
2014 National Atmospheric Deposition Program Site Survey Program Annual Report

Prepared for:

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

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Contract No.: EP-W-12-019

August 2015

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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 EPW12019¹, 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 maintaining 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). The AMoN and AMNet networks are relatively recent additions to the NADP and surveys of those sites are limited to the siting criteria when collocated with an existing NADP wet-deposition network or a CASTNET site as part of this contract. 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 atmospheric deposition 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 catalogue to include all the equipment related to the site along with 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 Previous to 6/14/2012, surveys of NADP Monitoring Stations were performed under contract EPW07061

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 ensure they are maintained. The site survey program provides a higher level of confidence in the data reported by the NADP.

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

Maintenance, evaluation, and quality assurance assessment of site instruments.

Evaluation of site operator proficiency and technique.

Reinforcement of NADP protocols and training.

Photograph catalogue to include all the equipment related to the site along with any findings that should be recorded.

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

1. Scheduling sites to be surveyed. This task is coordinated with the EPA Project Officer, the NADP Program Office, network liaisons, site operators, supervisors, and sponsors. Approximately 100 NADP sites (co-located are not considered separate sites) are scheduled for surveys during each contract period. The schedule is developed based on the elapsed time since the previous site survey (priority given to longest time since previous survey), inclusion of sites that have not been surveyed, and consideration for efficient and cost effective travel.

2. Preparing for field site surveys. During survey preparation, available site data are compiled and reviewed creating the site file. The necessary materials and standards for each site survey are checked and shipped if necessary. The site operators scheduled for surveys are contacted to finalize the survey arrangements.
3. Performing site surveys. During each site survey a comprehensive qualitative and quantitative assessment is performed. The site assessment consists of:
 - Verifying site contact information.
 - Verifying the NADP collector location using a WAAS GPS.
 - Qualitatively evaluating the site regarding the current NADP siting criteria that can be found at <http://nadp.isws.illinois.edu/>.
 - Qualitatively assessing the site surroundings regarding obstructions which could impact data collection and quality. Documenting the site surroundings with at least 8 digital photographs taken in the cardinal directions of N, NE, E, SE, S, SW, W, and NW. The photographs should be taken within 5 -10 meters of the NADP collector with the direction referenced.
 - Qualitatively assessing the instruments and equipment with regard to function, maintenance, and condition. Documenting equipment malfunctions and signs of wear on the survey forms and with photographs as necessary.
 - Qualitatively evaluating the site personnel regarding the methods and procedures used for sample handling, field analytical technique (AIRMoN), calibrations, cleaning, maintenance, recordkeeping, reporting, and material storage. Reviewing on-site documentation (raingage charts, logs, forms) for legibility, accuracy and completeness. Confirming that the current versions of NADP manuals/documentation are present.
 - Quantitatively assessing the accuracy of the NADP instrumentation responses to QA standards. These include standard weights for raingage tests and mass determinations, and analytical standards for pH and conductivity meter tests (AIRMoN sites only).
 - Recording all data on the hard copy forms provided in the site file. Printing additional forms from the database if required in order to record all data. Comparing the observations to the pre-populated values, verifying and correcting any discrepancies, and confirming with the site personnel as needed.
4. Performing minor repairs, maintenance, adjustments, and guidance. With the consent of the site personnel and the approval of the appropriate liaison
 - Perform any necessary minor repair, maintenance, adjustment, and calibration to restore proper function in accordance with the Network Operations Subcommittee (NOS) procedures. These tasks can include leveling and

- stabilizing the instrument, and correcting the orientation. 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.

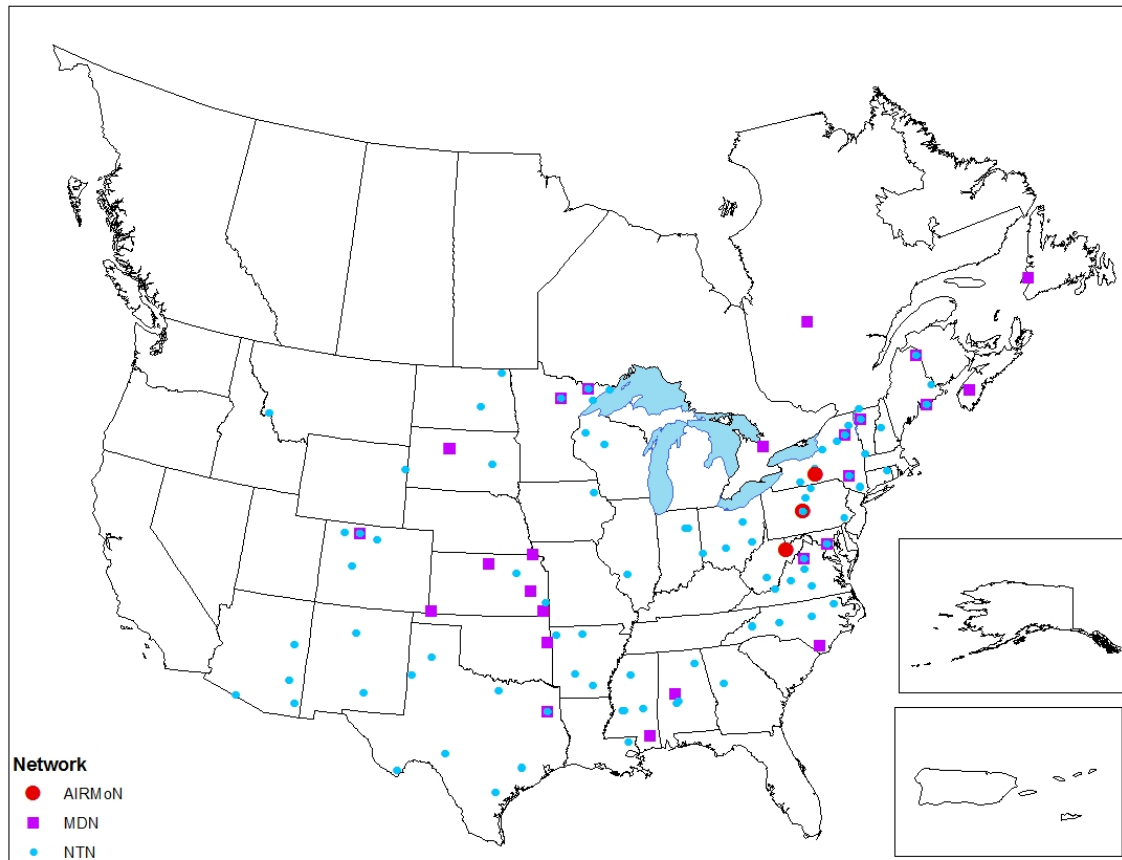
2.0 Status of Sites Surveyed

2.1 Sites Surveyed

This annual report includes site surveys performed from January through December of 2014.

A total of 110 NADP collectors² (this number includes co-located sites) were surveyed during the period covered by this report at 97 distinct locations. These include 25 MDN sites, 82 NTN sites, and three AIRMoN sites. Figure 2-1 is a map of the locations of the sites visited during 2014. Table 2-1 is a list of the sites surveyed and includes the network, site name, survey date, and equipment found.

Figure 2-1. Site Survey Locations in 2014



Source – NADP Program Office

² Contract EP-W-12-019 includes the survey of the siting criteria of AMoN sites. A total of 22 AMoN sites were assessed but are not identified in Figure 2-1.

2.2 General Status of Sites Surveyed

Overall the sites surveyed during the reporting period were found in good condition and collecting data that meet NADP quality objectives. Of the 97 precipitation gages surveyed (co-located sites usually use the same gage), nine were Belfort mechanical raingages. Due to the age of the Belfort gages, most were found to have some operational issues. Most problems were minor and were corrected during the site survey. Survey data continues to indicate that the gages require attention and it is likely that the mechanical gages have reached, or in some cases exceeded, their useful life-expectancy. Replacing Belfort gages with electronic gages has led to improved network operation. Efforts should continue to replace all Belfort gages with electronic gages. Altogether 88 electronic gages were surveyed, with only a few minor problems observed with those gages.

Of the 110 collectors (sites) surveyed, 48 sites operated N-CON collectors. The 62 remaining collectors were AerocChem Metrics (ACM) type and manufactured by either AeroChem Metrics or Loda Electronics Company.

Forty one locations visited operate various types of backup gages. Only assessments of the backup gage siting criteria are evaluated during surveys, not the performance of the gages.

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.

2.3 Equipment Encountered During the Site Surveys

The list of sites surveyed during 2014 and the equipment found at the sites is shown in Table 2.1.

Table 2-1. Sites Surveyed from January through December 2014 and Equipment Found

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
AL03	Centreville	MDN/NTN	2/24/2014	N-CON	ETI	N/A
AL10	Marion Junction	NTN	2/24/2014	ACM-type	OTT	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
AL99	Sand Mountain Research & Extension Center	NTN	3/5/2014	ACM-type	OTT	Tipping Bucket
AR02	Warren 2WSW	NTN	2/25/2014	N-CON	OTT	N/A
AR03	Caddo Valley	NTN	2/25/2014	N-CON	OTT	N/A
AR16	Buffalo National River-Buffalo Point	NTN	2/28/2014	ACM-type	ETI	N/A
AR27	Fayetteville	NTN	2/26/2014	N-CON	OTT	N/A
AZ06	Organ Pipe Cactus NP	NTN	4/22/2014	ACM-type	ETI	N/A
AZ97	Petrified Forest National Park-Rainbow Forest	NTN	4/7/2014	ACM-type	ETI	Tipping Bucket
AZ98	Chiricahua NM	NTN	4/23/2014	ACM-type	ETI	Tipping Bucket
AZ99	Oliver Knoll	NTN	4/25/2014	N-CON	OTT	Belfort
CAN5	Frelighsburg	NTN	9/3/2014	N-CON	ETI	Other
CO10	Gothic	NTN	8/21/2014	ACM-type	ETI	Tipping Bucket
CO15	Sand Spring	NTN	8/25/2014	ACM-type	ETI	N/A
CO19	Rocky Mountain National Park - Beaver Meadow	NTN	8/27/2014	ACM-type	ETI	N/A
CO93	Dry Lake	NTN	6/1/2014	ACM-type	OTT	Tipping Bucket
CO97	Buffalo Pass-Summit Lake	MDN/NTN	8/26/2014	ACM-type	OTT	N/A
CT15	Abington	NTN	11/9/2014	ACM-type	ETI	N/A
GA41	Georgia Station	NTN	3/4/2014	ACM-type	ETI	Tipping Bucket
IA08	Big Springs Fish Hatchery	NTN	7/22/2014	N-CON	OTT	N/A
IL46	Alhambra	NTN	7/22/2014	ACM-type	ETI	Tipping Bucket
IN20	Roush Lake	NTN	7/19/2014	N-CON	OTT	Tipping Bucket
KS03	Reserve	MDN	6/1/2014	N-CON	ETI	N/A
KS04	West Mineral	MDN	5/29/2014	N-CON	ETI	N/A
KS05	Coffey County Lake	MDN	6/3/2014	N-CON	ETI	N/A
KS07	Farlington Fish Hatchery	NTN	5/31/2014	N-CON	OTT	Stick

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
KS24	Glen Elder State Park	MDN	5/30/2014	N-CON	ETI	N/A
KS31	Konza Prarie	NTN	5/31/2014	ACM-type	OTT	Belfort
KS99	Cimarron National Grassland	MDN	5/30/2014	N-CON	ETI	N/A
LA30	Southeast Research Station	NTN	2/18/2014	ACM-type	OTT	N/A
MD99	Beltsville	MDN/NTN	11/11/2014	ACM-type	ETI	Tipping Bucket
ME00	Caribou	MDN/NTN	10/7/2014	N-CON/ACM-type	ETI	N/A
ME94	Indian Township	NTN	10/10/2014	ACM-type	ETI	OTT
ME98	Acadia National Park-McFarland Hill	MDN/NTN	10/2/2014	ACM-type	ETI	Tipping Bucket
MN08	Hovland	NTN	10/22/2014	ACM-type	Belfort	N/A
MN16	MARCELL EXPERIMENTAL FOREST	MDN/NTN	10/20/2014	ACM-type	ETI	Belfort
MN18	FERNBERG	MDN/NTN	10/21/2014	ACM-type	ETI	N/A
MN99	WOLF RIDGE	NTN	10/22/2014	ACM-type	ETI	N/A
MS10	Clinton	NTN	3/8/2014	N-CON	OTT	N/A
MS19	Newton	NTN	3/6/2014	ACM-type	Belfort	N/A
MS22	Oak Grove	MDN	2/20/2014	N-CON	ETI	N/A
MS30	Coffeeville	NTN	2/28/2014	ACM-type	Belfort	N/A
MT97	Lost Trail Pass	NTN	8/22/2014	ACM-type	OTT	N/A
NC03	Lewiston	NTN	11/17/2014	ACM-type	OTT	Stick
NC08	Waccamaw State Park	MDN	11/18/2014	N-CON	ETI	N/A
NC34	Piedmont Research Station	NTN	11/24/2014	ACM-type	OTT	Stick
NC41	Finley Farm	NTN	11/25/2014	ACM-type	OTT	N/A
NC45	Mt. Mitchell	NTN	10/28/2014	ACM-type	ETI	N/A
ND08	Icelandic State Park	NTN	9/3/2014	N-CON	OTT	N/A
ND11	Woodworth	NTN	9/2/2014	N-CON	OTT	N/A

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
NF19	Stephenville	MDN	10/15/2014	N-CON	ETI	N/A
NH02	Hubbard Brook	NTN	11/10/2014	ACM-type	Electronic	Belfort
NM07	Bandelier National Monument	NTN	4/15/2014	ACM-type	Belfort	N/A
NM08	Mayhill	NTN	4/14/2014	N-CON	OTT	N/A
NS01	Kejimikujik National Park	MDN	10/13/2014	N-CON	ETI	Other
NY01	Alfred	NTN	9/21/2014	N-CON	OTT	N/A
NY08	Aurora Research Farm	NTN	9/4/2014	ACM-type	Belfort	Stick
NY20	Huntington Wildlife	MDN/NTN	9/30/2014	ACM-type	Belfort	N/A
NY29	Moss Lake	NTN	11/13/2014	N-CON	OTT	N/A
NY52	Bennett Bridge	NTN	11/13/2014	ACM-type	ETI	N/A
NY67	Ithaca	AIRMoN	9/5/2014	ACM-type	ETI	Stick
NY68	Biscuit Brook	MDN/NTN	9/26/2014	ACM-type/N-CON	OTT	Belfort
NY98	Whiteface Mountain	NTN	9/29/2014	N-CON	OTT	Other
NY99	West Point	NTN	11/7/2014	N-CON	Belfort	N/A
OH09	Oxford	NTN	4/10/2014	N-CON	OTT	Tipping Bucket
OH49	Caldwell	NTN	4/8/2014	N-CON	OTT	N/A
OH54	Deer Creek State Park	NTN	4/9/2014	ACM-type	ETI	Tipping Bucket
OH71	Wooster	NTN	4/9/2014	N-CON	OTT	Stick
OK99	Cherokee	MDN	2/26/2014	N-CON	ETI	N/A
ON07	Egbert	MDN	8/28/2014	N-CON	ETI	Other
PA15	Penn State	AIRMoN/NTN	9/24/2014	ACM-type	ETI	Belfort
PA18	Young Woman's Creek	NTN	9/22/2014	N-CON	OTT	Stick
PA60	Valley Forge	NTN	9/24/2014	N-CON	OTT	Stick
PA90	Hills Creek State Park	NTN	9/22/2014	N-CON	OTT	Stick

