Quality Assurance Project Plan (QAPP)
Revision 1

Support for Conducting Systems and Performance Surveys of the National Atmospheric Monitoring Stations

Prepared for:
U. S. Environmental Protection Agency
Washington, DC 20460

Prepared by:

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EPA Contract No.: EPW12019

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GROUP A: PROJECT MANAGEMENT

A1 Approval Sheet

Approved by:

Maria L. Jones, PE **Project Manager** **EEMS, Inc.**	**Date**
Alison Ray **QA Manager** **EEMS, Inc.**	**Date**
Timothy Sharac **Project Officer** **US EPA, Office of Atmospheric Programs**	**Date**
Melissa Puchalski **Alternate Point of Contact** **US EPA, Office of Atmospheric Programs**	**Date**
Karen Orehowsky **Quality Officer** **US EPA, Office of Atmospheric Programs**	**Date**
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List of Acronyms and Abbreviations

AIRMoN	Atmospheric Integrated Research Monitoring Network
AMNet	Atmospheric Mercury Network
AMoN	Ammonia Monitoring Network
CAAA	Clean Air Act Amendments
CAL	Central Analytical Laboratory
CAMR	Clean Air Mercury Rule
CASTNET	Clean Air Status and Trends Network
EEMS	Environmental, Engineering & Measurement Services, Inc.
EPA	U.S. Environmental Protection Agency
FSSD	Field Site Survey Database
GPRA	Government Performance and Results Act
GPS	global positioning system
HAL	Mercury Analytical Lab
Hg	mercury
ISWS	Illinois State Water Survey
MDN	Mercury Deposition Network
NADP	National Atmospheric Deposition Program
NADP PO	NADP Program Office
NIST	National Institute of Standards and Technology
NOS	Network Operations Subcommittee
NO_x	nitrogen oxides
NTN	National Trends Network
NWS	National Weather Service
OAP	Office of Atmospheric Programs
OTC	Ozone Transport Commission
PART	Program Assessment Rating Tool
PO	Program Office
QA	quality assurance
QAAG	Quality Assurance Advisory Group
QAPP	quality assurance project plan
QC	quality control
QMP	quality management plan
SIP	state implantation plan
SO_2	sulfur dioxide
SOP	standard operating procedures
µS/cm	micro Siemens/centimeter

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A3 Distribution List

Copies of the approved document "Quality Assurance Project Plan (QAPP) for Support for Conducting Systems and Performance Surveys of the National Atmospheric Monitoring Stations", along with any subsequent revisions, are distributed to the persons listed below:

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1.0 GROUP A: Project Management Elements

This Quality Assurance Project Plan (QAPP) has been prepared to meet the requirement of the Environmental Protection Agency (EPA) Contract Number EPW12019 for the Support for Conducting Systems and Performance Surveys of National Atmospheric Monitoring Stations (from this point on referred to as the NADP Site Survey Program). This QAPP describes the objectives of the surveying activities to be performed at National Atmospheric Deposition Program (NADP) sites, data quality requirements and assessments, project management, organization and responsibilities of Environmental Engineering & Measurement Services, Inc. (EEMS) staff and consultants, and a schedule of activities and deliverables. This QAPP has been prepared to be compliant with EPA Order 5360.0 A2, *Policy and Program Requirements for the Mandatory Agency-wide Quality Systems* and with the EPA QAPP format as presented in the *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R5 (EPA 2001).

1.1 A1 – Title and Approval Sheet

Title and Approval Sheet provided in preliminary section of this document.

1.2 A2 – Table of Contents

Table of Contents provided in preliminary section of this document.

1.3 A3 – Distribution List

Distribution List provided in preliminary section of this document.

1.4 A4 – Project/Task Organization

The NADP Site Survey Program is fundamentally a quality assurance role to ensure the reliability of data collected at these sites. This includes a thorough, on-site evaluation of facilities, equipment, personnel, training, procedures, documentation and reporting aspects of the field operations systems. Field systems survey results are used to ensure that good quality assurance/quality control (QA/QC) practices are being applied as defined in the NADP Quality Management Plan (QMP). The individuals with major responsibilities participating in this project are presented below.

<u>EEMS Project Manager</u>

The project manager is responsible for:

- Coordinating with the surveyor regarding survey schedules, procedures, standards and constants, and required supplies.

- Reviewing all survey results.
- Distributing the survey results to designated personnel in a timely fashion.
- Reviewing and approving any changes to the survey procedures.
- Preparing and maintaining the QAPP.
- Assisting in preparing the template for the surveying activities (Site Performance Survey Questionnaire).
- Coordinating survey schedules with the Survey Team Leader.
- Notifying the applicable personnel of any upcoming surveys.
- Reviewing and forwarding the survey deliverables to the applicable personnel.
- Preparing Monthly Technical Progress reports to the U.S. EPA.
- Preparing an Annual Summary Report to the U.S. EPA.
- Attending annual NADP meetings.
- Participating in QAAG meetings.

The EEMS Project Manager is Maria Jones, P.E.

EEMS Survey Team Leader

The Survey Team Leader is responsible for:

- Coordinating with the Project Manager regarding survey schedules, survey procedures, accuracy goals, required materials, and survey standards.
- Performing all required surveys in accordance with approved survey protocols as described in the specific Standard Operating Procedures (SOP).
- Maintaining all survey standards.
- Meeting with, observing and/or interviewing the site operators as needed during surveys.
- Documenting the survey results using the appropriate forms and database.
- Preparing and forwarding survey reports to the Project Manager.
- Assisting in preparing the QAPP.
- Assisting in preparing the template for the surveying activities (Site Performance Survey Questionnaire).
- Acquiring the appropriate equipment, supplies and standards to conduct the surveys
- Training other EEMS employees, or EEMS consultants (Survey Technicians) who may be expected to perform surveys.
- Finalizing and forwarding the survey deliverables to the EEMS Project Manager.
- Attending annual NADP meetings.
- Participating in QAAG meetings.

The EEMS Survey Team Leader is Eric Hebert.

EEMS QA Manager

The QA Manager is responsible for:

- The review and approval of the QAPP.
- Document control.
- QC of database entries.
- Overseeing the maintenance of National Institute of Standards and Technology (NIST) traceable records and survey standards.
- The review all deliverables (including the QAPP) to the U.S. EPA and the NADP PO to ensure that these deliverables are of the type and quality required for their intended use.
- Participate in QAAG meetings.

The EEMS QA Manager is Alison Ray.

U.S. EPA Project Officer

The functions of the U.S. EPA Project Officer are:

- Providing overall technical direction for the project.
- Receiving notification of EEMS' activities on the project
- Receiving all EEMS' survey deliverables.

The U.S. EPA Project Officer is Timothy Sharac, and the alternate is Melissa Puchalski.

U.S. EPA QA Officer

The functions of the U.S. EPA QA Officer are:

- Reviewing all deliverables (including the QAPP) to ensure that these deliverables are of the type and quality required for the intended use.

The U.S. EPA QA Officer is Karen Orehowsky.

