

Massachusetts Department of Environmental Protection

**Promoting Implementation of Innovative Compliance Strategies in the Northeast and Use
of Common Business Sector Performance Measures**

Quality Assurance Project Plan

Revised February 27, 2006

**Massachusetts Department of Environmental Protection
Business Compliance Division
One Winter Street
Boston, MA 02108**

Project Manager Contact Information:

**Steven DeGabriele, Director
MassDEP, BWP, BCD 8th Floor
One Winter Street
Boston, MA 02108**

**Steven.DeGabriele@state.ma.us
Phone: 617. 556.1120
Fax: 617. 556.1063**

Abstract: Developing and implementing a common, core set of environmental performance measures for selected business sectors on a multi-state basis.

A PROJECT MANAGEMENT

A1. Approval Sheet

Steven DeGabriele, Director, BCD, BWP, MassDEP

Date

Susan Peck, MassDEP Quality Assurance Officer

Date

A2. Table of Contents

A PROJECT MANAGEMENT2
A1. Approval Sheet2
A2. Table of Contents3
A3. Distribution List4
A4. Project/Task Organization4
A6. Project /Task Description-Summary Work Plan and Quality Assurance Provisions9
A7. Quality Objectives and Criteria15
A8. Special Training16
A9. Documents and Records16
B DATA GENERATION AND ACQUISITION18
B1. Sampling Process Design (Experimental Design)18
B2. Sampling Methods18
B3. Sample Handling and Custody18
B4. Analytical Methods18
B5. Quality Control18
B6. Instrument/Equipment Testing, Inspection and Maintenance19
B7. Instrument/Equipment Calibration and Frequency19
B8. Inspection/Acceptance for Supplies and Consumables19
B9. Non-Direct Measurements (I.e., Secondary Data)19
B10. Data Management19
C ASSESSMENT/OVERSIGHT20
C1. Assessment and Response Actions20
C2. Reports to Management20
D DATA REVIEW AND EVALUATION21
D1. Data Review, Verification and Validation Criteria21
D2. Verification and Validation Methods21
D3. Evaluating Data in Terms of User Needs22

A3. Distribution List

Each person listed on the approval sheet and each person listed under Project/Task Organization will receive a copy of this Quality Assurance Project Plan (QAPP). Individuals taking part in the project and other interested parties may request additional copies of the QAPP from the QA Officer. QAPP distribution will be centralized so the QA Officer can ensure that all personnel are using the most recent revision (see Section A9).

This document has been prepared according to the United States Environmental Protection Agency publication EPA Requirements for Quality Assurance Project Plans dated March 2001 (QA/R-5).

A4. Project/Task Organization

Personnel involved in project implementation are listed in Table 1, and are shown in the organization chart in Figure 1.

Table 1: Project Implementation Personnel

Individual	Role in Project	Organizational Affiliation
Steven DeGabriele	Project Manager/State Lead	MassDEP
Susan Peck	Project QA Officer	MassDEP
Marge Miranda	EPA Grant Manager	USEPA Region I
Beth Termini	EPA Project Liaison	USEPA Region I
William Cass	Support Services Mgr.	NEWMOA
Robert Isner	State Project Co-Lead	CT DEP
Kevin Sullivan	State Project Co-Lead	CT DEP
Ron Dyer	State Project Lead	ME DEP
Paul Heirtzler	State Project Lead	NH DES
Ron Gagnon	State Project Lead	RI DEM
Gary Gulka	State Project Co-Lead	VT DEC
Marc Roy	State Project Co-lead	VT DEC

The Massachusetts DEP Project Manager will be responsible for the following activities:

- Overall management and contracting with NEWMOA and others for support services
- Managing outreach and training to participating state agencies (stakeholders)
- Developing consensus concerning
 - up to three business sectors
 - environmental performance indicators
 - use of statistical and other methodologies
 - data quality objectives for the QAPP amendment
- Developing audit procedures in consultation with stakeholders
- Sharing ERP information tools and resources with stakeholders

- Managing the developing of a data management strategy in consultation with stakeholders
- Managing the collection, evaluation and reporting of data to NEWMOA for aggregation
- Reporting results to EPA
- Amending the QAPP, as necessary
- Issuing quarterly and annual reports to EPA

The QA Officer will be responsible for the following activities:

- Maintaining the QAPP
- Distributing the QAPP and maintaining the distribution list
- Conducting readiness reviews

Note: The QA Officer will be provided support, as needed, from the MassDEP Office of Research and Standards in carrying out her responsibilities under the QAAP, with particular focus on data collection, aggregation, and analysis to ensure the statistical integrity of the data. The Office of Research and Standards (ORS) provides scientific expertise to MassDEP in environmental health, toxicology, standard setting, ecological and human health risk assessment, chemistry and statistics. ORS provides information and guidance on public health issues for the agency. Using available information and methods, scientists in ORS formulate exposure guidelines for toxics in air, water, soil and wastes, interpret existing state and federal guidelines and lead agency efforts to assess and reduce key environmental pollutants. ORS also develops new methods and conducts environmental research on priority pollutants.

Contractor(s) to be determined will provide training and if needed assistance in the use of ERP Statistical Methods Protocol and review of project audit procedures concerning:

- Sample design; data collection, aggregation and analysis; and assistance to state agencies concerning application of proper methods and data management systems and procedures
- Advice and assistance concerning Quality Objectives and Criteria for Performance Measures to be submitted in a QAPP amendment.

