Program Support 2006

CONTRACT VALUE: $67,500

SCHEDULE: February 9, 2006 through December 31, 2006 (elapsed time: 10 months)

Project Objective

The objective of this task order is to provide the Utah Division of Water Quality with the support required to manage and review Projects 1 -4 as defined by the Science Panel.

Scope of Work

Task 1 – Project Planning and Design

Objective

Review detailed work plans and protocols for all four projects. Work will be completed simultaneously with scope andcost development to expedite start of field activities.

Activities

Contractor will facilitate a kickoff/partnering meeting with the Division of Water Quality (DWQ) on February 9, 2006 to outline and confirm project objectives. Contractor will prepare a draft scope framework for review by DWQ and discussion at the kickoff/partnering meeting to ensure project objectives and key subtasks are accurate before developing the detailed scope of work.

Following the kickoff/partnering meeting, Contractor's oversight team (Project Advisor and Technical Advisors) will work with Principal Investigators (PIs) to develop a detailed scope of work, cost estimate, and detailed work plan for each of the four projects. Each project work plan will include scope of work, cost budget, schedule, change management plan, quality assurance plan (QAP), and pertinent standard operating procedures (SOPs). Contractor will facilitate up to two conference calls with DWQ and Science Panel to review proposed work plans.

Assumptions

The planned kickoff/partnering meeting will require all team members, including DWQ, to be present.

Detailed scopes of work and cost estimates will initially be prepared by PIs. Contractor will review and comment prior to submittal to DWQ. They will then be reviewed by DWQ and the Science Panel, and comments will be incorporated into the final contract documents. Contractor will present project elements and preliminary costs to the Steering Committee for approval. Final scopes of work and costs are subject to final approval by DWQ.

Work plans will be reviewed and accepted by DWQ and the Science Panel. Although the projects are expected to be dynamic, the work plan will present the path forward. Concurrence of the work plans from DWQ and Science Panel is essential.

Costs for QAP are included in Task 5, Quality Assurance/Data Management.

Deliverables

- Kickoff/Partnering Meeting
- Draft Scope Framework
- Detailed Scope of Work and Cost Estimate for Four Projects
- Kickoff Meeting with Steering Committee

Schedule

Work for this task will begin on February 9, 2006 and finish by April 7, 2006.

Task 2 – Project Management

Objective

Provide necessary project controls to coordinate project activities and ensure effective coordination and communication with DWQ, Science Panel, and Steering Committee.

Activities

Contractor will prepare a master schedule and will update monthly, in close consultation with the DWQ and PIs.

The Contractor will prepare status reports on a monthly basis (March through December 2006) and will include a level of detail that can be used to report on progress on individual subtasks for each activity being completed by the Contractor. Status reports will be included with monthly invoices summarizing expenses. The format of the status report will be jointly determined by DWQ and Contractor.

Contractor will, through the meetings described below, assist the DWQ in planning and scheduling work to respond to requests from the Science Panel.

Assumptions

Up to ten monthly planning and coordination meetings will be held with the DWQ. The Contractor's Project Manager, Project Advisor, Technical Advisors, and key PIs will attend each meeting. It is assumed that the Contractor's Project Advisor and Technical Advisors will attend these meetings via conference call. Meetings will be up to 2 hours in length.

Contractor's Project Advisor will participate in up to four science panel meetings for the purpose of updating and advising the panel on Contractor's activities. Contractor's PIs will also attend as required to present and/or discuss ongoing work. It is assumed that the Project Advisor will attend two Science Panel meetings in SLC (2 day trips coordinated with Task 3) and participate in others via conference call. Time has not been budgeted for Project Advisor to attend Steering Committee meetings.

Deliverables

- Master schedule and status reports

Schedule

Work for this task will be conducted March 1, 2006 through December 30, 2006.

Task 3 – Project Quality Control

Objective

Provide independent peer review and acceptance of work products completed during planning, execution, and evaluation phases of the program.

