
Quality Assurance



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Savannah River Site (SRS) conducts an environmental Quality Assurance (QA) program to ensure the integrity of analyses performed by SRS and offsite laboratories and to ensure that quality control (QC) program requirements are met. The program's objectives are to ensure that samples are representative of the surrounding environment, and that analytical results are accurate. The focus of this chapter is on environmental laboratory QA. QA and QC definitions are provided in the Glossary.

Environmental QA Program Integration

Laboratory QA

The SRS comprehensive environmental QA program follows the requirements defined in the site's quality assurance procedures. SRS has developed and implemented QA procedures that address these requirements. The SRS independent QA organization reviews and assesses the QA program to ensure compliance with site requirements. SRS environmental personnel periodically conduct QA self-assessments on specific environmental program activities. Results, improvement opportunities, and corrective actions generated by these assessments are documented, handled, and corrected as appropriate. Site management participates in the Management Field Observation process, and the results from these reviews also are documented.

SRS laboratories have documented QA programs that meet SRS and Department of Energy (DOE) requirements. Based on inspections of instrument records and on data reviews, no corrective actions were identified during 2011.

For SRS laboratories, instrumentation includes: liquid scintillation and gas flow proportional counter, alpha and gamma spectrometry, inductively coupled plasma atomic emission spectrometry (ICP-AES), inductively coupled plasma mass spectrometry (ICP-MS), and flow injection mercury system (FIMS). Analyses are also performed for pH, biological oxygen demand, fecal coliform, total residual chlorine, total suspended solids and temperature. Methodology and

instrument performance is monitored through the use of QC standards and control charts. Analytical batch performance is measured through the use of QC samples (blanks, spikes, carriers, tracers, laboratory control samples, and laboratory duplicates). QC results that fall outside of specified limits may result in analytical batch or individual sample reruns. For those batches or samples that fall outside of limits, but for which the results are determined to be satisfactory, the reason(s) are documented in the data package, which includes the QA cover sheet, instrument data printouts, and associated QC data.

Laboratory Certification

SRS is certified by the South Carolina Department of Health and Environmental Control (SCDHEC) Office of Laboratory Certification for measurement of field pH, temperature, total residual chlorine, biological oxygen demand, fecal coliform, and for low-level mercury.

SRS is also certified for analytical measurements using the following methods:

- Total suspended solids (Standard Methods, 2540D) (SM, 1992), 25 metals by ICP-AES (EPA, 200.7) (EPA, 1994a), mercury by FIMS (EPA, 245.2) (EPA, 1974), and 17 metals by ICP-MS (EPA, 200.8) (EPA, 1994b)
- 26 metals by ICP-AES (EPA, 6010C) (EPA, 2008a), mercury by FIMS (EPA, 7470A and 7471B)(EPA, 2008c and EPA, 2008d), and 15 metals by ICP-MS (EPA, 6020A) (EPA, 2008b)

Certificates are renewed every three years; the current certificates expire in June 2012.

Laboratory Performance

During 2011, SRS laboratories performing NPDES analyses participated in the SCDHEC-required proficiency testing studies, per State Regulation 61-81 (“State Environmental Laboratory Certification Program”). All laboratories utilized accredited proficiency testing providers, accredited by the American Association of Laboratory Accreditation.

SRS laboratories reported acceptable proficiency testing results during 2011; therefore, state certification was maintained for all analyses.

During 2011, SRS continued to participate in the DOE Mixed Analyte Performance Evaluation Program (MAPEP), a laboratory comparison program that tracks performance accuracy and tests the quality of environmental data reported to DOE. The DOE Radiological and Environmental Sciences Laboratory, under the direction of the Office of Health, Safety, and Security, administers the MAPEP. MAPEP samples include water, soil, air filter, and vegetation matrices, all with environmentally important stable inorganic, organic, and radioactive constituents. Two separate studies were offered by MAPEP in 2011. In 2011, SRS participated in the two studies, and the results for both studies (141 analyses) were found to be satisfactory.

SRS reviews laboratory performance by analyzing field blind and duplicate samples throughout the year.

SRS personnel routinely conduct blind sample analyses for field measurements of pH to assess the quality and reliability of field data measurements. The blind sample analyses results were acceptable during 2011 with no percent difference values greater than 20 percent. Blind pH sample results can be found in data table 8-1 (see “SRS Environmental Data/Maps” on the compact disk (CD) accompanying this report).