NEWMOA will provide support services including:

- Organizing and facilitating conference calls and meetings
- Serving as a clearinghouse for project information including performance results from participating states
- Developing and refining proposals for selecting sectors and groups, setting group performance goals and indicators, and compiling project results
- Organizing measurement and statistical methodology training
- Assisting MassDEP with QAPP Amendment preparation
- Providing direct support to individual states
- Develop and housing the project database
- Collecting and analyzing aggregated performance data from multiple states
- Assisting in preparing project reports
- Participation in the MassDEP Beyond ERP Implementation Team meetings that will provide overall guidance, advice and strategic planning for the project

EPA will be an active participant in the project, providing support needed to assure the overall success of project. This support and participation may include:

- Assistance in coordination with the participating states
- Assistance steering the project and ensuring that it remains on track
- Assistance with statistical analysis including, if deemed necessary, 3rd party review
- Participation in the MassDEP Beyond ERP Implementation Team meetings that will provide overall guidance, advice and strategic planning for the project.

MassDEP Bureau of Waste Prevention Beyond ERP Implementation Team is comprised of key Bureau of Waste Prevention Division Directors, Enforcement, Regulatory Development, and Program Evaluation managers, regional management and staff. One of its responsibilities is to champion the implementation of performance measurement throughout the Bureau. Augmented by representatives from NEWMOA and EPA it will provide overall strategic direction and guidance for the project.

Participating and Learning States

The “participating” states will:

- Provide up-to-date sector information, performance measures and results
- Provide training, support, and assistance to other states collectively and individually
- Actively participate in Workgroup conference calls, meetings, and training sessions
- Implement the performance measures in at least one sector and share the results through NEWMOA, as applicable
- Participate in the development of quality objectives and criteria for the QAPP amendment

The “learning” states will not directly participate in developing and implementing performance measurement strategies, but will participate in conference calls, meetings, and related project activities to learn more about the measurement tools and their uses to increase overall state capabilities. In the future, these states may join participating states’ project work and use the measurement approaches.

A5. Background and Project Goals and Objectives

The Massachusetts Department of Environmental Protection (MassDEP) and the other member state agencies of the Northeast Waste Management Officials’ Association (NEWMOA) are seeking EPA assistance to support the development and use of shared core performance measures for one or more business sector or regulated group. The project will rely on the models of innovative compliance strategies, including the Environmental Results Program (ERP) and other statistically valid compliance/performance rate approaches already in use. By developing and using shared measures, the participating states can not only evaluate the effectiveness of their own programs, but can also evaluate the relative effectiveness of the other states’ programs

and decide to adopt the more successful compliance assurance approaches used throughout the region. MassDEP is the lead state and grant applicant.

Project goals:

- Improve the ability of state environmental agencies to develop, implement, and analyze innovative performance measures for targeted business sectors
- Improve the ability of the state environmental agencies to develop and implement innovative compliance strategies, including ERP

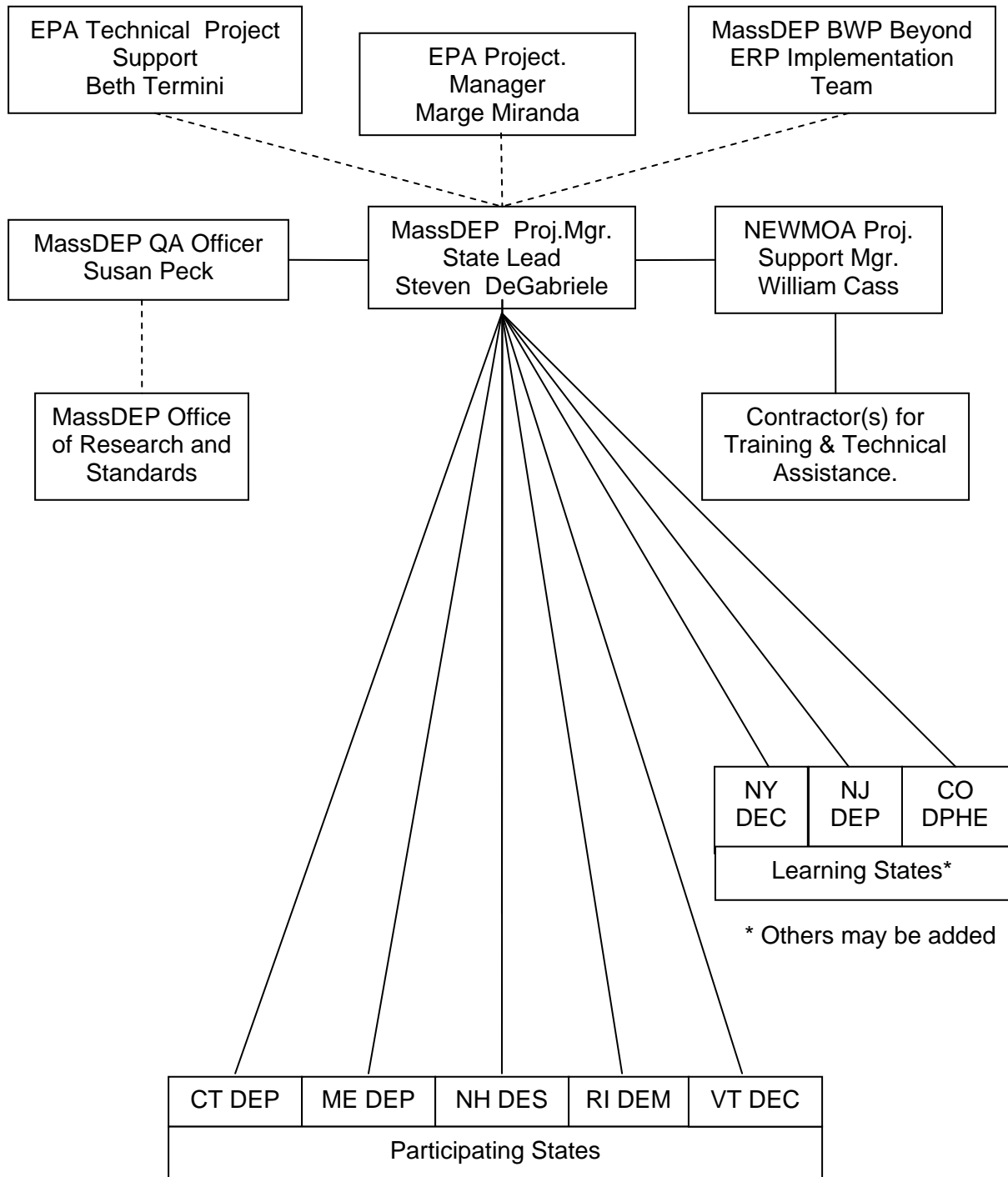
Project objectives:

- Develop and implement a common, core set of performance measures for business sectors or regulated groups on a multi-state basis
- Promote the implementation of innovative compliance strategies, including ERP, in the states in the Northeast that have not yet begun these initiatives, including New York and New Jersey
- Combine and present the environmental outcome data that is collected from the states using the core performance measures for at least one business sector and analyze and present the results

Anticipated project results:

- Illuminate the nature, scope and seriousness of problems within each selected sector
- Quantify environmental performance in the selected sectors
- Record group environmental performance status and changes over time
- Facilitate general comparisons of the effectiveness and efficiency of different state compliance assurance strategies within the same sector. The project will also enable participating states to better focus their limited resources on specific problem areas and to use those strategies that have been demonstrated to achieve the greatest environmental results improvements in the future.

Figure 1: Project Organizational Chart



Of eight Northeast states, six will be involved in this project as full participants: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. These six “participating” states have already initiated an ERP or innovative compliance program and are interested in coordinating on a set of core performance measures. Massachusetts, Rhode Island, Maine and Vermont are implementing ERP initiatives directed at several business sectors, including printers, dry cleaners, photo processors, small boilers, industrial wastewater holding tanks, dental practices handling mercury, auto salvage yards, auto body shops, and facilities with underground storage tanks. Connecticut and New Hampshire have developed innovative strategies for promoting and improving compliance among RCRA generators by developing methods of evaluating statistically valid compliance rates combined with improved compliance assistance directed toward areas of high non-compliance.

New York, New Jersey, Colorado and possibly other states will be involved in the project as “learning” states, since they are beginning to consider developing ERPs or similar programs and are eager to learn and benefit from the experiences in the other states. This project would be a vehicle for them to more quickly and efficiently develop their initiatives.

The six participating states will evaluate and use, as appropriate, statistical performance measurement methods to enhance confidence in the reliability and accuracy of collected performance data. These statistical methods will enable the participants to more accurately evaluate performance data for selected sectors without requiring every facility within groups to be inspected or otherwise evaluated. The statistical methods would also enable the participating states to draw more accurate inferences as to each group’s compliance status (with respect to selected indicators) and overall performance level.

A6. Project /Task Description-Summary Work Plan and Quality Assurance Provisions

Overview of QA Approach

The Project Manager and each of the participating state project leads is generally familiar with the quality issues related to performance measures and the gathering, processing, managing and interpreting of data relative to the measures that have been developed by their states. To ensure that there is consensus among the participating state leads concerning the central importance of quality to the success of this project, quality assurance concerns will be examined at the outset of the project/the kickoff meeting. Also note that the states will review and concur with the QAAP.

The quality issues anticipated at each step of the project will be identified and discussed in general terms. The participants will also be asked to identify appropriate data quality assurance and analysis procedures/criteria at key stages of the project, with the assistance of a consultant as needed, and will agree to abide by them. Perhaps most importantly, the participants will be asked to agree upon a set of quality criteria that will govern the extent to which data submitted by states under this project will be accepted into the database.

The review and comment on the proposed business sectors, performance measures and quality criteria by the NEWMOA Board of Directors (see attachment 1 for list of Directors) will be another important step in assuring that the groups and measures chosen can realistically be expected to produce meaningful results, within the constraints of time and available resources, QAAPP: Promoting Implementation of Innovative Compliance Strategies in the Northeast and Use of Common Business Sector Performance Measures. Page 9 Of 23

and that conclusions expected to be drawn from the data will withstand scrutiny by state and EPA senior management, the regulated community and other stakeholders.

