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

**Fixed Ambient Outdoor Reference
Air Sampling
Field Sampling Plan
WORKING DRAFT**

Contract No.: 68-W-01-012

TDD No.: 09-04-01-0011

Job No.: 001275.0440.01CP

September 2004

**Prepared for:
U.S. Environmental Protection Agency
Region IX**

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Superfund Technical Assessment and Response Team

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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 the collection of fixed ambient outdoor reference air samples from areas primarily outside of the influence of activity-based outdoor air sampling activities. The ambient outdoor reference air sampling will be at the following areas:

- Co-located with a temporary meteorological station positioned in a secure location west of the children's playground at the El Dorado Hills Community Park;
- Around and within the El Dorado Hills Community Park, Silva Valley Elementary School, and Rolling Hills Middle School, and
- Around and within Jackson Elementary School.

The task-specific field sampling information pertaining to ambient outdoor reference air sample collection at these locations 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 fixed ambient outdoor reference air sampling is tentatively scheduled to take place in late September and October 2004. The fixed ambient outdoor reference air sampling will be initiated several days prior to activity-based sampling, will run concurrently with activity-based sampling, and may continue for at least one day after activity-based air sampling is concluded. The duration of the fixed ambient outdoor reference air sampling collection activity is expected to last for up to about three weeks.

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

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

4.1 Fixed Ambient Air Sampling at the Community Park

Several days prior to activity-based air sampling, a meteorological station, a high-volume (i.e., high-flow approximately 10 liters/minute) air sample pump, and a dust monitor will be positioned within an existing small fenced area west of the children's playground at the El Dorado Hills Community Park. The purpose of this sampling is to document for reference use the ambient level of asbestos fibers in outdoor air in the vicinity of the El Dorado Hills Community Park in the days prior to, during, and after the activity-based sampling. The location of this area is shown on Figure FA4-1: Fixed Ambient Outdoor Reference Air Sampling Location Map.

Since the wind direction is known to be variable at the Community Park, the meteorological station will be set up to monitor wind speed, wind direction, humidity, temperature, and other meteorological conditions.

Air samples from this fixed location will be collected on air filters daily over an 8-hour time interval. The time interval will coincide with the anticipated activity-based scenario sampling time period. The air sample pump intakes will be positioned at a height of 3 feet above the ground surface. Total dust concentrations will also be monitored. The dust monitor will be positioned at the same height as the air collection filter cassette.

4.2 Fixed Ambient Air Sampling for Activity-Based Reference Level Determinations

4.2.1 Northern Reference Area Around Jackson Elementary School

Prior to activity-based sampling at Jackson Elementary School, five high-volume air sample pumps will be positioned in the vicinity of the school at five locations not less 300 feet from any planned activity-based sampling area. The purpose of this sampling is to document for reference use the ambient level of asbestos fibers in outdoor air in the vicinity of Jackson Elementary School. The locations will be distributed cross-wind or upwind of Jackson Elementary School. The potential area where these fixed ambient outdoor reference air sample locations are expected to be situated is shown as the Northern Reference Area on Figure FA4-1: Fixed Ambient Outdoor Reference Air Sampling Location Map.

Air samples from these fixed locations will be collected on air filters daily over an 8-hour time interval one day prior to, the day of, and the day after the activity-based sampling is conducted at the school. The time interval will coincide with the anticipated activity-based scenario sampling time period. The air sample pump intakes will be positioned at a height of 3 feet above the ground surface. A dust monitor will be co-located with one of the air sample pumps, and total dust concentrations will be monitored. The dust monitor will be positioned at the same height as the air collection filter cassette.