Site ID	Site Name	Network	Survey Date	Collector Type	Raingage Type	Backup Raingage Type
PQ17	Chapais	MDN	9/1/2014	N-CON	ETI	Other
SD18	Eagle Butte	MDN	8/26/2014	N-CON	ETI	N/A
SD99	Huron Well Field	NTN	8/27/2014	N-CON	OTT	Stick
TX02	Muleshoe National Wildlife Refuge	NTN	3/24/2014	N-CON	OTT	Other
TX03	Beeville	NTN	3/17/2014	N-CON	OTT	N/A
TX04	Big Bend National Park	NTN	3/20/2014	ACM-type	ETI	N/A
TX10	Attwater Prairie Chicken	NTN	3/13/2014	N-CON	OTT	N/A
TX16	Sonora	NTN	3/18/2014	ACM-type	OTT	N/A
TX21	Longview	MDN/NTN	3/11/2014	ACM-type	Belfort	Tipping Bucket
TX43	Canonceta	NTN	3/25/2014	ACM-type	ETI	Tipping Bucket
TX56	LBJ Grassland	NTN	3/10/2014	N-CON	OTT	N/A
VA00	Charlottesville	NTN	11/4/2014	N-CON	OTT	N/A
VA13	Horton's Station	NTN	11/17/2014	ACM-type	ETI	N/A
VA24	Prince Edward	NTN	11/3/2014	ACM-type	ETI	N/A
VA28	Shenandoah National Park-Big Meadow	MDN/NTN	11/18/2014	ACM-type	ETI	Tipping Bucket
VA99	Natural Bridge Station	NTN	11/25/2014	ACM-type	ETI	Tipping Bucket
VT01	Bennington	NTN	11/8/2014	N-CON	OTT	N/A
VT99	Underhill	MDN/NTN	11/12/2014	ACM-type/N-CON	ETI	Stick
WI35	Perkinstown	NTN	9/10/2014	ACM-type	ETI	N/A
WI37	Spooner	NTN	9/9/2014	ACM-type	Belfort	N/A
WV04	Babcock State Park	NTN	11/24/2014	N-CON	OTT	N/A
WV99	Canaan Valley Institute	AIRMoN	11/20/2014	ACM-type	ETI	Stick
WY99	Newcastle	NTN	7/22/2014	ACM-type	ETI	N/A

Table 2-2. AMoN Sites Visited in 2014

Site ID	Survey Date	Site Name
AL99	3/5/2014	Sand Mountain Research & Extension Center
AR03	2/25/2014	Caddo Valley
AZ98	4/23/2014	Chiricahua NM
CT15	11/9/2014	Abington
GA41	3/4/2014	Georgia Station
IL37	7/21/2014	Stockton
IL46	7/22/2014	Alhambra
KS03	6/1/2014	Reserve
KS31	5/31/2014	Konza Prarie
MD99	11/11/2014	Beltsville
MN18	10/21/2014	Fernberg
MS30	2/28/2014	Coffeeville
NH02	11/10/2014	Hubbard Brook
NS01	10/13/2014	Kejimkujik National Park
NY20	9/30/2014	Huntington Wildlife
NY98	9/29/2014	Whiteface Mountain
OH54	4/9/2014	Deer Creek State Park
TX43	3/25/2014	Canonceta
VA24	11/3/2014	Prince Edward
VT99	11/12/2014	Underhill
WI35	9/10/2014	Perkinstown
WV18	11/19/2014	Parsons

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 gage), status of supplies, site operator’s performance, and other general information relating to the site. Once the evaluations (questionnaire) are complete the information is entered into a relational database and summary reports are created.

The number of checks performed during a typical survey will vary depending on the network and the type of equipment present at the site as indicated in Table 3.1 below.

Table 3-1. Number of Items in Survey Questionnaire by Network and Equipment

Network	Equipment Present	Number of Fields Checked in Questionnaire
NTN	ACM, Belfort and Backup gage	239
	N-CON, electronic gage and no backup gage	152
MDN	ACM, Belfort and backup gage	242
	N-CON, electronic gage and no backup gage	153
AIRMoN	ACM, electronic gage and backup gage	213

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 3-2 shows the number of collectors, raingages and sites meeting the criteria that are deemed likely to impact data quality.

Table 3-2. Collector, Raingages and Siting Meeting Criteria

	Surveyed	Meeting all Assessments	
Collectors	110	90	82%
Number of ACM – type	52	43	83%
Number of Modified ACM – type	10	8	80%
Number of MDN N-CON	15	13	87%
Number of NTN N-CON	33	26	79%
Raingages	97	76	78%
Belfort Gages	9	3	33%
Electronic Gages	88	73	83%
Siting Criteria	110	14	13%
NTN Sites meeting all siting criteria	82	6	7%
MDN Sites meeting all siting criteria	25	7	28%
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. Table 3-3 shows those criteria that were met at all sites surveyed shown by network.

Table 3-3. Survey Questionnaire Items Met at All Sites as Found

NTN	Siting Criteria	30 degree rule for building met (raingage)
		30 degree rule for buildings met (collector)
		Waterways meet NADP siting criteria
		Airports meet NADP siting criteria
		Animal operations meet NADP siting criteria (NTN and AIRMoN)
	ACM-type collector	ACM sensor operates properly
	Electronic Raingage	Raingage operates properly (electronic gage)
MDN	Siting Criteria	30 degree rule for buildings met (raingage)
		30 degree rule for buildings met (collector)
		No herbicides and fertilizers used within 20 m radius
		Waterways meet NADP siting criteria
		Combustion sources meet NADP siting criteria (MDN only)
		Airports meet NADP siting criteria
		Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria

		Parking lots and maintenance areas meet NADP siting criteria
		Metalworking operations meet NADP siting criteria (MDN only)
	Modified ACM	Dry side bucket clean
		Lid liner in good condition
		Cooling fan thermostat in good condition
		Heater in good condition
		Heater thermostat in good condition
		Max / min thermometer within acceptable limits
		ACM sensor operates properly
		Motorbox operates within acceptable limits
	N-CON	N-CON fan in good condition
		N-CON cooling fan thermostat in good condition
		N-CON max / min thermometer in acceptable limits
		N-CON sensor respond to 5 passes
		N-CON lid liner in good condition
SAMPLING MEDIA	Is sampling media quality maintained?	
	Are samples stored and shipped properly?	
AIRMoN	Siting Criteria	Is the orifice of the collector +/- 0.3 meters of raingage (elevation)
		30 degree rule for building met (raingage)
		No objects > 1 m height inside 5 m radius (raingage)
		No fences > 1 m height inside 2 m radius (raingage)
		No objects > 1 m height within 5 m radius (collector)
		30 degree rule for trees met (collector)
		45 degree rule met (collector)
		30 degree rule for buildings met (collector)
		No fences > 1 m height inside 5 m radius (collector)
		No pastures and ag. activity within 20 m radius
		No herbicides and fertilizers used within 20 m radius
		Roads meet NADP siting criteria
		Waterways meet NADP siting criteria
		Airports meet NADP siting criteria
		Animal operations meet NADP siting criteria (NTN and AIRMoN)
		Parking lots and maintenance areas meet NADP siting criteria
		Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria
ACM-type Collector	Does lid seal properly	
	Lid liner in good condition	
	ACM sensor operates properly	
	Motor-box operates within acceptable limits	
Electronic Gage	Raingage operates properly (electronic gage)	
	Does datalogger receive event signals form all collectors (electronic gage)	

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

Table 3-4 presents the non-compliant survey data for the different sites. EEMS cannot report with any level of confidence that siting or operation for the entire NADP has improved or declined during the period of site survey performance since this would require multiple visits for every site in the program. However, summarizing this information allows any high number of observed assessment failures to be quickly and easily identified. Items with a non-compliant percentage greater than 20% are identified in Table 3-4 and discussed in more detail in other sections of this report.

Table 3-4. Percent of Non-compliant Findings

Siting and Performance Checks	Number of Assessments	Found Non-Compliant	Percent (%) Non-Compliant
Sample Handling			
Is sampling media quality maintained?	109	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)	110	5	4.5
30 degree rule for buildings met (raingage)	97	0	0.0
No objects > 1 m height inside 5 m radius (raingage)	97	3	3.1
No fences > 1 m height inside 2 m radius (raingage)	97	11	11.3
No vegetation height > 0.6 m within 5 m radius (raingage)	97	18	18.6
Collector and sensor oriented properly	110	16	14.5
45 degree rule met (collector)	110	15	13.6
30 degree rule for trees met (collector)	110	33	30.0
30 degree rule for buildings met (collector)	110	0	0.0
No objects > 1 m height within 5 m radius (collector)	110	37	33.6
No fences > 1 m height inside 5 m radius (collector)	110	17	15.5
No vegetation height > 0.6 m within 5 m radius (collector)	110	18	16.4
No treated lumber inside 5 m radius (collector)	110	23	20.9
No galvanized metal inside 5 m radius collector (MDN)	25	5	20.0
No pastures and ag. activity within 20 m radius	110	7	6.4
No herbicides and fertilizers used within 20 m radius	110	2	1.8

Siting and Performance Checks	Number of Assessments	Found Non-Compliant	Percent (%) Non-Compliant
Roads meet NADP siting criteria	110	2	1.8
Waterways meet NADP siting criteria	110	0	0.0
Airports meet NADP siting criteria	110	0	0.0
Animal operations meet NADP siting criteria (NTN and AIRMoN)	85	0	0.0
Combustion sources meet NADP siting criteria (MDN only)	25	0	0.0
Parking lots and maintenance areas meet NADP siting criteria	110	1	0.9
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria	110	3	2.7
Metalworking operations meet NADP siting criteria (MDN only)	25	0	0.0
ACM-type Collector Assessments			
Dry side bucket is clean	62	7	11.3
Does lid seal properly	62	2	3.2
Lid liner in good condition	62	3	4.8
Fan in good condition	9	1	11.1
Cooling fan thermostat in good condition	9	0	0.0
Heater in good condition	10	0	0.0
Heater thermostat in good condition	10	0	0.0
Has flush wall filter mount been installed	10	2	20.0
Filter in good condition	6	0	0.0
Max / min thermometer within acceptable limits	10	0	0.0
ACM sensor operates properly	62	0	0.0
Motor-box operates within acceptable limits	62	1	1.6
N-CON Collector Assessments			
N-CON fan in good condition	15	0	0.0
N-CON cooling fan thermostat in good condition	15	0	0.0
N-CON heater in good condition	15	2	13.3
N-CON heater thermostat in good condition	15	2	13.3
N-CON max / min thermometer in acceptable limits	15	0	0.0
N-CON sensor respond to a 20-second mist of water	43	1	2.3
N-CON lid seal in good condition	48	6	12.5
N-CON lid liner in good condition	48	3	6.3
Belfort Raingage Assessments			
Was the 'as found' turn-over set properly	9	6	66.7
Electronic Gage Assessments			

Siting and Performance Checks	Number of Assessments	Found Non-Compliant	Percent (%) Non-Compliant
Raingage operates properly (electronic gage)	88	1	1.1
Does datalogger receive event signals form all collectors (electronic gage)	87	3	3.4
Does optical sensor respond to "blocking" of light beam (electronic gage)	40	4	10.0
Does optical sensor respond to mist of water (electronic gage)	40	5	12.5

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. Additionally, on-site documentation (raingage charts, logs, forms) was also assessed for legibility, accuracy and completeness.

The data indicate that most of the non-compliant findings are related to objects within the 5 meter radius of the raingage and/or collector, and 30 degree tree guidance violations for collectors followed by treated lumber near the collector. The other most prevalent issues are the calibration and turn-over adjustment of the Belfort gage.

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 gage 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 gage 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.

Table 3-5 lists the sites surveyed that have seen 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”). However, these changes may or may not have contributed to siting criteria compliance. The changes observed during the surveys in 2014 are summarized in Table 3-5. The observations at site CO97 are likely to only temporarily affect sample collection.

The effects of the changes are captured in the current siting criteria results presented in the previous tables.

Table 3-5. Sites with Changes since Last Survey (not including e-gage installation)

CO97	MDN/NTN	Construction of a pad for a cell phone tower was taking place adjacent to site when the site was visited. Heavy equipment was used. This activity took place 85 m from collector.
NM08	NTN	Area around site burned in 2011 which cleared some trees.
NY99	NTN	Site moved since last survey. Trees surrounding site violate the 30 deg guideline for trees.
TX56	NTN	The site was upgraded to include an electronic gage and N-CON collector since the previous survey. A fence was added to protect the equipment from approximately 25 cattle that graze the area during a short time each year. The fence is 4.6 meters from the collector.

The following sites were surveyed by EEMS for the first time during this reporting:

- AL03-NTN Centreville
- ME94-NTN Indian Township
- NF19-MDN Stephenville
- PA60-NTN Valley Forge
- PA90-NTN Hills Creek State Park
- PQ17-MDN Chapais

3.2 Survey Results for Sites with Second Survey Visits

One hundred and four (104) of the 110 sites surveyed in 2014 had been previously visited by EEMS. Most of these sites have been visited three times. Tables presenting the survey assessments for successive visits can be found in Appendix C. Comparisons of the percent non-compliant results for successive surveys are presented in Table 3-6. The percentages presented in this table are based on the 104 sites that were previously surveyed, and do not include those sites where a network was added recently and had not previously been surveyed. For those sites with more than two surveys, only the last two visits were considered (i.e., survey conducted in 2014 and 2010, but not the survey conducted in 2008).

Table 3-6. Percent of Non-compliance Items for Sites Surveyed More than Once

Siting and Performance Checks	% Non-compliant During 2014	% Non-compliant During Previous Survey
30 degree rule for trees met (collector)	30%	31%
No objects > 1 m height inside 5 m radius (raingage)	32%	32%
No vegetation height > 0.6 m within 5 m radius (raingage)	19%	17%
No objects > 1 m height within 5 m radius (collector)	31%	34%
No vegetation height > 0.6 m within 5 m radius (collector)	16%	15%
No treated lumber inside 5 m radius (collector)	20%	17%
No pastures and ag. activity within 20 m radius	7%	8%
Is the orifice of the collector +/- .3 m of raingage (elevation)	5%	6%
No fences > 1 m height inside 5 m radius (collector)	15%	15%
Was the 'as found' turn over set properly (Belfort gage)	67%	67%
45 degree rule met (collector)	13%	17%
Dry side bucket is clean	11%	8%
No fences > 1 m height inside 2 m radius (raingage)	11%	12%
Collector and sensor oriented properly	14%	7%
No galvanized metal inside 5 m radius collector (MDN)	17%	22%
Parking lots and maintenance areas meet NADP siting criteria	1%	1%

Table 3-6 reveals that there is not likely significant overall improvement to siting criteria or performance checks at the sites with repeat surveys in 2014.