The consideration and resolution of quality issues is mentioned briefly in each of the steps below, where appropriate. The minutes of face-to-face meetings and conference calls will record the discussion and resolution of quality issues and will provide the substance of QAPP amendments as the project progresses through the elements and milestones described below. Most pertinently, MassDEP will submit a QAPP amendment to EPA for approval prior to the beginning of data submission by participating states, to present an opportunity for review of the performance measures and quality criteria developed by the participating states.

Summary Work Plan

Key elements: *

1. Identify and select up to three business sectors or regulated groups for performance measurement
2. Select group environmental performance indicators
3. Decide on use of statistical methodologies
4. Develop a data management strategy
5. Collect, evaluate, and report data to NEWMOA for aggregation
6. Submit routine progress reports and the final results to EPA. Participating states will also make performance data collected after the end of the project period available to EPA and others as requested

*For ease of presentation, the elements are presented in sequential fashion. However, all project participants recognize that a number of these activities will operate in parallel. For instance, it could be difficult to finalize a performance indicator without participating states first having carefully considered and decided upon statistical approaches, data management strategies and other quality procedures/criteria necessary to support analysis of performance indicators.

Element 1: Identify and select business sectors and groups for performance measurement

In FY2004, NEWMOA formed an Innovative Compliance Strategies Workgroup including representatives from each of the NEWMOA state environmental agencies – both “participating” and “learning” states. Members of the Workgroup are actively involved with managing and staffing their states’ innovative compliance strategies projects, including ERP. This Workgroup will play a key role in overseeing and managing NEWMOA efforts on this project. The state project leads will all be members of this Workgroup.

NEWMOA will survey members of the Workgroup to identify which sectors they are currently targeting (or plan to target) with ERP and other compliance assurance strategies, as a basis for selecting the business sectors for the focus of this project. NEWMOA will also catalog all of the performance indicators that the states have already developed and are using in their innovative compliance strategies projects. States will also be asked to summarize how the data are collected and the quality assurance processes that they use with these performance indicators. An

understanding of current data collection/quality assurance procedures will help the Workgroup better understand the extent to which participating States' procedures will need to converge and/or improve for a common indicators approach to be effective.

Once this survey is completed, NEWMOA will convene a face-to-face meeting of the Workgroup to review results, make plans for the project, and select up to three sectors for regional performance measurement. The initial business sectors that have already been discussed as possibilities are RCRA generators, automotive facilities (including auto body, repair and salvage shops), and facilities with underground storage tanks. In an initial survey of NEWMOA states, these business sectors appeared to have the highest degree of common interest. If selected, the RCRA generators "sector" would focus primarily on hazardous waste. However, the other sectors would be focused on improving multi-media environmental performance.

The "learning" states – New Jersey, New York, Colorado and potentially others – will participate in conference calls, selected meetings and related project activities to learn more about measurement tools and uses to increase overall state capability to develop and implement performance measurement-based programs. In the future, the "learning states" may join the participating states' work and use similar measurement approaches.

After the initial meeting, NEWMOA will compile and summarize for the eight states and EPA all of the available checklists, guidance documents, data collection procedures, quality assurance documentation and other project materials related to state ERP and innovative performance-based compliance projects in the selected sectors.

Based on the business sectors or "regulated groups" that are selected, the Workgroup will form sub-groups of key staff working on each business sector for more in-depth information sharing, coordination and development of key performance measures as well as relevant quality criteria. Throughout the rest of the first year of the project, NEWMOA will convene Workgroup and sub-group conference calls every two to three months or more frequently, as needed.

Element 2: Select group environmental performance indicators and establish quality objectives

Once NEWMOA has compiled and shared all of the performance measures that states have developed for the selected business sectors or "regulated groups" in Step 1, the association will review them to identify common characteristics, potential gaps and quality issues that may need to be addressed.

Each of the business sector/regulated group sub-groups will convene at least two conference calls to review in detail the list of sector performance measures and decide upon a final core list for the full Workgroup's consideration and adoption. Along with performance measures, each sub-group will recommend a set of quality criteria that data must meet in order to be included in the regional-level analysis. The kinds of quality issues the sub-groups will consider in developing these criteria will include (but not be limited to): the types of statistical sampling and analysis approaches that will be considered acceptable; whether a standard confidence level should be used by states; if data should be independently obtained, or whether data volunteered

by the regulated community or from other sources are acceptable; the need for normalizing data, if any; whether all datasets should have a common time frame (and the implications of not having common time frames); and procedures necessary for any physical/environmental samples that are to be taken.

The proposed measures and associated quality criteria will also be shared with and commented on by the NEWMOA Board of Directors during one of its regular meetings. The Workgroup may modify the sector lists, measures and/or quality criteria based on NEWMOA Director feedback.

Element 3: Decide on use of statistical methodologies and train and assist states concerning related Quality Assurance Issues

A contractor retained by MassDEP and supported by EPA OECA funds has recently completed development of four ERP analysis automation tools: inspection checklist data management and analysis, environmental performance results presentation, environmental performance statistical analysis, and environmental outcome analysis. MassDEP will share these software tools with the Workgroup.

