

11 SAMPLE RECEIPT, INSPECTION, AND TRACKING

11.1 Introduction

This chapter provides guidance on laboratory sample receiving and screening, inspecting, documenting custody, and assigning laboratory tracking numbers. These topics are presented in a sequentially in this chapter, but they may be done in a different order. The chapter is directed primarily at laboratory personnel (as are all of the Part II chapters), although the Project Manager and field personnel need to be aware of the steps involved in sample receipt, inspection, and tracking. For the purposes of MARLAP, the “sample receipt” process includes the screening of the package and sample containers for radiological contamination. “Sample inspection” is used to check the physical integrity of the package and samples, to confirm the identity of the sample, to confirm field preservation (if necessary), and to record and communicate the presence of hazardous materials. “Laboratory sample tracking” is a process starting with sample log-in and assignment of a unique laboratory tracking number to be used to account for the sample through analyses, storage, and shipment. Laboratory tracking continues the tracking that was initiated in the field during sample collection.

Figure 11.1 presents an overview of the topics discussed in this chapter. Note that the flow diagram in the field sample preparation chapter (Chapter 10, *Field and Sampling Issues that Affect Laboratory Measurements*) leads into sample receipt. This chapter focuses on sample receipt, inspection, and tracking of samples in the laboratory because these are the three modes of initial control and accountability. Sample receipt and inspection activities need to be done in a timely manner to allow the laboratory and field personnel to resolve any problems (e.g., insufficient material collected, lack of field preservation, etc.) with the samples received by the laboratory as soon as is practical. An effective interface between field personnel and the laboratory not only facilitates problem resolution but also prevents unnecessary delays in the analytical process.

Other relevant issues, including the laboratory’s license conditions and proper operating procedures are also noted because these topics are linked to receipt, inspection, and tracking ities. The end result of the sample receipt and inspection activities is to accept the samples as received or to perform the necessary corrective action (which may include rejecting samples).

Health and safety information is not presented but can be found in NRC (1998a; 1998b).

