El Dorado Hills
Naturally Occurring Asbestos
Multimedia Assessment
El Dorado Hills, California

Activity-Based Outdoor Air Sampling of Community Park Children's Playground
Field Sampling Plan
WORKING DRAFT

Contract No.: 68-W-01-012
TDD No.: 09-04-01-0011
Job No.: 001275.0440.01CP

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Region IX

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Superfund Technical Assessment and Response Team

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Table of Contents

Section **Page**

Table of Contents (Cont.)

Section **Page**

List of Tables, Illustrations and Appendices

Table — Page

Figure — Page

Addendum

1 Introduction

The United States Environmental Protection Agency (USEPA) has directed Ecology and Environment, Inc.'s (E & E's) Superfund Technical Assessment and Response Team (START) to conduct a multimedia assessment of community areas and schools in the City of El Dorado Hills in California to assess the potential for exposure from naturally occurring asbestos present in soils that have been disturbed. This Field Sampling Plan (FSP) addresses activity-based outdoor air sample collection at the children's playground at the El Dorado Hills Community Park.

The task-specific field sampling information pertaining to outdoor air sample collection at the children's playground is addressed in this FSP, which is supplemental to information addressed in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan* (QAPP). This FSP describes in detail the planned sample locations, sample location rationale, numbers of samples, and specific sample collection and handling techniques that will be used, including protocols and sample custody procedures that will be used to ensure that sample integrity is not compromised. This FSP is intended to reflect accurately the planned data-gathering activities for this investigation.

2 Background

Background information is described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

3 Project Objectives

The activity-based outdoor air sampling at the children's playground is tentatively scheduled to take place in October 2004. The duration of the air sampling collection activity at the children's playground is expected to last one day.

Project objectives are described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

4 Sampling Design

Scenario rationale and design are described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

4.1 Children's Playground Scenarios

Two activity-based playground sampling scenarios will be conducted, both using personal (i.e., low-flow) air sample pumps. During the first scenario, air sampling will be conducted while typical activity levels are simulated for the playground. During the second scenario, sampling will be conducted while aggressive activity levels are simulated for the playground. During both

scenarios, five personal air sample pumps will be placed on five sampling team members who will participate in scenario activities within the playground (one personal air sample pump on each of five sampling team members).

The general area where personal air sample pumps will be operated is illustrated on Figure CP4-1: Scenario Location Map - Playground During Children's Playground Scenarios.

All playground scenario activities and sample collecting will be conducted within the boundaries of the children's playground area. The sample pump intakes will be at a height of 3 feet above the ground surface. The sample pump intake heights are based upon a typical breathing height for children (ages 1 to 7 years) engaged in play activities at the playground.

4.1.1 Typical Activity Playground Scenario

The purpose of the typical activity playground scenario sampling event is to establish the level of asbestos fibers that may be present in air at the playground, including influences from outside areas, during typical playground use. The scenario will be conducted to simulate typical playground activities. Activity that will be conducted during the typical activity playground scenario may include, but is not limited to:

- Simulating play in the sandbox using a small shovel;
- Simulating play on the play structures including climbing, sliding, and crawling; and
- Walking, running, and ball kicking.

Scenario activities will be conducted by five sampling team members, all of whom will be wearing personal air sample pumps. All sampling team members will conduct scenario activities following prepared scenario scripts, with project management direction (Addendum CP-1). Air sample pumps will collect air samples for 2 hours. If any of the sampling team members need to leave the work zone, other field personnel will replace them so that the activity level remains relatively constant and the personal air sample pumps continue to collect air from the children's playground during the entire 2 hours.

4.1.2 Aggressive Activity Playground Scenario

The purpose of the aggressive activity playground scenario sampling event is to establish the level of asbestos fibers that may be present in air at the playground during aggressive dust generation activities. Activity that will be conducted during the aggressive activity playground scenario may include, but is not limited to:

- Using a leaf blower immediately prior to sampling to agitate any particles and fibers that might be present and cause them to become airborne;
- Using fans to agitate any particles and fibers that might be present and cause them to become or remain airborne;
- Hand raking in the wood chips or the sandbox;
- Sweeping the rubber ground surface material;
- Simulating play in the sandbox using a small shovel and bucket;
- Simulating play in the play structures including climbing, sliding, and crawling; and
- Walking, running, and ball kicking.

