

Waste Characterization

Guidelines

This document is not meant to encompass all aspects of SC Regulation 61-107.19. It was prepared to assist regulated parties when considering issues related to waste characterization. Please review the entire regulation to gain a complete understanding.

Regulatory Summary:

Regulation 61-107.19 Solid Waste Management, Solid Waste Landfills and Structural Fill (Regulation), defines the requirements for waste characterization that apply to Class Two and Class Three Landfills. The following extracted sections of the Regulation deal with waste characterization:

Regulation 61-107.19. Part 1.A. Applicability:

1.d. Part IV outlines the requirements for Class Two Landfills - all landfills for the disposal of waste as outlined in Appendix I of this regulation, and similar waste, and wastes that test, pursuant to Section C of this Part, less than ten (<10) times the maximum contaminant level (MCL) as published in R.61-58, State Primary Drinking Water Regulation current at the time of the permit application. When a waste not listed in Appendix I is approved by the Department for disposal, the landfill's permit will be modified to include the acceptability of the approved waste.

Regulation 61-107.19. Part 1.B. Definitions:

60. "Practical Quantitation Limit (PQL)" means the lowest concentration of an analyte that can be measured within specified limits of precision and accuracy during routine laboratory operating conditions.

Regulation 61-107.19. Part 1.C. Waste Characterization:

1. Waste Characterization Report.
 - a. Determination of the proper landfill class for disposal of a waste stream is based on the chemical and physical properties of the waste and not on the source of generation of the waste. To determine the class of landfill required for proper disposal of a waste stream, the permittee shall submit to the Department a waste characterization report. The waste characterization report shall consist of a comprehensive analytical evaluation of the chemical and physical nature of each waste stream. Hazardous wastes as defined in R.61-79, Hazardous Waste Management Regulations shall not be disposed of in the landfills under the purview of this regulation. The wastes acceptable for disposal in a Class One

landfill, and waste items listed in Appendix I are exempt from the waste characterization process outlined in this regulation. Class Three landfills shall adhere to their approved Special Waste Analysis and Implementation Plan (SWAIP), pursuant to S.C. Code Section 44-96-390 which shall be deemed to be in compliance with this Section.

- b. The toxicity characteristic leaching procedure (TCLP) (USEPA method 1311) shall be used to obtain all extracts for the purpose of characterizing a waste stream proposed for disposal in a solid waste landfill.
- c. The analytical results of the TCLP shall be compared to the MCLs in South Carolina R.61-58 State Primary Drinking Water Regulation to determine the appropriate class landfill in which the waste stream may be disposed. If no MCL exists for a parameter, then those drinking water risk-based concentrations recognized by EPA Region IV shall be used to determine the appropriate class landfill for the waste. For those parameters where no MCL or Region IV number exists, the Department, using input from the permittee, will develop an appropriate number for determining the landfill class for disposal of that waste stream.
- d. Unless otherwise exempted in this regulation, all wastes shall be characterized in accordance with the following schedule:
 - (1) A minimum of every three years using certified knowledge of the process by which the waste stream was generated;
 - (2) At a minimum of every six years using analytical test data from the TCLP;
 - (3) According to a Department approved alternate schedule based on the variability or non-variability noted in previous sampling events or other factors that affect the predictability of waste characteristics;
 - (4) When the process or raw materials used in the process that generates the waste changes significantly enough to alter the chemical makeup or chemical ratios of the waste stream; and,
 - (5) When a new waste stream is proposed for disposal.
- e. Waste streams not listed in Appendix I, that demonstrate properties similar to the waste listed on Appendix I, may be exempted from testing as determined by the Department on a case-by-case basis. Requests for an exemption from testing, along with technical rationale for the exemption, shall be submitted to the Department in writing.
- f. The Department will provide current forms and guidance documents needed for the successful completion of the waste characterization process. All analytical results from the characterization process shall be submitted to the Department on these forms or in a format approved by the Department.

2. Waste Testing and Waste Stream Determination.

a. The permittee shall submit to the Department a comprehensive determination of the chemical and physical nature of each waste stream to be landfilled in accordance with the following sampling and analytical requirements:

(1) To ensure that representative samples are obtained, the sampler shall develop a sampling plan and employ all reasonable measures, such as sampling different sources of solid waste at different times, or conducting random sampling of a representative pile of the waste generated from different sources at different times. All samples of waste shall be collected using procedures as described in EPA Publication SW-846.