NADP QA Manager

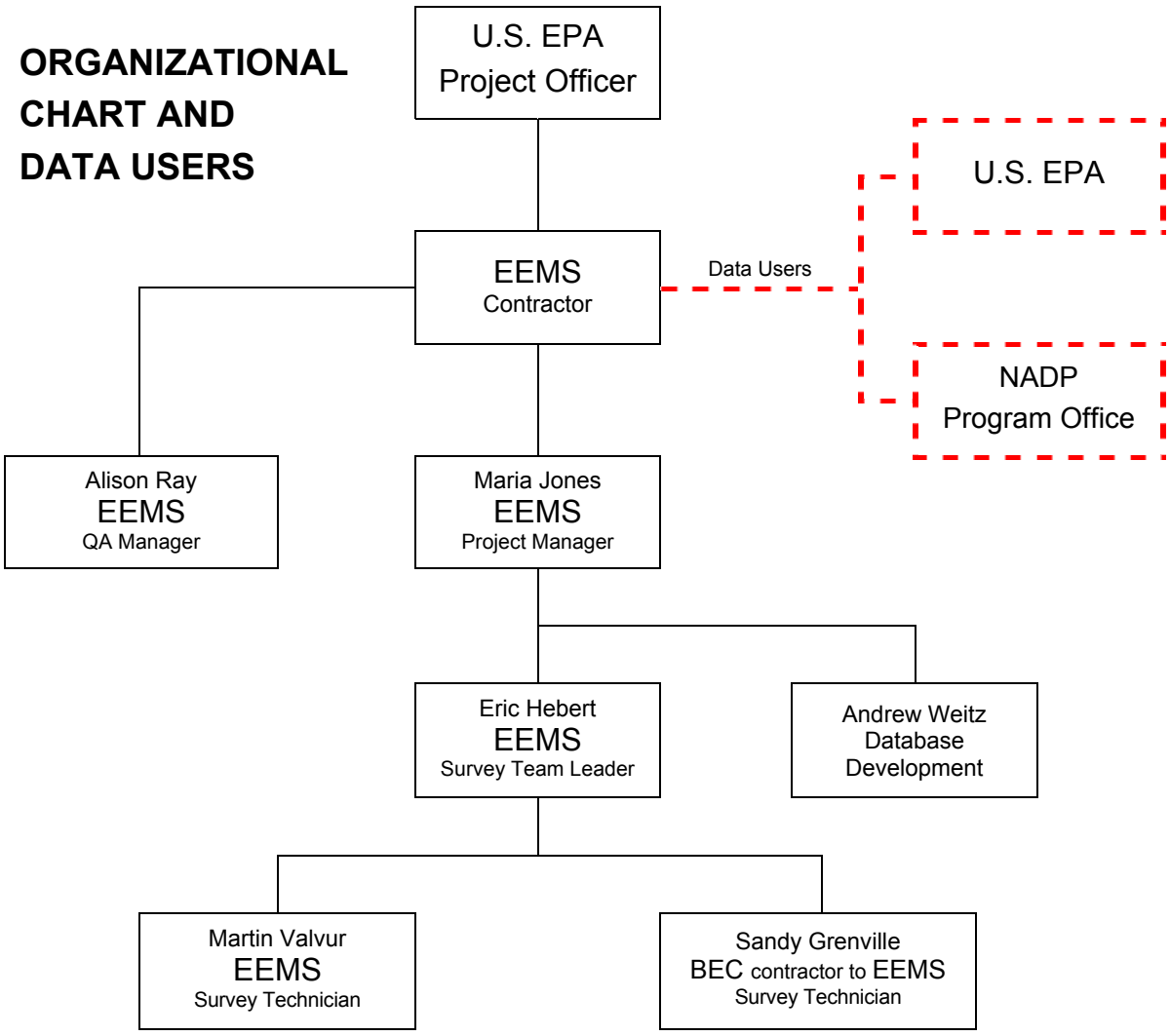
The functions of the NADP QA Manager are:

- Reviewing all deliverables to the NADP Program Office to ensure that these deliverables are of the type and quality required for the intended use.
- Assisting in preparing the template for the surveying activities (Site Performance Survey Questionnaire).
- Receiving all survey deliverables, including the annual QA report.

The NADP QA Manager is Mark Rhodes.

Figure 1 shows the organizational chart for EEMS with the relationships and lines of communication among the project participants, together with the users of the data generated by this survey program.

Figure 1. Organizational Chart and Data Users



1.5 A5 – Problem Definition/Background

The Acid Rain Program, established under Title IV of the 1990 Clean Air Act Amendments (CAAA), requires major reductions of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) emissions from the electric power industry. Similarly, other programs such as the Ozone Transport Commission (OTC), NO_x Budget Trading Program and the EPA's NO_x State Implementation Plan (SIP), both of which are seasonal and regional NO_x reduction programs also require emissions reductions from the power sector. In the spring of 2005, EPA promulgated a suite of air quality rules designed to further the reductions of SO_2 and NO_x, as well as mercury (Hg) emissions from power plants. Assessing the environmental impacts of power generation such as regional air quality and atmospheric deposition of sulfur, nitrogen, ammonia, and mercury is important to understanding and evaluating the progress of these emission reduction programs. EPA adheres to several mandates such as Title IX of the Clean Air Act, the Government Performance and Results Act (GPRA), and the Program Assessment Rating Tool (PART) to report on the performance and overall progress of these programs. This involves evaluating the environmental effectiveness of these programs as measured by a variety of environmental monitoring efforts at different scales, and examination of the link between emissions and atmospheric concentrations, deposition, and soil/aquatic chemistry and biological impact, and concentration levels and human health. EPA's air quality management strategy must continue and improve tracking regional patterns of pollutant concentrations, transport, and trends.

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's wet deposition concentration networks. 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. The NADP is a cooperative of multi-agency network, which measures precipitation chemistry and estimates atmospheric deposition for various pollutant ions and mercury. EPA has provided long-standing support for the operation of NADP. In addition to operational support, EPA provides support for the survey and quality assurance programs of the NADP networks. Contract Number EPW12019 provides for the survey and quality assurance assessment of sites associated with three NADP wet-deposition networks–the National Trends Network (NTN), the Atmospheric Integrated Research Monitoring Network (AIRMoN), and the Mercury Deposition Network (MDN). Examination of the AMoN (Ammonia Monitoring Network) shelters and the eight directional photographs of the samplers is also included as part of the quality assurance assessments. Surveys of sites under this contract will provide the necessary checks for the site operations and will serve to validate data provided by the sites in the network.

QA/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 across the networks. These activities strengthen the reliability and overall quality of the data the EPA uses for policy decisions and for measures of accountability.

1.6 A6 – Project/Task Description

The work to be performed under this contract involves support to the EPA, Office of Atmospheric Programs (OAP), Clean Air Markets Division (CAMD). Under this contract EEMS performs a survey of site operations for NADP's wet-deposition collection networks. All results are recorded in a relational database and reported to the relevant data users. The surveys provide quality assurance pertaining to siting, sample collection and handling, equipment operation and maintenance, recordkeeping, reports, and field laboratory procedures.

1.6.1 A6.1 Work Performed

The primary function of this contract is to provide in-field systems and performance survey services (herein after referred to as surveys) to assess and aid the performance and maintenance of the nationwide, long-term wet deposition monitoring networks of the NADP.

NADP collection stations are currently comprised of five networks which include: precipitation chemistry and wet deposition sites in the NTN; precipitation chemistry and wet deposition sites in the AIRMoN; and measurements of mercury concentrations in precipitation at wet deposition sites in the MDN. The most recently added networks include AMNet, Atmospheric Mercury Network which reports atmospheric mercury concentrations for determination of mercury dry deposition, and AMoN, Ammonia Monitoring Network which reports atmospheric ammonia concentrations to determine ammonia dry deposition.

There are currently over 250 wet deposition sites in the NADP/NTN, over 100 sites in the NADP/MDN, including over 40 that are collocated at NTN sites, and six sites in NADP/AIRMoN, including three that are collocated at NTN sites. NADP operates sites throughout the continental United States, Alaska, Canada, Puerto Rico, U.S. Virgin Islands, and one in Argentina. Current maps with the sites for the three different networks can be found at http://nadp.isws.illinois.edu/. The number of sites in each network can vary at any given time and is expected to increase. EEMS will be responsible for maintaining a current inventory of sites, based on information provided by the NADP PO, located at the Illinois State Water Survey (ISWS).

