TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 11

MONITORING AND SAMPLING AIRBORNE ALPHA RELEASES

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

PROCEDURE 11

MONITORING AND SAMPLING AIRBORNE ALPHA RELEASES

APPROVAL AND IMPLEMENTATION

This procedure is hereby approved for implementation and supersedes all previous editions.

06/02/2005
Date

/s/ Richard Ratliff
Radiation Program Officer
Radiation Control Program
Texas Department of State Health Services

DATE OF CHANGE	*INITIALS AND DATE ENTERED*
03/24/2004	Revised entire document
06/02/2005	Administrative changes

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MONITORING AND SAMPLING AIRBORNE ALPHA RELEASES

I. Purpose

This procedure provides uniform guidelines for personnel charged with collecting data concerning radiological conditions in areas affected by airborne releases of alpha-emitting radioactive materials.

II. Discussion

In order to evaluate the consequences of an accidental release of radioactive material, it is first necessary to identify the geographic area affected. Systematic performance of survey measurements, along with the collection and analysis of environmental samples from monitoring points will serve to validate or challenge protective action recommendations in effect or under consideration. These activities will provide a basis for the development of population dose estimates, and will identify measures necessary for the recovery and restoration of the contaminated area.

III. Definitions

A. In this procedure, all references to radioactive materials, radiation, contamination, count rate, counts per minute, disintegrations per minute and related terms and values are used in the context of alpha-emitting materials and alpha radiation except where another usage is clearly identified.

B. References in this procedure are to the E-600 with SHP-380AB and E-600 with the Field Instrument for the Detection of Low Energy Radiation (FIDLER,) during responses to incidents involving the Pantex Plant or other accidents where low energy gamma and/or alpha radiation will be the major concern.

IV. References

A. Procedure 3, Area Survey and Decontamination

B. Procedure 4, Tool & Equipment Decontamination

C. Procedure 5, Personnel Monitoring & Decontamination

D. Procedure 7, Personnel Dosimetry & Exposure records

E. Procedure 8, Respiratory Protection

F. Procedure 17, Radio Communications

G. Procedure 26, Selection & Use of Protective Clothing.

H. The appropriate Tab and Chapter (if any) to Annex D for the type of accident involved.

V. Equipment Required

A list of Field Monitoring Team equipment and supplies is included as Attachment 1 to this procedure. Except for those items that are specifically identified as available from Logistics Support or from Instrument Maintenance & Calibration, Field Monitoring Team members are individually responsible for obtaining and transporting their own initial supply of these materials. Additionally, each team member shall take with him/her a copy of this procedure and of each document referenced in Section IV, above.

VI. Precautions and Limitations

A. Individuals will maintain their exposures as low as is reasonably achievable (ALARA) under prevailing conditions.

B. Except when acting in support of life saving or other urgent emergency operations, persons entering a radioactive area shall not proceed into an area that requires respiratory protection (greater than 6 $\mu Ci/cm^2$) unless prior approval has been obtained from the Chief of Field Operations or his designee.

C. Precautions and limitations concerning use of protective clothing, personnel dosimetry, and respiratory protection will apply, and shall be implemented in accordance with guidance contained in the respective procedures covering those subjects unless specifically waived or modified by the Chief of Field Operations or designee. Information provided in this procedure concerning those topics is presented as a reminder only, and is not intended to replace, reference to, and use of the specific guidance in those procedures.

VII. Prerequisites

Each individual must attempt to ascertain anticipated radiation exposure rates and potential contamination hazards. This information will normally be available from the Field Monitoring Team Leader if it has not already been provided to team members in a briefing conducted by the Staging Area Coordinator. In addition to, or in lieu of information obtained from the above sources, where applicable, bills of lading, shipping papers or waste manifests; contact with shippers, carriers, or consignees; or information obtained from other emergency personnel such as police or firemen responding to the incident may provide data concerning the quantity, physical condition, and chemical form of the radioisotope(s) involved.

VIII. Team Activation

A. Notification and Mobilization or Standby

1. Following the declaration of a Site Area Emergency or a General Emergency at Pantex, or the occurrence of an accidental release of radioactive materials at any other location, selected personnel will either be activated or placed on standby.

2. Unless otherwise instructed at the time of notification, activated team members will assemble necessary supplies and equipment, and travel to the Radiation Control Program (RCP) staging area or other specified location for a briefing on emergency conditions and monitoring objectives.

3. Unless otherwise instructed at the time of notification, team members who are placed on standby will assemble necessary supplies and equipment, and make other preliminary preparations for response; but will then resume normal activities, keeping the Staging Area Coordinator appraised of their location and means of contact at all times.

B. Assembly and Briefing

1. All RCP response team members, will assemble at the staging area or other designated location for a briefing prior to deployment to duty assignments.

2. This briefing, which is to be conducted by the Staging Area Coordinator, the Field Monitoring Team Leader, or the Chief of Field Operations shall include the following:

a. A summary of the event(s) causing the emergency.

b. A description of current conditions, including;

(1) anticipated radiation exposure rates and potential contamination hazards;

(2) known or anticipated non-radiological hazards;

(3) the potential for improvement or worsening of the situation; and

(4) current meteorological conditions and weather predictions for the duration of the team assignment.

c. An explanation of specific response objectives including any special types of monitoring or sampling to be performed and an identification of any special equipment or supplies ("Special Response Items") needed by the teams.

d. An identification of other agencies involved in the response, including their roles, points of contact, and operating locations.

Note: Information concerning other agencies will normally focus on those agencies who are responding to the radiological aspects of the emergency or who are otherwise active in the Emergency Planning Zone (EPZ,) but should also provide an overview of actions being conducted outside the EPZ in response to the emergency.

C. Equipment Issuance, Inventory Preparing, and Operability Checks

1. Following the team briefing, each Field Monitoring Team shall inventory their equipment and supplies. A copy of the Field Monitoring Team equipment and supplies list is to be included in each Field Monitoring Team kit for use as a checklist while performing this inventory. Items identified as missing or requiring replacement can be obtained from Logistics Support.

Note: This inventory process may be initiated prior to the team briefing, but cannot be completed until any "Special Response Items" to be included have been identified. "Special Response Items" are listed separately on the equipment checklist, and are to be issued by Logistics Support only when identified as necessary for a specific response.

2. Requirements for "Special Response Items" will be identified during team briefings on emergency conditions and monitoring objectives. Primarily, these items consist of additional supplies needed for non-routine tasks, but in some instances they will merely be substitutes for standard team equipment.

3. Performance of the equipment inventory shall be noted on each team member's copy of form CI-13, Response and Recovery Activities Record Sheet.

4. The E-600 Kit contains the following equipment:

a. Survey Meter

b. SHP-380AB Scintillation Probe

c. SHP-270 Geiger Muller Probe

d. SLEG-1 Scintillation Probe

e. Two Cables

When responding to an accident involving alpha radiation, the probe of choice will be the SHP-380AB.

5. Except for radios, each team shall perform operability checks as appropriate on all equipment. At this time, background readings of all types appropriate to the incident involved should be recorded on an initial copy of form CI-18, Alpha Monitoring Data Sheet (see Attachment 5). The Performance of Operability checks should be noted on form CI-13.