Insert Figure CP4-1
Scenario Location Map - Playground During Children's Playground Scenarios

Scenario activities will be conducted by five sampling team members, all of whom will be wearing personal air sample pumps. All sampling team members will conduct scenario activities following prepared scenario scripts, with project management direction (Addendum CP-1). Air sample pumps will collect air samples for 2 hours. If any of the sampling team members need to leave the work zone, other field personnel will replace them so that the activity level remains relatively constant and the personal air sample pumps continue to collect air from the children's playground during the entire 2 hours.

The use of a leaf blower and fans to agitate particles and cause them to become airborne was chosen because they have been used successfully at other investigations to simulate aggressive exposure scenarios. Additionally, previous studies in Libby, Montana, where tremolite asbestos is a concern, have shown that tremolite asbestos is present in the breathing zone of individuals who are involved in routine physical activities, but that it falls out of the air quickly and is difficult to measure unless kept aloft in the vicinity of the sample pump intake.

The leaf blower will be used initially to stir up dust in the playground for 5 to 15 minutes. Up to 15 fans (either box fans or oscillating fans) will be placed in various locations throughout the playground and turned on while the leaf blower is in use. The leaf blower will then be turned off, with the fans still on, and the sample pumps will be started. Sampling team members will continue to employ the various scenario activity techniques to keep dust that may be present suspended in the air.

At the end of the sampling period, the canopies covering the play structures, the play structures, and any hard surfaces within the children's playground will be thoroughly rinsed with water using a pressure washer.

4.2 Video Exposure and Dust Monitoring During Scenarios

Video exposure monitoring (VEM) is an exposure assessment technique developed by the National Institute for Occupational Safety and Health (NIOSH), Engineering Control Technology Branch. The VEM technique generally is used to determine how a worker's activities affect his or her exposure to hazardous compounds or conditions. A standard operating procedure (SOP) for the technique developed by USEPA Region 8 for sampling activities associated with asbestos in air at Libby, Montana, is included in Appendix D of the QAPP. The collection and analysis of exposure data using the VEM technique requires three major components:

- A suitable direct-reading instrument for measuring and recording dust exposure concentrations.
- A video recording system (camcorder) for documenting work activities.
- A computer system with video overlay capabilities for analyzing and combining the two different types of data.

For asbestos fibers or other airborne dusts, direct-reading measurement of exposure is made with a light-scattering aerosol (dust) photometer, commonly known as a dust meter or dust monitor. This type of instrument measures the dust concentration based upon the amount of light scattered by the dust in the sensing chamber of the device.

The VEM technique that has been used by USEPA Region 8 will be used with modifications to produce a video recording that shows a graphical representation of potential exposure

concentrations during the activity-based outdoor air sampling activities at the children's playground. VEM will take place concurrent with all scenario sampling activities. The video and dust monitoring records will be used to document visually the fugitive dust concentration in the air during each scenario.

One dust monitor will be positioned with each of the personal air sample pumps for each scenario at the same height as the air collection cassette (i.e., a dust monitor will be worn by a member of the sampling team who is participating in the activity-based outdoor air sampling activities associated with the scenario). The video recorder will be used to record the activities and visual dust generated by the sampling team members.

4.3 Rationale for Sampler and Monitor Location

Table CP4-1 summarizes the rationale for the inclusion and placement of each sample pump location.

Table CP4-1
Summary of Sampler and Monitor Location Rationale

Sampler Location	Rationale
Five personal air sample pumps worn by five sampling team members within scenario activities areas during playground scenarios. One dust monitor worn by each sampling team member within scenario activities areas during playground scenarios. There will be one co-located personal air sample pump during one of the playground scenarios.	Personal air sample pumps will collect outdoor air samples during scenarios. Samples should represent the higher level of personal exposure at the sample height. Dust monitors will monitor dust concentration and should document the higher level of personal exposure. At least five sampling locations are needed to meet the project's AHERA-derived objective.