(2) All analytical testing required by this regulation shall be performed by a laboratory certified by the Department for the appropriate methodologies, to both properly prepare and analyze for the required parameters. The current guidelines for applicable regulatory thresholds, practical quantification limits, and required quality assurance data shall be obtained from the Department prior to the start of the characterization project. Analytical results shall be submitted to the Department within 60 days of the sample collection date.

(3) Mixing of individual wastes to be disposed of prior to testing is acceptable only if:

(a) The individual wastes are mixed prior to discharge in the normal production process of the generator or the individual wastes are generated by identical processes and identical raw materials; or,

(b) The mixing of individual non-hazardous wastes results in a waste in which leaching characteristics are no greater than the leaching characteristics of one or more of the individual wastes; and,

i. A demonstration is submitted to the Department for review and approval that details how a reduction in leaching occurs due to some factor other than dilution. The demonstration shall include, at a minimum:

aa. The concentration, determined in accordance with the requirements of this Section, for each parameter, which undergoes a reduction in concentration. Concentrations of parameters shall be determined for each individual waste in the mixture and for each parameter as a result of the mixture;

bb. A listing and the ratio, by weight and volume, of the individual wastes which comprise the mixture;

cc. Calculations using the concentration and weight data required in paragraphs aa. and bb. above, which demonstrate quantitatively

that the reduction in leaching characteristics is not solely due to dilution; and,

dd. Identification and explanation of the chemical reactions, including chemical equations, which cause the reduction.

ii. The individual non-hazardous wastes are mixed in the same ratios and in the same manner in which they will be mixed prior to disposal.

(4) For the purpose of obtaining an extract, which will be analyzed for any volatile organic compounds, a zero headspace extraction apparatus, as specified in the TCLP, shall be used.

(5) Practical Quantitation Limits (PQLs) for the analytical methods shall be one order of magnitude below the required regulatory threshold for the particular landfill class desired for disposal. Slight deviations in minimum PQL may be granted, on a case-by-case basis, with proper application and technical justification to the Department.

b. For the initial characterization of solid waste to be disposed of in a solid waste landfill, a minimum of two (2) representative samples of the waste shall be collected and tested in accordance with the TCLP. TCLP testing of additional samples of the solid waste may be required by the Department, based on a high degree of variability in the concentration of a parameter at or near the maximum allowable concentration for a particular landfill class. The Department may allow, with prior approval, the testing for selected constituents based on the generators knowledge of the process.

c. The permittee shall notify and obtain approval from the Department prior to making any physical or chemical changes to the waste stream being disposed of in a solid waste landfill.

(1) Significant changes in the chemical or physical nature of the waste stream may require disposal of the waste stream in a different class of landfill.

(2) Significant changes to the chemical or physical nature of the waste stream may require modification of the environmental monitoring program.

d. Any person seeking to utilize a testing or analytical method other than the TCLP method described in Section C.1.b. above may request authorization to do so. To be successful, the applicant shall demonstrate to the satisfaction of the Department that the proposed method is equal to or superior to the TCLP in terms of its sensitivity, accuracy, and precision (i.e., reproducibility). The request shall include, at a minimum:

(1) A full description of the proposed method, including all procedural steps and equipment used in the method;

- (2) Description of the types of wastes or waste matrices for which the proposed method may be used;
 - (3) Comparative results obtained from using the proposed method with those obtained from using the TCLP;
 - (4) An assessment of any factors, which may interfere with, or limit the use of, the proposed method;
 - (5) A description of the quality control procedures necessary to ensure the sensitivity, accuracy, and precision of the proposed method; and,
 - (6) Any other information on the proposed method, which the Department may reasonably request to evaluate the proposed method.
- e. The outcome of an alternate testing procedure as outlined in Section C.2.d. above may result in revision of the landfill class limits as defined in Part I, Section A.1. of this regulation to ensure equivalent protection of human health and the environment.
 - f. Solid waste streams that contain chemicals or chemical properties potentially harmful to human health and the environment, for which TCLP or other approved testing procedures as outlined in Section C.2.d. above is not sufficient, shall be classified on a case-by-case basis by the Department. The permit applicant may be required to perform alternate testing procedures as necessary to determine the potential adverse effects to human health and the environment.
 - g. A sampling and analysis plan for performing the activities outlined in Section C.2.a.-f. above shall be submitted to the Department for review and approval prior to sampling for waste characterization purposes.
 - h. If the waste characterization test results indicate that a landfill reclassification is necessary based on exceedance of the landfill classification level outlined in Part IV A.1., the Department may require additional sampling and testing to confirm or reject such indication. If exceedance of the landfill classification level outlined in Part IV A.1 is confirmed and the facility intends to continue to accept the waste stream in question, the Department will require the permittee to submit a permit application for appropriate modifications to the landfill. The required modifications shall insure that the facility meets the requirements of the new landfill classification.
3. Waste Characterization Report for Class Two Landfills.
 - a. Class Two landfills shall, prior to permit issuance, submit a waste characterization report that contains at a minimum, the following:
 - (1) A listing of each solid waste proposed for disposal in the facility;