The NADP PO operates and/or administers the three precipitation chemistry networks (NTN, AIRMoN, and MDN), two analytical independent laboratories, the Network Equipment Depot (NED) along with the AMoN and AMNet networks. Each network has a particular objective and corresponding sampling analytes and periods.

1.6.2 A6.2 Work Performed Prior to Initiating Performance Surveys

EEMS attended an operations workshop sponsored by the NADP PO at the ISWS prior to initiating performance surveys. The purpose of this workshop was to provide the necessary orientation to EEMS, on the various operations of the NADP PO, as well as to provide directions on network equipment and procedures to assist in implementing the site survey program. This workshop also allowed for the development of a template for the database which contains survey information collected for each network (from this point on referred to as the Site Performance Survey Questionnaire and can be found in Appendix B). Specific site survey procedures for each network, as well as quality assurance and the transfer of survey data to the NADP PO and the EPA procedures were developed with the cooperation of the NADP PO.

The workshop was conducted August 7 and 8, 2007. It was attended by EEMS personnel (Project Manager, Survey Team Leader, and QA Manager), along with two EEMS consultants, EPA's project officer representative, representatives from each of the three networks, Central Analytical Laboratory (CAL), Mercury Analytical Lab (HAL) and the former NADP QA Manager. This schedule was in conformance with the Statement of Work for this project, which required that the workshop be conducted within the first ninety days of contract award.

1.6.3 A6.3 Participation in NADP's Standing Subcommittee on Network Operations

Appropriate representatives from EEMS will actively participate on NADP's standing Subcommittee on Network Operations (NOS) meeting twice a year. EEMS representatives will also attend the Annual Technical Committee Meetings, participate in the QAAG conference calls, and any other interim business meetings as appropriate. Changes to equipment and methods are discussed and decided at the subcommittee meetings. Participation in the subcommittees is essential for staying informed about changes in network operations.

1.6.4 A6.4 Site Systems and Performance Surveys

EEMS will conduct surveys of approximately 100 sites per year from the NADP NTN, AIRMoN, and MDN networks, including collocated sites. A monitoring site can have one or more collocated NADP collection stations at a single site location. Collocated sites include those sites that are within a 1 km radius. Each approved NADP monitoring station at the physical location will be considered a single monitoring station in the total for the year. The purpose of the surveys is to provide an independent quality assurance assessment of all NADP sites, documenting the

conditions of the site, site operations, and site equipment. The survey team will conduct external quality assurance evaluations pertaining to NADP approved siting criteria, sample collection and handling, field measurement procedures and SOPs, equipment operation and maintenance, record keeping, reports and field laboratory procedures. As part of the site survey, EEMS will also perform minor repairs and preventive maintenance, and will assist in restoring proper function to site equipment. Surveys may also include certain other monitoring activities and special studies located at approved NADP sites using approved NADP monitoring equipment. In such cases, EEMS will contact the NADP PO and the EPA Project Officer to verify whether a survey is applicable.

The items in the Site Performance Survey Questionnaire for each network will be checked at each collection site and entered into a computer database maintained by EEMS. This database will ensure and verify the validity of all entries. Database reports and tables will be electronically transferred to the EPA and NADP QA Manager. The database files will be in Microsoft Access® format and contain every item on the network Site Performance Survey Questionnaire. Digital site images will be provided in electronic format with a consistent, site specific naming convention. Additional survey documentation will be mailed to the EPA Project Officer and the NADP QA Manager upon request. EEMS developed a site survey procedure manual, or SOPs that details the major functions and procedures involved in conducting a site survey as part of this program. The NADP anticipates changes to equipment and procedures during the period of this contract. Such changes, when approved by the NADP PO and subcommittees, are considered within the scope of Contract Number EPW12019.

The following tasks pertain to general preparation for conducting surveys at NADP monitoring sites.

1.6.5 A6.5 Work Performed in Preparation for Conducting Surveys

EEMS is familiar with the overall operations of each of the three NADP networks, and will work closely with the NADP PO in the coordination of site surveys and to maximize the utility of information gathered.

Standards and supplies required to conduct the survey will include:

- Standard weights for calibrating Belfort rain gages, and verifying the calibration of the electronic rain gages.
- Global Positioning System (GPS) device equipped with a Wide Area Augmentation System (WAAS). Survey quality compass (NIST certified) for accurate proximity determinations of site equipment and site configuration purposes.
- At a minimum 4.0 mega pixel digital camera.

- Field-suitable laptop computer with Microsoft Access® 2010, or later version,
- Quality control check samples and conductivity standards, as appropriate, provided by CAL.
- EEMS understands that in the event that the NADP updates site equipment over the period of this contract, EEMS may be required to procure additional equipment to verify calibration of new NADP-approved equipment.

EEMS will initiate communications with the NADP representatives and site liaisons and NADP QA Manager to obtain an update of the site status, and site operator information prior to initiating site surveys. Upon receiving updates of the status of the sites, EEMS will proceed to develop a proposed schedule of sites to be surveyed in the first year of this contract based on historical survey data.

EEMS developed a database that provides the EEMS team with electronic entry forms for inputting and handling information collected from the site surveys. The database is capable of storing historical information from previous surveys so data entry/exit rules can be written that will challenge entries that differ significantly from initial entries. This database generates an abbreviated exit report (Spot Report) from the preliminary numeric audit results and written findings. The Spot Report includes findings that could result in data invalidation. Further information on this database is provided in the NADP Site Systems Survey Standard Operating Procedures (NADP INSTALLATIONS) – SOP-NADP-1500 (Revision 1).

EEMS has developed a Quality Management Plan (QMP) according to EPA Requirements for Quality Management Plans (EPA QA/R-2) and this QAPP which conforms to EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5).

1.6.6 A6.6 Work Performed During the One-Year Base Period and Each One-Year Option Period

EEMS will conduct surveys of approximately 100 monitoring sites each year. The first consideration will be given to those sites that have not been surveyed for three or more years. Following this criteria, EEMS will develop a schedule of the sites to be surveyed during the each one-year period of the contract.

1.6.6.1 Prepare for Each Survey Trip

One month before the scheduled site surveys, EEMS contacts the EPA Project Officer, the NADP PO QA Manager, the appropriate site liaisons and site operators and supervisors to establish an agenda for the survey. Details pertaining to the contacting procedures can be found in SOP-NADP-1500 (Revision 1). EEMS also prepares the necessary supplies to conduct the site surveys.

These supplies comply with NOS-approved specifications. Equipment repaired and/or calibrated on site by EEMS are performed in accordance with NOS-approved procedures. EEMS compiles the necessary information in preparation for the site survey, and generates the necessary field forms to conduct the surveys. This subject is further discussed in Section B3 – Data Handling and Custody.

1.6.6.2 Conduct Site Surveys

Survey Technicians meet the site operators and other interested parties as prearranged, and conduct the surveys in accordance with the SOPs included in Appendix A. These SOPs have been developed by EEMS for the different aspects of conducting the survey. Assistance from the site operator will only be required to obtain the information necessary to complete the Site Performance Survey Questionnaire that pertains to the historical data and to the evaluation of his or her sample handling techniques.

EEMS conducts quantitative performance assessments during the surveys. All information is recorded by EEMS in the Site Performance Survey Questionnaire forms.

