QUALITY ASSURANCE PLAN

FOR

MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION'S

DIVISION OF REMEDIATION

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1.0 INTRODUCTION

This document serves as the Quality Assurance Plan (QAP) for the Division of Remediation (MEDEP/DR), one of five divisions within the Bureau of Remediation and Waste Management, (BRWM), a Bureau within the State of Maine's Department of Environmental Protection. This document will describe, or reference attached documents that describe:

- The MEDEP/DR functional statement and organization;
- Personnel responsible for assuring the standards set in the QAP are met;
- Quality standards goals;
- The basic flow of project activities, including preparation of sampling plans, implementation, report preparation, and document control;
- Standard Operating Procedures (SOPs) for conducting field work and routine work processes;
- MEDEP/DR procedures for obtaining analytical support;
- Quality Assessment; and
- Training.

The United States Environmental Protection Agency (EPA) requires that all environmental monitoring and measurement efforts mandated or supported by U.S. EPA participate in a centrally managed Quality Assurance Plan (QAP). The Maine Department of Environmental Protection's (MEDEP) Quality Management Plan (QMP) requires its' Programs to develop guidance to assure the quality of the work conducted. Therefore, the MEDEP/DR has developed this Non-Site Specific Quality Assurance Plan to meet these requirements. In accordance with 40 CFR Part 35, Subpart O, Section 35.6055(b)(2), this document will be submitted to USEPA for approval. The MEDEP will evaluate this QAP as part of its own internal Quality Management System, as outlined in the MEDEP's Quality Management Plan.

2.0 QUALITY ASSURANCE STATEMENT

It is the goal of the MEDEP/DR to implement a Quality Assurance Program (QAP) for all environmental activities that generate data. The QAP is a management tool that will help guarantee that data is of sufficient known quality to withstand scientific and legal challenge relative to the use for which the data is obtained. Additionally, MEDEP/DR strives to assure its work practices are conducted appropriately, uniformly, and transparently in carrying out the responsibilities of programs its administers. This QAP and associated Standard Operating Procedure Manuals will set out the basic requirements for achieving the goals of these programs.

All Quality Assurance/Quality Control (QA/QC) procedures must be in accordance with applicable professional technical standards, USEPA requirements, government regulations and guidelines, and specific project goals and requirements. Any party generating data under this QAP has the responsibility to implement procedures to assure that the precision, accuracy, completeness, and representativeness of its data are known and documented.

3.0 MEDEP/DR ORGANIZATION

3.1.1 Specific Programs Within MEDEP/DR

The MEDEP/DR is a Division within the MEDEP's Bureau of Remediation and Waste Management (BRWM) that administers several different programs within the MEDEP, all related to remediation of hazardous substances, lead and asbestos, and landfills. These programs are:

- Uncontrolled Sites – This program investigates and remediates hazardous substance contamination under the states Uncontrolled Hazardous Substance Sites Law;
- Federal Facilities – This program provides State oversight of remedial activities at National Priority List (NPL) Sites. This program also works with the Department of Defense (DOD) in addressing hazardous substance contamination at Federal Facility Sites and other sites considered to be formerly used defense sites (FUDS). This program receives funding through a NPL Support Agency Cooperative Agreement for Site Specific support agency activities at NPL Sites, and DOD cooperative agreements.
- Landfill Closure – This program oversees the closure and long term maintenance and remedial actions of municipal landfills throughout the State;
- RCRA Corrective Action (RCRA CA) – This program provides state oversight of remedial activities at RCRA CA Sites and at RCRA sites that are closing.
- Voluntary Response Action Program (VRAP) – This program oversees voluntary investigative and remedial activities of hazardous substance and petroleum contaminated sites.
- The Federal Site Assessment Program – This program conducts pre-remedial investigative activities at Sites that are on Superfund Enterprise Management System (SEMS), the list of sites being investigated for inclusion on the NPL. It is funded under a Multi-Site Cooperative Agreement with USEPA Region I.
- The Brownfields Program – This program conducts investigative and remedial activities at Federal and State funded Brownfield Assessment projects. It also provides state regulatory oversight to municipalities and other quasi - municipal entities that receive funding through EPA's Brownfields program. This program receives funding under a cooperative agreement from the EPA Brownfields Program.
- Lead and Asbestos Abatement Program (LAAP) – This program provides State oversight of lead and asbestos abatement throughout the State. Due to the requirements of the LAAP, the LAAP will develop and implement their own QAP and associated SOPs for data collection and work practices That QAP will be kept as a separate document from this QAP.

3.1.2 Organizational Hierarchy

The MEDEP/DR organizational chart can be found in Attachment A. Additionally, the MEDEP/DR often receives technical support from staff in MEDEP's Division of Technical Services (MEDEP/TS), whose organizational chart can be also found in Attachment A. TS staff are assigned to specific MEDEP/DR projects on a case-by-case basis.

Additional staff from other Divisions in the MEDEP may also be assigned to MEDEP/DR projects on an as needed basis.

