknown	0.02%
NY43	Adam CBK 16aH	-0.08%
NY96	Ohaus 1119D	-0.04%
OR09	Ohaus 1119D	-0.03%
OR18	Ohaus 1119D	0.00%
PA00	USEPA 01165	0.01%
PA29	Ohaus 1119D	-0.07%
PA42	Sartorius 1264MP	-0.10%
PR20	Ohaus 1119D	-0.03%
SC05	Ohaus 1119D	0.02%
SD04	Sartorius	0.28%
TN04	Ohaus 1119D	-0.11%
VI01	Ohaus 1119D	-0.16%
WI36	Ohaus 1119D	-0.03%

Site Id	Scale Type	Average % Difference
GA09	Ohaus	-0.02%
GA33	Unknown	0.40%
ID02	Sartorius ES 18DCE-IOUR	0.17%
ID11	Sartorius 110P	0.02%
IN20	Ohaus 1119D	-0.01%
IN41	Ohaus 1119D	0.01%
KY10	Ohaus 0-20 kg	-0.05%
KY22	Ohaus 1119D	0.03%
KY99	Mettler 4400	-0.13%
MA01	Mettler XA2001S	-0.02%
MA14	DYMO M25-US	0.12%
MA98	Electronic Scale	-0.01%
MI52	Ohaus 1119D	0.00%
MN23	Ohaus 1119D	0.05%
MN32	Ohaus 1119D	-0.09%
MT05	Ohaus 1119D	-0.04%
NC06	Ohaus 1119D	-0.04%
NC35	Ohaus 1119D	-0.17%
ND00	Ohaus 1119D	-0.07%
NY10	Ohaus 1119D	-0.12%
NY94	Adam CBK 16aH	0.01%
OH71	Mettler PC 4400	-0.03%
OR10	Mettler PE24	0.00%
OR97	Ohaus 1119D	-0.05%
PA13	Sartorius 1264 MP	-0.10%
PA30	Sartorius 1264 MP	-0.10%
PA47	Acculab VA-16000	-0.07%
SC03	Mettler PE16	0.01%
SC06	Ohaus 1119D	0.02%
TN00	Sartorius 2251	0.07%
TN14	Ohaus 1119D	-0.04%
WI08	Unknown	-0.20%
WY08	Ohaus 1119D	-0.05%

## 6.2 pH and Conductivity Measurements

This subsection presents the results of the field chemistry evaluations performed at the AIRMoN site surveyed during this reporting period.

In order to evaluate the pH and conductivity measurements performed in the field by the site operators, a sample of simulated rain was obtained from the PO. Prior to each AIRMoN site survey the NADP PO Quality Assurance Manager provided the survey team with in-house prepared simulated rain. The pH and conductivity comparisons are presented in Table 6-2.

The site operators of the AIRMoN sites surveyed demonstrate good technique while performing chemistry measurements. Probe and meter calibrations were performed prior to making the field measurements and sample temperature stabilization was maintained as well as possible.

**Table 6-2. Difference in pH and Conductivity Readings between Target and Measured Values**

Site Id	Network	Parameter	Target Value	Response	Difference
TN00	AIRMoN	pH	4.5 ± 0.06	4.5	0.0
		Conductivity	22.2 ± 2.2	22.1	0.1

## 6.3 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 HAL. Other observations of the procedures include:

- Not securing the sample bottle 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 recommended procedures were emphasized during the surveys. It is suggested that the recommended procedures, especially those observed to have been lax in the field, also be stressed during the MDN sample change-out webinars.

## **7.0 Data Quality Information**

Several procedures are in place to help ensure survey data quality. Foremost, a comprehensive QAPP was developed prior to collecting survey data. Field survey team training was provided to ensure consistency of methods. Duplicate entry of survey 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 survey data, recording data in the survey database and reporting survey results are 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 Survey QAPP and associated SOPs can be updated. The project QAPP was revised and approved in 2016.

### **7.2 Field Team Training and Internal QA Audits**

Initial survey team training took place while performing two surveys in Indiana in December 2007. Survey 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 survey teams meet and cooperatively complete a site survey. This is usually 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 location of site IL11 also allows the CAL and NADP PO to observe and participate with the exchange of information and techniques to ultimately improve the site survey methods. This activity was performed in September of 2015.

Site operator questionnaires are provided to each site operator following a site survey. The information gathered is used to improve the site survey 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 survey program.

### **Training Class Attendance and Webinar Participation**

In order to keep up with changes to the NADP procedures and protocols EEMS survey team members have attended past site operator training classes provided by the Mercury Analytical Laboratory (HAL), Central Analytical Laboratory (CAL), and Program Office and participate in

past webinars (no webinars were offered in 2016). This provides EEMS with a means to stay current with procedures and changes to site equipment. It also allows EEMS to provide the NADP PO with feedback and suggestions to improve the site operator training classes. EEMS intends to continue this practice in the future if the training program is reinstated. EEMS intends to participate in the training webinars, when scheduling permits, to accomplish the same goals.

### **7.3 Duplicate Data Entry**

A routine procedure utilized as part of the EEMS QA program for survey data, is duplicate data entry. Field personnel enter survey data results into the Field Site Survey Database (FSSD) after completing the survey. An initial spot report is generated using this raw data. After completing approximately three surveys, 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 survey results and reports. The photos taken during the site survey 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 NADP QA Manager and to the EPA Project Officer. This procedure is performed each quarter.

### **7.4 Identifiable Areas of Improvement to the Survey Program**

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

#### **7.4.1 Site Survey Questionnaire**

Despite considerable effort on the part of both EEMS and the NADP PO, some of the questions contained in the Site Survey Questionnaire remain ambiguous. This has led to some survey field

personnel interpreting some questions one way, while another team member might interpret the same question differently. Additionally, some survey questions are redundant or impossible to answer accurately during the field site survey. As cases are discovered during review of the survey reports, additional clarification is requested from the NADP QA Manager regarding the intent of the question. This information is then shared with the survey team members to eliminate confusion and maintain consistency. Subsequent versions of the questionnaire and database have been designed as described briefly in previous sections of this report. It is anticipated that changes to the questionnaire will be much easier to implement with the revised database. Refinement and improvement to the information collected during a site survey will continue. It is expected that feedback regarding the survey 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.

### 7.4.2 Internal QA

This section summarizes the results of EEMS’ internal QA processes.

#### Results of Duplicate Data Entry Process and Site File Review

When a discrepancy is identified by the EEMS QA Manager during review of the duplicate data entry, a code is assigned to the record to indicate if the error was the result of a typo by field personnel or QA personnel. If an error in the original entry is identified and not the result of a typo the record is also coded. The results of the QA coding are presented in Table 7-1. Discrepancies due to formatting issues are corrected, but are not considered errors.

The data indicates that of the 36,900 entries that are compared (does not include memo fields), the entry error rate is about 0.5% with approximately the twice as many errors found in the field entry than in the office entry.

**Table 7-1. 2016 Internal QA Results for Duplicate Entry Errors**

	Field Entry	Duplicate QA Entry	Total Entries
Total Number of Entries Compared	21,263	21,263	42,526
Initial File Entry Errors	207		
Duplicate QA Entry Errors		93	
Percent Errors	0.97%	0.44%	
Total Entry Errors	300		
Total Percent Errors	0.71%		



## **7.5 Survey Equipment Certification**

The instruments used by the survey team are maintained and certified by the EEMS Survey 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 raingages 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 D.

## **APPENDIX A**

### **Assessments Determined to Impact Data Quality**

## Assessments Determined to Impact Data Quality

Field Entry	NTN	MDN	AIRMON
Is sampling media quality maintained?	✓	✓	✓
Are samples stored and shipped properly	N/A	N/A	✓
Is the orifice of the collector +/- .3 m of raingage (elevation)	✓	✓	✓
30 degree rule for buildings met (raingage)	✓	✓	✓
No objects > 1 m height inside 5 m radius (raingage)	✓	✓	✓
No fences > 1 m height inside 2 m radius (raingage)	✓	✓	✓
No vegetation height > 0.6 m within 5 m radius (raingage)	✓	✓	✓
Does NADP require a raingage wind shield at this site	✓	✓	✓
If raingage wind shield present, is it installed correctly	✓	✓	✓
Collector and sensor oriented properly	✓	✓	✓
45 degree rule met (collector)	✓	✓	✓
30 degree rule for trees met (collector)	✓	✓	✓
30 degree rule for buildings met (collector)	✓	✓	✓
No objects > 1 m height within 5 m radius (collector)	✓	✓	✓
No fences > 1 m height inside 5 m radius (collector)	✓	✓	✓
No vegetation height > 0.6 m within 5 m radius (collector)	✓	✓	✓
No treated lumber inside 5 m radius (collector)	✓	✓	✓
No galvanized metal inside 5 m radius collector (MDN)	N/A	✓	N/A
No pastures and ag. activity within 20 m radius	✓	✓	✓
No herbicides and fertilizers used within 20 m radius	✓	✓	✓
Roads meet NADP siting criteria	✓	✓	✓
Waterways meet NADP siting criteria	✓	✓	✓
Airports meet NADP siting criteria	✓	✓	✓
Animal operations meet NADP siting criteria (NTN and AIRMoN)	✓	N/A	✓
Combustion sources meet NADP siting criteria (MDN only)	N/A	✓	N/A
Parking lots and maintenance areas meet NADP siting criteria	✓	✓	✓
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria	✓	✓	✓
Metalworking operations meet NADP siting criteria (MDN only)	N/A	✓	N/A
Dry side bucket is clean	✓	✓	✓
Does lid seal properly	✓	✓	✓
Lid liner in good condition	✓	✓	✓
Fan in good condition	N/A	✓	N/A
Cooling fan thermostat in good condition	N/A	✓	N/A

<b>Field Entry</b>	<b>NTN</b>	<b>MDN</b>	<b>AIRMON</b>
Heater in good condition	N/A	✓	N/A
Heater thermostat in good condition	N/A	✓	N/A
Has flush wall filter mount been installed	N/A	✓	N/A
Filter in good condition	N/A	✓	N/A
Max / min thermometer in acceptable limits	N/A	✓	N/A
ACM sensor operates properly	✓	✓	✓
Motorbox operates within acceptable limits	✓	✓	✓
N-CON fan in good condition	N/A	✓	N/A
N-CON cooling fan thermostat in good condition	N/A	✓	N/A
N-CON heater in good condition	N/A	✓	N/A
N-CON heater thermostat in good condition	N/A	✓	N/A
N-CON max / min thermometer in acceptable limits	N/A	✓	N/A
N-CON sensor responds to a 20-second mist of water	✓	✓	✓
N-CON lid seal in good condition	✓	✓	✓
N-CON lid liner in good condition	✓	✓	✓
Was the 'as found' turn over set properly (Belfort gage)	✓	✓	✓
Raingage operates properly (electronic gage)	✓	✓	✓
Does datalogger receive event signals form all collectors (electronic gage)	✓	✓	✓
Does optical sensor respond to "blocking" of light beam (electronic gage)	✓	✓	✓
Does optical sensor respond to mist of water (electronic gage)	✓	✓	✓

N/A= Not applicable to the particular network

## **APPENDIX B**

### **Findings Most Likely to Impact Data Quality**

**Table B-1. Findings Most Likely to Impact Data Quality – MDN Sites with ACM-type Collectors (page 1 of 2)**

StationId	CA20	CA75	CA94	FL05	FL11	FL95	FL97	GA09	KY10	MA01	MD00	MI52
Is sampling media quality maintained?												
Is the orifice of the collector +/- .3 m of raingage (elevation)												
No objects > 1 m height inside 5 m radius (raingage)	X							X		X	X	X
No fences > 1 m height inside 2 m radius (raingage)												
No vegetation height > 0.6 m within 5 m radius (raingage)	X	X		X		X		X				X
Collector and sensor oriented properly												
45 degree rule met (collector)		X							X		X	X
30 degree rule for trees met (collector)	X	X	X					X				
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)		X	X								X	X
No fences > 1 m height inside 5 m radius (collector)												X
No vegetation height > 0.6 m within 5 m radius (collector)		X				X						X
No treated lumber inside 5 m radius (collector)						X						
No galvanized metal inside 5 m radius collector (MDN)		X			X	X					X	X
No pastures and ag. activity within 20 m radius												
No herbicides and fertilizers used within 20 m radius												
Roads meet NADP siting criteria				X								
Waterways meet NADP siting criteria												
Airports meet NADP siting criteria												
Combustion sources meet NADP siting criteria (MDN only)												
Parking lots and maintenance areas meet NADP siting criteria												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
Metalworking operations meet NADP siting criteria (MDN only)												
Dry side bucket is clean					X							--
Does lid seal properly												
Lid liner in good condition												
Fan in good condition						X						
Cooling fan thermostat in good condition						--	--					
Heater in good condition					--	--	--					
Heater thermostat in good condition					--	--	--					
Has flush wall filter mount been installed									X			
Filter in good condition		U to T	U to T						--			U to T
Max / min thermometer in acceptable limits											X	X
ACM sensor operates properly										X		
Motorbox operates within acceptable limits										X		
Was the 'as found' turn over set properly (Belfort gage)	X	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)	--											
Does datalogger receive event signals form all collectors (electronic gage)	--				X					X		
Does optical sensor respond to "blocking" of light beam (electronic gage)	--		X							X		
Does optical sensor respond to mist of water (electronic gage)	--									X		

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-1. Findings Most Likely to Impact Data Quality – MDN Sites with ACM-type Collectors (page 2 of 2)**

StationId	MN23	MS12	MT05	PA00	SC05	SC19	TN12	WY08
Is sampling media quality maintained?			X					
Is the orifice of the collector +/- .3 m of raingage (elevation)						X		
No objects > 1 m height inside 5 m radius (raingage)	X	X	X			X		X
No fences > 1 m height inside 2 m radius (raingage)								X
No vegetation height > 0.6 m within 5 m radius (raingage)			X					
Collector and sensor oriented properly								
45 degree rule met (collector)						X		
30 degree rule for trees met (collector)	X		X		X	X	X	X
30 degree rule for buildings met (collector)								
No objects > 1 m height within 5 m radius (collector)						X		X
No fences > 1 m height inside 5 m radius (collector)			X			X		
No vegetation height > 0.6 m within 5 m radius (collector)		X	X					
No treated lumber inside 5 m radius (collector)	X						X	X
No galvanized metal inside 5 m radius collector (MDN)						X		X
No pastures and ag. activity within 20 m radius				X				
No herbicides and fertilizers used within 20 m radius				X				
Roads meet NADP siting criteria								X
Waterways meet NADP siting criteria								
Airports meet NADP siting criteria								
Combustion sources meet NADP siting criteria (MDN only)								
Parking lots and maintenance areas meet NADP siting criteria								X
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria								
Metalworking operations meet NADP siting criteria (MDN only)								
Dry side bucket is clean			X					
Does lid seal properly								
Lid liner in good condition								
Fan in good condition				X	X		--	
Cooling fan thermostat in good condition							--	
Heater in good condition		--					--	
Heater thermostat in good condition		--					--	
Has flush wall filter mount been installed							--	
Filter in good condition			Missing				--	--
Max / min thermometer in acceptable limits	X							
ACM sensor operates properly								
Motorbox operates within acceptable limits								
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	X	--
Raingage operates properly (electronic gage)							--	
Does datalogger receive event signals form all collectors (electronic gage)					X		--	
Does optical sensor respond to "blocking" of light beam (electronic gage)	--					--	--	
Does optical sensor respond to mist of water (electronic gage)	--	U to T				--	--	

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-2. Findings Most Likely to Impact Data Quality – MDN Sites with N-CON Collectors (page 1 of 2)**

StationId	GA33	GA40	ME04	MT95	NY06	NY43	NY96	PA13	PA29	PA30	PA42	PA47
Is sampling media quality maintained?												
Is the orifice of the collector +/- .3 m of raingage (elevation)			X			X						X
No objects > 1 m height inside 5 m radius (raingage)		X		X	X	X				X		
No fences > 1 m height inside 2 m radius (raingage)		X		X		X						
No vegetation height > 0.6 m within 5 m radius (raingage)		X				X				X		X
Does NADP require a raingage wind shield at this site?	X	X					X	X		X	X	X
Collector and sensor oriented properly				X			X					X
45 degree rule met (collector)				X		X				X		
30 degree rule for trees met (collector)			X		X	X		X		X	X	
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)		X		X	X	X		X		X		
No fences > 1 m height inside 5 m radius (collector)		X				X						
No vegetation height > 0.6 m within 5 m radius (collector)	X					X						X
No treated lumber inside 5 m radius (collector)						X						
No galvanized metal inside 5 m radius collector (MDN)			X	X	X	X						
No pastures and ag. activity within 20 m radius		X										
No herbicides and fertilizers used within 20 m radius												
Roads meet NADP siting criteria						X						
Waterways meet NADP siting criteria										X		
Airports meet NADP siting criteria												
Combustion sources meet NADP siting criteria (MDN only)												
Parking lots and maintenance areas meet NADP siting criteria												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
Metalworking operations meet NADP siting criteria (MDN only)												
N-CON fan in good condition				X								
N-CON cooling fan thermostat in good condition												
N-CON heater in good condition												
N-CON heater thermostat in good condition												
N-CON max / min thermometer in acceptable limits												
N-CON sensor responds to five passes												
N-CON lid seal in good condition			X									
N-CON lid liner in good condition												
Raingage operates properly (electronic gage)												
Does datalogger receive event signals form all collectors (electronic gage)	X											X
Does optical sensor respond to "blocking" of light beam (electronic gage)			X			X		--		--	--	--
Does optical sensor respond to mist of water (electronic gage)			X			X		--		--	--	--