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

investigated and defined to make the survey data less subjective. Evaluations of these and other assessments are discussed in Section 5.0 of this report.

Closer investigation of the other results in Table 3-6 reveals that many of these changes relate to the installation of new equipment at some of these sites. Twenty four N-CON collectors were installed at the sites considered here between the two surveys and 31 Belfort gages were replaced with electronic gages. This resulted in changes to the observed siting criteria following the changes to the site equipment. In addition to equipment changes, review of photos of the sites which reported a violation in the 45 degree rule for collectors in the most recent survey indicate that vegetation growth may have contributed to the increase in this percentage.

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

Furthermore, not all of these performance checks have the same impact on the quality of the sample. The fact that the vegetation is allowed to grow may impact sample quality less than not maintaining a clean dry side bucket. Since most of the items found out of compliance are related to siting criteria, significant improvements may be unrealistic expectations.

In general, review of data from repeat survey visits indicates that there may be a slight trend toward site operation improvement but it has not been determined whether or not it is significant in terms of sample quality improvement since all parameters do not have the same impact on actual sample quality. It can be seen from repeat site survey visits that some site operators and supervisors make an effort to improve site conditions with respect to siting criteria. The NADP PO should consider some type of recognition for those operators and supervisors.

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 3-7 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. Thirty five of the 42 gages identified as benefiting from a windshield in 2014 were found to have shields installed. ND08 had a wind shield when it

was operating a Belfort, and NY67 operated the stick gage with a wind shield, but neither site included the shield when replacing the gages with an electronic gage.

Table 3-7. Status of Surveyed Sites Requiring Raingage Shields

Site ID	Network	Condition in 2014	Previous Survey	Site ID	Network	Condition in 2014	Previous Survey
AZ97	NTN	Installed	Installed	NM07	NTN	Not present	Not present
CAN05	NTN	Installed	Installed	NM08	NTN	Installed	Not present
CO10	NTN	Installed	Installed	NS01	MDN/NTN	Installed	Installed
CO15	NTN	Installed	Installed	NY08	NTN	Not present	Not present
CO19	NTN	Installed	Installed	NY20	MDN/NTN	Installed	Installed
CO93	NTN	Installed	Installed	NY29	NTN	Installed	Installed
CT15	NTN	Installed	Installed	NY52	NTN	Installed	Installed
IA08	NTN	Installed	Installed	NY67	AIRMoN	Not present	Installed
KS99	MDN	Installed	Installed	NY68	MDN/NTN	Installed	Installed
ME00	MDN/NTN	Installed	Installed	NY98	NTN	Installed	Installed
ME94	NTN	Installed	--	ON07	MDN	Installed	Installed
ME98	MDN/NTN	Installed	Installed	PA18	NTN	Not present	Not present
MN08	NTN	Installed	Not present	PQ17	MDN	Installed	--
MN16	MDN/NTN	Installed	Installed	SD18	MDN	Not present	Not present
MN18	MDN/NTN	Installed	Installed	SD99	NTN	Installed	Installed
MN99	NTN	Installed	Not present	VA28	MDN/NTN	Installed	Improperly installed
MT97	NTN	Installed	Installed	VT01	NTN	Installed	Installed
ND08	NTN	Not present	Installed	VT99	MDN/NTN	Installed	Installed
ND11	NTN	Improperly installed	Not present	WI35	NTN	Installed	Not present
NF19	MDN	Installed	--	WI37	NTN	Not present	Not present
NH02	NTN	Installed	Installed	WY99	NTN	Installed	Not present

-- Indicates site not previously surveyed by EEMS.

4.0 Field Site Survey Results

This section summarizes the quantifiable survey data relating to raingage accuracy tests and ACM collector sensor heater performance.

4.1 Belfort Raingage Accuracy

Figure 4.1 presents the “as found” Belfort raingage accuracy results for nine Belfort raingages encountered during the period covered by this report. At co-located sites the same gage measures precipitation data for more than one network (i.e. MDN and NTN). Data presented here represent precipitation data as a whole, and is not related to any one network of NADP.

Overall program-wide Belfort raingage accuracy was found to be very good. A relatively few number of sites were not performing well and are easily identifiable in Figure 4-1.

Figure 4-1: As Found Belfort Accuracy - Nine Gages

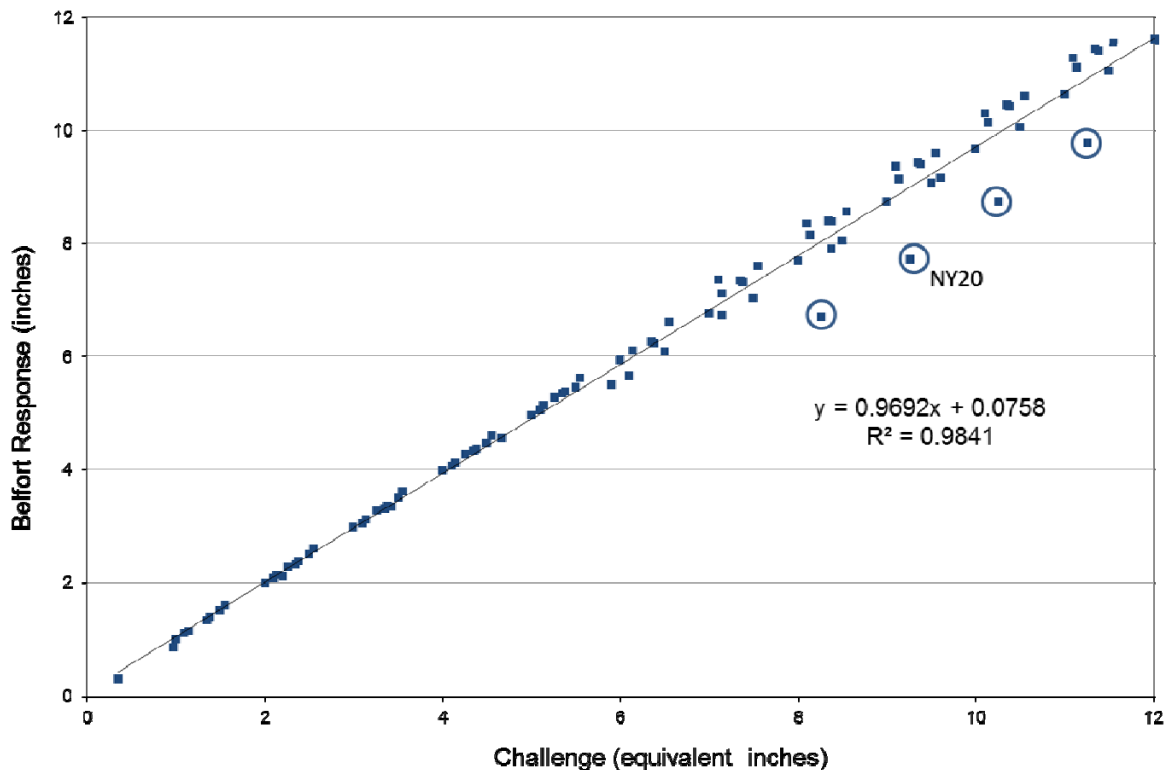
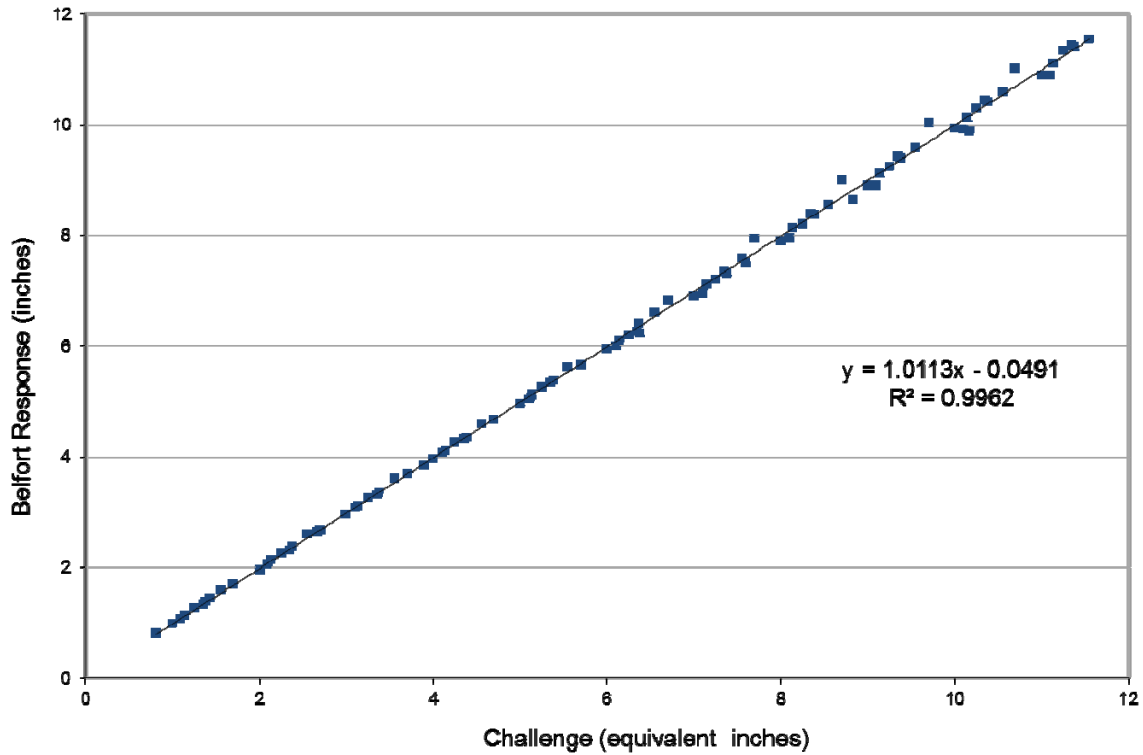


Figure 4-2 presents the “as left” Belfort raingage accuracy results for all gages encountered following any adjustments or improvements to the operation. Adjustments include leveling,

cleaning, adjusting linkage, and calibration. Overall program-wide accuracy was improved as the results indicate with a slope and correlation coefficient close to 1.0.

Figure 4-2. As Left Belfort Accuracy - Nine Gages



4.2 Belfort Calibration Results

Of the nine Belfort gages encountered, five gages required some type of adjustment. Only data from Belfort gages that were adjusted during the survey are presented in this subsection. Gages that were already within tolerance or could not be adjusted to within tolerance are not included. Figure 4-3 presents the “unadjusted” calibration results and Figure 4-4 presents the results after adjustments and calibration. There is a noticeable decrease in accuracy observed in points above six inches in Figure 4-3. This is mostly attributed to improper gage turnover which is discussed in Section 6.0 of this report.

Figure 4-3. As Found Belfort Accuracy - Five Adjusted Gages

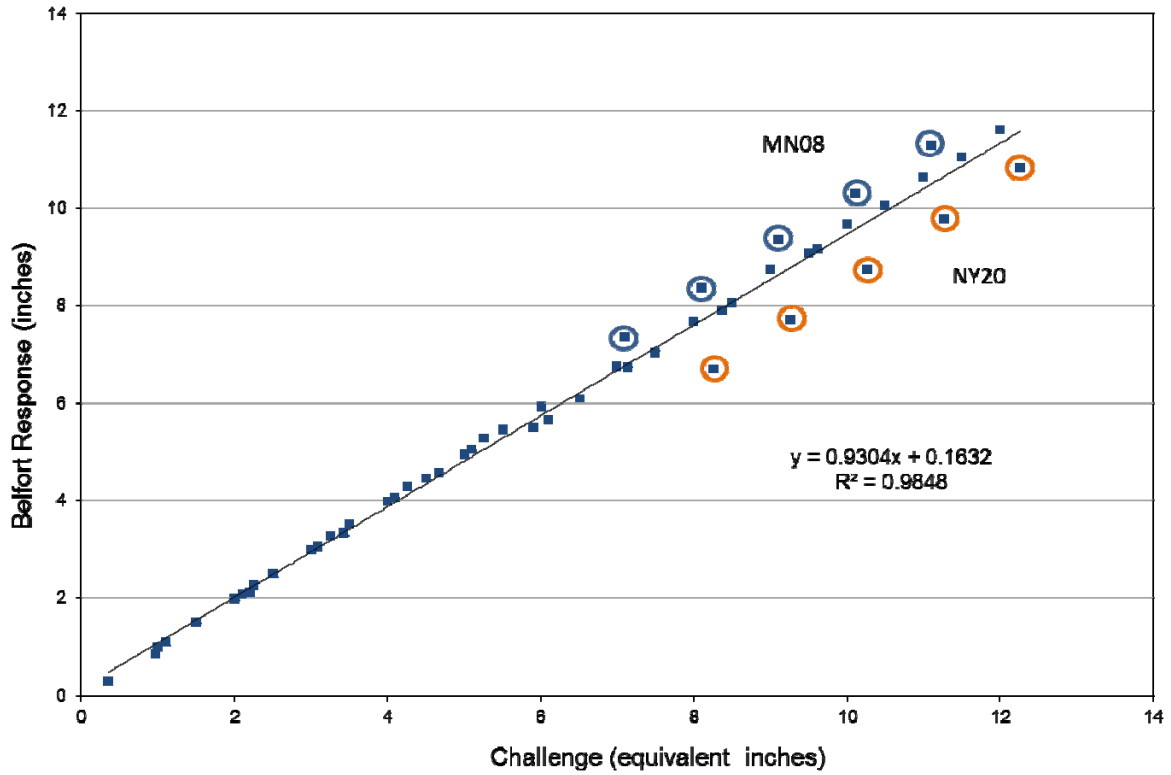
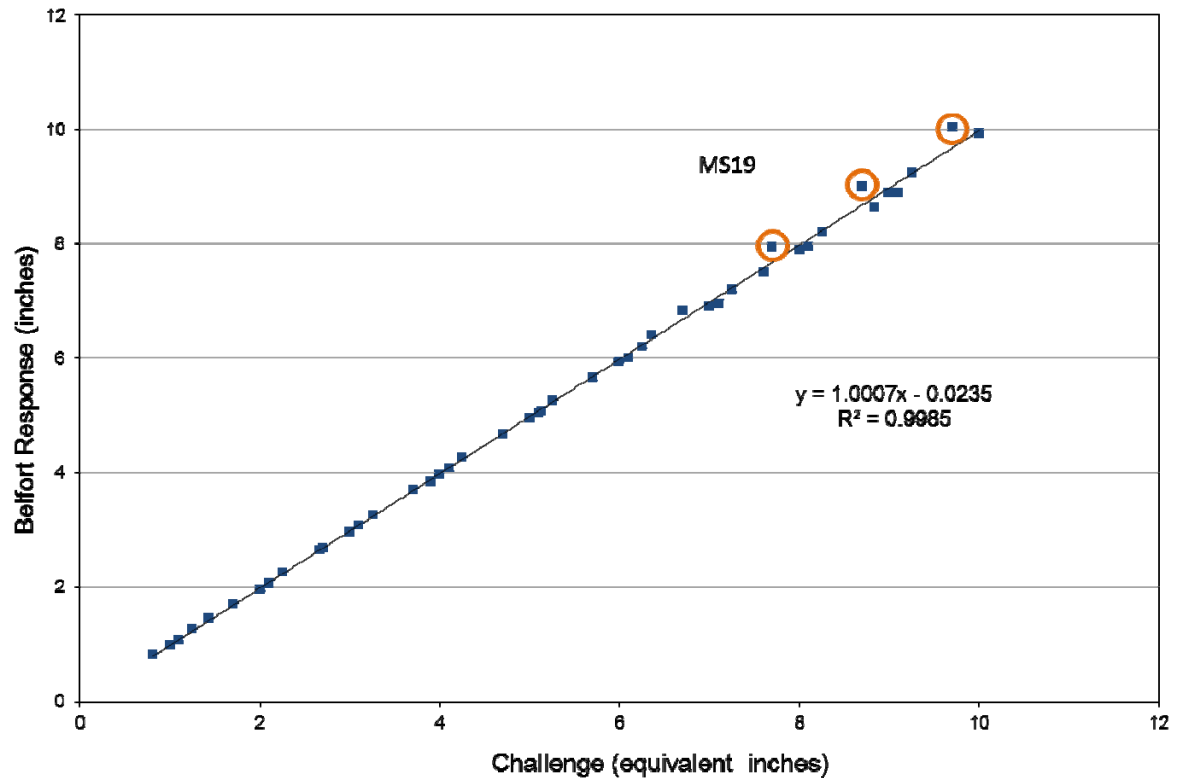