6. As a final communications check upon deployment, each Field Monitoring Team shall establish radio contact with the Field Monitoring Team Leader. This check is to be performed in accordance with guidelines in Procedure 17. This communications check should also be noted on form CI-13.

7. Following completion of all pre-deployment activities, each Field Monitoring Team shall travel to monitoring locations when and as directed by the Field Monitoring Team Leader.

D. Maps

1. Pantex

a. The 360 degree area surrounding the Pantex Plant has been divided into sixteen (16) 22.5 degree sectors which are identified by the alphabetized descriptors "A" through "R" ("I" and "O" omitted) as shown on attachments to Tab 2, Chapter 1 of Annex D.

b. Pre-selected offsite monitoring locations within a 10-mile radius of the Pantex Plant are designated on attachments to Tab 2, Chapter 1. Pre-selected monitoring locations are sequentially numbered and are usually located at road intersections or at other easily identifiable landmarks.

2. Other

For sustained operations at sites other than the Pantex Plant, maps showing pre-selected monitoring locations and sectors "A" through "R"

will be developed by Logistics Support and distributed to all response team members as time permits. Unless and until such maps are available, directions will be given, and locations will be identified using the following improvised system on whatever maps can be obtained.

a. The accident site will be assumed to be the center point on whatever map is provided. Mark the site with a small "x".

b. Using a straightedge and pen or pencil, draw a line through the accident site parallel to the north arrow on the map. This line should extend at least ten miles to both the north and the south, using the same scale for distance as is shown on the map; or to the edges of the map if it covers a smaller area.

c. Label the segment of the line north of the accident site "0 degrees." (This segment corresponds to the centerline of sector "A" on sector maps.)

d. Label the segment of the line south of the accident site "180 degrees." (This segment corresponds to the centerline of sector "J" on sector maps.)

Identify all subsequent locations in terms of approximate direction and distance from the accident site, using degrees clockwise from 0 degrees and/or a narrative description such as "next to private airport" when such additional information would be helpful in differentiating between otherwise similar points on the map.

e. As surveys are reported or samples collected, mark those locations on your copy of the map using a numerical sequence so that the Sample Coordinator and/or the Accident Assessment Team can later correlate analyses and assessments with the proper location.

E. Communications

1. In order to ensure a constant communications capability, Field Monitoring Team radios shall be turned on prior to departure from the staging area, and shall remain on at all times until the team is back at the staging area, or has been advised by the Field Monitoring Team Leader that radio contact is no longer required.

2. During operations, which do not include Department of Public Safety team personnel, communications will be made with the Field Monitoring Team Leader or another party designated by the Team Leader.

3. In the event of radio failure or loss of radio contact, alternate provisions as contained in Procedure 17, Radio Communications shall apply.

F. Exposure Control

1. Alpha radiation will not be detected by the dosimetry issued during an event. The dosimeters are required should there be a presence of gamma radiation. At the beginning of each shift, each member shall zero his or her dosimeter and fill out initial information on a new copy of RCP Form CI-1, Emergency Worker Radiation Exposure Record. (See Procedure 7, Personnel Dosimetry and Exposure Records.)

2. In order to hold personnel exposure ALARA, unnecessary time should not be spent within, or in proximity to any affected area where radiation readings exceed normal background without respiratory protection.

   Individual whole body gamma exposure shall be monitored by periodically checking dosimetry. Each time dosimetry is checked, this action should be noted on the "Response and Recovery Activities Record Sheet, CI-13."

3. Individual exposures exceeding 200 mRem shall be immediately reported to the Field Monitoring Team Leader. (As the upper limit of exposure, which can be measured on low-range team dosimetry, 200 mRem should serve as a flag requiring reassessment of an individual's need to remain in a radiation field.)

4. At the end of each shift, members shall present their dosimetry and Emergency Worker Radiation Exposure Records to the person performing exit monitoring. (See Section XIII of this procedure.)

5. Dosimetry "Reading at Exit" and "Indicated Dose" shall be entered on the Emergency Worker Radiation Exposure Record by the person performing exit monitoring and one copy of that form shall be returned to the Field Monitoring Team member as a temporary record of exposure received.

IX. Protective Clothing

A. During the pre-deployment briefing at the staging area, personnel will be provided with the RCP's best estimates of suspended and deposited nuclides in the restricted area. This information will generally be in the form of dose assessment projections generated by the HOTSPOT code or by actual field measurement data if available. Protective clothing and equipment will be recommended in accordance with the following:

- If the anticipated contamination levels are less than 0.2 $\mu Ci/m^2$, no protective covering is required

- If the anticipated contamination levels are greater than 0.2 $\mu Ci/m^2$, but less than 6 $\mu Ci/m^2$, shoe covers and gloves will be required for entry into the restricted area. A respirator may be recommended if work involving dust-generating operations will be performed.

- If the anticipated contamination levels are greater than 6, but less than 60 $\mu Ci/m^2$, anti-contamination clothing, shoe covers, gloves, cap, and the use of an approved respiratory protection system based on measured air concentrations.

- If the anticipated contamination levels are greater than 60, but less than 600 $\mu Ci/m^2$, anti-contamination clothing, shoe covers, gloves, cap, and an approved air purifying respirator will be required for entry into the restricted area. Only essential operations will be authorized at levels greater than 60 $\mu Ci/m^2$.

- If the anticipated contamination levels are greater than 600 $\mu Ci/m^2$, anti-contamination clothing, shoe covers, gloves, cap, and pressure demand SCBAs are required for entry into the restricted area. Specific authorization from the Chief of Field Operations is required for entry into areas with levels greater than 600 $\mu Ci/m^2$.

X. Field Monitoring

Due to the potential for contamination, periodic contamination checks of personnel and their vehicle and equipment are required. These checks can be obtained at an access control point that is staffed with trained monitors, or you can do it yourself in a "clean" area. If you perform the check, use the abbreviated monitoring method for checking yourself and other members or your team. Carefully monitor the head (including face around nose and mouth), hands, knees, and shoes. If alpha contamination is in excess of background rates are found on skin surfaces, decontamination is warranted.

Vehicles are monitored for alpha contamination using large area wipes. The wipes can be RCP provided 2”or 47 mm disks, paper towels, bathroom tissue (about three feet long and folded into a 4-6” length), or other available dry cloth or paper. Areas that should be monitored include:

- front grill
- wheel covers/wheel wells, and

- rear deck.

Monitoring teams, vehicles, and equipment will be monitored for contamination at access control/hot line locations when departing the restricted area. The outside of sample packages being transported out of the area will also be checked for contamination. If a person, vehicle, or equipment is found to be contaminated the team will be referred to the reception center while in operation or staging area if reception center is closed for decontamination. Samples having contaminated outer coverings will be decontaminated or repackaged, as appropriate.

A wipe survey is done by gently wiping a 100 cm2 area with a porous paper disc and measuring the amount of contamination on the disc with an E-600 survey meter and SHP-380AB probe. The wipes can be evaluated in the field and/or returned to the counting facility for analysis. Analysis in the field is accomplished by placing the wipes on a flat, clean surface and measuring the count rate of the wipe. Set the E-600 to read in disintegrations per minute. Results are recorded in disintegrations per minute/100 cm2.

Field monitoring teams, vehicles, and equipment will be monitored for contamination at access control locations when departing the restricted area. The outside of sample packages being transported out of the area will also be checked for contamination. If a person, vehicle, or equipment is contaminated, the team will be sent for decontamination at the RCP's staging area or other designated location. Samples having contaminated outer coverings will be decontaminated or repackaged, as appropriate.

