
2017 National Atmospheric Deposition Program Site Survey Program Annual Report

Prepared for:

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

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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 and GS-10F-075AA Order No. EP-G17H-00554, 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.

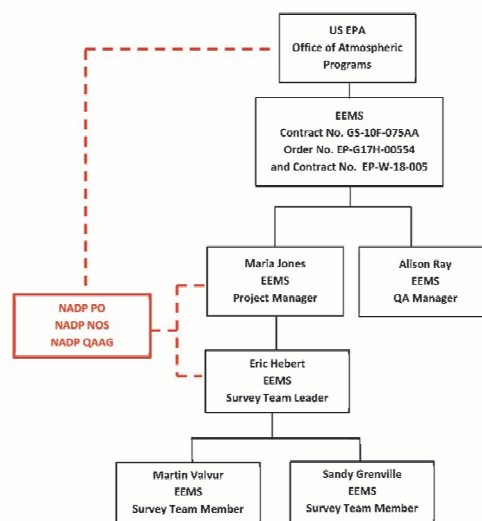
1.0 Introduction / Background

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 affords a higher level of confidence in the data reported by the NADP by verifying that each site operator is following the field SOPs. The survey program compliments the QA/QC procedures followed by the PO and the CAL.

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

Figure 1. Organization Chart of the NADP Site Survey Program



Surveys of the NADP sites are performed under contract EP-W-18-005. Maria Jones fulfills the role of Project Manager which includes contract issues, reports, and database administrator. Alison Ray as the QA Manager is responsible for reviewing all the data gathered in the field. Eric Hebert as the Survey Team Leader is responsible for the scheduling as well as directing the Survey Team Members in the performance of the sites surveys. Martin Valvur, Sandy Grenville and Korey Devins are the field technicians that perform the surveys along with Eric Hebert. Both the Project Manager and Survey Team Leader maintain close contact with the NADP PO, and NOS and participate in QAAG meetings.

NADP site surveys are accomplished by visiting approximately 25% of the total precipitation (or wet deposition) NADP sites each year. The operation of the site instrumentation is checked, maintenance is performed as needed, the site operator is observed while performing the routine site activities, technical and training support are provided, and the results are reported during each survey. 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 rain gauge 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.

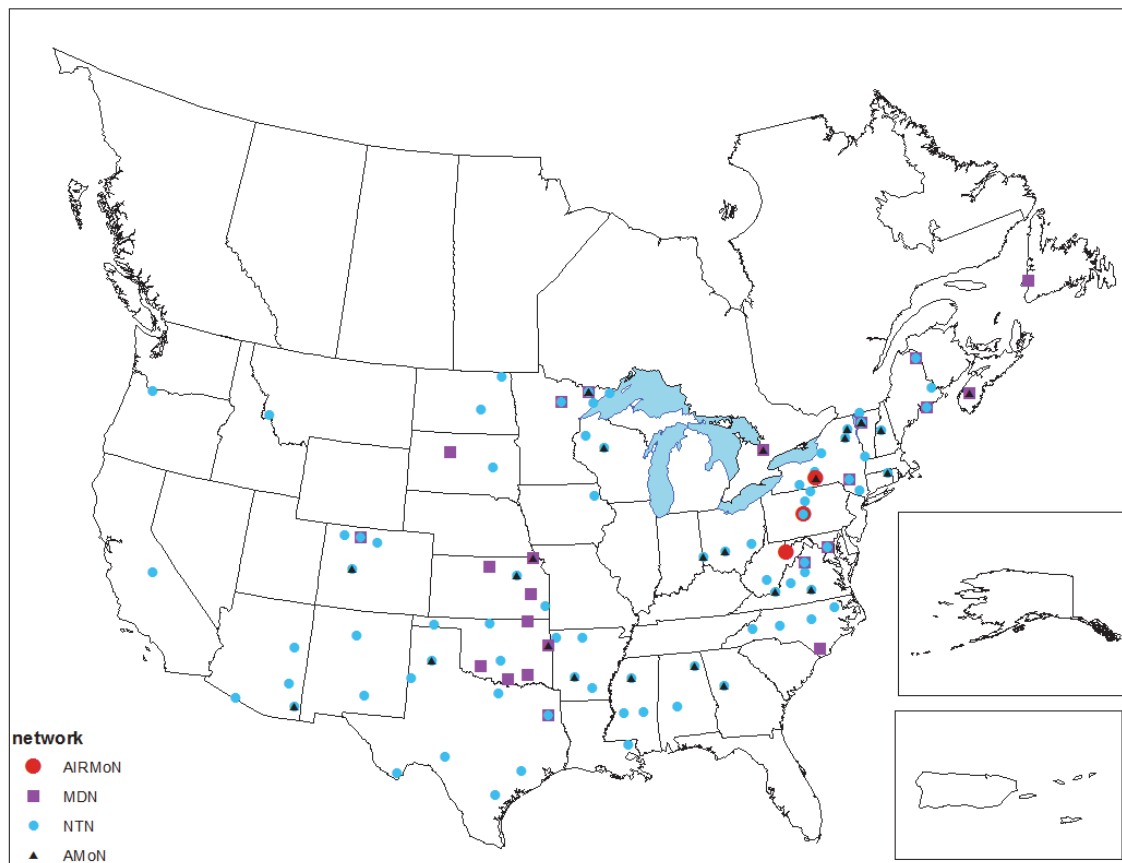
2.0 Status of Sites Surveyed

2.1 Sites Surveyed

This annual report includes site surveys performed from January through December of 2017.

A total of 107 NADP collectors (this number includes co-located sites) were surveyed during the period covered by this report at 95 distinct locations. These include 24 MDN sites, 80 NTN sites, and three AIRMoN site. Figure 2-1 is a map of the sites visited during 2017. 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. Site Survey Locations in 2017



Source – NADP Program Office

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 95 precipitation raingages surveyed (co-located sites usually use the same raingage) were electronic raingages either ETI NOAH IV (51 raingages) or the OTT PLUVIO (38 raingages). Only six Belfort mechanical raingages were surveyed and found to be operating reasonably well.

Of the 107 collectors (sites) surveyed, 48 sites operated N-CON collectors. The 59 remaining collectors were AeroChem Metrics (ACM) type, manufactured by either AeroChem Metrics or Loda Electronics Company.

Thirty three 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 2017 and the equipment found at the sites is shown in Table 2.1.

Table 2-1. Sites Surveyed from January through December 2017 and Equipment Found

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
AL10	Marion Junction	NTN	12/12/2017	ACM-type	OTT	Stick
AL99	Mountain Research & Extension	NTN	2/28/2017	ACM-type	OTT	N/A
AR02	Warren 2WSW	NTN	4/11/2017	N-CON	OTT	N/A
AR03	Caddo Valley	NTN	4/6/2017	N-CON	OTT	N/A
AR16	Buffalo National River-Buffalo Point	NTN	5/15/2017	ACM-type	ETI	N/A
AR27	Fayetteville	NTN	5/8/2017	N-CON	OTT	Tipping Bucket

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
AZ06	Organ Pipe Cactus Np	NTN	4/27/2017	ACM-type	ETI	N/A
AZ97	Forest National Park-Rainbow	NTN	4/24/2017	ACM-type	ETI	Other
AZ98	Chiricahua Nm	NTN	4/26/2017	ACM-type	ETI	Tipping Bucket
AZ99	Oliver Knoll	NTN	4/25/2017	N-CON	OTT	N/A
CA28	Kings River Experimental Watershed	NTN	5/22/2017	ACM-type	ETI	N/A
CAN5	Frelighsburg	NTN	10/16/2017	N-CON	ETI	Other
CO10	Gothic	NTN	10/3/2017	ACM-type	ETI	N/A
CO15	Sand Spring	NTN	7/26/2017	ACM-type	ETI	N/A
CO19	Rocky Mountain National Park	NTN	8/1/2017	ACM-type	ETI	N/A
CO97	Buffalo Pass-Summit Lake	MDN/NTN	10/17/2017	ACM-type	OTT	N/A
CT15	Abington	NTN	8/21/2017	ACM-type	ETI	N/A
GA41	Georgia Station	NTN	2/27/2017	ACM-type	ETI	Tipping Bucket
IA08	Big Springs Fish Hatchery	NTN	10/26/2017	N-CON	OTT	N/A
KS03	Reserve	MDN	4/5/2017	N-CON	ETI	N/A
KS05	Coffey County Lake	MDN	4/6/2017	N-CON	ETI	N/A
KS07	Farlington Fish Hatchery	NTN	4/6/2017	N-CON	OTT	Stick
KS24	Glen Elder State Park	MDN	4/3/2017	N-CON	ETI	N/A
KS31	Konza Prarie	NTN	4/4/2017	ACM-type	OTT	Belfort
LA30	Southeast Research Station	NTN	3/27/2017	ACM-type	OTT	N/A
MD99	Beltsville	MDN/NTN	11/21/2017	ACM-type	ETI	Tipping Bucket
ME00	Caribou	MDN/NTN	10/13/2017	N-CON	ETI	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
ME94	Indian Township	NTN	10/9/2017	ACM-type	ETI	OTT
ME98	Acadia National Park - Mcfarland Hill	MDN/NTN	10/10/2017	ACM-type	ETI	Tipping Bucket
MN08	Hovland	NTN	10/24/2017	ACM-type	ETI	N/A
MN16	Marcell Experimental Forest	MDN/NTN	9/6/2017	ACM-type	ETI	Stick
MN18	Fernberg	MDN/NTN	9/5/2017	ACM-type N-CON	ETI	N/A
MN99	Wolf Ridge	NTN	10/23/2017	N-CON	ETI	N/A
MS10	Clinton	NTN	2/22/2017	N-CON	OTT	N/A
MS19	Newton	NTN	2/22/2017	ACM-type	Belfort	N/A
MS30	Coffeeville	NTN	2/21/2017	ACM-type	OTT	N/A
MT97	Lost Trail Pass	NTN	8/15/2017	ACM-type	OTT	N/A
NC03	Lewiston	NTN	11/21/2017	ACM-type	OTT	Stick
NC08	Waccamaw State Park	MDN	11/28/2017	N-CON	ETI	N/A
NC34	Piedmont Research Station	NTN	11/20/2017	ACM-type	OTT	N/A
NC41	Finley Farm	NTN	11/21/2017	ACM-type	OTT	N/A
NC45	Mt. Mitchell	NTN	7/17/2017	ACM-type	ETI	N/A
ND08	Icelandic State Park	NTN	8/31/2017	N-CON	OTT	N/A
ND11	Woodworth	NTN	8/30/2017	N-CON	OTT	N/A
NF19	Stephenville	MDN	10/4/2017	N-CON	ETI	N/A
NH02	Hubbard Brook	NTN	8/22/2017	ACM-type	ETI	N/A
NM07	Bandelier National Monument	NTN	5/9/2017	ACM-type	ETI	Tipping Bucket
NM08	Mayhill	NTN	5/8/2017	N-CON	OTT	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raigage Type	Backup Raigage Type
NS01	Kejimkujik National Park	MDN	10/6/2017	N-CON	ETI	Other
NY01	Alfred	NTN	8/16/2017	N-CON	OTT	N/A
NY08	Aurora Research Farm	NTN	10/11/2017	ACM-type	Belfort	Stick
NY20	Huntington Wildlife	MDN/NTN	10/17/2017	ACM-type	Belfort	OTT
NY52	Bennett Bridge	NTN	8/15/2017	ACM-type	ETI	N/A
NY67	Ithaca	AIRMoN	10/10/2017	ACM-type	ETI	Stick
NY68	Biscuit Brook	MDN/NTN	8/14/2017	ACM-type	OTT	N/A
NY98	Whiteface Mountain	NTN	9/27/2017	N-CON	OTT	OTT
NY99	West Point	NTN	8/14/2017	N-CON	Belfort	N/A
OH09	Oxford	NTN	5/22/2017	N-CON	OTT	N/A
OH49	Caldwell	NTN	5/24/2017	N-CON	OTT	N/A
OH54	Deer Creek State Park	NTN	5/23/2017	ACM-type	ETI	N/A
OK00	Salt Plains National Wildlife Refuge	NTN	4/3/2017	N-CON	OTT	N/A
OK01	McGee Creek	MDN	4/5/2017	N-CON	ETI	N/A
OK04	Lake Murray	MDN	4/5/2017	N-CON	ETI	N/A
OK06	Wichita Mountains NWR	MDN	4/4/2017	N-CON	ETI	N/A
OK17	Kessler Farm Field Laboratory	NTN	3/31/2017	ACM-type	Belfort	N/A
OK29	Goodwell Research Station	NTN	4/2/2017	ACM-type	OTT	N/A
OK31	Copan	MDN	4/3/2017	N-CON	ETI	N/A
OK99	Cherokee	MDN	5/9/2017	N-CON	ETI	Tipping Bucket
ON07	Egbert	MDN	10/13/2017	N-CON	ETI	Other