3.2 Personnel Responsible for QAP Implementation

All Staff: All data acquisition and documentation activities conducted by MEDEP/DR personnel will be completed as outlined by this QAP and associated Attachments. All personnel outside of MEDEP/DR that are working on projects assigned to MEDEP/DR shall also follow all procedures in this QAP. All staff are responsible for working as a team to ensure that the procedures in this document are followed, and for recommending improvements to QA procedures to the QAC.

Unit Supervisors: The Unit Supervisors are responsible for determining which activities their staff will be responsible for conducting, and for seeing that their personnel receive adequate training in order to conduct the tasks appropriately, safely, and provide the required QC for all environmental monitoring and/or measurement.

Division Director: The Division Director shall designate the Quality Assurance Manager (QAM) for the MEDEP/DR. The current QAM is a Brownfields and VRAP OHMS II project manager (indicated in Attachment A). The Division Director shall also work with DEP management to ensure that the Division has the appropriate resources to implement the procedures in this document. Finally, the Division Director shall promptly resolve any conflict between personnel regarding implementation of this QAP.

Quality Assurance Manager (QAM): The QAM is responsible for drafting and updating the QAP as necessary, and seeing that the specific quality control (QC) procedures as outlined in the QAP are followed. The QAM is responsible for initiating and conducting (with appropriate assistance from other staff, both internal and external to MEDEP/DR and MEDEP/TS) any QC programs for the Division, including those outlined in Section 9.0 and any other QC programs deemed necessary by the Division Director. The QAM will determine, upon initiation of such QC programs, who will be responsible for tracking and recording the results of QC programs within the Division, and responsible for notifying the appropriate personnel and their supervisors, when necessary, of any observed problems needing corrective action. The QAM shall notify EPA QA personnel of pending changes to this document and seek EPA's approval for the changes.

QA Team Coordination: Supervisory staff, the QAM, field team leaders and EPA may periodically observe staff under actual field conditions to ensure that the Standard Operating Procedures (SOPs), as outlined in this document, are being followed. When requested, the QAM with input from other observers, will investigate data quality problems and suggest alternate methods when appropriate to avoid the generation of data of questionable quality. If laboratory data quality problems are suspected, the QAM will communicate directly with the laboratory to resolve all issues. If any laboratory data quality issues are suspected, the QAM or project manager for the project involved, will notify the Chemistry Unit Leader (CUL) in the MEDEP/TS of any suspected problems and work to develop possible corrective actions. A laboratory audit of applicable analytical methods may be initiated when laboratory issues cannot be quickly and completely resolved.

The QAM, CUL, appropriate supervisor(s), and project manager(s) (if applicable) will determine the need for corrective action. The CUL is responsible for assuring the appropriate staff, appropriate supervisor(s) or management (as necessary) understand the corrective action needed. The appropriate supervisor(s) and management are then responsible for ensuring that the corrective action is completed.

USEPA QA Personnel: As this QAP will be used to meet the Quality Management requirements of multiple programs that receive USEPA funding, (Pre-Remedial, Brownfields, Superfund, etc.), USEPA will inform the QAC of the appropriate USEPA staff required to review and approve the QAP. EPA QA personnel shall review the procedures in this document to ensure that they meet federal standards for quality assurance plans for the federal grant money used to obtain environmental data by DEP/DR. EPA QA personnel shall promptly notify the QAM of pending changes to federal QA requirements that pertain to this document. A signature approval page will be maintained for the QAP to provide a record of USEPA, MEDEP, and any other applicable Agency review and approval.

4.0 PROJECT ACTIVITY FLOW

Unit Supervisors/ Program Managers assign individual projects that are referred to the Division to appropriate program staff based on the nature of the project (i.e., Uncontrolled Sites project, VRAP project, Brownfields project, RCRA, etc.) in consultation with the Division Director. Once assigned to a program, the Program Manager assigns the project to a specific project manager. The Project Manager is then responsible for coordinating the project tasks and schedule required to complete the project, including coordinating the appropriate project team. In the case of small projects, the team may consist of only the Project Manager; in the case of large projects, the team may consist of staff in other programs in the Division, Staff in other Divisions and Bureaus of the MEDEP, consultants and contractors directly hired by the MEDEP, outside stakeholders of the project (such as site owners, responsible parties, municipal officials, EPA, etc), and the agents (consultants, contractors, etc.) of outside stakeholders.

Individual projects within the Division vary widely in scope; however all share the same general flow:

1) Determining the extent and nature of all hazardous substance and petroleum contamination at the site;
2) Determining the risks to human health and the environment posed by the contamination;
3) Determining the appropriate remedial actions and long-term requirements to mitigate the risk posed by the identified contamination;
4) Completing the appropriate remedial activities to address the identified risks; and
5) Developing a written public record of project activities to assure all stakeholders, now and in the future, understand actions and decisions made for the Project, including long-term requirements of the Projects.