4.4 Reference Locations and Sampling

Reference sampling is described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Fixed Ambient Outdoor Reference Air Sampling Field Sampling Plan.*

4.5 Analytical Rationale

Analytical rationale is described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

5 Analytical Laboratory Methods

Analytical Methods are described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

Table CP5-1 summarizes analytical methods and requirements for Children's Playground scenario sampling. Table CP5-2 contains the detailed sample collection information.

Table CP5-1 Summary of Analytical Methods and Requirements Children's Playground Scenarios	
Method:	ISO 10312, *Ambient air–Determination of asbestos Fibres–Direct-transfer transmission electron microscopy method*
Sample Container:	Open-faced cassette with a 25 millimeter diameter, mixed cellulose ester filter with pore size less than or equal to 0.80 micrometers (µm). (Modified by the USEPA from the specified ISO 10312 requirement of 0.45 µm.)
Sample Types	**Number of Samples**
Total Children's Playground samples	15
Personal air sample pump samples	10
Co-located samples	2 (10% minimum; one each scenario)
Field blanks	2
Filter blanks	1

Table CP5-2
Request for Analytical Services: Air Samples
Laboratory Analytical Methods and Requirements

ANALYSES REQUESTED		
ANALYSIS TYPE	**ASBESTOS**	
SPECIFIC ANALYSES REQUESTED	*ISO 10312: Ambient air–Determination of asbestos fibres–Direct-transfer transmission electron microscopy method*	*If Needed* *ISO 13794: Ambient air–Determination of asbestos fibres–Indirect-transfer transmission electron microscopy method*
SENSITIVITY	0.001 structures/cubic centimeter	0.001 structures/cubic centimeter
LEVEL OF DETECTION (for zero structures)	0.003 structures/cubic centimeter	0.003 structures/cubic centimeter
PRESERVATIVES	none	none
ANALYTICAL HOLDING TIME(S)	none	none
NUMBER OF FILTER CASSETTES PER ANALYSIS	One 0.8 Fm filter in asbestos sampling cassette with cowl	One 0.8 Fm filter in asbestos sampling cassette with cowl

Playground Scenario–Typical Activity				
Sample Number	**Estimated Collection Volume**	**Special Designation**	**Location**	**Samples**
TPG-L2-1CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #1	1
TPG-L2-11CH-(Date)	300 liters	Co-located with TPG-L2-1CH-(Date)	Playground co-located personal sample pump #1	1
TPG-L2-2CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #2	1
TPG-L2-3CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #3	1
TPG-L2-4CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #4	1
TPG-L2-5CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #5	1
TPG-L2-1ZB-(Date)	300 liters will be indicated	Trip Blank	Playground scenario field trip blank	1
TPG-L2-FB-(Date)	NA	Filter Blank	Playground scenario filter blank	1

Playground Scenario–Aggressive Activity				
Sample Number	**Estimated Collection Volume**	**Special Designation**	**Location**	**Sample**
APG-L2-1CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #1	1
APG-L2-2CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #2	1
APG-L2-3CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #3	1
APG-L2-13CH-(Date)	300 liters	Co-located with APG-L2-3CH-(Date)	Playground co-located personal sample pump #3	1
APG-L2-4CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #4	1
APG-L2-5CH-(Date)	300 liters	Critical Sample	Playground personal sample pump #5	1
APG-L2-1ZB-(Date)	300 liters will be indicated	Trip Blank	Playground scenario field trip blank	1
Total				15

6 Field Methods and Procedures

6.1 Equipment Procedures

6.1.1 Equipment

The following primary sampling and monitoring equipment will be utilized to obtain environmental data:

Parameter:	Video Exposure Monitoring with Video Camera	
Matrix:	Air and dust	
Equipment	Fabrication	Dedicated
Video Camera	Various	No

Parameter:	Dust Monitoring	
Matrix:	Air	
Equipment	Fabrication	Dedicated
MIE Personal DataRam™ (PDR)	Various	No

Parameter:	Meteorological Conditions	
Matrix:	Air	
Equipment	Fabrication	Dedicated
Portable weather station(s)	Various	No

Parameter:	Sampling of Air for Dust and Determination of Asbestos Structure in	
Matrix:	Air	
Equipment	Fabrication	Dedicated
Low-flow personal sampling pumps	Various	No
High -flow stationary sampling pumps	Various	No
Sample tubing	Tygon	No
Sampling cassette with mixed cellulose ester filter	polypropylene	Yes

Parameter:	Field Data Collection and Sample Management	
Matrix:	Air	
Equipment	Fabrication	Dedicated
Field Computer and Printer(s)	Various	No

Parameter:	Field data collection of sampling location coordinates	
Matrix:	N/A	
Equipment	Fabrication	Dedicated
GPS unit	Various	No

A comprehensive list of additional field equipment required to support the data collection activities is located in Addendum CP-2.

