DRAFT FINAL

REMEDIAL INVESTIGATION REPORT
ADDENDUM FOR CALENDAR YEAR 2011

OPERABLE UNIT 7 OF THE LIBBY ASBESTOS SUPERFUND SITE

July 2013

Prepared for:

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
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REVIEWS AND APPROVALS

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ACRONYMS AND ABBREVIATIONS

AAS	Outdoor ambient air study
ABS	Activity-based sampling
AD	Address
AHERA	Asbestos Hazard Emergency Response Act
CDM	Camp, Dresser, and McKee
CIC	Community Involvement Coordinator
CFR	*Code of Federal Regulations*
COC	Chain of custody
CUA	Common use area
DEQ	Montana Department of Environmental Quality
DQO	Data quality objective
EDD	Electronic data deliverable
EPA	U.S. Environmental Protection Agency
ERS	Environmental resource specialist
ESAT	Environmental Services Assistance Team
FS	Feasibility study
FSDS	Field sample data sheet
GPS	Global positioning system
HHRA	Human health risk assessment
IDW	Investigation-derived waste
ISO	International Organization for Standardization
LA	Libby amphibole
LUA	Limited use area
mph	Miles per hour
ND	Not detected
NIOSH	National Institute for Occupational Safety and Health
NUA	Non-use area
OU/OU7	Operable unit/Operable Unit 7 of the Libby Asbestos Superfund Site
PCC	Project completion checklist
PDA	Personal digital assistant
PDF	Portable digital format
PLM	Polarized light microscopy
PLM-VE	Polarized light microscopy – visual estimation
PRI	Project Resources, Inc.
QA	Quality assurance
QC	Quality control
RAWP	Response action work plan
RDI	Removal design investigation
RI	Remedial investigation
RPD	Relative percent difference

ACRONYMS AND ABBREVIATIONS (CONTINUED)

s/cm^2	Structures per square centimeter
s/cc	Structures per cubic centimeter
SAP	Sampling and analysis plan
SOP	Standard operating procedure
SRC	Syracuse Research Corporation
SUA	Specific use area
TAAD	Troy Ambient Air Database
TAPE	Troy Asbestos Property Evaluation
Tetra Tech	Tetra Tech EM Inc.
TEM	Transmission electron microscopy
TFO	Troy field office
TOAD	Troy Owner Access Database
TPIC	Third-party independent contractor
UA	Use area
USACE	U.S. Army Corps of Engineers
VCI	Vermiculite-containing insulation
VV	Visible vermiculite
VWC	Volumetric water content

1.0 INTRODUCTION

Tetra Tech EM Inc. (Tetra Tech) was tasked by the Montana Department of Environmental Quality (DEQ) under DEQ Contract No. 407026, Task Order No. 101, to prepare an addendum to the *Draft Final Remedial Investigation Report for Operable Unit 7 of the Libby Asbestos Superfund Site* (Tetra Tech 2010e) for calendar year 2011. The U.S. Environmental Protection Agency (EPA) is the lead agency for the Libby Asbestos Superfund Site, and the DEQ is the lead agency for Operable Unit 7 (OU7) through a cooperative agreement with EPA. This remedial investigation (RI) report addendum summarizes activities and findings conducted pursuant to the Troy Asbestos Property Evaluation (TAPE) work plan (Tetra Tech 2007), the Outdoor Ambient Air Study (AAS) work plan (Tetra Tech 2009b), the Removal Design Investigation (RDI) sampling and analysis plan (SAP) (Tetra Tech 2010b), and the Activity-Based Sampling (ABS) SAP (Tetra Tech 2011c) for calendar year 2011.

These investigations were undertaken to assess the nature and extent of Libby Amphibole (LA) asbestos contamination within OU7. Data from these investigations will be used in the preparation of a human health risk assessment (HHRA), feasibility study (FS), remedy selection, and the eventual remediation of OU7. Tetra Tech is the contractor for the DEQ and has assisted with all OU7 investigations to date.

1.1 REMEDIAL INVESTIGATION REPORT ADDENDUM PURPOSE AND OBJECTIVES

The purpose of this RI report addendum is to summarize, consistent with the *Draft Final Remedial Investigation Report for Operable Unit 7 of the Libby Asbestos Superfund Site* (draft final RI report)(Tetra Tech 2010e), OU7 investigation activities and results for calendar year 2011. Descriptions of TAPE, RDI, AAS, and ABS field methods, sampling activities, quality control (QC) samples, and deviations from the respective work plans are provided herein. In addition, this RI report addendum summarizes the OU7 removal actions that occurred in 2011. All TAPE, RDI, AAS, and ABS investigations in 2011 were completed in support of the primary RI objectives for OU7, which are described in the draft final RI report (Tetra Tech 2010e).

This RI report addendum serves as an update to the draft final RI report (Tetra Tech 2010e). Future addenda will be prepared annually as additional investigation data are obtained, removal activities are performed, EPA residential and commercial removal action levels and clearance criteria are amended, and an HHRA is completed. An HHRA was not completed as part of the draft final RI report because the toxicity of LA asbestos was still under investigation and because data for the residential indoor air pathway for OU7 was needed. An HHRA will be included in the appropriate annual addendum to the RI

report once these data are available. The draft final and annual addenda to the RI report will eventually be combined with the risk assessment to form a final RI report for OU7.

The EPA removal action levels and clearance criteria are outlined in a document titled *Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum* (EPA 2003), which is provided as an attachment to this report, and provides guidance for identifying properties within the Libby Asbestos Superfund Site that require (or are eligible for) a removal action. In addition to the EPA removal action criteria, the DEQ also evaluates OU7 properties for removal action using other lines of evidence to determine if removal is warranted. Alterations to EPA action levels and clearance criteria may influence ongoing TAPE, RDI, AAS, and ABS sampling requirements and protocols, and could affect the number of properties requiring removal actions. Also, the results of additional TAPE investigations may impact the delineation of LA asbestos contamination within OU7.

1.2 REPORT ORGANIZATION

This RI report addendum is organized into six sections of text, which are followed by a list of references, figures, appendices, and attachments. Tables appear within the text. The contents of Sections 1.0 through 6.0 are briefly described below.

Section 1.0 – Introduction: describes the report purpose, objectives, and organization.

Section 2.0 – 2011 TAPE and RDI Activities: provides an update for calendar year 2011 to TAPE investigative objectives and procedures, field methods and activities, data management, deviations from the TAPE work plan (Tetra Tech 2007), and analytical methods; assesses TAPE data quality and describes RDI procedures.

Section 3.0 – 2011 AAS Activities: provides an update for year 2011 to AAS investigative objectives and procedures, field methods and activities, data management, quality assurance (QA) and QC methods and samples, management of investigation-derived waste (IDW), opportunistic sampling, deviations from the AAS work plan (Tetra Tech 2009b), and analytical methods. It also assesses AAS data quality.

Section 4.0 – 2011 Outdoor ABS Activities: describes investigative objectives and procedures, field methods and activities, data management, QA and QC methods and samples, management of IDW, opportunistic sampling, deviations from the ABS SAP (Tetra Tech 2011c), and analytical methods. It also assesses ABS data quality.

Section 5.0 – Field Results and Nature and Extent of Contamination: summarizes current understanding of the nature and extent of contamination based on field observations and data gathered during the TAPE, RDI, AAS, and ABS investigations in calendar year 2011. This section also discusses removal actions in OU7 during 2011.

Section 6.0 – Summary and Recommendations: presents conclusions and recommendations based on this 2011 addendum to the draft final RI report.

Background information on OU7 of the Libby Asbestos Superfund Site and LA asbestos appears in Sections 1.3 through 3.0 and on Figures 1-1 through 1-3 of the 2010 draft final RI report (Tetra Tech 2010e) and is, therefore, not repeated in this addendum. In addition, EPA removal action criteria (EPA 2003) are explained in Section 3.4 of the draft final RI report (Tetra Tech 2010e) and summarized in the attachment to this RI report addendum.

2.0 TROY ASBESTOS PROPERTY EVALUATION AND REMEDIAL DESIGN INVESTIGATION ACTIVITIES

This section describes the objectives, methods, and procedures utilized during TAPEs and RDIs in 2011. The information in this section serves as an update to Section 4.0 of the draft final RI report (Tetra Tech 2010e). For additional details on TAPE procedures, refer to the 2010 draft final RI report (Tetra Tech 2010e) or the *Final TAPE Work Plan (Field Sampling Plan and Quality Assurance Project Plan) for the Troy OU7 of the Libby Asbestos Superfund Site* (Tetra Tech 2007). For additional details on RDI procedures, refer to the *Removal Design Investigation SAP for OU7 of the Libby Asbestos Site* (Tetra Tech 2010b).

2.1 TAPE OBJECTIVES AND FIELD INVESTIGATION METHODS

Previous investigations in Libby, Montana revealed that LA asbestos was present in multiple environmental media including indoor air, outdoor ambient air, attic insulation, and soil. Because of the proximity of Libby and Troy and the historical connection the towns share, it was determined that the magnitude of LA asbestos and potential exposure of Troy residents to this were unknown, and that additional data would be needed to determine the nature and extent of LA asbestos to support removal action decisions. In response to this decision, the TAPE data acquisition process was formulated, and TAPE DQOs were established to ensure acquisition of adequate data and under appropriate conditions.

Two of the primary objectives of the TAPEs were to determine eligibility of properties for removal actions and to obtain sufficient information to evaluate the properties if the eligibility criteria should change. These criteria are described in Section 3.4 of draft final RI report (Tetra Tech 2010e) and in the *Draft Final Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum* (EPA 2003), which is attached to this report. The following subsections outline general protocols of TAPE inspections in 2011.

Figure 2-1 shows all properties that have undergone a TAPE since project inception and through December 31, 2011.

2.1.1 Site Access

A signed access agreement is required before a TAPE inspection occurs on a property. Unlike the 2007 through 2009 field seasons, a bulk access agreement mailing was not performed in 2011. The majority of properties within OU7 had undergone a TAPE inspection between 2007 and 2009, and given the publicity of TAPE inspections during that time, it was reasoned that property owners would request an

inspection in 2011 if they were interested. Interested property owners would contact the Community Involvement Coordinator (CIC) at the DEQ Troy Information Center to acquire an access agreement. Once a signed access agreement had been received, the CIC contacted the property owner to schedule a TAPE inspection and sampling visit.

2.1.2 Community Engagement

The community relations program for OU7 was developed prior to the start of the initial field season in 2007 and continues currently. Prior to each field season, the DEQ mails a public meeting announcement postcard to individual property owners, citizens groups, and city and county officials to announce the date and the content of the meeting. The meeting offers the public a summary of field activities to occur during the ensuing summer, as well as an opportunity to question both EPA and DEQ about activities within OU7. The Troy public meeting for 2011 was held on May 17, 2011.

2.1.3 Interior Inspection and Sampling

Each land parcel within OU7 is identified by a unique two-letter, six-digit address (AD) number for tracking purposes. At the property inspected, the TAPE field team records all field data using the assigned AD number. The TAPE investigation commences with a verbal interview with the property owner or resident that addresses all primary and secondary buildings and exterior use areas (UA) on the property. Each building on the property is assigned a unique building identification number (BD-2XXXXX) for tracking purposes. The attic of each building is accessed and inspected by the field team for presence of vermiculite insulation and/or other visible vermiculite (VV). The field team also inspects additional areas where vermiculite insulation may be exposed in living spaces (e.g., crawlspaces, closets, wall openings). Wall openings are inspected only if the cavity is open, sharing a common air space with the living spaces, and visible to the field team while inspecting interior living spaces. The visual inspection includes checking for vermiculite insulation under other types of attic insulation (such as blown-in or fiberglass insulation). If minor damage in the home could cause exposure of the residents to vermiculite, the field team may install temporary barriers (caulking cracks, taping over openings) to prevent additional vermiculite from entering the living space. Habitable buildings with more extensive damage and greater potential exposure are addressed in a separate response, referred to as an Environmental Resource Specialist (ERS) response. Details on ERS activities are in Section 5.1.5. Soil samples are collected from all accessible soil surfaces inside buildings, such as garages, pump houses, sheds, basements, and crawlspaces. Soil is sampled from interior surfaces regardless of the results of

the visual inspection. TAPE interior surface soil samples are collected as 30-point composites, with each aliquot collected from 0 to 3 inches in depth. Variations to this sampling protocol are documented in all cases and are limited to factors such as limited volume or square footage, limited access to the interior area, or inability to sample at the specified depth.

2.1.4 Exterior Inspection and Sampling

All areas of OU7 properties not covered with buildings are inspected for vermiculite in soil and surface materials. These exterior areas are grouped into four general types: (1) specific use areas (SUA) (e.g., gardens, flowerbeds, etc.), (2) common use areas (CUA) (e.g., yards), (3) limited use areas (LUA) (e.g., maintained fields, overgrown areas, etc.), and (4) non-use areas (NUA) (wood areas, unmaintained fields, etc.). A unique UA identification number (UA-2XXXXX) is assigned to each exterior UA delineated and inspected. For the TAPE, visual point inspections correlate approximately with soil sample aliquot locations. A minimum of 5 and a maximum of 30 visual point inspections occur per UA. After the visual inspection of the property, the TAPE field team collects a 30-point composite soil sample from each exterior UA. Each composite is collected from either a depth of 0 to 3 inches for CUAs and LUAs or from a depth of 0 to 6 inches for SUAs. No soil samples are collected from non-soil-covered areas such as parking lots or other outdoor paved areas. Each aliquot is examined for presence of VV. The amount of VV is categorized as none, low, intermediate, or high, and described as expanded or unexpanded.

2.1.5 Quality Control Samples

Field QC samples are collected as part of the TAPE investigation to satisfy DQOs. The basis for TAPE QC sampling (type, frequency, etc.) for the Libby Asbestos Superfund Site is outlined in the *Draft Quality Assurance Project Plan* (Camp, Dresser, and McKee [CDM] 2007-Smith). All field QC samples collected during the TAPE are submitted to the laboratory as “blind” samples (not identified as QC samples).

Soil field duplicate samples are collected at a frequency of one sample per 20 composite soil samples or a rate of 5 percent. Field duplicate samples are collected as samples co-located in the same exterior UA (yard or landscaped area, for example) and contain the same number of sample aliquots, but are collected from adjacent aliquot locations.

Equipment rinsate blanks were not collected in 2011 because limits of detection for LA asbestos using Polarized Light Microscopy (PLM) are not low enough to capture concentrations expected in equipment

rinsate blanks, and because the frequency of LA asbestos detections has been extremely low in rinsate blanks previously collected from sampling equipment at OU7.

2.1.6 Field Documentation

The primary tool for field documentation of TAPE inspection information is the Trimble GeoXT Personal Digital Assistant (PDA). In addition to the PDA, the field teams also record information in field logbooks, on property sketches, in field forms, and on photographs. All TAPE data—including answers during property owner interviews, results of the visual inspection at the property, and sample collection data—are entered into the PDA. Use of the PDA also allows for compilation of TAPE data into the OU7 Scribe database. Any additional information not recorded on the PDA field forms is recorded in the logbooks. The field logbook serves as an independent (backup) record of all activities and samples collected at a property, in the event that the PDA data become lost or corrupted. TAPE inspection information is also recorded on individual field sketches. The field sketch shows the property boundary, building locations, exterior UAs, fences, pavement, large trees, locations of VV (if found), and other major identifiable features of the property. Each TAPE field team is also provided with a digital camera for photo-documenting primary characteristics of inspected parcels. The field teams take photographs of the primary and secondary buildings, attic insulation, any vermiculite insulation or VV discovered on the premises; UAs; and any other notable features.

2.1.7 Decontamination and Investigation-Derived Waste Handling

Reusable stainless steel scoops, bowls, and augers are used for soil sampling and undergo a decontamination process after collection of each soil sample. Decontamination occurs at the location where the soil sample is collected and includes spraying the equipment with distilled water and drying it with paper towels. The water is allowed to fall on the ground surface within the area just sampled, and the paper towels are placed in a labeled asbestos waste bag. Field team members must wear nitrile gloves during dust and soil sampling. Any visible soil on hands or clothing is removed by washing with soap and water. IDW includes used wet wipes, wet paper towels, disposable gloves, used respirator cartridges, used plastic tubing, disposable protective outerwear, plastic floor coverings, and other minimal waste. All IDW is double-bagged in appropriate asbestos bags, labeled with asbestos labels, and stored in an approved containment area at the Tetra Tech Troy field office—to be transferred subsequently to an approved landfill (Lincoln County, outside of Libby) for final disposal.

2.1.8 Record Keeping and Sample Management

At the end of each field day, the TAPE field teams return to the field office to download the PDA and cameras, catalog and store all environmental and QC samples, and turn in the appropriate logbook and paperwork to the Tetra Tech Sample Coordinator. Once inspection data on the PDA is reviewed for accuracy and imported into the OU7 Scribe database, the Tetra Tech Sample Database Coordinator creates chain-of-custody (COC) forms for all of the samples collected. The field team confirms that each COC matches the samples in the numbered storage bin, signs the COC, and places it in the corresponding bin. The Tetra Tech Sample Coordinator stores the samples in a secure area until the samples are transferred to the appropriate laboratories.

2.2 TAPE SAMPLE ANALYSIS

Soil samples are analyzed using Polarized Light Microscopy – Visual Estimation (PLM-VE). Sample preparation proceeds in basic accordance with project-specific standard operating procedure (SOP) ISSI-LIBBY-01 (Revision 10), *Soil Sample Preparation* (Syracuse Research Corporation [SRC] 2007), and sample analysis proceeds in basic accordance with project-specific SOP SRC-LIBBY-03 (Revision 2), *Analysis of Asbestos Fibers in Soil by Polarized Light Microscopy* (SRC 2008). The coarse fraction of each TAPE soil sample is archived.

2.3 TAPE DATA MANAGEMENT

The only change to management of TAPE parcel, field, or electronic data in 2011 was compliance of electronic data entry into the OU7 Scribe database with EPA reporting requirements specified in the EPA Data Management Plan (EPA 2010). A complete description of data management practices for TAPE investigations is in the *Final TAPE Work Plan (Field Sampling Plan and Quality Assurance Project Plan) for the Troy OU7 of the Libby Asbestos Superfund Site* (Tetra Tech 2007) and in the *Data Management Plan Version 3.0* (Tetra Tech 2009a).

2.4 TAPE DATA QUALITY ASSESSMENT

Tetra Tech assesses the quality of both field and laboratory data generated during the TAPE to ascertain whether these data satisfy project DQOs specified in the final TAPE work plan (Tetra Tech 2007). The TAPE field data verification process is summarized in Section 2.4.1, and the TAPE laboratory data verification process is summarized in Section 2.4.2. A statement of data quality is provided in Section 2.4.3.

2.4.1 Field Data Verification

Tetra Tech verified the accuracy and completeness of TAPE field documentation obtained and recorded during the 2011 field season in accordance with the procedures outlined in the Data Management Plan Version 3.0 (Tetra Tech 2009a) and the draft final RI report (Tetra Tech 2010e). Field data were examined using the Category 1 and Category 2 verification tiers as described in the aforementioned reports.

Category 1 verification occurs to identify inconsistencies within the OU7 Scribe database. It was conducted on 100 percent of the data in the OU7 Scribe database generated during 2011. Global queries occur sequentially to eliminate broader based discrepancies first. Example global query topics include: (1) identification of blank fields, (2) identification of missing sample numbers or UA numbers, and (3) identification of obvious errors, such as the square footage of a primary residence listed as 50 square feet. After completion of global queries and resolution of any issues, relational queries occur. Relational queries also occur on 100 percent of the data in the OU7 Scribe database generated during each field season. Similar to the global query process, relational queries are completed sequentially, with discrepancies resolved before proceeding to subsequent queries.

Category 2 verification is to identify errors in the written documentation (e.g., logbook entries and sketches), as well as inconsistencies between the OU7 Scribe database and written documentation. Category 2 verification was performed on 10 percent of field forms, logbooks, and photo documentation for the 2011 TAPE field season.

2.4.2 Analytical Data Verification

Tetra Tech is in the process of verifying the accuracy and completeness of 10 percent of the TAPE analytical results generated during the 2011 field season in accordance with procedures in project-specific SOP EPA-LIBBY-09, Revision 2, *Standard Operating Procedure for PLM Data Review and Data Entry Verification.* Analytical data are received from the laboratory in two formats: (1) sample receipt documentation and laboratory bench sheets in Portable Digital Format (PDF) and (2) electronic data deliverables (EDD) in Excel spreadsheet format. Once the analytical results are received from the laboratory, the electronic data are imported into the OU7 Scribe database. This allows linkage of the field data to analytical results. The analytical data subsequently undergo a three-step verification process to identify and correct any inconsistencies among the laboratory bench sheets, EDDs, and the

final OU7 Scribe database—and to verify consistency of laboratory procedures with analytical method requirements, and consistency between laboratories and analysts.

2.4.3 Statement on Data Quality

One of the primary objectives of the TAPE is to identify parcels in OU7 that meet the removal criteria specified by the EPA (EPA 2003) in the attachment to this report. This objective was met in 2011 through visual inspections for vermiculite and collection and analysis of interior and exterior soil samples. These samples were analyzed at analytical sensitivities sufficient to identify LA asbestos above the EPA removal action levels (EPA 2003). In addition, TAPE field and analytical data were verified by the processes described above to ensure accuracy and reliability. As a result, 2011 TAPE data met the TAPE DQOs and were sufficient to determine whether or not inspected properties required additional investigation through the RDI process and/or subsequent removal action if necessary.

2.5 REMEDIAL DESIGN INVESTIGATIONS

RDIs are conducted at properties where the results of a TAPE inspection reveal that the parcel meets one or more EPA removal action criteria. The primary objective of an RDI is to support the removal objective of the TAPE and obtain the additional data necessary to design removal activities at properties identified for a removal action. No RDIs were conducted in 2011.

RDI field methods are briefly described below; a thorough description of the RDI process is in the *RDI SAP for OU7 of the Libby Asbestos Site* (Tetra Tech 2010b). The RDI SAP also outlines the DQOs for RDIs.

Tetra Tech conducts the exterior portion of the RDI inspections, and a contractor to the U.S. Army Corps of Engineers (USACE) performs the interior portion of the RDI inspections.

For the exterior RDI process, Tetra Tech reviews field and analytical inspection data before providing results of the RDI to the USACE contractor responsible for preparing design drawings and performing removal activities. Once design drawings are prepared, Tetra Tech again reviews the RDI results to ensure the removal is based on accurate information. Removal activities then commence and are performed by the USACE contractor.

For the interior RDI process, Tetra Tech provides the USACE removal contractor with a summary document outlining TAPE findings and listing known vermiculite in buildings, attics, crawl spaces, living

spaces, and outbuildings. Additionally, the removal contractor receives the property access agreements, removal registry agreement, the TAPE field sketches, photos, logbook notes, and property reports.

The removal contractor is also given a building drawing provided by another USACE contractor, which outlines the interior removal scope of work. The removal contractor's supervisor completes a building walkthrough inspection prior to the project to verify accuracy of the TAPE findings. An additional interior inspection is completed by the removal contractor's supervisor during the removal process to document any containment breaches or vermiculite containing insulation (VCI) leaking from the removal areas. The removal contractor's supervisor completes a final walkthrough of the building to document completion of the removal process.