NEWMOA will convene a training session for the Workgroup and other interested state staff to learn statistical techniques, software tools (which may not be limited to the MassDEP tools) and quality objectives, criteria and procedures/steps. NEWMOA will procure the contractor(s) services to help with this training and to assist individual states as they implement statistical methods. MassDEP and NEWMOA staff will also be available to assist states with software tools, statistical approaches and quality issues as part of this training. If deemed necessary, MassDEP and NEWMOA will seek additional contractor assistance to ensure that proper statistical methods are used throughout the project. Wherever appropriate the project will rely upon the methodologies that were developed and peer reviewed through previous ERP work.

Once the states have become familiar with the basics, the Workgroup will review the various options for which statistical approaches are the most appropriate for measuring sector performance levels. If needed, the contractor will provide assistance to states for specific issues and questions that may arise as they implement the statistical methods and use the new tools. The contractor will also advise and assist in the development of the QAPP amendment.

Element 4: Develop a data collection, management, and analysis strategy

The Workgroup will provide a forum for states to share information and techniques for data collection and management. Several states, including Massachusetts and Rhode Island, have devised strategies for data collection and management under their ERPs. Connecticut recently hired a contractor to assist its efforts to evaluate compliance trends among RCRA generators in the states. These and other experienced states will share their methods with partner states and address any questions or concerns during face-to-face meetings of the Workgroup.

As part of this element, NEWMOA will also develop a methodology for analyzing data to be submitted by states, incorporating workgroup decisions on indicators and quality criteria. This QAPP: Promoting Implementation of Innovative Compliance Strategies in the Northeast and Use of Common Business Sector Performance Measures. Page 12 of 23

methodology will be reviewed by the participating states and by the NEWMOA Board of Directors. Once adopted, the methodology, data collection/management strategy, indicators and quality criteria will be submitted as part of an amended QAPP for EPA approval.

Element 5: States report data to NEWMOA

NEWMOA will coordinate with the states on implementing this method for at least one of the targeted business sectors, with the assistance of a contractor as necessary. States will have approximately one year to gather and analyze supporting data, and report indicator data to NEWMOA, and will meet together to discuss progress and share lessons learned at approximately the midway point. Data may be aggregated on a secure portion of NEWMOA's Web site and will be reported to EPA.

Element 6: Reports to EPA

MassDEP and NEWMOA will submit routine progress reports to EPA detailing workplans, schedules, progress, unanticipated obstacles, and expenditures.

It is anticipated that the EPA Technical Project Liaison will participate actively in the project and be aware of progress.

At the end of the project, MassDEP and NEWMOA will submit a project report for EPA that summarizes results of the project, including:

- Performance measures selected for each sector,
- Statistical or other methodologies that the states are implementing to gather and analyze the data
- Data aggregation, analysis and quality assurance methods used by NEWMOA, and
- Results of the aggregated data.
- Descriptions of the participating states compliance assurance strategies
- Lessons learned

Drafts of the final report will be shared with the Workgroup and NEWMOA Directors for review and comment prior to submission to EPA.

In addition, the project participants will make performance data collected after the end of the grant available to interested parties, to the extent they continue to collect such data.

Table 2. Major Project Tasks & Milestones
(Provided that project is funded by March 1, 2006)

Task Description	Start Date	End Date
Collect existing state materials and performance measures –	March 06	April-06
Hold project organization and kick-off meeting		April-06
Finalize sector group selection		April-06
Workshop on statistical methodologies & QA		May-06
Share statistical methods and data collection information	May-06	August-06
Meeting and calls to select draft measurement indicators and quality criteria for selected sectors	June-06	August-06
Develop regional aggregation methodology	May-06	September-06
Review by NEWMOA Board of Directors		Sept-06
Submit Amended QAAP to EPA		Sept-06
States implement performance measures	October-06	March-07
Workgroup face-to-face meeting to discuss the status of the project		April-07
Continue implementation of performance measures	January-07	September-07
Collect data from the states using regional aggregation methodology	July-07	December-07
Collect information about each state's performance measurement strategies	July-07	December -07
Summarize and present results of data aggregation	November-07	April-08
Develop final report summarizing group environmental performance results		May-08
Draft final report distributed for comment by participating states		July-08
Hold project wrap-up meeting including other interested states		September-08
Final progress report including summary of results to date, lessons learned and recommendations for future work		March-09

Geographic Focus.

Northeast States/EPA Regions 1& 2

Resource and time constraints

The proposed budget for this project is \$255,000 and the proposed period for completion is three years. However, most of the requested funding is to provide support services and part of the project travel/ meeting costs. Participating states are funding the salaries of the staff that they assign to the project, all of which will also be expected to continue meeting their line-agency responsibilities. Activities and turnaround time on project tasks must allow that the state participants will have limited availability and must balance the project work demands with their regular agency responsibilities.

This project's results may also be limited during the 3-year time frame of the project. While the project team will likely identify groups, set measures and gather baseline data, it is conceivable final follow-up data for the indicators may not be available from states during the project

timeframe. Participating states will make longer-term performance data available after the grant is over, to the extent that they continue to collect the performance data

A7. Quality Objectives and Criteria

The Workgroup will focus on ensuring that the methodology for the indicators guarantees sufficient quality that states can use these indicators to make policy decisions related to the chosen sectors or relevant environmental issues. Specific quality objectives are difficult to determine in advance, without knowing the specific sectors or indicators, but the workgroup will define quality objectives as it moves forward and explore relevant quality issues. The Workgroup will focus on issues of sample design, data aggregation and statistical analysis of the results. If it is deemed necessary, the Workgroup will seek additional guidance in statistical methods.