Specific work tasks are conducted to complete the project flow stated above. Examples of specific work tasks include: Phase I/II Investigations, targeted source delineation investigations, migration pathway studies, soil gas surveys, surface water body assessments, remedial investigations; development of conceptual site models; feasibility studies, containerized waste surveys, soil removals, container removal actions, biopile construction and monitoring, soil vapor extraction system installation, Operation and Maintenance Plans, Declarations of Environmental Covenants, etc.

Although the scope will vary based on the task, work tasks are completed through the following basic steps:

1) Planning of the task;
2) Conducting the task;
3) Evaluating the completed task;
4) Documenting the task; and
5) Filing documents for future retrieval.

All of the above steps involve actions or activities that result in the collection, evaluation, reporting, and/or eventual storage of data. For example, the task of delineation of soil contamination may consist of the actions of soil sample collection, field screening of soil samples utilizing PIDs and FIDs, and soil screening using portable X-Ray Fluorescence (XRF) Spectrometers, and documenting results. All of these actions have SOPs. SOPs for conducting most of the data collection actions or activities that will be completed by staff can be found in Attachment B – Standard Operating Procedure Manual. All data collected must be collected in a manner that meets the Data Quality Objectives (DQOs) identified in a site-specific plan for the project and the specific work task(s). Work practices regarding project management can be found in Attachment C - Uniform work practices SOPs. Examples of work practices would include notification of liability requests, designation of an Uncontrolled Site, VRAP Certification of Completion, project filing, and updating of Division databases.

4.1 Data Quality Objectives

DQOs are qualitative and quantitative statements that specify the quality of the data required to support decisions made from data gathered during site assessments and other tasks, and are an integral part of any plan involving the collection of data. DQOs are dependent on the end uses of the data that is collected. Project and task specific DQOs will be established prior to collecting data and incorporated into the SAP, QAPP or work plan. Three steps will be followed in developing DQOs: 1) Identify the goal of the site assessment or work task, 2) Identify the use of the data, and 3) Identify the data quality needed to meet the site assessment or work task goal and data use.

4.2 Task Planning

Planning is the most important part of any data collection task, as vast projects should not be implemented from half vast ideas. Any task that involves the collection of data must have a plan developed prior to the task, such as a sampling plan, QAPP, work plan, or remedial action plan, that outlines goals of the task and actions/activities to meet those goals.

4.2.1 Work Plan Development

The work plan will discuss the what, how, where, why, and when of the site activities as completely as possible. MEDEP/DR has developed a Standard Operating Procedure (SOP) for the development of a Sampling and Analysis Plan and for Development of a Site Specific Quality Assurance Project Plan to Meet USEPA Hazard Ranking System (HRS) Requirements; These SOPs can be found in the MEDEP/DR SOP Manual (Attachment B). Tasks that involve the collection of data, but are not specifically sampling tasks (such as contaminated soil removal actions with post excavation sampling) must still have DQOs addressed as part of the task's work plan.

The first step in developing any sampling or work plan is to develop a conceptual site model (CSM). ASTM defines a CSM as "*a written or pictorial representation of an environmental system and the biological, physical and chemical processes that determine the transport of contaminants from sources through environmental media to environmental receptors within the system*." The CSM is a dynamic tool to be updated as new information becomes available, and therefore should be amended, as appropriate, after each stage of investigation. A description of the CSM does not have to be included in every work plan; however the CSM should be referenced in the plan and made available to all staff working on the project for review.

4.2.2 Sampling and Analysis Plan

All sampling specific activities require the development of a Sampling and Analysis Plan (SAP). The minimum specific requirements for a MEDEP/DR SAP can be found in SOP DR#014 in Attachment B. The SAP will define the proper procedures to be followed in the collection, preservation, identification and documentation of environmental samples and field data. The SAP shall outline the data quality objectives (DQOs) and protocols for data collection activities to ensure that the data generated by these activities are of a quality commensurate with their intended use. The SAP will include reference to the SOPs to be followed. Any planned deviation from the referenced SOP shall be described and an evaluation of the deviation's impact on the DQOs shall be included in the final report. Overall responsibility for developing the SAP will belong to the project manager for the site, with input by the project team, the QAM, and field personnel as necessary.

4.2.3 Site Specific QAPP

The majority of sampling activities performed by MEDEP/DR will not require the development of a site specific QAPP, and the completion of the SAP will be adequate. However, for those projects requiring the strictest QA/QC guidelines, a site specific QAPP will be generated. A QAPP will be generated for field work conducted specifically for Pre-Remedial HRS related and Brownfields Site Assessment related tasks. Additionally, a QAPP may be generated for a specific site if determined appropriate by the QAC, the MEDEP/DR project manager and supervisor, and the appropriate project personnel at MEDEP and EPA. Examples in which a site specific QAPP may be

generated would be a site which will, in all likelihood, be listed on the National Priority List (NPL), or a site in which there is a great possibility of litigation.