2.6 DEVIATIONS FROM THE TAPE WORK PLAN

Procedures were continually monitored to ensure that the objectives of the TAPE work plan (Tetra Tech 2007) were accomplished. Modifications to the procedures described in this document were occasionally necessary to fulfill project objectives or to accommodate changes to project objectives. This section summarizes deviations from the TAPE work plan (Tetra Tech 2007) as these relate to 2011 TAPEs.

Routine modifications (e.g., field team could not reach required depth of soil sample) were recorded in the field forms and on the PDA. All minor handwritten entry errors in the logbook or property sketch were corrected by utilizing a single strikeout through the information to be changed, initials of the field staff member recording the modification were provided, and the date of documentation changes were noted. The corrected information was entered in close proximity to the erroneous entry where possible. Errors encountered after the document had been scanned were corrected via electronic comments attached to the PDF file using Adobe Acrobat. Additional deviations during calendar year 2011 are as follows:

- Many properties that underwent TAPE inspections are outside the OU7 boundary. These out-of-study area properties were included in the TAPE program on a case-by-case basis and under consultation with DEQ.
- No dust samples were collected in 2011. Dust sampling was curtailed after the 2008 field season because it did not contribute significantly to the removal action decision-making process.
- No equipment rinsate blanks were collected in 2011 because the limits of detection for LA asbestos using PLM are not low enough to capture concentrations expected in equipment

rinsate blanks, and because the frequency of LA asbestos detections has been extremely low in rinsate blanks previously collected from sampling equipment at OU7.

- No RDIs were completed during the 2011 field season. Following all removals completed in 2010, very few pending removals remained on the removal list, so the RDI process was postponed.

2.6.1 Troy Field Office Record of Modifications

Project-wide modifications were necessary on occasion and required the DEQ Project Officer to consult with the EPA Remedial Project Manager regarding the modification. When a modification was required, a Troy Field Office (TFO) Record of Modification form was filled out by the DEQ Project Officer. The Tetra Tech project team did not implement the modification until the DEQ Project Officer granted verbal or written approval. Two TFO records of modification apply to the 2011 TAPE activities. Table 2-1 below summarizes these modifications. Copies of the TFO records of modification are in Appendix A.

TABLE 2-1
TROY FIELD OFFICE RECORDS OF MODIFICATION APPLICABLE TO 2011 TROY ASBESTOS PROPERTY EVALUATIONS

Record of Modification Number	Record of Modification Date	Description of Modification
TFO-00015	5/4/2010	Eliminates collection of equipment rinsate blanks for soil sampling.
TFO-00016	5/4/2010	Adjusts the schedule of visual observations and soil sampling frequency for TAPE inspections to be consistent with the final OU4 General Property Investigation Work Plan by CDM-SMITH, dated April 2010.

Notes:
CDM-SMITH Camp, Dresser, and McKee
OU4 Operable Unit 4
TAPE Troy Asbestos Property Evaluation
TFO Troy field office

3.0 OUTDOOR AMBIENT AIR STUDY

This section describes objectives, methods, and procedures associated with the outdoor AAS program during calendar year 2011. The outdoor AAS program began in 2009 and continued through 2011. The information in this section serves as an update to Section 5.0 of the draft final RI report (Tetra Tech 2010e); for greater detail on outdoor AAS procedures, refer to the draft final RI report (Tetra Tech 2010e) or the *Final Remedial Investigation Work Plan, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site* (Tetra Tech 2009b).

3.1 OUTDOOR AMBIENT AIR STUDY OBJECTIVES AND FIELD INVESTIGATION METHODS

The OU7 outdoor AAS began in October 2009. Initial field activities included selection of site monitoring stations, assembly and installation of monitoring equipment, and initiation of outdoor ambient air sample collection. The outdoor AAS has included monitoring of ambient air in four distinct "air zones" across OU7. Seven monitoring station locations within four air zones were sampled to evaluate upwind, downwind, and residential exposure scenarios. The four air sampling zones were originally identified based on geographic location and land use coverage. Personnel and work zone monitoring also occurred to ensure worker safety and to evaluate real-time airborne levels of asbestos in ambient air.

Encompassing most of calendar year 2011, Year 2 of the AAS program extended from November 10, 2010, through October 29, 2011—including AAS Year 2 sample periods 42 through 72 (December 30, 2010, through October 29, 2011). Although the AAS objectives remained the same throughout Year 1 and Year 2 of the AAS program, the air sampling stations were moved for AAS Year 2 sampling to provide a more robust data set for an HHRA and evaluation of future remedial actions. AAS DQOs are described in Section 3 of the outdoor AAS work plan (Tetra Tech 2009b). The following sections summarize field investigation methods, QC sampling, field and analytical data verification, and deviations from the work plan (Tetra Tech 2009b).

3.1.1 Site Access and Pre-Sampling Activities

Site access, logistics, and pre-sampling activities in 2011 remained mostly unchanged from 2010. Station installation procedures and operation of the meteorological station remained unchanged. The only

major change to the outdoor AAS program involved relocation of monitoring stations in November 2010, before the start of Year 2 of the outdoor AAS.

AAS Year 2 began with selection of seven new station locations (numbered 11 through 17) in November 2010. Figure 3-1 shows locations of the outdoor AAS stations for years 1 and 2. Selection of Year 2 monitoring locations entailed deviations from the work plan (Tetra Tech 2009b). The deviations are discussed in Section 3.4 of this RI report addendum.

Station installation procedures did not deviate from those specified in the outdoor AAS work plan (Tetra Tech 2009b) or in the draft final RI report (Tetra Tech 2010e).

3.1.2 Field Investigation Methods and Activities

Field investigation methods and activities remained mostly unchanged from 2010. Sample collection methods, equipment, and schedule accorded with specifications for these in the outdoor AAS work plan (Tetra Tech 2009b) and in the draft final RI report (Tetra Tech 2010e). Moreover, methods specified in the work plan and reported in the draft final RI report for field documentation, sample management, sample analysis, decontamination, and handling of IDW were followed in 2011.

The only changes to outdoor AAS field investigation activities in 2011 were reductions in sample pump flow rates and collection of co-located samples at rotating stations instead of at a single station. These changes, details of which appear in Section 3.4, entailed deviations from the outdoor AAS work plan.

3.1.3 Data Management

Methods for managing field data, electronic data, and analytical data in 2011 did not deviate from those specified in the outdoor AAS work plan (Tetra Tech 2009b) or the draft final RI report (Tetra Tech 2010e).

3.2 QUALITY CONTROL SAMPLES

Three types of QC samples were collected during calendar year 2011: lot blanks, field blanks, and co-located samples. All QC samples were submitted “blind” to the laboratory (i.e., not identified as QC samples).

Lot blanks – Before any cassettes were used, a cassette from each filter lot was randomly selected and submitted for analysis. Data for lot blank samples were used to evaluate whether cassettes had been

received asbestos-free from the supplier. Tetra Tech did not use a cassette from a given lot until the lot blank results confirmed the cassettes were asbestos-free. The lot blanks were analyzed for asbestos fibers by the same Transmission Electron Microscopy (TEM) method used for field sample analysis.

Field blanks – In 2011, one field blank was collected during each 5-day sampling event. The field blanks were collected by opening the sample cassette package and exposing the cassette to the full range of field efforts including sample handling, car travel, 10 seconds attached to the air sample pump (not turned on), sample cassette retrieval, return to office, packaging, and transport to the laboratory. The field blanks were analyzed for asbestos fibers by the same TEM method used for field sample analysis. Data for the field blank ambient air samples were evaluated to assess potential for sample cross-contamination during sample handling.

Co-located samples – Co-located samples were collected throughout 2011 to evaluate sampling variability. One co-located sample was collected per sampling event (total of 30 co-located samples collected during calendar year 2011). During Year 1 of the outdoor AAS program (sampling periods 1 through 36), all co-located samples were collected at the same sampling location (Station T4QC). Station T4QC was approximately 7 feet from sampling station T4 at the DEQ Troy Information Center. At the start of outdoor AAS program Year 2 (beginning with period 37), co-located samples were collected at rotating station locations (T11, T12, T13, T14, T15, T16, and T17). Section 3.4 discusses calendar year 2011 outdoor AAS changes regarding collection of co-located samples. All co-located samples were handled and sent to the laboratory for analysis using the same TEM method used for field samples.

3.3 DATA QUALITY ASSESSMENT

The primary objective of data quality assessment is to determine whether the obtained data meet project DQOs. Outdoor AAS field and analytical data verification procedures in 2011 followed those specified in the work plan (Tetra Tech 2009b) and the draft final RI report (Tetra Tech 2010e). The sections below summarize verification procedures; for additional details on these procedures, see the reports listed in the previous sentence.

3.3.1 Field Data Verification

Outdoor AAS field data from each sampling round were reviewed for completeness, accuracy, and consistency to ensure adequate quality of the collected outdoor ambient air samples. Pump history files were first reviewed to ensure performance met acceptable criteria. To ensure data were consistent, the

pump history data were then compared to data manually recorded on Field Sampling Data Sheets (FSDS) and in the ambient air logbook. Data from the pump history files, FSDS, and the logbook were then checked against the Troy Ambient Air Database (TAAD) to again ensure that data were consistent among the data summary locations, and that notable events had been documented throughout. If discrepancies were noted on the FSDS forms or in the logbook, the field team was contacted, and changes to the appropriate files were made via electronic notes in the PDF files. Discrepancies or errors identified in the TAAD database were addressed by manually correcting the entries in the database. Finally, a review of the OU7 Scribe Database occurred after data entry to verify that transfer of data from TAAD was complete and no errors were present.

3.3.2 Analytical Data Verification

Outdoor AAS samples were analyzed using TEM according to International Organization for Standardization (ISO) Method 10312. Tetra Tech conducted data review and data entry verification of the 2011 outdoor AAS data in accordance with SOP EPA-LIBBY-09 (SRC 2008). A copy of this SOP is in Appendix F of the outdoor AAS work plan (Tetra Tech 2009b). Tetra Tech followed the data review and data entry verification procedures outlined in this SOP, with some minor deviations for OU7. The deviations are explained, where applicable, in the subsections below.

Tetra Tech's data review and data entry verification process involved three steps: (1) selection of data records for review and verification, (2) review of the original laboratory bench sheets, and (3) verification of transfer of results from the bench sheets onto the EDDs. Tetra Tech also reviewed field QC sample results for adherence to minimum frequency requirements and procedures, and QC limits specified in the work plan (Tetra Tech 2009b). The data review and data entry verification process are described in the subsections below.

<u>Selection of TEM Records for Review</u>

SOP EPA-LIBBY-09 specifies review and verification of a minimum of 10 percent of the sample records. Tetra Tech deviated from this minimum requirement and reviewed 100 percent of the sample records for sampling periods 1 through 5, approximately 50 percent of the sample records for sampling periods 6 through 18, approximately 25 percent of the sample records for sampling periods 19 through 36, and approximately 10 percent of the sample records for sampling periods 37 through 72. The decision to exceed the minimum review and verification requirement early in the study was in part due to the high

incidence of significant errors (e.g., incorrect transfer of structure counts from bench sheets to EDD) noted during analysis of early samples, and in part because the structure of the database was changed in early 2010 at the request of EPA, resulting in emergence of a number of data formatting and structural issues. Refer to the appropriate quarterly AAS report for details regarding errors and issues identified during data review and verification (Tetra Tech 2010a, 2010c, 2010d, 2011a).

SOP EPA-LIBBY-09 also specifies a query of the OU7 Scribe database to select specific percentages of analytical records to verify—representing laboratory and analyst, as well as detected and non-detected results. During 2011, analytical data verification record selection conformed to the record selection process described in detail in SOP EPA-LIBBY-09 (SRC 2008).

Consistency Review of Laboratory Bench Sheets

Tetra Tech inspected the information recorded on the original hand-written laboratory bench sheets in accordance with the procedure for reviewing consistency of laboratory bench sheets outlined in Section 5 of SOP EPA-LIBBY-09 (SRC 2008), with minor OU7-related modifications. The bench sheets were reviewed to identify any data omissions, apparent inconsistencies, or potential errors in structure. The objective was to assess whether the raw structure data were recorded in accordance with ISO 10312 counting rules (as modified by applicable Libby laboratory modifications).

Corrective Action – Tetra Tech summarized all apparent inconsistencies, omissions, and suspected errors, and provided these to the Environmental Services Assistance Team (ESAT). The ESAT determined which of these were authentic and would require correction, and then forwarded them to the appropriate laboratories for response.

Verification of Data Transfer from Bench Sheet to Database

To ensure that data from laboratory bench sheets were transferred, through the EDDs, into the OU7 Scribe database without error or omission, Tetra Tech compared selected analysis-specific information in the laboratory bench sheets to that in associated EDDs. Tetra Tech followed the verification of data transfer procedure outlined in Section 6.0 of SOP EPA-LIBBY-09 (SRC 2008), with minor modifications for OU7. The bench sheets include the laboratory COC form, sample check-in form, preparation log, and hand-written data record sheets. This process (1) compared analysis-specific information in the EDD to the original laboratory job documentation (e.g., internal laboratory COC, preparation logs, bench sheets,

etc.); and (2) verified (by recalculation) reported air sensitivities for amphibole and chrysotile, the area analyzed, and for indirect preparations, the indirect preparation dilution factor. Using the bench sheets, Tetra Tech also recounted the countable LA structures across all grid openings evaluated and compared this number (and the calculated concentrations) to the total number of LA structures in the EDD.

The final step in the verification of data transfer process is to verify that the data in the EDDs were loaded into the OU7 Scribe database without error or omission.

Corrective Action – Tetra Tech summarized all apparent inconsistencies, omissions, and suspected errors, and provided these to ESAT. The ESAT determined which of these were authentic and would require correction, and then forwarded them to the appropriate laboratories for response.

Review of Field Quality Control Sample Results

Tetra Tech reviewed the field QC sample (co-located and field blank sample) results, and initiated any necessary corrective actions. Each co-located sample pair was compared using the Poisson rate test, included as Attachment 3 to SOP LB-000029B (SRC 2007), to determine whether the results differed statistically from one other at the 95 percent confidence level. The Poisson rate test is suitable for this analysis because fiber counts on TEM grids are considered independent and random.

Corrective Action –For co-located field sample pairs, Tetra Tech reviewed the Poisson rate test results and investigated the basis for any significant statistical differences and need for any appropriate corrective actions. Poisson rate test results that indicate the co-located samples are similar at the 95 percent confidence interval are considered good. Test results in the 90 to 95 percent confidence interval range are considered acceptable, and test results that fall below the 90 percent confidence interval are considered poor for similarity.

If test results were found below the 90 percent interval, Tetra Tech investigated the basis for the discrepancy and implemented as-needed corrective action in sampling procedures. Tetra Tech generally reported the results from the original sample (as opposed to co-located sample or laboratory recount sample results). A possible exception to this rule was an ESAT inter-laboratory recount result. If, during validation, an inter-laboratory recount result was deemed more representative than the original result, Tetra Tech discussed these findings with DEQ and reported whichever result was determined the most representative.

For field blanks, Tetra Tech has reviewed and will continue to review the results for all field blanks for adherence to the QC limits specified in SOP LB-000029B (SRC 2007). All field blank results to date have been within QC limits.

3.3.3 Statement on Data Quality

The objectives of the AAS are to obtain the data necessary to determine: (1) whether levels of LA asbestos in outdoor ambient air pose a risk of cancer or non-cancer effects, either alone or in combination with other exposure pathways; (2) whether that risk is within an acceptable risk range under a reasonable maximum exposure scenario; and (3) whether the data identify any significant differences in levels of LA asbestos in outdoor ambient air as a function of time or location in OU7. The outdoor AAS DQOs appear in the work plan (Tetra Tech 2009b).

To address AAS objectives, Tetra Tech is collecting and analyzing outdoor ambient air samples for LA asbestos. The results will be used in the HHRA for OU7. A total of 639 outdoor ambient air samples (including co-located and blank samples) have been collected since project inception through December 31, 2011.

To ensure accuracy and reliability, outdoor AAS field data and analytical results undergo review and verification in accordance with the procedures specified in the work plan (Tetra Tech 2009b). Data quality to date has appeared adequate for supporting exposure scenario and risk assessment calculations.

3.4 DEVIATIONS FROM THE OUTDOOR AMBIENT AIR STUDY WORK PLAN

The following deviations from the outdoor AAS work plan (Tetra Tech 2009b) apply to the calendar year 2011 outdoor AAS investigation and data. All associated TFO forms were submitted to the DEQ Project Officer for review and approval. The signed copies were placed in the DEQ Troy Information Center office.

<u>TFO-00002</u>

Because of periodic overloading of the sample filters, TFO-00002 was implemented to change the sampling pump air flow from 3 liters per minute to 2 liters per minute (resulting in a decrease in total air volume sampled from 21,600 to 14,400 liters). Reducing the air flow eliminated the incidence of overloaded sample filters and still allowed generation of high-quality data that met sensitivity analysis

requirements without counting of excessive filter grid openings during TEM analysis. This modification was implemented as a permanent procedural change beginning in Year 1, Sample Period 13. A copy of TFO-00002 is in Appendix A.

TFO-00003

This TFO requested relocations of ambient air monitoring stations for Year 2 sampling to achieve more comprehensive coverage of the four air zones identified in OU7. This modification resulted in additional data to support the HHRA related to ambient air exposure. A copy of TFO-00003 is in Appendix A.

TFO-00004

This TFO modified sampling protocol so as to rotate the co-located sampling station (Station TQC) among all seven ambient air sampling stations for Year 2 sampling. Analytical protocol was not affected; however, moving the co-located sampling station allowed an evaluation of analytical variability among all seven monitoring stations. Co-located field samples were collected (station TQC) at rotating station locations during each sample period throughout quarter 5. Station TQC was placed next to the monitoring stations. Station TQC was moved after each sampling period (beginning with monitoring station T11) and was cycled through each of the remaining stations (T12, T13, T14, T15, T16, T17). After cycling through station 17, station TQC was returned to station T11 to start the process anew. Cycling of station TQC continued throughout Year 2 so that a minimum of five co-located samples were collected at each of the seven monitoring stations. A copy of TFO-00004 is in Appendix A.

Analytical Data Review and Verification

Tetra Tech conducted review and verification of the analytical data from sampling periods 1 through 23 in general accordance with SOP EPA-LIBBY-09 (SRC 2008), with minor modifications for OU7. The SOP specifies data review and data entry verification of a minimum of 10 percent of the sample records. It also specifies criteria for selecting sample records for review and verification.

However, 100 percent of the period 1 through 5 sample records, approximately 50 percent of the period 6 through 18 sample records, and approximately 25 percent of the period 19 through 23 sample records underwent data review and data entry verification. For these period 1 through 23 records, rather than random selection from the OU7 Scribe database as specified in the SOP, records were hand-selected for review and verification based on result type (detected LA) and sample type (field duplicate pairs and

field blanks). This deviation occurred because the sample records had not been published in the Scribe database, which would have allowed application of the random selection process described in the SOP. For periods 24 through 72, approximately 10 percent of the sample records underwent data review and data entry verification. These records were randomly selected, in general accordance with SOP EPA-LIBBY-09 (SRC 2008).

4.0 OUTDOOR ACTIVITY-BASED SAMPLING

This section summarizes objectives, methods, and procedures of the outdoor ABS program associated with calendar year 2011, which was initiated in April 2011. For additional details on the outdoor ABS program, refer to the *Final Activity-Based Sampling, Sampling and Analysis Plan for Operable Unit 7 of the Libby Asbestos Superfund Site* (Tetra Tech 2011c).

4.1 OUTDOOR ACTIVITY-BASED SAMPLING OBJECTIVES AND INVESTIGATION METHODS

Previous investigations in Libby, Montana revealed presence of LA asbestos in multiple environmental media including indoor air, outdoor ambient air, attic insulation, and soil. Because of the proximity of Libby and Troy and the historical connection the towns share, it was determined that the magnitude of LA asbestos and potential exposure of Troy residents to this were unknown, and that additional data would be needed to allow DEQ to complete an HHRA for OU7. Therefore, two outdoor ABS events were performed; one in May 2011 (wet season) and one in August 2011 (dry season). Data from this investigation will be used in the preparation of an HHRA, FS, remedy selection, and remediation of OU7. ABS investigation methods are summarized below.

4.1.1 Pre-Sampling Planning

Residential properties in OU7 are categorized as Property Category A or B based on removal criteria described in EPA (2003) and DEQ (2009a). The HHRA work plan (Tetra Tech 2011b) identified outdoor ABS data for two residential property categories and for community-wide scenarios as data gaps.

Samples representing the following property categories were collected:

- Category A – residential properties for which removal of soil was deemed unnecessary
- Category B – residential properties for which removal of soil had been completed.

In addition, the HHRA will evaluate threats to human health from community-wide (nonresidence-specific) exposures to LA asbestos in air within OU7, so community-wide ABS samples were also collected and are described below.

4.1.1.1 Selection of Sampling Locations

Prior to start of field activities, residential UA sampling locations were selected via a query of the OU7 database. To the extent possible, the residential locations were selected from representative locations

across OU7. Property owners were contacted to determine their willingness to participate prior to the start of ABS. This process continued until the desired number of sampling locations had been selected.

Property-specific information was obtained for each sampling location and recorded on an OU7 ABS field form (Appendix C of the ABS SAP [Tetra Tech 2011c]).

4.1.1.2 Field Planning and Required Equipment and Supplies

Before the field crews mobilized, Tetra Tech prepared detailed property maps identifying the OU7 residential properties to be included. Maps were also prepared and reviewed for the recommended routes for the recreational biking and driving ABS scenarios. Residential ABS activities were scheduled at dates and times convenient to the property owners.

The Tetra Tech field manager conducted an inventory of project-procured equipment and supplies prior to field work, and confirmed availability of or obtained the necessary equipment and supplies.

4.1.2 Investigation Methods and Activities

Although a wide variety of activities may result in outdoor disturbances of LA asbestos, it was not feasible to evaluate every type of disturbance, so six disturbance scenarios were identified as realistic and representative of outdoor LA asbestos disturbances within OU7. Air sample collection is summarized in Section 4.1.2.1 and soil sample collection is summarized in Section 4.1.2.2.

4.1.2.1 Air Sampling

A total of 495 air samples (including field QC samples) were collected while conducting the following six disturbance scenarios. Residential ABS air sample collection locations are depicted on Figure 4-1, and recreational ABS air sampling locations are depicted on Figure 4-2.

Scenario 1: Yard Work in Residential Yards

This scenario assumed three activities involving residential yard soil considered realistic examples of relatively vigorous disturbances:

- Raking the lawn or yard with a metal-tined leaf rake
- Digging in the soil with a shovel
- Mowing the yard with a gasoline-powered rotary lawn mower

Because risk is related to long-term average exposure across all of these activities, ABS samples were composited from the three types of disturbance activities. Samples were collected from residential properties where removal of yard soil was not required (Category A) and from residential properties where removal of yard soil had been completed (Category B).

Adult residents, teenagers, and groundskeepers are the most likely receptors and age groups under this scenario, so samples were collected at the adult breathing height. Sampling occurred for 1 hour: on a single filter cartridge, air was collected during 21 minutes of raking, 18 minutes of digging, and 21 minutes of mowing.

To account for seasonal factors and provide ABS samples representative of potential exposures over multiple seasons, two sampling events occurred—one in spring (wet season) and one in late summer (dry season). A minimum of 10 residential yard-work samples within each property category (A and B) were collected. Considering temporal factors, a minimum of 20 samples were collected from properties within each property category (A and B).