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"



**Table B-2. Findings Most Likely to Impact Data Quality – MDN Sites with N-CON Collectors (page 1 of 2)**

StationId	PA60	PA90	PR20	SC03	UT97	WI08	WI36	WY26
Is sampling media quality maintained?								
Is the orifice of the collector +/- .3 m of raingage (elevation)		X						
No objects > 1 m height inside 5 m radius (raingage)	X	X	X	X	X		X	
No fences > 1 m height inside 2 m radius (raingage)	X					X		
No vegetation height > 0.6 m within 5 m radius (raingage)		X	X					
Does NADP require a raingage wind shield at this site?	X	X	X	X				
Collector and sensor oriented properly			X					
45 degree rule met (collector)		X		X				
30 degree rule for trees met (collector)	X	X					X	
30 degree rule for buildings met (collector)								
No objects > 1 m height within 5 m radius (collector)	X		X		X	X		
No fences > 1 m height inside 5 m radius (collector)	X					X		
No vegetation height > 0.6 m within 5 m radius (collector)			X					
No treated lumber inside 5 m radius (collector)							X	X
No galvanized metal inside 5 m radius collector (MDN)					X	X		
No pastures and ag. activity within 20 m radius								
No herbicides and fertilizers used within 20 m radius								
Roads meet NADP siting criteria					X			
Waterways meet NADP siting criteria								
Airports meet NADP siting criteria								
Combustion sources meet NADP siting criteria (MDN only)								
Parking lots and maintenance areas meet NADP siting criteria					X			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria								
Metalworking operations meet NADP siting criteria (MDN only)								
N-CON fan in good condition								
N-CON cooling fan thermostat in good condition								
N-CON heater in good condition								
N-CON heater thermostat in good condition								
N-CON max / min thermometer in acceptable limits								
N-CON sensor responds to five passes								
N-CON lid seal in good condition								X
N-CON lid liner in good condition								
Raingage operates properly (electronic gage)								
Does datalogger receive event signals form all collectors (electronic gage)						X		
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--						
Does optical sensor respond to mist of water (electronic gage)	--	--		U to T				

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table B-3. Findings Most Likely to Impact Data Quality – NTN Sites with ACM-type Collectors (page 1 of 4)**

StationId	AK01	AK03	AK97	CA42	CA66	CA67	CA75	CA94	CA96	CA99	CO93	FL03
Is sampling media quality maintained?												
Is the orifice of the collector +/- .3 m of raingage (elevation)			X								X	
No objects > 1 m height inside 5 m radius (raingage)		X	X			X						
No fences > 1 m height inside 2 m radius (raingage)												
No vegetation height > 0.6 m within 5 m radius (raingage)	X	X		X		X	X	X				X
Does NADP require a raingage wind shield at this site?	X	X		X	X	X		X				X
Collector and sensor oriented properly												
45 degree rule met (collector)						X	X					
30 degree rule for trees met (collector)		X		X			X			X		X
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)			X	X		X	X	X				
No fences > 1 m height inside 5 m radius (collector)												
No vegetation height > 0.6 m within 5 m radius (collector)	X			X		X		X		X		X
No treated lumber inside 5 m radius (collector)	X		X								X	
No pastures and ag. activity within 20 m radius												
No herbicides and fertilizers used within 20 m radius												
Roads meet NADP siting criteria												
Waterways meet NADP siting criteria												
Airports meet NADP siting criteria												
Animal operations meet NADP site cirteria (NTN and AIRMoN)												
Parking lots and maintenance areas meet NADP siting criteria												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
Dry side bucket is clean			X		X						X	X
Does lid seal properly												
Lid liner in good condition												
ACM sensor operates properly												
Motorbox operates within acceptable limits												
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)												--
Does datalogger receive event signals form all collectors (electronic gage)										X		--
Does optical sensor respond to "blocking" of light beam (electronic gage)								X			--	--
Does optical sensor respond to mist of water (electronic gage)			U to T								--	--

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-3. Findings Most Likely to Impact Data Quality – NTN Sites with ACM-type Collectors (page 2 of 4)**

StationId	FL05	FL11	FL23	GA09	GA20	GA33	ID02	ID03	IL46	IN41	KY10	KY99
Is sampling media quality maintained?												
Is the orifice of the collector +/- .3 m of raingage (elevation)	X		X									
No objects > 1 m height inside 5 m radius (raingage)			X	X					X			
No fences > 1 m height inside 2 m radius (raingage)					X							
No vegetation height > 0.6 m within 5 m radius (raingage)	X			X				X	X			
Does NADP require a raingage wind shield at this site?	X	X	X	X	X	X		X	X	X	X	X
Collector and sensor oriented properly												
45 degree rule met (collector)			X								X	
30 degree rule for trees met (collector)				X	X							
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)			X						X			
No fences > 1 m height inside 5 m radius (collector)					X							
No vegetation height > 0.6 m within 5 m radius (collector)									X			
No treated lumber inside 5 m radius (collector)			X				X					
No pastures and ag. activity within 20 m radius					X				X			
No herbicides and fertilizers used within 20 m radius									X			
Roads meet NADP siting criteria	X											
Waterways meet NADP siting criteria												
Airports meet NADP siting criteria												
Animal operations meet NADP site criteria (NTN and AIRMoN)												
Parking lots and maintenance areas meet NADP siting criteria												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
Dry side bucket is clean						X		X				
Does lid seal properly						X						
Lid liner in good condition												
ACM sensor operates properly		X										
Motorbox operates within acceptable limits												
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)												
Does datalogger receive event signals form all collectors (electronic gage)		X			X	X						
Does optical sensor respond to "blocking" of light beam (electronic gage)										--		
Does optical sensor respond to mist of water (electronic gage)										--		

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-3. Findings Most Likely to Impact Data Quality – NTN Sites with ACM-type Collectors (page 3 of 4)**

StationId	LA12	MA01	MA08	ME04	MI52	MI99	MN32	MS12	MT05	NC06	NC29	NC35
Is sampling media quality maintained?									X			
Is the orifice of the collector +/- .3 m of raingage (elevation)				X			X					
No objects > 1 m height inside 5 m radius (raingage)		X			X			X	X	X		X
No fences > 1 m height inside 2 m radius (raingage)												
No vegetation height > 0.6 m within 5 m radius (raingage)					X		X		X	X		
Does NADP require a raingage wind shield at this site?	X	X			X			X		X	X	X
Collector and sensor oriented properly												
45 degree rule met (collector)					X							
30 degree rule for trees met (collector)			X			X	X		X			
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)					X				X	X		
No fences > 1 m height inside 5 m radius (collector)					X				X			
No vegetation height > 0.6 m within 5 m radius (collector)					X		X	X		X		
No treated lumber inside 5 m radius (collector)												
No pastures and ag. activity within 20 m radius	X											
No herbicides and fertilizers used within 20 m radius												X
Roads meet NADP siting criteria												
Waterways meet NADP siting criteria												
Airports meet NADP siting criteria												
Animal operations meet NADP site criteria (NTN and AIRMoN)	X											
Parking lots and maintenance areas meet NADP siting criteria												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
Dry side bucket is clean	X								X			
Does lid seal properly												
Lid liner in good condition												
ACM sensor operates properly								X			X	
Motorbox operates within acceptable limits								X				
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--		--	--	--	--	--	--
Raingage operates properly (electronic gage)						--						
Does datalogger receive event signals form all collectors (electronic gage)						--				X		
Does optical sensor respond to "blocking" of light beam (electronic gage)		X		X		--					--	--
Does optical sensor respond to mist of water (electronic gage)		X		X		--		U to T			--	--

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-3. Findings Most Likely to Impact Data Quality – NTN Sites with ACM-type Collectors (page 4 of 4)**

StationId	NC36	ND00	OR10	OR97	PA00	PA29	PR20	SC05	SC06	SD04	TN04	VI01	WY08
Is sampling media quality maintained?													
Is the orifice of the collector +/- .3 m of raingage (elevation)													
No objects > 1 m height inside 5 m radius (raingage)		X	X				X					X	X
No fences > 1 m height inside 2 m radius (raingage)	X												X
No vegetation height > 0.6 m within 5 m radius (raingage)		X					X					X	
Does NADP require a raingage wind shield at this site?	X		X	X	X		X	X	X		X	X	
Collector and sensor oriented properly													
45 degree rule met (collector)		X	X						X		X	X	
30 degree rule for trees met (collector)			X				X	X	X	X			X
30 degree rule for buildings met (collector)													
No objects > 1 m height within 5 m radius (collector)		X	X				X					X	X
No fences > 1 m height inside 5 m radius (collector)		X											X
No vegetation height > 0.6 m within 5 m radius (collector)		X					X					X	
No treated lumber inside 5 m radius (collector)				X									X
No pastures and ag. activity within 20 m radius					X						X		
No herbicides and fertilizers used within 20 m radius					X								
Roads meet NADP siting criteria													X
Waterways meet NADP siting criteria													
Airports meet NADP siting criteria													
Animal operations meet NADP site cirteria (NTN and AIRMoN)													
Parking lots and maintenance areas meet NADP siting criteria												X	X
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria													
Dry side bucket is clean		X	X						X	X		X	X
Does lid seal properly					X								
Lid liner in good condition													
ACM sensor operates properly							X						
Motorbox operates within acceptable limits													
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)										--			
Does datalogger receive event signals form all collectors (electronic gage)				X				X		--			
Does optical sensor respond to "blocking" of light beam (electronic gage)	--			U to T					--	--			
Does optical sensor respond to mist of water (electronic gage)	--			U to T					--	--			

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-4. Findings Most Likely to Impact Data Quality – NTN Sites with N-CON Collectors (page 1 of 3)**

StationId	71OH	CA45	CA50	CA76	CA88	FL14	FL41	GA99	ID11	IN20	IN22	KY03
Is sampling media quality maintained?										X		
Is the orifice of the collector +/- .3 m of raingage (elevation)									X			X
No objects > 1 m height inside 5 m radius (raingage)					X	X		X				
No fences > 1 m height inside 2 m radius (raingage)		X										
No vegetation height > 0.6 m within 5 m radius (raingage)	X											
Does NADP require a raingage wind shield at this site?		X			X	X	X	X		X	X	X
Collector and sensor oriented properly		X										
45 degree rule met (collector)			X			X						
30 degree rule for trees met (collector)		X	X			X	X					X
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)							X					
No fences > 1 m height inside 5 m radius (collector)		X		X	X							
No vegetation height > 0.6 m within 5 m radius (collector)		X										
No treated lumber inside 5 m radius (collector)			X	X								
No pastures and ag. activity within 20 m radius					X							
No herbicides and fertilizers used within 20 m radius	X				X	X					X	
Roads meet NADP siting criteria												
Waterways meet NADP siting criteria												
Airports meet NADP siting criteria												
Animal operations meet NADP site criteria (NTN and AIRMoN)												
Parking lots and maintenance areas meet NADP siting criteria									X			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
N-CON sensor responds to five passes												
N-CON lid seal in good condition												
N-CON lid liner in good condition									X			
Raingage operates properly (electronic gage)												
Does datalogger receive event signals form all collectors (electronic gage)					X			X				
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--		--		--	--	--	--	--	--	
Does optical sensor respond to mist of water (electronic gage)	--	--		--		--	--	--	--	--	--	

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table B-4. Findings Most Likely to Impact Data Quality – NTN Sites with N-CON Collectors (page 2 of 3)**

StationId	KY19	KY22	KY35	MA14	MA22	MA98	MN23	MN28	MT07	NY06	NY10	NY43
Is sampling media quality maintained?												
Is the orifice of the collector +/- .3 m of raingage (elevation)												X
No objects > 1 m height inside 5 m radius (raingage)			X		X	X	X		X	X	X	X
No fences > 1 m height inside 2 m radius (raingage)		X									X	X
No vegetation height > 0.6 m within 5 m radius (raingage)				X		X						X
Does NADP require a raingage wind shield at this site?	X	X	X	X								
Collector and sensor oriented properly				X	X	X						
45 degree rule met (collector)		X									X	X
30 degree rule for trees met (collector)		X	X				X		X	X	X	X
30 degree rule for buildings met (collector)												
No objects > 1 m height within 5 m radius (collector)		X			X	X			X	X	X	X
No fences > 1 m height inside 5 m radius (collector)									X		X	X
No vegetation height > 0.6 m within 5 m radius (collector)						X					X	X
No treated lumber inside 5 m radius (collector)									X			X
No pastures and ag. activity within 20 m radius												
No herbicides and fertilizers used within 20 m radius												
Roads meet NADP siting criteria												X
Waterways meet NADP siting criteria												
Airports meet NADP siting criteria												
Animal operations meet NADP site criteria (NTN and AIRMoN)												
Parking lots and maintenance areas meet NADP siting criteria												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
N-CON sensor responds to five passes												
N-CON lid seal in good condition												
N-CON lid liner in good condition			X									
Raingage operates properly (electronic gage)												
Does datalogger receive event signals form all collectors (electronic gage)												
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--				--		--		--	X
Does optical sensor respond to mist of water (electronic gage)	--	--	--				--		--		--	X

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table B-4. Findings Most Likely to Impact Data Quality – NTN Sites with N-CON Collectors (page 3 of 3)**

StationId	NY94	NY96	OH71	OR09	OR18	PA13	PA30	PA42	PA47	SC03	TN14	WI08	WI36
Is sampling media quality maintained?				U to T									
Is the orifice of the collector +/- .3 m of raingage (elevation)													
No objects > 1 m height inside 5 m radius (raingage)	X						X			X			X
No fences > 1 m height inside 2 m radius (raingage)												X	
No vegetation height > 0.6 m within 5 m radius (raingage)			X				X		X				
Does NADP require a raingage wind shield at this site?		X				X	X	X	X	X	X		
Collector and sensor oriented properly	X	X							X				
45 degree rule met (collector)							X			X			
30 degree rule for trees met (collector)	X				X		X	X					X
30 degree rule for buildings met (collector)													
No objects > 1 m height within 5 m radius (collector)					X	X	X			X		X	
No fences > 1 m height inside 5 m radius (collector)										X		X	
No vegetation height > 0.6 m within 5 m radius (collector)							X						
No treated lumber inside 5 m radius (collector)					X						X		X
No pastures and ag. activity within 20 m radius					X								
No herbicides and fertilizers used within 20 m radius			X										
Roads meet NADP siting criteria											X		
Waterways meet NADP siting criteria							X						
Airports meet NADP siting criteria													
Animal operations meet NADP site criteria (NTN and AIRMoN)													
Parking lots and maintenance areas meet NADP siting criteria											X		
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria													
N-CON sensor responds to five passes													
N-CON lid seal in good condition	X		X						X				X
N-CON lid liner in good condition	X		X										
Raingage operates properly (electronic gage)													
Does datalogger receive event signals form all collectors (electronic gage)									X			X	
Does optical sensor respond to "blocking" of light beam (electronic gage)	--		--	--	--	--	--	--	--		--		
Does optical sensor respond to mist of water (electronic gage)	--		--	--	--	--	--	--	--	U to T	--		

Indicates found compliant  
 X Indicates found non-compliant  
 -- Indicates "Not Applicable"  
 U to T Indicates "Unable to Test"



**Table B-5. Findings Most Likely to Impact Data Quality - AIRMoN**

	StationId	TN00
Is sampling media quality maintained?		
Are samples stored and shipped properly?		
Is the orifice of the collector +/- .3 m of raingage (elevation)		
No objects > 1 m height inside 5 m radius (raingage)		X
No fences > 1 m height inside 2 m radius (raingage)		
No vegetation height > 0.6 m within 5 m radius (raingage)		
Does NADP require a raingage wind shield at this site?		X
Collector and sensor oriented properly		
45 degree rule met (collector)		
30 degree rule for trees met (collector)		X
30 degree rule for buildings met (collector)		
No objects > 1 m height within 5 m radius (collector)		X
No fences > 1 m height inside 5 m radius (collector)		
No vegetation height > 0.6 m within 5 m radius (collector)		
No treated lumber inside 5 m radius (collector)		
No pastures and ag. activity within 20 m radius		
No herbicides and fertilizers used within 20 m radius		
Roads meet NADP siting criteria		
Waterways meet NADP siting criteria		
Airports meet NADP siting criteria		
Animal operations meet NADP site criteria (NTN and AIRMoN)		
Parking lots and maintenance areas meet NADP siting criteria		
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria		
Dry side bucket is clean		
Does lid seal properly		
Lid liner in good condition		
ACM sensor operates properly		
Motorbox operates within acceptable limits		
Raingage operates properly (electronic gage)		
Does datalogger receive event signals form all collectors (electronic gage)		
Does optical sensor respond to "blocking" of light beam (electronic gage)		
Does optical sensor respond to mist of water (electronic gage)		