- (2) The solid waste sampling plan used to ensure that accurate and representative samples are collected in accordance with Section C.2.a. above;
 - (3) A detailed description of any mixing to be proposed as described in Section C.2.a. above, and any available information that is required by that section;
 - (4) All laboratory results and quality assurance/quality control documentation that fully characterizes each waste; and,
 - (5) The name, location, and contact person of each generator of solid waste to be disposed of at the facility.
- b. Class Two landfills that accept ONLY those wastes specifically listed in Appendix I are exempt from the waste characterization report requirements.
 - c. Class Three landfills shall adhere to their approved Special Waste Analysis and Implementation Plan (SWAIP), pursuant to S.C. Code Section 44-96-390.
4. Compliance with the Department approved SWAIP will satisfy requirements of this section for Class Three landfills.

Regulation 61-107.19. Part IV. Class Two Landfills:

A. General Provisions:

1. Applicability. Part IV. establishes minimum criteria for all landfills used for the disposal of: waste as outlined in Appendix I of this regulation; other wastes not listed in Appendix I that demonstrate similar properties to the wastes listed and are approved by the Department on a case-by-case basis; or, wastes that test less than ten (<10) times the maximum contaminant level (MCL) as published in R.61-58, State Primary Drinking Water Regulation current at the time of submittal of the permit application. The testing criteria outlined in Part I., Section C. Waste Characterization shall be used when testing is required. Hereinafter, these landfills will be referred to as Class Two landfills.

4. Only those items listed in Appendix I of this regulation, approved Appendix I-type waste, and any items specifically listed on the facility's permit issued by the Department may be accepted for disposal at a Class Two landfill. These wastes shall not be contaminated with hazardous constituents listed in the S.C. Hazardous Waste Management Regulations 61-79.261 (e.g., pesticides), petroleum products, or lead-based paint. When a waste not listed in Appendix I is approved by the Department for disposal, the landfill's permit will be modified to add the approved waste. A list of Appendix I-type waste will be available from the Department.

Chapter 1 C. Operation Criteria for Class Two Landfills:

2. The Class Two landfill shall, prior to receipt of any waste materials that are not specifically listed in the permit application, submit for Department approval a

characterization of the waste materials to determine the suitability for disposal in the landfill unless the Department grants an exemption for like materials.

Guidance for Preparing a Waste Characterization Report:

If a Class Two Landfill wants to take a waste stream that is not listed in Appendix I of the Regulation and is not land clearing debris, then the landfill shall submit a Waste Characterization Report to the Department for approval. If the waste stream is approved for disposal at the facility, the Department will modify the landfill's permit listing the waste stream as acceptable for disposal in the special conditions section of the permit. As the Department's approval process starts and ends with its Solid Waste Permitting Section, the landfill or its consultant shall submit the waste characterization report to the SCDHEC, Solid Waste Permitting Section, Division of Solid Waste Management and Mining, Bureau of Land and Waste Management, 2600 Bull Street, Columbia, SC 29201-1708.

The Regulation states that the waste characterization report shall consist of a comprehensive analytical evaluation of the chemical and physical nature of each waste stream. This evaluation is done in a two-step process. Step one is the sampling and analysis plan, which must be approved by the Department. The analytical results from the first step then lead to the second step: a waste characterization report, which must be approved by the Department.

Step One – Sampling and Analysis Plan:

Generally, this starts with the generator's knowledge of the waste created in its industrial process. The generator of the waste should have knowledge of the chemical and physical nature of their waste streams and the consistency of the waste streams. This information should help in developing the sampling and analysis plan. Please note that the Department may approve testing of selected constituents based upon the generators knowledge of the process. Generator knowledge requests should be included in the plan or may be handled prior to submission of the plan if the generator certifies that waste characterization is not required.