A total of 82 ABS air samples (41 high volume and 41 low volume) (not including field QC samples) were collected under this scenario. The low volume samples were analyzed only if the high volume samples were overloaded.

Scenario 2: Gardening in Residential Gardens

This scenario assumed two activities involving residential garden soil considered realistic examples of relatively vigorous disturbances:

- Rototilling
- Digging with a trowel.

Samples were collected at Category A and B residential properties. Similar to ABS Scenario 1, a long-term average exposure across both of these activities was represented by collecting composite ABS samples. Sampling occurred for 1 hour: on a single filter cartridge, air was collected during 45 minutes of digging and 15 minutes of rototilling.

A total of 76 ABS air samples (38 high volume and 38 low volume) (not including field QC samples) were collected under this scenario. The low volume samples were analyzed only if the high volume samples were overloaded.

Scenario 3: Bicycling and Playing on Unpaved Residential Driveways

This scenario assumed a child riding a tricycle and playing on an unpaved driveway may disturb the soil. Activities under this scenario included bicycling on and digging in driveways, with samples collected at a child's breathing height at both Category A and B residential properties.

The tricycling activity occurred at each selected driveway for 30 minutes. The child actor rode a tricycle up and down the driveway, covering the entire area of the driveway during that time period.

Digging occurred at each selected driveway for 30 minutes. The child actor sat on the ground on the driveway while digging or scraping the top 2 to 6 inches of soil, pushing soil and rocks to the side, and then replacing them. The digging activity occurred for approximately 5 minutes at each of six discrete and widely distributed locations along the driveway.

Similar to ABS Scenario 1, long-term average exposure across bicycling and playing activities was represented by collecting composite ABS samples. Samples were collected at the child breathing height because a residential child is the primary receptor and age group under this scenario.

A total of 80 ABS air samples (40 high volume and 40 low volume) (not including field QC samples) were collected under this scenario. The low volume samples were analyzed only if the high volume samples were overloaded.

Scenario 4: Driving on Paved and Unpaved Roads and Alleys

Scenario 4 assumes driving in a motorized vehicle on roads and alleys within OU7 may result in exposure to LA asbestos from disturbance of road surfaces. Composite ABS air samples were collected during driving on paved and unpaved roads and alleys within OU7 to represent combined exposures from a variety of road surfaces.

Driving occurred for 60 minutes. The driving actor drove a full-sized automobile on both paved roads and unpaved roads and alleys. Travel was evenly distributed across road types throughout OU7. During sampling, the front windows of the vehicle were fully open, and the back two windows were open approximately 1 inch. Driving routes were documented using a portable Global Positioning System (GPS) unit.

The driving ABS activity occurred during non-rain periods when the roads were free of excess water or runoff. Samples were collected at the breathing height of an adult while seated in a vehicle because adults (drivers and passengers) are the most frequent receptors and age group under this scenario based on length of exposure time and duration. Although children and teenagers are also potential receptors under this scenario, differences in breathing heights among adults, children, and teenagers in a motor vehicle were not considered large enough to warrant additional sampling.

Two sampling events occurred: one in spring (wet season) and one in late summer (dry season). A total of 40 ABS air samples (20 high volume and 20 low volume) (not including field QC samples) were collected under this scenario. The low volume samples were analyzed only if the high volume samples were overloaded.

Scenario 5: Bicycling on Paved and Unpaved Roads, Alleys, and Trails

This scenario of riding bicycles on roads, alleys, and trails within OU7 assumedly causes more soil disturbances than would occur during other recreational activities such as walking or running. Composite ABS air samples were collected during bicycling on paved and unpaved roads and alleys within OU7 to represent combined exposures from a variety of road surfaces.

The biking activity occurred for 60 minutes. The actor-samplers used non-motorized, 2-wheeled bicycles. A bicycle trailer was attached to the back of one of the bicycles, and a personal air monitor was mounted inside the trailer to collect the child ABS sample. Two bicycle riders were fitted with air sample pumps and monitoring cassettes affixed in the breathing zone. The cyclists rode in single file along a predetermined route for 60 minutes. The distance maintained between the riders depended on visibility, terrain, and safety considerations. The riders alternated positions (lead and trailing) throughout the scenario. The trailing rider rode in the dust cloud of the rider in front as much as was safe and practical. During these events, the bicycle riders varied their speed between 3 and 15 miles per hour (mph), attempting to maintain an average speed of 8 mph. Biking routes were documented using a portable GPS unit.

The bicycling ABS scenario occurred during non-rain periods when the roads were free of rainwater runoff. All age groups—adults, teens, and children—are likely receptors under this scenario. The breathing height of a very young child (infant), who might be a passenger in a bicycle trailer, is significantly closer to the ground than that of an adult, teenager, or non-infant child. To evaluate the

effect breathing height has on exposure to LA asbestos, samples were collected at two breathing heights: adult while seated on a bicycle and infant passenger in a bicycle trailer. Although the breathing heights of teenagers and non-infant children seated on a bicycle differ from that of adults, the difference is not considered large enough to warrant additional sampling at different breathing heights.

Twenty 60-minute bicycling-scenario events occurred—10 in the spring (wet season) and 10 during the late summer (dry season). A total of 80 ABS air samples (40 high volume and 40 low volume) (not including field QC samples) were collected under this scenario. The low volume samples were analyzed only if the high volume samples were overloaded.

Scenario 6: Recreational Activities at Parks and School Yards

This scenario involves recreational activities in playgrounds and ball fields at public parks and school yards. Activities at playgrounds may include playing on playground equipment (i.e., swing sets, merry-go-rounds, jungle-gyms, and see-saws) and digging in sand boxes. The main playgrounds in Troy are at the Troy elementary school and at Roosevelt Park (Figure 4-2).

Recreational activities at the ball fields and parks may include baseball, football, soccer, Frisbee, and Frisbee golf. These recreational activities are most likely to occur at the Troy junior and senior high schools, Roosevelt Park, and the Timber Beast Disk Golf Course (Figure 4-2).

These playground and recreational activities are assumed to cause more soil disturbance than do other less vigorous recreational activities. Composite ABS samples were collected to represent a variety of playground and ball field activities under a combined ABS exposure scenario.

The adult breathing height was used for recreational activities at ball fields because adults and teenagers are more likely to participate in these activities. The child breathing height was used for playground activity sampling because children are more likely to play at playgrounds.

Ten one-hour samples representing the child-receptor playground scenario and 10 one-hour samples representing the adult-receptor ball field scenario were collected. One ABS sampling event occurred during the wet spring season, and a second event occurred during the dry late summer. A total of 79 ABS air samples (40 high volume and 39 low volume) (not including field QC samples) were collected under this scenario. The low volume samples were analyzed only if the high volume samples were overloaded.

4.1.2.2 Soil Sampling

Two side-by-side 30-point composite soil samples were collected at 0- to 1-inch and 0- to 6-inch depths under each residential ABS scenario: (1) yard work in residential yards, (2) gardening in residential gardens, and (3) bicycling and playing on unpaved driveways. Composite samples were collected from across the yard, garden, and driveway areas to represent the entire UA.

Soil samples were collected and homogenized in accordance with the TAPE WP (Tetra Tech 2007). To ensure availability of sufficient soil material for potential future analysis, the target mass of each composite sample was 2.5 kilograms. Each aliquot was inspected for VV in accordance with the project-specific SOP CDM-LIBBY-16, Revision 0, with the following modifications:

- The entire UA for ABS was inspected for VV regardless of previous investigation results or removal activities.
- The approximate location and level of any VV was documented on a field sketch that detailed the location of each scenario area. If available, land surveys were used as baselines for these sketches. If a survey was not available, an aerial photo was used. Soil sampling and vermiculite observations occurred during each sampling event.
- Field personnel documented square footage of each UA where ABS air and soil samples were collected.
- Field personnel documented the predominant type of ground cover at each UA where air and soil samples were collected. Ground-cover options included: (1) grass, (2) bare soil, (3) gravel and rock, (4) post-removal grass, (5) post-removal bare soil, (6) and post-removal gravel and rock (see Assessment of Soil Cover below).
- Field personnel documented a perimeter GPS outline of each UA where air and soil samples were collected.

Before collection of ABS air or soil samples, in-situ soil moisture was measured at each ABS sample location using a soil moisture meter. Soil moisture was measured at a minimum of 10 locations between 0 and 3 inches below ground surface. ABS sampling did not occur if the average volumetric water content (VWC) exceeded 30 percent, or if the VWC at any measurement point exceeded 50 percent. The soil moisture result for each area was recorded in the field logbook. On days when ABS activities occurred, meteorological data were downloaded from the local weather station at the Troy DEQ Information Center and archived in electronic format for future reference. The hourly recorded data include:

- Temperature (degrees Fahrenheit)
- Relative humidity (percent)

- Wind speed (mph)
- Wind gusts (mph)
- Wind direction
- Precipitation (inches).

A total of 251 soil samples (including field QC samples) were collected and archived.

Assessment of Soil Cover – Photograph Method

The extent of soil cover was estimated for each sampling event and recorded on the field form and in the field logbook using the method described below. Digital photographs were used for a qualitative estimation of vegetative cover within UAs. Individual sample quadrats (1 square meter) were photographed. The percent of each quadrat covered by vegetation or other material was determined by superimposing a grid frame of 25 equal-sized squares onto the digital picture.

1. Three sample quadrats were randomly located within the UA by tossing the quadrat to three locations from the central area of the UA. The percent soil cover within the UA is the average of the three quadrat estimates.

2. Each quadrat was labeled according to the AD and UA numbers, location, date, and quadrat number (1, 2, or 3). The full quadrat label was written on a board and placed at the top frame of each photograph.

3. A tripod and camera bar were used to position the camera vertically over the approximate center of the quadrat at about 4 feet above ground surface. A digital camera with a zoom lens was used to take each picture. The picture area was zoomed in or out to have the quadrat frame encompass most of the viewing area.

The digital photographs were analyzed by:

1. Superimposing a grid onto the digital picture to align exactly with the quadrat to have 25 equal-sized squares.

2. Randomly selecting five grid squares from each of the three quadrats (total of 15) for evaluation of soil cover. The number of grid squares covered by grass, bare soil, gravel or rock, post-removal grass, post-removal bare soil, or post-removal gravel or rock were counted. A grid square with greater than 50 percent of one of the above categories was counted as that category. A grid square with less than 50 percent of any category was assigned the category most represented by materials or vegetation present.

3. Summarizing the percent soil cover values for each quadrat and the average cover values calculated for each UA.

4.1.3 Data Management

Management of 2011 ABS field data, electronic data, and analytical data is described in, and did not deviate from, the outdoor ABS SAP (Tetra Tech 2011c).

4.2 FIELD QUALITY CONTROL SAMPLES

The following field QC samples (including field duplicates) were collected in association the ABS samples. Field QC samples associated with air samples include lot blanks and field blanks. Each of these QC sample types is described below and summarized in Table 4-1.

TABLE 4-1
OUTDOOR ACTIVITY-BASED SAMPLING
FIELD QUALITY CONTROL SAMPLES

Media	QC Sample	Collection Frequency	Analysis Frequency	Analysis Request	Acceptance Criteria
Air	Lot blank	1 per case (50 cassettes)	100%	TEM	ND for all asbestos fibers
Air	Field blank	1 per day	100%	TEM	ND for all asbestos fibers
Soil	Co-located sample	1 per 20 field samples	Archived [a]	PLM-VE	<30% RPD

Notes:

[a] Co-located soil samples were collected and archived, pending need to analyze the associated field samples.

% Percent
ND Not detected
PLM-VE Polarized light microscopy - visual estimation
RPD Relative percent difference
TEM Transmission electron microscopy

4.2.1 Lot Blanks (Air)

Before an air sampling cassette was used, a cassette from each filter lot was randomly selected and submitted for analysis. The lot blanks were analyzed for asbestos fibers by the same method used for field sample analysis. The entire batch of cassettes would have been rejected if an asbestos fiber had been detected on a lot blank.

4.2.2 Field Blanks (Air)

One field air blank was collected each day for the duration of the ABS sampling program. The field blanks were analyzed for asbestos fibers by the same TEM method used for field sample analysis. A field blank was collected by opening the sample cassette package and exposing the cassette to the full range of field efforts including sample handling, car travel, attachment to the air sample pump for 10 seconds (not turned on), retrieval of the sample cassette, return to the office, packaging, and transport to the laboratory.

4.2.3 Equipment Rinsate Blanks (Soil)

EPA currently does not require equipment rinsate blanks for soil sampling at the site because: (1) detection levels for LA using current PLM analytical methods are not low enough to capture concentrations that would be expected in equipment rinsate blanks, and (2) the frequency of detection of LA asbestos has been extremely low in historically-collected equipment rinsate blanks.

4.2.4 Co-located Samples (Soil)

Co-located samples for ABS soil sampling activities were collected at a rate of 1 per 20 field samples. Co-located samples were collected from areas undergoing sampling during the ABS activities discussed in the previous sections. Individual composite aliquots for each co-located sample were collected from soil adjacent to the original sample location. Co-located samples were collected in accordance with the TAPE WP (Tetra Tech 2007). Co-located samples were not sent for analysis but were archived, along with the field samples, for future analysis as necessary.

4.3 DATA QUALITY ASSESSMENT

The primary objective of data quality assessment is to determine whether obtained data meet project DQOs. Field and analytical data verification procedures for the 2011 ABS air data followed those specified in the outdoor ABS SAP (Tetra Tech 2011c). The sections below summarize verification procedures; for additional details on these procedures, refer to the aforementioned SAP.

4.3.1 Field Data Verification

Outdoor ABS field data were reviewed for completeness, accuracy, and consistency to ensure adequate quality of the outdoor ABS samples. Data recorded on the FSDSs and in logbooks were then checked against the OU7 Scribe Database to ensure consistency of data throughout. Finally, a review of the OU7

Scribe Database occurred after data entry to verify that the data were complete and no errors were present.

4.3.2 Analytical Data Verification

Outdoor ABS air samples were analyzed using TEM per ISO Method 10312, altered in accord with project-specific SOPs and laboratory modifications described in the SAP (Tetra Tech 2011c).

Tetra Tech conducted data review and data entry verification of the 2011 outdoor ABS data in basic accord with project-specific SOP EPA-LIBBY-09 (SRC 2008). Tetra Tech followed the data review and data entry verification procedures outlined in this SOP with minor deviations for OU7. Significant deviations are explained in the subsections below.

Tetra Tech's data review and data entry verification process entailed three steps: (1) selection of data records for review and verification, (2) review of the original laboratory bench sheets, and (3) verification of transfer of results from the bench sheets onto the EDDs. Tetra Tech also reviewed field QC sample results for adherence to minimum frequency requirements and procedures and QC limits specified in the SAP (Tetra Tech 2011c). The data review and data entry verification process are described in the following subsections.

<u>Selection of TEM Records for Review</u>

SOP EPA-LIBBY-09 specifies review and verification of a minimum of 10 percent of the sample records. Tetra Tech deviated from this minimum requirement and reviewed 20 percent of the outdoor ABS air sample records, in part because of the incidence of errors (e.g., data formatting and structural issues related to database structural changes).

SOP EPA-LIBBY-09 also specifies a query of the OU7 Scribe database to select specific percentages of analytical records to verify—representing laboratory and analyst, as well as detected and non-detected results. The 2011 process for selecting analytical data verification records conformed with that detailed in the SOP EPA-LIBBY-09 (SRC 2008).

Consistency Review of Laboratory Bench Sheets

Tetra Tech inspected the information recorded on the original hand-written laboratory bench sheets in accordance with the consistency review of laboratory bench sheets procedure outlined in Section 5 of SOP EPA-LIBBY-09 (SRC 2008), with minor OU7-related modifications. The bench sheets were reviewed to identify any data omissions, apparent inconsistencies, or potential errors in structure. The objective was to assess whether the raw structure data were recorded in accordance with ISO 10312 counting rules (as modified by applicable Libby laboratory modifications).

Corrective Action – Tetra Tech summarized all apparent inconsistencies, omissions, and suspected errors, and provided these to the ESAT. The ESAT then forwarded them to the appropriate laboratories for response.

Verification of Data Transfer from Bench Sheet to Database

To ensure that data from laboratory bench sheets were transferred, through the EDDs, into the OU7 Scribe database without error or omission, Tetra Tech compared selected analysis-specific information in the laboratory bench sheets to that in the associated EDDs. Tetra Tech followed the verification of data transfer procedure outlined in Section 6.0 of SOP EPA-LIBBY-09 (SRC 2008), with minor modifications for OU7. The bench sheets include the laboratory COC form, sample check-in form, preparation log, and hand-written data record sheets. This process compared analysis-specific information in the EDD to the original laboratory job documentation (e.g., internal laboratory COC, preparation logs, bench sheets, etc.). The process included verifying (by recalculation) the reported air sensitivities for amphibole and chrysotile, the area analyzed, and for indirect preparations, the indirect preparation dilution factor. Using the bench sheets, Tetra Tech also recounted the countable LA structures across all grid openings evaluated and compared this number (and the calculated concentrations) to the total number of LA structures indicated in the EDD.

The final step in the verification of data transfer process was to verify that the data in the EDDs had been loaded into the OU7 Scribe database without error or omission.

Corrective Action – Tetra Tech summarized all apparent inconsistencies, omissions, and suspected errors, and provided these to the ESAT. The ESAT then forwarded them to the appropriate laboratories for response.

Review of Field QC Sample Results

Tetra Tech reviewed field QC sample (field duplicate and field blank sample) results, and used the findings to refine sampling procedures where applicable. For the co-located field samples, each co-located sample pair was compared using the Poisson rate test, included as Attachment 3 of SOP LB-000029B (SRC 2007), to determine whether the results differed statistically from one other at the 95 percent confidence level. The Poisson rate test is suitable for this analysis because fiber counts on TEM grids are considered independent and random.

Corrective Action –For field co-located samples, Tetra Tech reviewed the Poisson rate test results and investigated the basis for any significant statistical differences and need for any appropriate corrective actions (modification of sampling protocol). Poisson rate test results are considered good when the field duplicate samples are similar at the 95 percent confidence interval. Test results in the 90 to 95 percent confidence interval range are considered acceptable, and test results below the 90 percent confidence interval are considered poor for similarity.

For field blanks, Tetra Tech reviewed the results for adherence to the QC limits specified in SAP (Tetra Tech 2011c). All field blank results were within QC limits.

4.3.3 Statement on Data Quality

The objective of the ABS investigation was to obtain the data necessary for DEQ to complete an HHRA of OU7. The air data needed to complete the HHRA—identified in the HHRA work plan for OU7 (Tetra Tech 2011b)—include ABS data for outdoor air within the two residential property categories and within community areas. The outdoor ABS DQOs are presented in the SAP (Tetra Tech 2011c).

To address outdoor ABS objectives, Tetra Tech collected and analyzed 495 outdoor ABS air samples (including field QC samples) for LA asbestos. The results will be used in the HHRA for OU7. Tetra Tech also collected 251 soil samples (including field QC samples), which are currently archived. To ensure accuracy and reliability, outdoor ABS field data and analytical results were reviewed and verified in accordance with the procedures specified in the SAP (Tetra Tech 2011c). Data quality appears to be adequate for supporting exposure scenario and risk assessment calculations.

4.4 DEVIATIONS FROM THE OUTDOOR ACTIVITY-BASED SAMPLING AND ANALYSIS PLAN

Ten residential gardens at properties having undergone a completed outdoor soil removal action were originally planned for sampling under the residential garden scenario. However, only eight residential gardens met this criterion and were sampled during the wet season ABS event in May 2011. For the August 2011 dry season ABS event, nine residential gardens that met the criterion were identified and sampled. All other ABS exposure scenarios and locations, and the number of samples collected, accorded with specifications in Table 4-1 in the SAP (Tetra Tech 2011c).

5.0 FIELD RESULTS AND NATURE AND EXTENT OF CONTAMINATION

This section summarizes TAPE, RDI, AAS, and outdoor ABS investigation results and associated activities at OU7 during calendar year 2011. The TAPE work plan was implemented in April 2007, the AAS work plan was implemented in September 2009, and the RDI SAP was implemented in 2010; all three investigations are ongoing. The outdoor ABS SAP was implemented in 2011, and the investigation is complete.

The intents of these investigations are to gather sufficient and reliable data to characterize the nature and extent of LA asbestos in OU7 and to assess associated human health risks. In addition, TAPE data have been used to identify parcels meeting EPA removal action levels (EPA 2003). Data obtained from the AAS investigation will primarily be used to determine whether LA asbestos in outdoor ambient air contributes a risk of cancer or non-cancer effects. The TAPE, AAS, and ABS data will eventually be used in support of a site-wide risk assessment and determination of remedial alternatives.

TAPE results and associated activities during calendar year 2011 are summarized in Section 5.1. Section 5.2 provides an update of the nature and extent of LA asbestos contamination within OU7 as compared to EPA removal action levels and DEQ selection criteria. It also discusses the OU7 parcel selection process for removal action, and describes removal activities in 2011. AAS results and associated activities for calendar year 2011 are summarized in Section 5.3. Section 5.4 is a summary of the outdoor ABS results and associated activities for calendar year 2011.

5.1 TROY ASBESTOS PROPERTY EVALUATION STATISTICS

TAPE investigation results for calendar year 2011 are presented in this section. Between January 1 and December 31, 2011, 35 parcels were inspected. Of these, 27 are within the OU7 boundary and 8 are outside the OU7 boundary (Figure 2-1).

The out-of-OU7 boundary TAPEs were performed case-by-case because of unique circumstances such as owner transport of buildings or vermiculite from Libby to the parcel, or if the owner had knowledge of such an event. For the purpose of the RI, these parcels are considered part of OU7 and are included in the TAPE inspection count for calendar year 2011.

The OU7 Scribe database is used to store, manage, and retrieve TAPE data. The OU7 Scribe database is dynamic; data have been corrected or updated over the course of the project as a result of

modifications to TAPE sampling objectives, additional information gained from parcel revisits (i.e., VV re-inspections, aggressive attic entry), and as part of the TAPE data verification process (Section 2.4.1). To present TAPE data by year, database queries were developed using the initial inspection date for each parcel. This eliminated the possibility of counting a parcel or data record twice. The data presented in the sections below have been extracted from the OU7 Scribe database. A summary of the TAPE investigation results is in Appendix C.

Calendar year 2011 site access statistics are summarized in Section 5.1.1. Calendar year 2011 attic and interior inspection statistics are summarized in Section 5.1.2. Calendar year 2011 soil sampling statistics are summarized in Section 5.1.3. ERS activities for 2011 are summarized in Section 5.1.4.

5.1.1 Site Access

As noted in Section 2.1.1, Tetra Tech did not conduct a mass mailing of access agreements to OU7 residents in 2011. Because most properties in OU7 underwent a TAPE inspection between 2007 and 2009, and considering the level of public outreach in OU7, it was determined that interested property owners would contact the DEQ Troy Information Center directly for inspection scheduling. Property owners who had returned signed access agreements previously, but had not undergone a TAPE in 2010, were contacted by the CIC at the beginning of the 2011 field season for scheduling.

In addition to the access agreements received from the 2007-2009 yearly access mailings, access agreements were also obtained from walk-ins to the DEQ Troy Information Office and from door-to-door solicitations of owners whose addresses were listed incorrectly (or were unknown) in the tax database. The Troy Owner Access Database (TOAD) is used to track site access status changes. The access status of all OU7 parcels as of December 31, 2011, were as follows:

Granted = 984
Limited = 10
Denied = 138.