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
PA15	Penn State	AIRMoN/ NTN	8/18/2017	ACM-type	ETI	Belfort
PA18	Young Woman's Creek	NTN	8/25/2017	N-CON	OTT	Stick
PA90	Hills Creek State Park	NTN	8/19/2017	N-CON	OTT	Stick
SD18	Eagle Butte	MDN	10/11/2017	N-CON	ETI	N/A
SD99	Huron Well Field	NTN	10/10/2017	N-CON	OTT	Stick
TX02	Muleshoe National Wildlife Refuge	NTN	3/1/2017	N-CON	OTT	Other
TX03	Beeville	NTN	3/29/2017	N-CON	OTT	N/A
TX04	Big Bend National Park	NTN	3/2/2017	ACM-type	ETI	N/A
TX10	Attwater Prairie Chicken	NTN	3/28/2017	N-CON	OTT	Tipping Bucket
TX16	Sonora	NTN	3/30/2017	ACM-type	OTT	N/A
TX21	Longview	MDN/NTN	4/9/2017	ACM-type	Belfort	Tipping Bucket
TX43	Canonceta	NTN	2/27/2017	ACM-type	OTT	Tipping Bucket
TX56	Lbj Grassland	NTN	3/31/2017	N-CON	OTT	N/A
VA00	Charlottesville	NTN	7/24/2017	N-CON	OTT	N/A
VA13	Horton's Station	NTN	7/18/2017	ACM-type	ETI	N/A
VA24	Prince Edward	NTN	7/25/2017	ACM-type	ETI	N/A
VA28	Shenandoah National Park-Big Meadow	MDN/NTN	11/29/2017	ACM-type	ETI	Tipping Bucket
VA99	Natural Bridge Station	NTN	7/19/2017	N-CON	ETI	Tipping Bucket
VT01	Bennington	NTN	8/22/2017	N-CON	OTT	N/A
VT99	Underhill	MDN/NTN	8/23/2017	N-CON	ETI	Stick
WA98	Columbia River Gorge	NTN	8/18/2017	ACM-type	ETI	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
WI35	Perkinstown	NTN	10/22/2017	ACM-type	ETI	N/A
WI37	Spooner	NTN	10/23/2017	N-CON	ETI	N/A
WV04	Babcock State Park	NTN	7/19/2017	N-CON	OTT	N/A
WV99	Canaan Valley Institute	AIRMoN	8/27/2017	ACM-type	ETI	Stick
WY99	Newcastle	NTN	10/12/2017	ACM-type	ETI	N/A

A total of 27 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 2017

Side ID	Station Name	Last Visit Date
AL99	Sand Mountain Research & Extension Center	2/27/2017
AR03	Caddo Valley	4/6/2017
AZ98	Chiricahua NM	4/26/2017
CT15	Abington	8/21/2017
GA41	Georgia Station	2/28/2017
IL11	Bondville	11/11/207
IL46	Alhambra	10/27/2017
KS03	Reserve	4/5/2017
KS97	Kickapoo Tribe - Powhattan	4/5/2017
MD99	Beltsville	11/21/2017
MI52	Ann Arbor	10/19/2017
MN18	Fernberg	9/5/2017
NC06	Beaufort	11/27/2017
NE98	Santee	9/7/2017
NH02	Hubbard Brook	8/22/2017

Side ID	Station Name	Last Visit Date
NS01	Kejimikujik National Park	10/6/2017
NY20	Huntington Wildlife	10/18/2017
NY67	Ithaca	10/10/2017
NY98	Whiteface	9/27/2017
OK99	Cherokee	2/26/2014
PA15	Penn State	8/18/2017
PA29	Kane Experimental Forest	8/16/2017
TX43	Canonceta	2/27/2017
VA24	Prince Edward	7/25/2017
VT99	Underhill	8/23/2017
WI35	Perkinstown	10/23/2017
WV18	Parsons	8/27/2017

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 ¹	Percent Meeting all Assessment
Collectors	107	91	85 %
Number of NTN ACM – type	50	34	68 %
Number of MDN ACM – type	9	8	89 %
Number of MDN N-CON	15	11	73 %
Number of NTN N-CON	33	28	85 %
Raingages	95	88	93 %
Belfort Raingages	6	4	67 %

¹ Meeting all assessments “as found”.

	Surveyed	Meeting all Assessments ¹	Percent Meeting all Assessment
Electronic Raingages	89	84	94 %
Siting Criteria	107	22	21 %
NTN Sites Meeting All Siting Criteria	80	15	19 %
MDN Sites Meeting All Siting Criteria	24	6	25 %
AIRMoN Sites Meeting All Siting Criteria	3	1	33 %

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 of the siting criteria requirements.

Table 3-2. Percent of Non-compliant Findings

Siting and Performance Checks	Number of Assessments ²	Found Non-Compliant	Percent (%) Non-Compliant
Sample Handling			
Is sampling media quality maintained?	107	1	0.9
Are samples stored and shipped properly	3	0	0.0
Siting Criteria Assessments			
Is the orifice of the collector +/- .3 m of raingage (elevation)	107	5	4.7
30 degree rule for buildings met (raingage)	95	0	0.0
No objects > 1 m height inside 5 m radius (raingage)	95	33	34.7
No fences > 1 m height inside 2 m radius (raingage)	95	10	10.5
No vegetation height > 0.6 m within 5 m radius (raingage)	95	20	21.1
Collector and sensor oriented properly	107	9	8.4
45 degree rule met (collector)	107	16	15.0
30 degree rule for trees met (collector)	107	39	36.4
30 degree rule for buildings met (collector)	107	0	0.0

² 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.

Siting and Performance Checks	Number of Assessments²	Found Non-Compliant	Percent (%) Non-Compliant
No objects > 1 m height within 5 m radius (collector)	107	34	31.8
No fences > 1 m height inside 5 m radius (collector)	107	20	18.7
No vegetation height > 0.6 m within 5 m radius (collector)	107	21	19.6
No treated lumber inside 5 m radius (collector)	107	21	19.6
No galvanized metal inside 5 m radius collector (MDN)	24	8	33.3
No pastures and ag. activity within 20 m radius	107	10	9.3
No herbicides and fertilizers used within 20 m radius	107	5	4.7
Roads meet NADP siting criteria	107	1	0.9
Waterways meet NADP siting criteria	107	0	0.0
Airports meet NADP siting criteria	107	0	0.0
Animal operations meet NADP siting criteria (NTN and AIRMoN)	83	0	0.0
Combustion sources meet NADP siting criteria (MDN only)	24	0	0.0
Parking lots and maintenance areas meet NADP siting criteria	107	2	1.9
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria	107	2	1.9
Metalworking operations meet NADP siting criteria (MDN only)	24	0	0.0
ACM-type Collector Assessments			
Dry side bucket is clean (NTN and AIRMoN)	50	12	24.0
Dry side bag installed correctly (MDN)	9	0	0.0
Does lid seal properly	59	0	0.0
Lid liner in good condition	59	3	5.1
Fan in good condition (MDN)	9	0	0.0
Cooling fan thermostat in good condition (MDN)	9	0	0.0
Heater in good condition (MDN)	8	0	0.0
Heater thermostat in good condition (MDN)	8	0	0.0
Has flush wall filter mount been installed (MDN)	9	1	11.1
Filter in good condition (MDN)	8	0	0.0
Max / min thermometer within acceptable limits (MDN)	9	0	0.0
ACM sensor operates properly	59	1	1.7
Motor-box operates within acceptable limits	59	0	0.0
N-CON Collector Assessments			
N-CON fan in good condition (MDN)	15	0	0.0
N-CON cooling fan thermostat in good condition (MDN)	15	0	0.0
N-CON heater in good condition (MDN)	15	1	6.7

Siting and Performance Checks	Number of Assessments²	Found Non-Compliant	Percent (%) Non-Compliant
N-CON heater thermostat in good condition (MDN)	15	0	0.0
N-CON max / min thermometer in acceptable limits (MDN)	15	1	6.7
N-CON sensor respond to a 5 passes	48	0	0.0
N-CON lid seals properly	48	3	6.3
N-CON lid liner in good condition	48	6	12.5
Belfort Raingage Assessments			
Was the 'as found' turn-over set properly	6	2	33.3
Electronic Raingage Assessments			
Raingage operates properly (electronic gage)	89	0	0.0
Does datalogger receive event signals form all collectors (electronic gage)	89	1	1.1
Does optical sensor respond to "blocking" of light beam (ETI)	51	6	11.8
Does optical sensor respond to mist of water (ETI)	51	5	9.8

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.

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 3-3 and discussed in more detail in other sections of this report.

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”):

- NS01-MDN The site has been moved since the previous survey. There are buildings within 30 meters of the equipment.
- CAN5-NTN The site has been moved since the previous site survey.

3.2 Survey Results for Sites with Multiple Site Visits

All sites surveyed in 2017 had been previously visited by EEMS, most of them in 2014 with a few exceptions that were surveyed in 2013. Most of these sites have been visited at least four times by EEMS. 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 3-4. For those sites with more than two surveys, only the last two visits were considered (i.e., survey conducted in 2017 and 2014 or 2013, but not the survey conducted in 2011).

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

Siting and Performance Checks	% Non-compliant During 2017	% Non-compliant During Previous Survey
Is sampling media quality maintained?	0.9%	1.9%
Is the orifice of the collector +/- .3 m of raingage (elevation)	4.7%	3.7%
No objects > 1 m height inside 5 m radius (raingage)	35.4%	30.5%
No fences > 1 m height inside 2 m radius (raingage)	10.4%	13.7%
No vegetation height > 0.6 m within 5 m radius (raingage)	21.9%	20.0%

Siting and Performance Checks	% Non-compliant During 2017	% Non-compliant During Previous Survey
Collector and sensor oriented properly	8.4%	13.1%
45 degree rule met (collector)	15.0%	13.1%
30 degree rule for trees met (collector)	36.4%	30.8%
No objects > 1 m height within 5 m radius (collector)	31.8%	29.9%
No fences > 1 m height inside 5 m radius (collector)	18.7%	15.9%
No vegetation height > 0.6 m within 5 m radius (collector)	19.6%	18.7%
No treated lumber inside 5 m radius (collector)	19.6%	18.7%
No galvanized metal inside 5 m radius collector (MDN)	33.3%	33.3%
No pastures and ag. activity within 20 m radius	9.3%	8.4%
No herbicides and fertilizers used within 20 m radius	4.7%	0.9%
Roads meet NADP siting criteria	0.9%	0.9%
Airports meet NADP siting criteria	0.0%	0.0%
Parking lots and maintenance areas meet NADP siting criteria	1.9%	0.9%
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria	1.9%	2.8%
Dry side bucket is clean	24.0%	18.5%
Does lid seal properly	3.4%	3.1%
Lid liner in good condition	5.1%	6.3%
Fan in good condition	0.0%	11.1%
Heater in good condition	0.0%	0.0%
Has flush wall filter mount been installed	11.1%	20.0%
Filter in good condition	0.0%	0.0%
Max / min thermometer in acceptable limits	1.3%	0.0%
ACM sensor operates properly	2.0%	0.0%
Motorbox operates within acceptable limits	0.1%	0.0%
N-CON lid seals properly	6.3%	11.6%
N-CON lid liner in good condition	12.5%	4.7%
N-CON cooling fan thermostat in good condition	6.7%	0.0%
N-CON max / min thermometer in acceptable limits	6.7%	7.1%
Was the 'as found' turn over set properly (Belfort gage)	33.3%	60.0%
Raingage operates properly (electronic gage)	0.0%	2.4%
Does datalogger receive event signals form all collectors (electronic gage)	1.1%	2.4%
Does optical sensor respond to "blocking" of light beam (electronic gage)	10.0%	12.5%
Does optical sensor respond to mist of water (electronic gage)	8.0%	12.5%

Two items (treated lumber and galvanized metal) 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 3-4 reveals that some of these changes relate to the installation of new equipment at some of these sites. Three N-CON collectors were installed at the sites considered here between the two latest surveys and four 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 e.g., on sample quality.