Collected samples and completed documentation will be forwarded (or taken) to the Sample Preparation and Coordination team for processing and subsequent analysis after being cleared by monitors at the access control point. When the samples are transferred to another person or team, complete the chain of custody documentation in accordance with the requirements in this procedure.

Note: During operations involving the Pantex Plant, the Accident Assessment Team should always have a fairly accurate computer projection of the affected area. While physical confirmation of this data will be required, this projection can be of some value during the locating and tracking process.

XI. Survey Measurements

Note: Survey measurements that are to be recorded and transmitted should be selected, where possible, for ease in communicating the measurement location; e.g., pre-selected monitoring points, other road intersections, etc. Sector designations (or approximate compass direction from the accident site), and estimated distance should be recorded along with the pre-selected monitoring point number, if applicable.

A. Alpha Measurements

1. Monitoring for alpha radiation is generally much slower and more tedious than monitoring for either beta or gamma radiation. This is due to the alpha particle's short range in air and large mass. As a general rule, the detector must be within about one quarter inch (1/4) of an alpha source in order to detect it, whereas beta radiation can be detected a meter or so away from a beta particle source, and gamma rays can be detected from much longer distances. The surface area being monitored must be dry. A water film (such as dew) is sufficient to prevent the alpha particle from entering the detector.

   When monitoring for alpha particles, use the SHP-380AB scintillation probe. It is used in combination with the Eberline E-600 survey meter.

2. Take measurements with the detector held about one quarter (1/4) inch above, and parallel to the surface. Allow the detector to remain stationary over the area being monitored for one minute. Record this reading.

3. A measurement shall be performed each time the Field Monitoring Team collects a sample.

4. When monitoring for alpha radiation around sites such as the Pantex Plant, the E-600 survey meter connected to a FIDLER probe will be used to initially establish the area of deposition.

   a. The E-600 and FIDLER Low Energy Scintillation probe will permit detection of an affected area by utilizing the (60 keV) decay peak of 241-Am from Plutonium.

      (1) Readings obtained using the FIDLER probe are in Counts Per Minute per microcurie per meter squared ($CPM/\mu Ci/m^2$).

      (2) Once the affected area has been located by a reading of twice background, report location and reading to Field Team Leader.

B. Deposition surveys

Ground deposition may be surveyed by either of two methods; "direct scan" or "wipe evaluation."

Note: The formulas that are given in the following sections for conversion of CPM to Ci/m^2 ground deposition and DPM/100 cm^2 smearable contamination provide field approximations only. These conversions may be useful to Emergency Response Team personnel, but judgments requiring accurate data as their basis must be deferred until laboratory analysis of collected samples can be performed.

1. Deposition Survey by Direct Scan

   a. For this survey, use the Eberline E-600 instrument with the Eberline SHP-380AB scintillation probe attached.

   b. Enter data on the Alpha Monitoring Data Sheet (Attachment 5).

   c. Take a gross count rate measurement with the probe held not more than one-quarter (1/4) inch above the surface. Scan at a speed of one inch per second. When activity is located, allow the detector to remain stationary over the area being monitored for one minute. Record the reading.

   d. Calculate deposition as follows:

$$mCi/m^2 = \frac{GrossCountRate}{(Eff)(2.22E+6)(.01)}(inCPM/100cm^2)$$

Where:

Eff = counting efficiency factor for probe (.25)
2.22E+6 = to convert to μci
.01 = to convert from 100 cm^2 to m^2

   e. Mark location on Site Area Map.

2. Deposition Survey by Wipe Evaluation

   a. This survey requires the following equipment and supplies.

(1) Eberline Model E-600

(2) Eberline SHP-380AB probe

(3) 1 inch wipe paper

(4) One 2-inch plastic petri dish with cover

(5) Small (1 pint capacity) zip-lock bag

(6) 1 inch piece of sample sealing tape

(7) Adhesive sample label

(8) Large (1 gallon capacity) zip-lock bag

(9) Site Area map

(10) One set of form EP-6, Radionuclide Analysis Report (Attachment 2)

(11) One copy of form CI-18, Alpha Monitoring Data Sheet for this location (Attachment 5)

(12) Pen or pencil

b. Record all data in the Alpha Monitoring Data Sheet for this location (Attachment 5).

c. Allowing only one side of the wipe paper to come in contact, take a 100 cm^2 swipe of a flat, exposed, horizontal area such as the hood of a car that has remained parked outside since before the beginning of the release.

d. Being careful not to contaminate the outside of the petri dish or to shake collected material off of the wipe paper, place the wipe in the petri dish, contaminated side up.

e. Hold the Eberline SHP-380AB probe 3" above the wipe for approximately ten seconds. Record this value as the gross count rate. Do not bring the probe in contact with the wipe.

f. Calculate the smearable contamination as follows:

$$DPM / 100\ cm^2 = \frac{(\text{gross count rate})\ (100\ cm^2)}{(\text{Eff})}$$

Where:

Eff = Counting efficiency factor for probe
= 17 percent for the SHP-380AB

g. Enter required data on an adhesive sample label, peel off the backing paper and attach the label to the backside of the zip-lock bag. (The back side is the side opposite the contact side of the wipe.)

h. Put lid on petri dish. Place the petri dish containing the wipe in a 1 pint zip-lock bag and seal the bag by folding a 1" piece of sample sealing tape over the bag opening.

i. Fill out form EP-6, Radionuclide Analysis Report (Attachment 4) and place it and the bag containing the wipe inside a 1-gallon zip-lock bag.

j. Mark the survey location on the Site Area map.

k. Submit the sample to the Sample Preparation and Coordination Team through the courier or in person as directed by Field Team Leader.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary custody of a specific sample. When necessary, additional blank sets of form number EP-6 shall be used to continue Chain of Custody certification. Such additional sets shall each bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ____." (Since each change in sample custody must be noted on form EP-6, the outer bag should be closed by its zip-lock closure, but should not be sealed in any way that would prevent access to that form.)

XII. Sample Collection and Field Evaluation

Note: Some of the steps in the following processes are designed to keep the samples from being contaminated. These steps are not necessarily sufficient to protect the sample taker from contamination, but should be followed in addition to personnel anti-contamination procedures. Because of the concentration of contaminants that can occur during some collection processes, disposable rubber gloves should always be worn when handling any unbagged sample collection medium or sample container. All gloves, and any shoe covers used by a team may be stored in a single plastic bag until proper disposal can be arranged at the end of the shift.

A. Air Samples

1. Purpose

Air samples are collected and evaluated for the purpose of identifying airborne radioactive contaminants that could contribute to exposures through inhalation, direct external exposure, or uptake in plants or animals.

2. Discussion

a. The field evaluation of the particulate filter can yield an early approximation of gross particulate activity.

b. Air sample collection and evaluation can provide an indication of the extent to which re-suspension of deposited materials poses a continuing threat to respiration or could result in contamination of additional downwind areas.

c. The method used for air sampling is also the same as that described in Procedure 10. Removal of the filter and its packaging are described in paragraphs XII.A.4. l through q of this procedure. In order to determine the amount of alpha contamination on a surface, a direct scan using the E-600 survey meter and SHP-380AB probe can be accomplished by holding it about one quarter inch (1/4) above the surface of the air filter for one minute. Record this reading in CPM. The amount of alpha deposition on the filter is an indication of airborne alpha activity requiring the consideration of the use of respiratory protection. The active surface area of the SHP-380AB probe is 100 cm^2.