If a QAPP is necessary, it will include the elements listed in SOP DR#016 – Requirements for the Development of a Site Specific QAPP to Meet USEPA HRS Requirements, found in Attachment B.

4.2.4 Data Use

The data use(s) will be identified in the plan. Prior to collecting data, the end use for that data should be identified. Some examples of data use of data collected include, but are not limited to, the following:

- To determine the presence of hazardous substance and petroleum contamination;
- To determine the need for emergency action;
- To determine the quantity and levels of contamination;
- To determine if soil concentrations exceed Remedial Action Guideline levels
- To identify and quantify specific source areas;
- To identify migration pathways;
- To identify impacted targets/receptors and natural resources;
- To develop a site score including SI Scoresheets and Hazard Ranking System Packages.
- To document the need for further action or no further action.
- To determine the endpoint of remedial actions;
- To monitor the long-term effectiveness of remedial systems.

As stated earlier, the DQOs of the project must meet the goals of the end use of the data.

Historical and third-party data is sometimes available for projects and may be utilized as part of the decision making process. Prior to its use for decision making, historical and third-party data will be evaluated based on such factors as: relevance and applicability, age, method, QA/QC, SOPs used by the collectors and laboratory, source of data, and detection limits.

4.2.5 Data Quality/Quantity Necessary for Project

The quality and quantity of data needed to meet the decisions made above will be identified in the work plan. Factors that are considered in determining quality are: appropriate analytical levels (e.g. field screening, portable laboratory, or fixed laboratory), contaminants of concern, levels of concern, required detection limit and critical samples. Additional data quality indicators that should be considered are: precision, accuracy, representativeness, completeness and comparability (see Section 8.0 - Data Quality Assessment).

The quantity of data needed will vary based on available usable data, data use, analytical methods used, and goal of the data collection activity. The quantity of data must meet goals of the end use of the data.

4.2.6 Data Collection Methodology

The Work Plan must outline the specific actions that will occur, i.e., soil sampling, groundwater sampling, surface water sampling, etc. The MEDEP/DR has developed an SOP manual for routine data collection activities. This manual can be found in Attachment B. Activities that do not have a specific SOP can be completed as long as the work plan has a project specific SOP for that particular action or the action is sufficiently documented in the final report that outlines the completed task.

The SAP, QAP, or work plan will also identify the analysis methodology utilized by the laboratory, with containerization and sample preservation requirements for any samples collected.

Depending on the DQOs, QA/QC samples may be required; please Section 8.6 – "QA/QC Samples".

4.3 Conducting the Work Task

As stated earlier, MEDEP/DR has SOPs for most data collection and sampling procedures (see Attachment B). Staff are to complete the procedures following the work plan as closely as possible. However, the Work Plan should be considered as a dynamic tool that can evolve in the field as the task progresses and more information is obtained regarding a specific site. A chain of command should be stated in the work plan for making substantive changes to the site activities. However, field staff should be empowered to make common sense changes due to field conditions encountered that are different than expected. Some examples include, but not limited to, the following:

- Depth to groundwater is deeper or shallower than expected;
- Utility lines are located unexpectedly;
- Geology formation is not conducive to the type of sampling proposed;
- Sediment type is not conducive to sampling;
- Property lines are different than expected;
- Additional information is obtained from knowledgeable persons regarding locations of tanks, dry wells, disposal areas, etc.

Changes in the Work Plan must be documented in field notes outlining the change, the reason for the change, and the expected impact of the change to the data.

4.3.1 Documentation of Field Activities

It is expected that field samplers and analytical laboratories will follow standard operating procedures (Attachment B) and adhere to generally accepted "good field and laboratory practices". With that stated, staff will document work activities following the protocol outlined in MEDEP/DR SOP DR#013 – Documentation of Field Activities and Development of a Trip Report (found in Attachment B). Generally, the Trip Report will

describe actual sampling locations, field conditions, actual activities completed, field decisions, deviations from the SAP and SOPs, copies of chains of custody, and any other information that the field personnel deem relevant to the field activities for that sampling event. The person responsible for developing the Sampling Event Trip Report (SETR) will be stated in the Work Plan for that activity.

It should be mentioned that occasionally, certain quality assurance requirements cannot be met, and deviations from SAPs and SOPs are needed in order overcome “real life conditions”. In such cases, the reason for the deviation should be stated in the SAP or the SETR, along with the expected or observed impact on the data.

4.4 Work Task Evaluation

After completion of the work task activities, the project manager should review the field notes and laboratory analytical data to determine whether the goals of the task, including the DQOs, were met. Any deficiencies will be documented in the final report outlining the work task.

Data quality indicators to consider are: precision, accuracy, representativeness, completeness and comparability (see Section 8 - Data Quality Assessment).

4.5 Work Task Documentation

After completion of any project work task, a final report outlining the task will be completed. Depending on the scope of the work task, the final report may consist of a simple Trip Report (See MEDEP/DR SOP#013 – Documentation of Field Activities and Development of a Trip Report), or a stand alone document, such as a Phase II Site Investigation Report, Remedial Action Report, etc.