The results for SRS and subcontract laboratory blind and duplicate sample analyses indicated that, although there were some differences, no problems occurred consistently within the laboratories during 2011. For blind samples, only two percent difference values out of 76 were greater than 20 percent; for duplicate samples, only five percent difference values out of 78 were greater than 20 percent. Complete field blind and duplicate sample program results can be found in data tables 8-2 and 8-3 (see “SRS Environmental Data/Maps” on the CD accompanying this report).

SRS’s water quality program requires checks of 10 percent of the samples to verify analytical results. Duplicate samples from SRS streams and the Savannah River were analyzed by SRS and a subcontract laboratory in 2011. Results for the field duplicate sampling program indicated that, although there were some differences, no problems occurred consistently within the laboratories. Detailed stream and Savannah River field duplicate sample results can be found in data table 8-4 (see “SRS Environmental Data/Maps” on the CD accompanying this report).

Data Evaluation

Environmental investigations of soils and sediments, primarily for Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) projects, are performed by SRS and subcontract laboratories. Evaluation of the data is completed by SRS according to U.S. Environmental Protection Agency (EPA) standards for analytical data quality, or as specified by SRS onsite customers.

SRS environmental data review program is based in part on two EPA guidance documents, “Guidance for the Data Quality Objectives Process for Superfund” [EPA, 1993a] and “Systematic Planning: A Case Study for Hazardous Waste Site Investigations” [EPA, 2006]. These documents identify QA issues to be addressed, but they do not specify a procedure for data evaluation or provide pass/fail criteria to apply to data and document acceptance. Hence, the SRS data review program contains elements from, and is influenced by, several other references, including

- “Guidance on Environmental Data Verification and Data Validation” (QA/G-8) [EPA, 2002b]
- “USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review” [EPA, 1999b]
- “USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dioxin/Furan Data Review” [EPA, 2005]
- “USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review” [EPA, 2004]
- “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA, November 1986, SW-846, Third Edition; Latest Update, February 2008 [EPA, 2008f]
- “DOE Quality Systems for Analytical Services,” Revision 2.6, November 2010 [DOE, 2010]

- “Analytical Data Qualification,” ER-SOP-033, Revision 4 [SRNS, 2010]

For the SRS program, many QA parameters are evaluated by automated processing of electronically reported data. Others are selectively evaluated by manual inspection of associated analytical records. A summary of findings is presented in each project narrative or validation report prepared by Environmental Compliance & Area Completion Projects (EC&ACP) personnel.

Commercial Laboratory Evaluation

The DOE Consolidated Audit Program (DOECAP) implements a consolidated, uniform audit program for conducting annual audits of commercial laboratories (subcontract laboratories) with the main purpose of providing trained auditors to support consolidated audits thereby eliminating audit redundancy from all DOE program line organizations and field sites. An annual DOECAP evaluation of each subcontract laboratory is performed to ensure that all the laboratories demonstrate technical capability and proficiency and follow the required QA programs. The evaluation includes an examination of laboratory performance with regard to sample receipt, instrument calibration, analytical procedures, data verification, data reports, records management, nonconformance and corrective actions, and preventive maintenance. In 2011, evaluations were conducted at three laboratories, resulting in a total of 23 Priority II findings. The findings are fairly evenly distributed among the laboratories audited.

A Priority II finding documents a deficiency that is not of sufficient magnitude to render the audited facility unacceptable to provide services to DOE. A report on the 2011 findings and recommendations was provided

to each laboratory. Each affected laboratory then submitted corrective action responses, and the responses subsequently were reviewed. The findings typically are resolved during the next laboratory audit (scheduled for 2012).

Evaluations also were conducted at three laboratories in 2010, resulting in 13 Priority II findings. Each laboratory submitted a corrective action response that addressed each finding. Ten of the 13 Priority II findings identified during 2010 were reviewed and closed during 2011. It is anticipated that the remaining three findings will be closed out with the next scheduled audit in 2012.

During 2011, subcontract laboratories participated in various water pollution studies. The subcontract laboratories reported acceptable proficiency testing results; therefore, state certification was maintained for all analyses.

MAPEP results for subcontract laboratories used by SRS in 2011 also were satisfactory, with the exception of vegetation analyses for several radionuclides at one laboratory. The laboratory with the finding did not perform vegetation analyses for SRS. The laboratory will be evaluated for the cause of the failed analyses and will be required to develop corrective actions to prevent a recurrence.

To help participants identify, investigate, and resolve potential quality concerns, MAPEP issues a letter of concern to a participating laboratory upon identification of a potential analytical data quality problem in the MAPEP results. Letters of concern have been issued since 1996 that are intended to be informative and not punitive. A copy of each letter is sent to DOE/contractor oversight points of contact.