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

## **APPENDIX C**

### **Comparison between Surveys of Findings Most Likely to Impact Data Quality**

**Table C-1. NADP – MDN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (1 of 5)**

StationId	CA20			CA75			CA94			FL05			FL11			FL97			GA09				GA33					
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	
Is sampling media quality maintained?																												
Is the orifice of the collector +/- .3 m of raingage (elevation)										X							X											
30 degree rule for buildings met (raingage)																												
No objects > 1 m height inside 5 m radius (raingage)			X	X				X														X	X	X	X	X	X	
No fences > 1 m height inside 2 m radius (raingage)																												
No vegetation height > 0.6 m within 5 m radius (raingage)	X			X			X		X		X	X									X	X	X	X	X	X		
Collector and sensor oriented properly			X														X											
45 degree rule met (collector)					X	X	X														X							
30 degree rule for trees met (collector)	X	X	X	X	X	X	X	X	X	X											X	X	X	X	X			
30 degree rule for buildings met (collector)																												
No objects > 1 m height within 5 m radius (collector)					X	X	X	X	X	X																X	X	
No fences > 1 m height inside 5 m radius (collector)																												
No vegetation height > 0.6 m within 5 m radius (collector)	X				X	X	X	X																	X	X		X
No treated lumber inside 5 m radius (collector)																												
No galvanized metal inside 5 m radius collector (MDN)						X	X									X												
No pastures and ag. activity within 20 m radius								--													--							
No herbicides and fertilizers used within 20 m radius								--				X									--							
Roads meet NADP siting criteria											X	X																
Waterways meet NADP siting criteria																												
Airports meet NADP siting criteria																												
Combustion sources meet NADP siting criteria (MDN only)																												
Parking lots and maintenance areas meet NADP siting criteria																												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																												
Metalworking operations meet NADP siting criteria (MDN only)																												

- Indicates found compliant
- Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table C-1. NADP – MDN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (2 of 5)**

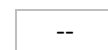
StationId	GA40				KY10			MA01			MD00			ME04			MN23				MS12		
	Year	2008	2011	2013	2016	2010	2013	2016	2009	2013	2016	2010	2013	2016	2009	2012	2016	2008	2011	2013	2016	2013	2016
Is sampling media quality maintained?									X														
Is the orifice of the collector +/- .3 m of raingage (elevation)															X	X							
30 degree rule for buildings met (raingage)																							
No objects > 1 m height inside 5 m radius (raingage)			X	X				X	X	X	X	X	X							X	X	X	X
No fences > 1 m height inside 2 m radius (raingage)			X	X																			
No vegetation height > 0.6 m within 5 m radius (raingage)				X				X											X				
Collector and sensor oriented properly																							
45 degree rule met (collector)						X	X	X				X	X										
30 degree rule for trees met (collector)								X								X			X				
30 degree rule for buildings met (collector)																							
No objects > 1 m height within 5 m radius (collector)			X	X							X	X	X										
No fences > 1 m height inside 5 m radius (collector)			X	X																			
No vegetation height > 0.6 m within 5 m radius (collector)																			X				X
No treated lumber inside 5 m radius (collector)																				X	X		
No galvanized metal inside 5 m radius collector (MDN)											X	X	X		X	X							
No pastures and ag. activity within 20 m radius	--		X	X	X									--				--					
No herbicides and fertilizers used within 20 m radius	--																	--					
Roads meet NADP siting criteria																							
Waterways meet NADP siting criteria																							
Airports meet NADP siting criteria																							
Combustion sources meet NADP siting criteria (MDN only)																							
Parking lots and maintenance areas meet NADP siting criteria																							
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																		--					
Metalworking operations meet NADP siting criteria (MDN only)																							



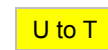
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-1. NADP – MDN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (3 of 5)**

StationId	MT05				MT95		NY06			NY43			PA00			PA13				PA29		
	Year	2008	2011	2013	2016	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2010	2013	2016	2013	2016
Is sampling media quality maintained?				X																		
Is the orifice of the collector +/- .3 m of raingage (elevation)										X	X	X										
30 degree rule for buildings met (raingage)		X	X	X																		
No objects > 1 m height inside 5 m radius (raingage)	X	X	X	X	X	X	X	X	X	X	X	X				X	X					
No fences > 1 m height inside 2 m radius (raingage)						X				X	X	X										
No vegetation height > 0.6 m within 5 m radius (raingage)		X		X								X										
Collector and sensor oriented properly					X	X	X															
45 degree rule met (collector)					X	X				X	X	X				X						
30 degree rule for trees met (collector)	X			X					X	X	X	X				X	X	X	X			
30 degree rule for buildings met (collector)																						
No objects > 1 m height within 5 m radius (collector)			X		X	X	X	X	X	X	X	X							X	X		
No fences > 1 m height inside 5 m radius (collector)	X	X	X	X				X		X	X	X										
No vegetation height > 0.6 m within 5 m radius (collector)		X	X	X								X										
No treated lumber inside 5 m radius (collector)	X										X	X										
No galvanized metal inside 5 m radius collector (MDN)					X	X	X	X	X		X	X										
No pastures and ag. activity within 20 m radius													X	X	X	--						
No herbicides and fertilizers used within 20 m radius													X	X	X	--						
Roads meet NADP siting criteria			X								X	X										
Waterways meet NADP siting criteria																						
Airports meet NADP siting criteria																						
Combustion sources meet NADP siting criteria (MDN only)																						
Parking lots and maintenance areas meet NADP siting criteria																						
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																						
Metalworking operations meet NADP siting criteria (MDN only)																						



Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-1. NADP – MDN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (4 of 5)**

StationId	PA30				PA42			PA47			PA60			PA90				SC03			
	Year	2008	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2010	2013	2016	2009	2013	2016
Is sampling media quality maintained?	X	X																			
Is the orifice of the collector +/- .3 m of raingage (elevation)	X							X		X	X						X	X			
30 degree rule for buildings met (raingage)																					
No objects > 1 m height inside 5 m radius (raingage)	X	X	X	X	X						X	X	X	X	X	X	X	X	X	X	X
No fences > 1 m height inside 2 m radius (raingage)											X	X	X						X		
No vegetation height > 0.6 m within 5 m radius (raingage)	X	X	X	X						X					X	X	X				
Collector and sensor oriented properly									X	X											
45 degree rule met (collector)			X	X											X	X	X	X	X	X	X
30 degree rule for trees met (collector)	X	X	X	X	X	X	X				X	X	X	X	X	X	X				
30 degree rule for buildings met (collector)																					
No objects > 1 m height within 5 m radius (collector)	X	X	X	X	X				X		X	X	X		X				X		
No fences > 1 m height inside 5 m radius (collector)											X	X	X						X		
No vegetation height > 0.6 m within 5 m radius (collector)										X											
No treated lumber inside 5 m radius (collector)																					
No galvanized metal inside 5 m radius collector (MDN)																					
No pastures and ag. activity within 20 m radius																					
No herbicides and fertilizers used within 20 m radius																					
Roads meet NADP siting criteria																					
Waterways meet NADP siting criteria	X	X	X	X																	
Airports meet NADP siting criteria																					
Combustion sources meet NADP siting criteria (MDN only)																					
Parking lots and maintenance areas meet NADP siting criteria																					
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																					
Metalworking operations meet NADP siting criteria (MDN only)																					



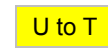
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-1. NADP – MDN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (5 of 5)**

StationId	SC05				SC19				UT97			WI08				WI36				WY08			WY26		
	Year	2008	2011	2013	2016	2008	2011	2013	2016	2011	2013	2016	2008	2011	2013	2016	2008	2010	2013	2016	2009	2013	2016	2013	2016
Is sampling media quality maintained?																									U to T
Is the orifice of the collector +/- .3 m of raingage (elevation)							X	X																	
30 degree rule for buildings met (raingage)																									
No objects > 1 m height inside 5 m radius (raingage)						X	X	X	X	X	X			X					X			X	X		
No fences > 1 m height inside 2 m radius (raingage)														X	X	X							X		
No vegetation height > 0.6 m within 5 m radius (raingage)														X											
Collector and sensor oriented properly												X													
45 degree rule met (collector)						X	X	X																	
30 degree rule for trees met (collector)	X	X	X	X	X	X	X	X						X					X	X	X	X			
30 degree rule for buildings met (collector)																									
No objects > 1 m height within 5 m radius (collector)					X	X	X	X	X	X	X		X	X	X				X	X	X				
No fences > 1 m height inside 5 m radius (collector)					X	X	X	X					X	X	X										
No vegetation height > 0.6 m within 5 m radius (collector)													X	X											
No treated lumber inside 5 m radius (collector)																		X			X	X	X	X	X
No galvanized metal inside 5 m radius collector (MDN)					X	X	X	X	X	X	X	X	X	X	X	X					X	X			
No pastures and ag. activity within 20 m radius												--						--							
No herbicides and fertilizers used within 20 m radius												--						--							
Roads meet NADP siting criteria									X	X	X											X	X		
Waterways meet NADP siting criteria																									
Airports meet NADP siting criteria																									
Combustion sources meet NADP siting criteria (MDN only)																									
Parking lots and maintenance areas meet NADP siting criteria									X	X	X											X	X		
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												--						--							
Metalworking operations meet NADP siting criteria (MDN only)																									



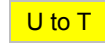
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (1 of 11)**

StationId	AK01			AK03			AK97		CA42			CA45			CA50			CA66			CA67		
Year	2010	2013	2016	2010	2013	2016	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016
Is sampling media quality maintained?	X																						
Is the orifice of the collector +/- .3 m of raingage (elevation)							X	X	X	X													
30 degree rule for buildings met (raingage)																							
No objects > 1 m height inside 5 m radius (raingage)				X	X	X		X				X	X								X	X	X
No fences > 1 m height inside 2 m radius (raingage)												X		X									
No vegetation height > 0.6 m within 5 m radius (raingage)	X		X	X		X			X		X				X						X	X	X
Collector and sensor oriented properly													X	X									
45 degree rule met (collector)															X	X	X				X	X	X
30 degree rule for trees met (collector)				X	X	X			X	X	X	X	X	X	X	X	X						
30 degree rule for buildings met (collector)																							
No objects > 1 m height within 5 m radius (collector)								X	X	X	X	X	X								X	X	X
No fences > 1 m height inside 5 m radius (collector)												X		X									
No vegetation height > 0.6 m within 5 m radius (collector)	X		X						X	X	X		X	X							X	X	X
No treated lumber inside 5 m radius (collector)			X					X					X				X						
No pastures and ag. activity within 20 m radius													X										
No herbicides and fertilizers used within 20 m radius												X	X										
Roads meet NADP siting criteria																							
Waterways meet NADP siting criteria																							
Airports meet NADP siting criteria																							
Animal operations meet NADP siting criteria (NTN and AIRMoN)																							
Parking lots and maintenance areas meet NADP siting criteria																							
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																							



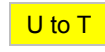
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"



**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (2 of 11)**

StationId	CA75			CA76			CA88			CA94			CA96			CA99			CO93				FL03			
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2011	2014	2016	2010	2013	2016
Is sampling media quality maintained?			U to T																							
Is the orifice of the collector +/- .3 m of raingage (elevation)																				X	X	X	X			
30 degree rule for buildings met (raingage)																										
No objects > 1 m height inside 5 m radius (raingage)								X	X	X																
No fences > 1 m height inside 2 m radius (raingage)																										
No vegetation height > 0.6 m within 5 m radius (raingage)				X	X						X	X		X										X	X	
Collector and sensor oriented properly								X																		
45 degree rule met (collector)	X	X	X																							
30 degree rule for trees met (collector)	X	X	X							X							X	X	X					X	X	X
30 degree rule for buildings met (collector)																										
No objects > 1 m height within 5 m radius (collector)	X	X	X					X		X	X	X														
No fences > 1 m height inside 5 m radius (collector)						X			X																	
No vegetation height > 0.6 m within 5 m radius (collector)					X					X	X	X		X		X	X	X						X	X	
No treated lumber inside 5 m radius (collector)					X	X															X	X	X			
No pastures and ag. activity within 20 m radius									X																	
No herbicides and fertilizers used within 20 m radius									X																	
Roads meet NADP siting criteria																										
Waterways meet NADP siting criteria																										
Airports meet NADP siting criteria																										
Animal operations meet NADP siting criteria (NTN and AIRMoN)																										
Parking lots and maintenance areas meet NADP siting criteria																										
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																										

- Indicates found compliant
- Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (3 of 11)**

StationId	FL05			FL11			FL14			FL23			FL41			GA09				GA20			GA33					
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2011	2013	2016	2009	2013	2016	2008	2011	2013	2016	
Is sampling media quality maintained?																												
Is the orifice of the collector +/- .3 m of raingage (elevation)		X		X						X	X	X																
30 degree rule for buildings met (raingage)																												
No objects > 1 m height inside 5 m radius (raingage)								X	X	X	X	X							X	X	X	X		X	X	X		
No fences > 1 m height inside 2 m radius (raingage)																					X	X	X					
No vegetation height > 0.6 m within 5 m radius (raingage)			X	X						X				X				X	X	X				X	X			
Collector and sensor oriented properly																												
45 degree rule met (collector)								X	X	X	X	X	X			X												
30 degree rule for trees met (collector)							X	X	X	X			X	X	X	X	X	X	X	X	X	X	X					
30 degree rule for buildings met (collector)																												
No objects > 1 m height within 5 m radius (collector)										X	X	X		X	X			X			X			X	X			
No fences > 1 m height inside 5 m radius (collector)																					X	X	X					
No vegetation height > 0.6 m within 5 m radius (collector)										X														X	X			
No treated lumber inside 5 m radius (collector)										X		X																
No pastures and ag. activity within 20 m radius																					X	X	X					
No herbicides and fertilizers used within 20 m radius			X						X																			
Roads meet NADP siting criteria			X	X																	X							
Waterways meet NADP siting criteria																												
Airports meet NADP siting criteria																												
Animal operations meet NADP siting criteria (NTN and AIRMoN)																												
Parking lots and maintenance areas meet NADP siting criteria																												
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																												



Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (4 of 11)**

StationId	GA99				ID02				ID03				ID11				IL46				IN20					
	Year	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2009	2012	2014	2016	2010	2012	2014	2016	
Is sampling media quality maintained?																									X	
Is the orifice of the collector +/- .3 m of raingage (elevation)														X	X	X	X									
30 degree rule for buildings met (raingage)																										
No objects > 1 m height inside 5 m radius (raingage)		X			X									X	X					X	X					
No fences > 1 m height inside 2 m radius (raingage)														X												
No vegetation height > 0.6 m within 5 m radius (raingage)									X	X	X	X									X					
Collector and sensor oriented properly			X																							
45 degree rule met (collector)																										
30 degree rule for trees met (collector)																										
30 degree rule for buildings met (collector)																										
No objects > 1 m height within 5 m radius (collector)																				X	X					
No fences > 1 m height inside 5 m radius (collector)																										
No vegetation height > 0.6 m within 5 m radius (collector)														X	X						X		X			
No treated lumber inside 5 m radius (collector)					X	X	X	X																		
No pastures and ag. activity within 20 m radius																		X		X	X					
No herbicides and fertilizers used within 20 m radius						X	X											X		X	X					
Roads meet NADP siting criteria																										
Waterways meet NADP siting criteria																										
Airports meet NADP siting criteria																										
Animal operations meet NADP siting criteria (NTN and AIRMoN)																										
Parking lots and maintenance areas meet NADP siting criteria														X	X	X										
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																										



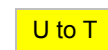
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (5 of 11)**

StationId	IN22				IN41				KY03			KY10			KY19			KY22			KY35			
	Year	2008	2011	2013	2016	2007	2011	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016
Is sampling media quality maintained?										X														
Is the orifice of the collector +/- .3 m of raingage (elevation)										X	X	X												
30 degree rule for buildings met (raingage)																								
No objects > 1 m height inside 5 m radius (raingage)																								X
No fences > 1 m height inside 2 m radius (raingage)																			X	X	X			
No vegetation height > 0.6 m within 5 m radius (raingage)																								
Collector and sensor oriented properly														X					X	X	X			
45 degree rule met (collector)																			X	X	X			
30 degree rule for trees met (collector)	X										X	X							X	X	X	X		X
30 degree rule for buildings met (collector)																								
No objects > 1 m height within 5 m radius (collector)						X				X	X		X						X	X	X	X		
No fences > 1 m height inside 5 m radius (collector)																			X					
No vegetation height > 0.6 m within 5 m radius (collector)																								
No treated lumber inside 5 m radius (collector)						X																		
No pastures and ag. activity within 20 m radius													X											
No herbicides and fertilizers used within 20 m radius				X	X												X	X						
Roads meet NADP siting criteria																								
Waterways meet NADP siting criteria																								
Airports meet NADP siting criteria																								
Animal operations meet NADP siting criteria (NTN and AIRMoN)																								
Parking lots and maintenance areas meet NADP siting criteria																								
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																								



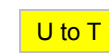
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (6 of 11)**

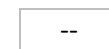
StationId	KY99			MA01			MA08			ME04			MI52			MI99				MN23				MN28					
	Year	2010	2013	2016	2009	2013	2016	2009	2013	2016	2009	2012	2016	2010	2013	2016	2008	2010	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	
Is sampling media quality maintained?																													
Is the orifice of the collector +/- .3 m of raingage (elevation)										X	X	X																	
30 degree rule for buildings met (raingage)																													
No objects > 1 m height inside 5 m radius (raingage)				X	X	X							X	X	X								X	X					
No fences > 1 m height inside 2 m radius (raingage)														X															
No vegetation height > 0.6 m within 5 m radius (raingage)				X				X					X		X							X					X		
Collector and sensor oriented properly																									X				
45 degree rule met (collector)				X	X								X	X	X														
30 degree rule for trees met (collector)				X				X	X										X	X				X					
30 degree rule for buildings met (collector)																													
No objects > 1 m height within 5 m radius (collector)														X	X								X						
No fences > 1 m height inside 5 m radius (collector)														X	X	X													
No vegetation height > 0.6 m within 5 m radius (collector)				X				X					X		X							X					X		
No treated lumber inside 5 m radius (collector)																							X						
No pastures and ag. activity within 20 m radius																													
No herbicides and fertilizers used within 20 m radius																													
Roads meet NADP siting criteria																													
Waterways meet NADP siting criteria																													
Airports meet NADP siting criteria																													
Animal operations meet NADP siting criteria (NTN and AIRMoN)																													
Parking lots and maintenance areas meet NADP siting criteria																													
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																													