Furthermore, not all of these performance checks have the same impact on the quality of the sample. Allowing vegetation to grow may impact sample quality less than not maintaining a clean dry-side bucket. Since most of the items found out of compliance are related to siting criteria, significant improvements in data quality may not be realized but changes in the surrounding area including industrial or agricultural sources, obstructions, or vegetation may impact overall trend in the data.

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 3-5 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 3-4. Status of Surveyed Sites Requiring Raingage Shields

Site ID	Network	Condition in 2017	Previous Survey	Site ID	Network	Condition in 2017	Previous Survey
AR16**	NTN	Installed	Not Present	NY01	NTN	Installed	Installed
AZ97	NTN	Installed	Installed	NY08	NTN	Not Present	Installed
CA28	NTN	Installed	Installed	NY20	MDN/NTN	Installed	Installed
CAN5	NTN	Installed	Installed	NY52	NTN	Installed	Installed
CO10	NTN	Installed	Installed	NY67	AIRMoN	Installed	Installed
CO15	NTN	Installed	Installed	NY68	MDN/NTN	Installed	Installed
CO19	NTN	Installed	Installed	NY98	NTN	Installed	Installed
CO97	MDN/NTN	Not Present	Not Present	NY99	NTN	Not Present	Not Present
CT15	NTN	Installed	Installed	OK04*	MDN	Not Present	Installed
IA08	NTN	Installed	Installed	OK06*	MDN	Not Present	Installed
KS03*	MDN	Not Present	Not Present	OK29**	NTN	Installed	Not Present
KS05*	MDN	Not Present	Not Present	ON07	MDN	Installed	Installed
KS24*	MDN	Not Present	Not Present	PA 15	AIRMoN/NTN	Not Present	Not Present
MD99**	MDN/NTN	Installed	Not Present	PA 18	NTN	Not Present	Installed
ME00	MDN/NTN	Installed	Installed	PA90	NTN	Not Present	Not Present
ME94*	NTN	Installed	Installed	SD18	MDN	Not Present	Installed
ME98	MDN/NTN	Installed	Installed	SD99	NTN	Installed	Installed
MN08	NTN	Installed	Installed	TX02**	NTN	Installed	Not Present
MN16	MDN/NTN	Installed	Installed	TX04**	NTN	Installed	Not Present
MN18	MDN/NTN	Installed	Installed	TX43*	NTN	Not Present	Not Present
MN99	NTN	Installed	Not Present	VA28**	MDN/NTN	Installed	Installed
MT97	NTN	Installed	Installed	VT01	NTN	Installed	Installed
ND08	NTN	Not Present	Installed	VT99	MDN/NTN	Installed	Installed
ND11	NTN	Not Present	Installed	WA98**	NTN	Installed	Not Present
NF19	MDN	Installed	Installed	WI35	NTN	Installed	Installed
NH02	NTN	Installed	Installed	WI37	NTN	Installed	Installed
NM07	NTN	Not Present	Installed	WV99	AIRMoN	Not Present	Not Present
NM08	NTN	Installed	Installed	WY99	NTN	Installed	Installed
NS01	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

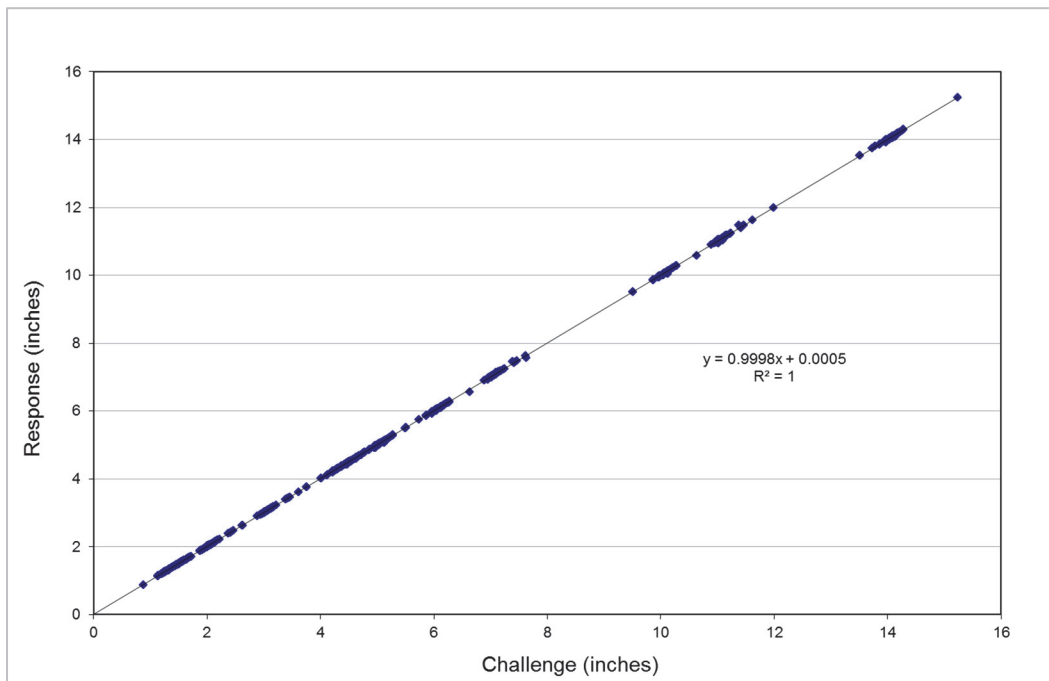
4.0 Field Site Survey Results

This section summarizes the quantifiable survey data relating to raingage accuracy tests and ACM collector sensor heater performance. Ninety five raingages were surveyed during this reporting period most of which operate electronic raingages. With only six 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 89 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 3. Electronic Raingage Accuracy – 89 Raingages



4.2 ACM Sensor Heater Tests

The ACM type collectors used throughout the networks of the NADP utilize a contact grid sensor. Two types of sensors are operated, one with 7 grids, and one with 11 grids which allows for smaller

size precipitation to activate the sensor. When precipitation bridges the gap between the grid and the sensor plate the sensor is “activated” and the collector opens. In order to optimize that operation the sensor is heated at a low level when the ambient temperature is below approximately 4°C during dry conditions. This provides sufficient heat to melt frozen precipitation and bridge the gap quickly when a snow or ice event occurs. The manufacturer states that when the ambient temperature is above 4°C and the conditions are dry, the sensor is not heated.

When the sensor is activated the sensor is heated at a high level to evaporate the precipitation from the grid surface quickly when the event ends. The intent is to minimize 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. Three sensors, AZ97-NTN, CO19-NTN and WY99-NTN exhibited lower temperature while inactivated than the ambient temperature. The likely explanation is that the survey team member measured the ambient temperature later during the survey, or the thermocouple was not left long enough in contact with the sensor plate.

Figure 4. Inactivated ACM Sensor Temperature

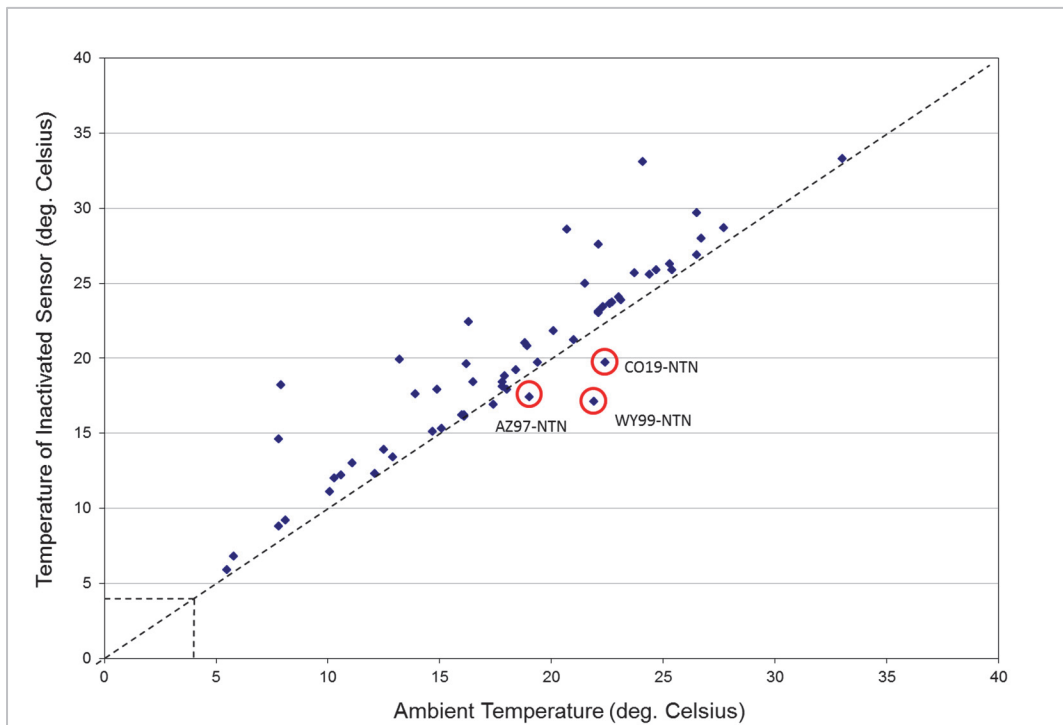
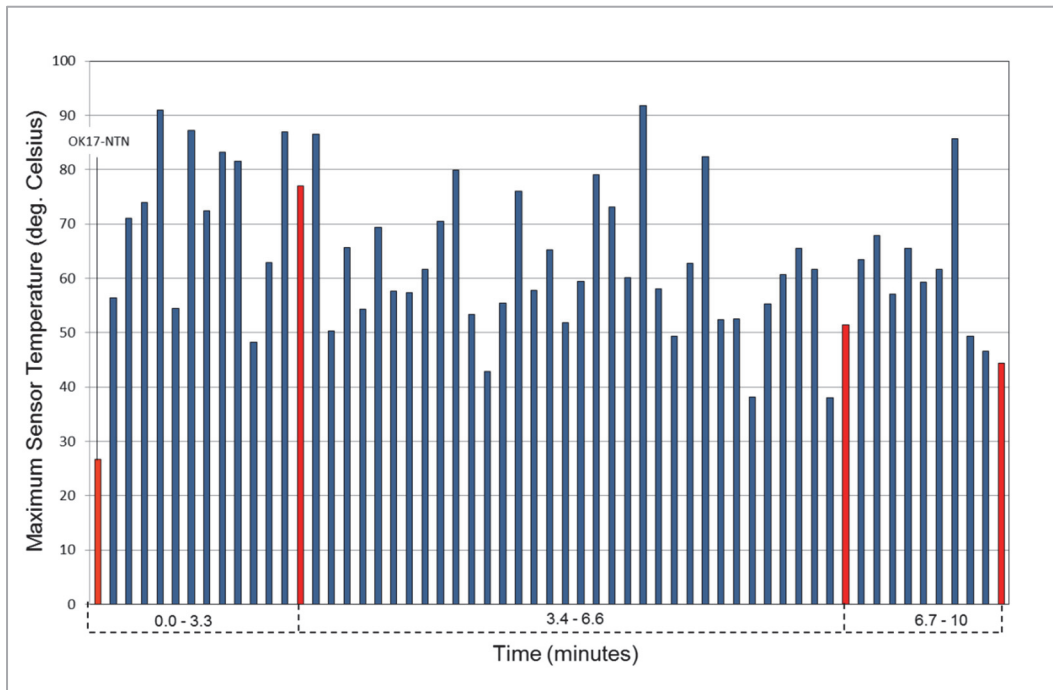


Figure 4-3 presents the maximum temperature reached by each sensor when activated, and the time required for each sensor to reach that temperature. There is some variability between sensors for maximum temperature, but most sensors are between 50°C and 70°C within 10 minutes of activation. A few sensors 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 sensor at OK17-NTN was found to be not functioning properly and was replaced during the site survey.

