GUIDELINES
FOR
SPECIFICATION
AND
SELECTION
OF
DATA
ACQUISITION
AND
HANDLING
SYSTEMS
FOR
CONTINUOUS
EMISSIONS
MONITORING
APPLICATIONS

ICAC

**INSTITUTE OF
CLEAN
AIR
COMPANIES**

Publication ICAC-EM-3

Guidelines for Specification and Selection of Data Acquisition and Handling Systems
for Continuous Emissions Monitoring Applications

ICAC

The Institute's mission is to be the voice of the stationary source air pollution control and monitoring industry by providing technical information relevant to flexible clean air policies based on practical, achievable and measurable emission limitations.

Guidelines for Specification and Selection of Data Acquisition and Handling Systems for Continuous Emissions Monitoring Applications

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SUMMARY:

This document provides guidelines for the specification and selection of a Data Acquisition and Handling System (DAHS or DAS) for Continuous Emission Monitoring (CEM) systems for compliance with Federal EPA and State regulations. It should be read in conjunction with Publication ICAC-CEM-1, "Guidelines for Preparation of Bid Specifications and Bid Evaluations for Continuous Emissions Monitoring Systems (CEMS.)"

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1. HISTORY

In December 2000, ICAC issued the original publication ICAC-EM-3 to assist industry in specifying and procuring Data Acquisition and Handling Systems. This publication has been widely accepted by industry, and forms the basis of many user specifications. It was developed in conjunction with ICAC publication ICAC-CEM-1 and should be considered a companion document and does not repeat information or specifications contained within that publication.

In May 2007, this publication was updated in order to reference and acknowledge recent technology developments and provide the end user a stand alone document for developing a DAHS bid specification. The monitoring plan and Quality Assurance (QA) plan sections included in the original document have been removed as these should be stand alone documents and are not customarily provided as part of a standard DAHS Specification.

2. INTRODUCTION AND SCOPE

ICAC-EM-3's purpose is to provide the customer with an understanding of the scope of supply provided by data acquisition and handling system (DAHS) vendors and to provide a road map for the satisfactory procurement of regulatory compliant DAHS. This document does not address commercial terms, conditions of contract, or pricing.

3. DEFINITIONS & ACRONYMS

3.1 Acid Rain Program (ARP) – Federal program established under Title IV of the 1990 Clean Air Act Amendments establishing formal emissions monitoring requirements for utilities and other industries.

3.2 Bid Specification – A document containing equipment specifications, performance criteria, and scope of work sought, which is distributed to vendors to describe the requirements of the DAHS intended for purchase.

3.3 CAIR – Clean Air Interstate Rule. A market based cap and trade program affecting power plants that require monitoring and applies limits to NO_X and SO_2 mass in 28 states and the District of Columbia.

3.4 CAMD – Compliance Assurance Monitoring Division. A division of the US EPA in the Office of Air and Radiation that among other functions, oversees the emissions reporting for facilities that are subject to the Acid Rain Program, CAIR, RGGI, and several other federal and state reporting programs.

3.5 CEM – A continuous emissions monitor.

3.6 CEMS – A continuous emissions monitoring system. Composed of several subsystems: the sampling interface, the gas analyzer(s), and the data acquisition/controller system.

3.7 Certification Testing – Performance testing of the CEMS and DAHS according to a specific testing protocol approved by the applicable regulatory agency for the purposes of demonstrating compliance to regulatory monitoring requirements.

3.8 CFR – Code of Federal Regulations

3.9 CGA – Cylinder Gas Audit

3.10 COMS – A continuous opacity monitoring system.

3.11 Construction Services – Electrical and mechanical labor required to physically mount, secure and install the system and its ancillary components at the site.

3.12 Customer – Entity responsible for the DAHS purchase. This may be the end user, an architectural and engineering (A&E) company, a consulting company, a CEMS integrator or other.

3.13 DCS – Distributed Control System. Plant control system used to control the operation of the combustion source (*e.g.* boiler, turbine or kiln).

3.14 ECMPS – Emissions Collection and Monitoring Plan System. EPA designed software client and process utilized by affected sources for reporting electronic reports of emissions, quality assurance test results and monitoring plans. The ECMPS client software program is used to error check and submit these reports to the US EPA.