5.1.2 Attic and Interior Inspections

Visual inspections of interior living areas and attic spaces (where accessible) continued in 2011. Tetra Tech inspected 35 parcels in 2011, which included 35 primary buildings and 72 secondary buildings. Of these buildings, 23 buildings did not have attics, and 11 buildings had inaccessible attics. The remaining

attics were inspected for presence of and type of insulation. One building inspected in 2011 had VCI in the attic. Field teams also identified two properties with VV in an indoor living space.

5.1.3 Soil Sampling

As part of the TAPE activities in 2011, Tetra Tech identified and visually inspected the following types and numbers of UAs:

CUAs	27
LUAs	30
SUAs	31
NUAs	19

A total of 208 soil samples (including exterior, interior, and co-located samples) were collected in 2011. Of these, 9 were co-located exterior samples and 11 were interior soil (i.e., from crawl spaces) samples (including co-located samples).

5.1.4 Environmental Resource Specialist Activities

Tetra Tech and Project Resources, Inc. (PRI) conducted ERS activities at four parcels in 2011; two of the parcels were outside the OU7 boundary and two were inside the boundary. The ERS actions in 2011 were similar to those from previous years and involved temporarily isolating potential LA-containing material from residents or workers. Copies of the ERS scopes of work were scanned and placed in the individual electronic archive folders for the pertinent properties. A note indicating that an ERS response had been conducted at the property was entered into the OU7 Scribe database. Copies of the ERS response scopes of work and completion forms are in Appendix B.

Additionally, five minor ERS responses were completed in 2011 by the Tetra Tech ERS technicians. These responses did not require preparation of formal statements of work or involvement by PRI or the removal contractors. Electronic records of these ERS responses have also been placed in the individual electronic archive folders for the pertinent properties.

5.2 LA ASBESTOS CONTAMINATION IN OU7, SELECTION OF PARCELS FOR REMOVAL ACTION, AND POST-REMOVAL CLEARANCE AND CONFIRMATION SAMPLING

This section presents the 2011 TAPE analytical results and compares these to criteria specified in the EPA and DEQ documents guiding removal action decisions in OU7—the EPA *Libby Asbestos Site*

Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum (EPA 2003), *Libby Asbestos Site Troy OU7 Residential/Commercial Cleanup Criteria Specific Use Area Visible Vermiculite Action Level Technical Memorandum* (DEQ 2009a), and the *Libby Asbestos Site Troy OU7 Removal Parcel Status* (DEQ 2009b) memorandum.

5.2.1 TAPE Analytical Results

Soil was the only medium from the 2011 TAPE inspections submitted for analysis for LA asbestos. LA asbestos bin assignments for all soil samples collected in calendar year 2011 are listed in Table 5-1 below. These samples were assigned to bins in accordance with EPA action level and clearance criteria (EPA 2003). LA asbestos bin categories are defined as follows:

Bin A	Not detected
Bin B1	Trace detected (< 0.2 percent by weight)(EPA/DEQ action level for possible removal)
Bin B2	Detected between > 0.2 percent and < 1 percent by weight (EPA/DEQ action level for possible removal)
Bin C	Detected at ≥ 1 percent by weight (EPA/DEQ action level for removal).

A total of 208 soil samples (including exterior, interior, and co-located samples) were collected in 2011. The breakdown of bin assignments is as follows:

TABLE 5-1
2011 TAPE SOIL ANALYTICAL RESULTS

Bin	Number of Samples
A	146
B1	62
B2	0
C	0
Total	**208**

Notes:
Results include exterior, interior, and co-located soil samples

None of the soil samples collected in 2011 was assigned to Bin B2 or Bin C.

5.2.2 Comparison of TAPE Results to EPA Removal Action Levels

Two objectives of the TAPEs are to (1) identify parcels that meet EPA removal action levels (identify parcels with LA asbestos contamination at levels that pose potentially unacceptable health risks), and (2) provide reliable data on LA asbestos contamination for RDIs and removal activities that would

minimize unacceptable health risks by removing the contamination. As discussed in Section 3.4 of the 2010 Draft Final RI Report (Tetra Tech 2010e), EPA established removal action levels that allow investigators to determine whether a removal action is warranted (EPA 2003). Need for removal is assessed by determining contaminant concentrations in one or more of the following areas: (1) attic or interior walls (attics/walls), (2) indoor living space (interiors), or (3) outdoor soils (soils). A summary of TAPE results for calendar year 2011 that met the EPA removal action levels appears below, along with the cumulative total since TAPE project inception in 2007:

<u>OU7 TAPE Attic/Walls</u>

- Total number of parcels with visual confirmation of VCI: **2011 = 1**; Cumulative = 87

<u>OU7 TAPE Interiors</u>

- Total number of parcels with visual confirmation of VV in an indoor living space: **2010** = **2**; Cumulative = 61
- Total number of indoor dust samples collected with an LA concentration exceeding 5,000 structures per square centimeter (s/cm^2): **2011** = **0**; Cumulative = 6.

<u>OU7 TAPE Soils</u>

- Total number of SUAs with visual confirmation of VV: **2010** = **23**; Cumulative = 310
- Total number of exterior soil samples with an analytical LA concentration greater than or equal to 1 percent (i.e., Bin C): **2011 = 0**; Cumulative = 0.

5.2.3 OU7 Parcel Selection for Removal Action

In addition to the EPA removal action criteria presented in the previous section, the DEQ reviewed OU7 properties against the additional lines of evidence described below. Background information regarding this process is provided in the Final Libby Asbestos Site Troy Operable Unit 07 Residential/Commercial Cleanup Criteria, Specific Use Area Visible Vermiculite Action Level Technical Memorandum (DEQ 2009a) attached to this report. The majority of properties in OU7 underwent a TAPE inspection between 2007 and 2009. In November 2009, the DEQ evaluated these parcels against the EPA removal action levels and additional lines of evidence (see attachment) to generate a list of OU7 properties where RDI and removal action was warranted. The requirements were:

EPA Removal Action Levels:

- VV in a Living Space = Yes
- VV in an Attic = Yes
- VV in a SUA = Yes
- Field soil sample (interior or exterior) with an analytical result = Bin B2 or Bin C
- Dust concentration greater than or equal to 5,000 s/cm^2.

DEQ Additional Lines of Evidence:

- Any knowledge of former miners, close relatives of miners, or any highly exposed persons living or visiting the building? = Yes
- Has a resident, past or present, been diagnosed with an asbestos-related disease? = Yes
- To the best of your knowledge, was vermiculite from the mine used in, or around, your home? = Yes
- Has the resident/business purchased any Libby vermiculite materials from W.R. Grace in the past? = Yes
- Has the property been used for a for-profit enterprise of distributing, treating, storing, or disposing of Libby vermiculite? = Yes
- Are Libby vermiculite additives in any of the building materials? = Yes.

The DEQ Project Officer reviewed each parcel meeting the above requirements to determine whether removal action would be necessary. This included review of the analytical results, electronic data archive records from visual inspections at the parcel (logbook, property sketch, photographs, and ERS reports), and all pertinent data from the OU7 Scribe database (DEQ 2009b). Based on the requirements and parcel review, the DEQ identified parcels eligible for interior removal only (71), exterior removal only (16), and both interior and exterior removals (15), for a total of 102 parcels eligible for removal actions.

DEQ then provided the EPA a list of parcels to undergo 2010 OU7 RDIs and removal activities. Figure 7-2 of the Draft Final RI Report (Tetra Tech 2010e) spatially depicts the parcels identified for removal action within OU7 during 2010.

5.2.4 OU7 Removal Parcels Identified and Removal Actions Completed in 2011

As a result of TAPE inspections during the 2011 field season, two parcels were added to the OU7 removal list. These parcels were added because of presence of enough vermiculite in a living area or in exterior soil to warrant a removal action.

Six removal actions were completed in OU7 in 2011. Of these, five were interior removals only and one included both interior and exterior removals. Six property owners on the removal list in 2011 deferred removal action on their properties until a later date. Seventeen property owners declined removal action in 2011, and Tetra Tech was unable to contact seven property owners regarding possible removal actions.

As of the end of the 2011 field season, 105 removals had been completed within OU7, and 30 parcels remained on the active removal action list.

Table 5-2 below summarizes this information. Figure 5-1 depicts the parcels where removal activities have occurred from project inception through December 31, 2011.

TABLE 5-2
SUMMARY OF 2011 REMOVAL ACTION ACTIVITIES

Type of Removal Action	Identified in 2011	Completed in 2011	Total Completed	Active Parcels Remaining on Removal List	Inactive Parcels Remaining on Removal List
Interior Only	1	5	64	12	---
Exterior Only	1	0	12	11	---
Combination	0	1	29	7	---
Deferred	---	---	---	---	6
Declined	---	---	---	---	17
No Contact	---	---	---	---	7
TOTAL	**2**	**6**	**105**	**30**	**30**

The USACE contractor who performed the removal activities maintained detailed records of removal work at each property, such as the volume of interior material (i.e., insulation) removed and the volume of soil removed. Appendix D provides a summary of this information for reference.

5.2.5 Post-Removal Clearance and Confirmation Sampling

Following completion of a removal action at a property, clearance air samples or confirmation soil samples, as appropriate, were collected and analyzed to determine whether the removal activities had been effective. Each sample type is described below.

Clearance Air Samples

If a removal of vermiculite insulation, LA-contaminated interior dust or soil floors, or LA-contaminated building materials was required at a property, clearance air samples were collected following removal activities to determine if interior LA contamination levels had been reduced to project-specific action levels.

Clearance air samples were collected from living spaces and non-living spaces (e.g., attics) where LA-contaminated media had been removed. Secondary structures were sampled in accordance with building-type designation as described in the response action work plan (RAWP) (PRI 2011). After the contractor had removed the contaminated material, a third-party independent contractor (TPIC) inspected the area to determine if clearance air sampling could commence. If sample results did not meet project-specific action levels, additional cleaning was performed and clearance samples were re-collected. Once the action levels had been met, the area was designated as adequately cleaned and restoration activities began.

Prior to collecting clearance air samples, a TPIC field member determined whether the area being sampled was considered a living space or an attic space to compare the data obtained to the project-specific action levels specified for these two area types. Five clearance samples were collected within each area where a response action had occurred. Each clearance air sample was collected and analyzed in accordance with TEM Asbestos Hazard Emergency Response Act (AHERA) sampling guidance (EPA 1987), with applicable project-specific laboratory modifications.

Confirmation Soil Samples

If a property required removal of vermiculite-containing or LA asbestos-contaminated soil, confirmation soil samples were collected following removal activities to determine if contaminated soils had been removed to project-specific clearance criteria.

Following excavation of contaminated soils within the removal area and before confirmation soil sampling, the excavated area and sidewalls were visually inspected for high concentrations of vermiculite. Because presence of high levels of vermiculite is a likely indicator of LA asbestos, further excavation may have been required prior to collecting confirmation soil samples. Once an excavation had been cleared through a visual inspection, a confirmation soil sample was collected for analysis and

any remaining observed vermiculite within the sample area was documented during that sampling to determine if cleanup goals had been achieved.

Each confirmation soil sample was collected as a 30-point composite surface soil sample to characterize an area where contaminated soil had been removed and to document any remaining vermiculite. Each sample aliquot was collected from 0 to 2 inches below the surface of the completed excavation and consisted of nearly equal portions of soil from 30 locations within the delineated sample area. It was up to the discretion of the TPIC to decide the number of samples required to characterize the excavated area. However, to maintain consistency among the sampling teams, at least one composite sample was collected for every 2,500 square feet of excavation area.

Individual confirmation soil samples may have included composite points from different UAs (e.g., yard and flowerbed, yard and garden) as long as all areas had been excavated to design depth and had passed visual inspection. If excavation advanced more than 10 feet beyond a computed boundary to a neighboring property with a different address, soil clearance samples were collected in association with the different address with a separate FSDS, red-line drawing, and project completion checklist (PCC) form. All confirmation soil samples were analyzed by PLM (National Institute for Occupational Safety and Health [NIOSH] 1994).

Soil Sampling for Areas Not Excavated to Design Depth

Excavation along or adjacent to foundations, curbs and roads, sidewalks, and around trees presented challenges to the removal contractor—additional potential hazards such as structure failure, slope failure, and falling trees. Therefore, excavations in these areas may not have been advanced to the design depth specified in the site-specific removal work plan. In addition, these areas may have been sampled separately or in combination with other similar areas, as necessary. Although no additional excavation may have been feasible, samples were collected for documentation. Compositing samples collected at multiple areas that were not excavated to design depth into one sample was deemed acceptable in some instances. However, to be more representative of the areas not excavated to design depth, samples collected in these areas were not combined with sample aliquots from areas excavated to design depth.

Excavation around trees was completed in accordance with the RAWP (PRI 2011) and the site-specific removal work plan to the extent possible without impacting the integrity of the root system. If sampling

was not feasible due to root congestion, a visual inspection, as outlined in SOP CDM-LIBBY-16, was performed, and quantities of vermiculite were documented as low or intermediate. If high concentrations of vermiculite were present, TPIC obtained approval from the government representative to allow excavation to continue.

Soil Sampling Under Structures

If a structure (e.g., shed, deck, etc.) was moved during excavation and the footprint of the structure was less than 2,500 square feet, composite points of soil from the original structure's location may have been combined with composite points of soil from the surrounding area to a maximum of 2,500 square feet of the combined areas. If a structure was not moved during excavation, a separate discreet soil sample was collected in the footprint of the structure, and was not combined with samples from the surrounding excavation area**.**

5.3 OUTDOOR AMBIENT AIR STUDY RESULTS

The following sections present results from AAS monitoring activities during calendar year 2011. Monitoring activities and schedule are summarized in Section 5.3.1. Analytical AAS results from project inception through calendar year 2011 are summarized in Section 5.3.2.

5.3.1 Monitoring Activities and Schedule

Calendar year 2011 encompasses most of Year 2 (November 10, 2010, through October 29, 2011) of the AAS program, including AAS Year 2 sample periods 42 through 72 (December 30, 2010, through October 29, 2011).

AAS monitoring began on October 30, 2009, and continued through 2011. Calendar year 2011 included sample period 42, which began on December 30, 2010, through sample period 72, which ended on October 29, 2011. Each quarter consisted of nine 5-day sampling periods, separated from adjacent periods by approximately five non-sampling days.

AAS monitoring activities and schedule from project inception through the end of 2009 are described in the Draft Final RI Report (Tetra Tech 2010e). Monitoring activities for calendar year 2010 are described in the following AAS quarterly reports:

- *Final First Quarter Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated February 2010 (Tetra Tech 2010a),
- *Final Quarter 2 and Quarter 3 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated September 2010 (Tetra Tech 2010c),
- *Final Quarter 4 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated December 2010 (Tetra Tech 2010d),
- *Final Quarter 5 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated February 2011 (Tetra Tech 2011a).

Monitoring activities and schedule for calendar year 2011 are described in the following AAS quarterly reports:

- *Final Quarter 5 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated February 2011 (Tetra Tech 2011a),
- *Final Quarter 6 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated August 2011 (Tetra Tech 2011d),
- *Final Quarter 7 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated September 2011 (Tetra Tech 2011e),
- *Final Quarter 8 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated December 2011 (Tetra Tech 2011f).

The 2011 AAS monitoring activities and schedule are briefly summarized below, organized by quarter. Field data and observations were recorded daily on FSDSs, copies of which were provided as appendices to the associated AAS quarterly reports (Tetra Tech 2011a, d, e, f).

Quarter 5

This section briefly summarizes the Quarter 5 schedule of AAS monitoring activities during calendar year 2011. Quarter 5 began on November 10, 2010, and ended on February 2, 2011. The portion of Quarter 5 AAS monitoring that occurred in 2010 is discussed in the Draft Final RI Report Addendum for 2010 (Tetra Tech 2011a).

The portion of Quarter 5 AAS sampling that occurred in calendar year 2011—beginning with sample period 42 on December 30, 2010, and ending with sample period 45 on February 2, 2011—is discussed in the *Final Quarter 5 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated February 2011 (Tetra Tech 2011a).

Monitoring consisted of four five-day sampling periods separated by five off days between each period. Calendar year 2011 Quarter 5 sample periods and dates are summarized in Table 5-3.

TABLE 5-3
OU7 OUTDOOR AMBIENT AIR STUDY SAMPLING
QUARTER 5 SAMPLE PERIODS AND DATES

Sample Period	Dates
42	December 30, 2010 through January 3, 2011
43	January 9, 2011 through January 13, 2011
44	January 19, 2011 through January 23, 2011
45	January 29, 2011 through February 2, 2011

Quarter 6

This section briefly summarizes the Quarter 6 schedule of AAS monitoring activities. Quarter 6 AAS monitoring activities began with sample period 46, on February 9, 2011, and finished with sample period 54, which ended on May 4, 2011. Quarter 6 AAS activities and schedule are discussed in the *Final Quarter 6 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated August 2011 (Tetra Tech 2011d).

Quarter 6 AAS monitoring consisted of nine five-day sampling periods, generally separated by five off days between each period. Quarter 6 sample periods and dates are summarized in Table 5-4.

TABLE 5-4
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 6 SAMPLE PERIODS AND DATES

Sample Period	Dates
46	February 9, 2011 through February 13, 2011
47	February 19, 2011 through February 23, 2011
48	March 1, 2011 through March 5, 2011
49	March 11, 2011 through March 15, 2011
50	March 21, 2011 through March 25, 2011
51	April 1, 2011 through April 5, 2011
52	April 10, 2011 through April 15, 2011
53	April 21, 2011 through April 25, 2011
54	April 30, 2011 through May 4, 2011

Quarter 7

This section briefly summarizes the Quarter 7 schedule of AAS monitoring activities. Quarter 7 AAS monitoring activities initiated on May 10, 2011, and are described in the *Final Quarter 7 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated September 2011 (Tetra Tech 2011e).

Quarter 7 AAS monitoring consisted of nine five-day sampling periods, generally separated by five off days between each period. Quarter 7 monitoring began with sample period 55 on May 10, 2011, and ended with sample period 63, on August 2, 2011. Quarter 7 sample periods and dates are summarized in Table 5-5.

TABLE 5-5
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 7 SAMPLE PERIODS AND DATES

Sample Period	Dates
55	May 10, 2011 through May 14, 2011
56	May 20, 2011 through May 24, 2011
57	May 30, 2011 through June 4, 2011
58	June 9, 2011 through June 13, 2011
59	June 19, 2011 through June 23, 2011
60	June 29, 2011 through July 3, 2011
61	July 9, 2011 through July 13, 2011
62	July 19, 2011 through July 23, 2011
63	July 29, 2011 through August 2, 2011

Quarter 8

This section briefly summarizes the Quarter 8 schedule of AAS monitoring activities. Quarter 8 AAS monitoring activities initiated on August 7, 2011, and are described in the *Final Quarter 8 Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site*, dated December 2011 (Tetra Tech 2011f).

Quarter 8 AAS monitoring consisted of nine 5-day sampling periods, generally separated by five off days between each period. Quarter 8 monitoring began with sample period 64 on August 7, 2011, and ended

with sample period 72 on October 29, 2011. The sample periods and dates for Quarter 8 are summarized in Table 5-6.

TABLE 5-6
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 8 SAMPLE PERIODS AND DATES

Sample Period	Dates
64	August 7, 2011 through August 11, 2011
65	August 16, 2011 through August 20, 2011
66	August 26, 2011 through August 30, 2011
67	September 5, 2011 through September 9, 2011
68	September 15, 2011 through September 19, 2011
69	September 25, 2011 through September 29, 2011
70	October 6, 2011 through October 10, 2011
71	October 15, 2011 through October 19, 2011
72	October 25, 2011 through October 29, 2011

5.3.2 Analytical Results

This section summarizes the AAS analytical data acquired in 2011 (sampling periods 42 through 72). Detailed discussions of AAS analytical results appear in the applicable AAS program quarterly reports (Tetra Tech 2011a, 2011d, 2011e, and 2011f) and are only briefly summarized herein.

The complete set of analytical results for AAS sampling periods 1 through 72, as well as a spreadsheet with the data review and data entry verification findings for these sampling periods, will appear in the final RI report.

Quarter 5 (Sampling Periods 42 through 45)

Two LA asbestos fibers were found in sample TA-20068, a co-located sample collected at the AAS sampling station T11QC on January 19, 2011. No LA asbestos fibers were found in the original sample collected on this date at this location. The remaining samples collected during the 2011 portion of Quarter 5 contained no countable LA asbestos fibers.

Quarter 5 detected results are summarized in Table 5-7.

TABLE 5-7
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 5 DETECTED RESULTS

Location	Location Comment	Sample No.	Sample Date	Sample Type	No. Of Structures	LA Asbestos Concentration (s/cc)	Sampling Period
T11QC	Epps Body Shop	TA-20068	1/19/11	Co-located	2	7.76E-05	44

Notes:
QC Quality control
LA Libby amphibole
s/cc Structures per cubic centimeter

Quarter 6 (Sampling Periods 46 through 54)

One LA asbestos fiber was found in sample TA-20151, a field sample collected at AAS sampling location T12 on April 20, 2011. The remaining samples collected during Quarter 6 periods 46 through 54 contained no detectable LA asbestos fibers.

Quarter 6 detected results are summarized in the Table 5-8.

TABLE 5-8
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 6 DETECTED RESULTS

Location	Location Comment	Sample No.	Sample Date	Sample Type	No. Of Structures	LA Asbestos Concentration (s/cc)	Sampling Period
T12	Northwest border of OU7	TA-20151	4/20/11	Field Sample	1	3.97E-05	53

Notes:
QC Quality control
LA Libby amphibole
OU7 Operable Unit 7 of the Libby Asbestos Superfund Site
s/cc Structures per cubic centimeter

Quarter 7 (Sampling Periods 55 through 63)

One LA asbestos fiber was found in sample TA-20204, a field sample collected at AAS sampling location T12 on June 18, 2011; and one LA asbestos fiber was found in sample TA-20224, a field sample collected at AAS sampling location T14 on July 8, 2011. The remaining samples collected during Quarter 7 contained no detectable LA asbestos fibers.

Quarter 7 detected results are summarized in the Table 5-9:

TABLE 5-9
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 7 DETECTED RESULTS

Location	Location Comment	Sample No.	Sample Date	Sample Type	No. Of Structures	LA Asbestos Concentration (s/cc)	Sampling Period
T12	Northwest border of OU7	TA-20204	6/18/11	Field Sample	1	3.90E-05	59
T14	City of Troy – central site	TA-20224	7/8/11	Field Sample	1	3.99E-05	61

Notes:
LA Libby amphibole
OU7 Operable Unit 7 of the Libby Asbestos Superfund Site
s/cc Structures per cubic centimeter

Quarter 8 (Sampling Periods 64 through 72)

One LA asbestos fiber was detected in sample TA-20275, a field sample collected from AAS sampling location T11 on September 6, 2011. One LA asbestos fiber was detected in sample TA-20276, a field sample collected from AAS sampling location T12 on September 6, 2011. One LA asbestos fiber was detected in sample TA-20279, a field sample collected from AAS sampling location T14 on September 6, 2011. Two LA asbestos fibers were detected in sample TA-20287, a field sample collected from AAS sampling location T14 on September 16, 2011. One LA asbestos fiber was detected in sample TA-20297, a field sample collected from AAS sampling location T15 on September 26, 2011. No LA asbestos fibers were detected in any of the other Quarter 8 samples.