INSERT Figure FA4-1

4.2.2 Southern Reference Area Around and Within the El Dorado Hills Community Park, Silva Valley Elementary School, and Rolling Hills Middle School

Prior to activity-based sampling at the El Dorado Hills Community Park, Silva Valley Elementary School, and Rolling Hills Middle School, five high-volume air sample pumps will be positioned in the vicinity of the park and schools at five locations not less 300 feet from any planned activity-based sampling area. The purpose of this sampling is to document for reference use the ambient level of asbestos fibers in outdoor air in the vicinity of these areas. The locations will be distributed cross-wind or upwind of the park and the schools. The potential area where these fixed ambient outdoor reference air sample locations are expected to be situated is shown as the Southern Reference Area on Figure FA4-1: Fixed Ambient Outdoor Reference Air Sampling Location Map.

Air samples from these fixed locations will be collected on air filters daily over an 8-hour time interval one day prior to, each day during, and the day after the activity-based sampling is conducted at the Community Park and the southern two schools. The time interval will coincide with the anticipated activity-based scenario sampling time period. The air sample pump intakes will be positioned at a height of 3 feet above the ground surface. A dust monitor will be co-located with one of the air sample pumps, and total dust concentrations will be monitored. The dust monitor will be positioned at the same height as the air collection filter cassette.

4.3 Sampling Sequence

The fixed ambient outdoor reference air sampling within the small fenced area at the El Dorado Hills Community Park will take place for approximately five days prior to all activity-based air sampling, will run concurrent with all activity-based air sampling, and will continue up to three days after all activity-based air sampling has concluded. Air sampling at this location also will coincide with the operation of the temporary meteorological station to be positioned in the same area.

The fixed ambient outdoor reference air sampling for activity-based reference level determinations at Jackson Elementary School will take place for one day prior to, the day of, and one day after the activity-based air sampling is conducted at Jackson Elementary School.

The fixed ambient outdoor reference air sampling for activity-based reference level determinations at the El Dorado Community Park, Silva Valley Elementary School, and Rolling Hills Middle School will take place for one day prior to, the days of, and one day after the activity-based air sampling is conducted at the El Dorado Community Park, Silva Valley Elementary School, and Rolling Hills Middle School.

4.4 Rationale For Sampler and Monitor Locations

Table FA4-1 summarizes the rationale for the inclusion and placement of each sampler location.

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*.

Table FA4-1 Summary of Sampler and Monitor Location Rationale	
Location	Rationale
Meteorological station at the Community Park.	Secure and centrally located area.
Fixed sampler and dust monitor in the vicinity of meteorological station. There will be one co-located stationary sampler during one of the collection days.	Located with the meteorological station. Secure and centrally located area.
Fixed samplers and dust monitor at the Northern Reference Area.	Locations are outside of activity area influence. Establish reference levels for Jackson Elementary School activity-based data. Dust monitor and one random location as a reference.
Fixed samplers and dust monitors at the Southern Reference Area (El Dorado Community Park, Silva Valley Elementary School, and Rolling Hills Middle School).	Locations are outside of activity area influence. Establish reference levels for El Dorado Community Park, Silva Valley Elementary School, and Rolling Hills Middle School activity-based data. Dust monitor and one random location as a reference.

5 Analytical Methods

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

Table FA5-1 summarizes analytical methods and requirements for fixed ambient outdoor reference air sampling at schools and the Community Park. Table FA5-2 contains the detailed sample collection information.

**Table FA5-1
Summary of
Analytical Methods and Requirements**

Method:	ISO 10312, <i>Ambient air-Determination of asbestos fibres–Direct-transfer transmission electron microscopy method</i>
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 High-Volume Field Samples from Fixed Ambient Outdoor Reference Air Samplers	76
Co-located	8
Field Blanks	10
Filter Blanks	5

**Table FA5-2
Request for Analytical Services: Fixed Ambient Outdoor Reference Air Samples
Laboratory Analytical Methods and Requirements**

ANALYSES REQUESTED		
ANALYSIS TYPE	ASBESTOS	
SPECIFIC ANALYSES REQUESTED	<i>ISO 10312-Ambient air–Determination of asbestos fibres–Direct-transfer transmission electron microscopy method</i>	<i>*If Needed* ISO 13794-Ambient air–Determination of asbestos fibres–Indirect-transfer transmission electron microscopy method</i>
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