Figure 4-4. As Left Belfort Accuracy - Five Adjusted Gages

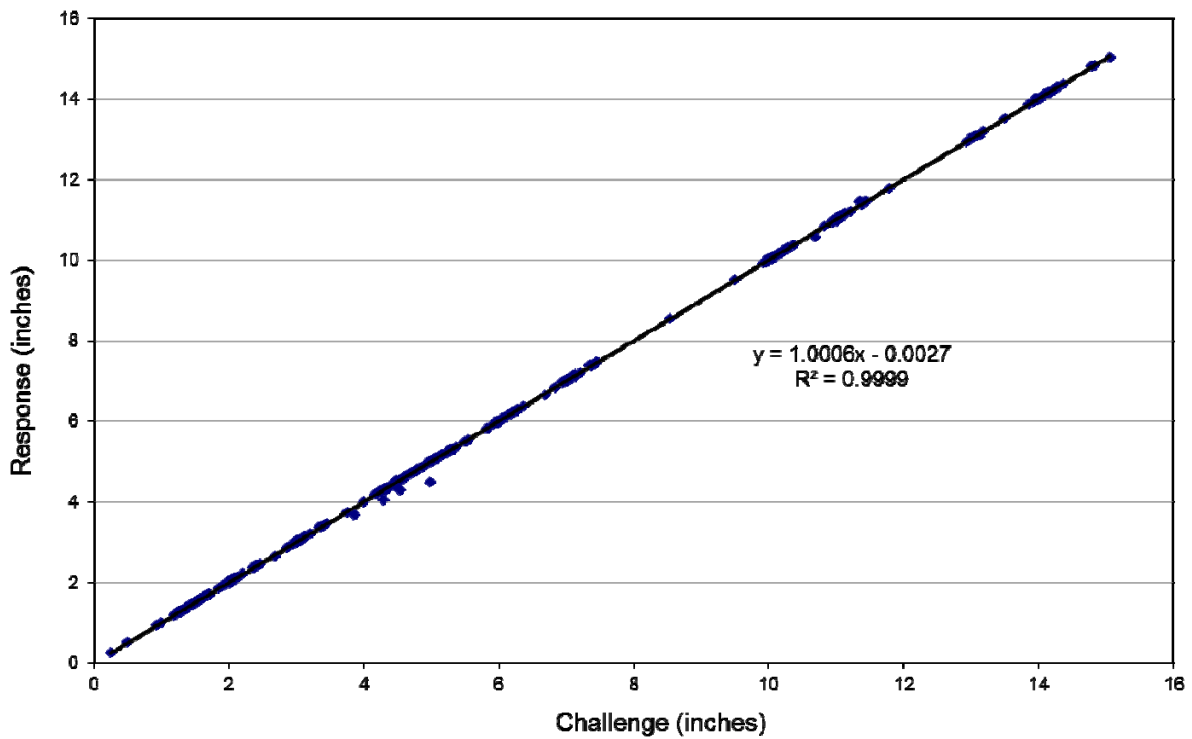


4.3 Electronic Gage Accuracy

The results of the accuracy tests for the 88 electronic raingages challenged during the period covered by this report are presented in Figure 4-5.

As demonstrated the gages report the weight of the standards added very accurately for the entire span. No problems with the electronic gages were encountered. The only notable problem with the electronic gage operation is related to the Personal Digital Assistant (PDA) and the required interfacing software. This is discussed further in Section 5.0.

Figure 4-5. As Found Electronic Gage Accuracy - 88 Gages



4.4 Sensor Heater Tests

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

When the sensor is activated the sensor is heated at a high level to evaporate the precipitation from the grid surface quickly when the event ends. The intent is to minimize the time the collector is open with no precipitation occurring and to maximize the precipitation catch. 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 4-6. The results indicate that all inactive sensor heaters were functioning properly. GA41 appears to have a sensor that was warm when it was not necessary for the heater to be active. That was most likely caused by the heater being active prior to testing due to the cool morning temperature. The sensor probably had not cooled to ambient temperature prior to the test.

Figure 4-6. Inactivated Sensor Temperature

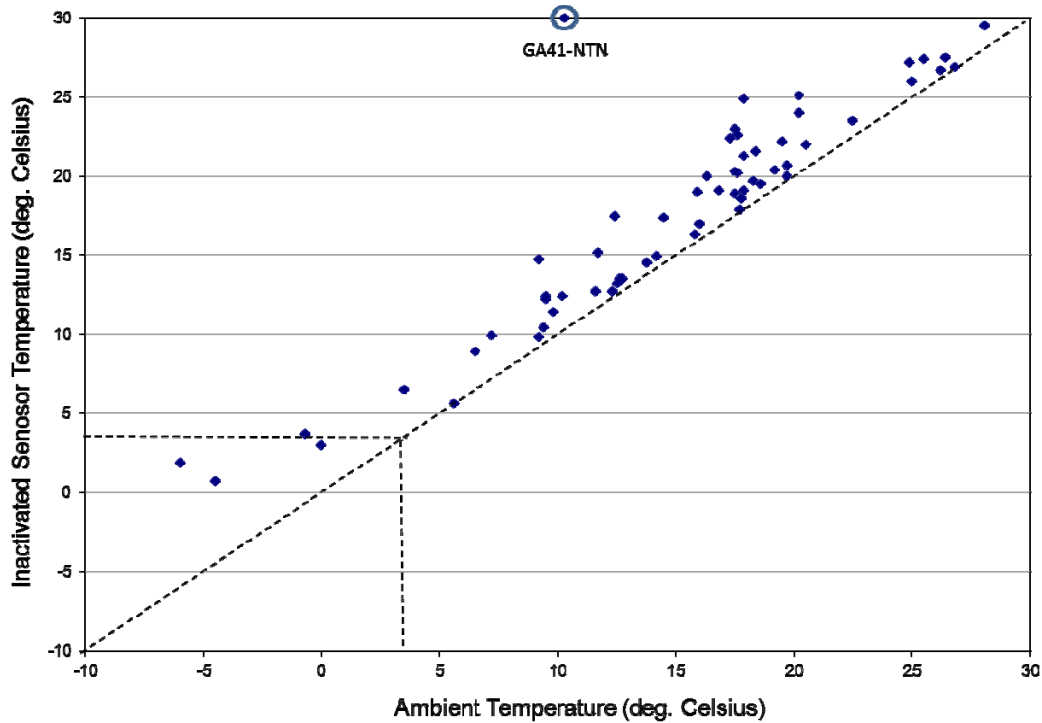
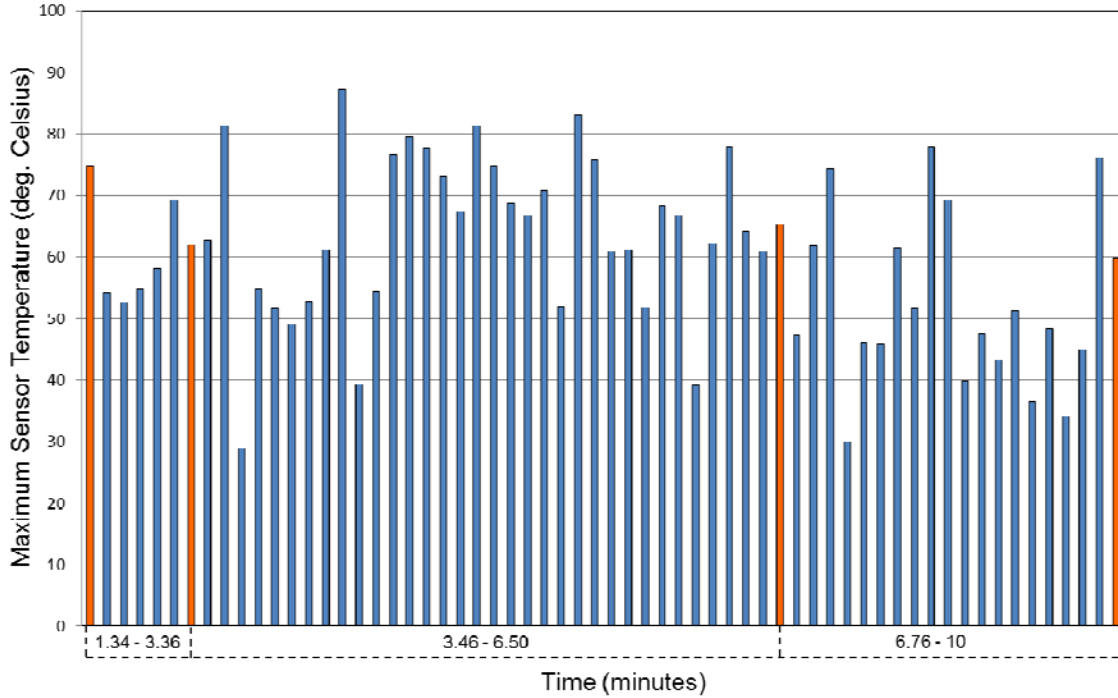


Figure 4-7 presents the maximum temperature reached by each sensor when activated, and the time required for each sensor to reach that temperature. There seems to be considerable variability between sensors for maximum temperature, but nearly all sensors are between 60°C and 80°C prior to 10 minutes of activation. A few sensors did not reach 50°C, however that could

be due to low ambient temperature or high wind speed during the test. Tests at two sites were conducted at ambient temperatures well below freezing.

Figure 4-7. Activated Sensor Temperature Increase and Elapsed Time



Further evaluation of the data presented in Figure 4-7 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. Number of Sensors for each Temperature Range

Temperature Range	Number of Sensors
< 30.0 °C	1
30.0° to 40.0 °C	6
40.1° to 50.0 °C	8
50.1° to 60.0 °C	13
60.1° to 70.0 °C	18
70.1° to 80.0 °C	12
80.1° to 90.0 °C	4
> 90.1 °C	0

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.

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 the siting criteria. For the sites visited in 2014 objects within 5 meters of the collector was the most prevalent non-compliant issue followed by the 30 ° tree guideline for collectors.

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.

Additional criteria regarding pressure treated wood within 5 meters and galvanized metal within 5 meters (MDN) should also be investigated to determine effect on sample quality. If it is determined that there is a negative impact from these materials being present within the 5 meter radius of the collector, the criteria should establish an amount of the material (surface area estimate) that can be used as a threshold to flag collectors that are above the criteria. Or it may be beneficial to evaluate the possibility for splash from the surface of the material to enter the sample train. The current criteria are “any materials” which could be interpreted as the heads of nails, or the pipe that the collector is mounted on and clearly those items are not likely to impact data quality.

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

Improvement was observed during this reporting period regarding updating and distributing procedures and training material. This is largely due to the implementation of the online training sessions offered by both the CAL and the HAL. It was also observed during the site surveys that information pertaining to the schedule and agenda of the webinars had been distributed by various means, and was available to the site operators. 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.

It is important 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/>. This process should continue and be a high priority for the CAL, HAL and PO. This will greatly 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 easily identified through the NADP PO website.

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 Belfort Raingage

Only 9 Belfort raingages were surveyed during this reporting period. As indicated in Section 4.1 most were found to be operating very well. The same few problems that have been observed in previous years were still evident but very limited due to the relatively small number of gages

encountered. Those problems continue to be related to routine maintenance of the gages, specifically improper pen turnover setting and dirty linkage.

As documented in previous reports, additional raingage operation and maintenance procedure may benefit data quality. If Belfort gages are going to remain as part of the network, two solutions that could be easily implemented and could help to eliminate inaccuracies in precipitation measurement due to turnover problems are:

- Reduce the amount of antifreeze used during the winter and have the site operator empty the bucket and replace the antifreeze more frequently during the winter to avoid reaching the second transverse.
- Have the site operator check and adjust the turnover on a regular schedule.

The first suggestion may not be practical at all site locations due to both the amount of precipitation that falls during one week and the logistics involved with winterization of the gage.

The second solution requires removing the gage cover and making an adjustment to a linkage. There is always a potential for undesired results when adjustments are made to the mechanical linkage of the gage, therefore training should be provided and proper care should be exercised if implementing this approach. It has been our experience however, that the turnover adjustment is relatively straightforward and easily accomplished. Most site operators would be able to perform this adjustment given proper instruction. It is further suggested that if the second approach (check and adjust the turnover) is to be performed, it should be done during good weather just prior to winterizing the gage.

The second problem affecting the gages surveyed was the accumulation of dirt on the internal moving linkages. In most cases cleaning the linkages restored proper function of the gage. Therefore it is suggested that the site operators be instructed to clean the gages at least once per year. The best time to clean the gage would vary from site to site based on the local weather patterns. For example, gages in the southwest should be cleaned following the spring windstorms when they are likely to receive the most wind-blown dust. This would also ensure that they are clean and working properly prior to the season most likely for precipitation to occur.

It would also be advisable to clean the gage when performing the turnover adjustment, and check the turnover when cleaning the gage, since both procedures require removing the gage cover.

5.2.2 ACM Type Collector

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

Motor Box Fuse Holders

Several instances of broken, too loose or too tight motor box fuse holders were observed and recorded during this reporting period. The fuse holders are difficult to service in the field and most site operators should not attempt a repair.

It is suggested that as part of the motor box refurbishing process, all fuse holders be replaced. Some of the motor boxes are many years, or decades old, and if the fuse holders are original they have outlasted the expected duty cycle for the type of material they are made of, and the normal wear-and-tear of the twisting motion they endure. As part of the replacement process the nuts and lock washers which secure the holders should be evaluated and upgraded to improve the ability to lock the holders in place. Once the holder becomes loose there is a danger of damaging the connecting wires and causing an open circuit and loss of collector operation.