It is important to note that the data collected in the study is expected to consist of “secondary data” rather than primary data from sampling or analysis. This important distinction will affect both the statistical methods used and the quality criteria established

The sub-groups will develop specific quality considerations that will be appropriate for the performance measures selected. These quality considerations will be summarized in the amendment to the QAPP. Data quality considerations are likely to take into account some or all of the following six data quality indicators (DQIs):

Precision. Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions. Precision considerations might include the following: Will data collection approaches be standardized, and what sort of training will data collectors receive? Will the wording of data collection instruments like surveys and reporting forms be standardized? Will there be penalties for submission of false data by facilities? If a statistical approach is to be used, precision standards can be expressed quantitatively.

Bias. Bias is a systematic or persistent distortion of a measurement process that causes errors in one direction. Source-related bias can be reduced by having data collected, or at least verified, by the Agency or a third party. Self-selection bias can be avoided by taking a random sample of facilities, since a pool of volunteers might be unrepresentative of the larger community. Where bias cannot be avoided, the specific bias and the implications of that bias should be noted.

Representativeness. Representativeness is the degree to which a sample accurately and precisely represents the larger context. As mentioned above, an unrepresentative sample can be a source of bias. Random sampling is one way to ensure representativeness. In addition, careful selection of sampling points, etc., can help ensure that indicators are representative of the facility. Where lack of representativeness cannot be avoided, it should be noted, and its implications for data analysis should be defined.

Completeness. Completeness is a measure of the amount of valid data needed to be obtained from a measurement system. Often 100% reporting from facilities is difficult to achieve, for

example, but the workgroup might specify a minimum reporting percentage that would make a data set acceptable.

Comparability. Comparability is a measure of confidence that the underlying assumptions behind two data sets are similar enough that the data sets can be compared and combined to inform decisions. In a sense, comparability is the overarching concern of the Workgroup: standardizing QA criteria for the data sets submitted by states helps to ensure that the data sets will be comparable enough to support meaningful analysis. At the level of individual data sets, comparability can be a concern when comparing baseline and follow-up data, for example. The workgroup might set standards for normalization of data collected from facilities over time. Another comparability issue may arise if states submit data for a particular sector that were gathered over different periods of time.

Sensitivity. Sensitivity is a measurement of the capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest. If indicators require taking measurements, the workgroup might set uniform standards for sensitivity (e.g. measurements in pounds should be rounded to the nearest ten pounds). If laboratory work is needed, state or EPA resources can provide guidance on the sensitivity achievable by various analytical methods and techniques.

A8. Special Training

As noted previously, all project participants will receive statistical, quality assurance and data collection training from a contractor to be determined. Further, MassDEP and other state project participants will confer regularly concerning general and specialized training and technical assistance needs. These needs will be addressed by the contractor, NEWMOA, and/or project participants as determined necessary to meet the goals and objectives of the project. The Workgroup will consider whether states should provide specialized training to their own staff as part of meeting quality criteria defined for each sector's performance measures. Decisions will be documented in an amendment to the QAPP.

A9. Documents and Records

Report format/information

The Workgroup will determine an appropriate reporting format(s) for written information and data as part of the project development elements described in this plan.

Document/record control

The recording media for the project will be both paper and electronic, although NEWMOA expects that states will submit their performance measures data for aggregation in an electronic format. **The project will implement proper document control procedures for both, consistent with MassDEP's Quality Management Plan.** The MassDEP Project Manager will have ultimate responsibility for any and all changes to records and documents. Similar controls will be put in place for electronic records. The practices and procedures identified herein for MassDEP will also be followed by NEWMOA.

The MassDEP Project Manager shall retain all updated versions of the QAPP and be responsible for distribution of the current version of the QAPP. The MassDEP Project Manager will develop any necessary QAPP amendments. MassDEP and NEWMOA shall retain copies of all management reports, memoranda, and all correspondence between MassDEP, NEWMOA the contractor and all project personnel identified in A4.

Other records/documents

Other records and documents that may be produced in conjunction with this project include:

- Readiness reviews (see below)
- Reports transmitting data from states to NEWMOA
- Data handling reports
- Quarterly, annual and special progress reports to EPA
- Project final report (to include discussion of QA issues encountered, and how they were resolved)

Storage of project information

It is not certain at this time exactly what records, documents and data will be needed because the groups to be measured and the performance measures will be developed in the first phase of the project. When decided, the record retention and maintenance procedures will be put in place. These will be described in the planned amendment to this QAAP.

Backup of electronic files

The information will be collected and organized in a dedicated secure database housed at NEWMOA, which will be backed up daily.

QAPP preparation and distribution

This QAPP conforms to the format described in the United States Environmental Protection Agency publication *EPA Requirements for Quality Assurance Project Plans* dated March 2001 (QA/R-5). The QAPP shall govern the operation of the project at all times. Each responsible party listed in Section A4 shall adhere to the procedural requirements of the QAPP and ensure that subordinate personnel do likewise.