The project manager will be responsible for determining the “comprehensiveness” of the final report; however, it must meet the minimum requirements stated in MEDEP/DR SOP #013. It must also outline any data quality deficiencies noted during the evaluation of the data.

All project documents must be maintained as outlined in Section 5 – Document Control of this QAP.

5.0 DOCUMENT CONTROL

The term document control, as it applies to MEDEP/DR projects, refers to the maintenance of project files. The Administrative Record for Remediation Sites is switching from this paper format to an all-electronic format. The goal is to have the official Administrative Record be all electronic by December 31, 2021. There will be a transition period between the effective date of this SOP and that date, where some files will be in paper format and adhere to the SOP NO. RWM-DR-WP001, Project Records Retention Protocol (February 8, 2010) and others will be electronic and adhere to this SOP (001).

Project files are public records of the activities at a Site, and are therefore required to be kept in a manner that is available to the public. "Public record" or "public records" shall mean all documents, papers, letters, maps, books, tapes photographs, films, sound recordings, or other material regardless of physical form or characteristics made or received pursuant to law or ordinance or in connection with the transaction of official business by the MEDEP/DR.

All final documents, work plans, sampling plans, letters, memorandum, telephone records, printed emails, analytical data, and any other documents related to the specific project must be kept in the specific projects file, as outlined in MEDEP/DR SOP#WP001 – "Project Filing Protocols" , found in Attachment C – "Work Practices SOP" of this QAP.

Under no circumstances are any personal opinions or irrelevant information to be filed in the official project files. The project manager shall review the file at the conclusion of the project to insure that the file is complete.

The following records shall not be placed in the project file:

- Trade secrets and commercial or financial information obtained from a person, firm, or corporation, which is of a privileged or confidential nature under state law;
- Preliminary drafts, notes, impressions memoranda, working papers, and work products;
- The contents of real estate appraisals, engineering or feasibility estimates and evaluations made for or by MEDEP/DR relative to the acquisition of property or to prospective public supply and construction contracts, until such time as all of the property has been acquired or all proceedings or transactions have been terminated or abandoned, provided the law of eminent domain shall not be affected by this provision;
- All investigatory records of public bodies pertaining to possible violations of statute, rule or regulation, other than records of final actions taken, provided that all records prior to formal notification of violations or non-compliance shall not be deemed public; and
- Records, reports, opinions, information, and statements required to be kept confidential by federal or state law, rule, rule of court, or regulation by state statute.

6.0 STANDARD OPERATING PROCEDURES

6.1 Standard Procedures for Data Collection Methodology

MEDEP/DR's standard operating procedures for conducting sampling and other data collection activities can be found in Attachment B - MEDEP/DR Standard Operating Procedures Manual.

Depending on circumstances and needs, it may not be possible or appropriate to follow these procedures exactly in all situations due to site conditions, equipment limitations,

health and safety issues, and limitations of the standard procedures. In some instances, it may be necessary to perform an activity that does not have a specific SOP. Whenever SOPs cannot be followed, they may be used as general guidance with any and all modifications fully documented in either the SAP or the SETR. If no SOP for an activity is available, a description of the activity will be included in the task work plan.

Any changes in MEDEP/DR SOPs must be approved by the QAC. The SOPs are controlled documents and revisions should be indicated on each page in the right hand corner along with the revision date.

6.1.2 Equipment

A variety of equipment is available to the MEDEP/DR for conducting data collection tasks. This includes equipment that is owned by MEDEP directly, and equipment that is available through rental agencies. All equipment shall be maintained and calibrated according to the manufacturers instructions and in accordance with the appropriate analytical methods. Manufacturers instructions and other instructional documentation will be kept with the equipment. Additionally, some specialized equipment, such as portable vapor monitors (PVMs) and XRF Spectrometers, have specific SOPs for their use (See Attachment B). Equipment with its own SOP will be operated and maintained as stated in its SOP.

In the case of rental equipment, staff will be trained in the use of the equipment by the rental company prior to its use by staff for data collection. Training will be documented as part of the final report for the task.

Equipment that requires calibration for use, such as PVMs, etc., shall be calibrated routinely on a monthly basis, or as directed by the manufacturer, and prior to its use in the field at the beginning of each work day. Additional calibration may also be conducted throughout the work day as directed by the manufacturer, or as deemed necessary by the field personnel when equipment appears to be reporting suspect results. Documentation of routine calibration and maintenance shall be kept in the calibration and maintenance log book for that specific piece of equipment. Documentation of calibration of equipment prior to and during its use in the field will be noted in the field log book of the person conducting the calibration.