Contractor has identified a Project Advisor (Ohlendorf) who is responsible for overall technical direction and review of the program. Technical Advisors (Byron, Santolo, and Moore) will work closely with the Project Advisor and assist him in providing oversight of their assigned project(s). All will work jointly with PIs throughout the project. Project assignments are as follows:

Task Description	Technical Advisor
Project 1	Gary Santolo
Project 2	Earl Byron
Project 3	Earl Byron
Project 4	Earl Byron
Quality Assurance	Dan Moore

Activities

Technical Advisors will participate in conference calls with their respective PIs to coordinate and discuss ongoing activities. The number and frequency of these conference calls will vary with the intensity of project work, but an average frequency of bi-weekly calls is anticipated. Technical Advisors will attend the following general meetings in Salt Lake City for each of the projects after the work plans are completed. Meetings for projects will be coordinated to minimize travel.

- Project kickoff meeting, including scouting/review of sampling sites
- Field review meeting, QA/QC of field sampling activities
- Data evaluation activities

The oversight team will provide technical assistance to the PIs as required. They will also participate in and review the evaluation/analysis of data and preparation of final reports.

Assumptions

Project Advisor will make one 2-day trip to review project location and proposed sampling locations. He will coordinate trips to attend Science Panel meetings to also review ongoing activities.

Santolo is assumed to make one 2-day trip for the project kickoff meeting and one 5-day trip to assist PIs in examining eggs as part of Project 1. Byron is assumed to make three 2-day trips and one 5-day trip to oversee Projects 2, 3 and 4. It is assumed that his time in SLC will coincide with all three projects.

Santolo will provide an average of 1 hour per week for ongoing support of Project 1 (26 weeks). Byron will provide an average of 2 hours per week for Projects 2, 3, and 4 (36 weeks). Ohlendorf will provide an average of 4 hours per month for ongoing support (10 months). DenBleyker will provide an average of 2 hours per month for ongoing support (10 months).

CH2M HILL will review reports prepared by principal investigators and provide comments. It is assumed that CH2M HILL will not be required to author, prepare, or edit them.

Deliverables

- Review comments on all deliverables
- Assistance in examining bird eggs for teratogenisis and malposition of embryos

Schedule

Work for this task will be conducted March 1, 2006 through December 30, 2006.

Task 4 – Data Quality Objectives

Objective

The United States Environmental Protection Agency (USEPA) has prepared a Data Quality Objectives (DQOs) process (USEPA, 2000) that serves as a useful tool in assessing what decisions must be made, what information is available toward making those decisions, what additional information is needed, how that information will be collected, and how it will be used in making decisions as related to development of a selenium standard for the open waters of the Great Salt Lake (GSL). Using the DQOs process along with the previously developed conceptual model (Johnson et al., undated) will help show how the physical, chemical, and ecological components of the environment are related, as well as providing rationale and context for the work that is being done. The DQOs will describe the overall approach for conducting studies to support development of the standard and will provide more specific information about the work to be done under each of the individual projects.

Activities

The steps in the DQO process that are described by USEPA (2000) (see Exhibit 2) are generally applicable to the overall objective for the project and also in more detail to the individual research projects. They will be adapted as needed to provide an efficient

framework and structure for the work that is to be done in 2006. The following activities will be conducted as part of this task:

- Develop the overall DQOs for conducting studies to support development of the site-specific standard (to be presented in a table with brief accompanying explanatory text linking the DQOs to processes identified in the conceptual model)
- Work with PIs to develop detailed DQOs for each project (to be presented in a separate table for each project, with brief text linking the DQOs to processes identified in the conceptual model)
- Prepare Draft DQO Technical Memorandum/Report
- Incorporate DWQ and Science Panel review comments
- Finalize DQOs

Assumptions

- Ohlendorf will prepare the overall DQOs and provide guidance and assistance to the Technical Advisors and PIs toward preparation of project-specific DQOs.
- The PIs for each project will complete the draft DQOs for their projects, discussing them with Technical Advisors (Santolo, Byron, and Moore), Project Advisor (Ohlendorf), and Project Manager (DenBleyker) as needed.
- The DQO technical memorandum/report will have about 15 to 20 pages of text, with five tables (one overall, four for individual projects).
- PIs will prepare the tables for their individual projects.

Deliverables

- Draft and Final DQO technical memorandum/report

Schedule

Work for this task will be complete April 30, 2006.