3. Equipment

In addition to a power supply (normally provided by the battery of the survey team vehicle), collection and field evaluation of one air sample requires use of the following Field Monitoring Team equipment:

a. RADeCO/SAI low volume air sampler and sampling head (filter holder)

b. TRIP LITE Model PV-500 FC (12VDC to 115VAC) power inverter

c. 16' set of power cables

d. One roll of sample sealing tape

e. One 47mm filter & backing pad

f. One Eberline E-600 portable survey meter

g. One Eberline SHP-380AB probe

h. One 2" plastic petri dish with cover

i. Two small (1 pint capacity) zip-lock bags

j. One large (1 gallon capacity) zip-lock bag

k. Two adhesive sample labels

l. One pair of tweezers

m. Pen or pencil

n. One set of form EP-6, Radionuclide Analysis Report

o. One copy of form CI-18, Alpha Monitoring Data Record Sheet for this location

p. Site Area map

4. Collection

a. Unscrew the outer ring of the sampler head and place the filter on the screen. Replace outer ring.

b. Screw the sampling head into the sampler.

c. Attach one end of the yellow power cable to the inverter's positive terminal and one end of the black power cable to the inverter's negative terminal.

d. Attach the other end of the yellow power cable to the vehicle battery's positive terminal and the other end of the black power cable to a vehicle chassis ground.

e. With the air sampler turned off, plug the sampler into the inverter.

f. With the sampler flow rate adjusted to the lowest setting, start the vehicle's engine and turn on the sampler.

g. Adjust sampler flow rate to 2 cubic feet per minute (CFM).

h. Record the sampling start time and actual flow rate in form CI-18.

i. Allow the sampler to run until the desired volume of air has been sampled.

Note: The preferred volume is 30 ft^3. The actual volume desired will depend upon the time available. The Field Monitoring Team Leader will specify the volume of air to be sampled in instances when it is to be any volume other than the standard 30 ft^3. If a high volume air sampler is to be used, techniques on its use will be demonstrated and procedures will be supplied.

j. Stop the sampler and record the sampling time and volume of air sampled on form CI-18.

The following steps will require a clean, uncontaminated surface on which to lay bags and sampling head parts. A clean sheet of notepaper, a paper towel, or even an inside page from a newspaper carried in the team vehicle should suffice.

k. Remove the sampling head from the air sampler and, holding the sampling head upright, unscrew the filter holder cap and lay it aside.

l. Using tweezers carefully lift the particulate filter disc out of the sampling head.

Note: The filter disc should be handled only by the outer lip, which was covered by the filter holder cap during sampling. The filter disc

will probably be stuck to the sampling head and must be removed carefully to avoid tearing it or shaking off particles, which have been collected on the surface.

m. Lay the sampling head aside and place the particulate filter disc into a plastic petri dish with the upstream side of the disc corresponding to the marked side of the dish. Use care when transporting the sample to keep the marked side upright at all times.

n. Place the petri dish in a small zip-lock bag, close the bag and seal it by folding a 1" piece of sample sealing tape over the bag opening.

o. Survey the sample head for signs of contamination and decontaminate if necessary. Reassemble the sampling head, disconnect the air sampler, inverter, and power cables and store these items.

p. Mark the sampling location on the Site Area map.

q. Since a measurement is to be performed each time a sample is collected, an Eberline E-600 survey meter, an Eberline SHP-380AB scintillation probe, and a copy of form CI-18, Alpha Monitoring Data Sheet for each location will also be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

5. Field Evaluation

Preliminary evaluation of alpha activity may be performed at the

Contamination Control /Hot Line Point using the Alpha 6A-1 air monitor. Field evaluation will be performed at the Mobile Laboratory.

6. Sample Submission

All particulate filter discs shall be labeled and submitted to the Sample Preparation and Coordination Team. Labels and form EP-6 must show the volume of air sampled in cubic feet.

a. Enter required data on adhesive sample label and form EP-6, Radionuclide Analysis Report (Attachment 4).

b. Attach label to the top of the bag containing the particulate filter.

c. Place form EP-6 and the bag containing the filter disc in a 1-gallon zip-lock bag. Use care when handling the filter to keep the marked side up at all times.

d. Note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

e. Submit the sample to the Sample Preparation and Coordination Team.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of the specific sample. When necessary, additional blank sets of form EP-6 shall be used to continue Chain of custody certification. Such additional sets shall each bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___." (Since each change in sample custody must be noted on form EP-6, the outer bag should be closed by its zip-lock closure, but should not be sealed in any way that would prevent access to that form.)

B. Soil Samples

1. Purpose

Soil samples are collected and evaluated for the purpose of identifying and quantifying radioactive contaminants that have been deposited on the ground surface as a result of an airborne release.

2. Discussion

a. Contaminants deposited on the soil are significant because they could potentially affect persons in the following manner:

(1) Re-suspension resulting in either whole body exposure, inhalation, or re-deposition in previously unaffected areas;

(2) Adsorption or absorption resulting from direct skin contact; and/or

(3) Plant uptake and subsequent entry into the food chain.

b. Following completion of the initial deposition process, soil sample collection and evaluation may be necessary to determine the extent to which routine land usage must be restricted, or the extent to which decontamination may be required.

c. Prior to the time when land tillage or precipitation causes deposited materials to be mixed into the soil, most contaminants will remain in a very thin surface layer of soil.

(1) In most instances, a sample that contains the top quarter inch (3") of soil will be representative of contaminants deposited from an airborne release.

(2) In instances where the soil is very uneven due to clotting or cracking, a greater sampling depth will be required.

(3) Samples for soil depth profiles will not routinely be collected during response to accidental airborne releases. When such samples are desired, they will be specifically requested by the Field Monitoring Team Leader.

d. During later stages of response operations, after contaminants have been mixed into the soil through tillage or percolation, the Field Monitoring Team Leader will provide guidance concerning soil sampling techniques to be utilized.

Because the intent in gathering the sample is to determine the deposition per unit area, the size of the area from which a soil sample is collected is as important as the sampling depth and must be accurately determined.

3. Equipment

a. The following equipment will be required each time a soil sample is to be collected. Additional quantities of some items will be required if the area to be sampled is clotted or cracked and a greater than normal volume of soil must be collected.

(1) Disposable gloves and shoe covers

(2) Ruler (1-foot minimum)

(3) Trowel

(4) Sample container (16oz. plastic tub) and lid

(5) Masking tape

(6) Adhesive sample label

(7) Pen or pencil

(8) Sample sealing tape

(9) Form EP-6, Radionuclide Analysis Report

(10) Site Area map

(11) Two 1-gallon zip-lock bags (A 22" X 28" sample collection bag shall be substituted if soil sample is in multiple containers.)

b. Since a measurement is to be performed each time a sample is collected, an Eberline E-600 meter, and an Eberline SHP-380AB scintillation probe, along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

4. Collection

a. In selecting a site from which to collect a soil sample, apply the following criteria in descending order of priority. So long as even one site meets a given criterion, other sites that fail to do so should be eliminated from further consideration.