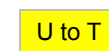
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (7 of 11)**

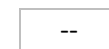
StationId	MN32				MS12		MT05				MT07			NC06				NC29				NC35				
	Year	2008	2011	2013	2016	2013	2016	2008	2011	2013	2016	2009	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016
Is sampling media quality maintained?											X															
Is the orifice of the collector +/- .3 m of raingage (elevation)		X	X	X																						
30 degree rule for buildings met (raingage)								X	X	X																
No objects > 1 m height inside 5 m radius (raingage)					X	X	X	X	X	X		X	X	X	X	X	X							X	X	
No fences > 1 m height inside 2 m radius (raingage)																										
No vegetation height > 0.6 m within 5 m radius (raingage)	X			X				X		X							X									
Collector and sensor oriented properly																										
45 degree rule met (collector)																										
30 degree rule for trees met (collector)	X	X	X	X			X	X	X	X	X	X	X													
30 degree rule for buildings met (collector)																										
No objects > 1 m height within 5 m radius (collector)							X	X	X	X	X	X	X	X	X	X	X									
No fences > 1 m height inside 5 m radius (collector)							X	X	X	X	X		X													
No vegetation height > 0.6 m within 5 m radius (collector)	X	X	X	X		X		X									X									
No treated lumber inside 5 m radius (collector)												X	X													
No pastures and ag. activity within 20 m radius															X											
No herbicides and fertilizers used within 20 m radius																								X	X	
Roads meet NADP siting criteria									X																	
Waterways meet NADP siting criteria																										
Airports meet NADP siting criteria																										
Animal operations meet NADP siting criteria (NTN and AIRMoN)																										
Parking lots and maintenance areas meet NADP siting criteria																										
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																										



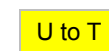
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (8 of 11)**

StationId	NC36				ND00				NY06		NY10				NY43		NY96			OH71				
	Year	2008	2011	2013	2016	2008	2011	2013	2016	2013	2016	2008	2010	2013	2016	2013	2016	2009	2013	2016	2008	2011	2014	2016
Is sampling media quality maintained?							X																	
Is the orifice of the collector +/- .3 m of raingage (elevation)		X													X	X								
30 degree rule for buildings met (raingage)																								
No objects > 1 m height inside 5 m radius (raingage)					X	X	X	X	X	X	X	X	X	X	X	X								
No fences > 1 m height inside 2 m radius (raingage)			X	X							X	X	X	X	X	X								
No vegetation height > 0.6 m within 5 m radius (raingage)					X	X	X	X			X					X				X	X		X	
Collector and sensor oriented properly																	X				X			
45 degree rule met (collector)					X	X	X	X					X	X	X	X								
30 degree rule for trees met (collector)										X	X	X	X	X	X	X								
30 degree rule for buildings met (collector)																								
No objects > 1 m height within 5 m radius (collector)			X		X	X	X	X	X	X	X		X	X	X	X	X							
No fences > 1 m height inside 5 m radius (collector)						X	X	X	X		X		X	X	X	X								
No vegetation height > 0.6 m within 5 m radius (collector)					X	X	X	X			X		X	X		X								
No treated lumber inside 5 m radius (collector)															X	X								
No pastures and ag. activity within 20 m radius																								
No herbicides and fertilizers used within 20 m radius																							X	
Roads meet NADP siting criteria						X	X								X	X								
Waterways meet NADP siting criteria																								
Airports meet NADP siting criteria																								
Animal operations meet NADP siting criteria (NTN and AIRMoN)																								
Parking lots and maintenance areas meet NADP siting criteria																								
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																								



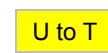
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (9 of 11)**

StationId	OR09				OR10				OR18				OR97				PA00			PA13		PA29				
	Year	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2010	2013	2016	2013	2016	2008	2010	2013	2016
Is sampling media quality maintained?				U to T																						
Is the orifice of the collector +/- .3 m of raingage (elevation)									X																	
30 degree rule for buildings met (raingage)																										
No objects > 1 m height inside 5 m radius (raingage)					X		X	X	X																	
No fences > 1 m height inside 2 m radius (raingage)																										
No vegetation height > 0.6 m within 5 m radius (raingage)																										
Collector and sensor oriented properly																X										
45 degree rule met (collector)					X	X	X	X																		
30 degree rule for trees met (collector)					X	X	X	X	X	X		X											X			
30 degree rule for buildings met (collector)																										
No objects > 1 m height within 5 m radius (collector)					X		X	X	X		X	X									X	X	X	X		
No fences > 1 m height inside 5 m radius (collector)					X																					
No vegetation height > 0.6 m within 5 m radius (collector)																										
No treated lumber inside 5 m radius (collector)			X						X	X	X	X					X									
No pastures and ag. activity within 20 m radius										X	X	X				X		X		X						
No herbicides and fertilizers used within 20 m radius															X		X		X							
Roads meet NADP siting criteria							X																			
Waterways meet NADP siting criteria																										
Airports meet NADP siting criteria																										
Animal operations meet NADP siting criteria (NTN and AIRMoN)																										
Parking lots and maintenance areas meet NADP siting criteria																										
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																										



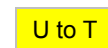
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"



**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (10 of 11)**

StationId	PA30		PA42				PA47			PR20			SC03		SC05				SC06					
	Year	2013	2016	2008	2010	2013	2016	2010	2013	2016	2010	2013	2016	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	
Is sampling media quality maintained?																								
Is the orifice of the collector +/- .3 m of raingage (elevation)							X							X										
30 degree rule for buildings met (raingage)																								
No objects > 1 m height inside 5 m radius (raingage)		X	X		X					X	X	X	X	X										
No fences > 1 m height inside 2 m radius (raingage)														X										
No vegetation height > 0.6 m within 5 m radius (raingage)		X	X						X		X	X												
Collector and sensor oriented properly									X															
45 degree rule met (collector)		X	X											X	X							X	X	
30 degree rule for trees met (collector)		X	X	X	X	X	X					X	X	X	X	X	X	X	X		X	X	X	
30 degree rule for buildings met (collector)																								
No objects > 1 m height within 5 m radius (collector)		X	X							X	X	X	X	X										
No fences > 1 m height inside 5 m radius (collector)														X	X									
No vegetation height > 0.6 m within 5 m radius (collector)			X								X	X												
No treated lumber inside 5 m radius (collector)																								
No pastures and ag. activity within 20 m radius																								
No herbicides and fertilizers used within 20 m radius																								
Roads meet NADP siting criteria																								
Waterways meet NADP siting criteria		X	X																					
Airports meet NADP siting criteria																								
Animal operations meet NADP siting criteria (NTN and AIRMoN)																								
Parking lots and maintenance areas meet NADP siting criteria																								
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																								



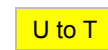
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (11 of 11)**

StationId	SD04				TN04			TN14			VI01			WI36				WY08			
	Year	2008	2011	2013	2016	2009	2013	2016	2010	2013	2016	2010	2013	2016	2008	2010	2013	2016	2009	2013	2016
Is sampling media quality maintained?																					
Is the orifice of the collector +/- .3 m of raingage (elevation)																					
30 degree rule for buildings met (raingage)																					
No objects > 1 m height inside 5 m radius (raingage)									X			X	X	X				X		X	X
No fences > 1 m height inside 2 m radius (raingage)																					X
No vegetation height > 0.6 m within 5 m radius (raingage)	X	X							X			X		X							
Collector and sensor oriented properly								X	X												
45 degree rule met (collector)						X	X					X	X	X							
30 degree rule for trees met (collector)				X				X	X									X	X	X	X
30 degree rule for buildings met (collector)																					
No objects > 1 m height within 5 m radius (collector)												X	X	X						X	X
No fences > 1 m height inside 5 m radius (collector)																					X
No vegetation height > 0.6 m within 5 m radius (collector)	X	X							X			X		X							
No treated lumber inside 5 m radius (collector)											X							X		X	X
No pastures and ag. activity within 20 m radius					X	X	X														
No herbicides and fertilizers used within 20 m radius					X			X													
Roads meet NADP siting criteria											X									X	X
Waterways meet NADP siting criteria																					
Airports meet NADP siting criteria																					
Animal operations meet NADP siting criteria (NTN and AIRMoN)																					
Parking lots and maintenance areas meet NADP siting criteria											X	X	X	X						X	X
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria									X												



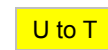
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-3. NADP – MDN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (1 of 5)**

StationId	CA20			CA75			CA94			FL05			FL11			FL97			GA09				GA33				
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016
Dry side bucket is clean																		X	X					--	--	--	--
Does lid seal properly																								--	--	--	--
Lid liner in good condition																								--	--	--	--
Fan in good condition																							X	--	--	--	--
Cooling fan thermostat in good condition																								--	--	--	--
Heater in good condition														--	--	--	--	--	--					--	--	--	--
Heater thermostat in good condition														--	--	--	--	--	--					--	--	--	--
Has flush wall filter mount been installed					X																			--	--	--	--
Filter in good condition					--	U to T	U to T			U to T	U to T													--	--	--	--
Max / min thermometer in acceptable limits					X							X												--	--	--	--
ACM sensor operates properly	X																							--	--	--	--
Motorbox operates within acceptable limits																								--	--	--	--
N-CON lid seal in good condition	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON lid liner in good condition	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON fan in good condition	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON cooling fan thermostat in good condition	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON heater in good condition	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON heater thermostat in good condition	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON max / min thermometer in acceptable limits	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
Raingage operates properly (electronic gage)	--	--	--																					--			
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--							X	X													--			
Does optical sensor respond to mist of water (electronic gage)	--	--	--																					--			
Does datalogger receive event signals form all collectors (electronic gage)	--	--	--													X								--			X
Was the 'as found' turn over set properly (Belfort gage)	X	X	X	--	--	--	--	--	--	X	--	--	--	--	--	--	X	--	--					--	--	--	--

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table C-3. NADP – MDN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (2 of 5)**

StationId	GA40				KY10			MA01			MD00			ME04			MN23				MS12			
	Year	2008	2011	2013	2016	2010	2013	2016	2009	2013	2016	2010	2013	2016	2009	2012	2016	2008	2011	2013	2016	2013	2016	
Dry side bucket is clean				--	--				--	X					--	--	--							
Does lid seal properly				--	--										--	--	--							
Lid liner in good condition				--	--										--	--	--							
Fan in good condition				--	--										--	--	--							
Cooling fan thermostat in good condition				--	--										--	--	--							
Heater in good condition				--	--										--	--	--		U to T	U to T			--	
Heater thermostat in good condition				--	--										--	--	--			U to T			--	
Has flush wall filter mount been installed			X	--	--			X							--	--	--							
Filter in good condition	X	--	--	--		U to T	--								--	--	--	X						
Max / min thermometer in acceptable limits	X		--	--			X						X		--	--	--						X	
ACM sensor operates properly			--	--						X					--	--	--							
Motorbox operates within acceptable limits			--	--						X					--	--	--							
N-CON lid seal in good condition	--	--				--	--	--	--	--	--	--	--			X		--	--	--	--	--	--	--
N-CON lid liner in good condition	--	--				--	--	--	--	--	--	--	--					--	--	--	--	--	--	--
N-CON fan in good condition	--	--				--	--	--	--	--	--	--	--					--	--	--	--	--	--	--
N-CON cooling fan thermostat in good condition	--	--				--	--	--	--	--	--	--	--					--	--	--	--	--	--	--
N-CON heater in good condition	--	--				--	--	--	--	--	--	--	--		X			--	--	--	--	--	--	--
N-CON heater thermostat in good condition	--	--				--	--	--	--	--	--	--	--					--	--	--	--	--	--	--
N-CON max / min thermometer in acceptable limits	--	--				--	--	--	--	--	--	--	--					--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--				--	--	--	--	--	--	--	--					--	--	--	--	--	--	--
Raingage operates properly (electronic gage)	--	--							--		X							--	--				X	
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	U to T						--		X						X	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	U to T						--		X		U to T				X	--	--	--	--	--	U to T	
Does datalogger receive event signals form all collectors (electronic gage)	--	--							--		X	X						--	--					
Was the 'as found' turn over set properly (Belfort gage)	X		--	--		--	--	--	X	--	--	--	--	--	--	--	--	X				--	--	--



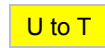
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-3. NADP – MDN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (3 of 5)**

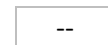
StationId	MT05				MT95		NY06			NY43			PA00			PA13				PA29		
	Year	2008	2011	2013	2016	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2010	2013	2016	2013	2016
Dry side bucket is clean				X	--	--	--	--	--	--	--	--							--	--	--	--
Does lid seal properly					--	--	--	--	--	--	--	--							--	--	--	--
Lid liner in good condition					--	--	--	--	--	--	--	--							--	--	--	--
Fan in good condition					--	--	--	--	--	--	--	--			X				--	--	--	--
Cooling fan thermostat in good condition					--	--	--	--	--	--	--	--							--	--	--	--
Heater in good condition					--	--	--	--	--	--	--	--							--	--	--	--
Heater thermostat in good condition					--	--	--	--	--	--	--	--							--	--	--	--
Has flush wall filter mount been installed					--	--	--	--	--	--	--	--		X			X		--	--	--	--
Filter in good condition				MISSING	--	--	--	--	--	--	--	--					U to T	--	--	--	--	--
Max / min thermometer in acceptable limits			X		--	--	--	--	--	--	--	--							--	--	--	--
ACM sensor operates properly					--	--	--	--	--	--	--	--					X		--	--	--	--
Motorbox operates within acceptable limits					--	--	--	--	--	--	--	--							--	--	--	--
N-CON lid seal in good condition	--	--	--	--	X								--	--	--	--	--					
N-CON lid liner in good condition	--	--	--	--									--	--	--	--	--					
N-CON fan in good condition	--	--	--	--		X							--	--	--	--	--					
N-CON cooling fan thermostat in good condition	--	--	--	--									--	--	--	--	--					
N-CON heater in good condition	--	--	--	--									--	--	--	--	--					
N-CON heater thermostat in good condition	--	--	--	--									--	--	--	--	--					
N-CON max / min thermometer in acceptable limits	--	--	--	--									--	--	--	--	--					
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--								--	--	--	--	--					
Raingage operates properly (electronic gage)																			--	--		
Does optical sensor respond to "blocking" of light beam (electronic gage)												X							--	--	--	--
Does optical sensor respond to mist of water (electronic gage)												X							--	--	--	--
Does datalogger receive event signals form all collectors (electronic gage)													X						--	--		
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X		--	--	--	--



Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-3. NADP – MDN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (4 of 5)**

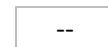
StationId	PA30				PA42			PA47			PA60			PA90				SC03		
Year	2008	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2010	2013	2016	2009	2013	2016
Dry side bucket is clean		X	--	--		--	--		--	--		--	--			--	--		--	--
Does lid seal properly			--	--		--	--		--	--	X	--	--			--	--		--	--
Lid liner in good condition			--	--		--	--		--	--		--	--			--	--		--	--
Fan in good condition			--	--		--	--		--	--		--	--			--	--		--	--
Cooling fan thermostat in good condition			--	--		--	--		--	--		--	--			--	--		--	--
Heater in good condition			--	--		--	--	U to T	--	--		--	--			--	--		--	--
Heater thermostat in good condition			--	--		--	--		--	--		--	--			--	--		--	--
Has flush wall filter mount been installed		X	--	--	X	--	--	X	--	--		--	--			--	--		--	--
Filter in good condition	U to T	--	--	--	--	--	--	--	--	--		--	--	X		--	--		--	--
Max / min thermometer in acceptable limits	X		--	--		--	--		--	--	X	--	--			--	--		--	--
ACM sensor operates properly			--	--		--	--		--	--		--	--			--	--		--	--
Motorbox operates within acceptable limits			--	--		--	--		--	--		--	--			--	--		--	--
N-CON lid seal in good condition	--	--			--			--			--			--	--			--		
N-CON lid liner in good condition	--	--			--			--			--			--	--			--		
N-CON fan in good condition	--	--			--			--			--			--	--			--		
N-CON cooling fan thermostat in good condition	--	--			--			--			--			--	--			--		
N-CON heater in good condition	--	--			--			--			--			--	--			--		
N-CON heater thermostat in good condition	--	--			--			--			--			--	--			--		
N-CON max / min thermometer in acceptable limits	--	--			--			--			--			--	--			--		
N-CON sensor responds to a 20-second mist of water	--	--			--			--			--			--	--			--		
Raingage operates properly (electronic gage)	--	--			--			--			--			--	--			--		
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	U to T	
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	U to T	U to T
Does datalogger receive event signals form all collectors (electronic gage)	--	--			--			--	X	X	--			--	--			--		
Was the 'as found' turn over set properly (Belfort gage)		X	--	--	X	--	--		--	--	X	--	--	X	X	--	--	X	--	--



Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

Table C-3. NADP – MDN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (5 of 5)