3.15 EDR – Electronic Data Report. Report submitted to the U.S. EPA for compliance with the requirements under 40 CFR Part 75 Monitoring. The current process uses the ECMPS program to submit EDR files in XML format..

3.16 EER – Excess Emissions Report. State or local level reports that generally follow 40 CFR Part 60 monitoring, quality assurance and reporting formats. Generally, these consist of a summary report followed by excess emission and analyzer downtime descriptions.

3.17 Factory Acceptance Tests – Testing of the system and components at the manufacturer's site to ensure the system conforms to the factory specifications.

3.18 I/O- Input and Output

3.19 LAN – Local Area Network

3.20 MATS – Mercury and Air Toxics Standards – Federal regulation governing toxic emissions at specific electric generation units.

3.21 NERC – North American Electric Reliability Corporation – the electric reliability organization (ERO) certified by the Federal Energy Regulatory Commission to establish and enforce reliability standards for the bulk power system in North America.

3.22 PC– Personal Computer

3.23 PLC – Programmable Logic Controller

3.24 Probe – The CEM direct interface to the sample gas. The device used to extract a sample for analysis from the stream of flue gas.

3.25 OIT – Operator interface terminal

3.26 Regional Greenhouse Gas Initiative (RGGI) – Consortium of Northeastern states that participate in a mandatory market-based CO_2 reduction program intended to reduce greenhouse gas emissions from the power sector through a CO_2 cap-and-trade program.

3.27 Start-up Services – Services performed to calibrate and verify system operation and functionality following installation at the site.

3.28 U.S. EPA- United States Environmental Protection Agency

3.29 Vendor – Entity that will supply the DAHS.

3.30 XML – extensible markup language.

4. CUSTOMER SUPPLIED EQUIPMENT, SERVICES AND RESPONSIBILITIES

4.1 General
The Customer should provide the following to the DAHS Vendor:

5.1.1 All CEM system hardware specifications.

5.1.2 All plant tie-ins and terminations to the CEMS/DAHS. This includes, but is not limited to:
  i. Wiring between CEMS PLC, Data Logger or other Controller, and DAHS PC.
  ii. Power per the requirements specified by the PC hardware manufacturer.
  iii. Telephone (direct analog line) or high speed VPN access to the DAHS.

5.5.1 A working environment at the DAHS PC location suitable for standard grade personal computer hardware, typically 68 to 78˚F and <95% RH.

5.5.2 Miscellaneous plant data (fuel flow, unit load, flame on, etc.) from the plant DCS will be available in the CEMS shelter as analog and digital process signals or via Ethernet connection.

5.5.3 Interconnecting fiber-optic cable, fiber modems, and media converters necessary to establish communication between the system controllers in each CEMs shelter and the DAHS per specification provided by the Vendor.

4.2 On-Site Activities The Customer will be responsible for performing all tasks associated with construction labor. These tasks may include but should not be limited to:

4.2.1 Unloading and storage of all DAHS related equipment including system controller and PC hardware.

4.2.2 Running, installing and terminating all signal wiring to the system controller.

4.2.3 Installing DAHS PC and client computers on plant network, if desired.

4.2.4 Organize and schedule all necessary plant personnel (technician, operator, environmental, etc.) to be trained in DAHS functionality.

4.3 Document Provisions
The Customer should furnish to the DAHS Vendor necessary copies of specifications, technical data, and documentation as may be reasonably required for performance of the work. This should include but not be limited to:

5.3.1 Copy of any existing monitoring plans or related documentation.

5.3.2 I/O listing for CEMS including each analyzers range and mode of operation.

5.3.3 I/O listing of required plant operations.

5.3.4 Regulatory based plant operational details (*e.g.* start-up/shut-down exemptions, special calibration requirements, etc.)

5.3.5 Copy of air permit.

5.3.6 Copy of State reporting requirements (copies of reports).

5.3.7 When applicable for a 40 CFR Part 75 (*e.g.* Acid Rain Program, NO_x SIP Call and CAIR) both hard and electronic copies of the current Monitoring Plan.