Figure 5. Activated ACM Sensor Temperature Increase and Elapsed Time



* Red lines in the graph indicate the 10 minutes divided into thirds to make it stand out that most of the sensors reach the maximum temperature between 3.4 and 6.6 minutes.

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	2	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	18	5.1 – 6.0 min	10

Temperature Range	Number of Sensors	Time to Maximum Temperature	Number of Sensors
60.1° to 70.0 °C	14	6.1 – 7.0 min	8
70.1° to 80.0 °C	9	7.1 – 8.0 min	2
80.1° to 90.0 °C	7	8.1 – 9.0 min	5
> 90.1° C	2	> 9.1 min	3

Sensor test data indicate that the ACM heated grid sensors in the network are functioning as expected throughout the network. Based on the evaluations performed on the sensors during the site 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. For this evaluation, one sensor responded after only two passes (VA99-NTN). Other sensor evaluations include inspection of the sensor housing to ensure there are no cracks that would allow moisture to enter the sensor. None of the sensors inspected during 2017 exhibited any cracks.

4.4 N-CON Motor/Lid-Arm Set Screws

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. During 2017, 48 N-CON collectors were surveyed, out of the 48 collectors, 30 required the set screws and lid arms bolts to be adjusted and tightened.

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.

5.0 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. 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.

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

Six 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 handling 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
AL10	Ohaus 1119D	-0.05%	AL99	Ohaus 1119D	-0.07%
AR02	DNVR Ins DI-12K	-0.05%	AR03	Ohaus 1119D	-0.05%
AR16	Ohaus Valor 2000W	0.12%	AR27	HRB6001 with a 6 kg	-0.03%
AZ06	Ohaus 1119D	0.00%	AZ97	Sartorius AG Gottingen	0.36%
AZ98	Adam model CBK35A	0.06%	AZ99	CJ400 digital scale	-0.04%
CA28	OHAUS EC-15	-0.03%	CAN5	Ohaus Explorer	-0.04%
CO10	Ohaus 1119D	-0.05%	CO15	Ohaus 1119D	-0.11%
CO19	Ohaus 1119D	-0.01%	CO97	Ohaus 1119D	-0.03%
CT15	Ohaus 1119D	-0.13%	GA41	Mettler PM34	-0.93%
IA08	Ohaus 1119D	-0.02%	KS07	Ohaus 1119D	-0.02%

Site Id	Scale Type	Average % Difference
KS31	Ohaus 1119D	-0.02%
MD99	Ohaus SP4001	0.08%
ME94	Ohaus 1119D	-0.05%
MN08	And EK-12KA	-0.07%
MN18	And EK-12KA	-0.06%
MS10	Ohaus 1119D	-0.06%
MS30	Ohaus 1119D	-0.01%
NC03	Ohaus 1119D	-0.03%
NC41	Ohaus 1119D	-0.14%
ND08	Ohaus 1119D	0.09%
NH02	Mettler SG8001	-0.02%
NM08	Ohaus 1119D	-0.06%
NY08	Toledo Model 4021	-0.03%
NY52	Ohaus 1119D	-0.02%
NY68	Ohaus 1119D	-0.06%
NY99	Ohaus 1119D	-0.07%
OH49	Ohaus 1119D	-0.09%
OK00	Ohaus 1119D	-0.01%
OK29	Electronic scale	-0.11%
PA18	Sartorius 1264 MP	-0.08%
SD99	Ohaus 1119D	-0.03%
TX03	Acculab in Kg only	0.35%
TX10	Ohaus 1119D	-0.08%
TX21	Ohaus 1119D	-0.11%
TX56	Ohaus 1119D	0.30%
VA13	Ohaus 1119D	-0.01%
VA28	Sartorius EA15DCE	0.08%
VT01	Ohaus 1119D	-0.07%
WA98	Sartorius	0.00%
WI37	Ohaus 1119D	-0.08%
WV99	Unknown	0.02%

Site Id	Scale Type	Average % Difference
LA30	Ohaus 1119D	-0.05%
ME00	Ohaus 1119D	-0.08%
ME98	Ohaus 1119D	-0.08%
MN16	Ohaus Model Explorer Pro	-0.03%
MN99	And EK-12KA	0.09%
MS19	Ohaus 1119D	-0.01%
MT97	Ohaus 1119D	-0.01%
NC34	Ohaus 1119D	-0.02%
NC45	Ohaus 1119D	-0.06%
ND11	Ohaus 1119D	0.15%
NM07	Ohaus CQ25R33	-0.02%
NY01	Ohaus /20-45kg to. 1g	-0.03%
NY20	Ohaus 1119D	0.03%
NY67	Ohaus 1119D	-0.13%
NY98	Sartorius U6100	-0.06%
OH09	Ohaus 1119D	-0.01%
OH54	Ohaus 1119D	-0.07%
OK17	Ohaus 1119D	-0.16%
PA15	Ohaus 1119D	-0.03%
PA90	Sartorius 1264 MP	-0.08%
TX02	Ohaus 1119D	-0.04%
TX04	Ohaus 1119D	-0.01%
TX16	Ohaus 1119D	-0.03%
TX43	Ohaus AV2101 and AV4101	0.10%
VA00	Ohaus 1119D	-0.07%
VA24	USEPA 01614	-0.01%
VA99	Sartorius EA15DCE	-0.02%
VT99	Ohaus 1119D	-0.01%
WI35	Ohaus 1119D	-0.07%
WV04	Ohaus 1119D	-0.08%
WY99	Ohaus 1119D	-0.10%

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 NADP 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	Survey Date	Parameter	Target Value	Response	Difference
PA15	8/18/2017	pH	4.79	4.75	0.04
		Conductivity	10.1	12.0	-1.9
WV99	8/27/2017	pH	4.79	4.6	0.19
		Conductivity	10.1	12.7	-2.6
NY67	10/10/2017	pH	4.79	4.81	-0.02
		Conductivity	10.1	10.4	-0.3

The discrepancies shown in the conductivity measurements between the target value and the measurement performed by the site operator are larger than expected for the first two AIRMoN sites visited (PA15 and WV99). Following the conductivity audit at WV99 the simulated rain sample was returned to the CAL to be reanalyzed where it was confirmed that the original value of the standard (target value) was inaccurate. The CAL QA staff indicated that it may have been due to contamination during the bottle cleaning procedure for the simulated rain standard sample.

A replacement simulated rain standard was sent to the survey team and used at NY67 with no discrepancies observed. Since the standard was in question during the first two audits it is likely that the field procedures and measurements were acceptable.

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 2017.

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.

In October of 2017 the EEMS QA Manager performed an internal audit and observation of an AIRMoN and NTN site survey at NY67 and NY08. Reports of those two internal audits were sent to the EPA Project Manager and NADP QA Manager. Findings and suggestions for improvements to EEMS procedures identified by the EEMS QA Manager were provided to the EEMS management team to be addressed with the survey staff and incorporated into the EEMS site survey SOP if necessary.

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. 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.

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 36,572 entries that are compared (does not include memo fields), the entry error rate is about 0.6% with approximately three times as many errors found in the field entry than in the office entry.

Table 7-1. 2017 Internal QA Results for Duplicate Entry Errors

	Field Entry	Duplicate QA Entry	Total Entries
Total Number of Entries Compared	18,286	18,286	36,572
Initial File Entry Errors	108		
Duplicate QA Entry Errors		35	
Percent Errors	0.59%	0.19%	
Total Entry Errors	143		
Total Percent Errors	0.39%		

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

Field Entry	NTN	MDN	AIRMON
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

StationId	CO97	MD99	ME98	MN16	MN18	NY20	NY68	TX21	VA28
Is sampling media quality maintained?									
Is the orifice of the collector +/- .3 m of raingage (elevation)									
No oobjects > 1 m height inside 5 m radius (raingage)	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		
Collector and sensor oriented properly				X					
45 degree rule met (collector)			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								
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								
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									
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									
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				U to T					
Has flush wall filter mount been installed									X
Filter in good condition									--
Max / min thermometer in acceptable limits									
ACM sensor operates properly									
Waterways meet NADP siting criteria									
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"

Table B-2. Findings Most Likely to Impact Data Quality – MDN Sites with N-CON Collectors

StationId	KS03	KS05	KS24	ME00	NC08	NF19	NS01	OK01	OK04	OK06	OK31	OK99	ON07	SD18
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
No fences > 1 m height inside 2 m radius (raingage)					X				X	X	X			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	X		X
Collector and sensor oriented properly											X			
45 degree rule met (collector)					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
No fences > 1 m height inside 5 m radius (collector)					X				X	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		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						
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)											--			
N-CON fan in good condition														
N-CON cooling fan thermostat in good condition		X												
N-CON heater in good condition							X							
N-CON heater thermostat in good condition														
N-CON max / min thermometer in acceptable limits				U to T										
N-CON sensor responds to five passes													--	
N-CON lid seal in good condition				X		X								
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			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-3. Findings Most Likely to Impact Data Quality – NTN Sites with ACM-type Collectors (page 1 of 4)

StationId	AL10	AL99	AZ06	AZ97	AZ98	CA28	CO10	CO15	CO19	CO97	CT15	GA41
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			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
Collector and sensor oriented properly							X					
45 degree rule met (collector)											X	
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				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											
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										
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												
Dry side bucket is clean												X
Does lid seal properly	X											
Lid liner in good condition	X						X					
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)												
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 2 of 4)

StationId	KS31	LA30	MD99	ME00	ME94	ME98	MN08	MN16	MS19	MS30	MT97	NC03
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)												
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
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	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											
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					
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)												
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
Does lid seal properly												
Lid liner in good condition										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)									--			
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-3. Findings Most Likely to Impact Data Quality – NTN Sites with ACM-type Collectors (page 3 of 4)

StationId	NC34	NC41	NC45	NH02	NM07	NY08	NY20	NY52	OH54	OK17	OK29	PA15
Is sampling media quality maintained?											X	
Is the orifice of the collector +/- .3 m of raingage (elevation)												
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			
Does NADP require a raingage wind shield at this site?	X	X	X		X	X			X	X		X
Collector and sensor oriented properly												
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			
No fences > 1 m height inside 5 m radius (collector)						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 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												
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				X			X	
Does lid seal properly												
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)	--	--	--	--	--			--	--	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)	--	--				--	--			--	--	
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 4 of 4)

StationId	TX04	TX10	TX16	TX21	TX43	VA13	VA24	VA28	WA98	WI35	WY99
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				
No fences > 1 m height inside 2 m radius (raingage)											
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	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
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						
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					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											
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		--									
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)				--							
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	AR02	AR03	AR27	AZ99	CAN5	IA08	KS07	MN18	MN99	MS10	ND08
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				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	
Collector and sensor oriented properly											
45 degree rule met (collector)		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		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		
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)											
Parking lots and maintenance areas meet NADP siting criteria			X								
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria											X
N-CON sensor responds to five passes			--								
N-CON lid seal in good condition											
N-CON lid liner in good condition		X						X			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)	--	--	--	--		--	--			--	--
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	ND11	NM08	NY01	NY68	NY98	NY99	OH09	OH49	OK00	PA18	PA90
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
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
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	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						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											
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											
N-CON sensor responds to five passes											
N-CON lid seal in good condition											
N-CON lid liner in good condition											
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"

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

StationId	SD99	TX02	TX03	TX10	TX56	VA00	VA99	VT01	VT99	WI37	WV04
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			
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	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
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 pastures and ag. activity within 20 m radius					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											
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		X									
N-CON sensor responds to five passes											
N-CON lid seal in good condition		X									
N-CON lid liner in good condition		X		X							
Raingage operates properly (electronic gage)											
Does datalogger receive event signals from 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-5. Findings Most Likely to Impact Data Quality – AIRMoN