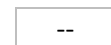
StationId	SC05				SC19				UT97			WI08				WI36				WY08			WY26		
	Year	2008	2011	2013	2016	2008	2011	2013	2016	2011	2013	2016	2008	2011	2013	2016	2008	2010	2013	2016	2009	2013	2016	2013	2016
Dry side bucket is clean										--	--	--		X	--	--		--					--	--	
Does lid seal properly										--	--	--			--	--							--	--	
Lid liner in good condition							X			--	--	--			--	--							--	--	
Fan in good condition				X						--	--	--			--	--							--	--	
Cooling fan thermostat in good condition										--	--	--			--	--							--	--	
Heater in good condition										--	--	--			--	--							--	--	
Heater thermostat in good condition										--	--	--			--	--							--	--	
Has flush wall filter mount been installed										--	--	--			--	--							--	--	
Filter in good condition										--	--	--			--	--					U to T	--	--	--	--
Max / min thermometer in acceptable limits										--	--	--			--	--			X				--	--	
ACM sensor operates properly										--	--	--			--	--							--	--	
Motorbox operates within acceptable limits										--	--	--			--	--	X						--	--	
N-CON lid seal in good condition	--	--	--	--	--	--	--	--	--				--	--			--	--	--		--	--	--	X	
N-CON lid liner in good condition	--	--	--	--	--	--	--	--	--				--	--			--	--	--		--	--	--	--	
N-CON fan in good condition	--	--	--	--	--	--	--	--	--				--	--			--	--	--		--	--	--	--	
N-CON cooling fan thermostat in good condition	--	--	--	--	--	--	--	--	--				--	--			--	--	--		--	--	--	--	
N-CON heater in good condition	--	--	--	--	--	--	--	--	--				--	--			--	--	--		--	--	--	--	
N-CON heater thermostat in good condition	--	--	--	--	--	--	--	--	--				--	--			--	--	--		--	--	--	--	
N-CON max / min thermometer in acceptable limits	--	--	--	--	--	--	--	--	--				--	--	X		--	--	--		--	--	--	--	
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--	--	--	--	--				--	--	--		--	--	--		--	--	--	--	
Raingage operates properly (electronic gage)	--	--			--	--							--				--	--							
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--			--	--							--				--	--							
Does optical sensor respond to mist of water (electronic gage)	--	--			--	--							--		U to T		--	--							
Does datalogger receive event signals form all collectors (electronic gage)	--	--		X	--	--					X		--	X		X	--	--							
Was the 'as found' turn over set properly (Belfort gage)	X		--	--	X	X	--	--	--	--	--	--	X	--	--	--		X	--	--	--	--	--	--	



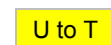
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

**Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (1 of 6)**

StationId	AK01			AK03			AK97		CA42			CA45			CA50			CA66			CA67			
	Year	2010	2013	2016	2010	2013	2016	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016
Dry side bucket is clean								X						--	--		--	--			X			
Does lid seal properly							X							--	--		--	--						
Lid liner in good condition														--	--		--	--						
ACM sensor operates properly														--	--		--	--						
Motorbox operates within acceptable limits		X												--	--		--	--						
N-CON lid seal in good condition		--	--	--	--	--	--	--	--	--	--	--	X		--	X		--	--	--	--	--	--	--
N-CON lid liner in good condition		--	--	--	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water		--	--	--	--	--	--	--	--	--	--	--			--			--	--	--	--	--	--	--
Raingage operates properly (electronic gage)		U to T							--	--					--			--	--					
Does optical sensor respond to "blocking" of light beam (electronic gage)		U to T	U to T						--	--				--	--		--	--						
Does optical sensor respond to mist of water (electronic gage)		U to T	U to T					U to T	--	--				--	--		--	--						
Does datalogger receive event signals form all collectors (electronic gage)		U to T							--	--				--			--			--	--			
Was the 'as found' turn over set properly (Belfort gage)		--	--	--	--	--	--	--	X	X	--			--	--		--	--			--	--	--	--

StationId	CA75			CA76			CA88			CA94			CA96			CA99			CO93				
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2011	2014	2016
Dry side bucket is clean			U to T			--	--		--	--													X
Does lid seal properly			U to T			--	--		--	--													
Lid liner in good condition						--	--		--	--													
ACM sensor operates properly			U to T			--	--		--	--													
Motorbox operates within acceptable limits			U to T			--	--		--	--													
N-CON lid seal in good condition		--	--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition		--	--	--	--	X		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water		--	--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)					--			--															
Does optical sensor respond to "blocking" of light beam (electronic gage)					--	--	--	--	--		X	X											
Does optical sensor respond to mist of water (electronic gage)					--	--	--	--	--														
Does datalogger receive event signals form all collectors (electronic gage)					--			--		X											X		
Was the 'as found' turn over set properly (Belfort gage)		--	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--

- Indicates found compliant
- Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"



**Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (2 of 6)**

StationId	FL03			FL05			FL11			FL14			FL23			FL41			GA09				
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2008	2011	2013	2016
Dry side bucket is clean		X	X	X																			
Does lid seal properly																							
Lid liner in good condition																							
ACM sensor operates properly																							
Motorbox operates within acceptable limits																							
N-CON lid seal in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)		--	--	--	--																		
Does optical sensor respond to "blocking" of light beam (electronic gage)		--	--	--	--																		
Does optical sensor respond to mist of water (electronic gage)		--	--	--	--																		
Does datalogger receive event signals form all collectors (electronic gage)		--	--	--	--																		
Was the 'as found' turn over set properly (Belfort gage)					X	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--	--	--

StationId	GA20			GA33				GA99				ID02				ID03				ID11				
	Year	2009	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016
Dry side bucket is clean						X	X			--	--								X	X			--	--
Does lid seal properly							X			--	--												--	--
Lid liner in good condition										--	--												--	--
ACM sensor operates properly										--	--										X		--	--
Motorbox operates within acceptable limits										--	--										X		--	--
N-CON lid seal in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		X
N-CON sensor responds to a 20-second mist of water		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)					--			--	--			--												
Does optical sensor respond to "blocking" of light beam (electronic gage)					--			--	--	--	--	--										--	--	--
Does optical sensor respond to mist of water (electronic gage)					--			--	--	--	--	--										--	--	--
Does datalogger receive event signals form all collectors (electronic gage)			X	X	--		X	--	--		X	--		X				X			--	--		
Was the 'as found' turn over set properly (Belfort gage)		--	--	--		--	--	X	X	--	--	X	--	--	--	--	--	--	--	--	X	X	--	--

Indicates found compliant  
X Indicates found non-compliant  
-- Indicates "Not Applicable"  
U to T Indicates "Unable to Test"

**Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (3 of 6)**

StationId	IL46				IN20				IN22				IN41				KY03			KY10			
	Year	2009	2012	2014	2016	2010	2012	2014	2016	2008	2011	2013	2016	2007	2011	2013	2016	2010	2013	2016	2010	2013	2016
Dry side bucket is clean							--	--	X	X	--	--	X	X			X	--					
Does lid seal properly							--	--			--	--						--	--				
Lid liner in good condition							--	--			--	--						--	--				
ACM sensor operates properly							--	--			--	--						--	--				
Motorbox operates within acceptable limits			X				--	--			--	--						--	--				
N-CON lid seal in good condition	--	--	--	--	--	--			--	--			--	--	--	--	--			--	--	--	--
N-CON lid liner in good condition	--	--	--	--	--	--			--	--			--	--	--	--	--			--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--	--			--	--			--	--	--	--	--			--	--	--	--
Raingage operates properly (electronic gage)					--	--			--				--	--	--		U to T						
Does optical sensor respond to "blocking" of light beam (electronic gage)					--	--	--	--	--	--	--	--	--	--	--	--	U to T						
Does optical sensor respond to mist of water (electronic gage)					--	--	--	--	--	--	--	--	--	--	--	--	U to T						
Does datalogger receive event signals form all collectors (electronic gage)					--	--			--				--	--	--		U to T						
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--		X	--	--	X	--	--	--	X	X	X	--	--	--	--	--	--	--	--

StationId	KY19			KY22			KY35			KY99			MA01			MA08			ME04				
	Year	2010	2013	2016	2010	2013	2016	2010	2013	2016	2010	2013	2016	2009	2013	2016	2009	2013	2016	2009	2012	2016	
Dry side bucket is clean		X			X	--	--	X	--					X		X							
Does lid seal properly				--		--	--		--														
Lid liner in good condition				--		--	--		--														
ACM sensor operates properly				--		--	--		--														
Motorbox operates within acceptable limits				--		--	--		--														
N-CON lid seal in good condition	--	--		--		--	--		--		--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition	--	--		--		--	--		X		--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--		--		--	--		--		--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)	--			--		--	--		--				--			--							
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--	--	--	--	--	--	--				--		X	--						X	
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--	--	--				--		X	--						X	
Does datalogger receive event signals form all collectors (electronic gage)	--			--		--	--		--				--			--							
Was the 'as found' turn over set properly (Belfort gage)	X	--	--	X	--	--		--	--	--	--	--	X	--	--	X	--	--	--	--	--	--	--

- Indicates found compliant
- Indicates found non-compliant
- Indicates "Not Applicable"
- Indicates "Unable to Test"

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (4 of 6)

StationId	MI52			MI99				MN23				MN28				MN32				MS12		MT05				
	Year	2010	2013	2016	2008	2010	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2013	2016	2008	2011	2013	2016
Dry side bucket is clean	X	X							X	--	--				--				U to T							X
Does lid seal properly										--	--				--											
Lid liner in good condition										--	--				--											
ACM sensor operates properly										--	--				--											X
Motorbox operates within acceptable limits					X					--	--				--											X
N-CON lid seal in good condition	--	--	--	--	--	--	--	--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition	--	--	--	--	--	--	--	--	--	X			--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--	--	--	--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)					--	--	--	--	--	--			--	--	--	--					X					
Does optical sensor respond to "blocking" of light beam (electronic gage)					--	--	--	--	--	--			--	--	--	--	--	--	--	--	--					
Does optical sensor respond to mist of water (electronic gage)					--	--	--	--	--	--			--	--	--	--	--	--	--	--	--					U to T
Does datalogger receive event signals form all collectors (electronic gage)					--	--	--	--	--	--			--	--	--	--	--	--	--	--	--					
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	X				X		--	--	X		X	--	X	--	--	--	--	--	--	--	--	--	--

StationId	MT07			NC06				NC29				NC35				NC36				ND00						
	Year	2009	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016		
Dry side bucket is clean			--	--	X																					X
Does lid seal properly			--	--																						
Lid liner in good condition			--	--								X														
ACM sensor operates properly			--	--								X														
Motorbox operates within acceptable limits			--	--																						
N-CON lid seal in good condition	--				--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition	--				--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--		--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)	--				--								--	--			--	--			--					
Does optical sensor respond to "blocking" of light beam (electronic gage)	--		--	--	--				--	--	--	--	--	--	--	--	--	--	--	--	--				X	
Does optical sensor respond to mist of water (electronic gage)	--		--	--	--				--	--	--	--	--	--	--	--	--	--	--	--	--				X	
Does datalogger receive event signals form all collectors (electronic gage)	--				--			X					--	--			--	--	U to T		--					
Was the 'as found' turn over set properly (Belfort gage)	X		--	--		--	--	--	X	--	--	--	X		--	--	X	X	--	--					--	--

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (5 of 6)**

StationId	NY06		NY10				NY43		NY96			OH71				OR09				OR10				
	Year	2013	2016	2008	2010	2013	2016	2013	2016	2009	2013	2016	2008	2011	2014	2016	2008	2011	2013	2016	2008	2011	2013	2016
Dry side bucket is clean	--	--	X		--	--	--	--			--			--	--			--	--					X
Does lid seal properly	--	--			--	--	--	--			--			--	--			--	--					
Lid liner in good condition	--	--			--	--	--	--			--			--	--			--	--					
ACM sensor operates properly	--	--			--	--	--	--			--			--	--			--	--					
Motorbox operates within acceptable limits	--	--			--	--	--	--			--			--	--			--	--					
N-CON lid seal in good condition				--	--				--	--		--	--		X	--	--			--	--	--	--	--
N-CON lid liner in good condition				--	--				--	--		--	--		X	--	--			--	--	--	--	--
N-CON sensor responds to a 20-second mist of water				--	--	X		--	--	--		--	--			--	--			--	--	--	--	--
Raingage operates properly (electronic gage)				--	--							--	--			--	--			--	--	--	--	--
Does optical sensor respond to "blocking" of light beam (electronic gage)				--	--	--	--		X			--	--	--	--	--	--	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	U to T			--	--	--	--		X	MISSING		--	--	--	--	--	--	--	--	--	--	--	--	--
Does datalogger receive event signals form all collectors (electronic gage)				--	--	X						--	--			--	--			--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	--	X		--	--	--	--	--	--	--	X		--	--	X	X	--	--					--

StationId	OR18				OR97				PA00			PA13		PA29				PA30		PA42				
	Year	2008	2011	2013	2016	2008	2011	2013	2016	2010	2013	2016	2013	2016	2008	2010	2013	2016	2013	2016	2008	2010	2013	2016
Dry side bucket is clean			--	--								--	--					--	--			X	--	--
Does lid seal properly			--	--								X	--	--				--	--				--	--
Lid liner in good condition			--	--								--	--					--	--				--	--
ACM sensor operates properly			--	--								--	--					--	--			X	--	--
Motorbox operates within acceptable limits			--	--								--	--					--	--				--	--
N-CON lid seal in good condition	--	--			--	--	--	--	--	--	--			--	--	--	--			--	--	--	--	--
N-CON lid liner in good condition	--	--			--	--	--	--	--	--	--			--	--	--	--			--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--			--	--	--	--	--	--	--			--	--	--	--			--	--	--	--	--
Raingage operates properly (electronic gage)	--	--			--									--				--	--			--	--	--
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--	--	--							U to T	--	--	--	--	--	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--							U to T	--	--	--	--	--	--	--	--	--	--	--	--
Does datalogger receive event signals form all collectors (electronic gage)	--	--			--							X	X					--	--			--	--	--
Was the 'as found' turn over set properly (Belfort gage)			--	--	X	--	--	--	--	--	--	--	--	X	--	--	--	--	--	X	X	--	--	--

- Indicates found compliant
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

**Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (6 of 6)**

StationId	PA47			PR20			SC03		SC05				SC06				SD04				
	Year	2010	2013	2016	2010	2013	2016	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016	2008	2011	2013	2016
Dry side bucket is clean	U to T	--	--				--	--					X			X					X
Does lid seal properly		--	--				--	--									X				
Lid liner in good condition		--	--				--	--											X		
ACM sensor operates properly		--	--		X	X	--	--			X										
Motorbox operates within acceptable limits		--	--				--	--													
N-CON lid seal in good condition	--		X	--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition	--			--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--			--	--	--			--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)	--			--					--	--			--	--			--	--	--	--	--
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--	--			U to T		--	--			--	--	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	X		U to T	U to T	--	--			--	--	--	--	--	--	--	--	--
Does datalogger receive event signals form all collectors (electronic gage)	--	X	X	--					--	--		X	--	--			--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)		--	--		--	--	--	--	X	X	--	--	X		--	--					

StationId	TN04			TN14			VI01			WI36				WY08			
	Year	2009	2013	2016	2010	2013	2016	2010	2013	2016	2008	2010	2013	2016	2009	2013	2016
Dry side bucket is clean	X	X				--		X	X				--				X
Does lid seal properly						--							--				
Lid liner in good condition						--							--				
ACM sensor operates properly		X				--				X			--				
Motorbox operates within acceptable limits						--							--				
N-CON lid seal in good condition	--	--	--	--	--		--	--	--	--	--	--	X	--	--	--	
N-CON lid liner in good condition	--	--	--	--	--		--	--	--	--	--	--		--	--	--	
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--		--	--	--	--	--	--		--	--	--	
Raingage operates properly (electronic gage)										--	--						
Does optical sensor respond to "blocking" of light beam (electronic gage)					--	--	--			--	--						
Does optical sensor respond to mist of water (electronic gage)					--	--	--			--	--						
Does datalogger receive event signals form all collectors (electronic gage)										--	--						
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--		X	--	--	--	--	--	--

- Indicates found compliant
- Indicates found non-compliant
- Indicates "Not Applicable"
- Indicates "Unable to Test"

**Table C-5. NADP – AIRMoN - Comparison Between Surveys of Findings Most Likely to Impact Data Quality**

StationId	TN00			
	Year	2009	2013	2016
Is sampling media quality maintained?				
Is the orifice of the collector +/- .3 m of raingage (elevation)				
30 degree rule for buildings met (raingage)				
No objects > 1 m height inside 5 m radius (raingage)	X	X	X	
No fences > 1 m height inside 2 m radius (raingage)				
No vegetation height > 0.6 m within 5 m radius (raingage)				
Collector and sensor oriented properly				
45 degree rule met (collector)				
30 degree rule for trees met (collector)	X	X	X	
30 degree rule for buildings met (collector)				
No objects > 1 m height within 5 m radius (collector)	X	X	X	
No fences > 1 m height inside 5 m radius (collector)				
No vegetation height > 0.6 m within 5 m radius (collector)				
No treated lumber inside 5 m radius (collector)				
No pastures and ag. activity within 20 m radius				
No herbicides and fertilizers used within 20 m radius				
Roads meet NADP siting criteria				
Waterways meet NADP siting criteria				
Airports meet NADP siting criteria				
Animal operations meet NADP siting criteria (NTN and AIRMoN)				
Parking lots and maintenance areas meet NADP siting criteria				
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria				
Dry side bucket is clean				
Does lid seal properly				
Lid liner in good condition				
ACM sensor operates properly				
Motorbox operates within acceptable limits				
Raingage operates properly (electronic gage)	--	--		
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--		
Does optical sensor respond to mist of water (electronic gage)	--	--		
Does datalogger receive event signals form all collectors (electronic gage)	--	--		

## **APPENDIX D**

### **Transfer Standard Instrument Certifications**



**Warren-Knight Instrument Company**

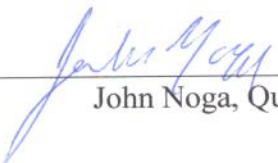
2045 Bennett Road  
Philadelphia, PA 19116  
Phone: 215-464-9300; Fax: 215-464-9303  
Web: <http://www.warrenind.com>

**CERTIFICATION OF CALIBRATION AND CONFORMANCE**

We hereby certify that the equipment below has been manufactured and/or inspected by standards traceable to NIST. Calibration of the specified instrument has been performed in compliance with ANSI Z540-1 requirements. It is warranted that the equipment has been calibrated to be in full conformance with the drawings and specifications of the instrument. Calibration tests were performed on the material specified below and were in accordance with all applicable quality assurance requirements with data on file at our facility.