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 and stresses the importance of testing the sensors each week.

Sensor Response Tests

In addition to comparison of gage 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).

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 gages.

5.2.3 MDN Collectors

As observed in past years, some of the MDN sites have chimney insulation that is showing signs of deterioration. It may be necessary to implement a procedure and schedule for insulation replacement for the modified ACM collectors.

Additionally, it was observed that there is some lack of consistency regarding sealing of the unused 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 the opinion of EEMS that the sealed surface of the second chimney presents a splash surface that likely affects sample catch and sample quality. It is suggested that all MDN collectors have the original “approved” configuration restored, or some alternative (repair or procedure) that can be approved as a modification to the collector.

N-CON MDN Heaters

New instruments and equipment used by NADP have been added over the years following extensive testing and approval by the subcommittees and the Executive Committee. 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. Site survey data have been collected that indicate most N-CON MDN collectors have heated chimneys. Several sites in Pennsylvania and other cold climate states (MT, ME) have been added to the NADP recently that could benefit from the addition of heated chimneys. It is recommended that climate be considered, and that MDN sites are prioritized to receive the heater upgrade. Additional survey data will be collected to include whether or not the heaters are passive, or have been modified to include the circulating fan.

5.2.4 N-CON NTN Single 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.

As part of the continuing improvements being implemented in the field, all set screws and lid arm bolts are being tightened and Loctite is being added to the screw threads. 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.

It was observed and recorded that some of the new N-CON collectors were not properly oriented during the installation process. Unless there is a sound reason for the incorrect orientation, they are usually corrected during site surveys since it is relatively easy to rotate the collector on the mounting post.

It was also noted that many of the sites that received N-CON collectors did not receive the tool kit supplied by the manufacturer, and the sensor test switch supplied by the CAL. It is suggested that all site operators that operate N-CON collectors be polled to see if they have the kit, and be provided the kit if they do not.

5.2.5 Electronic Gage and PDA

The introduction of the electronic raingages into the network is a great improvement. All site operators that are operating electronic gages reported that they are happy with the improvement. However, it has been observed that ETI NOAH IV gages have excessive corrosion around the connections for the sensors and batteries. This should be investigated further and a maintenance plan established.

PDA and Thumb Drives

EEMS is aware that software development and testing requires time. Also the introduction of new electronic devices including PDA sometimes renders the older models obsolete. As the program moves to the digital world these challenges are evident. Improvement in the areas of software development and documentation has been observed during the surveys that took place during this year. Effort should stay focused as continued changes occur going forward.

It is suggested that the PDA documentation include detailed references to the various versions of both hardware and software. An effort should be made to standardize the software as much as possible. If need be this should include specific versions of software for specific hardware. This information can be used to evaluate if the appropriate combination and latest version is available at each site. This evaluation can become part of the site survey assessment.

The efforts to standardize and improve the PDA operation should continue even though new gage installations have required new methods of data collection and transfer. Technology advancements have made PDA use obsolete, and the NADP has evolved to other methods to transmit data from the site loggers to the PO.

The more recent methods involve 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 gage 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.

5.2.6 General Maintenance

Several sites were observed to have equipment that was in need of general housekeeping maintenance. Most cases included the infestation of ants, bugs, bees, spiders, mice, or scorpions. It has been observed that since the installation of electronic gages, most site operators don't open the gage. When Belforts were used the operators would open the gage to replace the chart each week. That is no longer necessary with electronic gages. It is suggested that at least twice per year the gage be opened and cleaned to help prevent damage that might be caused by pests making homes in the gages. This could be performed when the gage is winterized and again in the spring.

6.0 Results of Field Laboratory and Procedure Assessments

The field site survey results have been presented and discussed in other sections of this report. Current field laboratory procedures are limited to sample weighing and decanting at NTN sites. AIRMoN sites still require pH and conductivity measurements. This section will focus on weighing and decanting the NTN and AIRMoN samples, results of the pH and conductivity measurements at AIRMoN sites, and sample handing at MDN sites.

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

6.1 Sample Weighing

Some site scales used for sample weighing require attention. 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	Network	Average % Difference	Site Id	Network	Average % Difference	Site Id	Network	Average % Difference
AL03	NTN	0.16%	AL10	NTN	-0.02%	AL99	NTN	-0.02%
AR02	NTN	-0.02%	AR03	NTN	-0.11%	AR16	NTN	0.07%
AR27	NTN	0.03%	AZ06	NTN	-0.06%	AZ97	NTN	0.36%
AZ98	NTN	0.05%	CAN5	NTN	-0.01%	CO10	NTN	-0.02%
CO15	NTN	-0.16%	CO19	NTN	-0.02%	CO93	NTN	-0.02%
CO97	NTN	-0.03%	CT15	NTN	-0.13%	GA41	NTN	0.17%
IA08	NTN	0.02%	IL46	NTN	-0.07%	IN20	NTN	0.00%
KS07	NTN	0.00%	KS31	NTN	-0.08%	LA30	NTN	0.04%
MD99	NTN	-0.27%	ME00	NTN	-0.11%	ME94	NTN	0.06%

Site Id	Network	Average % Difference	Site Id	Network	Average % Difference	Site Id	Network	Average % Difference
ME98	NTN	-0.09%	MN08	NTN	-0.10%	MN16	NTN	0.00%
MN18	NTN	-0.04%	MN99	NTN	0.07%	MS10	NTN	0.03%
MS19	NTN	-0.02%	MS30	NTN	0.00%	MT97	NTN	-0.01%
NC03	NTN	-0.03%	NC34	NTN	-0.05%	NC41	NTN	0.00%
NC45	NTN	-0.01%	ND08	NTN	-0.04%	ND11	NTN	0.00%
NH02	NTN	0.00%	NM07	NTN	-0.03%	NM08	NTN	-0.09%
NY01	NTN	-0.17%	NY08	NTN	-0.05%	NY20	NTN	0.03%
NY29	NTN	-0.02%	NY52	NTN	-0.06%	NY67	AIRMoN	0.17%
NY68	NTN	0.01%	NY98	NTN	-0.03%	NY99	NTN	0.03%
OH09	NTN	-0.01%	OH49	NTN	-0.12%	OH54	NTN	-0.05%
OH71	NTN	-0.02%	PA15	NTN	-0.06%	PA15	AIRMoN	-0.06%
PA18	NTN	-0.01%	PA60	NTN	-0.01%	PA90	NTN	-0.01%
SD99	NTN	-0.06%	TX02	NTN	-0.02%	TX03	NTN	0.11%
TX04	NTN	-0.03%	TX10	NTN	-0.08%	TX16	NTN	-0.06%
TX21	NTN	-0.06%	TX43	NTN	0.09%	TX56	NTN	0.29%
VA00	NTN	0.01%	VA13	NTN	-0.01%	VA24	NTN	0.32%
VA28	NTN	0.10%	VA99	NTN	0.02%	VT01	NTN	-0.92%
VT99	NTN	0.17%	WI35	NTN	-0.07%	WI37	NTN	-0.03%
WV04	NTN	-0.03%	WV99	AIRMoN	0.05%	WY99	NTN	-0.03%

6.2 pH and Conductivity Measurements

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

In order to evaluate the pH and conductivity measurements performed in the field by the site operators, a sample of simulated rain was obtained from the PO. Prior to each AIRMoN site survey the NADP PO Quality Assurance Manager provided the survey team with in-house prepared simulated rain. The pH comparisons are presented in Table 6-2 and the conductivity comparisons are shown in Table 6-3.

The pH and conductivity sample provided by the PO did not include a range of uncertainty as it has in past years. As a result it is unclear whether the values obtained by the site operator are within the acceptable error. The uncertainty values used in the tables below represent the largest errors from similar samples provided by the PO in past years. When compared to these uncertainties, both the pH and conductivity assessment results were above acceptable limits.

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 best as possible.

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

Site Id	Network	pH Target Value	Response	Difference
NY67	AIRMoN	4.83±0.15	4.99	-0.16
PA15	AIRMoN	4.83±0.15	4.82	0.01
WV99	AIRMoN	4.83±0.15	4.82	0.01

Table 6-3. Difference in Conductivity Readings between Target and Measured Values

Site Id	Network	Conductivity Target Value	Response	Difference
NY67	AIRMoN	9.6±0.9	9.4	0.2
PA15	AIRMoN	9.6±0.9	9.8	-0.2
WV99	AIRMoN	9.6±0.9	10.8	-1.2

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 exchange 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.

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 is tentatively scheduled for the summer of 2015.

Site operator questionnaires are provided to each site operator following a site survey. The information gathered is used to improve the site survey program. It is anticipated that refinement of the questionnaires, with input from the NADP PO and laboratories will take place in the near future with the goal of further improvements to the survey program.

Training Class Attendance and Webinar Participation

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

the webinars offered . This provides EEMS with a means to stay current with procedures and changes to site equipment. It also allows EEMS to provide the NADP PO with feedback and suggestions to improve the site operator training classes. EEMS intends to continue this practice in the future if the training program is reinstated. EEMS intends to participate in the training webinars, when scheduling permits, to accomplish the same goals.

7.3 Duplicate Data Entry

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

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

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

7.4 Identifiable Areas of Improvement to the Survey Program

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

7.4.1 Site Survey Questionnaire

Despite considerable effort on the part of both EEMS and the NADP PO, some of the questions contained in the Site Survey Questionnaire remain ambiguous. This has led to some survey field personnel interpreting some questions one way, while another team member might interpret the

same question differently. Additionally, some survey questions are redundant or impossible to answer accurately during the field site survey. As cases are discovered during review of the survey reports, additional clarification is requested from the NADP QA Manager regarding the intent of the question. This information is then shared with the survey team members to eliminate confusion and maintain consistency. Subsequent versions of the questionnaire and database have been designed as described briefly in previous sections of this report. It is anticipated that changes to the questionnaire will be much easier to implement with the revised database. Refinement and improvement to the information collected during a site survey will continue. It is expected that feedback regarding the survey data will be provided on an annual basis from the NADP PO and other data users so that EEMS can continue to collect data that are meaningful and useful to the NADP.

7.4.2 Internal QA

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

Results of Duplicate Data Entry Process and Site File Review

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

The data indicates that of the 48,672 entries that are compared (does not include memo fields), the entry error rate is about 0.5% with approximately the twice as many errors found in the field entry than in the office entry.

Table 7-1. 2014 Internal QA Results for Duplicate Entry Errors

	Field Entry	Duplicate QA Entry	Total Entries
Total Number of Entries Compared	24,336	24,336	48,672
Initial File Entry Errors	159		
Duplicate QA Entry Errors		93	
Percent Errors	0.65%	0.38%	
Total Entry Errors	252		
Total Percent Errors	0.52%		

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 Collector

StationId	CO97	MD99	ME98	MN16	MN18	NY20	NY68	TX21	VA28	VT99
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				X			
30 degree rule for buildings met (raingage)										
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				
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)		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	--	X								
Cooling fan thermostat in good condition	--									
Heater in good condition										
Heater thermostat in good condition										
Has flush wall filter mount been installed				X						X
Filter in good condition		U to T		--					MISSING	--
Max / min thermometer in acceptable limits										
ACM sensor operates properly										
Motorbox operates within acceptable limits										
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	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-2. Findings Most Likely to Impact Data Quality – MDN Sites with N-CON Type Collector

StationId	AL03	KS03	KS04	KS05	KS24	KS99	ME00	MS22	NC08	NF19	NS01	OK99	ON07	PQ17	SD18
Is sampling media quality maintained?					X										
Is the orifice of the collector +/- .3 m of raingage (elevation)	X						X								
No objects > 1 m height inside 5 m radius (raingage)	X	X		X			X							X	X
No fences > 1 m height inside 2 m radius (raingage)									X			X			X
No vegetation height > 0.6 m within 5 m radius (raingage)				X			X				X			X	
30 degree rule for buildings met (raingage)															
Collector and sensor oriented properly	X							X	X						
45 degree rule met (collector)									X			X			
30 degree rule for trees met (collector)				X					X						
30 degree rule for buildings met (collector)															
No objects > 1 m height within 5 m radius (collector)		X		X			X	X	X					X	X
No fences > 1 m height inside 5 m radius (collector)									X			X			X
No vegetation height > 0.6 m within 5 m radius (collector)				X			X				X				
No treated lumber inside 5 m radius (collector)	X						X					X			
No galvanized metal inside 5 m radius collector (MDN)							X		X		X			X	
No pastures and ag. activity within 20 m radius												X			
No herbicides and fertilizers used within 20 m radius															
Roads meet NADP siting criteria														X	
Waterways meet NADP siting criteria															
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 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			X									
N-CON heater thermostat in good condition			U to T			U to T									
N-CON max / min thermometer in acceptable limits															
N-CON sensor responds to a 20-second mist of water								--							
Raingage operates properly (electronic gage)											X				
Does datalogger receive event signals form all collectors (electronic gage)	X										X				
Does optical sensor respond to "blocking" of light beam (electronic gage)		U to T		U to T				U to T	U to T		X				
Does optical sensor respond to mist of water (electronic gage)		U to T		U to T			X	U to T	U to T		X				

- Indicates found compliant
- 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 Collector (1 of 3)

StationId	AL10	AL99	AR16	AZ06	AZ97	AZ98	CO10	CO15	CO19	CO93	CO97	CT15	GA41	IL46	KS31	LA30	MD99
Is sampling media quality maintained?					U to T												
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		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									
30 degree rule for buildings met (raingage)																	
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				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
No pastures and ag. activity within 20 m radius	X													X			
No herbicides and fertilizers used within 20 m radius														X			
Roads meet NADP siting criteria		X															
Waterways meet NADP siting criteria																	
Airports meet NADP siting criteria																	
Animal operations meet NADP siting 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																	
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														X			
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)																	
Does datalogger receive event signals form all collectors (electronic gage)							X										
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--			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-3. Findings Most Likely to Impact Data Quality – NTN with ACM-type Collector (2 of 3)

StationId	ME00	ME94	ME98	MN08	MN16	MN18	MN99	MS19	MS30	MT97	NC03	NC34	NC41	NC45	NH02	NM07	NY08
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
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		
30 degree rule for buildings met (raingage)																	
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
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		X			X								X		
No pastures and ag. activity within 20 m radius																	X
No herbicides and fertilizers used within 20 m radius																	X
Roads meet NADP siting criteria																	
Waterways meet NADP siting criteria																	
Airports meet NADP siting criteria																	
Animal operations meet NADP siting criteria (NTN and AIRMoN)																	
Parking lots and maintenance areas meet NADP siting criteria																	
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																	
Dry side bucket is clean												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)	--	--	--	X	--	--	--	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)		X		--			U to T	--	--	--	--	--	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	X	X		--			U to T	--	--	--	--	--	--	--	--	--	--

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

Table B-3. Findings Most Likely to Impact Data Quality – NTN with ACM-type Collector (3 of 3)