StationId	NY67	PA15	WV99
Is sampling media quality maintained?			
Are samples stored and shipped properly?			
Is the orifice of the collector +/- .3 m of raingage (elevation)	X		
No oobjects > 1 m height inside 5 m radius (raingage)			
No fences > 1 m height inside 2 m radius (raingage)			X
No vegetation height > 0.6 m within 5 m radius (raingage)			
Does NADP require a raingage wind shield at this site?			
Collector and sensor oriented properly	X		
45 degree rule met (collector)	X		X
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 pastures and ag. activity within 20 m radius			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			
Animal operations meet NADP site cirteria (NTN and AIRMoN)			
Parking lots and maintenance areas 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 (page 1 of 5)

StationId	CO97				KS03			KS05			KS24			MD99				
	Year	2008	2011	2014	2017	2010	2014	2017	2010	2014	2017	2010	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?													X					
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					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			
Collector and sensor oriented properly																		
45 degree rule met (collector)		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		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)								X	X					X	X	X		
No treated lumber inside 5 m radius (collector)								X						X	X	X	X	
No galvanized metal inside 5 m radius collector (MDN)		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																		
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 (page 2 of 5)

StationId	ME00				ME98				MN16				MN18				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
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										
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												X	X				
45 degree rule met (collector)						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	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				
No treated lumber inside 5 m radius (collector)		X	X	X	X												
No galvanized metal inside 5 m radius collector (MDN)		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																	
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 (page 3 of 5)

StationId	NC08				NF19		NS01				NY20				NY68			
	Year	2008	2011	2014	2017	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2014	2017
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			
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															
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					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					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									
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																		
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 (page 4 of 5)

StationId	OK01			OK04			OK06			OK31			OK99				
	Year	2011	2013	2017	2010	2013	2017	2010	2013	2017	2010	2013	2017	2008	2011	2014	2017
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			
No fences > 1 m height inside 2 m radius (raingage)	X	X			X	X	X	X	X	X	X	X	X	X	X	X	
No vegetation height > 0.6 m within 5 m radius (raingage)	X										X						
Collector and sensor oriented properly												X					
45 degree rule met (collector)																X	
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			X			X			
No fences > 1 m height inside 5 m radius (collector)	X	X			X		X	X	X	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)														U to T	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									X	X	X	X	X	--	X	X	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																	
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 (page 5 of 5)

StationId	ON07				SD18				TX21				VA28				VT99				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2009	2011	2014	2017	2008	2011	2014	2017
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	X	X	X												
No vegetation height > 0.6 m within 5 m radius (raingage)																					X
Collector and sensor oriented properly																					
45 degree rule met (collector)																					
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	X	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 galvanized metal inside 5 m radius collector (MDN)	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																					
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-2. NADP – NTN – Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (page 1 of 18)

StationId	AL10				AL99				AR02			AR03			AR16				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2010	2014	2017	2011	2014	2017	2008	2010	2014	2017
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	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					
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	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																
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)		--	--	--		--	--	--		--	--	--	--	--	--		--	--	--
No pastures and ag. activity within 20 m radius	X	X	X	X															
No herbicides and fertilizers used within 20 m radius				X					X										
Roads meet NADP siting criteria							X	X											
Waterways meet NADP siting criteria																			
Airports meet NADP siting criteria																			
Animal operations meet NADP site cirteria (NTN and AIRMoN)	X																		
Parking lots and maintenance areas meet NADP siting criteria							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 (page 2 of 18)

StationId	AR27				AZ06			AZ97				AZ98				AZ99			
Year	2008	2011	2014	2017	2008	2011	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
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															
No vegetation height > 0.6 m within 5 m radius (raingage)							X											X	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	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	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			
No galvanized metal inside 5 m radius collector (MDN)	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--		--	--
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 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																			



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 (page 3 of 18)

StationId	CA28			CAN5				CO10				CO15				CO19				
Year	2011	2013	2017	2008	2011	2014	2017	2008	2011	2014	2017	2009	2012	2014	2017	2009	2012	2014	2017	
Is sampling media quality maintained?																				
Is the orifice of the collector +/- .3 m of raingage (elevation)	X	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									
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					
Collector and sensor oriented properly								X	X	X	X									
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	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 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																				
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																				



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 (page 4 of 18)

StationId	CO97				CT15				GA41				IA08				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2009	2012	2014	2017
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	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								
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
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	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							
No galvanized metal inside 5 m radius collector (MDN)	--	--	--	--			--	--	--	--	--	--		--	--	--	--
No pastures and ag. activity within 20 m radius					X	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 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																	



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 (page 5 of 18)

StationId	KS07				KS31				LA30			MD99				
	Year	2008	2010	2014	2017	2008	2010	2014	2017	2011	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?																
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	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			
Collector and sensor oriented properly			X													
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				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	X	X	X	
No galvanized metal inside 5 m radius collector (MDN)			--	--	--		--	--	--	--	--	--	--	--	--	--
No pastures and ag. activity within 20 m radius										X		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 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																



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 (page 6 of 18)

StationId	ME00				ME94		ME98				MN08				MN16			
Year	2008	2011	2014	2017	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?																		
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	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				
Collector and sensor oriented properly					X	X					X	X	X	X		X	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
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
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	X	X							X	X				
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																		
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																		



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 (page 7 of 18)

StationId	MN18				MN99				MS10				MS19				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
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							
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
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
No treated lumber inside 5 m radius (collector)							X	X									
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																	
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																	



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 (page 8 of 18)

StationId	MS30				MT97				NC03				NC34				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2009	2012	2014	2017	2008	2012	2014	2017
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												
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)	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
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)																	
No treated lumber inside 5 m radius (collector)					X	X											
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																	
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																	



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 (page 9 of 18)

StationId	NC41				NC45				ND08				ND11				
	Year	2009	2012	2014	2017	2009	2012	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?																	
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			X	
No fences > 1 m height inside 2 m radius (raingage)																	
No vegetation height > 0.6 m within 5 m radius (raingage)						X								X			
Collector and sensor oriented properly												X					
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			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)																	
No galvanized metal inside 5 m radius collector (MDN)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No pastures and ag. activity within 20 m radius		X	X											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 cirteria (NTN and AIRMoN)																	
Parking lots and maintenance areas meet NADP siting criteria																	
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												X	X				



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 (page 10 of 18)

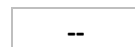
StationId	NH02				NM07				NM08				NY01			
Year	2011	2014	2017	2008	2008	2010	2014	2017	2008	2010	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?																
Is the orifice of the collector +/- .3 m of raingage (elevation)																
30 degree rule for buildings met (raingage)																
No objects > 1 m height inside 5 m radius (raingage)									X	X						
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				
Collector and sensor oriented properly																
45 degree rule met (collector)			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						
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)																
No treated lumber inside 5 m radius (collector)		X		X							X	X				
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																
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																



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 (page 11 of 18)

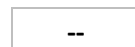
StationId	NY08				NY20				NY52				NY68				
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?											X						
Is the orifice of the collector +/- .3 m of raingage (elevation)																	
30 degree rule for buildings met (raingage)																	
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	X	X					X	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				
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	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	X	X	X	X	X				
No galvanized metal inside 5 m radius collector (MDN)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No pastures and ag. activity within 20 m radius		X	X	X	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 cirteria (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 (page 12 of 18)

StationId	NY98				NY99				OH09			OH49				OH54			
	Year	2008	2011	2014	2017	2009	2011	2014	2017	2011	2014	2017	2008	2011	2014	2017	2011	2014	2017
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	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	
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				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	
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					X	X	X	
No treated lumber inside 5 m radius (collector)			X	X											X	X			
No galvanized metal inside 5 m radius collector (MDN)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
No pastures and ag. activity within 20 m radius															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																			
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																			



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 (page 13 of 18)

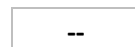
StationId	OK00				OK17				OK29				PA15			
	Year	2008	2010	2013	2017	2008	2010	2013	2017	2008	2010	2013	2017	2008	2011	2014
Is sampling media quality maintained?							X					X				
Is the orifice of the collector +/- .3 m of raingage (elevation)																
30 degree rule for buildings met (raingage)																
No objects > 1 m height inside 5 m radius (raingage)	X															
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								
30 degree rule for buildings met (collector)						X										
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)			X	X			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							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																
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																



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 (page 14 of 18)

StationId	PA18					PA90		SD99				TX02				TX03				
	Year	2008	2010	2013	2014	2017	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
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	
No fences > 1 m height inside 2 m radius (raingage)																				
No vegetation height > 0.6 m within 5 m radius (raingage)							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		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)																				
No vegetation height > 0.6 m within 5 m radius (collector)							X	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																				
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															X	X				

- Indicates found compliant
- X 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 (page 15 of 18)

StationId	TX04				TX10				TX16				TX21				TX43			
	Year	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2011	2014	2017
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
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		
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)						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		
No treated lumber inside 5 m radius (collector)						X	X													
No galvanized metal inside 5 m radius collector (MDN)	--	--	--	--	--			--	--	--		--	--	--		--	--	--	--	--
No pastures and ag. activity within 20 m radius																		X	X	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)																				
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 (page 16 of 18)

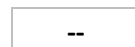
StationId	TX56				VA00				VA13				VA24				
	Year	2008	2011	2014	2017	2009	2011	2014	2017	2009	2011	2014	2017	2009	2011	2014	2017
Is sampling media quality maintained?																	
Is the orifice of the collector +/- .3 m of raingage (elevation)																	
30 degree rule for buildings met (raingage)																	
No objects > 1 m height inside 5 m radius (raingage)	X	X		X									X		X	X	
No fences > 1 m height inside 2 m radius (raingage)																	
No vegetation height > 0.6 m within 5 m radius (raingage)		X															
Collector and sensor oriented properly													X	X			
45 degree rule met (collector)									X			X	X	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					
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			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																	
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																	



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 (page 17 of 18)

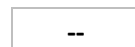
StationId	VA28				VA99				VT01				VT99				
	Year	2009	2011	2014	2017	2009	2011	2014	2017	2008	2011	2014	2017	2011	2014	2017	2008
Is sampling media quality maintained?																	
Is the orifice of the collector +/- .3 m of raingage (elevation)																	
30 degree rule for buildings met (raingage)																	
No objects > 1 m height inside 5 m radius (raingage)										X	X	X	X		X	X	
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				
Collector and sensor oriented properly													X				
45 degree rule met (collector)													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				
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	X	X				
No treated lumber inside 5 m radius (collector)						X	X	X	X					X	X	X	X
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										X							
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								X									



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 (page 18 of 18)

StationId	WA98				WI35				WI37				WV04				WY99				
	Year	2008	2011	2013	2017	2008	2011	2014	2017	2008	2011	2014	2017	2009	2012	2014	2017	2008	2011	2014	2017
Is sampling media quality maintained?	X																				
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	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	
Collector and sensor oriented properly	X		X	X																	
45 degree rule met (collector)					X	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
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	
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																					
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																					



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 (page 1 of 5)

StationId	CO97				KS03			KS05			KS24			MD99			
	2008	2011	2014	2017	2010	2014	2017	2010	2014	2017	2010	2014	2017	2008	2011	2014	2017
Dry side bucket is clean					--	--	--	--	--	--	--	--	--				
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?					--	--	--	--	--	--	--	--	--				
Filter in good condition					--	--	--	--	--	--	--	--	--	U to T	U to T	U to T	
Max / min thermometer in acceptable limits					--	--	--	--	--	--	--	--	--				
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	--	--	--	--						X				--	--	--	--
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	X		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															
Was the 'as found' turn over set properly (Belfort gage)?		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



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 (page 2 of 5)

StationId	ME00				ME98				MN16				MN18				NC08			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
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							--	--
Heater thermostat in good condition	--	--	--	--								U to T							--	--
Has flush wall filter mount been installed?	--	--	--	--							X								--	--
Filter in good condition	--	--	--	--							--								--	--
Max / min thermometer in acceptable limits	--	--	--	--															--	--
ACM sensor operates properly	--	--	--	--															--	--
Motorbox operates within acceptable limits	--	--	--	--															--	--
N-CON lid seal in good condition		U to T		X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition		U to T		X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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				U to T	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	U to T				--				--				--	--	U to T	
Does optical sensor respond to mist of water (electronic gage)	U to T	X	X	X	U to T				--				--				--	--	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		--	--

- 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 (page 3 of 5)