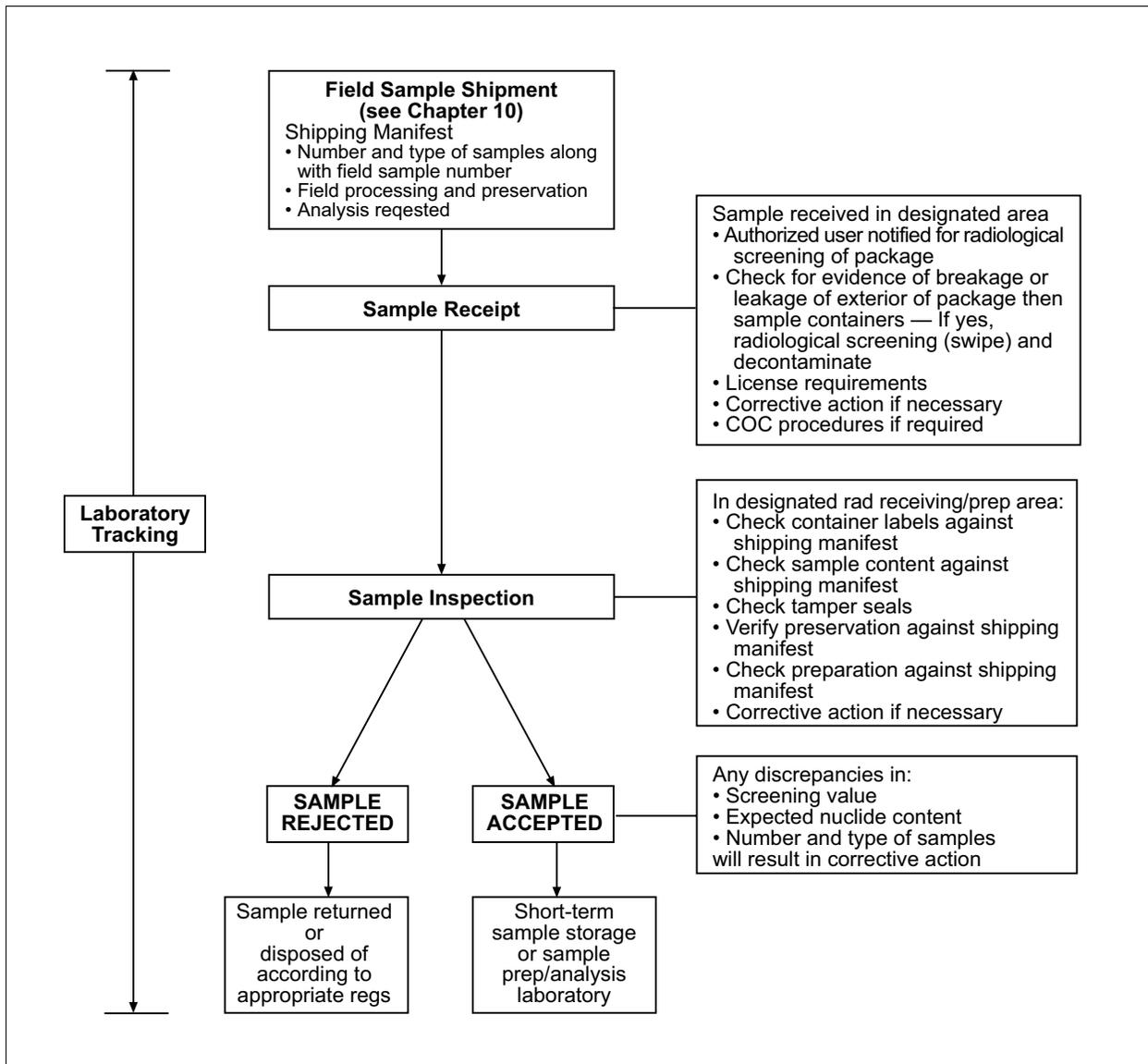


FIGURE 11.1 — Overview of sample receipt, inspection, and tracking

31 **11.2 General Considerations**

32 **11.2.1 Communication Before Sample Receipt**

33 Before the samples are received, the laboratory should know the relative numbers of samples that
34 will be received within a specific timeframe and the types of analyses that are expected for the
35 samples. Laboratory personnel should be provided with a contact in the field and with means of
36 contacting the person (telephone, FAX, e-mail). Communication between laboratory personnel
37 and project staff in the field allows the parties to coordinate activities, schedules, and sample
38 receipt. In particular, the Project Manager should provide to the laboratory special instructions
39 regarding the samples before shipment of samples. This information serves to notify the
40 laboratory of health and safety concerns and provides details that will affect analytical
41 procedures, sample disposition, etc. For example, without this communication, a laboratory
42 might receive a partial shipment and not realize that samples are missing. Furthermore, advance
43 communications allow laboratory staff to arrange for special handling or extra space for storage
44 should the need arise.

45 Planning for the samples to be received at the laboratory starts during the development of the
46 appropriate plan document and the statement of work (SOW) and continues through the
47 communication between the project staff in the field and the laboratory. For example, the
48 laboratory could pre-label and bar-code the appropriate containers to be used in the field. This
49 process would assist in assigning appropriate sample numbers for the laboratory tracking system,
50 which starts with sample receipt. The laboratory should instruct the field staff to place the
51 shipping manifest on the inside of the cooler lid for easy access and to include any other pertinent
52 information (field documentation, field screen information, etc.).

53 **11.2.2 Standard Operating Procedures**

54 A laboratory should have standard operating procedures (SOPs) for laboratory activities related
55 to sample receipt, inspection, and tracking. Some typical topics that might be addressed in
56 laboratory SOPs are presented in Table 11.1. For example, the laboratory should have an SOP
57 that describes what information should be included in the laboratory sample tracking system.
58 Laboratory SOPs should describe chain-of-custody procedures giving a comprehensive list of the
59 elements in the program such as signing the appropriate custody forms, storing samples in a
60 secure area, etc. (ASTM D4840; ASTM D5172; EPA, 1995).