StationId	NY20	NY52	OH54	PA15	TX04	TX16	TX21	TX43	VA13	VA24	VA28	VA99	WI35	WI37	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					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
30 degree rule for buildings met (raingage)															
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
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			
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 siting criteria (NTN and AIRMoN)															
Parking lots and maintenance areas meet NADP siting criteria															
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria												X			
Dry side bucket is clean					X			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)	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)	--	U to T	X	U to T		--	--	X						--	
Does optical sensor respond to mist of water (electronic gage)	--	U to T	X	U to T		--	--	X						--	

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

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

StationId	AL03	AR02	AR03	AR27	AZ99	CAN5	IA08	IN20	KS07	MS10	ND08	ND11	NM08	NY01	NY29
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						X		X
No vegetation height > 0.6 m within 5 m radius (raingage)			X		X	X									
30 degree rule for buildings met (raingage)															
Collector and sensor oriented properly									X		X				
45 degree rule met (collector)	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			
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
No pastures and ag. activity within 20 m radius															
No herbicides and fertilizers used within 20 m radius															
Roads meet NADP siting criteria															
Waterways meet NADP siting criteria															
Airports meet NADP siting criteria															
Animal operations meet NADP siting criteria (NTN and AIRMoN)															
Parking lots and maintenance areas meet NADP siting criteria															
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria											X				
N-CON lid seal in good condition					X	X						X			
N-CON lid liner in good condition	X				X							MISSING			
N-CON sensor responds to a 20-second mist of water										--					
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)															
Does datalogger receive event signals form all collectors (electronic gage)	X														
Does optical sensor respond to "blocking" of light beam (electronic gage)		--	--	--	--		--	--	--	--	--	--	--	--	--
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 with N-CON Collector (2 of 3)

StationId	NY68	NY98	NY99	OH09	OH49	OH71	PA18	PA60	PA90	SD99	TX02	TX03	TX10	TX56	VA00
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			
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		
30 degree rule for buildings met (raingage)															
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	X	X						
30 degree rule for buildings met (collector)															
No objects > 1 m height within 5 m radius (collector)		X		X	X			X	X		X	X			
No fences > 1 m height inside 5 m radius (collector)					X			X						X	
No vegetation height > 0.6 m within 5 m radius (collector)									X				X		
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															
Roads meet NADP siting criteria															
Waterways meet NADP siting criteria															
Airports meet NADP siting criteria															
Animal operations meet NADP siting criteria (NTN and AIRMoN)															
Parking lots and maintenance areas meet NADP siting criteria															
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria											X				
N-CON lid seal in good condition												X			
N-CON lid liner in good condition															
N-CON sensor responds to a 20-second mist of water													--	--	--
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)			--										MISSING		
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 with N-CON Collector (3 of 3)

	StationId	VT01	VT99	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
No fences > 1 m height inside 2 m radius (raingage)		X		
No vegetation height > 0.6 m within 5 m radius (raingage)				
30 degree rule for buildings met (raingage)				
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
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	
No pastures and ag. activity within 20 m radius				
No herbicides and fertilizers used within 20 m radius				
Roads meet NADP siting criteria				
Waterways meet NADP siting criteria				
Airports meet NADP siting criteria				
Animal operations meet NADP siting criteria (NTN and AIRMoN)				
Parking lots and maintenance areas meet NADP siting criteria				
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria				
N-CON lid seal in good condition		X		
N-CON lid liner in good condition				
N-CON sensor responds to a 20-second mist of water				X
Was the 'as found' turn over set properly (Belfort gage)		--	--	--
Raingage operates properly (electronic gage)				
Does datalogger receive event signals form all collectors (electronic gage)				
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-5. Findings Most Likely to Impact Data Quality – AIRMoN Sites

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)			
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		
30 degree rule for buildings met (raingage)			
Collector and sensor oriented properly	X		X
45 degree rule met (collector)			
30 degree rule for trees met (collector)			
30 degree rule for buildings met (collector)			
No objects > 1 m height within 5 m radius (collector)			
No fences > 1 m height inside 5 m radius (collector)			
No vegetation height > 0.6 m within 5 m radius (collector)	X		
No treated lumber inside 5 m radius (collector)			X
No pastures and ag. activity within 20 m radius			
No herbicides and fertilizers used within 20 m radius			
Roads meet NADP siting criteria			
Waterways meet NADP siting criteria			
Airports meet NADP siting criteria			
Animal operations meet NADP siting criteria (NTN and AIRMoN)			
Parking lots and maintenance areas meet NADP siting criteria			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria			
Dry side bucket is clean		X	
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)		U to T	
Does optical sensor respond to mist of water (electronic gage)		U to T	



Indicates found compliant



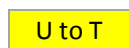
X

Indicates found non-compliant



--

Indicates "Not Applicable"



U to T

Indicates "Unable to Test"

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 4)

Station Id	AL03			CO97			KS03		KS04		KS05		KS24		KS99		MD99			
	Year	2014	2011	2008	2014	2011	2008	2014	2010	2014	2010	2014	2010	2014	2010	2014	2010	2014	2011	2008
Is sampling media quality maintained?													X							
Is the orifice of the collector +/- .3 m of raingage (elevation)		X	X	X																
30 degree rule for buildings met (raingage)																				
No objects > 1 m height inside 5 m radius (raingage)		X	X	X	X	X	X	X				X	X					X	X	X
No fences > 1 m height inside 2 m radius (raingage)																				
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														
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	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
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														
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
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

Table C-1. NADP – MDN - Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (page 2 of 4)

Station Id	ME00			ME98			MN16			MN18			MS22			NC08		
Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
Is sampling media quality maintained?																		
Is the orifice of the collector +/- .3 m of raingage (elevation)	X	X	X									X						
30 degree rule for buildings met (raingage)																		
No objects > 1 m height inside 5 m radius (raingage)	X	X	X		X								X	X		X	X	
No fences > 1 m height inside 2 m radius (raingage)																X	X	X
No vegetation height > 0.6 m within 5 m radius (raingage)	X			X	X	X												
Collector and sensor oriented properly							X						X			X		
45 degree rule met (collector)				X	X	X										X	X	X
30 degree rule for trees met (collector)			X				X	X	X							X	X	X
30 degree rule for buildings met (collector)																		
No objects > 1 m height within 5 m radius (collector)	X	X	X								X	X	X			X	X	X
No fences > 1 m height inside 5 m radius (collector)																X	X	X
No vegetation height > 0.6 m within 5 m radius (collector)	X	X		X	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													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
- X Indicates found non-compliant
- Indicates "Not Applicable"
- U to T Indicates "Unable to Test"

Table C-1. NADP – MDN - Siting Criteria and Sample Quality: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (page 3 of 4)

Station Id	NS01			NY20			NY68			OK99			ON07			SD18			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	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	X	X	
No vegetation height > 0.6 m within 5 m radius (raingage)	X						X	X											
Collector and sensor oriented properly																			
45 degree rule met (collector)									X	X									
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	
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																		
No treated lumber inside 5 m radius (collector)				X	X	X			X	X	X	U to T			X			X	
No galvanized metal inside 5 m radius collector (MDN)	X	X	X								X				X				
No pastures and ag. activity within 20 m radius										X	X	--							
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)																			

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

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

StationId	TX21			VA28			VT99			
	Year	2014	2011	2008	2014	2011	2009	2014	2011	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)										
No fences > 1 m height inside 2 m radius (raingage)										
No vegetation height > 0.6 m within 5 m radius (raingage)										
Collector and sensor oriented properly										
45 degree rule met (collector)										
30 degree rule for trees met (collector)					X	X	X	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)										
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				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
- 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 1 of 13)

Station Id	AL10			AL99			AR02		AR03		AR16			AR27			AZ06			
	Year	2014	2011	2008	2014	2011	2008	2014	2010	2014	2011	2014	2010	2008	2014	2011	2008	2014	2011	2008
Is sampling media quality maintained?																				
Is the orifice of the collector +/- .3 m of raingage (elevation)																		X	X	
30 degree rule for buildings met (raingage)																				
No objects > 1 m height inside 5 m radius (raingage)		X	X	X	X					X					X	X	X	X		
No fences > 1 m height inside 2 m radius (raingage)		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			
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			
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																		
No pastures and ag. activity within 20 m radius		X	X	X																
No herbicides and fertilizers used within 20 m radius									X								X			
Roads meet NADP siting criteria					X												X			
Waterways meet NADP siting criteria																				
Airports meet NADP siting criteria																				
Animal operations meet NADP siting criteria (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"
- 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 2 of 13)

Station Id	AZ97			AZ98			AZ99			CAN5			CO10			CO15			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2012	2009
Is sampling media quality maintained?	U to T																		
Is the orifice of the collector +/- .3 m of raingage (elevation)														X	X				X
30 degree rule for buildings met (raingage)																			
No objects > 1 m height inside 5 m radius (raingage)					X		X	X						X	X	X			
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														X	X	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	X				X	X	X			
No fences > 1 m height inside 5 m radius (collector)					X	X	X	X	X	X				X					
No vegetation height > 0.6 m within 5 m radius (collector)					X			X											
No treated lumber inside 5 m radius (collector)										X									
No pastures and ag. activity within 20 m radius																			
No herbicides and fertilizers used within 20 m radius																			
Roads meet NADP siting criteria																			
Waterways meet NADP siting criteria																			
Airports meet NADP siting criteria																			
Animal operations meet NADP siting criteria (NTN and AIRMoN)																			
Parking lots and maintenance areas meet NADP siting criteria																			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																			

- Indicates found in compliance
- 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 3 of 13)

Station Id	CO19			CO93			CO97			CT15			GA41			IA08			
	Year	2014	2012	2009	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2012	2009
Is sampling media quality maintained?																			
Is the orifice of the collector +/- .3 m of raingage (elevation)					X	X	X												
30 degree rule for buildings met (raingage)																			
No objects > 1 m height inside 5 m radius (raingage)								X	X	X	X	X	X					X	X
No fences > 1 m height inside 2 m radius (raingage)				X													X	X	X
No vegetation height > 0.6 m within 5 m radius (raingage)												X							
Collector and sensor oriented properly													X						
45 degree rule met (collector)									X		X							X	
30 degree rule for trees met (collector)				X													X	X	X
30 degree rule for buildings met (collector)																			
No objects > 1 m height within 5 m radius (collector)								X	X	X		X	X					X	X
No fences > 1 m height inside 5 m radius (collector)																	X	X	X
No vegetation height > 0.6 m within 5 m radius (collector)												X							
No treated lumber inside 5 m radius (collector)					X	X										X			
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 siting criteria (NTN and AIRMoN)																			
Parking lots and maintenance areas meet NADP siting criteria																			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																			

- Indicates found compliant
- 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 4 of 13)

Station Id	IL46			IN20			KS07			KS31			LA30		MD99			ME00			
	Year	2014	2012	2009	2014	2012	2010	2014	2010	2008	2014	2010	2008	2014	2011	2014	2011	2008	2014	2011	2008
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	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)																					
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	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
No pastures and ag. activity within 20 m radius	X		X											X							
No herbicides and fertilizers used within 20 m radius	X		X											X							
Roads meet NADP siting criteria																					
Waterways meet NADP siting criteria																					
Airports meet NADP siting criteria																					
Animal operations meet NADP siting criteria (NTN and AIRMoN)																					
Parking lots and maintenance areas meet NADP siting criteria																					
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																					

- Indicates found compliant
- 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 5 of 13)

Station Id	ME98			MN08			MN16			MN18			MN99			MS10			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	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		
No fences > 1 m height inside 2 m radius (raingage)																			
No vegetation height > 0.6 m within 5 m radius (raingage)	X	X	X																
Collector and sensor oriented properly					X	X	X	X	X			X							
45 degree rule met (collector)	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		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					
No pastures and ag. activity within 20 m radius																			
No herbicides and fertilizers used within 20 m radius																			
Roads meet NADP siting criteria																			
Waterways meet NADP siting criteria																			
Airports meet NADP siting criteria																			
Animal operations meet NADP siting criteria (NTN and AIRMoN)																			
Parking lots and maintenance areas meet NADP siting criteria																			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																			

- Indicates found compliant
- 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 6 of 13)

Station Id	MS19			MS30			MT97			NC03			NC34			NC41			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2012	2009	2014	2012	2008	2014	2012	2009
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																			
45 degree rule met (collector)	X	X		X	X	X								X	X				
30 degree rule for trees met (collector)	X	X	X	X	X	X	X	X	X	X	X	X		X	X				
30 degree rule for buildings met (collector)																			
No objects > 1 m height within 5 m radius (collector)										X									
No fences > 1 m height inside 5 m radius (collector)																			
No vegetation height > 0.6 m within 5 m radius (collector)																			
No treated lumber inside 5 m radius (collector)									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 siting criteria (NTN and AIRMoN)																			
Parking lots and maintenance areas meet NADP siting criteria																			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																			

- Indicates found compliant
- 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 7 of 13)

Station Id	NC45			ND08			ND11			NH02			NM07			NM08			
	Year	2014	2012	2009	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2010	2008	2014	2010	2008
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)																	X	X	X
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	
30 degree rule for trees met (collector)	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
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					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 siting criteria (NTN and AIRMoN)																			
Parking lots and maintenance areas meet NADP siting criteria																			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria				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 8 of 13)

Station Id	NY01			NY08			NY20			NY29			NY52			NY68			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
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
No fences > 1 m height inside 2 m radius (raingage)				X	X					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				X			
45 degree rule met (collector)													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				
No fences > 1 m height inside 5 m radius (collector)				X	X	X				X	X	X		X	X				
No vegetation height > 0.6 m within 5 m radius (collector)								X						X	X				
No treated lumber inside 5 m radius (collector)							X	X	X	X	X	X	X	X	X	X			
No pastures and ag. activity within 20 m radius				X	X	X													
No herbicides and fertilizers used within 20 m radius				X	X	X													
Roads meet NADP siting criteria																			
Waterways meet NADP siting criteria																			
Airports meet NADP siting criteria																			
Animal operations meet NADP siting criteria (NTN and AIRMoN)																			
Parking lots and maintenance areas meet NADP siting criteria																			
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																			

- Indicates found compliant
- 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 9 of 13)

Station Id	NY98			NY99			OH09		OH49			OH54		OH71			PA15			
	Year	2014	2011	2008	2014	2011	2009	2014	2011	2014	2011	2008	2014	2011	2014	2011	2008	2014	2011	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	X						
Collector and sensor oriented properly								X							X					
45 degree rule met (collector)		X	X										X	X						
30 degree rule for trees met (collector)	X	X	X	X						X	X		X	X						
30 degree rule for buildings met (collector)																				
No objects > 1 m height within 5 m radius (collector)	X	X	X					X		X	X	X	X	X						
No fences > 1 m height inside 5 m radius (collector)										X	X	X								
No vegetation height > 0.6 m within 5 m radius (collector)													X	X						
No treated lumber inside 5 m radius (collector)	X	X								X										
No pastures and ag. activity within 20 m radius										X										
No herbicides and fertilizers used within 20 m radius																				
Roads meet NADP siting criteria																				
Waterways meet NADP siting criteria																				
Airports meet NADP siting criteria																				
Animal operations meet NADP siting criteria (NTN and AIRMoN)																				
Parking lots and maintenance areas meet NADP siting criteria																				
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																				