Quarter 8 detected results are summarized in the Table 5-10 below:

TABLE 5-10
OU7 OUTDOOR AMBIENT AIR SAMPLING
QUARTER 8 DETECTED RESULTS

Location	Location Comment	Sample No.	Sample Date	Sample Type	No. Of Structures	LA Asbestos Concentration (s/cc)	Sampling Period
T11	Mid-OU7 community exposure site	TA-20275	9/6/11	Field Sample	1	3.92E-05	67
T12	Northwest border of OU7	TA-20276	9/6/11	Field Sample	1	3.92E-05	67
T14	City of Troy central site	TA-20279	9/6/11	Field Sample	1	2.67E-04	67
T14	City of Troy central site	TA-20287	9/16/11	Field Sample	2	7.96E-05	68
T15	City of Troy – southern site	TA-20297	9/26/11	Field Sample	1	3.85E-05	69

Notes:
LA Libby amphibole
OU7 Operable Unit 7 of the Libby Asbestos Superfund Site
s/cc Structures per cubic centimeter

5.4 OUTDOOR ACTIVITY-BASED SAMPLING RESULTS

The primary objective of outdoor ABS in OU7 was to obtain data needed to complete an HHRA of OU7. The HHRA will assess threats to human health from both residential and community-wide (nonresident-specific) sources of LA asbestos in air within OU7. HHRA findings will be used to prepare an FS, for remedy selection, and eventually for remediation of OU7. Residential properties in OU7 fall into two categories:

- Category A – properties for which soil removal is not required based on removal criteria specified in EPA (2003) and DEQ (2009a)
- Category B – properties for which soil removal has been completed.

Air data needed to complete the HHRA for OU7—identified in the HHRA work plan for OU7 (Tetra Tech 2011b)—consist of ABS data for outdoor air, ABS data for indoor air, and ambient air data. ABS data for indoor air and ambient air data are available and usable for the HHRA; data gaps were identified in ABS data for outdoor air within the two residential property categories and within community-wide areas (Tetra Tech 2011b).

A total of 495 ABS air samples (including field QC samples) were collected in 2011 under the three residential-disturbance scenarios and three community-wide disturbance scenarios described in Section 4.1.2.

Detected ABS results for Category A residential-property disturbance scenarios appear in Table 5.11. Detected results for Category B residential-property disturbance scenarios appear in Table 5.12. Detected results for community-wide disturbance scenarios appear in Table 5.13.

Outdoor ABS results, along with indoor ABS results and outdoor ambient air results, will be used in the HHRA for OU7.

TABLE 5-11
OUTDOOR ABS CATEGORY A (NO REMOVAL PERFORMED) RESIDENTIAL PROPERTY SCENARIOS
DETECTED RESULTS

Location	Sample ID	Season	Location Type	Location Description	Personnel Task	Scenario Description	Number of Structures	Result (s/cc)
AD-200438	TB-00538	DRY	Specific Use Area	Flowerbed	Digging, Rototilling	Gardening in residential yards	1	2.20E-04
AD-200458	TB-00296	WET	Common Use Area	Yard	Raking, Digging, Mowing	Yard work in residential yards	1	2.16E-04
AD-200458	TB-00300	WET	Specific Use Area	Garden	Digging, Rototilling	Gardening in residential yards	1	2.16E-04
AD-201096	TB-00144	WET	Specific Use Area	Driveway (unpaved)	Digging, Bicycling (child)	Bicycling and playing on unpaved driveways	2	4.37E-04
AD-201096	TB-00660	DRY	Common Use Area	Yard	Raking, Digging, Mowing	Yard work in residential yards	1	2.13E-04
AD-201096	TB-00665	DRY	Common Use Area	Former Garden	Digging, Rototilling	Gardening in residential yards	2	9.98E-04
AD-201096	TB-00670	DRY	Specific Use Area	Driveway (unpaved)	Digging, Bicycling (child)	Bicycling and playing on unpaved driveways	4	8.59E-04

Note:

s/cc Structures per cubic centimeter

TABLE 5-12
OUTDOOR ABS CATEGORY B (REMOVAL PERFORMED) RESIDENTIAL PROPERTY SCENARIOS
DETECTED RESULTS

Location	Sample ID	Season	Location Type	Location Description	Personnel Task	Scenario Description	Number of Structures	Result (s/cc)
AD-200594	TB-00878	DRY	Common Use Area	Yard	Raking, Digging, Mowing	Yard work in residential yards	2	4.39E-04
AD-200634	TB-00490	WET	Specific Use Area	Driveway (unpaved)	Digging, Bicycling (child)	Bicycling and playing on unpaved driveways	1	2.12E-04
AD-200634	TB-00893	DRY	Specific Use Area	Driveway (unpaved)	Digging, Bicycling (child)	Bicycling and playing on unpaved driveways	1	2.18E-04
AD-200759	TB-00955	DRY	Common Use Area	Yard	Raking, Digging, Mowing	Yard work in residential yards	1	2.14E-04
AD-200759	TB-00963	DRY	Specific Use Area	Driveway (unpaved)	Digging, Bicycling (child)	Bicycling and playing on unpaved driveways	1	2.15E-04
AD-200880	TB-00967	DRY	Specific Use Area	Lean-To	Digging, Bicycling (child)	Bicycling and playing on unpaved driveways	1	2.15E-04

Note:
s/cc Structures per cubic centimeter

TABLE 5-13
OUTDOOR ABS COMMUNITY-WIDE SCENARIOS
DETECTED RESULTS

Location	Sample ID	Season	Location Description	Personnel Task	Scenario Description	Number of Structures	Result (s/cc)
AD-200335	TB-00597	DRY	Community	Recreational sports & Ball field	Recreational activities at parks and school yards	1	2.20E-04
AD-OU7NA	TB-00563	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	6	1.30E-03
AD-OU7NA	TB-00565	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	2	4.09E-04
AD-OU7NA	TB-00568	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	2	4.14E-04
AD-OU7NA	TB-00570	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	3	6.39E-04
AD-OU7NA	TB-00573	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	4	8.73E-04
AD-OU7NA	TB-00578	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	13	2.80E-03
AD-OU7NA	TB-00581	DRY	Community	Driving	Driving on paved and unpaved roads and alleys	1	2.07E-04
AD-200335	TB-00414	WET	Community	Recreational sports & Ball field	Recreational activities at parks and school yards	3	6.37E-04
AD-OU7NA	TB-00322	WET	Community	Bicycling (infant in trailer)	Bicycling on paved and unpaved roads and alleys	1	2.20E-04

Note:
s/cc Structures per cubic centimeter

6.0 SUMMARY AND RECOMMENDATIONS

6.1 SUMMARY

Tetra Tech was tasked by the DEQ to prepare an addendum to the *Draft Final Remedial Investigation Report for Operable Unit 7 of the Libby Asbestos Superfund Site* (Tetra Tech 2010e) for calendar year 2011. This RI report addendum summarizes activities and findings pursuant to the TAPE work plan (Tetra Tech 2007), the Outdoor AAS work plan (Tetra Tech 2009b), the RDI SAP (Tetra Tech 2010b), and the ABS SAP (Tetra Tech 2011c) for calendar year 2011.

These investigations were to assess the nature and extent of LA asbestos contamination within OU7. The resulting data will be used in the preparation of a final RI report (including an HHRA), for an FS with recommended remedial alternatives, and for remedy selection. An HHRA was not completed as part of the draft final RI report (Tetra Tech 2010e) because the toxicity of LA asbestos is still being established by the EPA. Once the draft LA asbestos toxicity values have been adopted by the EPA, an HHRA will be included in the appropriate annual addendum to the RI report. The draft final and annual addenda to the RI report will eventually be combined with the risk assessment to form a final RI report for OU7.

Tetra Tech conducted TAPE inspections at 35 parcels during calendar year 2011. The TAPE inspections included visual inspections of 29 primary buildings and 27 secondary buildings, and collection of 208 exterior soil samples and 11 interior soil samples. Of the 35 parcels that underwent a TAPE inspection in calendar year 2011, 2 were identified as eligible for removal action. Six parcels underwent removal actions in calendar year 2011. A total of 105 removal actions have been completed in OU7 since project inception. Most of the removals occurred in 2010. As of the end of calendar year 2011, 30 parcels remained on the active removal action list. An additional 30 parcels were on the inactive removal action list as of December 31, 2010. These include 6 properties whose owners deferred removal action to a later date, 17 properties whose owners declined a removal action, and 7 properties whose owners Tetra Tech was unable to contact. TAPE investigations are summarized in Section 5.2.

Tetra Tech conducted 31 AAS sampling events in 2011, bringing the total number of events since project inception to 72. A total of 566 ambient air samples (including field duplicates) had been collected as of December 31, 2011; one or more LA asbestos fibers were detected in 27 of these samples. AAS sampling results are summarized in Section 5.3.

Tetra Tech collected a total of 495 ABS air samples (including field QC samples) and 251 soil samples (including field QC samples) during calendar year 2011. Sampling activities are described in Section 4.1.2.

One or more LA asbestos fibers were detected in seven Category A (no soil removal performed) residential property disturbance scenario samples. One or more LA asbestos fibers were detected in six Category B (soil removal performed) residential property disturbance scenario samples. One or more LA asbestos fibers were detected in 10 community-wide disturbance scenario samples.

Detected results for the Category A residential-property disturbance scenario samples appear in Table 5.11. Detected results for Category B residential-property disturbance scenario samples appear in Table 5.12. Detected results for community-wide disturbance scenario samples appear in Table 5.13.

6.2 RECOMMENDATIONS

Tetra Tech recommends the following to the DEQ regarding investigations in OU7:

- Address any remaining uninspected parcels in OU7 by conducting TAPE inspections, using means such as voluntary recruitment.
- Complete removal actions on parcels identified for removals to minimize or eliminate resident exposure to LA.
- Continue to evaluate OU7 parcels for possible removal action as remaining TAPE investigations occur.
- Complete the review of all AAS data for accuracy, completeness, and validity.
- Evaluate need to continue the outdoor ambient air sampling program beyond the second year, and continue the program if deemed appropriate.
- Conduct an LA background study of soils within the OU7 footprint for use in an HHRA.
- Maintain community support and outreach in OU7.
- Once toxicity of LA asbestos has been adopted, perform an HHRA using OU7 ABS, background, and AAS data.
- Develop appropriate remedial action alternatives in an FS.

These recommendations may be modified based on findings from additional investigations in 2012 (i.e., TAPEs, ABS, background sampling).

7.0 REFERENCES

Camp, Dresser, and McKee (CDM). 2007. Draft Quality Assurance Project Plan, Libby Asbestos Site, Libby, Montana. January.

Montana Department of Environmental Quality (DEQ). 2009a. Final Libby Asbestos Site, Troy Operable Unit 07, Residential/Commercial Cleanup Criteria, Specific Use Area Visible Vermiculite Action Level Technical Memorandum. April 23.

DEQ. 2009b. Libby Asbestos Site, Troy Operable Unit 07, Removal Parcel Status. November 30.

National Institute for Occupational Safety and Health (NIOSH). 1994. Manual of Analytical Methods for Asbestos (bulk) by PLM. 9002. Issue 2. August.

Project Resources, Inc. (PRI). 2011. Response Action Work Plan. Revision 3. Libby Asbestos Project. Libby, Montana. June.

Syracuse Research Corporation (SRC). 2007. Request for Modification to Laboratory Activities (LB-000029B). April.

SRC. 2008. Standard Operating Procedure for TEM Data Review and Data Entry Verification. EPA-LIBBY-09, Revision 1. March.

Tetra Tech EM Inc. (Tetra Tech). 2007. Troy Asbestos Property Evaluation (TAPE) Work Plan (Field Sampling Plan and Quality Assurance Project Plan) for the Troy Asbestos Property Evaluation Project, Troy Operable Unit 7. July.

Tetra Tech. 2009a. Final Data Management Plan (Version 3.0) for the Troy Asbestos Property Evaluation Project. August.

Tetra Tech. 2009b. Remedial Investigation Work Plan, Outdoor Ambient Air Study (AAS), Operable Unit 7 of the Libby Asbestos Superfund Site. October.

Tetra Tech. 2010a. Final First Quarter Memorandum, Outdoor Ambient Air Study, Operable Unit Number 7 of the Libby Asbestos Superfund Site. February.

Tetra Tech. 2010b. Removal Design Investigation (RDI) Sampling and Analysis Plan (SAP) for Operable Unit 7 of the Libby Asbestos Superfund Site. April.

Tetra Tech. 2010c. Final Quarter 2 and Quarter 3 Memorandum, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site. September.

Tetra Tech. 2010d. Final Quarter 4 Memorandum, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site. December 15.

Tetra Tech. 2010e. Draft Final Remedial Investigation Report, Operable Unit 7 of the Libby Asbestos Superfund Site. December.

Tetra Tech. 2011a. Final Quarter 5 Memorandum, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site. February.

Tetra Tech. 2011b. Final Human Health Risk Assessment Work Plan, Operable Unit 7 of the Libby Asbestos Superfund Site. April 29.

Tetra Tech. 2011c. Final Activity-Based Sampling, Sampling and Analysis Plan for Operable Unit 7 of the Libby Asbestos Superfund Site. July 12.

Tetra Tech. 2011d. Final Quarter 6 Memorandum, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site. August.

Tetra Tech. 2011e. Final Quarter 7 Memorandum, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site. September.

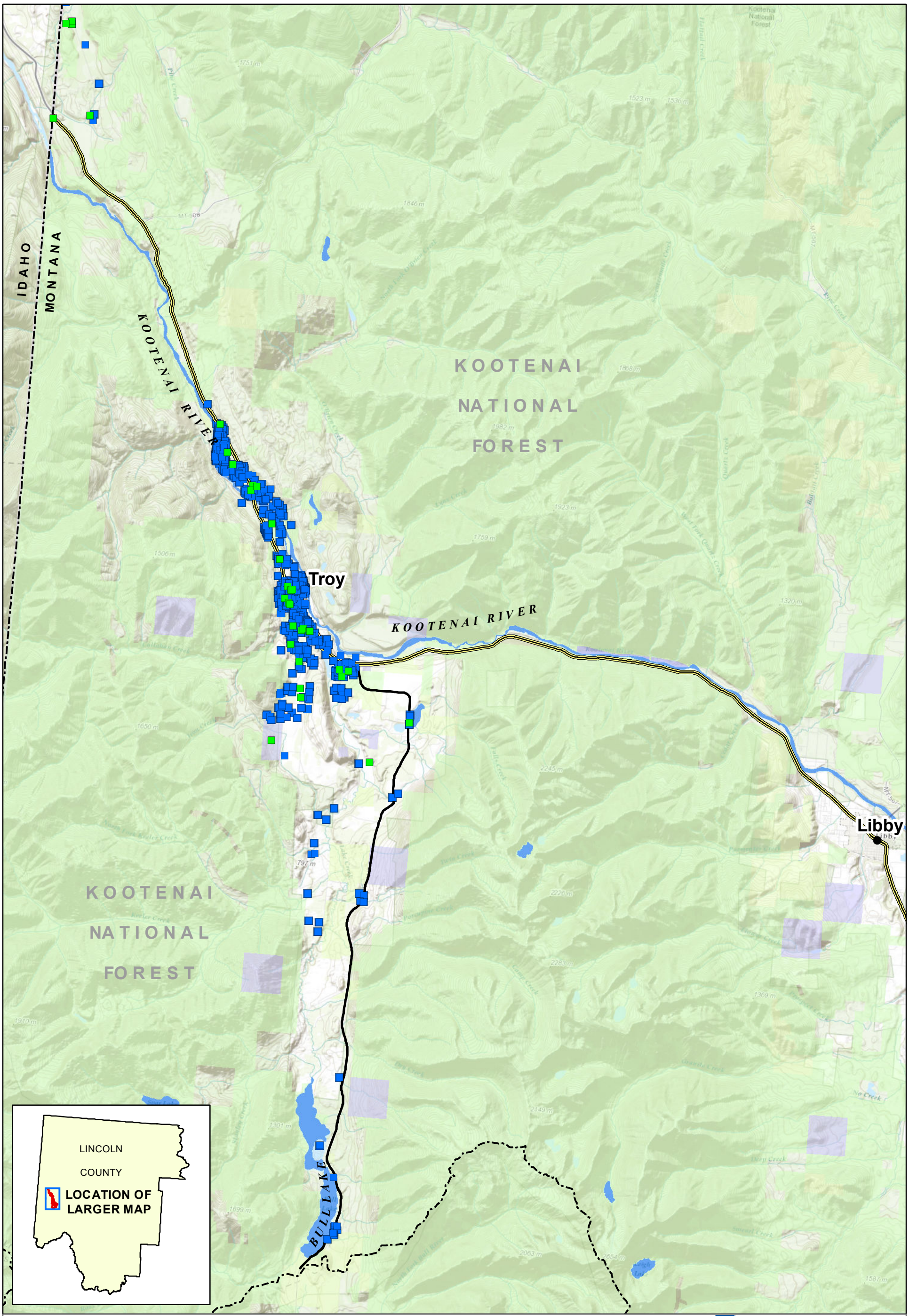
Tetra Tech. 2011f. Final Quarter 8 Memorandum, Outdoor Ambient Air Study, Operable Unit 7 of the Libby Asbestos Superfund Site. December.

U.S. Environmental Protection Agency (EPA). 1987. *Code of Federal Regulations* (CFR) 40. Appendix A to Subpart E of Part 763 – Interim Transmission Electron Microscopy Analytical Methods – Mandatory and Nonmandatory – and Mandatory Section to Determine Completion of Response Actions. October.

EPA. 2003. Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria, Technical Memorandum. Draft Final. December 15.

EPA. 2010. EPA Data Management Plan, Libby Asbestos Site. Version 2010.1. Prepared by EPA Region 8 and EPA Emergency Response and Removal DATA Team. March.

FIGURES



TETRA TECH EM INC.

Legend

- INSPECTED IN 2011 (35 PARCELS)
- INSPECTED PRIOR TO 2011 (972 PARCELS)

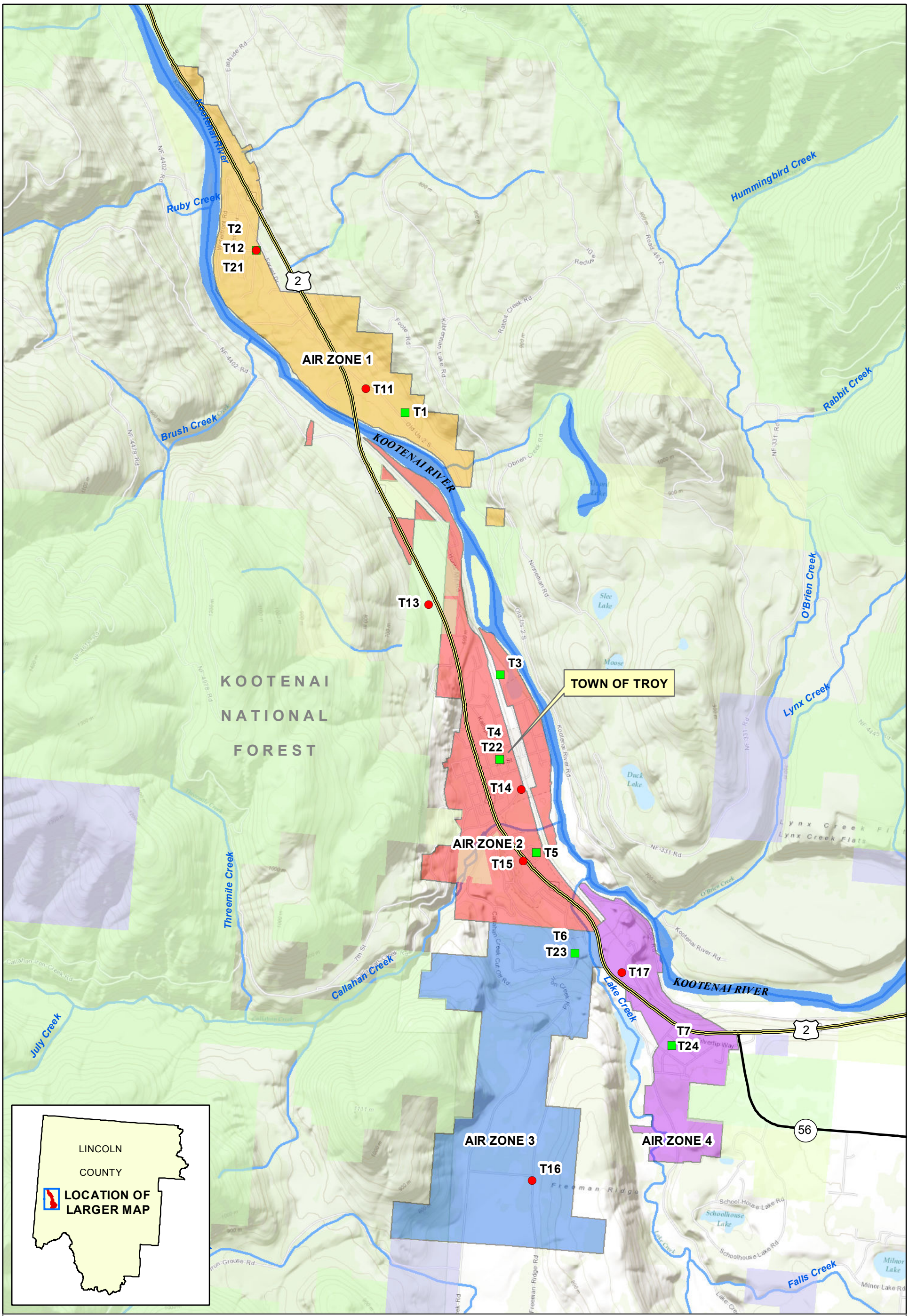
0 4 Miles

N

LIBBY ASBESTOS SUPERFUND SITE

FIGURE 2-1
OPERABLE UNIT 7
TROY ASBESTOS PROPERTY EVALUATION
INSPECTED PARCELS THROUGH 2011

GIS map by Ed Madej TTEMI-HE
FIG2-1_OU7RI_INSPECTED_PARCELS2_122612.mxd



Legend

- 2010 (Year 1) AMBIENT AIR SAMPLE STATION
- 2011 (Year 2) AMBIENT AIR SAMPLE STATION

AMBIENT AIR ZONES

- ZONE 1
- ZONE 2
- ZONE 3
- ZONE 4

0 1 Miles

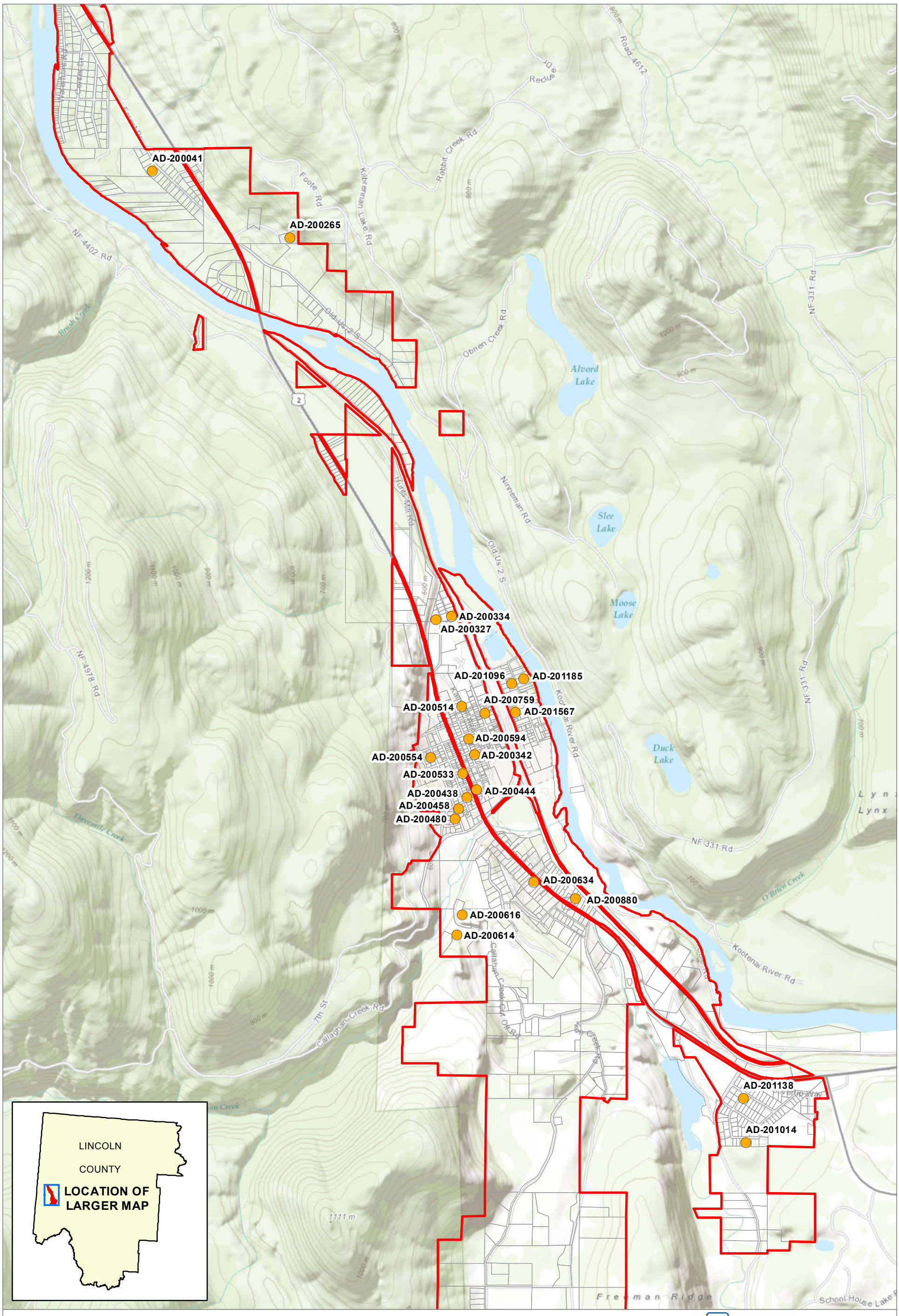
N

TETRA TECH EM INC.