5.3.8 CEMS as-built drawings and operational information.

5.3.9 Non-compliance reporting requirements, if any (process or inlet monitoring).

5.3.10 QA/QC Plan.

5.3.11 Project specific application data for process or plant operation.

5.3.12 Copy of PLC, Data Logger or other Controller program/logic specifically to identify CEM System timing and fault handling as allowed by vendor.

4.4 Design, Review, and Approval

4.4.1 The Customer should furnish to the DAHS Vendor prompt and reasonable responses to design, equation and calculations review, schedule, implementation testing and approval inquiries and requests.

4.4.2 The Customer should issue a written Notice to Proceed to the DAHS Vendor prior to the start of system configuration and procurement of new equipment.

4.4.3 The Customer should confirm final I/O list prior to commencement of work.

4.4.4 The Customer may, at its discretion, attend the Factory Acceptance Test ("F.A.T.") at the DAHS Vendor's facility. If the Customer opts not to attend the F.A.T., the Customer should provide the Vendor written authorization to ship the system after receiving F.A.T. results demonstrating compliance with the Project Specification.

5.5 On-Site Support

The Customer should provide reasonable access to:

5.5.1 The Customer and/or Customer's on-site maintenance contractor personnel for support of the project as it relates to the development and installation of the new DAHS system.

5.5.2 Appropriate plant personnel such as Environmental Manager, IT and CEMS Instrument & Controls technicians and electricians.

5.5.3 The CEMS to support design development and installation of the new DAHS.

5.5.4 Any ancillary equipment to support design, development, and installation of the new DAHS.

5.6 Acceptance

It is the Customer's responsibility to accept the new DAHS when all items specified in Section 9, of this document, Testing and Systems Acceptance, have been successfully accomplished.

6. DAHS VENDOR EQUIPMENT, SERVICES AND RESPONSIBILITIES

6.5 General

6.5.1 The Vendor should facilitate a project kick-off meeting either at the Vendor's facility, at the job site or via conference call, at the Customer's convenience. The purpose of the kick-off meeting should be for the Vendor and the Customer to jointly develop a project schedule and define, in detail, the specifications of the new DAHS ("Project Specification"). The Vendor should follow up the meeting with a Project Specification document to be reviewed and approved by the Customer prior to the Vendor starting work.

6.5.2 The requirements contained herein are the minimum necessary and should be supplemented by the Vendor's own design and quality control requirements as may be applicable. The Vendor must coordinate, design, develop, fabricate, assemble, program, factory test, deliver install, start up, site test, and turn over an operating, certifiable system. All vendor provided equipment and software should meet the criteria of this specification and comply with the regulatory requirements of the project.

6.5.3 The Vendor should deliver the DAHS in accordance with a mutually agreed upon project schedule.

6.5.4 The Vendor should not deviate from this specification or its attachments without written approval from the Customer's Project Manager.

6.5.5 The Vendor should provide all operations and maintenance documentation normally required by DAHS users.

6.5.6 The Customer, or its designated agents, should have access to all locations in which manufacture, assembly, and testing of systems to

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be supplied under this specification are undertaken. The Customer's agents should be allowed unrestricted opportunity for inspection and audit of the work under this specification. No system should be shipped from its point of development before it has been inspected by the Customer, unless authorized in writing by the Customer's Project Manager.

6.5.7 The Vendor should provide facilities and support for a factory functional check out (Factory Acceptance Test) of all functions prior to shipment. The Customer reserves the right to witness the proper operation of any provided element to within the requirements of the Project Specification or its amendments, if any.

6.5.8 The Vendor should verify that the DAHS can support the monitoring methodologies of the CEMS and properly monitor, quality assure and report data to the appropriate entities.

6.5.9 The Vendor should be responsible for the installation, start up and certification of the new DAHS. The duties of the Vendor's on-site representative in commissioning the system should include (but are not limited to) the following:

6.5.9.1 Accept the PLC, Data Logger, or Controller installed in the CEMS.

6.5.9.2 Inspect the internal workings of the DAHS to ensure that no damage occurred during shipment and installation.

6.5.9.3 Inspect and verify the correct installation and functionality of all components.

6.5.9.4 Provide technical assistance to the Customer's personnel in checkouts of the system to verify the proper operation of all components, including software.