6.2 Work Processes SOP

As stated in the MEDEP QMP, Section 6 “Standard Operating Procedures”, and Section 4 “Project Activity Flow”, an activity performed regularly and requires uniform conduct each time it is performed should have a standard accepted methodology, including operational procedures and boilerplate document drafting. A list of operational procedures and boilerplate document drafting that has specific SOPs can be found in Attachment C – Operational Procedures SOP Manual.

7.0 LABORATORY SERVICES

MEDEP/DR is currently using a bidding system for routine analytical services. As part of the "Request for Qualifications" process, the laboratories used must present proof of certification for the analysis performed, and the Laboratory's Quality Assurance Manuals will be obtained and reviewed by the CUL.

In instances of non-routine analysis or field laboratory analysis, the project manager (or designee), with assistance from the CUL, will review the field laboratories specific methodology to assure DQOs will be met prior to conducting the task.

Occasionally, MEDEP/DR will use laboratories other than those listed for "non-routine analysis", such as dioxin analysis or air sampling, or employ mobile field laboratories for site work requiring field analysis. The project manager, with input from the CUL and project team, will work with the specific lab(s) to ensure that quality control measures meet the DQOs stated in the Work Plan for the project.

For tasks which require a field laboratory, the project manager and QAC will work with the specific laboratory to ensure that quality control measures meet the DQOs stated in the SAP or QAPP for the particular project or event. Additionally, confirmatory samples will be submitted to one fixed commercial laboratory (for routine analysis) or another laboratory (for non-routine analysis) at a rate of 5 to 10%, as stated in the specific SAP, QAPP, or Work Plan for the project.

8.0 DATA QUALITY ASSESSMENT

Given that sampling and analytical procedures are not perfect, it is commonplace to find that the reported concentration and actual concentration are not identical. The difference between the reported concentration and the actual concentration of a sample is a function of both the sampling and analytical error. Sampling error is difficult to judge; however, adherence to standard sampling protocol will minimize this error. The potential magnitude of analytical error may be assessed by evaluating laboratory quality control samples, split samples with other labs, and statistical evaluations of datasets, all of which will help determine the significance of a reported concentration.

The level of assurance will vary depending on the use of the data. Even data of poor precision and/or accuracy may still be useful. The project manager, with input from the QAC and/or QAM as needed, will determine the usefulness of data that may be of poor quality.

All data generated will be reviewed by the project manager for precision, accuracy, representativeness, completeness, and comparability as described below. Additionally, field notes, custody forms, and sample extraction and analysis dates will be reviewed by the project manager to ensure holding times and other standard procedures are met. The project manager will also review QC sample results to assure that recoveries are within acceptable ranges, as well as blank, spike, and duplicate samples are also within acceptable criteria. The project manager or technical support team member will utilize MEDEP's Basic Data Review Checklist, found as Attachment D of this QAP.

If data of questionable quality is reported (i.e., outside the acceptance criteria presented in Section 8.1 – 8.5 of this QAP) or other quality control issues are uncovered, the project manager will report the issues to the QAC and/or QAM. At a minimum, the individual concerns of the data will be mentioned in the final report for which the data was generated. Need for additional corrective action, including the collection of new or additional samples, will be determined after review of the DQOs for the project on a case by case basis with input from the project manager, the QAC and/or QAM, and any other appropriate personnel. If additional corrective action is necessary, it will be carried as described in Section 10.0 - Corrective Action.

8.1 Precision

The precision required for a particular study will depend upon the difference between background levels and the action level. Laboratory precision is only one part of the total precision of the measurement process leading from sample collection through data reporting. Selection of an acceptable precision level should not be based solely on what is attainable in the laboratory. Once the sample has been submitted to the laboratory, much of the sample to sample variation has already been introduced into the sample by activities in the field.

Replicate or duplicate QC samples are submitted from the field to provide a means of determining the precision of the measurement process. The following formulas will be used for precision measured from duplicative samples, as defined by relative percent difference (%RPD) or relative standard deviation (%RSD):

$$\% \text{ RPD} = 100 \times 2(|X1 - X2| / (X1 + X2));$$

$$\% \text{ RSD} = (100/\sqrt{2}) \times (2 |X1 - X2| / (X1 + X2));$$

where: X1 is the concentration of duplicate #1; and
X2 is the concentration of duplicate #2.

The RPD should be less than 50% for soil and 35% for water, unless specified otherwise in the analytical method. If the RPD is greater than 50% and 35%, this shall be noted in the final report for the data.

8.2 Accuracy

Accuracy is controlled primarily by the laboratory and usually reported as percent recovery. Analysis of known concentrations should be within 80 - 120% for water and 70 - 130% for solids, unless specified otherwise in the analytical method. If recovery is not within the specified range, it shall be noted in the analytical data sheets, and in the final report of the data.

8.3 Representativeness

Representativeness reflects the ability to collect a sample that reflect the conditions of a particular site and must be a major focus when developing the SAP.

Representativeness is measured by how well the sampling followed the proposed SAP, so as to provide results that accurately depict the media and environmental conditions being evaluated.