TABLE 11.1 —Typical topics addressed in standard operating procedures related to sample receipt, inspection, and tracking

63	Sample	• Order and details for activities associated with receiving shipments of samples.
64	Receipt:	• Screening methods.
65	Inspection:	• pH measurement instructions. • Confirm sample identification. • Assign samples to laboratory information management system (LIMS). • Check physical integrity. • Identify/manage hazardous materials.
66	Tracking:	• Ensure proper identification of samples throughout process. • Procedures to quickly determine location and status of samples within laboratory. • Maintain chain of custody and document sample handling during transfer from the field to the laboratory, then within the laboratory.
67	Custodian:	• Execution of responsibilities of the sample custodian.
68	Forms/Labels:	• Examples of forms and labels used to maintain sample custody and document sample handling in the lab.

The laboratory needs to establish corrective action guidelines (Section 11.3.3) as part of every SOP for those instances when a nonconformance is noted. Early recognition of a nonconformance will allow the Project Manager and the laboratory more options for a quick resolution.

11.2.3 Laboratory License

Laboratory facilities with a few exceptions (e.g., certain DOE National Laboratories and DOD laboratories) that handle radioactive materials are required to have a radioactive materials license issued by the NRC or the Agreement State in which the laboratory operates. The radioactive materials license lists the radionuclides that the laboratory can possess, handle, and store. In addition, the license limits the total activity of specific radionuclides that can be in the possession of the laboratory at a given time.

The laboratory needs to have specific information from the field staff to make sure they can receive samples with the particular radionuclides expected to be present in the samples and that the laboratories have the proper radioactive materials license. The information needed includes the results of radiological field screening measurements. Both the laboratory and the Project Manager need to be aware of the type of radionuclide(s) in the samples and the total number of samples to be sent to the laboratory (this should be included in the appropriate plan document and SOW prior to sampling).

86 The laboratory is required by the license to maintain a current inventory of certain radioactive
87 materials present in the facility. The radioactive materials license also requires the laboratory to
88 develop and maintain a *radiation protection plan* (NRC, 1998b) that states how radioactive
89 samples will be received, stored, and disposed. The laboratory will designate an *authorized user*
90 (NRC, 1998b) to receive the samples. A Radiation Safety Officer (RSO) may be an authorized
91 user but not always. NRC (1998b) gives procedures for the receipt of radioactive samples during
92 working hours and non-working hours; part of these procedures are as follows:

93 During normal working hours, immediately upon receipt of any package of licensed material,
94 each package must be visually inspected for any signs of shipping damage such as crushed or
95 punctured containers or signs of dampness. Any obvious damage must be reported to the
96 RSO immediately. Do not touch any package suspected of leaking. Request the person
97 delivering the package to remain until monitored by the RSO.

98 Any packages containing radioactive material that arrive between (state times, e.g., 4:30 p.m.
99 and 7:00 a.m. or on Saturdays or Sundays) shall be signed for by the security guard (or other
100 designated trained individual) on duty and taken immediately to the designated receiving
101 area. Security personnel (or other designated trained individual) should unlock the door, place
102 the package in the designated secured storage area and re-lock the door.

103 Since certain packages of licensed material will have detectable external radiation, they
104 should be sent immediately to a designated storage area, where they will be checked for
105 contamination and external radiation level as soon as practical. They should not be allowed to
106 remain in the receiving area any longer than necessary, as they may be a source of exposure
107 for receiving personnel.