6.5.9.5 Provide hard copy documentation.

6.5.9.6 Demonstrate regulatory compliance through testing, formula verification, data substitution algorithm (as applicable), report generation or similar tests as agreed at the Project Specification phase.

6.5.9.7 Answer questions raised by the Customer's personnel regarding installation and functionality.

6.5.9.8 Provide on-site training as specified by the Customer.

6.6 Changes to Scope of Work
The equipment and software to be furnished under this specification should be engineered, designed fabricated, tested, certified, delivered and installed according to the requirements stated within the Project Specification document developed at the kick-off meeting and as amended and agreed upon by both parties in writing. The Vendor should submit to the Customer the cost impact of each change to the Project Specification before proceeding. The Vendor should record the minutes of any design review meetings and submit them to the Customer for approval.

6.7 The Vendor's Continuing Responsibilities
The Vendor should maintain a full backup copy of all the Customer DAHS software and configurations as they were delivered and certified, excluding actual real time or reporting data, as necessary to restore each system to full operational order in the event of a catastrophe during the warranty period and any subsequent extended maintenance contract.

(In the event all current reporting database information cannot be restored automatically by the DAHS, it should be recovered by the Customer using data backed-up by the Customer per the Customer's backup and recovery procedures.)

7. COMPLIANCE WITH REGULATIONS

The DAHS should comply with all applicable Federal, State, County and local regulations as defined by the Customer's RFQ and air permit to construct and operate the facility.

It is the responsibility of the Customer to advise the DAHS Vendor of the regulations under which the facility must operate and to provide the support documentation that defines it.

It is the responsibility of the Customer to advise the DAHS Vendor of any permit modifications that would impact the original design of the system including but

not limited to report formats, permit emission limits, Title V changes or quality assurance activities.

8. DAHS SPECIFICATIONS

8.1 General Considerations

DAHS software and hardware is available in many different forms and offers the customer a wide choice of solutions. The key considerations are regulations to be complied with, CEMS controller that the DAHS PC is required to interface with, choice of computer operating system and hardware that the DAHS software will run on, type of reporting required (EDR, XML and/or paper), location of the DAHS, and data interface requirements to other systems (*e.g.* DCS, PI, EMIS, fuel procurement, allowance management.)

8.2 Regulations

The customer must provide the DAHS Vendor with a copy of the site operating or Title V operating permits and monitoring plan if affected under the Acid Rain Program, NO_x SIP Call or CAIR *(see section 11)*. A copy of the QA/QC Plan is also useful, if available, as it will contain all the specifications which the CEMS must meet. If the DAHS being procured replaces' an existing system that has been operating, all of these documents will be available and a backup of the historical data would be required. Historical data must be transferred over to the new system in order to provide the appropriate look-back data for purposes of data substitution, accumulation of annual and seasonal totals. Replacement systems must comply with the U.S.EPA data storage requirements and the DAHS Vendor should be made accountable for converting the appropriate historical records. It is the Customer's responsibility to provide an uncorrupted data back up of their old system in a format suitable to the DAHS Vendor.

For new facilities these documents may not be available or be in draft form only. If the DAHS Vendor is required to provide information and to take responsibility to finalize any or all of these documents, this must be clearly specified in the DAHS Vendor scope of supply by the Customer.

8.3 CEMS Controller

The CEMS controller is an integral part of the CEMS, and most often takes the form of a PLC, Data Logger, or custom designed microcomputer.

If the customer has a preference for the type of controller required, this should be clearly stated. Otherwise, for new facilities the choice can be left to the CEMS and DAHS Vendors to work out between them. For replacement of existing DAHS, the DAHS Vendor can be given the choice of working with the existing controller, if possible, or providing a new one of their choice.

Upon a communication failure or DAHS maintenance, the CEMS controller should be designed to buffer a minimum of 7 days of monitoring and supporting quality assurance data and, upon recovery of the DAHS, automatically log this data to the DAHS.