Ambient Air Sampling Community Park Meteorological Station (Daily)

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
AAMS-D01-(Date)	4,800 liters	Ambient Sample	Met Station Day 1	1
AAMS-D02-(Date)	4,800 liters	Ambient Sample	Met Station Day 2	1
AAMS-D03-(Date)	4,800 liters	Ambient Sample	Met Station Day 3	1
AAMS-1ZB-(Date)	4,800 liters will be indicated	Trip Blank	Met Station Day 3 field trip blank #1	1
AAMS-D04-(Date)	4,800 liters	Ambient Sample	Met Station Day 4	1
AAMS-FB-(Date)	NA	Filter Blank	Met Station Day 4 filter blank	1
AAMS-D05-(Date)	4,800 liters	Ambient Sample	Met Station Day 5	1
AAMS-D06-(Date)	4,800 liters	Ambient Sample	Met Station Day 6	1
AAMS-D07-(Date)	4,800 liters	Ambient Sample	Met Station Day 7	1
AAMS-D107-(Date)	4,800 liters	Co-located with AAMS-D07-(Date)	Met Station Day 7	1
AAMS-D08-(Date)	4,800 liters	Ambient Sample	Met Station Day 8	1
AAMS-D09-(Date)	4,800 liters	Ambient Sample	Met Station Day 9	1
AAMS-D10-(Date)	4,800 liters	Ambient Sample	Met Station Day 10	1
AAMS-D11-(Date)	4,800 liters	Ambient Sample	Met Station Day 11	1
AAMS-D12-(Date)	4,800 liters	Ambient Sample	Met Station Day 12	1
AAMS-D13-(Date)	4,800 liters	Ambient Sample	Met Station Day 13	1
AAMS-D14-(Date)	4,800 liters	Ambient Sample	Met Station Day 14	1
AAMS-D15-(Date)	4,800 liters	Ambient Sample	Met Station Day 15	1
AAMS-D16-(Date)	4,800 liters	Ambient Sample	Met Station Day 16	1
AAMS-D116-(Date)	4,800 liters	Co-located with AAMS-D16-(Date)	Met Station Day 16	1
AAMS-D17-(Date)	4,800 liters	Ambient Sample	Met Station Day 17	1
AAMS-D18-(Date)	4,800 liters	Ambient Sample	Met Station Day 18	1
AAMS-D19-(Date)	4,800 liters	Ambient Sample	Met Station Day 19	1
AAMS-D20-(Date)	4,800 liters	Ambient Sample	Met Station Day 20	1
AAMS-D21-(Date)	4,800 liters	Ambient Sample	Met Station Day 21	1
AAMS-1ZB-(Date)	4,800 liters will be indicated	Trip Blank	Met Station Day 21 field trip blank #2	1
Total number of ambient air samples may vary depending upon the actual duration of activity-based sampling.				

Northern Reference Area (Around Jackson Elementary School) Reference Sampling

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY PRIOR TO ACTIVITY-BASED SAMPLING AT JACKSON ELEMENTARY SCHOOL				
NRA-1ZB-(Date)	4,800 liters will be indicated	Trip Blank	Pre-scenario Northern Reference Area field trip blank #1	1
NRA-R01-(Date)	4,800 liters	Sample	Pre-scenario Northern Reference Area Reference #1	1
NRA-R02-(Date)	4,800 liters	Sample	Pre-scenario Northern Reference Area Reference #2	1
NRA-R03-(Date)	4,800 liters	Sample	Pre-scenario Northern Reference Area Reference #3	1
NRA-R04-(Date)	4,800 liters	Sample	Pre-scenario Northern Reference Area Reference #4	1
NRA-R05-(Date)	4,800 liters	Sample	Pre-scenario Northern Reference Area Reference #5	1
NRA-2ZB-(Date)	4,800 liters will be indicated	Trip Blank	Pre-scenario Northern Reference Area field trip blank #2	1
NRA-FB-(Date)	NA	Filter Blank	Pre-scenario Northern Reference Area filter blank	1