108 **11.2.4 Sample Chain-of-Custody**

109 “Sample chain-of-custody” (COC) is defined as a process whereby a sample is maintained under
110 physical possession or control during its entire life cycle, that is, from collection to disposal
111 (ASTM D4840—see Chapter 10). The purpose of COC is to ensure the security of the sample
112 throughout the process. COC procedures dictate the documentation needed to demonstrate that
113 COC is maintained. When a sample is accepted by the laboratory it is said to be in the physical
114 possession or control of the laboratory. ASTM D4840 says that a sample is under “custody” if it
115 is in possession or under control so as to prevent tampering or alteration of its characteristics.

116 If the samples are transferred under COC the relinquisher and the receiver should sign the
117 appropriate parts of the COC form with the date and time of transfer. After receipt and inspection
118 the samples should be kept in a locked area or in an area with controlled access.

119 COC is not a requirement for all samples. COC is most often required when the sample data may
120 be used as legal evidence. The project plan should state whether COC will be required. The
121 paperwork received with the samples should also indicate whether COC has been maintained
122 from the time of collection and must be maintained in the laboratory. If the laboratory has been
123 informed that COC procedures should be followed, but it appears that appropriate COC
124 procedures have not been followed (before or after sample receipt at the laboratory) or there are
125 signs of possible sample tampering when the samples arrive, the Project Manager should be
126 contacted. The problem and resolution should be documented. Additional information on COC
127 can be found in EPA (1985).

128 **11.3 Sample Receipt**

129 Laboratory sample receipt occurs when a package containing samples is accepted, the package
130 and sample containers are screened for radiological contamination, and the physical integrity of
131 the package and samples is checked. Packages include the shipping parcel that holds the smaller
132 sample containers with the individual samples (see Section 11.3.2 on radiological screening).
133 Also note that topics and activities covered in Section 11.3 appear in a sequence but, in many
134 cases, these activities are performed simultaneously during initial receiving activities (i.e.,
135 package screening and observation of its physical integrity).

136 **11.3.1 Package Receipt**

137 Packages can be accepted only at a designated receiving area. Packages brought to any other
138 location by a carrier should be redirected to the appropriate receiving area. All packages labeled
139 RADIOACTIVE I, II, or III require immediate notification of the appropriate *authorized user*
140 (NRC, 1998b).

141 A sample packing slip or manifest is required and must be presented at the time of receipt, and
142 the approximate activity of the shipment should be compared to a list of acceptable quantities. If
143 known, the activity of each radionuclide contained in the shipment must be reviewed relative to
144 the total amount of that radionuclide currently on site to ensure that the additional activity will
145 not exceed that authorized by the NRC or Agreement State in the laboratory's license.

146 Screening measures described in Section 11.3.2 may indicate that the samples are more
147 radioactive than expected and that the radiation license limit may be exceeded. The laboratory
148 should take extra precautions with these samples, but the screening results should be verified.
149 The Federal, State, or local agency should be contacted immediately when verified license limits
150 are exceeded. The laboratory must respond quickly to stay in compliance with their license.

151 If the package is not accepted by the laboratory, the laboratory should follow corrective-action
152 procedures prescribed in the radiation materials license, the appropriate plan document (if this is
153 a reasonable possibility for the project), and the laboratory's SOPs.

154 **11.3.2 Radiological Screening**

155 In addition to ensuring compliance with the laboratory's license and verifying estimates of
156 radionuclide activity (Section 11.3.1), the radiological screening of packages during sample
157 receipt serves to identify and prevent the spread of external contamination. All packages
158 containing samples for analysis received by the laboratory should be screened for external
159 contamination and surface exposure rate. Exceptions may include known materials (types under
160 exclusion should be listed in the laboratory SOP) intended for analysis as: a) well-characterized
161 samples; b) bioassays; and c) radon and associated decay products in charcoal media. Screening
162 of packages and sample containers received in the laboratory should be conducted in accordance
163 with the laboratory's established, documented procedures and the laboratory radiation protection
164 and health and safety plan. The exterior of the package is screened first; if there is no evidence of
165 contamination or that the laboratory licence would be exceeded, the package is opened up and the
166 sample containers screened individually. These procedures should include the action level and
167 appropriate action as established by the facility. Personnel performing screening procedures
168 should be proficient in the use of portable radiation screening instruments and knowledgeable in
169 radiological contamination control procedures. Health and safety considerations are affected by
170 the suspected or known concentrations of radionuclides in a sample or the total activity of a
171 sample.