This QAPP shall be reviewed at each major milestone of the project or least annually to ensure that the project will achieve all intended purposes. All the responsible persons listed in Section A4 shall participate in the review of the QAPP. The MassDEP Project Manager, after consultation with the responsible persons listed in Section A4, shall be responsible for determining that data are of adequate quality to support this project. The project participants and NEWMOA shall be responsible for the implementation of changes to the project and shall document the effective date of all changes made.

It is expected that from time to time ongoing and perhaps unexpected changes will need to be made to the project. The MassDEP Project Manager shall authorize all changes or deviations in the operation of the project. Any significant changes will be noted in the next report to EPA, and shall be considered an amendment to the QAPP.

The Quality Assurance Officer is responsible for updating the QAPP, documenting the effective date of all changes made in the QAPP, and distributing new revisions to all individuals listed in A3 whenever a substantial change is made. Distribution of the QAAP may be performed by posting the document on an appropriate website available to all individuals listed in A3.

B DATA GENERATION AND ACQUISITION

Sections B2 through B8 pertain to primary data (new data generated for the purpose of this project). Since this project does not involve the generation of primary data, Sections B2 through B8 do not apply. The only data being used by this project are secondary data: i.e., data originally gathered for purposes other than this project. It is assumed that no state participant will specifically collect data solely for the purpose of contribution to the indicators database, but that state participants will rather submit data that already have been or will be collected for projects driven by other policy goals. Nonetheless, this project will develop agreed-upon quality criteria that will govern whether state-submitted data will be accepted for the regional-level analysis. Such quality criteria may include issues traditionally covered in elements B2-B8, if relevant.

B1. Sampling Process Design (Experimental Design)

The development of the performance indicators, quality criteria and regional aggregation methodology constitute the experimental design for this project. As mentioned elsewhere, these issues will be detailed in a subsequent amendment to the QAPP, once they have been defined by the project participants.

B2. Sampling Methods

This section is not relevant to this project. The project does not involve the generation of primary data.

B3. Sample Handling and Custody

This section is not relevant to this project. The project does not involve the generation of primary data.

B4. Analytical Methods

This section is not relevant to this project. The project does not involve the generation of primary data.

B5. Quality Control

This section is not relevant to this project. The project does not involve the generation of primary data.

B6. Instrument/Equipment Testing, Inspection and Maintenance

This section is not relevant to this project. The project does not involve the generation of primary data.

B7. Instrument/Equipment Calibration and Frequency

This section is not relevant to this project. The project does not involve the generation of primary data.

B8. Inspection/Acceptance for Supplies and Consumables

This section is not relevant to this project. The project does not involve the generation of primary data.

B9. Non-Direct Measurements (I.e., Secondary Data)

The data to be analyzed in this project are exclusively secondary data; these data will be provided by participating states. Data will be accepted if states certify that they have been collected, managed and/or analyzed (if applicable) in accordance with the QA procedures agreed upon by the individual sub-groups.

If the sub-groups determine that other secondary data are instrumental to the project, an amendment to the QAPP will detail quality considerations for using such data. For instance, one could imagine that the regional aggregation methodology might rely upon estimated emissions factors related to various compliance approaches, in order to estimate environmental outcomes. Such estimated emissions factors (and related assumptions) would most likely be derived from published secondary data.

B10. Data Management

As part of this project, MassDEP, NEWMOA and the Contractor will develop a data management strategy, and amend the QAPP based upon the strategy. Once amended, this QAPP section on data management will provide information on the following issues related to the management of data from state transmittal to final use and storage:

- Data management scheme
- Standard recordkeeping and tracking practices, and document control system (citing relevant agency documentation)
- Data handling equipment/procedures that will be used to process, compile, analyze, and transmit data reliably and accurately
- Individuals responsible for elements of the data management scheme
- Process for data archival and retrieval

Individual sub-groups will also determine the extent to which quality criteria related to the indicators should define data management criteria that states contributing data must meet.

C ASSESSMENT/OVERSIGHT

C1. Assessment and Response Actions

A readiness review is a systematic, documented review of readiness for the start-up or continuation of a critical aspect of the project. Readiness Reviews are typically conducted before proceeding beyond project milestones and before initiation of a major phase of work. The Quality Assurance Officer will conduct a Readiness Review prior to 1) the beginning of data collection by states 2) acceptance of state data sets, and 3) analysis of the combined data sets.

The procedure for the Readiness Reviews will generally consist of an email from the Project Manager to the QA Officer that the project has reached the phases described above. The QA Officer will perform the Readiness Review and upon completion will email the Project Manager describing the results of the review. In each case, the QA Officer will report findings to the Project Manager, who will take corrective action (if any is necessary). Any corrective action will be reviewed by the QA Officer. Data collection/submission, acceptance and data analysis will not begin until the QA Officer certifies readiness.

First Readiness Review: Before states begin the data collection/submission phase, the QA Officer will verify that the amended QAPP (describing the final indicators, quality criteria and the regional aggregation methodology) adequately describes the project plan, contains adequate quality controls, that the QAAP has been approved by EPA and that all participating states have received it.

Second Readiness Review: The QA Officer will verify that NEWMOA and/or MassDEP have a database suitable to house the combined state data sets (e.g., with enough memory, formatted with the appropriate fields, with data back-up protocols and equipment in place) and are equipped to transfer the data into the database.