Customer Name:	Environmental Engineering & Measurement Services, Inc.	
Purchase Order #:		
Instrument:	Ushikata Tracon S-25 Compass	
Serial Number:	191832	BEC (SEG)
Quantity:	1	
Calibration Due:	12/2016	12/9/2015

Page 1 of 2

  
John Noga, Quality Control

January 14, 2016

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 02/06/15 Due 02/06/16 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-7020 S/N 5167 Calibration 02/12/14 Due 02/12/19 731/244084-89 731/2216117





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

Page 2 of 2

Calibration Data Record				Temperature:	Humidity:
Customer Name	EE & MS		Item Name	USHIKATA	
Manufacturer	BEC		Model		
Serial Number	191832		Calibration Date	12-9-15	
Calibration Frequency			Job Card Number	5-23060	
Customer Reference Number			Date of Certification	12-9-15	
Measurement Standards					
Theodolite Wild T-3 S/N 18801 Calibration 02/12/15 Due 02/12/16 NIST Number 738/229329-83 738/223398					
Optical Wedge K&E 71-7020 S/N 5167 Calibration; 02/12/14 Due 2/12/19, NIST Number 731/244084-89 731/221617					
Initial Report					
Vanes			Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	0	+/- 30	
Needle			45	+/- 30	
Pivot Sharpness	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	90	+/- 30	
Straightness (+/-15 Minutes)	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	135	+/- 30	
Balance	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	180	+/- 30	
Lifter Function	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	225	+/- 30	
Azimuth Ring			270	+/- 30	
Control Knob Function	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	315	+/- 30	
Pinion Gear	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Graduation Clarity	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Graduation less than 1 minute in any position	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Level Bubble					
Bubble in Level	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Physical Condition	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Pass/Repair/Replace					
Pass	N/A	Replace	Repair		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Needle <input type="checkbox"/> Sharpen <input type="checkbox"/> Magnetize	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cap with Jewel	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pivot <input type="checkbox"/> Sharpen	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Level <input type="checkbox"/> Remount	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	North Sight	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	North Sight Block	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	South Sight	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	South Sight Block	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vane Spring	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Drive	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Knob Assembly	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cover Glass	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cover Glass Gasket	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clamp Screw	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pinion Gear	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Compass Ring	
Final Report					
Vanes			Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	0	+/- 30	< 30
Needle			45	+/- 30	< 30
Pivot Sharpness	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	90	+/- 30	< 30
Straightness (+/-15 Minutes)	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	135	+/- 30	< 30
Balance	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	180	+/- 30	< 30
Lifter Function	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	225	+/- 30	< 30
Azimuth Ring			270	+/- 30	< 30
Control Knob Function	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	315	+/- 30	< 30
Pinion Gear	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Graduation Clarity	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Graduation less than 1 minute in any position	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Level Bubble					
Bubble in Level	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Physical Condition	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail			
Certification					
Joseph Paolozzi			John Noga, Quality Assurance		
Repair Technician					



# Warren-Knight Instrument Company

2045 Bennett Road

Philadelphia, PA 19116

Phone: 215-464-9300; Fax: 215-464-9303

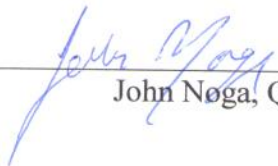
Web: <http://www.warrenind.com>

## CERTIFICATION OF CALIBRATION AND CONFORMANCE

We hereby certify that the equipment below has been manufactured and/or inspected by standards traceable to NIST. Calibration of the specified instrument has been performed in compliance with ANSI Z540-1 requirements. It is warranted that the equipment has been calibrated to be in full conformance with the drawings and specifications of the instrument. Calibration tests were performed on the material specified below and were in accordance with all applicable quality assurance requirements with data on file at our facility.

Customer Name:	Environmental Engineering & Measurement Services, Inc.
Purchase Order #:	Van # 1
Instrument:	Ushikata Tracon S-25 Compass
Serial Number:	190037 EEMS # 01265
Quantity:	1
Calibration Due:	12/9/2015

Page 1 of 2

  
 John Noga, Quality Control

January 14, 2016

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 02/06/15 Due 02/06/16 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-7020 S/N 5167 Calibration 02/12/14 Due 02/12/19 731/244084-89 731/2216117



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

Page 2 of 2

Calibration Data Record				Temperature:	Humidity:	
Customer Name	EEWMS 01265		Item Name	USHIKATA		
Manufacturer	190037		Model			
Serial Number			Calibration Date	12-9-15		
Calibration Frequency			Job Card Number	5-23058		
Customer Reference Number			Date of Certification	12-9-15		
Measurement Standards						
Theodolite Wild T-3 S/N 18801 Calibration 02/12/15 Due 02/12/16 NIST Number 738/229329-83 738/223398						
Optical Wedge K&E 71-7020 S/N 5167 Calibration; 02/12/14 Due 2/12/19, NIST Number 731/244084-89 731/221617						
Initial Report						
Vaness				Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights				0	+/- 30	
Needle				45	+/- 30	
Pivot Sharpness				90	+/- 30	
Straightness (+/-15 Minutes)				135	+/- 30	
Balance				180	+/- 30	
Lifter Function				225	+/- 30	
Azimuth Ring				270	+/- 30	
Control Knob Function				315	+/- 30	
Pinion Gear						
Graduation Clarity						
Graduation less than 1 minute in any position						
Level Bubble						
Bubble in Level						
Physical Condition						
Pass/Repair/Replace						
Pass	N/A	Replace	Repair			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Needle <input type="checkbox"/> Sharpen <input type="checkbox"/> Magnetize		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cap with Jewel		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pivot <input type="checkbox"/> Sharpen		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Level <input type="checkbox"/> Remount		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	North Sight		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	North Sight Block		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	South Sight		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	South Sight Block		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vane Spring		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Drive		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Control Knob Assembly		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cover Glass		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cover Glass Gasket		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clamp Screw		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pinion Gear		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Compass Ring		
Final Report						
Vaness				Direction (Degree)	Tolerance (Minute)	Compass Needle Error (Minute)
Pivot in line with Circle/Sights				0	+/- 30	< 30
Needle				45	+/- 30	< 30
Pivot Sharpness				90	+/- 30	< 30
Straightness (+/-15 Minutes)				135	+/- 30	< 30
Balance				180	+/- 30	< 30
Lifter Function				225	+/- 30	< 30
Azimuth Ring				270	+/- 30	< 30
Control Knob Function				315	+/- 30	< 30
Pinion Gear						
Graduation Clarity						
Graduation less than 1 minute in any position						
Level Bubble						
Bubble in Level						
Physical Condition						
Certification						
Joseph Paolozzi			John Noga, Quality Assurance			
Repair Technician						



# Warren-Knight Instrument Company

2045 Bennett Road

Philadelphia, PA 19116

Phone: 215-464-9300; Fax: 215-464-9303

Web: <http://www.warrenind.com>

## CERTIFICATION OF CALIBRATION AND CONFORMANCE

We hereby certify that the equipment below has been manufactured and/or inspected by standards traceable to NIST. Calibration of the specified instrument has been performed in compliance with ANSI Z540-1 requirements. It is warranted that the equipment has been calibrated to be in full conformance with the drawings and specifications of the instrument. Calibration tests were performed on the material specified below and were in accordance with all applicable quality assurance requirements with data on file at our facility.

Customer Name:	Environmental Engineering & Measurement Services, Inc.	
Purchase Order #:		
Instrument:	Ushikata Tracon S-25 Compass	
Serial Number:	199578	EEMS # 01272
Quantity:	1	
Calibration Due:	12/2016	12/9/2015

Page 1 of 2

  
 John Noga, Quality Control

January 14, 2016

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 02/06/15 Due 02/06/16 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-7020 S/N 5167 Calibration 02/12/14 Due 02/12/19 731/244084-89 731/2216117



**Certificate of Calibration**  
**Fluke Calibration, American Fork**  
**Primary Temperature Laboratory**

*EEMS #*  
*01229*

<b>Description:</b>	Digital Thermometer with Probe	<b>Certificate Number:</b>	B5C18007
<b>Manufacturer:</b>	Fluke	<b>Date of Calibration:</b>	09 Dec 2015
<b>Model:</b>	1551A	<b>Date Due:</b>	
<b>Serial Number:</b>	3275143	<b>Temperature:</b>	21.0 to 25.0 °C
<b>Status:</b>	As-Found: New As-Left: In Tolerance	<b>Relative Humidity:</b>	15 to 60 %RH
<b>Calibration:</b>	Full	<b>Pressure:</b>	83.5 to 88.5 kPa
<b>Procedure:</b>	AFC124 - 001	<b>Issue Date:</b>	18 Dec 2015

*page 1 of 2*

**Customer:** FOTRONIC CORPORATION  
MELROSE MA  
**PO Number:** 0203284

This calibration is traceable to the SI through recognized national measurement institutes, radiometric techniques, or natural physical constants and is in compliance with ISO17025:2005 and ANSI/NCSL Z540.1. The calibration has been completed in accordance with the Fluke Calibration Quality System document QSD 111.0. Calibration certificates without signatures are not valid. This certificate applies to only the item identified and shall not be reproduced other than in full, without the specific written approval by Fluke Corporation. This certificate shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

This calibration certificate may contain data that is not covered by the Scope of Accreditation. The unaccredited test points, where applicable, are indicated by an asterisk (\*), or confined to clearly marked sections. Functional tests are not accredited.

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

**Comments:**



Cert: B5C18007  
Due:  
S/N: 3275143

Electronically signed by  
**Approved Signatory**  
Michael Coleman  
Metrologist

# Certificate of Calibration

Model: 1551A  
 Serial No.: 3275143  
 Certificate No: B5C18007

Page 2 of 2

## As Found Data

No As Found Data Required

EEMS # 01229

Slope = 1.0000112  
 Int = -0.001926

12/9/2015

## As Left Data

Data ID: B5343072143703

Calibration Constants		Nominal (°C)	Actual (°C)	Measured (°C)	Error (°C)	Tolerance (°C)	Uncertainty	Pass/Fail
R0	100.003539	-50	-49.9886	-49.9898	-0.0012	±0.0500	±0.0080	P
A	3.917265E-03	-25	-25.0848	-25.0911	-0.0063	±0.0500	±0.0080	P
B	-6.408775E-07	0	-0.0078	-0.0070	0.0008	±0.0500	±0.0080	P
C	-1.292775E-11	100	100.0117	100.0118	0.0001	±0.0500	±0.0080	P
MINOP	-60	157	156.9983	156.9973	-0.0010	±0.0500	±0.0080	P
MAXOP	170							

Name	Reference	Offset
Device Calibration Constants		
DEVICE CAL 1	50.0080	0.0882
DEVICE CAL 2	100.0020	0.0760
DEVICE CAL 3	150.0070	0.0652
DEVICE CAL 4	200.0000	0.0598
User Calibration Constants		
USER CAL 1	-50.0000	0.0000
USER CAL 2	0.0000	0.0000
USER CAL 3	157.0000	0.0000

# Certificate of Calibration

EEMS#

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES  
1128 NW 39TH DRIVE  
GAINESVILLE, FL 32605  
FEDEX

P.O. Number:  
**ID Number: 01310**

Description: DIGITAL MULTIMETER  
Manufacturer: FLUKE  
Model Number: 187  
Serial Number: 86590148  
Technician: MIKE CASOLI  
On-Site Calibration:   
Comments:

Calibration Date: 12/23/2015  
Calibration Due: 12/23/2016  
Procedure: METCAL FLUKE 187  
Rev: 6/15/2015  
Temperature: 68 F  
Humidity: 42 % RH  
**As Found Condition: IN TOLERANCE**  
**Calibration Results: IN TOLERANCE**

Limiting Attribute:

This instrument has been calibrated using standards traceable to the National Institute of Standards and Technology, derived from natural physical constants, ratio measurements or compared to consensus standards. Unless otherwise noted, the method of calibration is direct comparison to a known standard.

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. A TUR of 4:1 is routinely observed unless otherwise noted on the certificate. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement.

TMI's Quality System is accredited to ISO/IEC 17025 and ANSI/NCSL Z540-1 by A2LA. ISO/IEC 17025 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. The instrument listed on this certificate has been calibrated to the requirements of ANSI/NCSL Z540-1 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.

FRANK BAHMANN, BRANCH MANAGER

JACK SHULER, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
1727902	FLUKE	5522A/SC1100	10/14/2015	10/14/2016



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994



## Instrument Data Sheet

ID Number: 01310  
 Serial Number: 85690148

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

Test Results
--------------

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
=====							
DISPLAY OPERATIONAL VERIFICATION							
=====							
Display Test						Pass	
=====							
BACKLIGHT OPERATIONAL VERIFICATION							
=====							
Backlight Test						Pass	
=====							
INPUT ALERT OPERATIONAL VERIFICATION							
=====							
Alert Function / Non-Current Functions						Pass	
Alert Function OHMS / mA Input						Pass	
No Alert Function mAmps / mA Input						Pass	
=====							
KEYPAD OPERATIONAL VERIFICATION							
=====							
Keypad Buttons Operational						Pass	
=====							
AC VOLTAGE VERIFICATION TEST							
=====							
4.5000 V @ 20 Hz		4.4758	4.4020	4.5980	V	Pass	
4.5000 V @ 45 Hz		4.4957	4.4780	4.5220	V	Pass	
4.5000 V @ 1 kHz		4.5027	4.4780	4.5220	V	Pass	
4.5000 V @ 10 kHz		4.4997	4.4780	4.5220	V	Pass	
4.5000 V @ 20 kHz		4.4961	4.4285	4.5715	V	Pass	
4.5000 V @ 100 kHz		4.4467	4.1360	4.8640	V	Pass	
45.000 V @ 45 Hz		44.955	44.780	45.220	V	Pass	
45.000 V @ 1 kHz		45.026	44.780	45.220	V	Pass	
45.000 V @ 10 kHz		45.094	44.780	45.220	V	Pass	
45.000 V @ 20 kHz		45.284	44.285	45.715	V	Pass	
450.00 V @ 45 Hz		449.51	447.80	452.20	V	Pass	
450.00 V @ 1 kHz		450.27	447.80	452.20	V	Pass	
450.00 V @ 10 kHz		451.15	447.80	452.20	V	Pass	
900.0 V @ 45 Hz		898.6	892.4	907.6	V	Pass	
900.0 V @ 1 kHz		900.0	892.4	907.6	V	Pass	
900.0 V @ 10 kHz		902.8	892.4	907.6	V	Pass	
45.0000 mV @ 20 Hz	44.8540		44.0200	45.9800	mV	Pass	
45.000 mV @ 45 Hz	45.049		44.780	45.220	mV	Pass	
45.000 mV @ 1 kHz	44.940		44.780	45.220	mV	Pass	
45.000 mV @ 10 kHz	43.556		42.710	47.290	mV	Pass	
45.000 mV @ 20 kHz	43.399		42.485	47.515	mV	Pass	
45.000 mV @ 100 kHz	41.001		38.210	51.790	mV	Pass	
450.00 mV @ 20 Hz	447.61		440.20	459.80	mV	Pass	
450.00 mV @ 45 Hz	450.53		447.80	452.20	mV	Pass	
450.00 mV @ 1 kHz	449.27		447.80	452.20	mV	Pass	
450.00 mV @ 10 kHz	434.50		427.10	472.90	mV	Pass	
450.00 mV @ 20 kHz	433.60		424.85	475.15	mV	Pass	
450.00 mV @ 100 kHz	431.88		413.60	486.40	mV	Pass	
2900.0 mV @ 20 Hz	2876.7		2834.0	2966.0	mV	Pass	

## Instrument Data Sheet

ID Number: 01310  
 Serial Number: 85690148

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

### Test Results

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
2900.0 mV @ 45 Hz		2891.9	2884.4	2915.6	mV	Pass	
2900.0 mV @ 1 kHz		2901.8	2884.4	2915.6	mV	Pass	
2900.0 mV @ 10 kHz		2898.6	2884.4	2915.6	mV	Pass	
2900.0 mV @ 20 kHz		2895.6	2852.5	2947.5	mV	Pass	
2900.0 mV @ 100 kHz		2962.6	2664.0	3136.0	mV	Pass	