172 Radiation screening is normally conducted using Geiger-Mueller (GM) detectors, ionization
173 chambers, micro-R meters, or alpha scintillation probes, as appropriate. The laboratory should
174 refer to any information they obtained before receipt of samples or with the samples, especially
175 concerning the identity and concentration of radioactive and chemical constituents in the
176 samples. Radiological screening needs to be performed as soon as practical after receipt of the
177 package, but not later than three hours (10 CFR 20.1906) after the package is received at the
178 licensee's facility for packages received during normal working hours. For packages received

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179 outside of normal working hours, the screening must be performed no later than three hours from
180 the beginning of the next workday.

181 Monitor the exterior of a labeled package for radioactive contamination (10 CFR 20.1906). If the
182 package is small (less than 100 cm²), the whole package should be wiped. Wipes are not always
183 used, but if there is reason to believe that something has leaked, then wipes should be used. An
184 external exposure rate determination of the package is also required within three hours after the
185 package is received (or three hours from beginning of the next business day for packages
186 received outside of normal working hours). This screening is performed to detect possible
187 violations of Department of Transportation (DOT) packaging and labeling regulations, as well as
188 to determine the possible presence of gamma- and some beta-emitting radionuclides that may
189 require special handling. Also, screening can help to avoid introducing a high-activity sample
190 into a low-activity area.

191 The Consolidated Guidance About Materials Licenses (NRC 1998b) gives the following sample
192 model for opening packages containing radioactive material:

- 193 • Wear gloves to prevent hand contamination.
- 194 • Visually inspect the package for any sign of damage (e.g. crushed, punctured). If damage is
195 noted, stop and notify the RSO.
- 196 • Check DOT White I, Yellow II, or Yellow III label or packing slip for activity of contents, so
197 shipment does not exceed license possession limits.
- 198 • Monitor the external surfaces of a labeled package according to specifications in Table 8.4,
199 Section 13.14, Item 10.
- 200 • Open the outer package (following supplier's directions if provided) and remove packing
201 slip. Open inner package to verify contents (compare requisition, packing slip and label on
202 the bottle or other container). Check integrity of the final source container (e.g., inspecting
203 for breakage of seals or vials, loss of liquid, discoloration of packaging material, high count
204 rate on smear). Again check that the shipment does not exceed license possession limits. If
205 you find anything other than expected, stop and notify the RSO.
- 206 • Survey the packing material and packages for contamination before discarding. If
207 contamination is found, treat as radioactive waste. If no contamination is found, obliterate the
208 radiation labels prior to discarding in the regular trash.

- 209 • Maintain records of receipt, package survey, and wipe test results.
- 210 • Notify the final carrier and by telephone, telegram, mailgram, or facsimile, the Administrator
- 211 of the appropriate NRC Regional Office listed in 10 CFR 20, Appendix D when removable
- 212 radioactive surface contamination exceeds the limits of 10 CFR 71.87(i); or external radiation
- 213 levels exceed the limits of 10 CFR 71.47.

214 **11.3.3 Corrective Action**

215 The laboratory's SOPs should specify corrective actions for routine and non-routine sample
216 problems, including deficiency in sample volume, leaking samples, and labeling errors. The
217 appropriate corrective action may require consulting the Project Manager and other laboratory
218 personnel. Timely response can allow for a broader range of options and minimize the impact of
219 the sample problem on the project. The laboratory should document the problem, the cause (if
220 known), the corrective action taken, and the resolution of each problem that requires corrective
221 action. The documentation should be included in the project files.