If desired, the CEMS controller should incorporate an OIT either integrated into the controller or mounted in the instrument enclosure for communication with the PLC. As a minimum the OIT should allow the operators to perform the following functions:

8.3.1 Display instantaneous readings

8.3.2 Display results of the last calibration

8.3.3 Initiate manual calibration

8.3.4 Control auto-cal scheduling and timing

8.3.5 Control blowback scheduling and timing

8.3.6 Engage maintenance mode when the system is taken off-line for service

8.3.7 Display system alarms

8.4 Other options to be considered with regard to an OIT include:

8.4.1 Password protection

8.4.2 Configuration access to calibration sequences, exceed limits, equations, status flags, backup storage, etc. Appropriate security should control access to these features.

8.4.3 Menus or touch screen access.

8.5 DAHS Computer & Peripherals

The PC system hardware is to be provided with at least the minimum hardware specification that is required by the DAHS software application. In addition, all additional requirements as listed within the customer's specification and/or bid

document should be included unless otherwise mutually agreed upon by the DAHS Vendor and the Customer.

If the DAHS is required to backup the data to a network server or ancillary device provided by the Customer, this information and communication protocol must be discussed with the Vendor prior to installation.

If the DAHS is required to communicate with any external devices such as historians, plant control equipment, mobile devices, or other, these must also be discussed with the Vendor prior to installation.

If there are IT guidelines, limitations, or rules for PC systems and software that the DAHS must conform to, these need to be discussed with the Vendor prior to installation.

The customer should clearly communicate any security restrictions (government sanctioned or otherwise) placed on the DAHS prior to installation.

8.5.1 The customer should consider if a physical DAHS server at each plant site is appropriate for their installation. Some customers have shown cost savings by locating the DAHS computer at a centralized corporate location. This centralization may help with computer system administration, particularly when multiple plant DAHS computers are utilized. Communication to the plant CEMS Controllers and control room displays would be via corporate network connections.

8.5.2 As a further cost savings, the physical DAHS computers may be able to be replaced with virtualized DAHS servers that share a common host machine and run virtualization software such as VMWare®. This may reduce the overall cost of the DAHS computers, particularly if multiple DAHS computers can be combined onto a common virtualization host.

8.5.3 When multiple DAHS computers are used, there may be further cost savings if those DAHS computers can share a single database server. Check with the DAHS Vendor to determine if this is possible with their software system.

8.5.4 As an alternative, some DAHS computer vendors offer to host DAHS computers "in the cloud" so that the customer does not have to purchase and maintain a separate DAHS computer. The hosted DAHS computer communicates to the CEMS Controllers, control room displays, and DAHS users via a secure VPN connection.

8.6 DAHS Software and Report Generation

8.6.1 Software will be designed to provide preparation of reports automated to the fullest extent possible. All real time data should be capable of being displayed on the monitor.

8.6.2 Report data (*e.g.* 6-minute data for opacity, hourly data for gaseous emissions, and time intervals as required by permit) to be stored in the DAHS computer for at least five (5) years as a minimum. Report formats are to comply with State, Regional, and Federal EPA formats as required by the air permit.

8.6.3 Excess emissions reports are to be computed in accordance with applicable requirements. Any conversion factors used, and the date and time of commencement and completion of each period of excess emissions, should be logged. Reports should allow the operator to edit data, and enter reason codes and corrective actions taken.

8.6.4 A CEMS out of service and/or data availability report should be generated for each CEM system as required by the permit.

8.6.5 Report data is to be sampled in accordance with the applicable regulatory requirement from the CEMS controller and *(e.g.* ten second or one minute averages) computed and stored in the DAHS computer for a minimum of one quarter of interest or as required by the specification. Raw average resolution per government rules should be one hour for gases. Additional report capability to be provided for: daily calibration data, missing data, minute data, six minute averages for opacity, hourly averages, daily averages, and others as required by the appropriate regulatory requirements.

8.6.6 Additional report information is currently required for DAHS operating under 40 CFR Part 75 and NO_x SIP Call rules. These reports must comply with the latest U.S. EPA reporting formats.