Note: Except as noted below, if the strict application of a particular standard would result in the elimination of all remaining sites, the two or three sites more nearly meeting the criterion should be evaluated on the basis of subsequent criteria.

(1) The soil surface must not have been disturbed since the beginning of the release.

Note: <u>This criterion must be met.</u> If no site in the vicinity of the desired sampling location meets this criteria, advise the Field Monitoring Team Leader and await further instructions.

(2) The site must be away from vehicles, building, trees, structures and other objects, which would shield it from the wind or otherwise influence deposition patterns.

Note: Since the term "away from" requires a subjective judgment on the part of the sample collector, the following guidelines should be applied.

(a) Assume that all deposition has resulted from materials that were carried on winds blowing in a straight line from the point of release to the sampling location.

(b) If the potential collection site is downwind of any intervening object, the distance of separation must be at least equal to twice the height of the object.

(c) If the potential collection site is upwind or to one side of an object, the distance of separation should be at least great enough to escape any noticeable wind swirl caused by the object.

(d) If no potential site meets criterion number two based on these guidelines, further consideration should be given to those sites on which deposition appears to have occurred in patterns which are representative of the area.

(3) Ideally, the site should be free of vegetation; but, since that is an unlikely condition in most undisturbed and unsheltered locations, some vegetation is acceptable.

(4) If more than one site remains eligible at this point, select the one site free of clods, rocks, ground cracks, debris and other features that would complicate the process of collecting a sample of uniform soil depth.

b. Mark off a 12" X 12" area within the selected site, being careful not to touch the ground inside the marked area.

c. Remove the soil from inside the marked area to a uniform depth of 3" and place it in the sample container.

(1) Include any vegetation from the area in the sample.

(2) Sampling depth may be increased slightly if doing so will result in a more accurate sample of clotted or cracked soil.

(3) If the area is free of vegetation, cracks, and clods, the sample will almost fill the container, leaving just enough space for the lid.

(4) If the sample volume exceeds the capacity of a single container, use as many containers as necessary, and indicate on their labels that they are part of the same sample.

d. Snap the lid on the container and tape it in place by running a piece of masking tape completely around the rim of the container, folding the upper edge of the tape down onto the lid. The tape must make adequate contact with both the container and the lid to hold the lid securely in place.

e. Seal the container with a (3" minimum) piece of sample sealing tape. Starting at a point on the container approximately 2" below the exposed outer end of the masking tape, run the sample sealing tape up the side of the container, down over the rim and onto the lid.

f. Enter data on the adhesive sample label, peel off the backing paper and attach the label on the side of the container below the masking tape.

g. Fill out a set of form EP-6 and place it and the sample container inside a 1-gallon zip-lock bag.

h. If multiple containers were required to hold this sample, repeat steps "d" through "f", above, for each container; indicate number of containers used on form EP-6, and place all containers, along with form EP-6, in one of the 22" X 28" sample collection bags.

Note: Since each change in sample custody must be noted on form EP-6, the outer bag should be closed, either by its zip-lock closure or with a twist tie, but should not be sealed in any way that would prevent access to that form.

i. Mark the sampling location on the Site Area map.

j. Enter requested data on a copy of form EP-6 for this location and note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

k. Wash trowel with clean water and dry it with a paper towel from the kit, before using it to collect another sample. Monitor for contamination.

l. Store any gloves and/or shoe covers plus other disposable items in a plastic bag until they can be properly disposed of. Gloves and/or shoe covers should never be reused.

m. Since a measurement is to be performed each time a sample is collected, an Eberline E-600 survey meter, an Eberline SHP-380AB scintillation probe, and a copy of form CI-18, Alpha Monitoring Data Sheet, for each location will also be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluation of soil samples collected during response to accidents involving airborne alpha releases. Field information concerning ground deposition can be more easily and accurately obtained through performance of deposition surveys by direct scan or by wipe evaluation. (See Section XI.)

b. All soil samples collected shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

c. Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets, shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___.")

C. Vegetation Samples

1. Purpose

Vegetation samples are collected and evaluated for the purpose of estimating ingestion exposure pathway hazards resulting from an airborne release of radioactive materials.

2. Discussion

a. Contaminants deposited on vegetation are significant because they could potentially affect persons by:

(1) Direct ingestion on the surface of vegetables, grain, nuts or fruits, or in the edible portion of the plant following uptake; and/or

(2) Indirect ingestion through consumption of meat, milk or other foods from animals that have eaten vegetation on or in which contaminants were present.

b. Following completion of the initial deposition process, vegetation sample collection and evaluation may be necessary to determine whether fruits, grains and vegetables are safe for human consumption; and whether grains and vegetation can safely be grazed by, or harvested and fed to animals whose flesh or byproducts are to be used for human foods.

(1) Of the processes mentioned above, the hazard from grazing by food-producing animals should be evaluated as soon as possible after deposition has terminated, because such early evaluation avoids the irreversible action of allowing contaminants to enter the animal before the effects are evaluated.

(2) In the case of grains which are harvested for animal feed, sample collection and evaluation should more properly be deferred until harvesting, thereby automatically correcting the evaluation to account for weathering and for any decontamination which normally occurs during the harvesting process.

(3) In the case of fruits, vegetables and grains that are harvested for human consumption, any evaluation should more properly be performed at a later stage, after the item has been processed.

(4) In the case of nuts, all of which have a protective outer shell which is removed prior to consumption contaminants present in the meat will almost exclusively be the result of plant uptake through the root system. Evaluation of this phenomenon must be delayed until after such uptake has occurred.

(5) In all cases, barring some urgent need to do otherwise, sampling and evaluation should only be performed at the stage of growth where grazing or harvesting would normally occur.

c. Because the intent in evaluating the sample is to determine the quantity of radionuclides that would be ingested during plant consumption, the size of the area from which vegetation samples are collected is of little significance. Assessments will be based on the quantity of contaminants per unit weight or volume of vegetation.

3. Equipment

a. For collecting grass samples, or samples of other plants that can be cut with grass clippers, the following equipment will be required.

(1) Disposable gloves and shoe covers

(2) Grass clippers

(3) 1 (2 gal) zip-lock plastic bag

(4) 1 (1 gal) zip-lock plastic bag

(5) Adhesive sample label

(6) Pen

(7) Sample sealing tape

(8) Form EP-6, Radionuclide Analysis Report

(9) Site Area map

b. For collecting hay samples, wire cutters may also be required.

c. For collecting grain samples, a knife may be required for cutting the seed head from the plant.

d. Since a measurement is to be performed each time a sample is collected, a Eberline E-600 portable survey meter, an SHP-380AB scintillation probe, and a copy of form CI-18, Alpha Monitoring Data Sheet for each location will be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

e. In instances where a ladder would be required for obtaining samples of fruits or nuts, sample collection activities should be coordinated with the producer, or with the County Agricultural Extension Agent.

4. Collection

a. Unless otherwise specified, each sample should consist of a 1-gallon zip-lock bag of vegetation. Excess air should be squeezed out of the bag before it is closed.

(1) The 1-gallon zip-lock bag will contain the desired quantity if it is filled with tightly packed, cured hay or dry grass, or if it is filled with moderately packed green grass.