**Northern Reference Area
(Around Jackson Elementary School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DURING ACTIVITY-BASED SAMPLING AT JACKSON ELEMENTARY SCHOOL				
NRA-R01-(Date)	4,800 liters	Sample	Scenario Day Northern Reference Area Reference #1	1
NRA-R101-(Date)	4,800 liters	Co-located with NRA-R01-(Date)	Scenario Day Northern Reference Area co-located Reference #1	1
NRA-R02-(Date)	4,800 liters	Sample	Scenario Day Northern Reference Area Reference #2	1
NRA-R03-(Date)	4,800 liters	Sample	Scenario Day Northern Reference Area Reference #3	1
NRA-R04-(Date)	4,800 liters	Sample	Scenario Day Northern Reference Area Reference #4	1
NRA-R05-(Date)	4,800 liters	Sample	Scenario Day Northern Reference Area Reference #5	1

**Northern Reference Area
(Around Jackson Elementary School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY AFTER ACTIVITY-BASED SAMPLING AT JACKSON ELEMENTARY SCHOOL				
NRA-1ZB-(Date)	4,800 liters will be indicated	Trip Blank	Post-scenario Northern Reference Area field trip blank #1	1
NRA-R01-(Date)	4,800 liters	Sample	Post-scenario Northern Reference Area Reference #1	1
NRA-R02-(Date)	4,800 liters	Sample	Post-scenario Northern Reference Area Reference #2	1
NRA-R03-(Date)	4,800 liters	Sample	Post-scenario Northern Reference Area Reference #3	1
NRA-R103-(Date)	4,800 liters	Co-located with NRA-R03-(Date)	Post-scenario Northern Reference Area co-located Reference #3	1
NRA-R04-(Date)	4,800 liters	Sample	Post-scenario Northern Reference Area Reference #4	1
NRA-R05-(Date)	4,800 liters	Sample	Post-scenario Northern Reference Area Reference #5	1
NRA-2ZB-(Date)	4,800 liters will be indicated	Trip Blank	Post-scenario Northern Reference Area field trip blank #2	1
NRA-FB-(Date)	NA	Filter Blank	Post-scenario Northern Reference Area filter blank	1

**Southern Reference Area
(El Dorado Community Park, Silva Valley
Elementary School, and Rolling Hills Middle School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY PRIOR TO ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-1ZB-(Date)	4,800 liters will be indicated	Trip Blank	Pre-scenario Southern Reference Area field trip blank #1	1
SRA-R01-(Date)	4,800 liters	Sample	Pre-scenario Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Pre-scenario Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Pre-scenario Southern Reference Area Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Pre-scenario Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Pre-scenario Southern Reference Area Reference #5	1
SRA-2ZB-(Date)	4,800 liters will be indicated	Trip Blank	Pre-scenario Southern Reference Area field trip blank #2	1
SRA-FB-(Date)	NA	Filter Blank	Pre-scenario Southern Reference Area filter blank	1

**Southern Reference Area
(El Dorado Community Park, Silva Valley
Elementary School, and Rolling Hills Middle School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY 1 OF ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-R01-(Date)	4,800 liters	Sample	Scenario Day 1 Southern Reference Area Reference #1	1
SRA-R101-(Date)	4,800 liters	Co-located with SRA-R01-(Date)	Scenario Day 1 Southern Reference Area co-located Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Scenario Day 1 Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Scenario Day 1 Southern Reference Area Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Scenario Day 1 Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Scenario Day 1 Southern Reference Area Reference #5	1
DAY 2 OF ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-R01-(Date)	4,800 liters	Sample	Scenario Day 2 Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Scenario Day 2 Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Scenario Day 2 Southern Reference Area Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Scenario Day 2 Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Scenario Day 2 Southern Reference Area Reference #5	1