StationId	NF19		NS01				NY20				NY68				OK01		
	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2011	2013	2017
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	--	--		--	--	--									--	--	--
Heater thermostat in good condition	--	--		--	--	--									--	--	--
Has flush wall filter mount been installed?	--	--		--	--	--									--	--	--
Filter in good condition	--	--		--	--	--									--	--	--
Max / min thermometer in acceptable limits	--	--		--	--	--					X				--	--	--
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 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			--				--	--	--	--	--	--	--	--	X	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)		X	--		X		--	--	--	--	--	--	--	--			
Does optical sensor respond to mist of water (electronic gage)		X	--		X		--	--	--	--	--	--	--	--			
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 (page 4 of 5)

StationId	OK04			OK06			OK31			OK99				ON07			
	2010	2013	2017	2010	2013	2017	2010	2013	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	--	--	--	--	--	--	--	--	--		--	--	--		--	--	
Does lid seal properly?	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--
Lid liner in good condition	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--
Fan in good condition	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--
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	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--
Max / min thermometer in acceptable limits	--	--	--	--	--	--	--	--	--		--	--	--		--	--	--
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	X									--				--			
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)					X					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	--	--	--



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 (page 5 of 5)

StationId	SD18				TX21				VA28				VT99			
	2008	2011	2014	2017	2008	2011	2014	2017	2009	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	--	--	--		--											--
Does lid seal properly?	--	--	--	--			X							X		--
Lid liner in good condition	--	--	--	--												--
Fan in good condition	--	--	--	--												--
Cooling fan thermostat in good condition	--	--	--	--												--
Heater in good condition	--	--	--	--												--
Heater thermostat in good condition	--	--	--	--												--
Has flush wall filter mount been installed?	--	--	--	--					X			X			X	--
Filter in good condition	--	--	--	--					--	U to T	U to T	--			--	--
Max / min thermometer in acceptable limits	--	--	--	--									X			--
ACM sensor operates properly	U to T	--	--	--												--
Motorbox operates within acceptable limits	U to T	--	--	--									X	X		--
N-CON lid seal in good condition					--	--	--	--	--	--	--	--	--	--	--	
N-CON lid liner in good condition	U to T				--	--	--	--	--	--	--	--	--	--	--	
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				--	--	--	--					--			X
Does optical sensor respond to mist of water (electronic gage)					--	--	--	--					--			X
Does datalogger receive event signals from all collectors (electronic gage)	U to T				--	--	--	--					--			X
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 (page 1 of 10)

StationId	AL10				AL99				AR02			AR03			AR16			
	2008	2011	2014	2017	2008	2011	2014	2017	2010	2014	2017	2011	2014	2017	2008	2010	2014	2017
Dry side bucket is clean										--	--	X	--	--			X	X
Does lid seal properly				X						--	--		--	--				
Lid liner in good condition				X						--	--		--	--				
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
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			X
Does datalogger receive event signals form all collectors (electronic gage)	--	--			--	--			--			--			--			
Was the 'as found' turn over set properly (Belfort gage)		X	--	--			--	--	X	--	--	X	--	--		--	--	--

StationId	AR27				AZ06			AZ97				AZ98			
	2008	2011	2014	2017	2008	2011	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	X		--	--	X	X			X						
Does lid seal properly			--	--				X							
Lid liner in good condition			--	--	--					X		--			
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	--	--			--	--	--	--	--	--	--	--	--	--	--
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)	--	--	--	--	--			--	U to T	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)	--	--			--			--				--			
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-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (page 2 of 10)

StationId	AZ99				CA28			CAN5				CO10			
	2008	2011	2014	2017	2011	2013	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean			--	--					--	--					
Does lid seal properly			--	--				X	--	--	--				
Lid liner in good condition	--		--	--					--	--	--				X
ACM sensor operates properly	X	X	--	--	X				--	--	--				
Motorbox operates within acceptable limits		X	--	--					--	--	--				
N-CON lid seal in good condition	--	--	X		--	--	--	--		X		--	--	--	--
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)	--	--	--	--				--				--	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	
Was the 'as found' turn over set properly (Belfort gage)	X		--	--	--	--	--	X	--	--	--	--	--	--	--

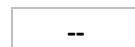
StationId	CO15				CO19				CO97				CT15			
	2009	2012	2014	2017	2009	2012	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean																
Does lid seal properly													U to T			
Lid liner in good condition																
ACM sensor operates properly													U to T			
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)	--								--				--			
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			--			
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-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (page 3 of 10)

StationId	GA41				IA08				KS07				KS31			
	2008	2011	2014	2017	2009	2012	2014	2017	2008	2010	2014	2017	2008	2010	2014	2017
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	--	--	--	--	--				--	--			--	--	--	--
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		
Was the 'as found' turn over set properly (Belfort gage)	X		--	--	X	--	--	--	X	X	--	--	X	--	--	--

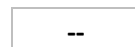
StationId	LA30			MD99			ME00				ME94		ME98				
	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	X	X	X	X				X									
Does lid seal properly																	
Lid liner in good condition																	
ACM sensor operates properly	X																
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)	--	--	--								X	X		U to T			
Does optical sensor respond to mist of water (electronic gage)	--	--	--					U to T	X	X	X	X		U to T			
Does datalogger receive event signals form all collectors (electronic gage)																	
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



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 (page 4 of 10)

StationId	MN08				MN16				MN18				MN99			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean												--				
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)	--	--	--		--				--				--	--	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)	--	--	--		--				--				--	--		
Was the 'as found' turn over set properly (Belfort gage)	X	X	X	--	X	--	--	--	X	--	--	--	X		--	--

StationId	MS10				MS19				MS30				MT97			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	X	X	--	--	X							--				
Does lid seal properly			--	--												
Lid liner in good condition			--	--								X				
ACM sensor operates properly			--	--		X								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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	X	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 (page 5 of 10)

StationId	NC03				NC34				NC41				NC45			
	2009	2012	2014	2017	2008	2012	2014	2017	2009	2012	2014	2017	2009	2012	2014	2017
Dry side bucket is clean	X			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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--			--	--		--	--	--

StationId	ND08				ND11				NH02				NM07			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2010	2014	2017
Dry side bucket is clean			--	--			--	--				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	--	--			--	--	X		--	--	--	--	--	--	--	--
N-CON lid liner in good condition	--	--		X	--	--	U to T		--	--	--	--	--	--	--	--
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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--



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 (page 6 of 10)

StationId	NM08				NY01				NY08				NY20			
	2008	2010	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	X		--	--		--	--	--	X							
Does lid seal properly			--	--		--	--	--								
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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--	X	--	--	--	X	X			X		X	

StationId	NY52				NY68				NY98				NY99			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2009	2011	2014	2017
Dry side bucket is clean				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	--	--	--	--	--	--			--				--	--		
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		--	--	--	--	--	--	--	--	--	--	--	--
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			



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 (page 7 of 10)

StationId	OH09			OH49				OH54			OK00				OK17			
	2011	2014	2017	2008	2011	2014	2017	2011	2014	2017	2008	2010	2013	2017	2008	2010	2013	2017
Dry side bucket is clean		--	--			--	--						--	--		X	X	
Does lid seal properly		--	--			--	--						--	--				
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)	--	--	--	--	--	--	--		X		--	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--		X		--	--	--	--	--	--	--	--
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

StationId	OK29				PA15				PA18					PA90		SD99			
	2008	2010	2013	2017	2008	2011	2014	2017	2008	2010	2013	2014	2017	2014	2017	2008	2011	2014	2017
Dry side bucket is clean			X	X	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)	--	--	--	--	--	--	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)	--	--			--	--			--	--						--	--		
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 (page 8 of 10)

StationId	TX02				TX03				TX04				TX10			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean	X	X	--	--		X	--	--			X	X		X	--	--
Does lid seal properly			--	--			--	--							--	--
Lid liner in good condition			--	--		X	--	--	--		X				--	--
ACM sensor operates properly		X	--	--			--	--					X		--	--
Motorbox operates within acceptable limits		X	--	--			--	--					X		--	--
N-CON lid seal in good condition	--	--		U to T	--	--	X		--	--	--	--	--	--		
N-CON lid liner in good condition	--	--		U to T	--	--			--	--	--	--	--	--		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)	--	--			--	--			--	--			--	--	U to T	
Was the 'as found' turn over set properly (Belfort gage)	X	X	--	--	X	X	--	--		--	--	--	X	X	--	--

StationId	TX16				TX21				TX43			TX56			
	2008	2011	2014	2017	2008	2011	2014	2017	2011	2014	2017	2008	2011	2014	2017
Dry side bucket is clean										X	X			--	--
Does lid seal properly										X				--	--
Lid liner in good condition	--									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 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	U to T	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--	--		X	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	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 (page 9 of 10)

StationId	VA00				VA13				VA24				VA28			
	2009	2011	2014	2017	2009	2011	2014	2017	2009	2011	2014	2017	2009	2011	2014	2017
Dry side bucket is clean		--	--	--												
Does lid seal properly		--	--	--												
Lid liner in good condition		--	--	--												
ACM sensor operates properly		--	--	--		X							U to T			
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)		--	--	--		--	--	--	--	--	--	--	--	--	--	--

StationId	VA99				VT01				VT99				WA98			
	2009	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2013	2017
Dry side bucket is clean				--		--	--	--		--	--	--	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		--	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)	--				--	--	--	--	--			X	--		U to T	
Does optical sensor respond to mist of water (electronic gage)	--				--	--	--	--	--			X	--		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	--	--	--



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 (page 10 of 10)

StationId	WI35				WI37				WV04				WY99			
	2008	2011	2014	2017	2008	2011	2014	2017	2009	2012	2014	2017	2008	2011	2014	2017
Dry side bucket is clean										--	--	--				
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	--	--	--	--	--	--	--				X		--	--	--	--
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			--		--	--	--	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	NY67				PA15				WV99			
	2008	2011	2014	2017	2008	2011	2014	2017	2008	2011	2014	2017
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)												
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								
Collector and sensor oriented properly	X	X	X	X					X	X	X	X
45 degree rule met (collector)												
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)												
No fences > 1 m height inside 5 m radius (collector)												
No vegetation height > 0.6 m within 5 m radius (collector)		X	X	X								
No treated lumber inside 5 m radius (collector)	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												
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		X			X
Does lid seal properly												
Lid liner in good condition												
ACM sensor operates properly										X		
Motorbox operates within acceptable limits												
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)	--	--			--	--			--	--		



Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

APPENDIX D

List of Site Operating and Sponsoring Agencies

Site ID	Network	Operating Agency	Sponsoring Agency
AL10	NTN	Auburn University-State Agricultural Experiment Station U.S. Geological Survey	U.S. Geological Survey
AL99	NTN	Auburn University-State Agricultural Experiment Station U.S. Geological Survey	U.S. Environmental Protection Agency - Clean Air Markets
AR02	NTN	U.S. Geological Survey University of Arkansas	U.S. Geological Survey
AR03	NTN	U.S. Geological Survey	U.S. Geological Survey
AR16	NTN	Buffalo National River NPS-Air Resources Division	NPS-Air Resources Division
AR27	NTN	University of Arkansas	U.S. Geological Survey
AZ06	NTN	Organ Pipe Cactus National Monument	NPS-Air Resources Division
AZ97	NTN	Petrified Forest National Park	NPS-Air Resources Division
AZ98	NTN	U.S. Environmental Protection Agency - Clean Air Markets	U.S. Environmental Protection Agency - Clean Air Markets
AZ99	NTN	U.S. Geological Survey	U.S. Geological Survey
CA28	NTN	Sierra Nevada Research Center	USFS - Pacific Southwest Research Station
CAN5	NTN	Meteorological Service of Canada	U.S. Geological Survey
CO10	NTN	U.S. Environmental Protection Agency - Clean Air Markets	U.S. Environmental Protection Agency - Clean Air Markets
CO15	NTN	U.S. Bureau of Land Management	U.S. Bureau of Land Management
CO19	NTN	Rocky Mountain National Park	NPS-Air Resources Division
CO97	MDN	Routt National Forest	U.S. Forest Service
CO97	NTN	Routt National Forest	U.S. Forest Service
CT15	NTN	U.S. Environmental Protection Agency - Clean Air Markets	U.S. Environmental Protection Agency - Clean Air Markets
GA41	NTN		University of Georgia-State Agricultural Experiment Station
IA08	NTN	U.S. Geological Survey	U.S. Geological Survey
KS03	MDN	Sac & Fox Tribe of Missouri	Kansas Department of Health and Environment
KS05	MDN		Kansas Department of Health and Environment
KS07	NTN	Kansas State Fish and Game	U.S. Geological Survey