(2) For samples other than grass samples, specific instructions will be provided by the Field Monitoring Team Leader if a sample volume other than one gallon is desired.

b. For samples taken from pastures, fields or orchards prior to harvest, the selection of vegetation to be included in a given sample should be based on the following considerations.

(1) If the sample is to represent vegetation that an animal would consume during grazing, the sample should include only plants that the animal would normally eat, and of those plants, should be limited to that portion of the plant normally consumed by the animal.

(2) If the sample is to consist of items for human consumption, include only the part of the plant which is normally eaten, plus any husks, shucks, rinds, pods, peelings, skins, hulls or shells not routinely removed prior to retail marketing.

(3) If the sample is to represent nuts or grain that would be harvested for human or animal consumption, include the hulls, shells, or seed heads.

(4) If the sample is to represent plants that would be harvested as hay or ensilage, include the entire above-ground portion of the plant.

c. Insert sample bag into zip lock bag. Seal zip lock bag with one inch sealing tape.

d. Enter required data on the adhesive sample label, peel off the backing paper and attach the label on the side of the bag.

e. Fill out a set of form EP-6 and place it, and the bag containing the sample inside a second sample collection bag.

Note: Since each change in sample custody must be noted on form EP-6, the outer bag should be closed, but should not be sealed in any way that would prevent access to that form.

f. Mark the sampling location on the Site Area map.

g. Enter requested data on a copy of form CI-15 for this location and note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

h. Wash grass clippers (or other collection tools) with clean water before using them to collect another sample. Monitor for contamination.

i. Store any gloves and/or shoe covers in a plastic bag until they can be properly disposed of.

j. Since a measurement is to be performed each time a sample is collected, An Eberline E-600 survey meter, and Eberline SHP-

k. 380AB scintillation probe, and a copy of form CI-18, Alpha Monitoring Data Sheet for each location will also be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluations of vegetation samples collected during response to accidents involving airborne alpha releases.

b. All vegetation samples collected shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

c. Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___.")

D. Water Samples

1. Purpose

Water samples are collected for the purpose of estimating ingestion exposure pathway hazards from an airborne release of radioactive materials.

2. Discussion

a. Contaminants deposited in water are significant because they could potentially affect persons in any of the following ways:

(1) Direct ingestion of contaminated drinking water or water used in food preparation.

(2) Contamination resulting from washing, bathing or swimming in contaminated water.

(3) Ingestion of milk or other products from animals whose water supply was contaminated.

(4) Ingestion of foods grown on plants that were irrigated from contaminated water supplies.

(5) Ingestion of fish or other marine products harvested from contaminated bodies of water.

b. In almost any conceivable event involving an airborne release of radioactive materials, water contamination will be negligible, but the possibility of significant contamination cannot be completely ignored. Some degree of water sample collection and analysis will be required in response to almost every incident involving an airborne release of radioactive materials.

(1) Public concern will almost certainly demand that public water supplies be sampled.

(2) Food producers and/or harvesters may require assurance that products grown or processed using area water supplies will be marketable.

(3) RCP's responsibility for protecting the public health and safety will not permit ignoring the potential of exposure through this medium.

c. Contaminants may not appear in water supplies until long after deposition has terminated.

(1) Contaminants in surface water supplies may result from run-off that has washed adjacent land areas and vegetation.

(2) Contaminants in ground water supplies may take years to appear because of the extremely slow movement of water through some aquifers.

3. Equipment

a. The following equipment will be required for collection of water samples.

(1) Disposable gloves and shoe covers

(2) One-gallon cubitainer with cap and transport box

(3) Sample sealing tape

(4) 2 adhesive sample labels

(5) Pen

(6) Form EP-6, Radionuclide Analysis Report

(7) Site Area map showing the sampling location

(8) Paper towels

(9) Bucket or dipper

Note: A clean soil sample container will serve as an improvised dipper if no other bucket or dipper is readily available.

b. Since a measurement is to be performed each time a sample is collected, an Eberline E-600 survey meter, an Eberline SHP-380AB scintillation probe, and a copy of form CI-18, Alpha Monitoring Data Sheet for each location will also be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

4. Collection

a. Unless modifying instructions are issued at the time of the event, sites for collection of water samples should be selected on the basis of the following guidelines.

(1) To sample drinking water, samples from municipal water supplies should be collected after the water has passed through the treatment plant; either from a tap at the plant, or from a tap supplying potable water at some point in the distribution system.

(2) Samples from private wells should be collected from a tap inside the residence, or from the tap, which is nearest to the point where water from that well would be used. This practice will ensure that the sample is representative of the actual water used, including the effects of any treatment such as water softening or demineralization normally occurring between the well and the tap in question.

(3) If the purpose in sampling is also to determine whether the supply itself is contaminated, a second sample of raw water should be collected upstream of any municipal or private treatment mechanism.

(4) Samples of untreated surface water should be collected from bodies of standing water unless a sample from a flowing stream is specifically desired.

(5) The Sample Preparation and Coordination Team will perform any necessary filtration and/or acidification of samples, and appropriate notation of such on form EP-6.

b. Cubitainers should be capped prior to entry into the affected area, and should remain capped at all times except while they are being filled.

c. Always rinse the cubitainer immediately before use. Rinse the cubitainer by filling it approximately half full, shaking it to wash all inside surfaces, and emptying it before filling it with the sample intended for analyses. Water from the source intended to be sampled should be used to rinse the cubitainer.

d. Each water sample should consist of 1 gallon of water.

e. When collecting a water sample from an outside tap, or from any other tap where contamination may have been deposited on the tap itself, the outside of the tap should be rinsed and water allowed to run from the tap for a few seconds before a sample is collected.

f. Surface water samples should be collected by pouring the sample into the cubitainer from a bucket or dipper. Rinse the bucket or dipper with the water to be sampled prior to use.

g. When collecting samples from shallow sources, care must be exercised to avoid stirring up silt, which would adulterate the sample.

h. After filling, dry the cubitainer if necessary, cap tightly and seal by running a piece of sample sealing tape across the top of the cap with the ends of the tape extending down at least one inch (1") onto the cubitainer on each side of the cap.

i. Enter required data on two copies of the adhesive sample label and one set of form EP-6, Radionuclide Analysis Report.

j. Assemble the cubitainer transport box.

k. Peel off label backing papers and attach one copy of the label to the front of the cubitainer and one copy to the side of the cubitainer transport box opposite the carrying slot.

l. Place the cubitainer in the cubitainer transport box.

m. Mark the sampling location on the Site Area map.

n. Enter requested data on a copy of form CI-18 for this location and note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

o. Wash any buckets, dippers or funnels in clean water before using them to collect another sample. After allowing the utensils to air dry, survey them for the presence of residual contamination. Bag the utensils to prevent contamination prior to use.

p. Store any gloves and/or shoe covers in a plastic bag until they can be properly disposed of; either as low-level radioactive waste if necessary, or as ordinary garbage. Gloves and/or shoe covers should never be reused.

q. Store any used paper towels in the bag with the discarded gloves and/or shoe covers.

r. Since a measurement is to be performed each time a sample is collected, an Eberline E-600 survey meter, an Eberline SHP-380AB scintillation probe, and a copy of form CI-18, Alpha

Monitoring Data Sheet for each location will also be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluations of water samples collected during response to accidents involving airborne alpha releases.

b. All water samples and Radionuclide Analysis Report forms shall be forwarded to the Sample Preparation and Coordination Team for routing to a laboratory facility for evaluation.

c. Chain of sample custody shall be certified by each person including couriers, having temporary or ultimate custody of a specific sample. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number___.")