The specific requirements for sampling and testing of a waste stream are defined under Regulation 61-107.19, Part I, C.2. The Regulation requires that the sampling and analysis plan follow procedures in US EPA Publication SW-846. There are two main goals of this plan. The first goal is to ensure that the samples are representative of the waste stream. In order to reach this goal, samples should be randomly taken from different sources of the waste at different times. The Department will accept a minimum of two samples for initial characterization; however, additional samples may be required if the results are significantly different between the samples.

The second goal is to ensure that the samples are properly analyzed by a laboratory certified by the Department, and that the results are representative of the industrial

process creating the waste stream and are reported at the required reporting limit based upon the class of landfill. In order to achieve this goal, the sampling and analysis plan must address the tests that will be run following analytical procedures prescribed in US EPA Publication SW-846. These analytical procedures may be limited to specific constituents based upon generator knowledge or may be the full set of constituents for the analytical procedure. In either case, the analytical procedures would normally be as follows:

1. TCLP for RCRA and drinking water metals
2. TCLP for RCRA and drinking water semi-volatiles
3. TCLP for RCRA and drinking water volatiles

Class Two Landfills may only receive waste streams that have constituents that are less than ten (<10) times the maximum contaminant level (MCL) as published in R.61-58, State Primary Drinking Water Regulation. This establishes the required regulatory threshold for disposal. The analytical methods used by the laboratory must then be able to achieve a Practical Quantitation Limit (PQL) one order of magnitude below the required regulatory threshold for a constituent. **If no MCL exists for a constituent, then those drinking water risk-based concentrations recognized by EPA Region IV shall be used to determine the appropriate class landfill for the waste. For those constituents where no MCL or Region IV number exists, the Department, using input from the permittee, will develop an appropriate number for determining the landfill class for disposal of that waste stream.** Please be advised that landfill or its consultant should ask for assistance for constituents that are not on the MCL list so that the sampling and analysis plan will be correct and retesting will not be required.

For example, let's say that the waste stream has metals. The table below provides the list of drinking water metals, the digestion and analytical method per US EPA Publication SW-846, the results, the PQL, regulatory limit based upon drinking water standards and the regulatory threshold for disposal.

Analytical Constituent	Digestion Method	Analytical Method	Results -- Measured Detection Limit (mg/l)	Laboratory's Minimum Practical Quantitation Limit (Mg/l)	Regulatory Limit MCL (mg/l)	Regulatory Threshold for Disposal 10 x MCL (mg/l)
Arsenic	SW1311	SW6010B		0.010	0.010	0.10
Barium	SW1311	SW6010B		2.000	2.000	20.00
Cadmium	SW1311	SW6010B		0.005	0.005	0.05
Chromium	SW1311	SW6010B		0.100	0.100	1.00
Lead	SW1311	SW6010B		0.015	0.015	0.15
Mercury	SW1311	SW7470A		0.002	0.002	0.02
Selenium	SW1311	SW6010B		0.050	0.050	0.50
Silver	SW1311	SW6010B		0.100	0.100	1.00

Step Two – Waste Characterization Report:

When the Department approves the sampling and analysis plan, samples are taken and then analyzed by a laboratory certified by the Department to perform the prescribed tests. The laboratory should provide the landfill an analytical report along with SCDHEC required forms for submission in the waste characterization report. The landfill or its consultant should prepare and submit the waste characterization report to the Department for review and approval. If approved, the Department will modify the permit for disposal of the waste stream.

In the example used above, let’s say the results are as follows:

Analytical Constituent	Digestion Method	Analytical Method	Results -- Measured Detection Limit (mg/l)	Laboratory’s Minimum Practical Quantitation Limit (Mg/l)	Regulatory Limit MCL (mg/l)	Regulatory Threshold for Disposal 10 x MCL (mg/l)
Arsenic	SW1311	SW6010B	0.0100	0.010	0.010	0.10
Barium	SW1311	SW6010B	Non-detect	2.000	2.000	20.00
Cadmium	SW1311	SW6010B	Non-detect	0.005	0.005	0.05
Chromium	SW1311	SW6010B	Non-detect	0.100	0.100	1.00
Lead	SW1311	SW6010B	0.0002	0.015	0.015	0.15
Mercury	SW1311	SW7470A	Non-detect	0.002	0.002	0.02
Selenium	SW1311	SW6010B	Non-detect	0.050	0.050	0.50
Silver	SW1311	SW6010B	0.0050	0.100	0.100	1.00

The results above show that the waste stream meets the regulatory threshold for disposal. Based upon these results, the Department would then approve then approve the waste stream for disposal by adding it to the permit upon review of the waste characterization report.