#### =====

#### FREQUENCY ACCURACY VERIFICATION TEST

#### =====

20.000 kHz @ 150 mV	20.000	19.998	20.002	kHz	Pass
---------------------	--------	--------	--------	-----	------

#### =====

#### DC VOLTAGE VERIFICATION TEST

#### =====

5.0000 V	4.9995	4.9977	5.0023	V	Pass
4.0000 V	3.9996	3.9980	4.0020	V	Pass
3.0000 V	2.9997	2.9982	3.0018	V	Pass
2.0000 V	1.9998	1.9985	2.0015	V	Pass
1.0000 V	0.9998	0.9987	1.0013	V	Pass
-5.0000 V	-4.9993	-5.0023	-4.9977	V	Pass
50.000 V	49.994	49.982	50.018	V	Pass
-50.000 V	-49.993	-50.018	-49.982	V	Pass
500.00 V	499.95	499.48	500.52	V	Pass
-500.00 V	-499.93	-500.52	-499.48	V	Pass
1000.0 V	999.8	998.8	1001.2	V	Pass
-1000.0 V	-999.7	-1001.2	-998.8	V	Pass

#### =====

#### DCV + ACV MEASUREMENT ACCURACY VERIFICATION

#### =====

4.5000 V @ 1 kHz	4.5031	4.4735	4.5265	V	Pass
45.000 V @ 1 kHz	45.031	44.735	45.265	V	Pass
450.00 V @ 1 kHz	450.34	447.35	452.65	V	Pass
900.0 V @ 1 kHz	901.8	891.5	908.5	V	Pass

50.000 mV	50.003	49.930	50.070	mV	Pass
-50.000 mV	-49.991	-50.070	-49.930	mV	Pass
500.00 mV	499.99	499.83	500.17	mV	Pass
-500.00 mV	-499.96	-500.17	-499.83	mV	Pass
2900.0 mV	2900.0	2898.8	2901.2	mV	Pass
-2900.0 mV	-2899.9	-2901.2	-2898.8	mV	Pass

#### =====

#### DCmV+ACmV MEASUREMENT ACCURACY VERIFICATION

#### =====

45.000 mV @ 1 kHz	44.925	42.350	47.650	mV	Pass
450.00 mV @ 1 kHz	449.18	447.35	452.65	mV	Pass
2900.0 mV @ 1 kHz	2902.9	2891.5	2908.5	mV	Pass

#### =====

#### RESISTANCE VERIFICATION TEST

#### =====

## Instrument Data Sheet

ID Number: 01310  
 Serial Number: 85690148

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

**Test Results**

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
190.00 Ohm		190.04	189.80	190.20	Ω	Pass	
1.9000 kOhm		1.9000	1.8988	1.9012	kΩ	Pass	
19.000 kOhm		19.000	18.988	19.012	kΩ	Pass	
190.00 kOhm		190.00	189.88	190.12	kΩ	Pass	
1.9000 MOhm		1.8997	1.8967	1.9033	MΩ	Pass	
19.000 MOhm		19.003	18.806	19.194	MΩ	Pass	
100.0 MOhm		99.8	96.8	103.2	MΩ	Pass	

CONDUCTANCE VERIFICATION TEST

10.00 nS		10.02	9.80	10.20	nS	Pass	
----------	--	-------	------	-------	----	------	--

AC CURRENT TEST VERIFICATION

45.000 mA @ 1 kHz		45.047	44.642	45.358	mA	Pass	
350.00 mA @ 1 kHz		350.39	347.32	352.68	mA	Pass	
450.00 μA @ 1 kHz		450.32	446.42	453.58	μA	Pass	
4500.0 μA @ 1 kHz		4502.9	4465.7	4534.3	μA	Pass	

DC CURRENT VERIFICATION TEST

45.000 mA		45.011	44.922	45.078	mA	Pass	
350.00 mA		350.15	349.45	350.55	mA	Pass	
450.00 μA		450.01	448.67	451.33	μA	Pass	
4500.0 μA		4500.0	4488.5	4511.5	μA	Pass	

AC CURRENT VERIFICATION TEST (cont.)

4.5000 A @ 1 kHz		4.5039	4.4305	4.5695	A	Pass	
10.000 A @ 1 kHz		10.007	9.845	10.155	A	Pass	

DC CURRENT VERIFICATION TEST (cont.)

4.5000 A		4.5003	4.4765	4.5235	A	Pass	
10.000 A		10.000	9.948	10.052	A	Pass	

CAPACITANCE VERIFICATION TESTS

0.900 nF		0.897	0.877	0.923	nF	Pass	1.59
9.10 nF		9.19	8.96	9.24	nF	Pass	
90.1 nF		90.1	88.7	91.5	nF	Pass	
1.000 μF		1.000	0.985	1.015	μF	Pass	

## Instrument Data Sheet

ID Number: 01310  
 Serial Number: 85690148

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

Test Results
--------------

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
TEMPERATURE ACCURACY VERIFICATION							
=====							
-10.0 °C		-9.9	-11.1		-8.9 °C	Pass	
0.0 °C		0.0	-1.0		1.0 °C	Pass	
100.0 °C		100.1	98.0		102.0 °C	Pass	
350.0 °C		350.2	345.5		354.5 °C	Pass	

\*\*\*\*\* End of Certificate \*\*\*\*\*

# Certificate of Calibration

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES  
1128 NW 39TH DRIVE  
GAINESVILLE, FL 32605  
FEDEX

P.O. Number:  
**ID Number: 01311**

*EEms*

Description: DIGITAL MULTIMETER  
Manufacturer: FLUKE  
Model Number: 287  
Serial Number: 95740135  
Technician: MIKE CASOLI  
On-Site Calibration:   
Comments:

Calibration Date: 12/23/2015  
Calibration Due: 12/23/2016  
Procedure: METCAL FLUKE 287  
Rev: 6/15/2015  
Temperature: 68 F  
Humidity: 42 % RH  
**As Found Condition: IN TOLERANCE**  
**Calibration Results: IN TOLERANCE**

Limiting Attribute:

This instrument has been calibrated using standards traceable to the National Institute of Standards and Technology, derived from natural physical constants, ratio measurements or compared to consensus standards. Unless otherwise noted, the method of calibration is direct comparison to a known standard.

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. A TUR of 4:1 is routinely observed unless otherwise noted on the certificate. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement.

TMI's Quality System is accredited to ISO/IEC 17025 and ANSI/NCSL Z540-1 by A2LA. ISO/IEC 17025 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. The instrument listed on this certificate has been calibrated to the requirements of ANSI/NCSL Z540-1 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.

*FRB*

FRANK BAHMANN, BRANCH MANAGER

*Jack Shuler*

JACK SHULER, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
1727902	FLUKE	5522A/SC1100	10/14/2015	10/14/2016



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

Phone: 813-978-3054 Fax 813-978-3758

[www.tmicalibration.com](http://www.tmicalibration.com)

ANSI/NCSL Z540-1-1994

## Instrument Data Sheet

ID Number: 01311  
 Serial Number: 95740135

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

### Test Results

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
=====							
IDENTIFICATION & FIRMWARE REVISION							
=====							
Manufacturer:	FLUKE						
Model:	287						
Serial Number:	95740135						
Firmware Level:	V1.00						
=====							
TONE WARNING VERIFICATION							
=====							
Tone Warning Functional						Pass	
=====							
DCmV MEASUREMENT ACCURACY VERIFICATION							
=====							
0.000 mV		0.001	-0.020	0.020 mV		Pass	
0.025 mV		0.025	0.005	0.045 mV		Pass	
-0.025 mV		-0.025	-0.045	-0.005 mV		Pass	
50.000 mV		50.001	49.955	50.045 mV		Pass	
500.00 mV		500.00	499.86	500.14 mV		Pass	
-250.00 mV		-249.99	-250.08	-249.92 mV		Pass	
50.00 mV		50.00	49.97	50.03 mV		Pass	
=====							
DCmV + ACmV MEASUREMENT ACCURACY VERIFICATION							
=====							
250.00 mV @ 35 kHz		248.48	237.10	262.90 mV		Pass	
=====							
RESISTANCE MEASUREMENT ACCURACY VERIFICATION							
=====							
0.00 Ohm		0.01	-0.10	0.10 Ωs		Pass	
1.000 Ohm		0.990	0.899	1.101 Ωs		Pass	
190.00 Ohm		190.02	189.81	190.19 Ωs		Pass	
1.90000 kOhm		1.90019	1.89885	1.90115 kΩs		Pass	
19.000 kOhm		19.005	18.988	19.012 kΩs		Pass	
190.000 kOhm	190.0100	190.000	189.895	190.125 kΩs		Pass	
1.9000 MOhm		1.9009	1.8967	1.9032 MΩs		Pass	
10.000 MOhm		10.007	9.846	10.154 MΩs		Pass	
100.00 MOhm	100.300	100.00	92.08	108.52 MΩs		Pass	
=====							
ACmV MEASUREMENT ACCURACY VERIFICATION							
=====							
5.000 mV @ 20 Hz		5.001	4.865	5.135 mV		Pass	
50.000 mV @ 65 kHz		48.623	48.210	51.790 mV		Pass	
50.00 mV @ 100 kHz		49.06	47.85	52.15 mV		Pass	
250.00 mV @ 65 kHz		246.61	240.85	259.15 mV		Pass	
500.00 mV @ 45 Hz		499.63	498.25	501.75 mV		Pass	

## Instrument Data Sheet

ID Number: 01311  
Serial Number: 95740135

Test Run: FOUND-LEFT  
Date Tested: 23 December 2015

### Test Results

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
<b>FREQUENCY MEASUREMENT ACCURACY VERIFICATION</b>							
45.000 Hz @ 500 mV		45.000	44.986	45.014	Hz	Pass	
950.00 kHz @ 600 mV		950.00	949.90	950.10	kHz	Pass	
<b>ACV MEASUREMENT ACCURACY VERIFICATION</b>							
0.1000 V @ 60 Hz		0.1010	0.0952	0.1048	V	Pass	
0.5000 V @ 10 kHz		0.4974	0.4945	0.5055	V	Pass	
3.0000 V @ 100 kHz		3.0469	2.8160	3.1840	V	Pass	
15.000 V @ 100 kHz		15.000	14.435	15.565	V	Pass	
500.00 V @ 10 kHz		499.41	497.75	502.25	V	Pass	
1000.0 V @ 10 kHz		999.4	993.5	1006.5	V	Pass	
<b>DCV MEASUREMENT ACCURACY VERIFICATION</b>							
4.0000 V		4.0000	3.9988	4.0012	V	Pass	
-40.000 V		-40.000	-40.012	-39.988	V	Pass	
400.00 V		399.99	399.86	400.14	V	Pass	
600.0 V		600.0	599.6	600.4	V	Pass	
<b>DCV + ACV MEASUREMENT ACCURACY VERIFICATION</b>							
0.2000 V		0.2001	0.1978	0.2023	V	Pass	
2.0000 V @ 5 kHz		2.0047	1.9660	2.0340	V	Pass	
<b>DIODE MEASUREMENT ACCURACY VERIFICATION</b>							
1.0000 V		1.0020	0.9880	1.0120	V	Pass	
Beeper is Operational							
<b>ACI<math>\mu</math>A MEASUREMENT ACCURACY VERIFICATION</b>							
500.00 $\mu$ A @ 60 Hz		500.18	496.80	503.20	$\mu$ A	Pass	
500.00 $\mu$ A @ 10 kHz		500.25	496.80	503.20	$\mu$ A	Pass	1.14
5000.0 $\mu$ A @ 10 kHz		5003.1	4969.0	5031.0	$\mu$ A	Pass	2.38
<b>DCI<math>\mu</math>A MEASUREMENT ACCURACY VERIFICATION</b>							
500.00 $\mu$ A		499.96	499.43	500.57	$\mu$ A	Pass	
5000.0 $\mu$ A		4999.8	4996.1	5003.9	$\mu$ A	Pass	
<b>ACImA MEASUREMENT ACCURACY VERIFICATION</b>							

## Instrument Data Sheet

ID Number: 01311  
 Serial Number: 95740135

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

**Test Results**

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
4.000 mA @ 20 Hz		3.989	3.940	4.060 mA		Pass	
30.000 mA @ 10 kHz		30.029	29.800	30.200 mA		Pass	3.17
300.00 mA @ 10 kHz		300.37	284.60	315.40 mA		Pass	
400.00 mA @ 60 Hz		400.06	397.55	402.45 mA		Pass	
=====							
DCImA MEASUREMENT ACCURACY VERIFICATION							
=====							
0.100 mA		0.102	0.090	0.110 mA		Pass	
50.000 mA		49.991	49.965	50.035 mA		Pass	
400.00 mA		399.92	399.38	400.62 mA		Pass	
=====							
ACI MEASUREMENT ACCURACY VERIFICATION							
=====							
5.0000 A @ 1 kHz		5.0034	4.9580	5.0420 A		Pass	
5.000 A @ 1 kHz		5.001	4.955	5.045 A		Pass	
=====							
DCI MEASUREMENT ACCURACY VERIFICATION							
=====							
5.0000 A		5.0002	4.9840	5.0160 A		Pass	
10.000 A		10.001	9.968	10.032 A		Pass	
=====							
TEMPERATURE MEASUREMENT ACCURACY VERIFICATION							
=====							
0.0 °C		-0.1	-1.0	1.0 °C		Pass	
100.0 °C		99.9	98.0	102.0 °C		Pass	
1000.0 °C		1000.0	989.0	1011.0 °C		Pass	
=====							
CAPACITANCE MEASUREMENT ACCURACY VERIFICATION							
=====							
0.900 nF		0.899	0.886	0.914 nF		Pass	0.97
9.10 nF		9.09	8.96	9.24 nF		Pass	
90.1 nF		89.9	88.7	91.5 nF		Pass	
1.000 µF		1.000	0.985	1.015 µF		Pass	
1.00 µF		1.00	0.94	1.06 µF		Pass	

\*\*\*\*\* End of Certificate \*\*\*\*\*



# Certificate of Calibration

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES  
1128 NW 39TH DRIVE  
GAINESVILLE, FL 32605  
FEDEX

P.O. Number:  
**ID Number: 01312**

*EEMS #*

Description: DIGITAL MULTIMETER  
Manufacturer: FLUKE  
Model Number: 287  
Serial Number: 95740243  
Technician: MIKE CASOLI  
On-Site Calibration:   
Comments:

Calibration Date: 12/23/2015  
Calibration Due: 12/23/2016  
Procedure: METCAL FLUKE 287  
Rev: 6/15/2015  
Temperature: 68 F  
Humidity: 42 % RH  
**As Found Condition: IN TOLERANCE**  
**Calibration Results: IN TOLERANCE**

**Limiting Attribute:**

This instrument has been calibrated using standards traceable to the National Institute of Standards and Technology, derived from natural physical constants, ratio measurements or compared to consensus standards. Unless otherwise noted, the method of calibration is direct comparison to a known standard.

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. A TUR of 4:1 is routinely observed unless otherwise noted on the certificate. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement.

TMI's Quality System is accredited to ISO/IEC 17025 and ANSI/NCSL Z540-1 by A2LA. ISO/IEC 17025 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. The instrument listed on this certificate has been calibrated to the requirements of ANSI/NCSL Z540-1 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.