E. Milk samples

1. Purpose

Milk samples are collected and evaluated for the purpose of quantifying exposure hazards resulting from ingestion of milk produced in areas affected by the airborne release of radionuclides.

2. Discussion

a. Contaminants incorporated in milk are significant because milk and dairy products constitute one of the basic food groups that are considered to be an essential part of the human diet.

b. Nuclides in milk, which mimic calcium transport and deposition in the body, may be incorporated in bone tissue; presenting very long term potential for internal exposure.

c. Collection of milk samples shall always be performed in the presence of, or at least with the knowledge and permission of, the dairy operator.

d. Milk samples will normally be collected either by personnel from the Radiation Control Program, accompanied by Sanitarians from the Division of Milk and Dairy Products.

e. This procedure addresses only the collection of raw milk samples. If samples of pasteurized milk or other dairy products are required, they would be collected in the containers in which they are marketed; or by RCP Sanitarians in accordance with the procedures of that Division.

3. Equipment

a. The following Field monitoring Team equipment and supplies will be required for collection of raw milk samples.

(1) Disposable gloves and shoe covers

(2) One-gallon cubitainer with cap and transport box

(3) Sample sealing tape

(4) Two adhesive sample labels

(5) Pen

(6) Form EP-6, Radionuclide Analysis Report

(7) Site Area map

b. The following equipment and supplies will also be required. Since they are not part of the Field Monitoring Team's routine inventory, these items are to be provided by the Division of Milk and Dairy Products Sanitarian, or obtained through Logistics Support from that Division whenever collection of milk samples is to be undertaken without an accompanying Sanitarian.

(1) Seamless, stainless steel dipper

(2) Chlorine test strip

(3) One-gallon empty plastic jug with split neck and opening cut in top for dipper

(4) Funnel

(5) 100 ml concentrated chlorine liquid

(6) Map showing dairy locations in the affected area

Note: Since almost every dairy will have chlorine available, this 100 ml supply is essentially a spare to prevent an additional trip in the unlikely event that a dairy is temporarily out of chlorine or refuses to provide any.

c. A supply of clean water will also be required for sanitizing the dipper prior to use. If, for any reason, the water at the dairy is possibly contaminated, the team will need one gallon of clean water from some other source.

d. Since a measurement is to be performed each time a sample is collected, an Eberline ESP-2 survey meter, an Eberline HP-380AB scintillation probe, and a copy of form CI-18, Alpha Monitoring Data Sheet, for each location will also be required; along with the team members' copies of form CI-13, Response and Recovery Activities Record Sheet.

e. Any addition of formaldehyde or other preservatives, and appropriate notation of such on form EP-6 will be performed by the Sample Preparation and Coordination Team.

4. Collection

a. Turn on the bulk tank agitator and allow it to stir milk for at least 5 minutes.

b. While the agitator is running, sterilize the dipper in a solution of at least 100ppm hypochlorite solution.

(1) While strength will vary based on strength of chlorine available, 100 ml of chlorine per gallon of water will provide at least the required strength solution.

(2) Solution strength can be tested with the chlorine test strip, following instructions accompanying the strip.

(3) The dipper must be submersed in the sterilizing solution beyond the depth that will enter the milk.

(4) The dipper must be submersed in the sterilizing solution for a minimum of 30 seconds.

c. Dip milk from opening in the top of the bulk tank and pour through funnel into cubitainer.

d. Tightly cap cubitainer and seal by running a piece of sample sealing tape across the top of the cap with the ends of the tape extending down at least one inch (1") onto the cubitainer on each side of the cap.

e. Turn off bulk tank agitator.

f. Enter required data on two copies of the adhesive sample label and one set of form EP-6, Radionuclide Analysis Report.

g. Assemble the cubitainer transport box.

h. Peel off label backing papers and attach one copy of the label to the side of the cubitainer and one copy to the side of the cubitainer transport box opposite the carrying slot.

i. Place the cubitainer and Form EP-6 in the transport box and close box cover.

j. Mark the sampling location on the Sample Area map.

k. Enter requested data on a copy of form EP-6 for this location and note sample collection activity on form CI-13.

l. Discard the used chlorine solution and wash the dipper, funnel and plastic jug in clean water. After allowing the utensils to air dry, survey them for the presence of residual contamination. Bag utensils to prevent contamination prior to use.

m. Store any gloves and/or shoe covers in a plastic bag until they can be properly disposed of; either as low-level radioactive waste, if necessary, or as ordinary garbage. Gloves and/or shoe covers should never be reused.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluations of milk samples collected during response to accidents involving airborne alpha releases.

b. All milk samples and Radionuclide Analysis Report forms shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

c. Each person, including couriers, having temporary or ultimate custody of a specific sample, shall certify Chain of sample custody. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___.")

XIII. Reporting Data

A. Reports from the field

1. Report each significant change in status; e.g.,

a. Report the time, location and reading for any measurement which are ten times normal background read or greater;

b. Departure en route to next location (identify destination);

c. Arrival at designated location;

d. Sample collected (or completion of any assigned task);

e. Inability to collect a sample (or to complete any assigned task);

f. Any planned action in which will result in loss of radio contact for more than 15 minutes;

g. Resumption of radio contact following "f", above;

h. Termination of radio contact at end of day; and

i. Other reports specifically requested by the Team Leader.

2. Report instrument readings in the units in which they are measured.

B. Document submission at end of duty

At the end of each day or other tour of duty, forward all written documentation prepared that day to the Field Monitoring Team Leader. This documentation should include copies of forms CI-13, and CI-18, as well as any Site Area maps on which sampling or monitoring locations have been marked.

Note: Emergency Worker Radiation Exposure Records and Radionuclide Analysis Reports are not covered by this instruction. Specific instructions for submission of those documents are provided elsewhere in this and other procedures.

XIV. Contamination Control

A. During field monitoring activities, personnel exposure can be reduced by effective use of the protection provided by the team vehicle.

1. While inside the plume, or in areas where re-suspension could be a factor, keep the vehicle closed as much as possible. Keep windows closed at all times and use only air conditioner or heater setting, which re-circulates inside air.

2. Upon exiting the plume, weather permitting, open vehicle windows for at least a few minutes to purge any contaminated air that may have been trapped in the vehicle.

B. Periodically, during the performance of plume monitoring and sampling activities, each Field Monitoring Team shall monitor itself, its vehicle and its equipment for possible contamination.

1. Each time a team member gets out of the vehicle in an area affected by the release, at least his or her hands and shoe soles shall be monitored before he or she reenters the vehicle. If contaminated, remove items before entering vehicle to keep contamination inside vehicle as low as possible.

Note: As a special purpose definition to be used in this context only, "area affected by the release" is defined as "any location where exposure rate or counts per minute readings are twice background."

2. Sample collecting tools and equipment shall be monitored after each use.

3. Instruments and probes shall be monitored each time they come in contact with a suspected contaminated surface. Probes shall also be monitored at any time persistent high readings are noted that are not readily attributable to another source.

4. Except when merely driving out of the affected area in order to reenter it at another nearby point, team members shall monitor themselves their vehicle and equipment each time they exit the affected area.