- Indicates found compliant
- 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 10 of 13)

Station Id	PA18				SD99			TX02			TX03			TX04			TX10			
	Year	2014	2013	2010	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	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	
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			
Collector and sensor oriented properly					X															
45 degree rule met (collector)																				
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			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 siting criteria (NTN and AIRMoN)																				
Parking lots and maintenance areas meet NADP siting criteria																				
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria								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 11 of 13)

Station Id	TX16			TX21			TX43		TX56			VA00			VA13			VA24		
Year	2014	2011	2008	2014	2011	2008	2014	2011	2014	2011	2008	2014	2011	2009	2014	2011	2009	2014	2011	2009
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
No fences > 1 m height inside 2 m radius (raingage)																				
No vegetation height > 0.6 m within 5 m radius (raingage)	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			
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											
No treated lumber inside 5 m radius (collector)																				
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 siting criteria (NTN and AIRMoN)																				
Parking lots and maintenance areas meet NADP siting criteria																				
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria																				

- Indicates found compliant
- 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 12 of 13)

Station Id	VA28			VA99			VT01			VT99			WI35			WI37		
Year	2014	2011	2009	2014	2011	2009	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	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									
No vegetation height > 0.6 m within 5 m radius (raingage)								X										
Collector and sensor oriented properly											X							
45 degree rule met (collector)													X	X	X		X	X
30 degree rule for trees met (collector)	X	X		X	X	X	X	X	X	X						X	X	X
30 degree rule for buildings met (collector)																		
No objects > 1 m height within 5 m radius (collector)							X	X	X					X	X			
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										
No treated lumber inside 5 m radius (collector)				X	X	X					X	X	X					
No pastures and ag. activity within 20 m radius																		
No herbicides and fertilizers used within 20 m radius									X									
Roads meet NADP siting criteria																		
Waterways meet NADP siting criteria																		
Airports meet NADP siting criteria																		
Animal operations meet NADP siting criteria (NTN and AIRMoN)																		
Parking lots and maintenance areas meet NADP siting criteria																		
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria				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 13 of 13)

Station Id	WV04			WY99		
	2014	2012	2009	2014	2011	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	
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						
45 degree rule met (collector)	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 pastures and ag. activity within 20 m radius						
No herbicides and fertilizers used within 20 m radius						
Roads meet NADP siting criteria						
Waterways meet NADP siting criteria						
Airports meet NADP siting criteria						
Animal operations meet NADP siting criteria (NTN and AIRMoN)						
Parking lots and maintenance areas meet NADP siting criteria						
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria						

- Indicates found compliant
- 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 1 of 4)

Station Id	AL03			CO97			KS03		KS04		KS05		KS24		KS99		MD99		
	Year	2014	2011	2008	2014	2011	2008	2014	2010	2014	2010	2014	2010	2014	2010	2014	2010	2014	2011
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	--		X				--	--	--	--	--	--	--	--	--	--	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		--	--	--	--	--										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							X	--	--	--
N-CON heater thermostat in good condition		--	--	--	--	--			U to T							U to T	--	--	--
N-CON max / min thermometer in acceptable limits		--	--	--	--	--											--	--	--
N-CON sensor responds to a 20-second mist of water		--	--	--	--	--											--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--				--	--		--	--	--	--	--	--	--	--	--	--	--	--
Raingage operates properly (electronic gage)		--	--			--													
Does datalogger receive event signals form all collectors (electronic gage)	X	--	--		X	--													
Does optical sensor respond to "blocking" of light beam (electronic gage)		--	--	--	--	--	U to T				U to T								
Does optical sensor respond to mist of water (electronic gage)		--	--	--	--	--	U to T				U to T								

- | |
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|--|

 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 2 of 4)

Station Id	ME00			ME98			MN16			MN18			MS22			NC08			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
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	--	--	--				X						--	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		--	--	--	--	--	--	--	--	--		--	--		--	--	
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				--	--	--	--	--	--	--	--	--		--	--		--	--	
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	X	--	--	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)						U to T			--			--	U to T	--	--	U to T	--	--	
Does optical sensor respond to mist of water (electronic gage)	X	X	MISSING			U to T			--			--	U to T	--	--	U to T	--	--	

- 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 4)

StationId	NS01			NY20			NY68			OK99			ON07			SD18			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
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	--	--									--	--		--	--		--	--	--
Heater thermostat in good condition	--	--									--	--		--	--		--	--	--
Has flush wall filter mount been installed	--	--									--	--		--	--	X	--	--	--
Filter in good condition	--	--									--	--		--	--		--	--	--
Max / min thermometer in acceptable limits	--	--								X				--	--		--	--	--
ACM sensor operates properly	--	--	X						X					--	--		--	--	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			--	--	--	--	--	--	--	--			--			--			MISSING
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			--	--	--	--	--	--	--	--			--			--			
Was the 'as found' turn over set properly (Belfort gage)	--	--	X	X		X		--	--		--	--	--	--	--	X	--	--	--
Raingage operates properly (electronic gage)	X		--	--	--	--							U to T			--			
Does datalogger receive event signals form all collectors (electronic gage)	X	X	--	--	--	--							U to T			--			U to T
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)	X		--	--	--	--							U to T			--			

- 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 4 of 4)

StationId	TX21			VA28			VT99			
	Year	2014	2011	2008	2014	2011	2009	2014	2011	2008
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		
Filter in good condition					MISSING	U to T	--	--		
Max / min thermometer in acceptable limits										X
ACM sensor operates properly										
Motorbox operates within acceptable limits								X	X	
N-CON lid seal in good condition	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition	--	--	--	--	--	--	--	--	--	--
N-CON fan in good condition	--	--	--	--	--	--	--	--	--	--
N-CON cooling fan thermostat in good condition	--	--	--	--	--	--	--	--	--	--
N-CON heater in good condition	--	--	--	--	--	--	--	--	--	--
N-CON heater thermostat in good condition	--	--	--	--	--	--	--	--	--	--
N-CON max / min thermometer in acceptable limits	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	X	X	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)	--	--	--							--
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 C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 1 of 13)

Station Id	AL10			AL99			AR02		AR03		AR16			AR27			AZ06		
	Year	2014	2011	2008	2014	2011	2008	2014	2010	2014	2011	2014	2010	2008	2014	2011	2008	2014	2011
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	--	--	--	--	--	--		--		--	--	--	--		--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	X		--			--	X	--	X	--	--		--			--	--	
Raingage operates properly (electronic gage)		--	--		--	--		--		--			--		--	--		X	--
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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 2 of 13)

Station Id	AZ97			AZ98			AZ99			CAN5			CO10			CO15			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2012	2009
Dry side bucket is clean			X				--			--	--								
Does lid seal properly				X			--			--	--	X							
Lid liner in good condition	X					--	--		--	--	--								
ACM sensor operates properly							--	X	X	--	--								
Motorbox operates within acceptable limits				X			--	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	--	--	--	--	--	--		--	--			--	--	--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	--		--	--	X	--		X	--	--	X	--	--		--	--	--	
Raingage operates properly (electronic gage)				--		--		--	--		X	--			--				--
Does datalogger receive event signals form all collectors (electronic gage)				--		--		--	--			--	X		--		X		--
Does optical sensor respond to "blocking" of light beam (electronic gage)	U to T	U to T	--			--	--	--	--			--		U to T	--				--
Does optical sensor respond to mist of water (electronic gage)	U to T	U to T	--			--	--	--	--			--		U to T	--				--

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

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 3 of 13)

Station Id	CO19			CO93			CO97			CT15			GA41			IA08		
	Year	2014	2012	2009	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2012
Dry side bucket is clean													X	X	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												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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			--
Was the 'as found' turn over set properly (Belfort gage)	--	--				X						X			X	--	--	X
Raingage operates properly (electronic gage)						--			--			--		--	--			--
Does datalogger receive event signals form all collectors (electronic gage)						--		X	--			--		--	--			--
Does optical sensor respond to "blocking" of light beam (electronic gage)					--	--	--	--	--			--		--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)			U to T		--	--	--	--	--			--		--	--	--	--	--

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 4 of 13)

Station Id	IL46			IN20			KS07			KS31			LA30		MD99			ME00			
	Year	2014	2012	2009	2014	2012	2010	2014	2010	2008	2014	2010	2008	2014	2011	2014	2011	2008	2014	2011	2008
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	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	--	--	--		--	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	--	--		X		--	X	X	--	--	X			--	--	--	--	--	--	--
Raingage operates properly (electronic gage)					--	--		--	--			--									
Does datalogger receive event signals form all collectors (electronic gage)					--	--		--	--		X	--									
Does optical sensor respond to "blocking" of light beam (electronic gage)					--	--	--	--	--	--	--	--	--	--							
Does optical sensor respond to mist of water (electronic gage)					--	--	--	--	--	--	--	--	--	--					X	X	MISSING

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

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 5 of 13)

Station Id	ME98			MN08			MN16			MN18			MN99			MS10			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
Dry side bucket is clean																	--	X	X
Does lid seal properly																	--		
Lid liner in good condition																	--		
ACM sensor operates properly																	--		
Motorbox operates within acceptable limits																	--		
N-CON lid seal in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
N-CON lid liner in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
N-CON sensor responds to a 20-second mist of water		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--
Was the 'as found' turn over set properly (Belfort gage)		--	--	--	X	X	X	--	--	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)				U to T	--	--	--			--			--	U to T	--	--	--	--	--
Does optical sensor respond to mist of water (electronic gage)				U to T	--	--	--			--			--	U to T	--	--	--	--	--

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 6 of 13)

Station Id	MS19			MS30			MT97			NC03			NC34			NC41			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2012	2009	2014	2012	2008	2014	2012	2009
Dry side bucket is clean				X									X	X		X			X
Does lid seal properly																			
Lid liner in good condition																			
ACM sensor operates properly			X						X										
Motorbox operates within acceptable limits																			
N-CON lid seal in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON lid liner in good condition		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)		X	X	X	X	X	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 C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 7 of 13)

Station Id	NC45			ND08			ND11			NH02			NM07			NM08			
	Year	2014	2012	2009	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2010	2008	2014	2010	2008
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	--	--	--		--	--	MISSING	--	--	--	--	--	--	--	--	--		--	--
N-CON sensor responds to a 20-second mist of water	--	--	--		--	--		--	--	--	--	--	--	--	--	--		--	--
Was the 'as found' turn over set properly (Belfort gage)	--	--		--	X		--	--	X	--	--		X	X		--	X	X	
Raingage operates properly (electronic gage)			--		--	--		U to T	--			--	--	--	--		--	--	
Does datalogger receive event signals form all collectors (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)			--	--	--	--	--	--	--			--	--	--	--	--	--	--	

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 8 of 13)

Station Id	NY01			NY08			NY20			NY29			NY52			NY68			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
Dry side bucket is clean	--	--				X				--	--						--		
Does lid seal properly	--	--								--	--			U to T			--		
Lid liner in good condition	--	--								--	--						--		
ACM sensor operates properly	--	--			X					--	--			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			--	--	--	--	--	--	--			--	--	--	--		--	--	
Was the 'as found' turn over set properly (Belfort gage)	--	--	X		X	X	X		X	--	--	--	--	--	X		--	--	
Raingage operates properly (electronic gage)			--	--	--	--	--	--	--			--		U to T	--		--	--	
Does datalogger receive event signals form all collectors (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	--	--	--	--	

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

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 9 of 13)

Station Id	NY98			NY99			OH09		OH49			OH54		OH71			
	Year	2014	2011	2008	2014	2011	2009	2014	2011	2014	2011	2008	2014	2011	2014	2011	2008
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			--		--	--		--		--	--	--	--		--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--		X			X		--	--	--	--	X		--	--		X
Raingage operates properly (electronic gage)			--	--	--	--					--				--	--	--
Does datalogger receive event signals form all collectors (electronic gage)			--	--	--	--		X			--		X		--	--	--
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--	--	--	--		--	--	--	--	X		--	--	--	--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--		--	--	--	--	X		--	--	--	--

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 10 of 13)

Station Id	PA15			PA18				SD99			TX02			TX03			TX04			
	Year	2014	2011	2008	2014	2013	2010	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2008
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		--						
Motorbox operates within acceptable limits					--	--			--		--	X		--						
N-CON lid seal in good condition	--	--	--			--	--		--	--		--	--	X	--	--	--	--	--	--
N-CON lid liner in good condition	--	--	--			--	--		--	--		--	--		--	--	--	--	--	--
N-CON sensor responds to a 20-second mist of water	--	--	--			--	--		--	--		--	--		--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	X		--	--	X	X		--	--	X	--	X	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)	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 C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 11 of 13)

Station Id	TX10			TX16			TX21			TX43		TX56			VA00			VA13			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008	2014	2011	2014	2011	2008	2014	2011	2009	2014	2011	2009
Dry side bucket is clean	--	X									X		--			--	--				
Does lid seal properly	--										X		--			--	--				
Lid liner in good condition	--						--				X		--		--	--	--				
ACM sensor operates properly	--		X										--			--	--			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	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	X	X	--	X		X	X	X	--	--	--	X	X	--	--		--	--		
Raingage operates properly (electronic gage)		--	--		--	--	--	--	--				--	--			--				--
Does datalogger receive event signals form all collectors (electronic gage)	MISSING	--	--		--	--	--	--	--				--	--			--				--
Does optical sensor respond to "blocking" of light beam (electronic gage)	--	--	--	--	--	--	--	--	--		X		--	--	--	--	--	--	--		--
Does optical sensor respond to mist of water (electronic gage)	--	--	--	--	--	--	--	--	--		X		--	--	--	--	--	--	--		--

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 12 of 13)

Station Id	VA24			VA28			VA99			VT01			VT99			WI35				
	Year	2014	2011	2009	2014	2011	2009	2014	2011	2009	2014	2011	2008	2014	2011	2008	2014	2011	2008	
Dry side bucket is clean											--	--		--	--					
Does lid seal properly											--	--		--	--					
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	--	--	--	--	--	--	--	--	--	X		--		X	--	--	--	--	--	
N-CON lid liner in good condition	--	--	--	--	--	--	--	--	--			--			--	--	--	--	--	
N-CON sensor responds to a 20-second mist of water	--	--	--	--	--	--	--	--	--			--			--	--	--	--	--	
Was the 'as found' turn over set properly (Belfort gage)	--	--	--	--	--	--	--	--	--			X	--	--	X	--	--	X		
Raingage operates properly (electronic gage)			U to T									--			--					--
Does datalogger receive event signals form all collectors (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								--	--	--		--					--

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

Table C-4. NADP – NTN – Raingage and Collector: Comparison Between Surveys of Findings Most Likely to Impact Data Quality (part 13 of 13)

Station Id	W137			WV04			WY99		
Year	2014	2011	2008	2014	2012	2009	2014	2011	2008
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		--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)			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)	--	--	--	--	--	--		--	--

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 Indicates found compliant
- | |
|---|
| X |
|---|