LIBBY ASBESTOS SUPERFUND SITE

FIGURE 3-1
OPERABLE UNIT 7
OUTDOOR AMBIENT AIR STUDY
YEAR 1 AND YEAR 2 STATION LOCATIONS

GIS map by Ed Madej TTEMI-HE
FIG3-1_OU7RI_AMBIENT_AIR_122612.mxd



TETRA TECH EM INC.

Legend

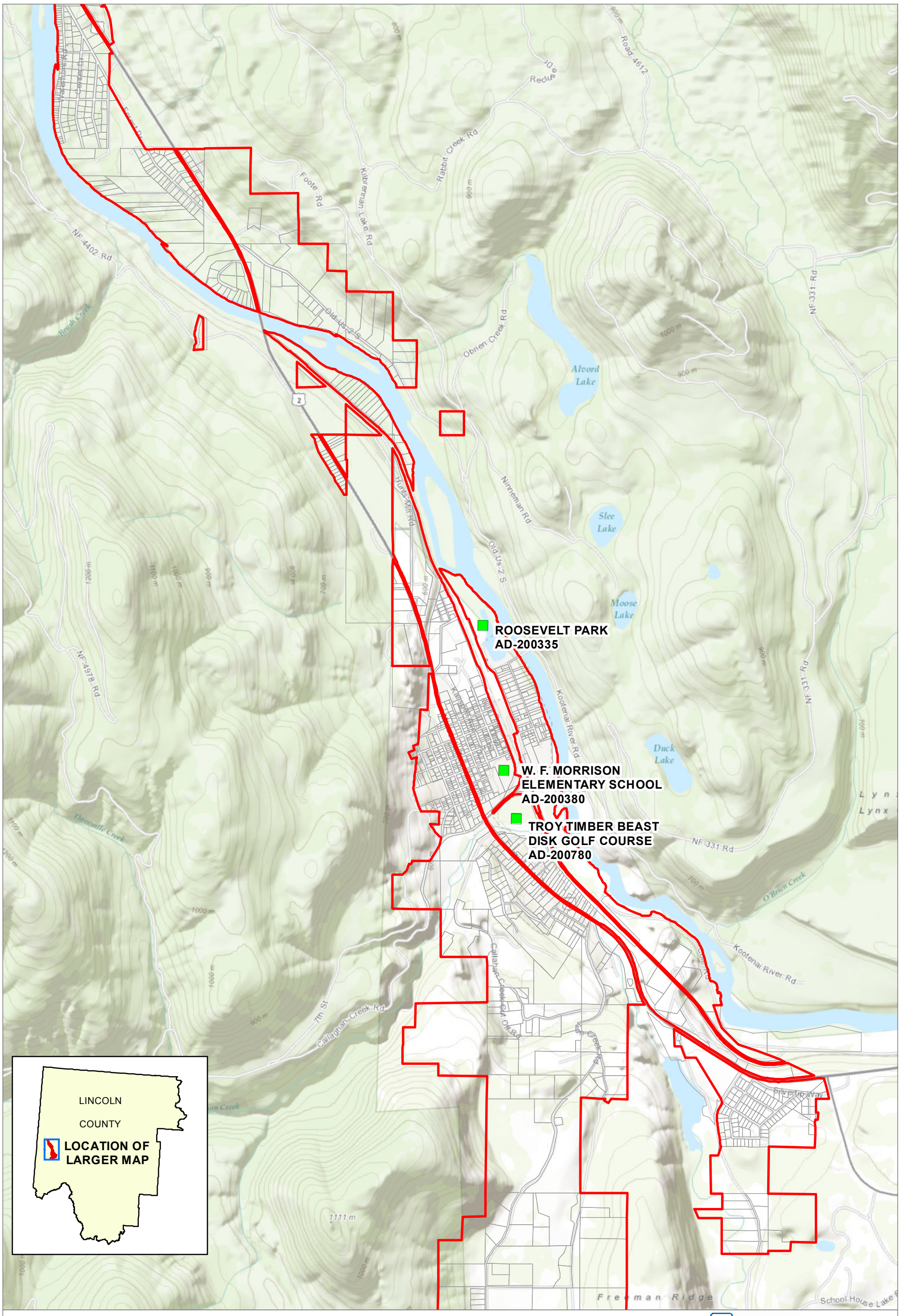
- RESIDENTIAL ACTIVITY-BASED SAMPLING LOCATION
- OPERABLE UNIT 7 BOUNDARY
- PARCEL BOUNDARY

0 2,500 Feet

LIBBY ASBESTOS SUPERFUND SITE

FIGURE 4-1
OPERABLE UNIT 7
OUTDOOR ACTIVITY-BASED SAMPLING
RESIDENTIAL SAMPLING LOCATIONS

GIS map by Ed Madej Tetra Tech HE
FIG4-1_RESIDENTIAL_ABS_122612.MXD

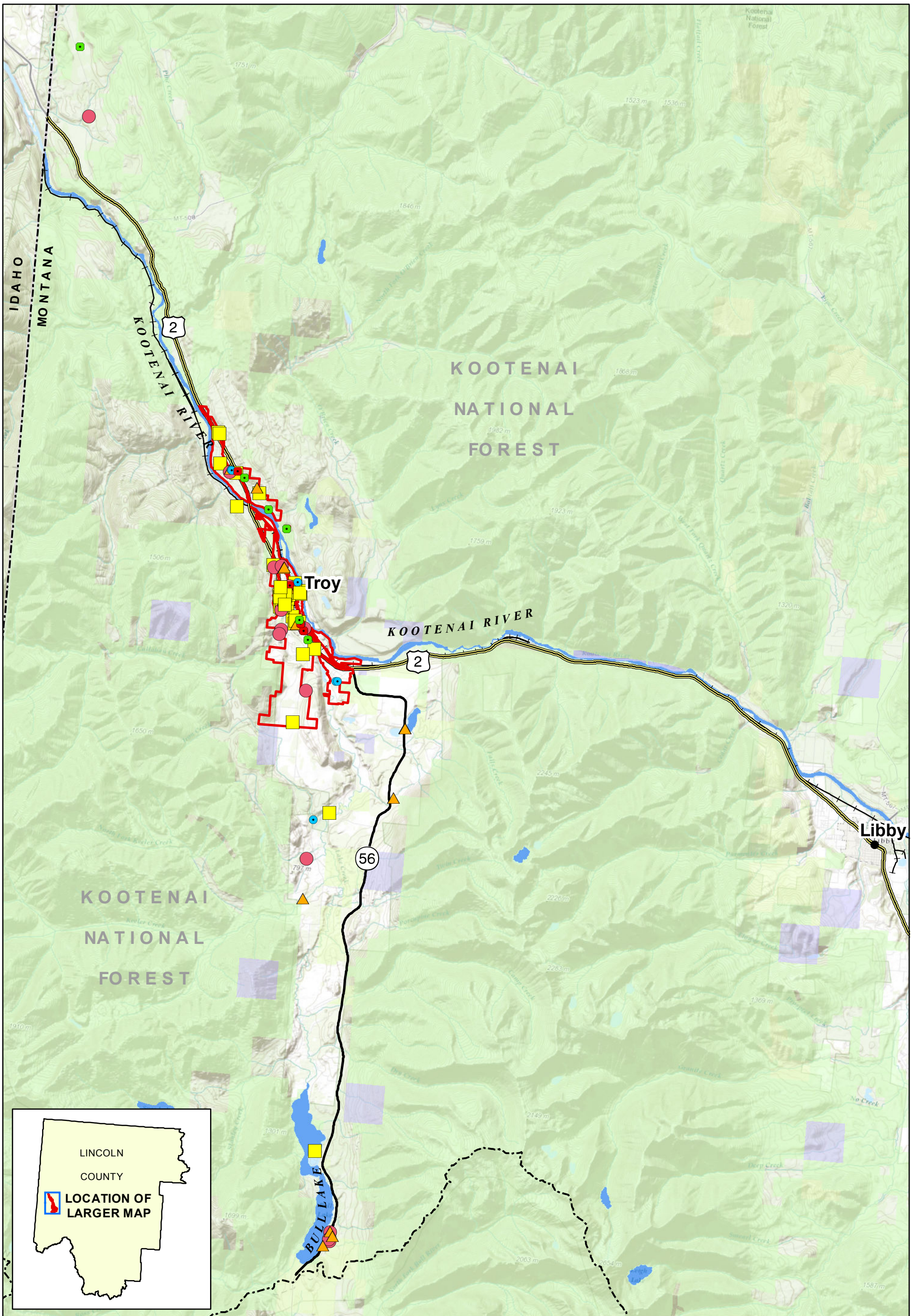


TETRA TECH EM INC.

LIBBY ASBESTOS SUPERFUND SITE

FIGURE 4-2
OPERABLE UNIT 7
OUTDOOR ACTIVITY-BASED SAMPLING
RECREATIONAL SAMPLING LOCATIONS

GIS map by Ed Madej Tetra Tech HE
FIG4-2_OU7RI_RECREATIONAL_ABS_122612.MXD



TETRA TECH EM INC.

Legend

- NO CONTACT FOR REMOVAL ACTION (5)
- DECLINED REMOVAL ACTION (13)
- DEFERRED REMOVAL ACTION (6)
- COMBINATION REMOVAL COMPLETED (16)
- EXTERIOR REMOVAL COMPLETED (14)
- INTERIOR REMOVAL COMPLETED (54)
- OU7 BOUNDARY

0 2 Miles

N

LIBBY ASBESTOS SUPERFUND SITE

FIGURE 5-1
OPERABLE UNIT 7
REMOVAL ACTION PARCELS
THROUGH 2011

GIS map by Ed Madej TTEMI-HE
FIG5-1_OU7RI_REMOVAL_PARCELS_TEST_121412.mxd

APPENDIX A
TROY FIELD OFFICE (TFO) MODIFICATION RECORDS THROUGH 2011

Record of Modification

to the

Troy Sampling and Quality Assurance Project Plan

Field Activities

TFO-00002

Instructions to Requester: **Fax to contacts at bottom of form for review and approval.**
File approved copy with Data Manager at the Troy Field Office (TFO).
Data Manager will maintain legible copies in a binder that can be accessed by TFO personnel.
If Modification is Temporary for a single Parcel, Data Manager will scan this and place in parcel's electronic file.

Project Work Plan/QAPP (check one)**:**

- ● Outdoor Ambient Air Study Work Plan
- O Other (Title and approval date):_____

Site-Specific Guidance/SOP:
Title___NA_____ Number/Revision): _NA_____

Requester: **Catherine LeCours** Title: **Project Manager**
Company: **DEQ** Date: **March 4, 2010**

Description of Modification (attach additional sheets if necessary, state section and page numbers of each document that are affected by the proposed modification): **Section 4.4.4 in the *Final Remedial Investigation Work Plan Outdoor Ambient Air Study – Operable Unit Number 7 of the Libby Asbestos Superfund Site*** references collecting approximately 3 liters per minute over the entire 5-day (120-hour) sampling event to achieve the target volume of 21,600 liters during the Troy ambient air study. A target volume of 21,600 liters will minimize the number of grid openings counted during laboratory analysis, reducing the time and cost of analysis while meeting the target analytical sensitivities.

However, sampling at high air volumes can create excessive filter loading which may lead to air pump faults, require additional analytical costs due to indirect sample analysis, or in some cases yield samples that can not be analyzed resulting in a loss of data. Therefore, the work plan reserved the option to "adjust this target volume based on changes in the target analytical sensitivities, sample results, or filter loading issues".

OU7 Overloading Summary:

Tetra Tech requested that analytical results for the first sampling period be obtained as soon as possible to determine if the specified pump flow rate of 3.0 liters per minute was excessive and filter overloading would result. Three samples from Period 1 yielded overloaded cassettes while the remaining five cassettes were not overloaded. Overloaded cassette filters were noted to have a black "soot-like" substance on the filter. The three overloaded cassettes were collected at stations T-4, T-4QC and T-5 (the DEQ Office, DEQ Office QC station, and the County Shops station). Tetra Tech consulted with the DEQ and resolved that the sample stations with the overloaded filter cassettes were likely located in dusty areas and near high traveled roads. Tetra Tech recommended relocating the sampling boxes at these locations to positions farther away from the main roads. Tetra Tech also reduced the sample flow rates from 3.0 to 2.0 liters per minute. These changes were made prior to starting sample Period 4.

The three overloaded cassettes were analyzed using a secondary dilution process. Additional grid openings would need to be counted in order to achieve the analytical sensitivity and would result in increased analytical time and costs. The number of grid openings to be counted would increase from 45 to either 73 or 146 to reach required sensitivity levels.

The initial analytical results for Sample Period 1 were received on December 8, 2009, just prior to the start of Sample Period 5. The other Period 1 sample results did not require secondary dilution; therefore Period 5 flow rates were returned to 3.0 liters per minute.

The DEQ recommended that rush analysis be completed for the Period 5 samples to help evaluate if relocating the sample boxes at T-4, T-4QC, and T-5 helped avoid filter overloading at these locations. No overloaded cassette filters were identified for any of the Period 5 samples. As a result, the new locations of the boxes and the 3.0 liters per minute flow rate was established for subsequent sampling periods.

In order to evaluate ongoing sampling activities and to check for potential overloading, the DEQ recommended that additional samples be sent in for analysis prior to the ESAT laboratory becoming operational. Samples from Period 11 were forwarded to the EMSL Libby mobile lab for analysis. Several cassette filters from Period 11 were subsequently found to be overloaded.

As a result of the periodic overloading of sample filters, DEQ directed Tetra Tech reduce the sample flow rates from 3.0 to 2.0 liters per minute for the remainder of the OU7 ambient air monitoring project. This modification was made as a permanent procedural change beginning in Sample Period 13.

Field Sampling Data Sheet where Modification is documented (attach associated correspondence): **N/A**

Potential Implications of Modification: Modifications to sampling protocol involve reprogramming sampling pumps to a flow rate of 2.0 liters per minute. Analytical protocol will be impacted as additional grids will be counted to meet analytical sensitivity requirements for the reduced air flow.

Duration of Modification (Check one):

O Temporary

Date(s):_____ Station Number-_____

TA-_____

- Permanent (Proposed Text Modification Section) Effective Date: March 4, 2010

Proposed Text Modifications in Associated Document (attach additional sheets if necessary): Section 4.4.4 in the *Final Remedial Investigation Work Plan Outdoor Ambient Air Study – Operable Unit Number 7 of the Libby Asbestos Superfund Site:*

4.4.4 Collection Interval and Flow Rates

To ensure that target analytical sensitivities can be achieved, the target volume of air to be collected for each sample will be ~~21,600~~ 14,400 liters. Tetra Tech may adjust this target volume based on changes in the target analytical sensitivities,

sample results, or filter loading issues. A target volume of ~~21,600~~ 14,400 liters will ~~minimize~~ optimize the number of grid openings counted during laboratory analysis, reducing the time and cost of analysis while meeting the target analytical sensitivities

The number of grid openings to be counted for this volume of air will be ~~45~~ 67 and was calculated using the equation provided in Section 6.1 of SOP No EPA-LIBBY-09 (rev 1). This equation and the spreadsheet used to calculate grid openings are shown in Appendix F.

To help ensure that samples capture long-term averages, each sample will be collected over a 5-day (120-hour) interval. Thus, the target flow rate is approximately ~~3~~ 2.0 liters per minute over the entire sampling event to achieve the target volume of ~~21,600~~ 14,400 liters.

Data Quality Indicator (circle one) – Please reference definitions on reverse side for direction on selecting data quality indicators:

Not Applicable **Reject** **Low Bias** **Estimate** **High Bias** **No Bias**

Technical Review and Approval: Catherine LeCours Date: March 15, 2010
(DEQ Project Manager or designate)

EPA Review and Approval: N/A Date: _____
(USEPA RPM or designate)

DATA QUALITY INDICATOR DEFINITIONS

Reject - Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely effect the associated sample to such a degree that the data are not reliable.

Low Bias - Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate - Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias - Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias - Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.

Basic Equations:

C = N * EFA / (GO * Ago * V * 1000)

S = EFA / (GO * Ago * V * 1000)

C = N * S

V = Flow * Time

EFA = effective filter area
GO = number of grid openings counted
Ago = area of one grid opening
V = volume of air passed through filter
S = analytical sensitivity = 1/volume analyzed

GOs needed to hit target S

GO = EFA / (S * Ago * V * 1000)

Note: to make GO small, must make V big

S	0.00004	cc-1
EFA	385	mm2
Ago	0.01	mm2
V	21600	L
GO	45	

Volume Calc

Flow	3	L/min
Time	5	days
V	21600	L

GOs needed to hit target S

GO = EFA / (S * Ago * V * 1000)

Note: to make GO small, must make V big

S	0.00004	cc-1
EFA	385	mm2
Ago	0.01	mm2
V	14400	L
GO	67	

Volume Calc

Flow	2	L/min
Time	5	days
V	14400	L

Record of Modification
to the
Troy Sampling and Quality Assurance Project Plan
Field Activities
TFO-00003

Instructions to Requester: **Fax to contacts at bottom of form for review and approval.**
File approved copy with Data Manager at the Troy Field Office (TFO).
Data Manager will maintain legible copies in a binder that can be accessed by TFO personnel.
If Modification is Temporary for a single Parcel, Data Manager will scan this and place in parcel's electronic file.

Project Work Plan/QAPP (check one):

- ● Outdoor Ambient Air Study Work Plan
- ○ Other (Title and approval date):_____

Site-Specific Guidance/SOP:
Title NA Number/Revision): NA

Requester: Catherine LeCours **Title:** Project Manager
Company: DEQ **Date:** October 14, 2010

Description of Modification (attach additional sheets if necessary, state section and page numbers of each document that are affected by the proposed modification): *Section 4.4.2 in the Final Remedial Investigation Work Plan Outdoor Ambient Air Study – Operable Unit Number 7 of the Libby Asbestos Superfund Site* provides a general description of proposed ambient air sampling station locations. The ambient air monitoring stations will be relocated for the second (and any subsequent) years for more comprehensive coverage of the four "air zones" identified in OU7. This will provide additional data in support of human health risks related to ambient air exposure. The text will provide flexibility for future changes to the sample station locations.

Field Sampling Data Sheet where Modification is documented (attach associated correspondence): N/A

Potential Implications of Modification: Re-locating the ambient air sampling stations within the four "air zones" will further support human health risk assessment for OU7. Moving the stations will not impact analytical protocol but may have an impact on LA concentrations due to the new station locations; however, it is not anticipated to have any impact on the quality and usefulness of analytical results.

Duration of Modification (Check one):

○ Temporary

Date(s):_____ Station Number-_____

TA-_____

● Permanent (Proposed Text Modification Section) Effective Date: November 1, 2010

Proposed Text Modifications in Associated Document (attach additional sheets if necessary): *Section 4.4.2 in the Final Remedial Investigation Work Plan Outdoor Ambient Air Study – Operable Unit Number 7 of the Libby Asbestos Superfund Site and Table 4-2 will read as follows:*

As previously discussed, the predominant winds in Troy flow in southeast and northwest directions, following the river corridor in which Troy is located. As wind direction can change throughout the year, sampling stations will be placed in close proximity to the northern and southern boundaries of OU7. This will ensure that there are upwind and downwind sample collection stations for both directions the wind is blowing. Additional stations will be located near the northern and southern borders of downtown Troy in order to have upwind and downwind sample stations in the area with the highest population density. One sample station will also be located in the densely populated area of downtown Troy and a final station will be located north of Troy in a developed area. Table 4-2 has the rationale for the ambient air monitoring locations and Figure 4-2 shows the proposed ambient air monitoring locations.

TABLE 4-2

OUTDOOR AMBIENT AIR SAMPLING LOCATIONS

Station Location*	Purpose
Upwind/downwind site near the NW border of OU7	This site will be used to evaluate LA concentrations at the northernmost boundary of OU7 and confirm if any LA is entering or leaving OU7
Community exposure site located within small community area NE of the Kootenai River	This site will be used to evaluate LA concentrations at the small community and the northern boundary of OU7
City of Troy northern site	This site will be used to evaluate LA concentrations north of the Troy community
City of Troy population exposure site	This site will be used to evaluate LA concentrations in the Troy community (specifically in the population center).
City of Troy southern site	This site will be used to evaluate LA concentrations south of the Troy community
SW upwind/downwind site	This site will be used to evaluate LA concentrations at the southwestern boundary of the OU and confirm if any LA is entering or leaving OU7
SE upwind/downwind site	This site will be used to evaluate LA concentrations at the southeastern boundary of the OU and confirm if any LA is entering or leaving OU7
Rotating co-located sampling station to each of the seven sampling locations	Co-located sampling station to evaluate analytical variability at each of the seven station locations

Notes:

LA	Libby Amphibole	SE	Southeast
NE	Northeast	SW	Southwest
NW	Northwest	OU	Operable Unit

* Predominant winds in the area blow from the southeast and northwest. Stations on the southeast and northwest boundaries of OU7 will act as upwind and downwind receptors depending on wind direction. A summary of historical meteorological conditions is presented in Section 4.4.1.