Task 5 – Quality Assurance/Data Management

Quality Assurance/Data Management Plan

Objective

The Quality Assurance Plan (QAP) presents the quality assurance (QA) and quality control (QC) requirements designed to ensure that environmental data collected for the Great Salt Lake (GSL) Selenium standard development study will be of the appropriate quality to achieve the data quality objectives defined in the project specific documents. Specific protocols for sampling, sample handling and storage, chain of custody, laboratory analyses, data handling, and data evaluation and assessment are discussed. Requirements for performance evaluations, corrective actions, and preventive maintenance of equipment are specified. The elements included in the QAPP will be consistent with those specified in the

US EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, March 2001. The objectives of the SLC QAP are as follows:

- Ensure that data collection and measurement procedures are standardized among all participants.
- Definition of staff roles and responsibilities.
- Monitor the performance of the various measurement systems being used in the projects to maintain statistical control and provide rapid feedback, so that corrective measures, if needed, can be taken before data quality is compromised.
- Periodically assess the performance of these measurement systems and their components.
- Verify that reported data are sufficiently complete, comparable, representative, unbiased, and precise, so that they are suitable for their intended use.

Activities

The scope of the data management activities addressed by the Data Management Plan (DMP), which will be part of the QAP, includes, but is not limited to:

- Standard project-wide field collection forms.
- Flow diagrams of how environmental data are collected, reviewed, and entered into the information system (with QC check points).
- Required electronic data deliverable (EDD) format used by the analytical laboratories to transfer analytical data electronically to the project team.
- Required EDD forms used by the project team to transfer field data electronically.
- Management and archive procedure for hardcopy and electronic project documentation.

The Data Management System (DMS) for the project will achieve the following:

- **Standardize and facilitate data collection:** use standard field forms; provide guidance for formatting, reviewing, and transferring data collected in the field to the Data Management System (DMS). The DMS includes hard copy record files and an electronic DMS such as a database.
- **Provide the ability to, where possible, electronically generate field forms used to collect data:** chains-of-custody (COCs), field parameter forms, etc.
- **Minimize the uncertainties associated with the data:** implement quality assurance and quality control (QA/QC) measures to provide accurate data representation of all data collected and stored in the DMS. QA/QC procedures include restricting data import or entry to specific valid value lists that will not allow incorrect data to be included in the DMS.

- **Provide a structured, yet flexible data set:** The DMS will store all types of environmental data. The DMS should be organized and structured, yet flexible enough to allow additional data to be added at any time during the history of the project.
- **Provide data that are well-documented:** Retain enough descriptive and source information for technical defensibility and legal admissibility of the data.
- **Provide end users with tools to gain access to the data:** Provide reporting and delivery formats from a single source and allow relatively simple and rapid access to stored data for environmental characterization, report generation, modeling, geographic information system (GIS) mapping, and statistical analyses.
- **Provide the ability to electronically compare data:** Allow electronic comparison of project data to specific reference or screening criteria.
- **Provide the ability to transfer data to different formats:** Provide the ability to reformat, convert, and transfer the data to any format as required by specific end-user application.

Assumptions

- Moore will prepare the QAP/DMP and work with the USGS to define the DMS in the DMP section and compile the final document after comments.
- USGS will maintain and administer the DMS and be able to provide data exports to the SLC team.
- Either the NWIS EDD structure or a CH2M HILL data structure will be used by the laboratories for providing electronic deliverables
- The PIs will provide examples of data collection forms and examples of data exports required from the database that will be required for their projects.

Deliverables

- The QAPP/DMP will be approximately 40-75 pages of text with 1-2 flow diagrams, several tables of QA/QC requirements and data validation guidelines.

Data Validation

Objective

Data validation tasks will verify that the established QA procedures are being followed and that data are being entered correctly.

Activities

Data validation will be performed on 100% of the analytical data using level 2, 3, or 4 procedures as defined below. The initial data packages for each laboratory/matrix/method combination will be reviewed following level 4 protocols. A tiered approach for data validation on the remaining data will be performed based upon the findings of the initial data validation.