222 **11.4 Sample Inspection**

223 After sample receipt, the next steps are to confirm that the correct sample has been sent, to check
224 that the appropriate field preservation and processing have been performed, and to identify any
225 hazardous chemicals.

226 Documents accompanying the samples should be reviewed upon receipt of the samples at the
227 laboratory. If the proper paperwork is not present, the Project Manager should be notified. Data
228 recorded on the paperwork, such as collection dates, sample descriptions, requested analyses, and
229 field staff personnel, should be compared to data on the sample containers and other documen-
230 tation. Any deficiencies or discrepancies should be recorded by the laboratory and reported to the
231 Project Manager. The documents can provide data useful for health and safety screening,
232 tracking, and handling/processing of critical short-lived radionuclides.

233 **11.4.1 Physical Integrity of Package and Sample Containers**

234 This section discusses checking for leakage or breakage and tampering of packages and sample
235 containers. Sample containers should be thoroughly inspected for evidence of sample leakage.
236 Leakage can result from a loose lid, sample container puncture, or container breakage. Packages
237 suspected to contain leaking sample containers should be placed in plastic bags. The authorized

238 user or alternate authorized user must be notified immediately for assistance. If leakage has
239 occurred, appropriate radiological and chemical contamination controls should be implemented.
240 Sample materials that have leaked or spilled are normally not suitable for analysis and should be
241 properly disposed. In all cases, the laboratory's management and Project Manager should be
242 notified of leaks, breakage, spills, and the condition of sample materials that remain in the
243 original containers.

244 Containers that have leaked from a loose lid or puncture may still hold enough sample for the
245 requested analyses. The laboratory must first determine if there is sufficient sample and if this
246 material is representative of the original sample. An assessment should be made to determine the
247 quantity of sample that remains and if this material is likely to be contaminated. If the sample
248 was contaminated with the analyte of interest at the time when the container leaked, the sample is
249 normally not analyzed. Unless appropriate information is provided in the project plan or SOW,
250 the Project Manager should determine whether or not the sample materials can be used for
251 analysis or if new samples are required to replace those lost due to leakage or contamination.

252 Packages, cooler chests, or individual sample containers may arrive at the laboratory bearing
253 custody seals. These seals provide a means to detect unauthorized tampering. When packages or
254 samples arrive with custody seals, they should be closely inspected for evidence of tampering.
255 Custody seals are made from material that cannot be removed without tearing. If a custody seal is
256 torn or absent, sample tampering may have occurred. This evidence of possible tampering is
257 generally sufficient to preclude use of the sample for laboratory analyses. The Project Manager
258 should be notified of the condition of the custody seal to determine if new samples are needed.
259 Observations regarding the condition of the custody seals should be recorded according to the
260 laboratory's standard procedures.

261 **11.4.2 Sample Identity Confirmation**

262 Visual inspection is the means to confirm that the correct sample has been received. Verifying
263 the identity of a sample is a simple process where the appearance, sample container label, and
264 chain-of-custody record or shipping manifest are compared. If all three sources of information
265 identify the same sample, then the sample is ready for the next step. If the sample label indicates
266 the sample is a liquid and the container is full of soil, this discrepancy would indicate a
267 nonconformance. If the sample label states that there is 1,000 mL of liquid and there only appears
268 to be 200 mL in the container, there may be a nonconformance. Visual inspection can be used to:

- 269 • Verify identity of samples by matching container label IDs and sample manifest IDs;

- 270 • Verify that the samples are as described by matrix and quantity;
- 271 • Check the tamper seal (if used);
- 272 • Verify field preparation (for example, filtering, removing extraneous material), if indicated;
- 273 and
- 274 • Note any changes to samples since shipping, such as a reaction with the preservative.

275 **11.4.3 Confirmation of Field Preservation**

276 For those liquid samples requiring acid preservation, pH measurements may be performed on all
277 or selected representative liquid samples to determine if acid has been added as a preservative.
278 The temperature of the sample may also be part of field preservation and the actual measured
279 temperature should be compared to the specified requirements in the documentation.