Data Quality Indicator (circle one) – Please reference definitions on reverse side for direction on selecting data quality indicators:

Not Applicable **Reject** **Low Bias** **Estimate** **High Bias** **No Bias**

Technical Review and Approval: Catherine LeCours **Date:** 10-18-2010
(DEQ Project Manager or designate)

EPA Review and Approval: [signature] **Date:** 10-18-2010
(USEPA RPM or designate)

DATA QUALITY INDICATOR DEFINITIONS

Reject – Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely affect the associated sample to such a degree that the data are not reliable.

Low Bias – Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate – Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias – Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias – Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.

Record of Modification
to the
Troy Sampling and Quality Assurance Project Plan
Field Activities
TFO-00004

Instructions to Requester: **Fax to contacts at bottom of form for review and approval.**
File approved copy with Data Manager at the Troy Field Office (TFO).
Data Manager will maintain legible copies in a binder that can be accessed by TFO personnel.
If Modification is Temporary for a single Parcel, Data Manager will scan this and place in parcel's electronic file.

Project Work Plan/QAPP (check one):

- ● Outdoor Ambient Air Study Work Plan
- ○ Other (Title and approval date):_____

Site-Specific Guidance/SOP:
Title NA Number/Revision): NA

Requester: Catherine LeCours **Title**: Project Manager
Company: DEQ **Date**: October 14, 2010

Description of Modification (attach additional sheets if necessary, state section and page numbers of each document that are affected by the proposed modification): Section 5.2 in the *Final Remedial Investigation Work Plan Outdoor Ambient Air Study – Operable Unit Number 7 of the Libby Asbestos Superfund Site* states "Field co-located samples will be collected from the same location throughout the project and will consist of a co-located sampling station (Station T4QC) to be built approximately seven feet from the proposed sampling station to be located at the DEQ Troy Information Center." For additional years of ambient air sampling this protocol will be changed so that the co-located sampling station will be named "TQC" and will move to a different sampling station during each sampling period.

Field Sampling Data Sheet where Modification is documented (attach associated correspondence): N/A

Potential Implications of Modification: Modifications to sampling protocol involve rotating the co-located sampling station among all of the seven ambient air sampling stations. Analytical protocol will not be impacted; however, moving the co-located sampling station will allow evaluation of analytical variability at all seven stations. A minimum of five co-located samples will be collected at each of the stations.

Duration of Modification (Check one):

- ○ Temporary

  Date(s):_____ Station Number-_____

  TA-_____

- ● Permanent (Proposed Text Modification Section) Effective Date: November 1, 2010

Proposed Text Modifications in Associated Document (attach additional sheets if necessary): Section 4.4.2 in the *Final Remedial Investigation Work Plan Outdoor Ambient Air Study – Operable Unit Number 7 of the Libby Asbestos Superfund Site (Table 4-2) and Section 5.2 (Paragraph 5) will read as follows:* Co-located field samples will be collected

by Station TQC at a different station location each sample period throughout the project. Station TQC will be placed next to each of the seven stations throughout monitoring. Station TQC will be moved after each sampling period and will be cycled through each of the stations (e.g. T11, T12, T13, T14...T17) so that a minimum of 5 co-located samples are collected from each of the seven sampling stations over 36 sampling periods.

TABLE 4-2

OUTDOOR AMBIENT AIR SAMPLING LOCATIONS

Station Location*	Purpose
Upwind/downwind site near the NW border of OU7	This site will be used to evaluate LA concentrations at the northernmost boundary of OU7 and confirm if any LA is entering or leaving OU7
Community exposure site located within small community area NE of the Kootenai River	This site will be used to evaluate LA concentrations at the small community and the northern boundary of OU7
City of Troy northern site	This site will be used to evaluate LA concentrations north of the Troy community
City of Troy population exposure site	This site will be used to evaluate LA concentrations in the Troy community (specifically in the population center).
City of Troy southern site	This site will be used to evaluate LA concentrations south of the Troy community
SW upwind/downwind site	This site will be used to evaluate LA concentrations at the southwestern boundary of the OU and confirm if any LA is entering or leaving OU7
SE upwind/downwind site	This site will be used to evaluate LA concentrations at the southeastern boundary of the OU and confirm if any LA is entering or leaving OU7
Rotating co-located sampling station to each of the seven sampling locations	Co-located sampling station to evaluate analytical variability at each of the seven station locations

Notes:

LA	Libby Amphibole	SE	Southeast
NE	Northeast	SW	Southwest
NW	Northwest	OU	Operable Unit

* Predominant winds in the area blow from the southeast and northwest. Stations on the southeast and northwest borders of OU7 will act as upwind and downwind receptors depending on wind direction. A summary of historical meteorological conditions is presented in Section 4.4.1.

Data Quality Indicator (circle one) – Please reference definitions on reverse side for direction on selecting data quality indicators:

Not Applicable **Reject** **Low Bias** **Estimate** **High Bias** **No Bias**

Technical Review and Approval: Catherine LeCours **Date:** 10-18-2010
(DEQ Project Manager or designate)

EPA Review and Approval: _____ **Date:** 10-18-2010
(USEPA RPM or designate)

DATA QUALITY INDICATOR DEFINITIONS

Reject – Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely affect the associated sample to such a degree that the data are not reliable.

Low Bias – Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate – Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias – Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias – Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.

Record of Modification
to the
Troy Sampling and Quality Assurance Project Plan
Field Activities
TFO-00015

Instructions to Requester: **Fax to contacts at bottom of form for review and approval.**
File approved copy with Data Manager at the Troy Field Office (TFO).
Data Manager will maintain legible copies in a binder that can be accessed by TFO personnel.
If Modification is Temporary for a Single Parcel, Data Manager will scan this and place in parcel's electronic file.

Project Work Plan/QAPP (check one)**:**

- ● Troy Asbestos Property Evaluation Work Plan
- O Other (Title and approval date):_____

Site-Specific Guidance/SOP (Number and Revision No.) (check one)**:**

- O CDM-LIBBY-10, Current Revision (30-point dust sample collection)
- O CDM-LIBBY-05, Current Revision (30-point soil sample collection)
- O CDM-LIBBY-06, Current Revision (Visible Vermiculite Estimation)

Other (Title, Number/Revision): _____

Requester: Catherine LeCours Title: Project Manager
Company: DEQ Date: May 4, 2010

Description of Modification (attach additional sheets if necessary; state section and page numbers of each document that are affected by the proposed modification): **This modification calls for the elimination of rinsate (equipment) blanks as field QC samples. Equipment blanks will no longer be collected as they are currently not required by EPA for soil sampling within OU7 because: (1) detection levels for LA using current polarized light microscopy (PLM) analytical methods are not low enough to capture concentrations that would be expected in equipment blanks; and (2) the frequency of detection for LA in historically-collected project equipment blanks is extremely low.**

Field logbook and page number where Modification is documented (or attach associated correspondence):
NA

Potential Implications of Modification: **Although equipment decontamination procedures will remain unchanged, there is a slight potential that incomplete decontamination issues will not be caught due to the elimination of equipment blanks. As the PLM analytical detection limits are not low enough to identify the levels that would remain as a result of incomplete decontamination, the contaminants that would potentially be passed along to the next soil sample would not be identified.**

Duration of Modification (check one):

O Temporary
Date(s):_____ AD-_____
BD(s)-_____ TT(s)-_____

● Permanent (Proposed Text Modification Section) Effective Date: May 4, 2010

Proposed Text Modifications in Associated Document (attach additional sheets if necessary): **The following text from Section 5.2 (Quality Control Samples) shall be removed. Equipment Rinsate Blanks** ~~**– Soil sampling equipment rinsate blanks will be collected at a rate of one per calendar week (Monday through Sunday) of sampling per field team. Equipment rinsate blanks will be collected by pouring distilled water over the sampling equipment into a decontaminated stainless steel sampling bowl, pouring the rinse water from the bowl into a sample bottle, placing the sample bottle in a re-closable plastic bag, and submitting it for analysis by method EPA 100.2, modification 20. Data from equipment blank samples will be used to evaluate whether the decontamination procedures result in sampling equipment that is asbestos-free. Equipment rinsate blank samples with elevated results may indicate inadequate equipment decontamination procedures. These results will be communicated to the field immediately upon receipt such that corrective action can be implemented.**~~

The following text shall replace the deleted text from Section 5.2 (Quality Control Samples) Equipment Rinsate Blanks: Equipment blanks are currently not required by EPA for soil sampling at OU7 because: (1) detection levels for LA using current polarized light microscopy (PLM) analytical methods are not low enough to capture concentrations that would be expected in equipment blanks; and (2) the frequency of detection for LA in historically-collected project equipment blanks is extremely low.

Data Quality Indicator (circle one) – Please reference definitions on reverse side for direction on selecting data quality indicators:

Not Applicable **Reject** **Low Bias** **Estimate** **High Bias** **No Bias**

Technical Review and Approval: Catherine LeCours Date: May 2, 3010
(DEQ Project Manager or designate)

EPA Review and Approval: NA Date: NA
(*USEPA RPM or designate*)

DATA QUALITY INDICATOR DEFINITIONS

Reject - Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely effect the associated sample to such a degree that the data are not reliable.

Low Bias - Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate - Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias - Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias - Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.

Record of Modification

to the

Troy Sampling and Quality Assurance Project Plan

Field Activities

TFO-00016

Instructions to Requester: **Fax to contacts at bottom of form for review and approval.**
File approved copy with Data Manager at the Troy Field Office (TFO).
Data Manager will maintain legible copies in a binder that can be accessed by TFO personnel.
If Modification is Temporary for a Single Parcel, Data Manager will scan this and place in parcel's electronic file.

Project Work Plan/QAPP (check one)**:**

- ● Troy Asbestos Property Evaluation Work Plan
- O Other (Title and approval date):_____

Site-Specific Guidance/SOP (Number and Revision No.) (check one)**:**

- O CDM-LIBBY-10, Current Revision (30-point dust sample collection)
- O CDM-LIBBY-05, Current Revision (30-point soil sample collection)
- O CDM-LIBBY-06, Current Revision (Visible Vermiculite Estimation)

Other (Title, Number/Revision): _____

Requester: Catherine LeCours Title: Project Manager

Company: DEQ Date: May 4, 2010

Description of Modification (attach additional sheets if necessary; state section and page numbers of each document that are affected by the proposed modification): **This modification adjusts the schedule of visual observations and soil sampling frequency for TAPE inspections. Changes implemented by this modification come from the recently approved OU4 General Property Investigation WP developed by Camp Dresser McKee (CDM) and approved as final in April 2010. This TFO is designed to provide consistency and efficiency between OU4 and OU7 sampling efforts in screening properties for potential future removal actions.**

Field logbook and page number where Modification is documented (or attach associated correspondence):
NA

Potential Implications of Modification: **This modification provides consistency to OU4 and OU7 characterization efforts and efficiency for potential future removal actions. No negative impacts to data quality or completeness of characterizations are anticipated.**

Duration of Modification (check one):

O Temporary

Date(s):_____ AD-_____

BD(s)-_____ TT(s)-_____

● Permanent (Proposed Text Modification Section) Effective Date: May 4, 2010

Proposed Text Modifications in Associated Document (attach additional sheets if necessary): **The following table and text from the General Property Investigation WP (CDM 2010) replaces all references to associated visual observation and soil sampling protocols as set forth in Section 4 of the 2007 TAPE WP. New protocols are as follows:**

Visual Inspection

Visual inspection of exterior soils will be completed in accordance with CDM-LIBBY-06. The number of point inspections to be completed per use area is defined in Table 4-2.

TABLE 4-2
TAPE VISUAL INSPECTION AND SOIL SAMPLING PROTOCOL

Area Type[1]	Visual Inspection Protocol[2]	Soil Sampling Protocol[3]
SUA (Flowerbed, Garden, Play Area, etc.)	1 PI/100 ft^2	1 sample per use area type
Driveway (SUA)	1 PI/200 ft^2	1 sample per use area
CUA (Yard, etc)	1 PI/1,450 ft^2	1 sample per acre (43,560 ft^2)
LUA (Field, Pasture, etc.)	1 PI/7,260 ft^2	1 sample per 5 acres (217,800 ft^2)
ISA (Shed, Carport, Garage, etc.)	1 PI/100 ft^2	1 sample per use area
Crawlspace (ISA)	1 PI /100 ft^2	1 sample per use area
NUA (Wooded Area, etc.)	No Inspection	No Sampling

Notes:
[1]Mulitple SUAs of the same type within the same general area may be combined to form one sample area. Examples include gardens along the drip line of the house, or multiple raised flower beds within a CUA.
[2]A minimum of 5 points will be inspected per use area regardless of size.
[3]All soil samples are 30-point composites. Areas where vermiculite is observed will also be sampled.

SUA – Specific Use Area
CUA – Common Use Area
LUA – Limited Use Are
NUA – Non Use Area
ISA – Interior Surface Area
PI – Point Inspection
ft^2 – square feet

Soil Sample Collection

The frequency of TAPE soil samples will be collected in accordance with Table 4-2, that defines the maximum area per soil sample. The soil samples will be collected following the procedures described in the TAPE Work Plan (Tetra Tech 2007). Thirty soil aliquots will be placed into a stainless steel bowl, homogenized, and placed in a re-closable plastic bag.

Data Quality Indicator (circle one) – Please reference definitions on reverse side for direction on selecting data quality indicators:

Not Applicable	Reject	Low Bias	Estimate	High Bias	No Bias

Technical Review and Approval: Catherine LeCours Date: May 4, 2010
(DEQ Project Manager or designate)

EPA Review and Approval: NA Date: NA
(*USEPA RPM or designate*)

DATA QUALITY INDICATOR DEFINITIONS

Reject - Samples associated with this modification form are not useable. The conditions outlined in the modification form adversely affect the associated sample to such a degree that the data are not reliable.

Low Bias - Samples associated with this modification form are useable, but results are likely to be biased low. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated low.

Estimate - Samples associated with this modification form are useable, but results should be considered approximations. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimates.

High Bias - Samples associated with this modification form are useable, but results are likely to be biased high. The conditions outlined in the modification form suggest that associated sample data are reliable, but estimated high.

No Bias - Samples associated with this modification form are useable as reported. The conditions outlined in the modification form suggest that associated sample data are reliable as reported.

APPENDIX B
ENVIRONMENTAL RESOURCE SPECIALIST (ERS) REPORTS THROUGH 2011

Removal and Restoration Completion Form For Quick Response Action at

Roy Navolynski

Po Box 804

Troy, Montana

RE: EPA Property ID: AD-200316

Between June 13, 2011 and June 21, 2011, quick response removal and restoration activities took place at 13280 US Highway 2 (Navolynski property). This Removal and Restoration Completion Form summarizes cleanup activities that took place at the property.

1.0 Removal and Restoration Activities

1.1 Exterior

Based on available information, including visual inspections and soil sample results, and in accordance with current removal criteria, soil removal was not warranted at this property. However, soils with trace amounts of Libby amphibole may remain in the flowerbeds around primary residence and tree rings, and the driveway. At this time, these low levels of contamination do not warrant a removal action. In order to minimize the potential for human exposure to Libby amphibole, the property owner is encouraged to refer to the EPA's document *"What to do if you find vermiculite or asbestos in or around your home or business"* when working in those areas. Also on your property, soils with visible vermiculite may remain in the flowerbeds around primary residence and tree rings. Available information suggests this material is not Libby vermiculite. Such information may include but is not limited to laboratory analytical results, visual observations and descriptions of the vermiculite by the field technicians, information provided by the property owner or resident, and overall property history and use.

1.2 Interior

Vermiculite-containing Insulation Removal

Vermiculite-containing insulation was removed from the attic space. Following the removal, the attic space was inspected and air clearance samples were collected to confirm the area was cleaned to standards established by the U.S. Environmental Protection Agency (EPA). The removed insulation was replaced unless otherwise stated in the Contract Documents.

Based on visual inspections and soil sample results, removal was not warranted in the understructure.

Interior Cleaning

Based on visual inspection, an interior cleaning was not warranted at this property.

The rental cabins and shop have been inspected to confirm that removal activities were not warranted in these structures.

I acknowledge that I have received a copy of the Quick Response Statement of Work for the property and that the removal and restoration activities were performed as discussed and agreed upon prior to the cleanup.

Owner

1-30-12
Date

Quick Response
Statement of Work
Roy Navolynski Property
13280 U.S. Highway 2, Troy, Montana 59935

1.0 Introduction

This quick response statement of work includes general and property-specific background information and response activities to be performed at 13280 U.S. Highway 2 (Navolynski property). All work at the property will be conducted in accordance with the Comprehensive Accident Prevention Plan (CDM Federal Programs Corporation [CDM] 2011); Response Action Work Plan, (RAWP) (Project Resources Incorporated (PRI 2010); and Response Action Sampling and Analysis Plan, Revision 1 (CDM 2008).

2.0 General Information

- Only government-authorized personnel will be permitted on site during the removal and restoration activities. As stated in the relocation package, for public safety, the resident will not be allowed to return to their property unless given permission or accompanied by a government representative. If the resident returns to their property without prior approval, their relocation agreement with the government will be nullified and per diem and hotel costs will not be paid. If an emergency arises and the resident requires items from inside the house (medication, etc.) they should contact the property coordination team at (406) 295-9238 for arrangements to be made to retrieve the item.

- During relocation, care for pets and plants will be coordinated by the property coordination team until the resident is allowed to return to the property.

- Some doors may be left unlocked and some windows may be left open as part of the removal activities; therefore, if the site cannot be secured, security will be provided (by the removal contractor) whenever the removal contractor is not working. When removal activities are complete, the windows and doors will be locked and additional security will not be provided. The property coordination team will be responsible for the key to the property until removal and restoration activities are complete, at which time the key will be returned to the resident.

- If the property owner or resident has questions or concerns, he or she should contact the property coordination team at (406) 295-9238.

3.0 Background Information

The subject property is located in Troy, Montana. This section provides a general description of investigation and/or removal work that has occurred at the property to

date, as well as a brief summary of the situation that has triggered quick response activities.

In June of 2007, a Troy Asbestos Property Evaluation (TAPE) was completed at the property. At that time, visible vermiculite insulation was identified in the attic space of the home. Removal work was completed at the property in 2010; however, the removal contractor didn't realize that the attic area between the main house and the garage, above the office area, should have been included in the removal scope of work.

On June 1, 2011, the property owner informed the DEQ Troy Information Center that he had begun renovation activities in an area of the house connecting the main living area with the garage. During this activity, the owner accessed this central attic area and discovered vermiculite. The owner discontinued his renovation work at that time.

4.0 Quick Response Activities

The following sections outline quick response activities to take place at the property. Work to be performed as part of this quick response will consist of:

- Set up
- Attic vermiculite insulation removal
- Wall cavity blocking

4.1 Set Up

The removal contractor will provide the water source for personnel and equipment decontamination. The removal contractor will capture the decontamination water and dispose of it properly. The removal contractor will turn off the electricity to property buildings as needed for construction. At the beginning of quick response activities, the property coordination team will coordinate with the property owner or tenant to identify equipment that must remain powered during the quick response. If applicable, the removal contractor will be responsible to maintain power to the identified items during the removal and restoration activities and will restore electricity when quick response activities are complete.

The property owner will be responsible for moving any vehicles, adjacent to the work area, outside the work zone prior to the start of quick response activities.

4.2 Attic Vermiculite Insulation Removal

Containment, negative air pressure, and final air clearance is required.

The removal contractor will ensure an 18-inch by 18-inch or equivalent area is maintained at the attic access, free of obstacles, for the ingress and egress of personnel. The removal contractor will restore any enlarged access points as close to their original conditions as possible.

The removal contractor will implement additional support as necessary to ensure the attic floor is stabilized for a minimum of one person plus equipment and to prevent damage to the ceiling below during setup, removal, and clearance activities. Any precautions taken by the removal contractor will be inspected by onsite government representatives or representatives independent of the removal contractor.

The removal contractor will remove, transport, and dispose of all insulation from the attic. The volume of insulation to be removed is approximately 7.5 cubic yards, and does not include the volume of insulation that may be removed from the ground floor walls.

The removal contractor will not remove vermiculite insulation that is inside interior walls. However, the contractor will seal any inaccessible vermiculite insulation in the exterior walls in place using attic blocking if breaches are identified between the attic and the upper walls.

The removal contractor will install blown-in insulation in attic area between the main house and the garage, above the office area, and restore all affected attic areas. The installed insulation will have a minimum rating of R-49. The removal contractor will inspect all seams, gaps, conduits, and electrical fixtures on the ground floor for vermiculite insulation. Any areas containing vermiculite insulation will be cleaned and sealed by the removal contractor. CDM will collect confirmation air clearance samples following attic removal activities to determine if the attic containment area meets the clearance criteria.

4.3 Wall Cavity Blocking

The removal contractor will inspect all seams, gaps, cracks, conduits, and open wall cavities in the area of the house connecting the main living area with the garage. The removal contractor will clean and seal any areas containing vermiculite with the appropriate materials. All removed materials will be disposed of properly by the removal contractor.

The removal contractor will replace the removed insulation in kind.

The property owner will be responsible for all remaining restoration activities and materials.

5.0 References

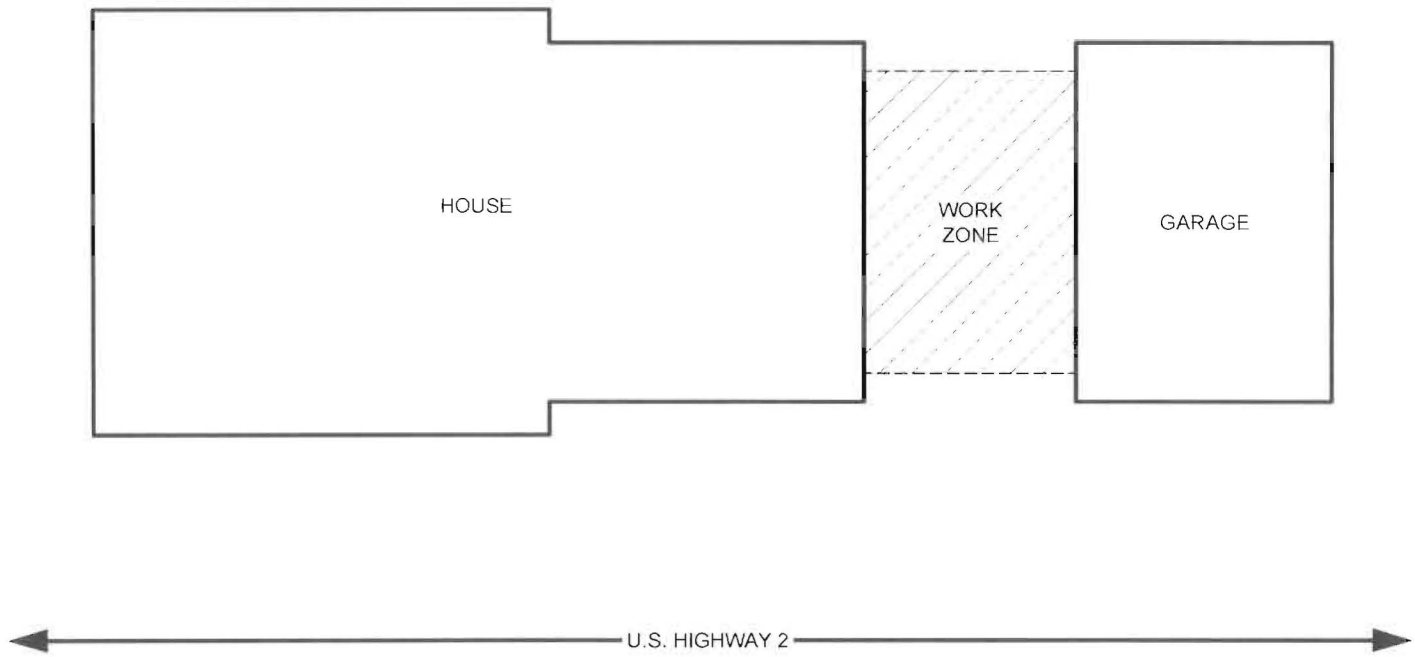
CDM. 2008. Response Action Sampling and Analysis Plan, Revision 1, Libby Asbestos Project, Libby, Montana. April.