Recommended Plan Formats:

Sampling and Analysis Plan

The Department recommends that the sampling and analysis plan contain the following items, at a minimum *(Plans may not require all types of samples listed herein to be collected. Those types not collected should be removed from the list):*

1. General Information about the Solid Waste Stream:

- a. Generator name;
 - b. Contact person at the generator: name, phone number, address;
 - c. Generator location;
 - d. Landfill for disposal: name, permit number, location;
 - e. Brief description of the generator's products associated with the waste stream along with copies of all MSDSs; and,
 - f. List of "k-listed" processes at the generator's facility that may have impacted the waste stream per Regulation 61-261. Subpart D. 261.32.
2. Generator Knowledge:
- a. Signed generator knowledge document (see enclosed template). This may be used to eliminate the need for sampling and analysis or it may be used to specify known characteristics in the waste stream thereby limiting the analytical work.
 - b. What is the physical nature of the waste stream? Sludge, solid, pH, etc.
 - c. Is the waste stream consistent regarding physical and chemical characteristics? Provide basis for this determination.
2. Project Data Quality Objectives:
- a. Project Task and Problem Definition to make a proper waste class determination for each identified waste stream;
 - b. Data Quality Objectives (<http://www.epa.gov/QUALITY/qs-docs/g4-final.pdf>);
 - c. Data Quality Indicators (precision, accuracy, completeness, detection limits, representativeness, and comparability per item g. below);
 - d. Data Review and Validation provided by the laboratory or consultant (<http://www.epa.gov/quality/qs-docs/g8-final.pdf>);
 - e. Data Management (data collection, transfer, and management process);
 - f. Assessment Oversight (how the QA officer will implement the QA program); and,
 - g. Data Reporting (DHEC Waste Assessment Forms for Solid Waste Projects) <http://www.scdhec.gov/eqc/admin/html/eqforms.html#land> .
3. Sampling Methods/Procedures (Refer to US EPA Publication SW-846 for details)

- a. Generated Waste Piles or contaminated soils (Refer to Chapter of SW-846 for guidance on representative sampling.) The minimum number of samples for proper classification is two (2), however more may be required; and,
 - b. Sample Containers, Preservation, and Holding Times (consult your Laboratory for this information).
4. Analytical Methods/Procedures (Refer to US EPA Publication SW-846 for details):
- a. Reference - USEPA Region-IV Analytical Laboratory
<http://www.epa.gov/region4/sesd/fbgstp/>
 - b. Reference - USEPA SW-846 Analytical Methods
<http://www.epa.gov/epaoswer/hazwaste/test/main.htm>
 - c. Analyses Narrative (State the samples numbers, volumes required, quality assurance samples required for each sample matrix);
 - d. Analytical Laboratory (Provide the laboratory that will conduct the analysis that is certified by the Department for the appropriate methodologies, to both properly prepare and analyze for the required parameters. List specific tests to be performed along with the practical quantitation limits required for the regulatory determination required.);
 - e. Practical Quantitation Limit, PQL - The PQL is the minimum certified standard concentration that is quantified in each sample matrix (Note: a one-point calibration shall render the associated analytical results null and void for regulatory purposes). The PQL must be 10 times less than the Regulatory Threshold, where achievable, for any analyte of concern, unless an alternate PQL agreement is documented by DHEC. For sample results, which are “below detection limit”, or BDL, the PQL is required to be both reported and used in all statistical determinations required. Using, either zero, 0.0, or a method detection limit is not allowed in the calculations;
 - f. Matrix Specific: USEPA directs QA analyticals to be Matrix Specific (i.e. Soil, Sludge, etc., for the Matrix Spike, Matrix Spike Duplicate and Water Media for the LCS). This means that no other matrix may be analyzed with this Batch unless the “other samples” are of the same matrix. EPA intends that the specific matrix is the specific sample matrix and no “other matrix”;
 - g. Matrix and the QA: The QA (LCS, MS, MSD, etc.) must be from the same matrix as the sample (i.e. a sludge sample QA is not represented by water or any matrix other than the sludge matrix that represents the sludge sample); and,

- h. Representative Number of samples: Refer to Chapter Nine of SW-846 for further information. For statistical purposes, two (2) are the minimum number of samples required for waste pile classifications, however more may be required.