 Indicates found non-compliant
- | |
|----|
| -- |
|----|

 Indicates "Not Applicable"
- | |
|--------|
| U to T |
|--------|

 Indicates "Unable to Test"

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

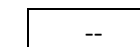
Station Id	NY67			PA15			WV99			
	Year	2014	2011	2008	2014	2011	2008	2014	2011	2008
Is sampling media quality maintained?										
Is the orifice of the collector +/- .3 m of raingage (elevation)										
30 degree rule for buildings met (raingage)										
No objects > 1 m height inside 5 m radius (raingage)										
No fences > 1 m height inside 2 m radius (raingage)										
No vegetation height > 0.6 m within 5 m radius (raingage)	X	X	X							
Collector and sensor oriented properly	X	X	X				X	X	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)										
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							
No pastures and ag. activity within 20 m radius										
No herbicides and fertilizers used within 20 m radius										
Roads meet NADP siting criteria										
Waterways meet NADP siting criteria										
Airports meet NADP siting criteria										
Animal operations meet NADP siting criteria (NTN and AIRMoN)										
Parking lots and maintenance areas meet NADP siting criteria										
Storage areas (fertilizers, road salt, manure, etc) meet NADP siting criteria										
Dry side bucket is clean				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	--	--	--	--	--	--	--	--	--	--
Was the 'as found' turn over set properly (Belfort gage)	--	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)		--	--	U to T	--	--		--	--	--
Does optical sensor respond to mist of water (electronic gage)		--	--	U to T	--	--		--	--	--



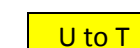
Indicates found compliant



Indicates found non-compliant



Indicates "Not Applicable"



Indicates "Unable to Test"

APPENDIX D

Transfer Standard Instrument Certifications

BL2 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
12/20/2013	8028481064	26677	Bal Init	0.00	0.00	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	1500.00	1499.89	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	1000.00	999.91	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	500.00	499.93	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	200.00	199.95	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	100.00	99.98	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	50.00	49.99	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	0.00	0.00	CEH	Initial Balance Check
12/20/2013	8028481064	BL2-0	Audit		999.9	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-1			823.1	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-2			820.4	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-3			824.4	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-4			825.0	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-5			823.3	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-6			824.0	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-7			823.4	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-8			823.4	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-9			823.6	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-10			823.7	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-11			823.5	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-12			824.1	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-a			206.84	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-b			205.77	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-c			206.30	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	BL2-d			206.48	CEH	ETI/Belfort Set #2 - EOH
12/20/2013	8028481064	26677	Bal Post	0.00	0.00	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	1500.00	1499.93	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	1000.00	999.92	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	500.00	499.93	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	200.00	199.96	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	100.00	99.96	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	50.00	49.98	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	0.00	0.00	CEH	Post Balance Check

Calibrator Signature: Casey Halbrook

Date: 12/20/2013

Reviewer Signature: *Ein Hebert*

Date: 12/20/2013

BL1 And BL3 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
12/20/2013	8028481064	26677	Bal Init	0.00	0.00	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	1500.00	1499.93	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	1000.00	999.92	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	500.00	499.93	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	200.00	199.96	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	100.00	99.96	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	50.00	49.99	CEH	Initial Balance Check
12/20/2013	8028481064	26677	Bal Init	0.00	0.00	CEH	Initial Balance Check
12/20/2013	8028481064	BL3-0	Audit		1001.1	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-1			824.3	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-2			823.4	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-3			825.2	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-4			823.9	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-5			823.9	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-6			823.1	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-7			823.7	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-8			824.8	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-9			824.3	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-10			821.0	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-11			824.0	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL3-12			823.2	CEH	ETI/Belfort Set #3 - SEG
12/20/2013	8028481064	BL1-a			207.56	CEH	ETI/Belfort Set #1 - SEG
12/20/2013	8028481064	BL1-b			207.36	CEH	ETI/Belfort Set #1 - SEG
12/20/2013	8028481064	BL1-c			207.24	CEH	ETI/Belfort Set #1 - SEG
12/20/2013	8028481064	BL1-d			207.63	CEH	ETI/Belfort Set #1 - SEG
12/20/2013	8028481064	26677	Bal Post	0.00	0.00	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	1500.00	1499.91	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	1000.00	999.94	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	500.00	499.93	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	200.00	199.96	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	100.00	99.97	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	50.00	49.99	CEH	Post Balance Check
12/20/2013	8028481064	26677	Bal Post	0.00	0.00	CEH	Post Balance Check

Calibrator Signature: Casey Halbrook

Date: 12/20/2013

Reviewer Signature: *Ein Hebert*

Date: 12/20/2013

P2OTT1 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
12/30/2013	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	1500.00	1500.06	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	1000.00	1000.01	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	500.00	499.96	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	200.00	499.96	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	100.00	99.99	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	50.00	49.99	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
12/30/2013	8028481064	P2OTT1-1			1018.0	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-2			1018.2	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-3			1017.5	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-4			1018.3	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-5			1017.0	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-6			1017.2	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-7			1017.8	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-8			1016.7	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-9			1018.1	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-a			255.43	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-b			255.24	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-c			255.32	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	P2OTT1-d			255.70	SEG	Ott P2 Set #1 - SEG
12/30/2013	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	1500.00	1500.05	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	1000.00	999.99	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	500.00	499.96	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	200.00	199.96	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	100.00	99.99	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	50.00	49.99	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville

Date: 12/30/2013

Reviewer Signature: *Ein Helbert*

Date: 1/1/2014

P2OTT2 Weight / Balance Calibration Log

Date	Balance SN#	Weight SN#	Cal Type	Std. (g)	Act. (g)	Calibrator	Notes
12/30/2013	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	1500.00	1500.06	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	1000.00	1000.01	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	500.00	499.96	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	200.00	499.96	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	100.00	99.99	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	50.00	49.99	SEG	Initial Balance Check
12/30/2013	8028481064	26677	Bal Init	0.00	0.00	SEG	Initial Balance Check
12/30/2013	8028481064	P2OTT2-1			1016.8	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-2			1017.3	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-3			1017.4	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-4			1017.2	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-5			1017.3	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-6			missing	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-7			1017.3	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-8			1016.0	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-9			1016.6	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-a			254.27	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-b			254.26	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-c			254.47	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	P2OTT2-d			254.45	SEG	Ott P2 Set #2 - EOH
12/30/2013	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	1500.00	1500.05	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	1000.00	999.99	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	500.00	499.96	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	200.00	199.96	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	100.00	99.99	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	50.00	49.99	SEG	Post Balance Check
12/30/2013	8028481064	26677	Bal Post	0.00	0.00	SEG	Post Balance Check

Calibrator Signature: Sandy Grenville

Date: 12/30/1013

Reviewer Signature: *Ein Helbert*

Date: 1/1/2014

Certificate of Calibration

Customer: EE & MS
1128 NW 39TH DRIVE
GAINESVILLE, FL 32605
FEDEX

P.O. Number: HOLD
ID Number: 01231

and 01230

Description: TEMPERATURE PROBE
Manufacturer: UNKNOWN
Model Number: SP034-39
Serial Number: 01H0060
Technician: STEVE TORRES

Calibration Date: 12/27/2013
Calibration Due: 12/27/2014
Procedure: NA 17-20ST-132
Rev: 11/1/2011
Temperature: 72 °F
Humidity: 42 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

On-Site Calibration:
Comments:

Limiting Attribute:

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

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. Either the measurement standard TUR to the item being calibrated is 4:1 or measurement uncertainties are reported. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement.

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

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

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FRANK BAHMANN, BRANCH MANAGER

JACK SHULER, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
30946	FLUKE	5616	5/11/2013	9/9/2014
A06118	HART SCIENTIFIC	9103	11/7/2013	1/23/2015
A88072	FLUKE	1502A	8/20/2013	5/14/2014



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

INSTRUMENT DATA SHEET

Asset Number: 01230 & 01231
Date Tested: 12/27/13

Customer: EE & MS

<u>Parameter Tested</u>	<u>Nominal Value</u> <u>In °C</u>	<u>Tolerance</u> <u>±.13 °C</u>	<u>Lower</u> <u>Limit</u>	<u>Upper</u> <u>Limit</u>	<u>As Found</u>	<u>Pass/Fail</u>	<u>As Left</u>
<u>Temperature Accuracy</u>	0.006	0.130	-0.124	0.136	0.01	PASS	AS FOUND
	10.061	0.130	9.931	10.191	9.94	PASS	AS FOUND
	20.120	0.130	19.990	20.250	20.04	PASS	AS FOUND
	29.941	0.130	29.811	30.071	30.00	PASS	AS FOUND
	40.028	0.130	39.898	40.158	40.02	PASS	AS FOUND
	49.928	0.130	49.798	50.058	49.93	PASS	AS FOUND

Date

1/8/2014 - - Calibration and verification of three thermocouples and fluke meters with most recent certification of EEMS RTD

TMI Data -- 12/27/2013			
	TMI STD	EEMS RTD	
cert date=	11/7/2013	01230 / 01231	
	0.006	0.01	-0.004
	10.061	9.94	0.121
	20.120	20.04	0.080
	29.941	30.00	-0.059
	40.028	40.02	0.008
	49.928	49.93	-0.002
RTD 01230/01231			
2014 correction:		slope=	1.0013315
		intercept=	-0.0573053
			0.9999948

At EEMS	Date 1/8/2014	fluke =	01311	01312	01310		
RTD			EEMS SEG	EEMS AER	EEMS EOH		
01230 / 01231		thermo =	01236	01237	01238		
raw	corrected		raw	corrected	raw	corrected	
0.15	0.21		0.2	0.15	0.17	0.2	0.15
9.67	9.71		9.8	9.71	9.71	9.9	9.76
19.77	19.80		20.0	19.87	19.85	20.1	19.86
26.65	26.67		26.9	26.74	26.71	27.0	26.70
30.46	30.48		30.7	30.53	30.58	30.8	30.46
34.91	34.97		35.1	34.91	34.86	35.3	34.92
43.85	43.91		44.0	43.78	44.30	44.3	43.83
51.70	51.69		52	51.74	51.75	52.3	51.75
Thermocouple offset =			0.0	-0.2	0.7		
slope =			1.003956	1.0061396	1.0097		
intercept =			0.050762	0.0289062	0.04451		
correlation =			1.0000	1.0000	1.0000		

Certificate of Calibration

Customer: EE & MS
1128 NW 39TH DRIVE
GAINESVILLE, FL 32605
FEDEX

P.O. Number: HOLD
ID Number: 01310

Description: DIGITAL MULTIMETER
Manufacturer: FLUKE
Model Number: 187
Serial Number: 86590148
Technician: RENN BANE

Calibration Date: 12/28/2013
Calibration Due: 12/28/2014
Procedure: METCAL FLUKE 187
Rev: 8/30/2012

Temperature: 72 °F
Humidity: 42 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

On-Site Calibration:
Comments:

Limiting Attribute:

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

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. Either the measurement standard TUR to the item being calibrated is 4:1 or measurement uncertainties are reported. Statements of compliance are based on test results falling within specified limits with no reduction by the uncertainty of the measurement.

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

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

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FRANK BAHMANN, BRANCH MANAGER



JACK SHULER, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
7040208	FLUKE	5520A	11/30/2012	12/30/2013



Technical Maintenance, Inc.

12530 TELECOM DRIVE, TEMPLE TERRACE, FL 33637

ANSI/NCSL Z540-1-1994

Certificate of Calibration

Customer: EE & MS
1128 NW 39TH DRIVE
GAINESVILLE, FL 32605
FEDEX

P.O. Number: HOLD
ID Number: 01311

Description: TRUE RMS MULTIMETER
Manufacturer: FLUKE
Model Number: 287
Serial Number: 95740135
Technician: RENN BANE
On-Site Calibration:
Comments:

Calibration Date: 12/28/2013
Calibration Due: 12/28/2014
Procedure: METCAL FLUKE 287
Rev: 8/30/2012
Temperature: 72 °F
Humidity: 42 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

Limiting Attribute:

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

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. Either the measurement standard TUR to the item being calibrated is 4:1 or measurement uncertainties are reported. 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



JACK SHULER, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
7040208	FLUKE	5520A	11/30/2012	12/30/2013



Technical Maintenance, Inc.

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www.tmicalibration.com

ANSI/NCSL Z540-1-1994

Certificate of Calibration

Customer: EE & MS
1128 NW 39TH DRIVE
GAINESVILLE, FL 32605
FEDEX

P.O. Number: HOLD
ID Number: 01312

Description: TRUE RMS MULTIMETER
Manufacturer: FLUKE
Model Number: 287
Serial Number: 95740243
Technician: RENN BANE

Calibration Date: 12/28/2013
Calibration Due: 12/28/2014
Procedure: METCAL FLUKE 287
Rev: 8/30/2012

Temperature: 72 °F
Humidity: 42 % RH
As Found Condition: IN TOLERANCE
Calibration Results: IN TOLERANCE

On-Site Calibration:
Comments:

Limiting Attribute:

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

Reported uncertainties and "test uncertainty ratios" (TUR's) are expressed as expanded uncertainty values at approximately 95% confidence level using a coverage factor of K=2. Either the measurement standard TUR to the item being calibrated is 4:1 or measurement uncertainties are reported. 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



JACK SHULER, QUALITY MANAGER

Calibration Standards

<u>Asset Number</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Date Calibrated</u>	<u>Cal Due</u>
7040208	FLUKE	5520A	11/30/2012	12/30/2013



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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

EE MS # 01265

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:	EE & MS
Purchase Order #:	
Instrument:	S-25 Tracon Surveying Compass
Serial Number:	190037
Quantity:	1
Calibration Due:	1/2015

John Noga, Quality Control

January 30, 2014

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 05/08/13 Due 05/08/14 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-2020 S/N 5167 Calibration 02/27/09 Due 02/27/14 731/244084-89



Warren-Knight Instrument Company

2045 Bennett Road

Philadelphia, PA 19116

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

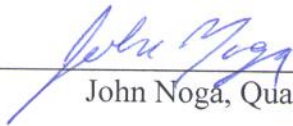
Web: <http://www.warrenind.com>

CERTIFICATION OF CALIBRATION AND CONFORMANCE

~~192034~~ ^{EEMS} #01270

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:	EE & MS
Purchase Order #:	
Instrument:	S-25 Tracon Surveying Compass
Serial Number:	190034
Quantity:	1
Calibration Due:	1/2015


John Noga, Quality Control

January 30, 2014

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 05/08/13 Due 05/08/14 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-2020 S/N 5167 Calibration 02/27/09 Due 02/27/14 731/244084-89



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

EMS # 01272

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:	EE & MS
Purchase Order #:	
Instrument:	S-25 Tracon Surveying Compass
Serial Number:	191832
Quantity:	1
Calibration Due:	1/2015

John Noga, Quality Control

January 30, 2014

Measurement Standards
Theodolite Wild T-3 S/N 18801 Calibration 05/08/13 Due 05/08/14 NIST Number 738/229329-83 738/223398
Optical Wedge K&E 71-2020 S/N 5167 Calibration 02/27/09 Due 02/27/14 731/244084-89