The air sampling equipment is in accordance with the sampling guidelines indicated in USEPA Environmental Response Team (ERT) SOP 2015 *Asbestos Sampling* and in ISO 10312. The ERT SOP is included in Appendix D of the QAPP.

Video documentation and dust monitoring will be performed with a video camera and MIE Personal DataRam (PDR) real-time dust monitors. PDRs and the video unit will be operated in accordance with manufacturer's guidelines. Video documentation will follow *USEPA Standard Operating Procedure (SOP) for Video Exposure Monitoring of Activities Potentially Associated with Exposure to Asbestos in Air, Region 8*, included in Appendix D of the QAPP.

6.1.2 Equipment Maintenance

Field equipment will be operated and maintained by the START according to the manufacturers' instructions. The background dust level measured by the PDR in a clean environment will be evaluated daily by the START, and the PDR will be re-zeroed as necessary. Sample pumps will be calibrated before and after use each sampling day. Any pump that does not maintain calibration over the course of a day will be removed from service for evaluation. All equipment maintenance will be recorded in the START field logbook.

The air sampling pumps will be checked frequently (every 20 to 30 minutes) during use to insure that the pumps are in operation and did not stop or reduce their flow rate due to low power supply or air intake blockage. During operation the dust monitors will be checked periodically to insure that the instruments are collecting information.

6.1.3 Inspection/Acceptance Requirements for Supplies and Consumables

There are no project-specific inspection/acceptance criteria for supplies and consumables. It is standard operating procedure that: personnel will not use broken or defective materials; items will not be used past their expiration date; supplies and consumables will be checked against order and packing slips to verify that the correct items were received; and the supplier will be notified of any missing or damaged items.

6.2 Field Notes

6.2.1 Logbooks

A logbook will be maintained for field work. Field logbooks will document where, when, how, and from whom any vital project information was obtained. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be kept in accordance with E & E SOP *Standard Operating Procedures for Field Activity Logbooks* (included in Appendix D of the QAPP). Use of subsidiary logbooks and field data sheets to record field and sampling information is allowed as long as a record of these documents is made in the field logbook and information is recorded in the subsidiary documents in accordance with the E & E SOP. The use of data acquisition and data management software, such as Scribe, does not constitute a substitute for a field logbook, and information entered into the computer program must be documented in a field logbook or data sheet.

The following information will be recorded, if applicable, during the collection of each sample:

- Sample location and description;
- Site sketch showing sample location(s) and measured distances;
- Sampler's name(s);
- Date and time of sample collection;
- Sample matrix;
- Sample equipment used;
- Field observations and details important to analysis or integrity of samples (rain, odors, etc.);
- Instrument reading (OVM, TVA, etc.);
- Sample description;
- Shipping arrangements (airbill numbers); and
- Receiving laboratory(ies).

In addition to sampling information, the following specifics may also be recorded in the field logbook for each day of sampling:

- Names of personnel on site and their responsibilities;
- Time of arrival/entry on site and time of departure;
- A summary of meetings or discussions with any potentially responsible party representatives, or representatives of any federal, state, or other regulatory agency;
- Descriptions of deviations from project scope, work plans, sampling plans, site safety plans, or QA procedures;
- Levels of safety protection;
- Equipment calibration and equipment models and serial numbers;
- Record of photographs;
- Field screening measurements; and
- A list of subsidiary logbooks or field data sheets.