Level 2 data validation consists of reviewing the following items:

- A review of the data set narrative to identify any issues that the lab reported in the data deliverable
- A check of sample integrity (sample collection, preservation, and holding times)
- An evaluation of basic QC measurements used to assess the accuracy, precision and representativeness of data, including QC blanks, LCSs, MS/MSD, and field or laboratory duplicate results
- A review of sample results and detection limits to verify that project analytical requirements are met
- Initiation of corrective actions, as necessary, based on the data review findings
- Qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations

Level 3 validation procedures also will include reviewing the evaluation of calibration and QC summary results against the project requirements and other method-specific QC requirements.

Level 4 validation procedures will include reviewing of sample raw data and verification of analyte identification and calculations for at least 10 percent of the data.

Assumptions

- Detailed laboratory Statement of Works used for subcontracting, Lab coordination and management, sample tracking, Level 4 validation for 10-20% of data, Level 2-3 validation on remaining data, limited interaction with USGS regarding the database, and data quality evaluation reports.
- The level of effort required for data validation is a function of the number of samples and data that require validation. Estimated sample quantities for 2006 field activities used to provide LOE estimates:

Project 1

420 tissue samples for Total Se analysis

7 water samples

Project 2

510 tissue samples for Total Se analysis

108 water samples for Total Se analysis

Project 3

260 water samples for total/dissolved Se analysis

Project 4

Cursory review of the 30 Vapor Se analyses

Cursory review of the 48 FFF-ICP-MS analyses

48 water samples for Total Se analysis

150 water samples for Total Se analysis

- Data validation qualifiers can be electronically applied to the data either directly or through upload to the DMS from a spreadsheet or equivalent.
- The laboratory selected can produce a data package that contains the necessary information to perform data validation in a logical, well-organized manner.
- Laboratory contracting - SOWs – 2 hours each, assume 8 hours to coordinate bids from labs.

Deliverables

- An initial data quality assessment report after the level 4 data validation is completed will be provided outlining the recommendations for the review of the remaining data.
- A final data quality assessment report will be provided after 2006 data collection activities are completed.

Schedule

Work for this task is ongoing. Final report will be complete December 30, 2006.

References

Johnson, W.P., M. Conover, W. Wurtsbaugh, and J. Adams. Undated. Conceptual Model for Selenium Cycling in the Great Salt Lake. Prepared for the Division of Water Quality of the Utah Department of Environmental Quality by Center for Water, Ecosystem, and Climate Science.

US Environmental Protection Agency (USEPA). 2001. Requirements for Quality Assurance Project Plans. EPA QA/R-5. Washington, DC. March

U.S. Environmental Protection Agency (USEPA). 2000. Guidance for the Data Quality Objectives Process. EPA QA/G-4. EPA/600/R-96/055. Office of Environmental Information, Washington, DC. August.

Exhibit 2

DQO Steps (excerpted from USEPA [2000])

1. State the Problem

- Identify the planning team members including decision makers.
- Describe the problem; develop a conceptual model of the environmental hazard to be investigated.
- Determine resources—budget, personnel, and schedule.

2. Identify the Decision

- Identify the principal study question.
- Define alternative actions.
- Develop a decision statement.
- Organize multiple decisions.

3. Identify the Inputs to the Decision

- Identify the information needed.
- Determine sources for this information.
- Determine the basis for determining the Action Level.
- Identify sampling and analysis methods that can meet the data requirements.

4. Define the Boundaries of the Study

- Define the target population of interest.
- Specify the spatial boundaries that clarify what the data must represent.
- Determine the time frame for collecting data and making the decision.
- Determine the practical constraints on collecting data.
- Determine the smallest subpopulation, area, volume, or time for which separate decisions must be made.

5. Develop a Decision Rule

- Specify an appropriate population parameter (mean, median, or percentile).
- Confirm the Action Level exceeds measurement detection limits.
- Develop a decision rule (*If...then...*statement).

6. Specify Tolerable Limits on Decision Errors

- Determine the range of the parameter of interest.
- Choose a null hypothesis.
- Examine consequences of making an incorrect decision.
- Specify a range of values where consequences are minor (gray region).
- Assign probability values to points above and below the Action Level that reflect tolerable probability for potential decision errors.

7. Optimize the Design for Obtaining Data

- Review the DQO outputs.
- Develop data collection design alternatives.
- Formulate mathematical expressions for each design.
- Select the sample size that satisfies the DQOs.
- Decide on the most resource-effective design, or agreed alternative.
- Document details in the QAP.