1.6.6.3 Prepare and Forward Survey Deliverables

The Survey Technician verbally briefs the site operator (and supervisor if present) on the results of the systems and performance survey. As soon as practicable after the completion of the site survey, EEMS Project Manager or Survey Technician generates a Spot Report that includes any immediate action items necessary to restore proper function to the site. It contains a summary of survey activities and serves to document the visit.

1.6.6.4 Prepare Monthly Progress Reports

EEMS Project Manager prepares written technical progress reports (Monthly Progress Report) that includes the following items:

- A summary of EEMS' activities conducted during the reporting period
- A summary of EEMS' activities currently scheduled during the next reporting period
- A listing of outstanding actions awaiting EPA Project Officer authorization

The Monthly Progress Report is submitted electronically to the EPA by the 15th day of each month: the EPA PO, the EPA COR and the EPA Contract Specialist are copied.

1.6.6.5 Prepare Annual Summary Report

EEMS Project Manager prepares a written draft report summarizing EEMS' surveying activities and findings. The report includes the sites surveyed during each calendar year. The draft is prepared and submitted by EEMS to the EPA Project Officer, the EPA COR and to the NADP

QA Manager. An effort is made to submit the draft report within 90 days following each calendar year or with sufficient time for the annual NADP interim subcommittee meeting. The recipients of the draft report have up to 45 days for review, and comment on the report. Once comments have been received, these are incorporated into the final report which is submitted within 30 days to the interested parties.

1.6.6.6 Semi-Annual NADP Meetings

EEMS Project Manager and Survey Team Leader (or representatives) attend the Annual Interim Subcommittee meeting (typically scheduled during the spring months) and actively participate on the NADP NOS. EEMS Project Manager and Survey Team Leader (or representatives) attend the annual NADP Technical Committee interim meeting (typically scheduled during the autumn months). A brief update of EEMS' recent activities is presented during the Annual Interim Subcommittee meeting. The EPA Project Officer and the NADP QA Manager provide updates and summaries as appropriate to NADP members. A summary of the results included in the annual summary report is presented at the Annual NADP Interim Subcommittee Meeting. EEMS also participates in the semi-annual QAAG conference calls.

1.6.6.7 Maintaining the QAPP

EEMS Project Manager periodically reviews the QAPP[1] for accuracy. The review should occur upon major changes in procedures or personnel, or at least annually, whichever is sooner. Approved revisions of the QAPP will be distributed electronically to those included in the document distribution list.

1.7 A7 – Quality Objectives and Criteria

The intent of the NADP Site Survey Program is to provide an unbiased assessment for all NADP wet-deposition sites and to document the results to verify that all evaluated parameters are consistent with the NADP performance and accuracy goals. The quality objectives of this survey program are to evaluate the parameters in a precise manner and to accurately report the findings.

1.7.1 A7.1 Project Quality Objectives

The project quality objective is to ensure that the survey data collected by EEMS are of the type and quality required by the EPA and the NADP PO to determine if the samples and field data collected at each network site are in conformance with NADP QAP. The project objective will be satisfied by:

- EEMS and the end users jointly developing the Site Performance Survey Questionnaire for gathering, recording and transmitting the data at the operations workshop

[1] Reviews of the QAPP will only be distributed in electronic format.

- Establishing regular communications between EEMS Survey Team Leader and NADP representatives (typically the NADP QA Manager and NADP network site liaisons).

Quality objectives will continue to be developed within the scope of this project.

1.7.2 A7.2 Measurement Performance Criteria

Historical data available from previous site surveys is entered into the Site Performance Survey Questionnaire for the upcoming surveys. All historical data is checked by EEMS during the survey, to verify if changes have occurred. Changes may be likely given that sites are surveyed approximately once every three years, and that sites are dynamic in terms of the performance of the site operators, the performance of the equipment, and site surroundings.

EEMS' goal is to obtain 100 percent data completeness of the Site Performance Survey Questionnaire. Difficulties in accomplishing this goal may include such factors as inclement weather during the survey, non-participation of the site operator during the survey, unexpected failure of any of EEMS' measurement equipment, and other factors beyond EEMS' control. EEMS expects to obtain an overall data completeness of the Site Performance Survey Report of at least 95 percent.

1.8 A8 – Special Training/Certification

No special training or certifications are required of EEMS personnel and its consultants assigned to participate in this project. EEMS personnel that participate in field activities and EEMS' consultants attended the Project Operations workshop as was required by Contract Number EPW07061. EEMS personnel and its consultants have extensive experience performing field survey activities.

Training of all new field personnel will be provided by the Survey Team Leader. All new field personnel will be trained by accompanying the Survey Team Leader to as many field sites as necessary to become proficient with the survey procedures.

An effort will be made to have the EEMS QA Manager observe the survey Team's procedures and techniques at various sites during NADP surveys. The QA Manager would then provide a report regarding the proficiency of the Survey Technicians within on month of the observation (or field audit).

1.9 A9 – Documents and Records

During the course of this project the following documents and records are generated and revised as needed:

- The current QAPP and subsequent revisions
- The Site Performance Survey Questionnaire
- Survey announcement letters to the site operator, site supervisor and site sponsor
- Field Data Sheets of the Site Performance Questionnaire for data gathering (individual SOPs)
- Survey deliverables
- Monthly Progress Reports
- Annual Summary Reports
- Site Survey File
- Any other formal written correspondence from the EEMS Project Manager to the EPA Project Officer or the NADP QA Manager.

The EEMS QA Manager is responsible for review of and maintaining the distribution of the current version of the SOPs and QAPP.

Table 1 includes the different types of reports, generated for the NADP Site Survey Program, the recipient of each report and the level of detail.

Table 1. Documents Generated for the NADP Site Survey Program

Report Name	Recipients	Purpose and Description
Project SOPs	EPA Project Officer ; NADP QA Manager	Describes the procedures to follow when conducting all aspects of the site surveys
QAPP and Subsequent Revisions	EPA Project Officer; NADP QA Manager	Documentation of all aspects of QA/QC to be followed during the period of this contract
Site survey announcement correspondence*	Site supervisor; site operator EPA Project Officer, NADP QA Manager	Letter confirming date, time and location of the scheduled site survey along with a brief agenda and duration of the site survey
Survey Deliverable: Spot Report	Site Operator and Supervisor; NADP QA Manager; EPA Project Officer	Report of site activities and items requiring repair and maintenance
Survey Deliverable: Monthly Progress Report	EPA Project Officer Contract Specialist	Report of the previous month's activities and planned activities for the following month
Survey Deliverable:	EPA Project Officer ; NADP	Summary of previous year's activities (Draft)

Report Name	Recipients	Purpose and Description
Annual Summary Report	QA Manager	Summary of previous year's activities (Final)
Database Transfer Tables Submitted Quarterly	EPA Project Officer ; NADP QA Manager	Electronic database file delivery

* Letter of Transmittal only

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2.0 GROUP B: Data Generation and Acquisition

This section addresses all aspects of data acquisition to ensure that appropriate methods of data collection, data handling, and QC activities are being followed.

2.1 B1 – Data Collection Design

The NADP Site Survey Program is an external QA and maintenance function of sites of four of the five NADP networks. The design, location, acceptance, and operation of the sites within the networks are the responsibility of the NADP PO and subcommittees.

The NADP Site Survey Program is designed to test and assess each of the measurement and sample collection devices at all of the wet-deposition sites in the NADP. The locations of the sites can be found at http://nadp.isws.illinois.edu/.

The schedule of site surveys is established to enable each site in the NADP to be surveyed once approximately every three years. The current Site Survey Schedule is available to authorized personnel by accessing EEMS' FTP site.

The sites are comprised of instruments and equipment that have been approved by the NADP PO and subcommittees. Table 2 summarizes the instruments and equipment operated by the networks of the NADP and those used during the survey procedures to assess the operation of the equipment.