Third Readiness Review: The QA Officer will verify that all expected state data sets have been received, will perform spot checks to confirm that they have been accurately transferred into the central database, and will verify that any necessary independent QA of state data (if any--specified in B9) has been conducted.

The Project Manager and QA Officer will meet regularly with project implementation staff to identify emerging/unanticipated problems and take corrective action, if necessary.

C2. Reports to Management

Three kinds of reports will be prepared: readiness reviews (described above), regular quarterly and annual progress reports, and project final report. Progress reports will note the status of project activities and identify whether any QA problems were encountered (and, if so, how they were handled). The project final report will analyze and interpret data, present observations, draw conclusions, identify data gaps, and describe any limitations in the way the data should be

used. The project final report will also offer lessons learned related to the process of developing the indicators

Project QA Status Reports

Type of Report	Frequency	Preparer	Recipients
Amended QAPP	Once, before primary data collection begins	MassDEP Project Manager *	All recipients of original QAPP
Readiness Review	Once before data collection, once before data acceptance and once before data analysis	MassDEP Project QA Officer	MassDEP Project Manager
Progress Report	Quarterly	MassDEP Project Manager*	U.S. EPA Project Officer (Copying US EPA OPEI)
Progress Report	Annually	MassDEP Project Manager*	U.S. EPA Project Officer (Copying US EPA OPEI), stakeholders
Final Project Report	Once	MassDEP Project Manager*	U.S. EPA Project Officer (Copying US EPA OPEI), stakeholders

* NEWMOA and the Contractor will assist the MassDEP Project Manager

D DATA REVIEW AND EVALUATION

D1. Data Review, Verification and Validation Criteria

States will be required to certify that their data were collected in accordance with the QA criteria determined by the sub-groups. If the sub-groups determine that any independent verification of state data will be conducted, verification approaches will be noted here in a future QAPP amendment. The description of verification approaches, if any, will list any conditions that will trigger such review, if applicable.

The final analysis will be reviewed by the NEWMOA Board of Directors, participating states and the QA officer to confirm that the data support conclusions reached.

D2. Verification and Validation Methods

All verification and validation methods will be noted in the analysis provided in the final project report.

To confirm that QA/QC steps have been handled in accordance with the QAPP, the QA Officer will prepare a readiness review before key data collection steps (as described in Element C1). Also, the Data Processing Manager will prepare data handling reports, to be reviewed by the QA Officer, after the data collection step and the data analysis step. These reviews and reports will be guided by the quality criteria described in Element D1, above, and performed in accordance with MassDEP's Quality Management Plan.

If at any point during verification and validation the QA Officer identifies a problem (e.g., the use of substandard data when higher-quality data are available, a faulty algorithm, a mismatch between a data set and the question it is meant to answer), the Project Manager, QA Officer, and any other relevant staff will discuss corrective action. If necessary, the Project Manager will issue a stop-work order until a solution is agreed upon. The Project Manager will implement corrective action. If the solution involves changes in project design, the QA Officer will amend the QAPP as necessary and distribute the new revision.

D3. Evaluating Data in Terms of User Needs

The final project report will contain an evaluation of confidence placed in project conclusions, prepared by the QA Officer. This evaluation will describe, in narrative form: the quality of data and the methodologies used to inform the multi-state analysis, the subsequent confidence in the analysis, and the validity of generalizing results. The evaluation will also describe perceived advantages and disadvantages of the approach pursued, and recommendations for how best to carry the project forward or replicate it in other regions. To the extent possible within the project timeframe, the evaluation will convey whether the results of the project have met the original objectives, and offer lessons learned.

Attachment 1.

NEWMOA Directors

Connecticut Department of Environmental Protection

- Michael Harder, Chief, Bureau of Waste Management
- Robert Kaliszewski, Permit Ombudsman, Office of Environmental Assistance and Outreach

Maine Department of Environmental Protection

- Stephen K. Davis, Director, Bureau of Remediation and Waste Management
- Ron E. Dyer, Director Office of Innovation and Assistance

Massachusetts Department of Environmental Protection

- Steven DeGabriele, Director, Business Compliance Division
- Sarah Weinstein, Assistant Deputy Commissioner, Bureau of Waste Prevention

New Hampshire Department of Environmental Services

- Anthony Giunta, Director, Waste Management Division

New Jersey Department of Environmental Protection

- Frank Coolick, Assistant Director, Division of Solid and Hazardous Waste
- Michael DiGiorio, Manager, Office of Pollution Prevention and Right To Know

New York Department of Environmental Conservation

- Stephen B. Hammond, Director, Division of Solid and Hazardous Materials
- David R. O'Toole, Assistant Director, Division of Solid and Hazardous Materials
- Jeff Sama, Director, Division of Environmental Permits

Rhode Island Department of Environmental Management

- Ron Gagnon, Director, Office of Technical and Customer Assistance
- Terrence Gray, Assistant Director for Air, Waste & Compliance

Vermont Agency of Natural Resources

- P. Howard Flanders, Director Waste Management Division
- Gary Gulka, Chief, Assistance & Prevention Section

Project Leads Not Included Above

- Kevin Sullivan, Program Analysis Supervisor, CT DEP
- Robert Isner, Acting Director, Waste Engineering and Enforcement Division, CT DEP
- Paul Heitzler, NH DES
- Marc Roy, Chief, Technical Services Section, VT ANR