3. Field Methods and Procedures

- a. Reference - EPA Region-IV field SOP
<http://www.epa.gov/region4/sesd/fbqstp>.
- b. List of Field Equipment Needed;
- c. Calibration of Field Equipment (list Calibrations needed, maintenance, and frequency of calibration);
- d. Waste Screening (list any screening tests/methods to be performed before sampling);
- e. Sampling (Grab or composite samples; depth, location, frequency; list all procedures including record keeping procedures. Grab samples are required for all volatile organic compounds (VOCs). These samples must be placed immediately on ice per SW 846 – 5035);
- f. Sample Preservation Procedures (list all method that will be used); and,
- g. Decontamination Procedures (recommended EPA procedures).

4. Sample Containers

- a. Reference - EPA Region-IV field SO
<http://www.epa.gov/region4/sesd/fbqstp>
- b. Waste Samples (list all processes and procedures).

5. Disposal of Residual Materials (procedures for handling derived waste from field sampling activities– list all types)

6. Sample Documentation and Shipping (list processes for each step)

- a. Field Notes;
- b. Field Logbooks;
- c. Photographs;
- d. Labeling;
- e. Preservation;

- f. Sample Chain-Of-Custody Forms and Custody Seals; and,
 - g. Packaging and Shipment.
7. Quality Control
- a. Field Quality Control Samples – per Matrix
 - b. Assessment of Field Contamination (Blanks)
 - i. Equipment Blanks
 - ii. Field Blanks
 - iii. Trip Blanks
 - iv. Temperature Blanks
 - c. Assessment of Field Variability (Field Duplicate or Co-located Samples)
 - d. Background Samples
 - e. Field Screening and Confirmation Samples
 - i. Field Screening Samples
 - ii. Confirmation Samples
 - f. Split Samples
 - g. Laboratory Quality Control Samples
 - h. FIELD VARIANCES (Conditions on the day of sampling may require necessary changes to the sampling plan. The QA manager must be notified. Describe this process.)

Waste Characterization Report

The Department recommends that the waste characterization report contain the following items, at a minimum:

1. General overview of the waste stream to include but not be limited to the following:
 - a. The generator’s name, location, and contact person of solid waste stream to be disposed of at the facility

- b. Description of the industrial process that produces the waste stream
 - c. Generator knowledge document specifying the known constituents in the waste stream
2. Analytical results to include but not be limited to the following:
- a. All laboratory results and quality assurance/quality control documentation that fully characterizes each waste;
 - b. SCDHEC Analytical Forms as required:
 - i. SCDHEC 3657 (12/99) - Industrial RCRA - TCLP Metals
 - ii. SCDHEC 3658 (12/99) - Industrial RCRA - TCLP Volatiles
 - iii. SCDHEC 3659 (12/99) - Industrial RCRA - TCLP Semi-Volatiles
 - iv. SCDHEC 3660 (11/99) - Industrial Inorganic TCLP/R.61-58.5
 - v. SCDHEC 3661 (11/99) - Industrial Volatile TCLP/R.61-58.5
 - vi. SCDHEC 3562 (11/99) - Industrial Semi-Volatile TCLP/R.61-58.5

Sources and Links:

SCDHEC <http://www.scdhec.net/eqc/>

<http://www.scdhec.net/environment/admin/htm/eqforms.htm>

<http://www.scdhec.gov/eqc/envserv/html/labcert2.html>

USEPA Region IX <http://www.epa.gov/Region9/qa/fieldsamp.html>

USEPA Quality System http://www.epa.gov/quality/qa_docs.html

<http://www.epa.gov/quality/qs-docs/g8-final.pdf>

<http://www.epa.gov/QUALITY/qs-docs/g4-final.pdf>

USEPA Region IV <http://www.epa.gov/region4/sesd/asbsop/asbsop.html>

<http://www.epa.gov/region4/sesd/fbqstp>

USEPA SW-846 <http://www.epa.gov/epaoswer/hazwaste/test/main.htm>

<http://www.epa.gov/epaoswer/hazwaste/test/pdfs/chap9.pdf>