8.6.7 Optional graphical reports both on screen and printed can be specified by the customer.

Typical reports are: historical trend data, real time data, calibration drift, and calibration percent of drift, missing data, and system status schematic.

8.6.8 A method should be used to archive on transportable media the database used to generate above reports. Facilities are to be provided to restore the archive data to the DAHS computer and generate hard copy reports for the restored data. Archiving data is required to be daily and done automatically. Valid archive data must be available to the system operator on demand.

8.6.9 Security and control of access to the DAHS should be provided by at least two levels of password protection; one level for the operator and another for the systems administrator.

8.6.10 DAHS software should be able to provide some level of automated, external notifications to the Customers as desired. The Customer should ensure that notifications are supported for the Customer's desired events, and that notifications are able to be sent to the customer's desired receiving device(s).

8.6.11 The customer should consider if the DAHS data needs to be available in a centralized DAHS database for cross-plant reporting. If so, the customer should specify the parameters that need to be available in the centralized database and the reports required.

8.6.12 If the DAHS data will need to be transferred to other "downstream" data systems such as an Environmental Management Information System (EMIS), a task should be included to require the DAHS Vendor and the downstream data system vendor to clearly define the data interface and the responsibilities of each party for the transfer. A joint integration period should be defined so that the vendors on each side of the connection are available to work out any issues. It is highly recommended that an industry-standard interface such as a web service or OPC interface be utilized.

9. TESTING AND SYSTEMS ACCEPTANCE

9.1 Inspection
The Vendor should give the Customer's inspector all reasonable access to facilities and information to satisfy the inspector that configuration and testing is in accordance with the Project Specification.

9.2 Factory Acceptance Test

9.2.1 Prior to delivery, the Customer's project Manager should have the option of being present at a fully integrated system test at the Vendor facility. The test should include exercises which the combination of hardware and software can be expected to perform. The Project Specification should provide the guidelines for testing. At a minimum, the DAHS Vendor should supply a check list for all areas of the hardware and software that will be tested. Testing should include, but not be limited to, the following demonstrations:

9.2.1.1 A thorough exercising of devices individually and collectively including all PLC, DAHS PC hardware, modem, network connectivity, and backup procedures.

9.2.1.2 The proper functioning of all software, reports, screens, remote access, backup and recovery.

9.2.1.3 Regulatory compliance through the use of testing, formula verification or other methodologies as agreed upon at the Project Specification phase.

9.2.1.4 System failure situations and start up after failure.

9.2.1.5 Demonstration of system administration functions.

Any specific test requested by the Customer should be submitted to the Vendor at the project kick-off meeting or at the Project Specification Phase.

9.2.2 Acceptance for the purpose of shipment of the system should depend upon achieving satisfactory results of the factory acceptance test at the Vendor's facility. The Vendor should work towards resolving any third party software problems on the Customer's behalf. Any fixes supplied to the Vendor as a result of reporting it to the original manufacturer/developer should be passed along to the Customer.

9.3 Test Results
The results will be recorded on checklists which accommodate a description of the compliance or

deviation for each step of the procedure described in the test plan, names of the persons witnessing the test, and a list of equipment used in each phase of the test. Test results should show conclusively that the DAHS are adequate for the intended application set forth in the Project Specification and that compliance with this specification was met.

9.4 Test Personnel
The Vendor's personnel should be responsible for operating and demonstrating the equipment during the tests.

9.5 The Customer's Site Acceptance
The new DAHS should be considered accepted by the Customer upon successful certification per a mutually agreed to testing procedure or by specific EPA regulations when required. If the certification testing indicates that the DAHS Vendor-supplied hardware, software or documentation does not meet the project specification requirements, the Vendor should replace or modify, at no cost to the Customer, hardware, software or documentation as necessary to correct the noted deficiencies. The test will then be re-run by the Vendor.