6.2.2 Photographs

Photographs will be taken at representative sampling locations and at other areas of interest on site. They will serve to verify information entered in the field logbook. When a photograph is taken, the following information will be written in the logbook or will be recorded in a separate field photography log:

- Time, date, location, and, if appropriate, weather conditions;
- Description of the subject photographed;
- Name of person taking the photograph; and
- Photograph number.

6.3 Field Measurements

6.3.1 Global Positioning System Procedures

Sample points and site features will be documented with a global positioning system (GPS) unit. The GPS will be used to assign precise latitude and longitude coordinates to sample locations on the site. GPS mapping will be done by personnel trained in the use of the equipment and will be completed in accordance with the manufacturer's instructions. Expected output from the use of the GPS mapping will be a site map with sample locations.

6.3.2 Video and Dust Monitoring Procedures

All air monitoring and sampling will be conducted in accordance with the previously cited methods and SOPs. Any deviations will be noted in the field logbook. Monitoring and sampling locations will be selected as outlined in Section 4. Air samples will be placed at heights outlined in Section 4. Sample locations will be recorded in the field logbook with a sketch or description of the sample location and physical reference points. If possible, distances to reference points will be labeled or noted. Sample locations will also be documented using GPS.

Air monitoring for dust will be conducted with PDR real-time dust monitors in conjunction with video monitoring of sampling activities. Each day prior to the start of sampling activities a background level of dust will be established for the work zone. The START will deploy PDRs as described in Section 4 and operate them concurrent with sampling activities. The START will record periodic readings (approximately 30 minutes) from the PDRs in a field logbook or data sheets, noting the dust reading and site activities. If a PDR is moved during the work day from one scenario to another, the time of the move and the dust reading will be recorded in the logbook or data sheets. PDRs and air sample pumps deployed together should be kept together throughout the entire scenario. At the end of each work day, the START will download data files from the PDRs.

6.4 Sampling Procedures

Air samples will be collected with personal sample pumps equipped with open-faced cassettes that contain a 25 millimeter (mm) diameter mixed cellulose ester (MCE) filter with a pore size less than or equal to 0.80 micrometers (Fm). Each personal sample pump will be operated at approximately 2.5 liters per minute (lpm). Sample pumps will be calibrated using an electronic calibrator prior to and after use each day using a cassette reserved for calibration (from the same lot of the sample cassettes to be used in the field). Pre-sampling calibration will be considered complete when ± 5 percent of the desired flow rate is attained, as determined by three measurements with the calibrator. For post-sampling, three separate constant flow calibration readings will be obtained, and those flow readings will be averaged. If the averaged post-sampling flow rate has changed by more than 5 percent during the sampling period, the average

of the pre- and post-sampling rates will be used to calculate the total sample volume. Flow rates that have more than a 10 percent difference for a sample pump will be noted with sampling documentation. Samples for which there is more than a 25 percent difference from initial calibration to end calibration will be considered as potentially invalid and noted with sampling documentation. The START will record the pump serial number, sample number, initial flow rate, sample start/end times, sample locations, and final flow rate either in the field logbook or on a field data sheet (Addendum CP-3). Calibration SOPs are included in Appendix D of the QAPP.

6.5 Scenario Procedures

Refer to Addendum CP-1 for scenario procedures and scenario script assignments.

6.6 Decontamination Procedures

Non-dedicated sampling equipment (e.g., sample pumps, dust monitors and scenario equipment) will be wiped down with decontamination wipes or other wetted disposable media (baby wipes) after every sampling scenario. Commercial decontamination wipes are routinely used by TEM analysis laboratories to decontaminate equipment. Decontamination wipes will be pre-certified to be asbestos-free to prior to field use. Dedicated equipment and decontamination materials will be disposed of as specified in Section 7.

6.7 Field Health and Safety Procedures

Field activities will be conducted according to the Health and Safety Plan included as Attachment C of the QAPP. In general, sampling will be conducted in the specified scenario area in Level C. All other activities will be in Level D.

6.8 Field Data Management Procedures

Field data generated for this project include but are not limited to: sample collection dates and times, sample numbers, field monitoring data for dust, meteorological data, and field mapping data. These data will be included in the permanent project file maintained in the START office as directed in USEPA Contract #68-W01-012. Information for all air sampling conducted also will be recorded using the Scribe program.