Table 2. Standard Instruments and Equipment

Site Instrument	Network			Survey Standards, Instruments and Tools
	NTN	MDN	AIRMoN	
Belfort Precipitation Gage	X	X		Weights, Linearity Tool
ETI NOAH IV Precipitation Gage	X	X	X	Weights, PDA[2], Voltmeter
OTT NADP Pluvio Precipitation Gage	X	X	X	Weights, PDA, Voltmeter
ACM Precipitation Collector	X	X	X	Temperature Probe, Weights, Voltmeter
N-CON Precipitation Collector		X		Temperature Probe, Voltmeter
Ohaus Balance	X		X	Weights

[2] PDA is used at some sites to communicate with the electronic raingage

Site Instrument	Network			Survey Standards, Instruments and Tools
	NTN	MDN	AIRMoN	
Scales (various)	X		X	Weights
pH meter (various)			X	Test solution and target values as provided by the CAL
Conductivity meter (various)			X	Test solution and target values as provided by the CAL

Other operational aspects of the sites are also assessed; those include the siting criteria and operational procedures, and are considered site systems surveys. The design and methods used for the assessment of all aspects of NADP site operations are described in the following sections.

2.2 B2 – Data Collection Methods

A performance survey and a system survey comprise the elements of a NADP site survey. When performing the site surveys, and collecting data, EEMS follows specific SOPs developed for each aspect of the survey and instrument. As the SOPs are followed, findings are recorded in the forms that constitute the Site Performance Survey Questionnaire. The Site Performance Survey Questionnaire can be found in Appendix B. The SOPs can be found in Appendix A.

2.2.1 B2.2.1 – Performance Survey Procedures SOPs

EEMS developed four SOPs where the overall or general procedures for conducting the performance survey for all sites and specifically in each of the three wet-deposition networks are specified:

- NADP Site Performance Survey Standard Operating Procedures – SOP-NADP-1500
- NTN Site Performance Survey Standard Operating Procedures – SOP-NADP-1010
- MDN Site Performance Survey Standard Operating Procedures – SOP-NADP-1020
- AIRMoN Site Performance Survey Standard Operating Procedures – SOP-NADP-1030

The performance survey procedures include verifying that sensors and gages are capable of making valid and accurate measurements as defined in the NADP QAP, performing maintenance and calibration on the equipment as required, evaluating field laboratory performance, documenting survey results using appropriate forms and database, and distributing the survey results to designated project personnel.

EEMS developed SOPs for conducting surveys of the different types of precipitation gages found at NADP sites:

- Belfort Precipitation Gage – SOP-NADP-1400 (under revision)
- OTT NADP Pluvio Precipitation Gage – SOP-NADP-1410 (under revision)
- ETI NOAH IV Precipitation Gage – SOP-NADP-1420 (under revision)

EEMS checks the response of the gages as found over the range appropriate for the gage, and when necessary, attempts to repair and recalibrate any Belfort gage in which the difference between the applied depth and recorded depth is out of tolerance as defined in the NADP QAP. Electronic gages will not be adjusted.

EEMS developed SOPs for conducting surveys of the different types of precipitation collectors found at NADP sites, including the collector sensor and motorbox:

- ACM NTN and AIRMoN Precipitation Collector – SOP-NADP-1310
- ACM MDN Precipitation Collector – SOP-NADP-1320
- N-CON Precipitation Collector – SOP-NADP-1330

EEMS developed SOPs for conducting surveys of the field laboratory activities, equipment and supplies found at NTN and AIRMoN NADP sites:

- Ohaus Balance (or electronic scale) – SOP-NADP-1210
- pH Meter – SOP-NADP-1220
- Conductivity Meter – SOP-NADP-1230

Field laboratory includes data that pertains to performance of the field laboratory equipment (bucket balance, pH measurement system and specific conductance measurement system), the inventory of supplies and recordkeeping by the site operator.

For AIRMoN sites, CAL provides EEMS with a simulated rain sample of known pH and specific conductance. EEMS then requests from the site operator that he or she analyze the sample as though it were a regular weekly sample. EEMS is able to assess the procedures executed by the site operator in completing this task.

The methods developed and described in the performance survey SOPs are intended to be used to determine and ensure that data collected and recorded by the NADP conforms to the performance acceptance criteria established in the NADP QAPP. Table 3 is a summary of these performance acceptance criteria.

Table 3. Performance Acceptance Criteria

Site Measurement	Survey Method	Acceptance Criteria
Belfort Precipitation Depth	Standard weight	± 0.10 in
ETI Precipitation Depth	Standard weight	±0.05 in
OTT NADP Pluvio Precipitation Depth	Standard weight	±0.05 in
Collector Clutch	Weight lift	2 standard weights
Mass	Standard weight	0.5%
pH	Reference solution	Target values as provided by the CAL
Conductivity	Reference solution	Target values as provided by the CAL
Precipitation Sensor Temperature	Standard temperature probe	60 °C ± 10% in 10 minutes
Precipitation Sensor Grid Type	Observation	7 for NTN and 11 for NTN
Precipitation Thies Sensor	Observation	5 passes in 50 seconds

2.2.2 B2.2.2 – NADP Systems Survey Procedures

The NADP Systems Survey Procedures include data that pertains primarily to those aspects of the survey that are not instrument specific such as general site information, siting criteria, power source for the site, field laboratory and site operator evaluation and training. EEMS follows SOP-NADP-1500 when performing this part of the survey.

EEMS takes electronic photographs of the site in standard Windows JPG format at a resolution not less than 4.0 mega pixels. The 8 cardinal directions N, NE, E, SE, S, SW, W, and NW are photographed as viewed from a distance of 5 to 10 meters from the precipitation collector, with a directional badge indicating the direction of the photo along with an overview photo of the site. Additional views may also be taken if deemed, by the Survey Technician, to be necessary to adequately show the site. EEMS uses a GPS system for measuring latitude, longitude, and elevation of the site precipitation collector for each site location.