Site ID	Network	Operating Agency	Sponsoring Agency
KS24	MDN	Kansas Department of Health and Environment	Kansas Department of Health and Environment
KS31	NTN	Kansas State University-State Agricultural Experiment Station	Kansas State University-State Agricultural Experiment Station
LA30	NTN	Louisiana State University-State Agricultural Experiment Station-Southeast Research Station U.S. Geological Survey	U.S. Geological Survey
MD99	MDN	University of Maryland - Chesapeake Biological Laboratory	Maryland Department of Natural Resources University of Maryland
MD99	NTN	University of Maryland-Department of Atmospheric & Oceanic Science	Maryland Department of Natural Resources
ME00	MDN	Maine Department of Environmental Protection	EPA/Maine Dept. of Environmental Protection
ME00	NTN	Maine Department of Environmental Protection	Maine Department of Environmental Protection U.S. Environmental Protection Agency
ME94	NTN	Indian Township Environmental Department	Passamaquoddy Tribe U.S. Environmental Protection Agency
ME98	MDN	Acadia National Park	Acadia National Park Maine Department of Environmental Protection U.S. Environmental Protection Agency
ME98	NTN	Acadia National Park	NPS-Air Resources Division
MN08	NTN	Minnesota Pollution Control Agency	Minnesota Pollution Control Agency
MN16	MDN	Marcell Experimental Forest	Minnesota Pollution Control Agency Northern Research Station
MN16	NTN	Marcell Experimental Forest	U.S. Forest Service
MN18	MDN	Superior National Forest	Minnesota Pollution Control Agency
MN18	NTN	U.S. Forest Service	U.S. Environmental Protection Agency - Clean Air Markets
MN99	NTN	Wolf Ridge Environmental Learning Center	Minnesota Pollution Control Agency
MS10	NTN	U.S. Geological Survey	U.S. Geological Survey
MS19	NTN	National Oceanic and Atmospheric Administration	National Oceanic and Atmospheric Administration - Air Resources Laboratory
MS30	NTN	U.S. Geological Survey	U.S. Forest Service
MT97	NTN	Bitterroot National Forest	U.S. Forest Service
NC03	NTN	North Carolina State University	North Carolina State University
NC08	MDN	North Carolina Department of Environment and Natural Resources, Division of Air Quality	North Carolina Department of Environment and Natural Resources, Division of Air Quality
NC34	NTN	North Carolina State University	North Carolina State University

Site ID	Network	Operating Agency	Sponsoring Agency
NC41	NTN	North Carolina State University	North Carolina State University
NC45	NTN	U.S. Environmental Protection Agency	North Carolina State University U.S. Environmental Protection Agency - Clean Air Markets
ND08	NTN	Icelandic State Park U.S. Geological Survey	U.S. Geological Survey
ND11	NTN	U.S. Geological Survey	U.S. Geological Survey
NF19	MDN	Environment Canada	Environment Canada
NH02	NTN	Northeastern Research Station	U.S. Forest Service
NM07	NTN	National Park Service	NPS-Air Resources Division
NM08	NTN	U.S. Forest Service	U.S. Geological Survey
NS01	MDN	Environment Canada	Environment Canada
NY01	NTN	Alfred University U.S. Geological Survey	U.S. Geological Survey
NY08	NTN	Cornell University-State Agricultural Experiment Station	Cornell University
NY20	MDN	New York State Energy Research & Development Authority State University of New York - College of Environmental Science and Forestry Syracuse University	New York State Energy Research & Development Authority U.S. Environmental Protection Agency
NY20	NTN	State University of New York - College of Environmental Science and Forestry	State University of New York - College of Environmental Science and Forestry
NY52	NTN	State University of New York - Oswego	U.S. Environmental Protection Agency - Clean Air Markets
NY67	AIRMoN	National Oceanic and Atmospheric Administration - Air Resources Laboratory	National Oceanic and Atmospheric Administration - Air Resources Laboratory
NY68	MDN	Frost Valley YMCA New York State Energy Research & Development Authority U.S. Geological Survey in New York	New York State Energy Research & Development Authority
NY68	NTN	U.S. Geological Survey	U.S. Geological Survey
NY98	NTN	State University of New York - Albany	U.S. Geological Survey
NY99	NTN	Black Rock Forest Consortium U.S. Geological Survey	U.S. Geological Survey
OH09	NTN	Miami University U.S. Geological Survey	U.S. Geological Survey
OH49	NTN	U.S. Geological Survey	U.S. Geological Survey
OH54	NTN	U.S. Environmental Protection Agency - Clean Air Markets	U.S. Environmental Protection Agency - Clean Air Markets
OK00	NTN	U.S. Fish and Wildlife Service U.S. Geological Survey	U.S. Geological Survey

Site ID	Network	Operating Agency	Sponsoring Agency
OK01	MDN	Oklahoma Department of Environmental Quality	Oklahoma Department of Environmental Quality
OK04	MDN	Oklahoma Department of Environmental Quality	Oklahoma Department of Environmental Quality
OK06	MDN	Oklahoma Department of Environmental Quality	Oklahoma Department of Environmental Quality
OK17	NTN	National Oceanic and Atmospheric Administration - National Severe Storms Laboratory	National Oceanic and Atmospheric Administration - National Severe Storms Laboratory
OK29	NTN	Panhandle Research Station U.S. Geological Survey	U.S. Geological Survey
OK31	MDN	Oklahoma Department of Environmental Quality	Oklahoma Department of Environmental Quality
OK99	MDN	Cherokee Nation	Cherokee Nation U.S. Environmental Protection Agency
ON07	MDN	Environment Canada	Environment Canada
PA15	AIRMoN	National Oceanic and Atmospheric Administration - Air Resources Laboratory	National Oceanic and Atmospheric Administration - Air Resources Laboratory
PA15	NTN	National Oceanic and Atmospheric Administration - Air Resources Laboratory Pennsylvania State University	National Oceanic and Atmospheric Administration - Air Resources Laboratory Pennsylvania Game Commission
PA18	NTN	Pennsylvania State University	U.S. Geological Survey
SD18	MDN	Cheyenne River Sioux Tribe Environmental Protection Department	Cheyenne River Sioux Tribe Environmental Protection Department U.S. Environmental Protection Agency
SD99	NTN	U.S. Geological Survey	U.S. Geological Survey
TX02	NTN	U.S. Fish and Wildlife Service U.S. Geological Survey	U.S. Geological Survey
TX03	NTN	Texas A & M University-State Agricultural Experiment Station	U.S. Geological Survey
TX04	NTN	Big Bend National Park	NPS-Air Resources Division
TX10	NTN	U.S. Fish and Wildlife Service U.S. Geological Survey	U.S. Geological Survey
TX16	NTN	Texas A & M University-State Agricultural Experiment Station	U.S. Geological Survey
TX43	NTN	Texas A & M University-State Agricultural Experiment Station	U.S. Environmental Protection Agency - Clean Air Markets
TX56	NTN	U.S. Geological Survey	U.S. Geological Survey
VA00	NTN	U.S. Geological Survey University of Virginia	U.S. Geological Survey
VA13	NTN	U.S. Environmental Protection Agency - Clean Air Markets Virginia Polytech Institute and State University-State Agricultural Experiment Station	U.S. Environmental Protection Agency - Clean Air Markets
VA24	NTN	U.S. Environmental Protection Agency - Clean Air Markets	U.S. Environmental Protection Agency - Clean Air Markets

Site ID	Network	Operating Agency	Sponsoring Agency
VA28	MDN	Shenandoah National Park	NPS-Air Resources Division
VA28	NTN	Shenandoah National Park	NPS-Air Resources Division
VA99	NTN	USFS - George Washington and Jefferson National Forest	USFS - Air Program
VT01	NTN	City of Bennington State of Vermont	U.S. Geological Survey
VT99	MDN	National Oceanic and Atmospheric Administration - Air Resources Laboratory University of Vermont - Rubinstein School of Environment & Natural Resources	National Oceanic and Atmospheric Administration - Air Resources Laboratory University of Vermont - Rubinstein School of Environment & Natural Resources
VT99	NTN	U.S. Geological Survey University of Vermont-State Agricultural Experiment Station	U.S. Geological Survey
WA98	NTN	USFS - Pacific Northwest Region	USFS - Pacific Northwest Region
WI35	NTN	U.S. Environmental Protection Agency - Clean Air Markets	U.S. Environmental Protection Agency - Clean Air Markets
WI37	NTN	University of Wisconsin-State Agricultural Experiment Station	U.S. Forest Service
WV04	NTN	U.S. Geological Survey	U.S. Geological Survey
WV99	AIRMoN	Canaan Valley Institute	National Oceanic and Atmospheric Administration - Air Resources Laboratory
WY99	NTN	U.S. Bureau of Land Management	U.S. Bureau of Land Management

APPENDIX E

Transfer Standard Instrument Certifications

Certificate of Calibration

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

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

Description: DIGITAL STIK THERMOMETER
Manufacturer: FLUKE
Model Number: 1551A EX
Serial Number: 2085085
Technician: STEVE TORRES
On-Site Calibration:
Comments: TUR is 2 to 1

Calibration Date: 01/23/2017
Calibration Due: 01/23/2018
Procedure: FLUKE 1551A EX,52A EX
Rev: 11/1/2010
Temperature: 72 F
Humidity: 41 % 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 17025:2005 and ANSI/NCSL Z540-1-1994. ISO/IEC17025:2005 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 Z540-1-1994 and TMI's Quality Manual, QM-1.

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

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

FRB
FRANK BAHMANN, BRANCH MANAGER

Scott Chamberlain
Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
899976	FLUKE	5618B-12	12/6/2016	2/21/2018
A06118	HART SCIENTIFIC	9103	5/8/2016	10/25/2017
A11967	HART SCIENTIFIC	9140	6/27/2016	6/27/2018
A88072	FLUKE/HART	1502A	1/17/2017	4/15/2017



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

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

www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate of CalibrationData 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	-25.03	-25.03	°C	
Temperature Accuracy	0.00	-0.05	0.05	0.00	0.00	°C	
Temperature Accuracy	100.00	99.95	100.05	100.03	100.03	°C	
Temperature Accuracy	150.00	149.95	150.05	150.04	150.04	°C	

EEMS # 01226

$$m = 1.0003664$$

$$b = -0.010611$$

$$r^2 = 1.00000$$



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

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

www.tmiclibration.com

ANSI/NCSL Z540-1-1994

Date

2/4/2017 - - Calibration and verification of three RTD meters with most recent certification of EEMS RTD

TMI Cert data -- 1/23/2017			
TMI STD	EEMS RTD		
Cert # A2380069	01229		
		diff	corrected
-25.00	-24.96	-0.040	-24.991
0.00	0.02	-0.020	-0.012
100.00	100.04	-0.040	100.003
150.00	150.04	-0.040	150.000
RTD 01229			
2016 correction:		slope=	1.000055
		intercept=	0.0319084
		corr=	1.0000000

Ein Helbert

2/4/2017

At EEMS	Date 2/4/2017	RTD 01230 / 01231	RTD 01227 / 1	RTD 01228 / 3	
RTD 01229		EEMS AER	EEMS SEG	EEMS van1	
raw	corrected	raw	corrected	raw	corrected
0.02	-0.01	0.04	-0.03	0.14	-0.01
11.25	11.22	11.28	11.22	11.45	11.03
19.82	19.79	19.84	19.79	20.07	19.58
31.53	31.50	31.55	31.51	31.90	31.51
40.39	40.36	40.39	40.36	40.81	40.36
48.82	48.79	48.78	48.76	49.30	48.78
24.91	24.88	24.93	24.89	25.21	24.87
		slope =	0.998954	1.007593	1.006555
		intercept =	0.069678	0.147536	-0.03341
		correlation =	1.0000	1.0000	1.0000

Date

2/4/2017 - - Calibration and verification of three RTD meters with most recent certification of EEMS RTD