9.6 System Acceptance
The new DAHS supplied under this specification should be considered accepted when all of the following conditions are met:

9.6.1 All specified equipment, software, and documentation have been delivered to the Customer site.

9.6.2 The DAHS is installed, CEM calibration has been demonstrated, and the complete system is functioning.

9.6.3 All system monitoring, recording, and reporting actions are taking place as specified.

9.6.4 The factory acceptance test and site certification of the DAHS have been successfully completed.

9.6.5 All DAHS documentation submittals per the Project Specification are complete.

9.6.6 The CEMS/DAHS operating as a complete and integral monitoring system has passed a certification test to demonstrate full compliance with State and Federal requirements per the conditions of the air permit.

10. INSTALLATION

The installation of the DAHS or complete CEMS/DAHS is the responsibility of the Customer following information provided by the Vendor, unless specified otherwise in the contract and purchase order. Prior to the start of commissioning and certification testing, the Vendor or Designated Representative should inspect the installation to ensure that it is acceptable.

11. DOCUMENTATION REQUIREMENTS

11.1 DAHS Technical Documentation (project specific)
Project specific DAHS Technical Documentation should be provided to the Customer after system startup. Project documentation should include site I/O configuration, collected data channels, derived or calculated channels with a clear understanding of the overall DAHS functions from inputs through reporting outputs.

11.2 DAHS User Documentation
DAHS user manuals should be provided to the Customer after system start up, in hard copy, electronic, or online form.

11.3 Third Party Documentation
All copies of third party software documentation that are received by the Vendor should be provided to the Customer with the DAHS Technical Documentation.

Freeware or shareware included with the system (*e.g.* database browser, data compression utility, etc.) may not have documentation. No new documentation will be created by the Vendor for free/shareware.

12. PROJECT COORDINATION

12.1 Project Organization and Management
As part of the Project Specification, the Vendor should describe its general organization related to project support and control, and the specific personnel assigned to support the Customer's project. The Vendor should identify and describe the responsibilities of the Vendor's Project Manager.

12.2 Customer Contacts

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Information relating to the procurement policies and procedures of the Customer may be obtained from the person listed below. All matters pertaining to commercial issues are to be directed to:

> CONTACT:
> ADDRESS:
> PHONE:
> FAX:
> E-MAIL:

Technical coordination and communication inquiries should be directed to the following Customer Project Manager:

> CONTACT:
> ADDRESS:
> PHONE:
> MODEM PHONE:
> NETWORK ADMIN PHONE:
> FAX:
> E-MAIL:

12.3 Design Review
Immediately following contract award, the Customer and Vendor should engage in a project kick-off meeting to define system specifications, schedule, etc. The outcome of this effort should be a hard copy Project Specification. The Project Specification should constitute the final system design that can be amended only by written change orders.

13. AFTER PURCHASE SUPPORT

Software Updates

A critical factor when choosing a DAHS software supplier is their ability to provide on-going technical support of their system once it's deployed to the field. Once the system has been started up and the field support engineer has left the site, the primary vehicle for updating and supporting the system will be via remote access.

Technological advancements over the years have made accessing and supporting DAS systems easier, faster and more secure now more than ever. Unfortunately, many corporate policies and philosophies prohibit such access without multiple levels of approval and or

Information Technology (IT) involvement. It is imperative that IT groups be brought into discussions early and often, if they are going to be responsible for administering remote access and support. They need to be aware of the critical nature of such support and that obstructed access could lead to missed reporting deadlines.

There are dozens of different methods and programs by which DAHS systems can be accessed remotely. Consult your IT Group to determine if your company has a protocol for remote vendor support and what applications and security is required. Some examples of methods used to provide remote support are as follows:

1. Modem Dial-up or Secure Virtual Private Network
2. PC Anywhere
3. Windows Remote Desktop Connection (RDC)
4. Virtual Network Computing (VNC) programs such as TeamViewer, Logmein, Glance and Mikogo.

Each DAHS software vendor has their own schedule for deploying software updates and enhancements. Additionally, each vendor may choose to limit the features or updates deployed based on the type of software maintenance agreement that's in place.

It is recommended that each bidder produce at least 4 references that are of similar size and industry type. This should provide a more accurate indicator on how the vendor will manage support of your systems once they are deployed to the field.