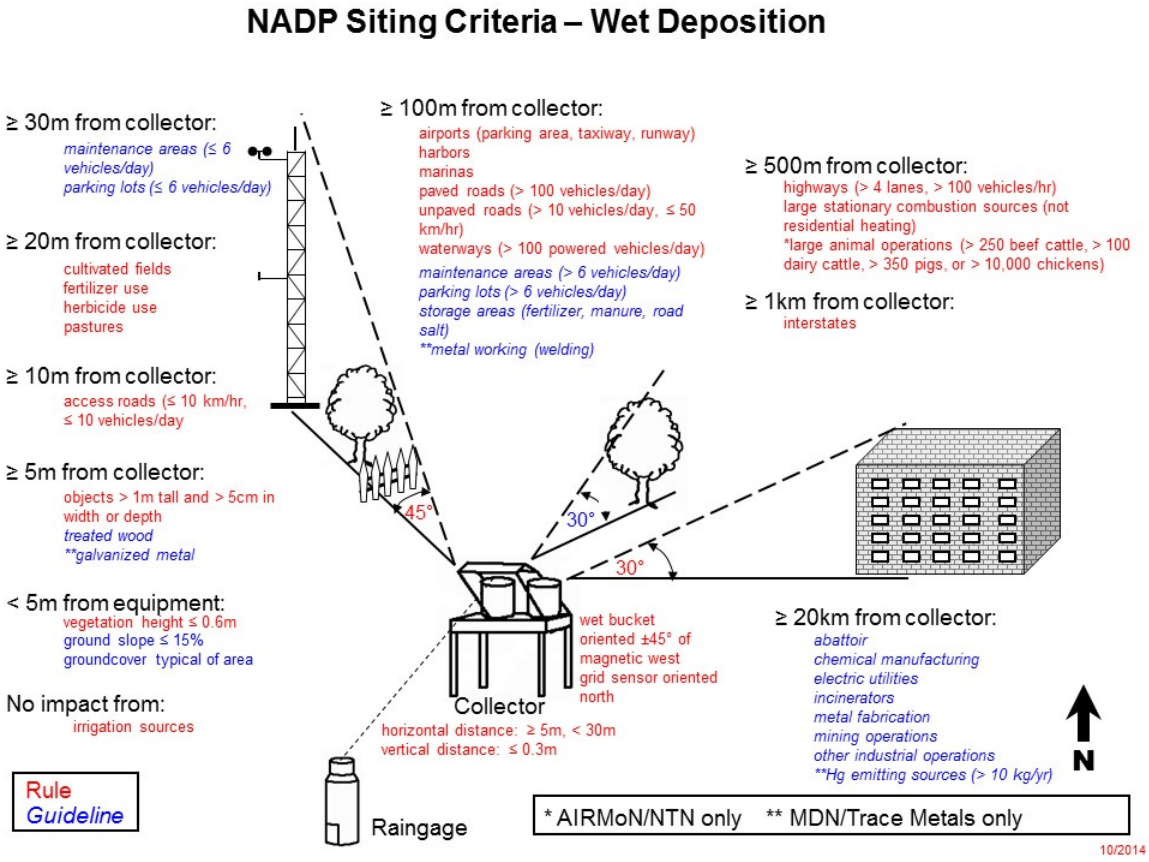
The methods developed and described in the system SOP are intended to be used to determine and ensure that data collected and recorded by the NADP conforms to the system acceptance criteria established in the NADP QAP. Table 4 is a summary of system acceptance criteria.

Table 4. Systems Acceptance Criteria

Site Measurement	Survey Method	Acceptance Criteria
Collector wet bucket oriented magnetic West	Certified compass	± 45 degrees
Collector and gage inlet height separation	Distance measuring device	± 0.3 m

Figure 2 shows the approved NADP siting criteria.

Figure 2. Accepted Siting Criteria



2.3 B3 – Data Handling and Custody

As a site survey is scheduled, EEMS requests from the NADP PO the most recent contact information for the site operator and site supervisor. EEMS will also request from the site personnel any information on modifications that may have been performed on the site instrumentation, and any operational problems that may exist at the site. This preliminary information is entered into the relational Field Site Survey Database (FSSD). EEMS then

compiles the Site Survey File. Detailed information regarding the Site Survey File can be found in site performance SOPs for the different networks (documents SOP-NADP-1010, SOP-NADP-1020, and SOP-NADP-1030).

Each Survey Technician is assigned a set of site survey equipment that includes tools, equipment, routine maintenance items, a field computer with FSSD, and survey supplies required to perform surveys. The Survey Technician is responsible for maintaining the equipment in working order and reporting any problems to the EEMS Field Operations Manager and/or QA Manager so that malfunctioning equipment may be repaired or replaced, as needed. The Survey Technician is also responsible for replenishing field supplies, as needed. The EEMS QA Manager is responsible for maintaining the required annual certifications for all survey equipment. Certification dates and any required correction factors are printed and adhered to the corresponding equipment. An electronic copy of each certification is maintained on the EEMS FTP server which is routinely backed-up. An electronic copy of any equipment certification is provided to the technician for his/her records. A hardcopy of each certification is also maintained at the EEMS office.

During the site survey, the Survey Technician follows the specific SOPs, and records the data generated onto the Site Performance Survey Questionnaire forms. The historical data from the previous site survey is verified. As soon as practicable, the Survey Technician enters the data gathered into the FSSD. A backup of the data is created after each site survey and the files are e-mailed to the Project Manager who reviews the data, generates Spot Reports, and e-mails the Spot Reports to the interested parties. Once three sites have been surveyed, the Survey Technician sends the original forms to EEMS via FedEx. Photographs taken during the Site Survey are uploaded to the EEMS FTP site by the Survey Technician. Once uploaded to the EEMS FTP site, these are correctly named following a naming convention and copied to the appropriate folder within the site by office personnel. These photos can then be accessed by the EPA PO and the NADP QA Manager.

The data collected then goes through the quality control process.

2.4 B4 – Analytical Methods

CAL will prepare simulated rain samples of known pH and specific conductance for use by EEMS in conducting surveys at AIRMoN sites. These samples will be prepared according to CAL's procedures and QAPP. These samples will be used by EEMS' Survey Technician to evaluate the technique of the site operators and to determine the accuracy of the instruments in question.

2.5 B5 – Quality Control

EEMS is acutely aware that the NADP Site Survey Program is one QA/QC role of the NADP program. As such, the internal site survey program QA/QC has added importance and consequence since not only data collected for the purpose of the survey, but data collected for the purpose of the NADP are jeopardized if the survey data are not accurate and quality assured.

EEMS QA Manager and Project Manager will review and oversee all of the procedures. Quality assurance documents (QMP and QAPP) will be prepared by the Project Manager with input and revisions by the QA Manager. These documents will specify the procedures followed as they relate to data collection and data entry.

Collected data will be recorded during the site surveys on the Site Performance Survey Questionnaire Forms. These handwritten entries will then be entered into the FSSD by the Survey Technician.

Double data entry of the data collected is performed by a technical assistant QA staff member. Any data discrepancies are revealed by the FSSD. It is the responsibility of the QA Manager and the Project Manager to resolve and reconcile any discrepancies between the two sets of data. Once the discrepancies have been resolved, a complete site report is generated and a more comprehensive QC process begins. The QA Manager then reviews all the photos taken during the site survey, and verifies that the data in the complete site report is correct and no inconsistencies are revealed between the photos and the report. When inconsistencies occur, the QA Manager will resolve these by contacting the Survey Technician and discussing the issues in question. Any records in the database that need to be modified after this screening are updated, then a backup of the final data is generated.

2.6 B6 – Equipment Testing, Inspection, and Maintenance

A list of the equipment and supplies used by EEMS in conducting the surveys is presented in each SOP. EEMS personnel inspect all equipment for damage prior to use and operate and maintain the equipment in accordance with the manufacturer's instructions. EEMS QA Manager is responsible for maintaining the site survey equipment and to oversee that the field equipment and supplies are complete and that required testing and maintenance of the equipment is performed.

The purpose of the NADP Site Survey Program is the testing, inspection and maintenance of the equipment located at NADP sites. Table 5 below shows the type of maintenance to be performed

by the Survey Technician while conducting the site surveys. Any testing, maintenance, and calibration will be performed in accordance with existing NADP SOPs and equipment manuals.