TMI Cert data -- 1/23/2017			
TMI STD	EEMS RTD		
Cert # A2380069	01229		
		diff	corrected
-25.00	-24.96	-0.040	-24.991
0.00	0.02	-0.020	-0.012
100.00	100.04	-0.040	100.003
150.00	150.04	-0.040	150.000
RTD 01229			
2016 correction:		slope=	1.000055
		intercept=	0.0319084
		corr=	1.0000000

Ein Helbert

2/4/2017

At EEMS	Date 2/4/2017 RTD 01229	RTD 01230 / 01231 EEMS AER	RTD 01227 / 1 EEMS SEG	RTD 01228 / 3 EEMS van1		
raw	corrected	raw	corrected	raw	corrected	raw
0.02	-0.01	0.04	-0.03	0.14	-0.01	-0.05
11.25	11.22	11.28	11.22	11.45	11.03	11.26
19.82	19.79	19.84	19.79	20.07	19.58	19.88
31.53	31.50	31.55	31.51	31.90	31.51	31.69
40.39	40.36	40.39	40.36	40.81	40.36	40.59
48.82	48.79	48.78	48.76	49.30	48.78	49.06
24.91	24.88	24.93	24.89	25.21	24.87	25.00
		slope =	0.998954	1.007593	1.006555	
		intercept =	0.069678	0.147536	-0.03341	
		correlation =	1.0000	1.0000	1.0000	

Certificate of Calibration

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

P.O. Number:
ID Number: EEMS 01229

Description: DIGITAL STIK THERMOMETER
Manufacturer: FLUKE
Model Number: 1551A EX
Serial Number: 3275143
Technician: STEVE TORRES
On-Site Calibration:
Comments: TUR is 2 to 1

Calibration Date: 01/23/2017
Calibration Due: 01/23/2018
Procedure: FLUKE 1551A EX,52A EX
Rev: 11/1/2010
Temperature: 72 F
Humidity: 41 % 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 17025:2005 and ANSI/NC SL Z540-1-1994. ISO/IEC17025:2005 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/NC SL Z540-1-1994 and TMI's Quality Manual, QM-1.

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

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

FRANK BAHMANN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
899976	FLUKE	5618B-12	12/6/2016	2/21/2018
A06118	HART SCIENTIFIC	9103	5/8/2016	10/25/2017
A11967	HART SCIENTIFIC	9140	6/27/2016	6/27/2018
A88072	FLUKE/HART	1502A	1/17/2017	4/15/2017



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NC SL 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	-24.96	-24.96	°C	
Temperature Accuracy	0.00	-0.05	0.05	0.02	0.02	°C	
Temperature Accuracy	100.00	99.95	100.05	100.04	100.04	°C	
Temperature Accuracy	150.00	149.95	150.05	150.04	150.04	°C	

EEMS # 01229

$$m = 1.000055$$

$$b = 0.0319084$$

$$r^2 = 1.00000$$



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

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

www.tmiclibration.com

ANSI/NCSL Z540-1-1994



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:	E.E. & M.S.
Purchase Order #:	
Instrument:	Ushikata Tracon S-25 Compass
Serial Number:	190037 ✓
Quantity:	1 <i>EEMS # 01265</i>
Calibration Due:	02/2018 <i>Van 2</i>

Page 1 of 1

John Noga
John Noga, Quality Control

February 8, 2017 ✓

Measurement Standards

Theodolite Wild T-3 S/N 18801 Calibration 01/19/17 Due 01/19/18 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
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Customer Name:	E.E. & M.S. <i>EW 2/14/17</i>
Purchase Order #:	<i>Brunton</i>
Instrument:	Burton Compass
Serial Number:	5064612690 <i>EEMS # 01269</i>
Quantity:	1
Calibration Due:	02/2018

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(AER)

John Noga, Quality Control

✓
February 8, 2017

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 01/19/17 Due 01/19/18 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



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Customer Name:	E.E. & M.S.
Purchase Order #:	
Instrument:	Ushikata Tracon S-25 Compass
Serial Number:	199278 199578 (20) 2/14/17
Quantity:	1
Calibration Due:	02/2018 EEMS # 01272

Van 1

Page 1 of 1


John Noga, Quality Control

February 8, 2017

Measurement Standards

Theodolite Wild T-3 S/N 18801 Calibration 01/19/17 Due 01/19/18 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

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

P.O. Number:
ID Number: 01310

EEEMS #

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

Calibration Date: 02/23/2017
Calibration Due: 02/23/2018
Procedure: METCAL FLUKE 187
Rev: 6/15/2015
Temperature: 72 F
Humidity: 41 % 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 17025:2005 and ANSI/NC SL Z540-1-1994. ISO/IEC 17025:2005 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/NC SL Z540-1-1994 and TMI's Quality Manual, QM-1.

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

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

FRANK BAHMANN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

Asset Number	Manufacturer	Model Number	Date Calibrated	Cal Due
7040208	FLUKE	5520A	8/10/2016	8/10/2017



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NC SL Z540-1-1994

Certificate of Calibration

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

P.O. Number:
ID Number: EEMS 01311

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

Calibration Date: 01/23/2017
Calibration Due: 01/23/2018
Procedure: METCAL-FLUKE 287
Rev: 6/15/2015
Temperature: 72 F
Humidity: 40 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

Limiting Attribute:

This instrument has been calibrated using standards traceable to the 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.

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FRANK BAHMANN, BRANCH MANAGER

Scott Chamberlain, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
7040208	FLUKE	5520A	8/10/2016	8/10/2017



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

Certificate of Calibration

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

P.O. Number:
ID Number: EEMS 01312

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

Calibration Date: 01/23/2017
Calibration Due: 01/23/2018
Procedure: METCAL-FLUKE 287
Rev: 6/15/2015
Temperature: 72 F
Humidity: 40 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

Limiting Attribute:

This instrument has been calibrated using standards traceable to the 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 17025:2005 and ANSI/NCSL Z540-1-1994. ISO/IEC17025:2005 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 Z540-1-1994 and TMI's Quality Manual, QM-1.

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Scott Chamberlain, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
7040208	FLUKE	5520A	8/10/2016	8/10/2017



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

P2OTT1 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1500.00	1499.53	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1000.00	999.70	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	500.00	499.82	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	200.00	199.90	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	100.00	99.93	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	50.00	49.94	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	P2OTT1-1	Audit		1017.6	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-2	Audit		1017.8	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-3	Audit		1017.1	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-4	Audit		1017.9	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-5	Audit		1016.6	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-6	Audit		1016.8	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-7	Audit		1017.5	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-8	Audit		1016.4	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-9	Audit		1017.8	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-a	Audit		255.34	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-b	Audit		255.18	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-c	Audit		255.25	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	P2OTT1-d	Audit		255.60	SEG	Ott P2 Set #1 - SEG
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1500.00	1499.58	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1000.00	999.73	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	500.00	499.83	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	200.00	199.92	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 1/12/2017

Reviewer Signature: Alison Ray  Date: 1/16/2016

BL1 And BL3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1500.00	1499.58	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1000.00	999.73	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	500.00	499.83	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	200.00	199.92	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	100.00	99.96	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	BL3-0	Audit		1000.5	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-1	Audit		824.0	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-2	Audit		823.2	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-3	Audit		825.0	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-4	Audit		823.6	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-5	Audit		823.6	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-6	Audit		822.9	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-7	Audit		823.6	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-8	Audit		824.6	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-9	Audit		824.0	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-10	Audit		820.7	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-11	Audit		823.8	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL3-12	Audit		823.0	SEG	ETI/Belfort Set #3 - SEG
1/12/2017	8028481064	BL1-a	Audit		207.41	SEG	ETI/Belfort Set #1 - SEG
1/12/2017	8028481064	BL1-b	Audit		207.21	SEG	ETI/Belfort Set #1 - SEG
1/12/2017	8028481064	BL1-c	Audit		207.08	SEG	ETI/Belfort Set #1 - SEG
1/12/2017	8028481064	BL1-d	Audit		207.47	SEG	ETI/Belfort Set #1 - SEG
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1500.00	1499.58	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1000.00	999.72	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	500.00	499.86	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	200.00	199.92	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	100.00	99.97	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 1/12/2017

Reviewer Signature: Alison Ray  Date: 1/16/2016

BL2 Weight / Balance Calibration Log


Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1500.00	1499.54	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1000.00	999.69	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	500.00	499.83	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	200.00	199.92	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	100.00	99.95	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	BL2-0	Audit		999.5	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-1	Audit		822.7	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-2	Audit		820.1	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-3	Audit		824.1	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-4	Audit		824.7	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-5	Audit		823.0	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-6	Audit		823.7	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-7	Audit		823.1	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-8	Audit		823.0	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-9	Audit		823.3	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-10	Audit		823.4	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-11	Audit		823.2	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-12	Audit		823.8	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-a	Audit		206.67	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-b	Audit		205.72	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-c	Audit		206.12	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	BL2-d	Audit		206.35	SEG	ETI/Belfort Set #2 - MHV
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1500.00	1499.56	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1000.00	999.70	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	500.00	499.84	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	200.00	199.94	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	50.00	49.97	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 1/12/2017

Reviewer Signature: Alison Ray  Date: 1/16/2016

BL4 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1500.00	1499.52	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1000.00	999.69	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	500.00	499.83	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	200.00	199.92	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	100.00	99.96	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	50.00	49.98	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	BL4-0	Audit		1034.1	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-1	Audit		824.7	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-2	Audit		823.4	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-3	Audit		824.3	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-4	Audit		824.4	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-5	Audit		823.0	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-6	Audit		824.6	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-7	Audit		823.8	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-8	Audit		824.1	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-9	Audit		824.8	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-10	Audit		823.4	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-11	Audit		823.8	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-12	Audit		823.8	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-a	Audit		207.38	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-b	Audit		207.37	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-c	Audit		207.54	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	BL4-d	Audit		207.61	SEG	ETI/Belfort Set #4 - EOH
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1500.00	1499.54	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1000.00	999.69	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	500.00	499.83	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	200.00	199.92	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	100.00	99.95	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 1/12/2017
 Reviewer Signature: Alison Ray  Date: 1/16/2016

P2OTT2 Weight / Balance Calibration Log


Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/13/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	1500.00	1499.75	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	1000.00	999.82	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	500.00	499.90	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	200.00	199.95	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	100.00	99.97	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	50.00	49.99	SEG	Initial Balance Check
1/13/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/13/2017	8028481064	P2OTT2-1	Audit		1016.6	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-2	Audit		1017.0	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-3	Audit		1017.2	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-4	Audit		1017.0	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-5	Audit		1017.1	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-6	Audit		1017.9	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-7	Audit		1017.1	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-8	Audit		1015.7	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-9	Audit		1016.4	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-a	Audit		254.24	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-b	Audit		254.21	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-c	Audit		254.45	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	P2OTT2-d	Audit		254.38	SEG	Ott P2 Set #2 - MHV
1/13/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	1500.00	1499.75	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	1000.00	999.84	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	500.00	499.90	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	200.00	199.97	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	100.00	99.99	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
1/13/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 1/13/2017

Reviewer Signature: Alison Ray  Date: 1/16/2016

P2OTT3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1500.00	1499.83	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	1000.00	999.87	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	500.00	499.90	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	200.00	199.94	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	100.00	99.98	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	50.00	49.99	SEG	Initial Balance Check
1/12/2017	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
1/12/2017	8028481064	P2OTT3-1	Audit		193.83	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-2	Audit		193.80	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-3	Audit		193.80	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-4	Audit		193.78	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-5	Audit		193.79	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-6	Audit		193.08	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-7	Audit		193.84	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-8	Audit		193.63	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-9	Audit		193.14	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-10	Audit		193.76	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-a	Audit		254.73	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-b	Audit		255.20	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-c	Audit		255.51	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	P2OTT3-d	Audit		255.37	SEG	Ott P2 Set #3- EOH
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1500.00	1499.52	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	1000.00	999.69	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	500.00	499.83	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	200.00	199.92	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	100.00	99.96	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	50.00	49.98	SEG	Post Balance Check
1/12/2017	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville Date: 1/12/2017
 Reviewer Signature: Alison Ray  Date: 1/16/2016