Electronic Sample Logging

The field team will utilize the Scribe software to prepare sample labels and chain-of-custody forms. Certain sample information, such as sample numbers, heights, estimated sampling dates, and analyses, may be entered into Scribe prior to mobilization to the field. This information may be changed or supplemented once samples are collected.

At a minimum, the following information must be entered for each sample after collection:

1. Sample name;
2. Sample date and time;
3. Sampling media;
5. Analysis priority or data turnaround time;
6. Analysis to be performed;
7. Sampler name; and
8. Air volume.

The field team will generate chain-of-custody forms (i.e., tracking reports) for each cooler of samples packaged and sent to a laboratory. Each chain-of-custody form will refer to the shipping method and tracking number.

The use of the Scribe software will require that the field team have access to a computer, a printer, computer paper, and labels while in the field. Field team members will have received specific training in use of the software.

7 Disposal of Investigation-Derived Waste

In the process of collecting environmental samples at this site, several different types of potentially contaminated investigation-derived wastes (IDW) may be generated, including the following:

- Used personal protective equipment (PPE);
- Disposable sampling equipment; and
- Solid decontamination material.

The USEPA's National Contingency Plan requires that management of IDW generated during site investigations comply with all relevant or appropriate requirements to the extent practicable. This sampling plan will follow the *Office of Emergency and Remedial Response (OERR) Directive* 9345.3-02 (May 1991), which provides the guidance for management of IDW during site investigations. Listed below are the procedures that will be followed for handling IDW. The procedures are flexible enough to allow the site investigation team to use its professional judgement on the proper method for the disposal of each type of IDW generated at each sampling location.

Used PPE and disposable sampling equipment will be double-bagged in plastic trash bags and disposed of at an appropriate local refuse disposal facility. Any PPE or dedicated equipment that is to be disposed of that could otherwise be reused will be rendered inoperable before disposal.

8 Sample Identification, Documentation and Shipment

8.1 Sample Nomenclature

Sample numbers will be assigned to each sample as it is collected. The sample prefix will be based upon the scenario from which it was generated. The prefixes are as follows:

"TPG" Samples collected during the Typical Activity Playground scenario; and
"APG" Samples collected during the Aggressive Activity Playground scenario.

The second term of the sample name will be the alphanumeric code "L2" indicating the sample is collected using a low-volume air sample pump for a 2-hour duration.

The third term of the sample name will consist of an alphanumeric code identifying the sample location within the scenario as follows:

"1CH"	Personal sample pump worn by the primary sampler involved in scenario activities.
"2CH"	Personal sample pump worn by the secondary sampler involved in scenario activities.
"3CH"	Personal sample pump worn by the third sampler involved in scenario activities.
"4CH"	Personal sample pump worn by the forth sampler involved in scenario activities.
"5CH"	Personal sample pump worn by the fifth sampler involved in scenario activities.

The final suffix will be the date in six digits (e.g., May 19, 2004, is "051904").

Co-located samples will have the number "1" before the alphanumeric code in the third term. For example, the co-located sample of sample TPG-L2-1CH-061704 would be TPG-L2-11CH-061704. Blank samples will have a third term of "1ZB" for field trip blanks and "FB" for filter blanks.

8.2 Container, Preservation and Holding Time Requirements

All filter cassettes used for the project will have been pre-tested for asbestos fibers prior to delivery to the START. Air samples will be collected with the filter cassette open-faced. There are no preservation or holding time requirements for asbestos fiber analysis.

8.3 Sample Labeling, Packaging and Shipping

All laboratory samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. Sample labels will be affixed to the sample containers and secured with clear tape. Samples will have preassigned, identifiable and unique numbers in accordance with Section 8.1. The sample labels will contain the following information:

- Sample number;
- Date and time of collection;
- Site name; and
- Analytical parameter.

Samples will be stored in a secure location on site pending shipment to the analytical laboratory. Samples will be retained in the custody of project personnel at all times or secured so as to deny access to anyone else. When samples are not under the direct control of the individual responsible for them, they must be stored in a locked container sealed with custody seals.