280 **11.4.4 Presence of Hazardous Materials**

281 The presence of hazardous materials in a sample typically creates the need for additional health
282 and safety precautions when handling, preparing, analyzing, and disposing samples. If there is
283 documentation on the presence of non-radiological hazardous constituents, the Project Manager
284 should notify the laboratory about the presence of these chemicals. These chemical contaminants
285 should be evaluated by the laboratory to determine the need for special precautions. The
286 laboratory can also perform preliminary sample screening for chemical contaminants using
287 screening devices such as a photoionization detector for volatile components. The presence of
288 suspected or known hazardous materials in a sample should be identified, if possible, during
289 project planning and documented in the plan document and SOW. Visual inspection can also be
290 used such as checking the color of the sample (i.e., a green-colored water sample may indicate
291 the presence of high chromium levels). The presence of suspected or known hazardous materials
292 determined in the field should be communicated to the laboratory prior to the arrival of samples
293 and noted on documentation accompanying the samples to the laboratory. If no documentation on
294 non-radiological hazardous constituents is available, the laboratory should review previous
295 experience concerning samples from the site to assess the likelihood of receiving samples with
296 chemical contaminants. The laboratory should notify the Health and Safety Officer and the
297 Project Manager about the presence of potentially hazardous chemical contaminants.

298 **11.4.5 Corrective Action**

299 Visual inspection can also verify whether field sample preparation was performed as stated in
300 accompanying documentation. Samples that were not filtered in the field or that reacted with the
301 preservative to form a precipitate may represent a significant problem to the laboratory. If it
302 appears that the sample was filtered in the field (i.e., there is a corresponding filter sample for the
303 liquid sample), the liquid generally will be analyzed as originally specified. Laboratory personnel
304 should check the project plan or SOW to see if the filter and filtered materials require analyses
305 along with the filtered sample. If it appears that the sample was not filtered in the field (i.e., there
306 is no corresponding filter, there are obviously solid particles in a liquid sample), sample
307 documentation should be reviewed to determine if a deviation from the project plan was
308 documented for the sample. It may be appropriate to filter the sample in the laboratory. The
309 Project Manager should be notified immediately to discuss possible options such as filtering the
310 sample at the laboratory or collecting additional samples.

311 One example of a corrective action for inspection is, if the pH is out of conformance, it may be
312 possible to obtain a new sample. If it is not possible or practical to obtain a new sample, it may
313 be possible to acidify the sample in the laboratory.

314 Visual inspection can serve to check certain aspects of sample collection. For example, if the
315 SOP states that a soil sample is supposed to have twigs, grass, leaves, and stones larger than a
316 certain size removed during sample collection and some of this foreign material is still included
317 as part of the sample, this discrepancy results in a nonconformance.

318 **11.5 Laboratory Sample Tracking**

319 Sample tracking should be done to ensure that analytical results are reported for the “correct”
320 sample. A good sample tracking system helps to prevent sample mix-up. Sample tracking is a
321 process by which the location and status of a sample can be identified and documented. The
322 laboratory is responsible for sample tracking starting with receipt (at which time a unique
323 laboratory tracking number is assigned), during sample preparation, and after the performance of
324 analytical procedures until final sample disposition. The process of sample tracking begins the
325 moment a field worker assigns an identification number (based on the information provided in
326 the appropriate plan document) and documents how materials are collected. The way samples are
327 transported from the field to the laboratory should be documented. The sample receiving
328 procedures and documentation should be consistent when applicable with 10 CFR Part 20
329 Subpart J, and the client’s requirements as stated in the appropriate plan document or statement
330 of work.