**Southern Reference Area
(El Dorado Community Park, Silva Valley
Elementary School, and Rolling Hills Middle School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY 3 OF ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-R01-(Date)	4,800 liters	Sample	Scenario Day 3 Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Scenario Day 3 Southern Reference Area Reference #2	1
SRA-R102-(Date)	4,800 liters	Co-located with SRA-R02-(Date)	Scenario Day 3 Southern Reference Area co-located Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Scenario Day 3 Southern Reference Area Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Scenario Day 3 Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Scenario Day 3 Southern Reference Area Reference #5	1
DAY 4 OF ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-R01-(Date)	4,800 liters	Sample	Scenario Day 4 Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Scenario Day 4 Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Scenario Day 4 Southern Reference Area Reference #3	1
SRA-R103-(Date)	4,800 liters	Co-located with SRA-R03-(Date)	Scenario Day 4 Southern Reference Area co-located Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Scenario Day 4 Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Scenario Day 4 Southern Reference Area Reference #5	1

**Southern Reference Area
(El Dorado Community Park, Silva Valley
Elementary School, and Rolling Hills Middle School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY 5 OF ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-R01-(Date)	4,800 liters	Sample	Scenario Day 5 Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Scenario Day 5 Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Scenario Day 5 Southern Reference Area Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Scenario Day 5 Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Scenario Day 5 Southern Reference Area Reference #5	1
DAY 6 OF ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-R01-(Date)	4,800 liters	Sample	Scenario Day 6 Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Scenario Day 6 Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Scenario Day 6 Southern Reference Area Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Scenario Day 6 Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Scenario Day 6 Southern Reference Area Reference #5	1

**Southern Reference Area
(El Dorado Community Park, Silva Valley
Elementary School, and Rolling Hills Middle School)
Reference Sampling**

Sample Number	Estimated Collection Volume	Special Designation	Location	Samples
DAY AFTER ACTIVITY-BASED SAMPLING AT SOUTHERN AREA				
SRA-1ZB-(Date)	4,800 liters will be indicated	Trip Blank	Post-scenario Southern Reference Area field trip blank #1	1
SRA-R01-(Date)	4,800 liters	Sample	Post-scenario Southern Reference Area Reference #1	1
SRA-R02-(Date)	4,800 liters	Sample	Post-scenario Southern Reference Area Reference #2	1
SRA-R03-(Date)	4,800 liters	Sample	Post-scenario Southern Reference Area Reference #3	1
SRA-R103-(Date)	4,800 liters	Co-located with SRA-R03-(Date)	Post-scenario Southern Reference Area co-located Reference #3	1
SRA-R04-(Date)	4,800 liters	Sample	Post-scenario Southern Reference Area Reference #4	1
SRA-R05-(Date)	4,800 liters	Sample	Post-scenario Southern Reference Area Reference #5	1
SRA-2ZB-(Date)	4,800 liters will be indicated	Trip Blank	Post-scenario Southern Reference Area field trip blank #2	1
SRA-FB-(Date)	NA	Filter Blank	Post-scenario Southern Reference Area filter blank	1

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:

<u>Parameter:</u>	Video Exposure Monitoring Camera	
<u>Matrix:</u>	Air	
<u>Equipment</u>	<u>Fabrication</u>	<u>Dedicated</u>
Video Camera	Various	No

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

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

<u>Parameter:</u>	Sampling of Air for Dust and Determination of Asbestos Fibers	
<u>Matrix:</u>	Air	
<u>Equipment</u>	<u>Fabrication</u>	<u>Dedicated</u>
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

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

A comprehensive list of additional field equipment required to support the data collection activities is located in Addendum FA-1.

The planned equipment is in accordance with the USEPA Environmental Response Team (ERT) SOP 2015 *Asbestos Sampling* and sampling guidelines 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 site 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 high-volume 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 high-volume sample pump will be operated at approximately 10 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 FA-2). Calibration SOPs are included in Appendix D of the QAPP.