*FRB*

FRANK BAHMANN, BRANCH MANAGER

*Jack Shuler*

JACK SHULER, QUALITY MANAGER

**Calibration Standards**

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
1727902	FLUKE	5522A/SC1100	10/14/2015	10/14/2016



**Technical Maintenance, Inc.**

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

# Instrument Data Sheet

ID Number: 01312  
 Serial Number: 95740243

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

## Test Results

Test Description	True Value	Test Result	Lower limit	Upper limit	Units	Result	TUR
=====							
IDENTIFICATION & FIRMWARE REVISION							
=====							
Manufacturer:	FLUKE						
Model:	287						
Serial Number:	95740243						
Firmware Level:	V1.00						
=====							
TONE WARNING VERIFICATION							
=====							
Tone Warning Functional						Pass	
=====							
DCmV MEASUREMENT ACCURACY VERIFICATION							
=====							
0.000 mV		0.000	-0.020	0.020 mV		Pass	
0.025 mV		0.024	0.005	0.045 mV		Pass	
-0.025 mV		-0.025	-0.045	-0.005 mV		Pass	
50.000 mV		50.000	49.955	50.045 mV		Pass	
500.00 mV		500.01	499.86	500.14 mV		Pass	
-250.00 mV		-249.98	-250.08	-249.92 mV		Pass	
50.00 mV		50.02	49.97	50.03 mV		Pass	
=====							
DCmV + ACmV MEASUREMENT ACCURACY VERIFICATION							
=====							
250.00 mV @ 35 kHz		248.23	237.10	262.90 mV		Pass	
=====							
RESISTANCE MEASUREMENT ACCURACY VERIFICATION							
=====							
0.00 Ohm		0.01	-0.10	0.10 Ωs		Pass	
1.000 Ohm		0.990	0.899	1.101 Ωs		Pass	
190.00 Ohm		190.02	189.81	190.19 Ωs		Pass	
1.90000 kOhm		1.89989	1.89885	1.90115 kΩs		Pass	
19.000 kOhm		19.002	18.988	19.012 kΩs		Pass	
190.000 kOhm	189.9700	190.000	189.855	190.085 kΩs		Pass	
1.9000 MOhm		1.8994	1.8967	1.9032 MΩs		Pass	
10.000 MOhm		9.999	9.846	10.154 MΩs		Pass	
100.00 MOhm	99.700	100.00	91.52	107.88 MΩs		Pass	
=====							
ACmV MEASUREMENT ACCURACY VERIFICATION							
=====							
5.000 mV @ 20 Hz		4.990	4.865	5.135 mV		Pass	
50.000 mV @ 65 kHz		48.859	48.210	51.790 mV		Pass	
50.00 mV @ 100 kHz		49.05	47.85	52.15 mV		Pass	
250.00 mV @ 65 kHz		246.75	240.85	259.15 mV		Pass	
500.00 mV @ 45 Hz		499.54	498.25	501.75 mV		Pass	

## Instrument Data Sheet

ID Number: 01312  
 Serial Number: 95740243

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

### Test Results

<u>Test Description</u>	<u>True Value</u>	<u>Test Result</u>	<u>Lower limit</u>	<u>Upper limit</u>	<u>Units</u>	<u>Result</u>	<u>TUR</u>
<b>FREQUENCY MEASUREMENT ACCURACY VERIFICATION</b>							
45.000 Hz @ 500 mV		45.000	44.986	45.014	Hz	Pass	
950.00 kHz @ 600 mV		950.00	949.90	950.10	kHz	Pass	
<b>ACV MEASUREMENT ACCURACY VERIFICATION</b>							
0.1000 V @ 60 Hz		0.0976	0.0952	0.1048	V	Pass	
0.5000 V @ 10 kHz		0.4956	0.4945	0.5055	V	Pass	
3.0000 V @ 100 kHz		3.1735	2.8160	3.1840	V	Pass	
15.000 V @ 100 kHz		14.974	14.435	15.565	V	Pass	
500.00 V @ 10 kHz		499.32	497.75	502.25	V	Pass	
1000.0 V @ 10 kHz		999.1	993.5	1006.5	V	Pass	
<b>DCV MEASUREMENT ACCURACY VERIFICATION</b>							
4.0000 V		4.0001	3.9988	4.0012	V	Pass	
-40.000 V		-40.001	-40.012	-39.988	V	Pass	
400.00 V		400.00	399.86	400.14	V	Pass	
600.0 V		600.0	599.6	600.4	V	Pass	
<b>DCV + ACV MEASUREMENT ACCURACY VERIFICATION</b>							
0.2000 V		0.1999	0.1978	0.2023	V	Pass	
2.0000 V @ 5 kHz		2.0038	1.9660	2.0340	V	Pass	
<b>DIODE MEASUREMENT ACCURACY VERIFICATION</b>							
1.0000 V		1.0081	0.9880	1.0120	V	Pass	
Beeper is Operational						Pass	
<b>ACIuA MEASUREMENT ACCURACY VERIFICATION</b>							
500.00 $\mu$ A @ 60 Hz		499.95	496.80	503.20	$\mu$ A	Pass	
500.00 $\mu$ A @ 10 kHz		500.12	496.80	503.20	$\mu$ A	Pass	1.14
5000.0 $\mu$ A @ 10 kHz		5001.6	4969.0	5031.0	$\mu$ A	Pass	2.38
<b>DCIuA MEASUREMENT ACCURACY VERIFICATION</b>							
500.00 $\mu$ A		500.00	499.43	500.57	$\mu$ A	Pass	
5000.0 $\mu$ A		5000.0	4996.1	5003.9	$\mu$ A	Pass	
<b>ACImA MEASUREMENT ACCURACY VERIFICATION</b>							

## Instrument Data Sheet

ID Number: 01312  
 Serial Number: 95740243

Test Run: FOUND-LEFT  
 Date Tested: 23 December 2015

Test Results
--------------

Test Description	True Value	Test Result	Lower limit	Upper limit	Units	Result	TUR
=====							
4.000 mA @ 20 Hz		3.973	3.940		4.060 mA	Pass	
30.000 mA @ 10 kHz		30.019	29.800		30.200 mA	Pass	3.17
300.00 mA @ 10 kHz		300.29	284.60		315.40 mA	Pass	
400.00 mA @ 60 Hz		399.99	397.55		402.45 mA	Pass	
=====							
DCImA MEASUREMENT ACCURACY VERIFICATION							
=====							
0.100 mA		0.110	0.090		0.110 mA	Pass	
50.000 mA		49.993	49.965		50.035 mA	Pass	
400.00 mA		399.99	399.38		400.62 mA	Pass	
=====							
ACI MEASUREMENT ACCURACY VERIFICATION							
=====							
5.0000 A @ 1 kHz		5.0030	4.9580		5.0420 A	Pass	
5.000 A @ 1 kHz		4.998	4.955		5.045 A	Pass	
=====							
DCI MEASUREMENT ACCURACY VERIFICATION							
=====							
5.0000 A		5.0014	4.9840		5.0160 A	Pass	
10.000 A		10.003	9.968		10.032 A	Pass	
=====							
TEMPERATURE MEASUREMENT ACCURACY VERIFICATION							
=====							
0.0 °C		0.0	-1.0		1.0 °C	Pass	
100.0 °C		100.0	98.0		102.0 °C	Pass	
1000.0 °C		1000.1	989.0		1011.0 °C	Pass	
=====							
CAPACITANCE MEASUREMENT ACCURACY VERIFICATION							
=====							
0.900 nF		0.886	0.886		0.914 nF	Pass	0.97
9.10 nF		9.08	8.96		9.24 nF	Pass	
90.1 nF		90.1	88.7		91.5 nF	Pass	
1.000 µF		1.001	0.985		1.015 µF	Pass	
1.00 µF		1.00	0.94		1.06 µF	Pass	

\*\*\*\*\* End of Certificate \*\*\*\*\*

# Certificate of Calibration

Customer: ENVIRONMENTAL ENGINEERING & MEASUREMENT SERVICES  
1128 NW 39TH DRIVE  
GAINESVILLE, FL 32605  
FEDEX

P.O. Number:  
ID Number: **01226**

EEMS #

Description: DIGITAL STIK THERMOMETER  
Manufacturer: FLUKE  
Model Number: 1551A EX  
Serial Number: 2085085  
Technician: JEFF BAHMANN

Calibration Date: **12/23/2015**  
Calibration Due: 12/23/2016  
Procedure: FLUKE 1551A EX,52A EX  
Rev: 11/1/2010  
Temperature: 70 F  
Humidity: 40 % RH  
**As Found Condition: IN TOLERANCE**  
**Calibration Results: IN TOLERANCE**

On-Site Calibration:   
Comments:

**Limiting Attribute:**

This instrument has been calibrated using standards traceable to the National Institute of Standards and Technology, derived from natural physical constants, ratio measurements or compared to consensus standards. Unless otherwise noted, the method of calibration is direct comparison to a known standard.

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. A TUR of 4:1 is routinely observed unless otherwise noted on the certificate. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement.

TMI's Quality System is accredited to ISO/IEC 17025 and ANSI/NCSL Z540-1 by A2LA. ISO/IEC17025 is written in a language relevant to laboratory operations, meeting the principles of ISO 9001 and aligned with its pertinent requirements. The instrument listed on this certificate has been calibrated to the requirements of ANSI/NCSL Z540-1 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.

FRANK BAHMANN, BRANCH MANAGER

JACK SHULER, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
30946	FLUKE	5616	9/8/2014	2/25/2016
A06118	HART SCIENTIFIC	9103	1/13/2015	5/13/2016
A11967	HART SCIENTIFIC	9140	10/29/2014	6/27/2016
A88072	FLUKE/HART	1502A	11/23/2015	3/5/2016



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

Phone: 813-978-3054 Fax 813-978-3758

[www.tmicalibration.com](http://www.tmicalibration.com)

ANSI/NCSL Z540-1-1994

# Certificate of Calibration

## Data Sheet

<u>Parameter</u>	<u>Nominal</u>	<u>Minimum</u>	<u>Maximum</u>	<u>As Found</u>	<u>As Left</u>	<u>Unit</u>	<u>ADJ/FAIL</u>
Temperature Accuracy	-25.00	-25.05	-24.95	-25.02	-25.02	°C	
Temperature Accuracy	0.00	-0.05	0.05	0.05	0.05	°C	
Temperature Accuracy	100.00	99.95	100.05	99.96	99.96	°C	
Temperature Accuracy	150.00	149.95	150.05	149.95	149.95	°C	

12/23/2015

Slope = 0.9996275  
int = 0.0059542  
R<sup>2</sup> = 0.999999

EEMS # 01226



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

Phone: 813-978-3054 Fax 813-978-3758

[www.tmiclibration.com](http://www.tmiclibration.com)

ANSI/NCSL Z540-1-1994

Date

12/9/2015 - - Calibration and certification of fluke RTD

Fluke Data -- 12/9/2015				
	STD	EEMS RTD		
cert date=	12/9/2015	01229		
		diff	corrected	
	-49.9886	-49.9898	0.001	-49.987
	-25.0848	-25.0911	0.006	-25.089
	-0.0078	-0.0070	-0.001	-0.005
	100.0117	100.0118	0.000	100.013
	156.9983	156.9973	0.001	156.997
			0.000	0.002
		<b>RTD 01229</b>		
<b>2016 correction:</b>		slope=		1.00001115
		intercept=		-0.0019258
		1.0000000		

*Ein Hebert*

1/14/2016

At	Date	fluke =	01311	01312	01310			
			EEMS SEG	EEMS van 2	EEMS van 1			
	RTD	thermo =	01236	01237	01238			
	01226							
raw	corrected		raw	corrected	raw	corrected	raw	corrected
0.02	0.02		0.1	0.09	0.1	0.12	0.1	0.07
15.62	15.62		15.6	15.58	15.6	15.60	15.7	15.64
31.79	31.79		31.8	31.77	31.7	31.69	31.8	31.72
50.64	50.64		50.6	50.56	50.6	50.58	50.7	50.59
68.69	68.69		68.8	68.75	68.8	68.76	68.9	68.76
89.91	89.91		90.0	89.94	90.0	89.94	90.2	90.02
80.46	80.46		80.5	80.44	80.5	80.45	80.5	80.34
	0.00			-0.01		0.02		-0.03
		Thermocouple offset =	-0.2		-0.6		0.4	
<b>POST CALIBRATION CHECK</b>								
23.63	23.63		23.7	23.68	23.6	23.60	23.6	23.53
		slope =	1.000561		1.0008		1.00164	
		intercept =	0.009876		-0.015907		0.02936	
		correlation =	1.0000		1.0000		1.0000	

### BL1 And BL3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1500.00	1499.82	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1000.00	999.89	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	500.00	499.91	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	200.00	199.94	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	100.00	99.97	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	50.00	49.99	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	BL3-0	Audit		1000.7	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-1	Audit		824.2	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-2	Audit		823.3	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-3	Audit		825.1	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-4	Audit		823.7	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-5	Audit		823.8	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-6	Audit		823.0	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-7	Audit		823.6	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-8	Audit		824.7	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-9	Audit		824.2	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-10	Audit		820.8	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-11	Audit		823.9	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL3-12	Audit		823.1	JPJ	ETI/Belfort Set #3 - SEG
1/13/2016	8028481064	BL1-a	Audit		207.48	JPJ	ETI/Belfort Set #1 - SEG
1/13/2016	8028481064	BL1-b	Audit		207.21	JPJ	ETI/Belfort Set #1 - SEG
1/13/2016	8028481064	BL1-c	Audit		207.16	JPJ	ETI/Belfort Set #1 - SEG
1/13/2016	8028481064	BL1-d	Audit		207.55	JPJ	ETI/Belfort Set #1 - SEG
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1500.00	1499.82	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1000.00	999.86	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	500.00	499.89	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	200.00	199.94	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	100.00	99.97	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	50.00	49.98	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check

Calibrator Signature: \_\_\_\_\_

Date: \_\_\_\_\_ 1/13/2016

Reviewer Signature: \_\_\_\_\_

Date: \_\_\_\_\_ 1/13/2016




## BL2 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1500.00	1499.82	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1000.00	999.88	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	500.00	499.89	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	200.00	199.94	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	100.00	99.98	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	50.00	49.98	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	BL2-0	Audit		999.8	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-1	Audit		822.9	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-2	Audit		820.3	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-3	Audit		824.2	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-4	Audit		824.8	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-5	Audit		823.2	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-6	Audit		823.9	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-7	Audit		823.2	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-8	Audit		823.2	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-9	Audit		823.4	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-10	Audit		823.6	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-11	Audit		823.4	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-12	Audit		823.9	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-a	Audit		206.72	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-b	Audit		205.75	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-c	Audit		206.18	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	BL2-d	Audit		206.40	JPJ	ETI/Belfort Set #2 - AER
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1500.00	1499.82	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1000.00	999.87	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	500.00	499.91	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	200.00	199.94	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	100.00	99.97	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	50.00	49.99	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check

Calibrator Signature: \_\_\_\_\_ 

Date: \_\_\_\_\_ 1/13/2016

Reviewer Signature: \_\_\_\_\_ 

Date: \_\_\_\_\_ 1/13/2016

### BL4 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1500.00	1499.83	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1000.00	999.88	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	500.00	499.90	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	200.00	199.94	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	100.00	99.97	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	50.00	49.98	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	BL4-0	Audit		1034.2	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-1	Audit		824.8	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-2	Audit		823.5	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-3	Audit		824.5	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-4	Audit		824.6	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-5	Audit		823.1	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-6	Audit		824.8	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-7	Audit		823.9	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-8	Audit		824.3	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-9	Audit		825.0	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-10	Audit		823.5	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-11	Audit		823.9	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-12	Audit		824.0	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-a	Audit		207.38	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-b	Audit		207.37	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-c	Audit		207.54	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	BL4-d	Audit		207.61	JPJ	ETI/Belfort Set #4 - EOH
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1500.00	1499.83	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1000.00	999.87	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	500.00	499.90	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	200.00	199.95	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	100.00	99.97	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	50.00	49.98	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check

Calibrator Signature: \_\_\_\_\_

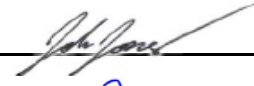
Date: \_\_\_\_\_ 1/13/2016

Reviewer Signature: \_\_\_\_\_


Date: \_\_\_\_\_ 1/13/2016

### P2OTT1 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1500.00	1499.83	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1000.00	999.87	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	500.00	499.90	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	200.00	199.94	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	100.00	99.97	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	50.00	49.99	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	P2OTT1-1	Audit		1017.8	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-2	Audit		1018.0	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-3	Audit		1017.3	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-4	Audit		1018.1	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-5	Audit		1016.8	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-6	Audit		1017.0	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-7	Audit		1017.6	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-8	Audit		1016.5	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-9	Audit		1017.9	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-a	Audit		255.34	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-b	Audit		255.18	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-c	Audit		255.25	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	P2OTT1-d	Audit		255.60	JPJ	Ott P2 Set #1 - SEG
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1500.00	1499.83	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1000.00	999.87	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	500.00	499.90	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	200.00	199.95	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	100.00	99.97	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	50.00	49.99	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check

Calibrator Signature: \_\_\_\_\_ 

Date: \_\_\_\_\_ 1/13/2016

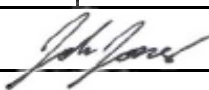
Reviewer Signature: \_\_\_\_\_ 

Date: \_\_\_\_\_ 1/13/2016

## P2OTT2 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1500.00	1499.83	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1000.00	999.88	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	500.00	499.89	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	200.00	199.94	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	100.00	99.97	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	50.00	49.98	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	P2OTT2-1	Audit		1016.6	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-2	Audit		1017.1	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-3	Audit		1017.2	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-4	Audit		1017.1	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-5	Audit		1017.1	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-6	Audit		1018.0	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-7	Audit		1017.2	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-8	Audit		1015.8	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-9	Audit		1016.5	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-a	Audit		254.24	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-b	Audit		254.21	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-c	Audit		254.45	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	P2OTT2-d	Audit		254.38	JPJ	Ott P2 Set #2 - AER
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1500.00	1499.83	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1000.00	999.87	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	500.00	499.89	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	200.00	199.95	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	100.00	99.98	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	50.00	49.98	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check

Calibrator Signature: \_\_\_\_\_



Date: 1/13/2016

Reviewer Signature: \_\_\_\_\_




Date: 1/13/2016

### P2OTT3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1500.00	1499.83	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	1000.00	999.87	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	500.00	499.90	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	200.00	199.94	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	100.00	99.98	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	50.00	49.99	JPJ	Initial Balance Check
1/13/2016	8028481064	26677	Bal Init	0.00	0.00	JPJ	Initial Balance Check
1/13/2016	8028481064	P2OTT3-1	Audit		193.86	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-2	Audit		193.84	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-3	Audit		193.83	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-4	Audit		193.80	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-5	Audit		193.82	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-6	Audit		193.08	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-7	Audit		193.88	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-8	Audit		193.67	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-9	Audit		193.16	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-10	Audit		193.80	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-a	Audit		254.78	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-b	Audit		255.21	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-c	Audit		255.54	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	P2OTT3-d	Audit		255.41	JPJ	Ott P2 Set #3- EOH
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1500.00	1499.83	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	1000.00	999.88	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	500.00	499.89	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	200.00	199.94	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	100.00	99.97	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	50.00	49.98	JPJ	Post Balance Check
1/13/2016	8028481064	26677	Bal Post	0.00	0.00	JPJ	Post Balance Check

Calibrator Signature: \_\_\_\_\_ 

Date: \_\_\_\_\_ 1/13/2016

Reviewer Signature: \_\_\_\_\_ 

Date: \_\_\_\_\_ 1/13/2016