Table 5. Maintenance Chart

Instrument Condition	Calibrate	Troubleshoot	Clean	Adjust	Replace
ACM-type Collector					
Worn thrust collar	NA	Yes	No	Yes	No
Faulty sensor	NA	Yes	Yes	No	Yes
Poor bucket lid seal	NA	Yes	NA	Yes	NA
Lid tension area	NA	Yes	Yes	Yes	No
Lid liner	NA	Yes	Yes	Yes	Yes
Faulty motor box	NA	Yes	NA	NA	Yes
Improper counter weight	NA	Yes	NA	Yes	Yes
Improperly mounted snow roof	NA	NA	NA	Yes	Yes
Missing or rusted mounting screws	NA	NA	Yes	NA	Yes
Missing chimney insulation (MDN)	NA	Yes	NA	Yes	Yes
Fuses	NA	Yes	NA	NA	Yes
N-CON Collector					
Poor lid seal	NA	Yes	NA	Yes	NA
Lid liner	NA	Yes	Yes	Yes	Yes
Adjust the arm set screws	NA	Yes	NA	Yes	NA
Electronic Raingage					
Connectivity issues	NA	Yes	NA	Yes	NA
Correcting corrosion issues	NA	Yes	Yes	NA	NA
Modify connectivity system	NA	Yes	NA	NA	Yes
Wiring of all collectors to datalogger	NA	Yes	NA	Yes	Yes
Belfort Raingage					
Faulty clock	No	Yes	No	No	Yes
Out of tolerance gage	Yes	Yes	Yes	Yes	No
Pen & event marker hang-up	NA	Yes	Yes	Yes	Yes
Low oil in damper	NA	Yes	No	NA	Yes
Pen traverse off time line	NA	Yes	Yes	Yes	No
Improper zero adjust	NA	Yes	Yes	Yes	No
Missing/loose screws	NA	Yes	No	Yes	Yes

Instrument Condition	Calibrate	Troubleshoot	Clean	Adjust	Replace
Field Laboratory (AIRMoN)					
Poor pH measurement	Yes	Yes	Yes	Yes	No
Poor conductivity measurement	Yes	Yes	Yes	Yes	No
Poor mass measurement	Yes	Yes	Yes	Yes	No

2.7 B7 – Instrument/Equipment Calibration and Frequency

Instruments and equipment located at the NADP sites are calibrated according to the NADP Site Survey Program schedule. EEMS is responsible for surveying approximately 100 NADP sites per contract year, resulting in calibrations at each site once approximately every three years. EEMS selects the sites to be surveyed following these criteria:

- Select sites that have not been visited as part of this project for at least three years;
- Select sites in regional geographic proximity to one another;
- Select sites in the northern or mountainous parts of the networks to be visited during spring, summer and autumn months (to help facilitate travel and surveying operations).

It is the responsibility of the QA Manager the routine maintenance, calibration and certification of instruments and equipment used by EEMS while conducting site surveys. The QA Manger is also responsible for maintaining the appropriate certification and maintenance documentation and complying with the recertification schedule. Table 6 shows the equipment requiring regular maintenance and certification.

Table 6. Equipment Certification Information

Item	Certifying Organization	Certification Frequency
Compass	Independent Laboratory	Annual
Electronic Balance	Independent Laboratory	Annual
Standard Weights	EEMS	Quarterly
Resistive Temperature Device (RTD)	Independent Laboratory	Semiannual
Multi meter	Independent Laboratory	Annual
Range finder	EEMS	Semiannual

2.8 B8 – Inspection/Acceptance of Supplies and Consumables

Upon receipt of items and prior to use, EEMS QA Manager performs an acceptance inspection in order to ensure conformance with the procurement requirements. The inspection may include verification of configuration or physical requirements, conformance with catalog descriptions, receipt of certifications, and no damage during shipping. The inspection also includes the calibration and/or setup of equipment and/or test of satisfactory performance. The QA Manager documents and maintains records of any relevant purchases, and any recertification schedule.

2.9 B9 – Non-direct Measurements

The only non-direct measurements or data relevant to this project are data provided by the NADP PO as historical data to be verified during the site survey. These historical data are entered or imported into the FSSD and becomes part of the Site Survey File. As the Survey Technician conducts the survey, this historical data is verified, by either recording the corrected values in the Site Performance Survey Questionnaire forms, or accepting the historical values as correct.

2.10 B10 – Data Management

Data management activities are performed according to the Systems and Performance SOPs developed for this project (see SOP-NADP-1010, SOP-NADP-1020 SOP-NADP-1030, and SOP-NADP-1500).

Among the preliminary survey activities EEMS requests from the NADP PO information pertaining to the sites scheduled to be surveyed. This type of information is presented in Table 7.

Table 7. Preliminary Site Communication Information

Site Name	Site ID	Survey Date	Previous Survey Date	NADP Network(s)
Site #1				
Site #2				
Site #3				
:				

Information gathered from the NADP liaison during the preliminary communication should include the information presented in Table 8 for each site.

Table 8. Initial Site Information

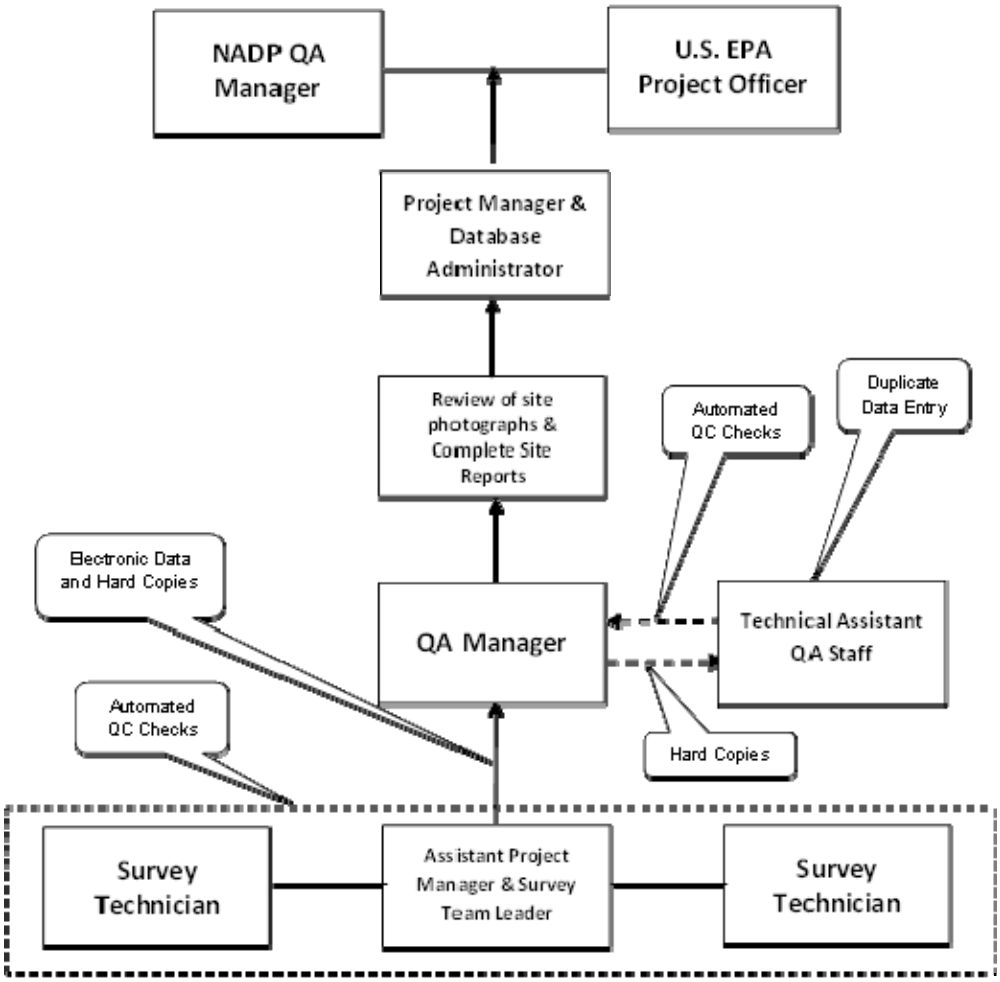
	Current Information
Site operator (name, address, phone, e-mail)	
Site supervisor (name, address, phone, e-mail)	
Site sponsor contact (name, address, phone, e-mail)	
Precipitation gage (manufacturer, model)	
Precipitation collector (manufacturer, model)	
Balance (manufacturer, model)	
pH meter (manufacturer, model)	
Conductivity meter (manufacturer, model)	
Site characteristics (i.e., solar power, remote, etc)	
Known problems (equipment and/or siting related)	
Additional requests (training issues, etc)	
Logistical concerns (i.e.,. passes or keys required, etc)	

This information is entered into the FSSD and becomes part of the Site Survey File which is backed up any time new data is incorporated.