All samples will be placed in coolers or another delivery container with the appropriate chain-of-custody forms. All forms will be enclosed in plastic bags and affixed to the underside of the cooler lid. Empty space in the cooler will be filled with bubble wrap or styrofoam peanuts to prevent movement and breakage during shipment. Each cooler will be securely taped shut with strapping tape, and custody seals will be affixed to the front, right, and back of each cooler.

Samples will be shipped for immediate delivery to the contracted laboratory. Upon shipping, the laboratory will be notified of:

- Shipment date and expected delivery date;
- Total number of samples by matrix;
- Carrier, air bill number(s), method of shipment (e.g., priority);
- Irregularities or anticipated problems associated with the samples; and
- Whether additional samples will be sent or if the shipment is the last one.

8.4 Chain-of-Custody Forms and QA/QC Summary Forms

A chain-of-custody form will be maintained for all samples to be submitted for laboratory analysis, from the time the sample is collected for analysis to its final deposition. The chain-of-custody must include the following:

- Sample identification number;
- Site name;
- Sample date;
- Number and volume of sample containers;
- Required analysis;
- Signature and name of samplers; and
- Signature(s) of any individual(s) with control over samples.

Every transfer of custody must be noted and signed for; a copy of this record is kept by each individual who has signed. The original records will accompany the sample shipment with a separate record for each cooler.

Corrections on sample paperwork will be made by drawing a single line through the mistake, initialing and dating the deletion. The correct information will be entered above, below or after the mistake.

9 Quality Assurance and Quality Control (QA/QC)

9.1 Quality Assurance/Quality Control Samples

The QA/QC samples described in the following subsections, which are also listed in Table CP5-1, will be collected during this investigation.

9.1.1 Filter Blanks

A filter blank is an unused filter that is analyzed to determine the background asbestos structure count for the sample medium. The blank is kept with the sample set in the field but is not opened at any time. One filter blank will be submitted to the laboratory with the children's playground scenario samples. The filter blank sample will be identified as a filter blank on the chain-of-custody form.

9.1.2 Field Trip Blanks

A field trip blank is a filter cassette that has been taken to the sampling site, opened, and then closed. Such a filter is analyzed to determine the background asbestos structure count for the measurement. One field trip blank will be generated for the outdoor air sampling at the children's playground. This sample will be sent blind to the laboratory and will not be identified as a field trip blank on the chain-of-custody forms.

9.1.3 Field Duplicates and Co-located Samples

The generation of field duplicate samples is not possible due to the sample collection procedure. For this project, co-located samples will be collected instead (i.e., a sample collected using a sample pump with the intake positioned immediately next to and at the same height as the original sample). The co-located samples are collected to evaluate the reproducibility of sampling and analysis. START data quality guidelines require that at least 10 percent of samples analyzed must be co-located. Co-located samples will be preserved, packaged, and sealed in the same manner as other samples. A separate sample number will be assigned to each co-located sample, and all co-located samples will be submitted blind to the laboratory. If the data quality indicator (DQI) goal for precision is not met for the co-located pairs, the impact on data quality will be evaluated. The rationale for co-located sample locations is indicated in Table CP9-1.

Table CP9-1
Summary of Co-located Sample Location Rationale

Co-Located Sample Location	Rationale
One personal sample pump worn by a sampling team member during each of the playground scenarios.	Objective is to have one co-located sample from each scenario. Actual selected sample pump location is random.

9.1.4 Laboratory QC

Laboratory QC is described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

9.2 Analytical and Data Package Requirements

Analytical and data package requirements are described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

9.3 Data Validation

Data validation is described in the *El Dorado Hills Naturally Occurring Asbestos, Multimedia Exposure Assessment, El Dorado Hills, California, Quality Assurance Project Plan.*

9.4 Field Variances

As conditions in the field may vary, it may become necessary to implement modifications to the proposed sampling as presented in this FSP. When appropriate, the USEPA QA Office will be notified of the modifications and a verbal approval obtained before implementing the modifications. All modifications to the FSP will be with approval of the USEPA Task Monitor. Modifications to the approved FSP will be recorded in site records and reported in the post-sampling report.

Addendum CP-1

Scenario Procedures and Scenario Script Assignments

Addendum CP-2

Equipment List

Addendum CP-3

Field Data Sheets