C. At the end of each shift or other duty period, each Field Monitoring Team, its vehicle, instruments, probes, and equipment shall be monitored by a Contamination Control Team or by other RCP personnel at an alternate location specified by the Field Monitoring Team Leader.

Note: While they are the responsibility of the persons performing exit monitoring, the following actions are of significance to the Field Monitoring Team members. For your own protection, ensure that each of these steps is completed by the person(s) performing this survey.

1. Enter personal dosimetry "Reading at Exit" and "Indicated Dose" on the individual's Emergency Worker Radiation Exposure Record form. Route copies of this form as indicated on the document.

2. Return dosimetry to the individual.

3. Perform, or supervise performance of such decontamination as may be required before individual can leave the area. Repeat survey and decontamination process as appropriate; subject to limitations imposed by decontamination capabilities available at the monitoring location.

4. Inform the individual of any remaining contamination and of any additional decontamination actions which should be performed by the individual at his or her place of lodging or other appropriate location.

5. Collect any used gloves, shoe covers, respirator cartridges, and other potentially contaminated waste for appropriate disposal.

D. Decontamination of Field Monitoring Team personnel, vehicles, and equipment shall be performed in accordance with RCP procedures and as directed by the Contamination Control Team or Field Monitoring Team leader.

FIELD MONITORING TEAM EQUIPMENT AND SUPPLIES

In addition to personnel dosimetry and such other equipment and supplies as are required by other applicable procedures, each Field Monitoring team shall have the following items in their possession prior to commencing field operations.

Team members are responsible for bringing the following previously issued items with them from their regional or Austin offices.

1 E-600 Survey Kit containing:
- E-600 survey meter with batteries
- SHP-380AB scintillation probe
- SHP-270 Geiger-Mueller probe
- SLEG-1
- Cables, wrench, and check sources

1 RADeCO/SAI high volume air sampler and sampling head (filter holder)
1 TRIP LITE Model PV-500 FC (12VDC to 115VAC) power inverter
1 Set of 16' power cables (jumper cables)
1 Package of air filter discs and backing pads
25 1" wipes
25 Plastic petri dishes
12 Soil sample containers (16 oz. plastic tubs) with lids
12 One gallon cubitainers with caps and transport boxes
1 Roll of sample sealing tape
1 Roll of 1" masking tape
1 Pair of tweezers
1 Pair of grass clippers
1 Trowel
1 12" ruler
1 D cell flashlight with batteries
1 Site Area map
1 Pencil or pen

Logistics Support will issue the following items to each two-person team at the staging area:

1	Roll of sample sealing tape
36	Zip-lock plastic bags (2 gallon capacity)
24	Zip-lock plastic bags (1 gallon capacity)
36	Zip-lock plastic bags (1 pint capacity)
1	Pad of pre-printed adhesive sample labels
1	Roll or package of paper towels
1	Box of disposable gloves (or at least 50 gloves)
2	Each, pair of appropriate sized protective coveralls
30	Pair of tyvek disposable shoe covers
12	Copies of EP-6, Radionuclide Analysis Report
10	Copies of form CI-13, Response and Recovery Activity Record Sheet
10	Copies of form CI-18, Alpha Monitoring Data Sheet
6	Extra C cell flashlight batteries for survey meters (6 per meter)
1	Full face air purifying respirator

SPECIAL RESPONSE ITEMS

The following items will be issued by Logistics Support when necessary to meet specific conditions or to perform special tasks:

1	Seamless, stainless steel dipper
5	Chlorine test strips
1	Funnel
1	Vial containing 100 ml of concentrated chlorine liquid
1	One-gallon empty plastic jug with split neck and with opening cut in top to allow insertion of dipper
1	Set of maps showing locations of dairies in the affected area

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM
RADIONUCLIDE ANALYSIS REPORT

Handling Instructions _____

_____

Authorized By _____

Sample Type:
☐ Soil ☐ Vegetation ☐ Milk

☐ Air (Sample volume: _____ cu. Ft.) ☐ Water ☐ Wipe

☐ Other _____

Container reading on contact (mR/hr): _____

Sampling Location Exposure Rate 1 meter above ground:

Window open _____mR/hr Window closed _____mR/hr

Sampling location _____

Licensee/Facility_____

I certify this sample was collected by me at

_____:____.m. on _____/_____/_____ and remained in my

custody until I transferred to _____

at _____:____.m. on _____/_____/_____.

Signed_____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at _____:_____.m. on _____/_____/_____.

Signed_____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at _____:_____.m. on _____/_____/_____.

Signed_____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at _____:_____.m. on _____/_____/_____.

Signed_____

FOR USE BY THE LABORATORY ONLY

Laboratory Sample Number: _____

Condition of Seals:
☐Satisfactory ☐ (Specify) _____

Wet (as received) Weight _____

Notes _____

I certify this sample was continuously in my custody from the time of receipt until the completion of laboratory analysis on ____/____/____.

Signed: _____

Am-241	____	____∀____	uCi/_____
Ba-140	____	____∀____	uCi/_____
Ce-144	____	____∀____	uCi/_____
Co-58	____	____∀____	uCi/_____
Co-60	____	____∀____	uCi/_____
Cs-134	____	____∀____	uCi/_____
Cs-137	____	____∀____	uCi/_____
Cs-138	____	____∀____	uCi/_____
Fe-59	____	____∀____	uCi/_____
I-131	____	____∀____	uCi/_____
I-132	____	____∀____	uCi/_____
I-133	____	____∀____	uCi/_____
I-134	____	____∀____	uCi/_____
I-135	____	____∀____	uCi/_____
K-40	____	____∀____	uCi/_____
Kr-85	____	____∀____	uCi/_____
Kr-85m	____	____∀____	uCi/_____
Kr-87	____	____∀____	uCi/_____
Kr-88	____	____∀____	uCi/_____
Na-22	____	____∀____	uCi/_____
La-140	____	____∀____	uCi/_____
Mn-54	____	____∀____	uCi/_____
Nb-95	____	____∀____	uCi/_____
Rb-88	____	____∀____	uCi/_____
Ru-106	____	____∀____	uCi/_____
Te-132	____	____∀____	uCi/_____
Xe-133	____	____∀____	uCi/_____
Xe-133m	____	____∀____	uCi/_____
Xe-135	____	____∀____	uCi/_____
Xe-135m	____	____∀____	uCi/_____
Xe-138	____	____∀____	uCi/_____
Zn-65	____	____∀____	uCi/_____
Zr-95	____	____∀____	uCi/_____

ALPHA COUNT

Gross Alpha _____∀_____ uCi/_____

BETA COUNT

Gross Beta _____∀_____ uCi/_____

Results reported at ____:____ __.m. on ____/____/____

EP-6 (2/05)

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM

ALPHA MONITORING DATA SHEET

Date: _____ Time: _____ Page _____ of _____

Team No._____

Team Members (1)_____ & (2)_____

Instrument Model (1)_____ & (2)_____

Instrument Serial No. (1)_____ & (2)_____

In each location where a measurement is made, enter data on this form. Use additional pages if necessary. Forward this form to the field Monitoring Team Leader at the end of this shift.

24HR CLOCK		MONITORING POINT DESCRIPTION	5 LEG-1 GAMMA READING	5 HP-300AB ALPHA READING

CI-18