As the Survey Technician conducts the site survey he or she records all data gathered in the Site Performance Survey Questionnaire forms. These data are then entered by the Survey Technician into the FSSD. After each site survey data set is entered the data tables are backed up and a copy is sent to the Project Manager who does a preliminary review, generates the Spot Reports and distributes them to the appropriate parties. The data then goes through the QA process, and then it is delivered to the EPA PO and NADP QA Manager in the form of tables.

Figure 3 shows the flow diagram of data management beginning with the data collection show at the bottom of the diagram.

Figure 3. Schematic Diagram of Data Management



3.0 GROUP C: Assessment and Oversight

The purpose of the NADP Site Survey Program is to ensure that good QA/QC practices are being applied as defined in the NADP Quality Management Plan, Revised 2016-04, Version 1.8 and associated network quality assurance plans. The assessment of each NADP site is strictly controlled by the implementation of the NADP Network QAP, Revised 2016-04, Version 1.8.

3.1 C1 – Assessments and Response Actions

The NADP Site Survey Program is an external assessment program for the NADP. It is EEMS' goal to review 100% of the data generated during the period of this contract. In order to accomplish this goal, EEMS implements an internal assessment program along with an independent assessment program. The internal assessment begins with the review of SOPs, field forms, database and other data management tools by the Survey Technicians. Any concerns and/or suggestions are addressed by the QA Manager and the Project Manager. The QA Manager and the Project Manager are also responsible for database assessments. The QA Manager and Field Team Leader are responsible for assessments related to field techniques. In the event that the assessment program identifies problems with project data, as it pertains to data generation, data entry, data management or data reporting, response actions will be triggered. The nature of these actions will depend upon the severity and type of problem encountered, and will begin with a review of project procedures related to the identified problem.

3.1.1 C1.1 – Preventive Response Actions

These measures will be directed at preventing the identified problem from being repeated, and include the implementation of high-level monitoring of project activities associated with the problem to prevent further deviations; and initiation of a system of audits that will include random and unannounced evaluations of personnel and equipment to determine if procedures outlined in the QAPP are being followed. The Project Manager will be responsible for implementing corrective measures to address identified deviations from the QAPP.

3.1.2 C1.2 – Corrective Response Action

This measure will result in a correction of the problem and replacement of the problematic data with data that meet the project objectives. Corrective action will require re-entry of all questionable data into the FSSD.

3.1.3 C1.3 – Independent Assessments

Independent assessments are performed by the NADP and subcommittees, and EPA who review the SOPs, QAPP and annual reports.

Survey Technicians and the QA Manager will perform internal proficiency checks at least once every other year at one of the scheduled sites. The purpose of this exercise is to ensure that all Survey Technicians are performing the site surveys consistently and to evaluate their field techniques.

Reports of the assessment will be included in the Annual Report. The reports will discuss the effectiveness of the survey technique and procedures in meeting the goals of the NADP and EPA.

3.2 C2 – Reports to Management

EEMS generates monthly reports indicating progress and significant activities from the previous month as well as activities planned for the following month. This monthly report is distributed to the EPA Project Officer and Contract Specialist.

Included as part the monthly reports there is a summary of the latest deliverables to the appropriate organizations, a summary of any current project problems uncovered during the internal assessments mentioned above, or any deficiencies in meeting deliverable deadlines or quality assurance goals, and a list of outstanding actions awaiting EPA Project Officer authorization.

4.0 GROUP D: Data Validation and Usability Elements

This section addresses the QA activities that take place after data are collected during the site survey process.

4.1 D1 – Data Review, Verification, and Validation

It is EEMS' goal to review 100% of the data collected during site surveys. This is accomplished during the various stages of data entry and verification. It begins with the entry of field-collected data into the FSSD by the Survey Technician. This is followed by double entry of the same data into the FSSD by a different EEMS Technician, and the reconciliation of discrepancies encountered by the FSSD.

Maintaining current and valid certification of survey standards ensures that survey data are valid. Valid survey data in turn ensures that NADP data are valid. The QA Manager will report any certification results that would impact survey results if a standard was used for the survey that was found to be inaccurate. Any data qualifiers will be reported to EPA and other users.

4.2 D2 – Verification and Validation Methods

Data generated during the site surveys will be recorded by the Survey Technician on forms. Historical data will be verified or corrected during the survey. These data will then be entered into the FSSD. Field data will be entered a second time by a different EEMS team member into the FSSD. The FSSD will then reveal any discrepancies between the two sets of data. These discrepancies will be reconciled by the QA Manager and the Project Manager by further reviewing the original field forms and if necessary, consulting with the Survey Technician or site operator. The last review of the data is performed by the QA Manager who then scrutinizes all the information collected during the site visit including the photographs and the data already entered in the FSSD to ascertain that no inconsistencies exists in the data collected.

Data validation methods for this project consist of maintaining current any required certifications of standards used in the performance of the site surveys. Both data verification and validation methods are used for data collected during site surveys. Some data collected may be observations made by the Survey Technician for which no instrumentation is required. Other data collected during the site survey may be measurements made by instruments, or responses from standards that require certification to a reference. All data is verified, but only data collected by a measurement process requires validation.

This process resolves errors prior to data being available to the users. If a survey standard is found to be in error the questionable data is reported to the users when the error is discovered. Questionable survey data is identified and corrective actions reported in the next report of results.

Results from the NADP Site Survey Program are conveyed to the users by means of a number of deliverables. These consist of electronic reports (Spot Report, , Monthly and Annual Report) and electronic data tables to be imported by the NADP PO into their data management system.

The Spot Report addresses the following items:

- Site, and site operator's information
- Immediate action items necessary to restore proper function to the site
- Any required site supplies or maintenance items
- Summary of survey activities

The Spot Report is submitted as an electronic copy (a hardcopy is submitted to those parties with no access to electronic mail) to the site supervisor and operator, NADP QA Manager and the EPA Project Officer at the completion of the site survey.

The Site Performance Survey Report is generated by the FSSD once all the data entered has undergone the initial QA/QC procedures and data are free of data entry errors. It is comprised of all the information gathered, and data recorded while conducting the survey and completing the Site Performance Survey Questionnaire forms. It covers all the areas covered during the survey: site information, siting criteria, all the instruments and equipment, site operator's assessment, and field laboratory. The Site Performance Survey Report is used by EEMS QA Manager to verify that all the information collected during the site survey is correct and complete. The verification of data in the Site Performance Survey Report will reveal any errors before the Database Transfer Tables are submitted to the EPA Project Officer and NADP QA Manager in electronic format on a quarterly basis.

The Monthly Progress Report is prepared for the EPA Project Officer indicating progress and significant activities from the previous month as well as activities planned for the following month.

The Annual Report are a summary of the sites visited and include the overall status of the sites, problems encountered, and how these problems may be impacting the performance of the network. The report provides information on the status of important performance measures, and describes any significant events or changes to the networks that may affect interpretations of results, the quality of data produced by the program and any limitation in using the data.

4.3 D3 – Reconciliation with User Requirements

The survey program and results are reviewed by the NADP PO and EPA Project Officer to identify changes or new requirements. The program documentation should be updated with any changes in program requirements. Survey results and network operation assessments are discussed with users at management meetings. Recommendations for improvements to the program are incorporated following periodic program review by EPA and data users.