331 **11.5.1 Sample Log-In**

332 Laboratory sample numbers should be assigned to each sample in accordance with the
333 laboratory's SOP on sample codes. Each sample should receive a unique tracking number by
334 which it can be logged into the laboratory tracking system, scheduled for analysis, tracked, and
335 disposed. Information to be recorded during sample log-in should include the field sample
336 identification number, laboratory sample tracking number, date and time samples were collected
337 and received, reference date for decay calculations, method of shipment, shipping numbers,
338 condition of samples, requested analyses, number and type of each sample, quality control
339 requirements, special instructions, and other information relevant to the analyzing and tracking of
340 samples at the laboratory. Laboratory sample tracking is a continuation of field sample tracking.

341 Documents generated for laboratory sample tracking must be sufficient to verify the sample
342 identity, that the sample may be reliably located, and that the right sample is analyzed for the
343 right analyte. The documentation should include sample log-in records, the analysis request form,
344 names of staff responsible for the work, when procedures are completed, and details concerning
345 sample disposal. The documentation must conform to the laboratory's SOPs.

346 During sample log-in, laboratory quality control (QC) samples may be scheduled for the analyses
347 requested. The type and frequency of QC samples should be provided by the plan document or
348 SOW and consistent with the laboratory's SOPs.

349 **11.5.2 Sample Tracking During Analyses**

350 At this point, samples are introduced into the laboratory's analytical processing system. The
351 information gathered during screening, along with the assigned tracking identification, passes to
352 the laboratory where specific preparation and analyses are performed. The sample may be further
353 sub-sampled. Each sub-sample, along with the original sample, requires tracking to account for
354 all materials handled and processed in the laboratory.

355 At the same time that samples are received at the laboratory, each set of samples should be
356 accompanied by documents listing requests for specific analyses. This documentation should be
357 compared to separate paperwork obtained before sample receipt. Laboratory management
358 personnel should be notified of any discrepancies. The requested analyses should be entered into
359 the laboratory's tracking system. Typically, only one sample container of sufficient volume or
360 quantity will be provided for a single or multiple set of different analyses. Each aliquant removed
361 from the original container may require tracking (and perhaps a different tracking number).

362 Aliquants used during the analytical process can be tracked using analysis laboratory notebooks,
363 forms, or bench sheets that record laboratory tracking numbers, analyte, reference date for decay
364 correction, aliquant size, and designated quality control samples. Bench sheets are loose-leaf or
365 bound pages used to record information during laboratory work. Bench sheets are used to assist
366 in sample tracking. Each sheet is helpful for identifying and processing samples in batches that
367 include designated quality control samples. The bench sheet, along with the laboratory log book,
368 can later be used to record analytical information for use during the data review process. Bench
369 sheets can also be used to indicate that sample aliquants were in the custody of authorized
370 personnel during the analytical process.

371 After receipt, verification of sample information and requested analyses, and assignment of
372 laboratory sample tracking numbers, the requested analyses can be scheduled for performance in
373 accordance with laboratory procedures. Using this system, the laboratory can formulate a work
374 schedule, and completion dates can be projected.

375 **11.5.3 Storage of Samples**

376 If samples are to be stored and analyzed at a later date, they must be placed in a secure area that
377 meets all custody requirements. Before storage, any special preservation requirements, such as
378 refrigeration or additives, should be determined.

379 The laboratory should keep records of the sample identities and the location of the sample
380 containers. Unused sample aliquants should be returned to the storage area for final disposition.
381 In addition, for some samples, depending on the level of radioactivity or hazardous constituents
382 present, the laboratory must record when the sample was disposed and the location of the
383 disposal facility. These records are necessary to ensure compliance with the laboratory's license
384 for radioactive materials and other environmental regulations.

385 Areas where samples are stored must be designated and posted as radioactive materials storage
386 areas. Depending on the activity level of the samples, storage areas may require special posting.
387 If additional storage space or shielding is needed, arrangements that are consistent with the
388 license must be made with the authorized user. See Chapter 20 on waste disposal for more
389 information.

390 **11.6 References**

391 American Society of Testing and Materials (ASTM) D4840. Standard Guide for *Sampling*
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