Documentation of field events confirms that proper protocols were followed and all planned samples were collected an analyzed. The Trip Report will outline any deviations from the SAP, and include a discussion into the possible impact to the data from the deviation.

8.4 Completeness

Completeness is the number of valid measurements divided by the number of samples taken. The project manager will be responsible for determining the completeness of the data. If completeness falls below 80%, it will be noted in the final report for the data.

8.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data should be comparable with other measurement data for similar samples and sample conditions. This goal is achieved through the use of standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units.

When available, analytical data will be compared to data collected from previous sampling events and other secondary source data. If currently collected data does not compare similarly with previously collected data, it shall be, at a minimum, reported to the QAC and/or QAM. Need for corrective action will be determined after review of the DQOs for the project, and follow the parameters listed in Section 12.0 - Corrective Action - of this QAP.

8.6 QA/QC Samples

QA/QC samples may be collected to ensure that the sampling methodology employed by staff is collecting the desired media without possible adulteration being introduced by the sampling methodology, or bias from background levels of compounds of concern, both naturally occurring and anthropogenic. Examples of QA/QC samples include, but are not limited to:

- Background Samples – Samples collected to determine the impact of naturally occurring compounds (such as metals), and anthropogenic caused contamination from off-site, or off-source locations. Examples of background samples include: upstream sediment surface water samples, upgradient groundwater samples, off-site/off-source soil samples, and ambient air samples.
- Trip Blanks – Sample containers of media that travel with the containers to determine possibility of sample cross-contamination, or introduction of non-site contamination to the sample. Trip blanks are only relevant for volatile compound analysis.
- Field Blanks – Collection of samples in the field to determine possible introduction of contamination to samples due to ambient conditions at the site.

- Method blanks – Samples collected to determine possible introduction of contamination to samples due to sample methodology. Tracer gas samples during soil gas is an example of a method blank.
- Rinsate/Equipment blanks – Samples collected to determine effectiveness of decontamination procedures.
- Duplicate Samples – Co-located samples for assessing possible variability due to sampling and analysis methodology and the media being sampled.

A discussion of QA/QC samples pertinent to a specific activity can be found in the activities specific SOP located in Attachment B of this QAP. Additionally, laboratories QA/QC protocol or the DQOs of the task/project may require the collection of additional sample volume in order to conduct laboratory QA/QC (i.e, matrix spike, matrix spike duplicates, etc). The work/sampling plan or QAP must outline QA/QC sampling requirements. The project manager will be responsible for communications with the laboratory conducting the analysis to ensure that enough QA/QC samples will be collected for the laboratories needs, and that meet the DQOs of the project.

9.0 QAP ASSESSMENT

Periodic assessments of the QAP will take place in the following ways:

9.1 Laboratory Performance Evaluation

The laboratory will conduct standard performance studies as outlined in their respective Quality Assurance Manual. Records of all performance evaluation studies shall be maintained by the laboratory. Problems identified in performance evaluation studies shall be immediately investigated and corrected.

9.2 MEDEP/DR Internal Assessment

Personnel responsible for performing field and laboratory activities are responsible for continually monitoring individual compliance with the QAP, Task Work Plan, SAP, and QAPP (whichever is applicable). The QAM will periodically review procedures, results, and calculations to determine compliance with the QAP. The results of this internal assessment are discussed with the QAM and appropriate supervisors, with suggestions and/or recommended requirements for a plan to correct observed deficiencies. Additionally, a “review” audit of select field methodology and documentation will be conducted periodically by the QAM, with assistance from both internal and external staff, as necessary.

9.3 External Evaluation

As part of the MEDEP’s Quality Assurance Plan (QMP), the activities of the Division will be audited periodically by the MEDEPs Audit Team. Such an assessment is an extremely valuable method for identifying overlooked problems. As outlined in the QMP, results of the assessment will be submitted to the QAM, Division Director, and Program Managers, with suggestions and requirements for a plan to correct observed

deficiencies. Additionally, the USEPA will audit the MEDEP/DR as part of its Quality Management program, as determined by USEPA. EPA audits will be coordinated with the MEDEP/DR and the MEDEP's overall Quality Management System as part of the QMP.

10.0 CORRECTIVE ACTION

Corrective actions must be taken immediately when data or field procedures are of questionable quality. These corrections may range from noting possible impact of data quality issues in the final report, to modifying certain procedures and re-conducting an entire field investigation. Any suspected problems will be brought to the attention of the QAM and, in the case of laboratory analysis, the CUL.

The need for corrective action may be identified during performance audits, standard QC procedures, or just when data "does not seem right". The steps in the corrective action are:

- Identification and definition of the problem;
- Investigation of the problem;
- Determining the cause of the problem and appropriate corrective action;
- Implementing the corrective action; and
- Verifying the problem has been corrected.

The QAM is responsible for ensuring effective corrective actions have been taken in regards to sampling activities and other field work. The CUL is responsible for ensuring effective corrective actions have been taken in regards to laboratory activities.