Identified below are a few questions to ask your vendor regarding their software support program:
1. Are there different "levels" of software support (i.e. 24/7/365, on demand, ect.)?
2. Are regulatory updates included throughout the term of the software support agreement?
    a. How about new software features and enhancements?
3. How are software updates and release notes communicated to end users?
4. How often are software updates released to end users (monthly, quarterly, never, ect.)?

5. How is software deployed to the field (dial up vs. high speed vs. download from web)?
6. Are software updates automatic or manually initiated?
7. Can software updates be downloaded and installed without assistance from the vendor or do they need to be scheduled?

APPENDIX 1 – CHECKLIST AND EVALUATION FORM – *Page 1*

Note: **Because this evaluation check-list encompasses a variety of designs and situations, some of the items included may not be relevant in all cases.**

CUSTOMER SUPPLIED EQUIPMENT, SERVICES	Vendor 1	Vendor 2	Vendor 3
CEM system hardware and controller			
Wiring between CEMS controller and DAHS			
Power Requirements to DAHS			
Direct analog telephone line or high-speed VPN connection to DAHS			
Suitable location for DAHS installation			
Documents and specifications for required DAHS			
Design, review and approval procedures			
On-Site support and access available			
Criteria for acceptance of completed DAHS			
Delivery date requirements (Yes/No)			
VENDOR SUPPLIED EQUIPMENT, SERVICES			
Define scope of work for DAHS supply			
Define criteria for changes to scope of work			
Criteria for continuing responsibilities			
COMPLIANCE WITH REGULATIONS			
US EPA 40 CFR Part 60			
US EPA 40 CFR Part 64			
US EPA 40 CFR Part 503			
US EPA 40 CFR Part 75			
US EPA 40 CFR Part 72 (NO$_X$ Budget)			
Applicable state and local regulations			
Air Permit available and sent to DAHS Vendor			
Other [specify]:			
Other [specify]:			
GENERAL DAHS SPECIFICATIONS			
Type of CEM system controller			
PLC type, make and model			
Data logger type, make and model			
Other type, make and model			

- Continued on Page 2

APPENDIX 1 – CHECKLIST AND EVALUATION FORM *–Continued - Page 2*

GENERAL DAHS SPECIFICATIONS - continued	Vendor 1	Vendor 2	Vendor 3
Data storage facilities, type and time			
Number of serial connections to instruments			
Number of analog inputs - and are they Isolated (Yes/No)			
Number of analog outputs - and are they Isolated (Yes/No)			
Number of digital inputs – and are they Isolated (Yes/No)			
Number of digital outputs - and are they Isolated (Yes/No)			
20% spares included with all inputs/outputs (Yes/No)			
DAHS Computer and Peripherals			
PC type, make and model			
Operating system, make and type			
Amount of RAM memory			
Size of hard drive			
Network communications, make and type			
Monitor type & size, make and model			
Printer type, make and model, pages per minute			
Modem type, speed, make and model			
Data backup type, make and model			
Remote access software, make and type			
DAHS Software and Report Generation			
State, region and federal reports available?			
Real time data displayed on monitor?			
Report data storage capability, type & time			
Excess emissions reports available?			
Edit data and reason code entry available?			
CEMS out of service reports available?			
Sampled and computed data type available?			
EDR available to current US EPA version			
Graphical and trend report types available?			

APPENDIX 1 – CHECKLIST AND EVALUATION FORM *–Continued - Page 3*

GENERAL DAHS SPECIFICATIONS - continued	Vendor 1	Vendor 2	Vendor 3
Level and type of password protection			
Is valid archive data available to operator?			
Automated report generation available?			
DESIGN REVIEW			
Schedule review with contracted Vendor			
Hold review with selected Vendor			
Produce and document agreed specifications			
Distribute project specifications as agreed			
FACTORY ACCEPTANCE TESTS			
Schedule factory acceptance tests			
Agreed list of tests to be completed			
Complete and document acceptance tests			
SITE INSTALLATION			
Installation completed by customer			
Installation checked and accepted by Vendor			
System accepted commissioned and certified			
DOCUMENTATION			
Hard copy of agreed documentation received?			
Electronic copy of documentation received?			
OTHER			

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VIM Technologies, Inc.
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Washington Group – URS