6.5 Decontamination Procedures

Non-dedicated sampling equipment (e.g., sample pumps, dust monitors) will be wiped down with decontamination wipes or other wetted disposable media (baby wipes) after every sampling day. 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.

6.6 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, fixed ambient outdoor reference air sampling will be conducted in Level D.

6.7 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 taken to 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

Unique sample numbers will be assigned to each sample as it is collected. Each sample will have a prefix, a middle term, and a final suffix. The final suffix will be the date in six digits (e.g., May 19, 2004, is "051904"). The prefixes are as follows:

"AAMS" Samples collected at the Community Park meteorological station.
 "NRA" Samples collected from reference samplers at the Northern Reference Area.
 "SRA" Samples collected from reference samplers at the Southern Reference Area.

The middle of the sample name will consist of a hyphen then number identifying the sample collection sequence. For the sample from the Community Park meteorological station, the middle identifiers are shown in Table FA8-1. For the samples from the northern and southern reference areas, the middle identifiers are shown in Table FA8-2.

Table FA8-1: Sample Name Middle Terms			
REFERENCE SAMPLER AT COMMUNITY PARK METEOROLOGICAL STATION			
IDENTIFIER TERM	COLLECTION DAY	IDENTIFIER TERM	COLLECTION DAY
D01	Day #1	D02	Day #2
D03	Day #3	D04	Day #4
D05	Day #5	D06	Day #6
D07	Day #7	D08	Day #8
D09	Day #9	D10	Day #10
D11	Day #11	D12	Day #12
D13	Day #13	D14	Day #14
D15	Day #15	D16	Day #16
D17	Day #17	D18	Day #18
D19	Day #19	D20	Day #20
D21	Day #21	D22	Day #22

**Table FA8-2: Sample Name Middle Terms
REFERENCE SAMPLERS AT REFERENCE AREAS**

IDENTIFIER TERM	LOCATION
R01	High-Volume sampler at Location #1
R02	High-Volume sampler at Location #2
R03	High-Volume sampler at Location #3
R04	High-Volume sampler at Location #4
R04	High-Volume sampler at Location #5

Co-located samples will have the number “1” after the letter “D” or “R” in the middle term. For example, the co-located sample of sample NRA-R01-061704 would be NRA-R101-061704. Blank samples will have a middle term of “1ZB” for the first field trip blank on a given day and the middle term of “2ZB” for the second field trip blank on a given day. The middle term “FB” will be used for filter blanks. The middle term of “1ZP” will be used for performance evaluation samples.

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 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 FA5-1, 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. For samples collected at Community Park meteorological station, a filter blank will be stored and submitted for analysis with the samples. For samples collected at the Northern Reference Area on non-scenario activity days, one filter blank will be submitted for each day of sampling. For samples collected at the Southern Reference Area on non-scenario activity days, one filter blank will be submitted for each day of sampling. For reference samples collected on scenario activity days, filter blanks are not needed because filter blanks will be collected as part of the activity-based sampling. Each 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. For samples collected at the Community Park meteorological station, two field trip blanks will be submitted for analysis with the samples. One field trip blank will be from pre-scenario sampling, and the second will be from post-scenario sampling. For samples collected at the Northern Reference Area on non-scenario activity days, two field trip blanks will be submitted for each day of sampling. For samples collected at the Southern Reference Area on non-scenario activity days, two field trip blanks will be submitted for each day of sampling. For reference samples collected on scenario activity days, field trip blanks are not needed because field trip blanks will be collected as part of the activity-based sampling. These samples will be sent blind to the laboratory and will not be identified as a field trip blanks 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 FA9-1.

Table FA9-1 Summary of Co-located Sample Location Rationale	
Co-Located Sampler Location	Rationale
Fixed ambient outdoor reference air sampler at Community Park meteorological station.	Days for co-located sampling was selected at random.
Air samplers at reference areas.	Locations for co-located sampling was selected at random

9.1.4 Laboratory QC Samples

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 FA-1

Equipment List

Addendum FA-2

Field Data Sheets