11.0 TRAINING

Training for the MEDEP/DR consists of three (3) categories: 1) Professional Development, 2) Health and Safety, 3) Data Collection activity, and 4) QAP training.

11.1 Professional Training

All staff will receive professional training for carrying out the responsibilities of their position as outlined in the MEDEP QMP (Section 3.0 – Personnel Qualifications and Training).

11.2 Data Acquisition/Field Activities Training

Procedures/activities with specific training requirements (such as use of the XRF spectrometer, or use of air monitoring devices for personnel protection decisions) are outlined in that activities specific SOP, and staff with need of those skills, as determined by the specific staff person, and their supervisor, will be appropriately trained and documented (as stated in the SOP).

Staff will receive in-house training on data acquisition techniques from the QAC, or their designee(s), through either formal training, or “on the job” training, on an as needed basis for those activities without specifically stated training in its SOP.

11.3 Health and Safety Training

In addition to the required training for all MEDEP staff as outlined in the MEDEP QMP, all permanent staff will receive 40-hour HAZWOPER Health and Safety Training, as well as Annual 8-hour HAZWOPER Refresher Training. In addition, all Supervisors will receive the HAZWOPER Supervisor Training. All staff will receive Red Cross CPR training and Red Cross First Aid training every two years. Staff will also receive specific health and safety training, such as respirator training, based on the requirements of the staff person’s specific position requirements, as determined by the staff and their respective supervisor.

11.4 QAP Training

As stated in the MEDEP QMP, all staff are required to be familiar with the QMP, and Division and/or Program Managers must annually review the QMP with staff. All data related programs requiring QAP/ QMP have, within those documents, standards and procedures for ensuring that program staff receive training in QA/QC related to their activities, and maintain proficiency in the QA/QC requirements of that program. To meet these requirements, all MEDEP/DR staff will be required to review this QAP within 360 days of its renewal. As new staff is hired by MEDEP/DR, they will be required to review this QAP within 90 days of their hiring date. Once Staff has reviewed the QAP, they will be required to sign the “QAP Log Sheet” that is in the custody of the QAC.

12.0 IMPLEMENTATION SCHEDULE

This QAP will be implemented by MEDEP/DR once USEPA has given approval. This QAP is to be considered a “working document”. Although the requirements outlined in the QAP will be followed until a new QAP is created, this QAP will be periodically updated and revised as technology, policy and protocol change.

13.0 DISTRIBUTION LIST

Upon approval and implementation of this QAP, the original shall be kept with the QAC, and a copy placed in the MEDEP/DR Library. Additionally, an electronic change protected copy of the document will be placed on the MEDEP’s webpage.

14.0 LIST OF ACRONYMS

BSA - Brownfield Site Assessment
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
SEMS - Superfund Enterprise Management System
CLP - Contract Laboratory Program
Data Quality Objectives
DD - Division Director

DQ - Data Quality
ES - Environmental Specialist
HETL - State of Maine Health and Environmental Testing Laboratory
HRS - Hazard Ranking Scoring
LUST - Leaking Underground Storage Tank
MEDEP/DR - Maine Department of Environmental Protection, Division of Remediation
MEDEP/TS - Maine Department of Environmental Protection, Division of Technical Services
MSCA - Multi - Site Cooperative Agreement
NPL - National Priorities List Sites
OHMS - Oil and Hazardous Materials Specialist
PA - Preliminary Assessment
QA - Quality Assurance
QA/QC - Quality Assurance/Quality Control
QAC - Quality Assurance Coordinator
QAM - Quality Assurance Manager
QAP - Quality Assurance Plan
QAPP - Quality Assurance Project Plan
QMP – Quality Management Plan
RCRA – Resource Conservation and Recovery Act, subsection C (Hazardous Waste)
RP - Responsible Party
SAP - Sampling and Analysis Plan
SASS - MEDEP/DR, Site Assessment and Support Services Unit
SDP - Site Discovery Project
SETR - Sampling Event Trip Report
SI - Site Inspection
SIP - Site Inspection Prioritization
SOP - Standard Operating Procedure
USEPA - United States Environmental Protection Agency, Region I
VRAP - Voluntary Response Action Program

ATTACHMENT A

QUALITY ASSURANCE PLAN
Maine Department of Environmental Protection
Division of Site Remediation

Organizational Hierarchy of the Division of Remediation
And Division of Technical Services

ATTACHMENT B

QUALITY ASSURANCE PLAN
Maine Department of Environmental Protection
Division of Site Remediation

MEDEP/DR Standard Operating Procedure Manual,
Data Collection

ATTACHMENT C

QUALITY ASSURANCE PLAN
Maine Department of Environmental Protection
Division of Site Remediation

MEDEP/DR Standard Operating Procedure Manual,
Work Practices

ATTACHMENT D

QUALITY ASSURANCE PLAN
Maine Department of Environmental Protection
Division of Site Remediation

MEDEP Basic Data Review Checklist