____. 2011. Comprehensive Accident Prevention Plan, Revision 0. Libby Asbestos Project, Libby, Montana. May.

PRI. 2011. Response Action Work Plan, Libby Asbestos Project, Libby, Montana. June.

Roy Navolynski
Owner Signature

6-8-11
Date



SCALE: NO SCALE

Roy Navolynski Property (AD-200316)
Troy, Montana

QUICK RESPONSE -
ATTIC VERMICULITE REMOVAL

TETRA TECH EM. INC.

House Drawing_AD-200316.dwg - 06/08/2011 - DWH - TtEMI Helena

Murphy, Tamara

From: TrackingUpdates@emails.fedex.com
Sent: Wednesday, May 02, 2012 3:18 PM
To: Murphy, Tamara
Subject: FedEx Shipment 798324469832 Delivered

fedex.com | Ship | Track | Manage | Learn | Office/Print Services

Your shipment has been delivered.

Tracking # 798324469832

Friday 4/27/2012

Michelle Carlson
Tetra Tech EM Inc
7 West 6th Street Suite 612
Helena
MT
US
59601

Delivered

Wednesday 5/2/2012

Cecil McDougall
275 LOG CABIN RD
TROY
MT
US
59935

Shipment Facts

Our records indicate that the following shipment has been delivered:

Tracking number:	798324469832
Door Tag number:	DT102918559729
Reference:	103ds1613094
Ship (P/U) date:	Apr 27, 2012
Delivery date:	May 2, 2012 3:13 PM
Sign for by:	J.SPECK
Delivery location:	TROY, MT
Delivered to:	Receptionist/Front Desk
Service type:	FedEx Express Saver
Packaging type:	FedEx Envelope
Number of pieces:	1
Weight:	0.50 lb.
Special handling/Services:	Adult Signature Required

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This tracking update has been requested by:

Company name:	Tetra Tech EM Inc
Name:	Michelle Carlson
Email:	'not provided by requestor'

Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 4:17 PM CDT on 05/02/2012.

To learn more about FedEx Express, please visit our website at fedex.com.

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To track the latest status of your shipment, click on the tracking number above, or visit us at fedex.com.

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Thank you for your business.

FedEx

Shipment Receipt
Address Information

Ship to:	**Ship from:**
Cecil McDougall	Michelle Carlson
	Tetra Tech EM Inc
275 LOG CABIN RD	7 West 6th Street Suite 612
TROY, MT	Helena, MT
59935-9556	59601
US	US
406-295-9570	4062959238

Shipping Information
Tracking number: 798324469832
Ship date: 04/25/2012
Estimated shipping charges:

Package Information
Service type: FedEx Express Saver
Package type: FedEx Envelope
Number of packages: 1
Total weight: 0.50LBS
Declared value: 0.00USD
Special Services: Adult signature required,Residential Delivery
Pickup/Drop-off: Use an already scheduled pickup at my location

Billing Information
Bill transportation to: Tetra Tech EM Inc-080
Your reference: 103ds1613094
P.O. no.:
Invoice no.:
Department no.:

Thank you for shipping online with Fedex ShipManager at fedex.com.

Please Note

FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is $500, e.g., jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits; Consult the applicable FedEx Service Guide for details.
The estimated shipping charge may be different than the actual charges for your shipment. Differences may occur based on actual weight, dimensions, and other factors. Consult the applicable FedEx Service Guide or the FedEx Rate Sheets for details on how shipping charges are calculated.

Removal and Restoration Completion Form For Quick Response Action at

Cecil McDougall

275 Log Cabin Road

Troy, Montana

RE: EPA Property ID: AD-201036

Between July 15, 2011 and July 25, 2011, quick response removal and restoration activities took place at Address (last name property). This Removal and Restoration Completion Form summarizes cleanup activities that took place at the property.

1.0 Removal and Restoration Activities

1.1 Exterior

Soil was removed from the footprint of the house and restored in accordance with the Contract Documents. Confirmation soil samples were collected from this area to verify the contamination was removed to the depth required to meet current U.S. Environmental Protection Agency (EPA) removal goals. However, contaminated soil remains at depth in the areas indicated on the attached map. This area was covered with materials in order to minimize the potential for human exposure. EPA strongly recommends that it be left alone and not disturbed. If the at-depth material is exposed or disturbed, the property owner is encouraged to refer to the guidance included in the post-cleanup completion packet. Information about Libby vermiculite is also available at the EPA Information Center (108 E. 9th Street) and online at http://www.epa.gov/region8/superfund/libby/inhome.html. Also, soils with trace amounts of Libby amphibole may remain in the horse corral. At this time, these low levels of Libby amphibole do not warrant a removal action.

1.2 Interior

Vermiculite-containing Insulation Removal

In accordance with the Contract Documents, the guest house on the property was demolished and disposed of properly. Vermiculite-containing insulation was not removed prior to demolition. The area was restored in accordance with the Contract Documents for the property.

The primary house, detached garage, and the three sheds have not been inspected because access was not permitted during the original Troy Asbestos Property Evaluation (TAPE) inspection. It is recommended that these structures be inspected per the TAPE protocol.

I acknowledge that I have received a copy of the Quick Response Statement of Work for the property and that the removal and restoration activities were performed as discussed and agreed upon prior to the cleanup.

_____ _____

Owner Date

Quick Response Statement of Work

Cecil McDougall Property
275 Log Cabin Road
Troy, MT 59935

1.0 Introduction

This quick response statement of work includes general and property-specific background information and demolition response activities to be performed at 275 Log Cabin Road (Cecil McDougall property). All work is associated with the McDougall's guest house (BD-200969). All work at the property will be conducted in accordance with the Comprehensive Site Health and Safety Program (CDM Federal Programs Corporation [CDM] 2006); Troy Area Property Evaluation (TAPE) Site Specific Health and Safety Plan (Tetra Tech 2009a), Response Action Work Program (RAWP) Project Resources, Inc. (PRI) (PRI 2010); and the TAPE Work Plan (Tetra Tech 2009b).

2.0 General Information

Only government-authorized personnel will be permitted on site during the removal and restoration activities. As stated in the relocation package, for public safety, the resident will be allowed to stay in their residence during the quick response demolition/removal effort but will not be allowed access to the guest house unless given permission or accompanied by a government representative. If an emergency arises and the resident requires items from inside the guest house they should contact the property coordination team at (406) 295-9238 for arrangements to be made to retrieve the item prior to demolition.

3.0 Background Information

The subject property is located in Troy, Montana. In 2007, a limited access Troy Asbestos Property Evaluation (TAPE) was completed at the property. At that time, the guest house on the property (BD-200969) was not identified as a priority cleanup and vermiculite insulation not found to be present in the living spaces. Additionally, during the TAPE inspection vermiculite insulation was not discovered in the attic of the house.

On March 29, 2011, the property owner informed the DEQ Troy information center that he was planning to demolish the guest house. He provided a jar containing vermiculite insulation that he obtained from the walls of building. Tetra Tech's ERS technician, Jay Jordan, mobilized to the property and confirmed the presence of

vermiculite in the attic. He observed remnants of vermiculite insulation beneath fiberglass and mineral wool insulation. Upon obtaining signed authorization from the owner allowing destructive sampling, Tetra Tech returned to the guest house to open interior walls to determine if they also contained vermiculite. Tetra Tech confirmed the presence of minor amounts of vermiculite in the perimeter and interior walls, but the extent could not be determined without more extensive demolition.

4.0 Quick Response Activities

The following sections outline quick response activities to take place at the property. Work to be performed as part of this quick response will consist of:

- Set up
- Demolition
- Restoration

4.1 Set Up

The removal contractor will provide the water source for personnel and equipment contamination. The removal contractor intends to pump water from Lake Creek during the effort. The removal contractor will capture the decontamination water and dispose of it properly. The property owner has stated that the electricity has been disconnected from the guest house building (BD-200969) and this will be confirmed by the removal contractor prior to demolition. The removal contractor will disconnect the phone line from the building and leave the line intact for the owner. All other utilities have been disconnected by the owner and this will be confirmed by the removal/demolition contractor prior to demolition.

The removal contractor will establish a containment area outside the excavation perimeter. All work, including set-up activities, conducted within the exclusion zone will be completed in Level C personal protective equipment as defined in the Comprehensive Site Health and Safety Plan (CDM 2006).

The removal contractor will construct an appropriate water collection, soil erosion, and sediment control system to collect and prevent runoff of water used for dust suppression. All collected water will be managed, transported, and disposed of properly by the removal contractor.

The property owner will be responsible for moving all vehicles off the property prior to the start of quick response demolition activities.

The removal contractor will punch holes in the roof and the interior walls of the building and saturate the building with water prior to beginning demolition activity.

4.2 Demolition

All of the building demolition materials will be disposed of properly by the removal contractor. The removal contract will take steps to avoid damaging the pine tree on the east side of the building, as well as the septic tank buried approximately 12 feet out from the north side of the building.

The removal contractor should avoid the sewer hole located at the north east corner of the building. The owner agreed to allow the removal contractor to fill the sewer hole after demolition has been completed.

The building has a concrete foundation that should be removed during the demolition phase.

The property owner has given the removal contractor permission to remove and dispose of the following items:

- Lilac bushes on the north side of the building
- Rose bushes on the south side of the building
- Fuel oil tank on the northeast corner of the building can be cut at the legs by the removal contractor and set aside for the owner to dispose of

No restoration materials or credits will be required.

4.3 Restoration

The total demolition area comprises an approximate 30 by 30- foot zone of approximately 900 square feet in size. The excavated area will be restored by the removal contractor after demolition has been completed. The building has a basement within approximately half of its footprint that will require approximately 96 inches of common fill after demolition. Other areas within the building footprint will require approximately 12 inches of common fill after demolition. A total of 150 cubic yards of common fill are estimated for the renovation. Additionally the entire footprint will require 4 inches of topsoil (11 cubic yards).

Provide 900 square feet of (Seed Type) seed to cover the area disturbed by the demolition and removal efforts.

CDM will collect confirmation soil samples following excavation to determine if further soil removal is warranted. Soil removed will be disposed of as per response action guidance (PRI 2010).

No other restoration materials or credits will be required. The property owner will be responsible for all remaining restoration activities and materials.

5.0 References

CDM. 2006. Comprehensive Site Health and Safety Program, Revision 5. Libby Asbestos Project, Libby, Montana. December.

Project Resources, Inc. (PRI) 2010. Response Action Work Plan, Libby Asbestos Project, Libby, Montana. May.

Tetra Tech. 2009a. Troy Area Property Evaluation Health and Safety Plan, Troy Operable Unit 7 of the Libby Asbestos Superfund Site. May.

Tetra Tech. 2009b. Troy Area Property Evaluation Work Plan, Troy Operable Unit Number 7 of the Libby Asbestos Superfund Site. May.

Home Owner Signature

7/13/11
Date

Removal and Restoration Completion Form For Quick Response Action at

Linda Lundin

69 Lime Creek Lane

Troy, Montana

RE: EPA Property ID: AD-202007

OnAugust 4, 2011, quick response removal and restoration activities took place at 69 Lime Creek Lane (Lundin property). This Removal and Restoration Completion Form summarizes cleanup activities that took place at the property.

1.0 Removal and Restoration Activities

1.1 Exterior

Soil was removed from the footprint of the former chicken coop and restored in accordance with the Contract Documents. Confirmation soil samples were collected from this area to verify the contamination was removed to the depth required to meet current U.S. Environmental Protection Agency (EPA) removal criteria.

However, based on information from the removal activities conducted in September 2010, contaminated soil remains at depth in areas indicated on the map received at the time of your May 2011 meeting. These areas were covered with materials in order to minimize the potential for human exposure. EPA strongly recommends that it be left alone and not disturbed. Also on your property, soils with Libby Amphibole may remain in a section of the pasture. Such information may include but is not limited to laboratory analytical results, visual observations and descriptions of the vermiculite by the field technicians, information provided by the property owner or resident, and overall property history and use.

I acknowledge that I have received a copy of the Quick Response Statement of Work for the property and that the removal and restoration activities were performed as discussed and agreed upon prior to the cleanup.

Linda J. Lundin 02/07/12

Owner Date

Quick Response
Statement of Work
Lundin Property
69 Lime Creek Lane
Troy, MT 59935

1.0 Introduction

This quick response statement of work includes general and property-specific background information and response activities to be performed at 69 Lime Creek Lane (Lundin property) to properly decontaminate and dispose of vermiculite debris and contaminated soil located on the north and east sides of the Chicken Coop (BD-202387) on the north section of the Lundin property. All work at the property will be conducted in accordance with the Comprehensive Accident Prevention Plan (CDM Federal Programs Corporation [CDM] 2011), Response Action Work Program (RAWP) Project Resources, Inc. (PRI) (PRI 2010); and Response Action Sampling and Analysis Plan, Revision 1 (CDM 2008).

2.0 General Information

- Only government-authorized personnel will be permitted inside the construction zone during removal and restoration activities.
- If the property owner or resident has questions or concerns, he or she should contact the Tetra Tech property coordination team at (406) 295-9238.

3.0 Background Information

This section provides a general description of investigation activities that have occurred at the property to date, as well as a brief summary of the situation that triggered quick response activities.

A Troy Asbestos Property Evaluation (TAPE) inspection was completed at the Lundin property in July 2008 at which time significant vermiculite contamination was discovered throughout exterior property areas. A subsequent RDI survey and an abatement design were completed in June 2010. Exterior removal actions were completed at Lundin property in September and October 2010.

On Thursday, June 14, 2011 the property owner, Linda Lundin, informed the Troy DEQ office that she had demolished the northern half of their chicken coop and discovered vermiculite in the soil beneath the perimeter footings of the building. Additionally, she stated that vermiculite was observed migrating downhill from the perimeter wall of the south section of the building. Apparently, soil removal was completed within and around the chicken coop during the summer of 2010; however, soil was not removed under the building footings, an area which is now exposed and remains contaminated.

Tetra Tech inspected the chicken coop on July 14th and confirmed the presence of vermiculite along a 4 to 6-inch wide strip approximately 32 foot long where the building footing had been located at the north end of the chicken coop. (see removal design sketch) Vermiculite was also observed migrating downhill from the east side of the building contaminating a 12 by 4 foot area east of the remaining section of the chicken coop.

collect confirmation soil samples following excavation to determine if further soil removal is warranted. Soil removed will be disposed of as per response action guidance (PRI 2010).

Restore the disturbed area with 8 inches of common fill (2.5 cubic yards) and 4 inches of top soil (1.5 cubic yards). Provide 100 square feet of (playground mix) seed to cover the area disturbed by the decontamination and removal efforts.

The property owner will be responsible for any additional restoration activities and materials.

6.0 References

CDM. 2011. Comprehensive Accident Prevention Plan, Revision 0. Libby Asbestos Project, Libby, Montana. May.

____. 2008. Response Action Sampling and Analysis Plan, Revision 1, Libby Asbestos Project, Libby, Montana. April.

Project Resources, Inc. (PRI) 2010. Response Action Work Plan, Libby Asbestos Project, Libby, Montana. May.

Linda J. Lundin
Property Owner Signature

07/28/2011
Date

Removal and Restoration Completion Form For Quick Response Action at

Linda Owen

160 Forest Road

Troy, Montana

RE: EPA Property ID: AD-202045

Between July 13, 2011 and July 14, 2011, quick response removal and restoration activities took place at 160 Forest Road (Owen property). This Removal and Restoration Completion Form summarizes cleanup activities that took place at the property.

1.0 Removal and Restoration Activities

1.1 Exterior

Soil was removed from the yard and restored in accordance with the Contract Documents. Confirmation soil samples were collected from this area to verify the contamination was removed to the depth required to meet current U.S. Environmental Protection Agency (EPA) removal criteria.

I acknowledge that I have received a copy of the Quick Response Statement of Work for the property and that the removal and restoration activities were performed as discussed and agreed upon prior to the cleanup.

Linda Owen 01/19/12

Owner Date

Quick Response
Statement of Work
Owen Property
160 Forest Road
Troy, MT

1.0 Introduction

This quick response statement of work includes general and property-specific background information and response activities to be performed at 160 Forest Road (Owen property) to properly decontaminate and dispose of vermiculite debris and contaminated soil located east of the water pump shed, south of the garage on the Owen property. All work at the property will be conducted in accordance with the Comprehensive Accident Prevention Plan (CDM Federal Programs Corporation [CDM] 2011), Response Action Work Program (RAWP) Project Resources, Inc. (PRI) (PRI 2010); and Response Action Sampling and Analysis Plan, Revision 1 (CDM 2008).

2.0 General Information

- Only government-authorized personnel will be permitted inside the construction zone during removal and restoration activities.
- If the property owner or resident has questions or concerns, he or she should contact the Tetra Tech property coordination team at (406) 295-9238.

3.0 Background Information

This section provides a general description of investigation activities that have occurred at the property to date, as well as a brief summary of the situation that triggered quick response activities.

A Troy Asbestos Property Evaluation (TAPE) inspection has not been completed at the Owen property; however, during the 2010 summer field season an old school bus that was formerly used to transport mine workers from Troy to Libby and now sits on the north end of the Owen property was decontaminated via the ERS process.

On Friday, May 27, 2011 the property owner, Linda Owen, came to the Troy DEQ office stating that she was cleaning her yard and found a ~~black garbage bag with vermiculite in it.~~ Tetra Tech arrived at the property and was shown the location where a ~~plastic bag containing vermiculite~~ had been damaged. Visible vermiculite had been strewn throughout ~~a 20 by 20 foot partially wooded~~ area between the water pump shed and a garage east of the Owen family's house. The owner also showed Tetra Tech the location of a five gallon bucket full of yard debris and vermiculite.

4.0 Schedule

The work specified herein shall be performed between 7:00 am and 5:00 pm Monday through Thursday unless otherwise requested and approved by PRI and the property owner. The project is tentatively scheduled to be completed in June 2011, once this statement of work is approved and equipment becomes available.

Work stoppage may be required if other health and safety related issues are identified which could lead to worker injuries. PRI and Tetra Tech anticipate that all work can be completed during one mobilization. Project sequencing is discussed in Section 5 below.

5.0 Quick Response Activities

The following sections outline quick response activities to take place at the property. Work to be performed as part of this quick response will consist of:

- Set up
- Soil excavation / Site restoration

5.1 Set Up

At the beginning of quick response activities, the property coordination team will coordinate with the property owner to identify the area to remain clear during response activities and will identify all safety conditions related to the response. Once contractor mobilization to the site is complete, the contractor will:

- Establish an exclusion zone around the contaminated soil area
- Develop a waste staging area

The quick response contractor will provide the water source and materials necessary for personnel and equipment decontamination. The contractor will perform all decontamination activities within the exclusion zone.

5.2 Soil Excavation and Site Restoration

To complete soil excavation and site restoration activities the quick response contractor will:

The removal contractor will excavate the contaminated soil area to a depth of 12 inches below ground surface. The total area comprised an approximate ~~20 by 20- foot zone of~~ approximately ~~400 square feet in size.~~ A resulting 15 cubic yards of soil is scheduled to be removed (see attached drawing for exact location). CDM will collect confirmation soil samples following excavation to determine if further soil removal is warranted. Soil removed will be disposed of as per response action guidance (PRI 2010).

Restore the disturbed area with 8 inches of common fill (10 cubic yards) and 4 inches of top soil (5 cubic yards). Provide 400 square feet of (Seed Type) seed to cover the area disturbed by the decontamination and removal efforts.

NO **~~The property owner will be responsible for any additional restoration activities and materials.~~**

6.0 References

CDM. 2011. Comprehensive Accident Prevention Plan, Revision 0. Libby Asbestos Project, Libby, Montana. May.

____. 2008. Response Action Sampling and Analysis Plan, Revision 1, Libby Asbestos Project, Libby, Montana. April.

Project Resources, Inc. (PRI) 2010. Response Action Work Plan, Libby Asbestos Project, Libby, Montana. May.

Linda Owen
Property Owner Signature

6/16/06
Date

APPENDIX C
SUMMARY OF TAPE INVESTIGATION RESULTS THROUGH 2010

APPENDIX C
TROY ASBESTOS PROPERTY EVALUATION STATISTICS FOR 2011

Description	Parcel Count	Primary Building	Secondary Building	Use Area	Soil Samples	Soil Field Duplicate
Total Inspections, 2007–2011 (all OUs, includes R&A)	1,310					
Total Parcels (all OUs, includes R&A)	1,619					
Total parcels outside of OU7	72					
Road and Alley Parcels	316					
2007 - 2011 Access Granted	984					
2007 - 2011 Access Limited	10					
2007 - 2011 Access Denied	138					
2011 Access Granted	32					
2011 Access Limited	2					
2011 Access Denied	102					
2011 TAPE Inspection	35	35	72	210	208[a]	9
2011 Inspections outside of OU7	8					
2011 TAPE Inspection – No attics	23					
2011 TAPE Inspection – Inaccessible attics (entry denied or physical barrier)	11					
2011 TAPE Inspection – No VCI per Owner	4					
2011 TAPE Inspection – VCI in attic	1					
2011 TAPE Inspection – VV in indoor living space	2					
2011 TAPE Inspection – Common Use Areas	27					
2011 TAPE Inspection – Limited Use Areas	30					
2011 TAPE Inspection – Specific Use Areas	31					
2011 TAPE Inspection – Non-Use Areas	19					
2011 TAPE Inspection – Interior Soil					11	
2011 TAPE Inspection – ERS Action	1					

Notes:

a Includes both exterior and interior and co-located samples.

ERS Environmental Resource Specialist

OU7 Operable Unit 7 of the Libby Asbestos Superfund Site

R&A Roads and alleys

VCI Vermiculite-containing insulation

VV Visible vermiculite

APPENDIX D
REMOVAL STATISTICS THROUGH 2011

REMOVAL ACTION STATISTICS - PROJECT INCEPTION THROUGH 2011
OPERABLE UNIT 7 OF THE LIBBY ASBESTOS SUPERFUND SITE

Year	Property ID	Property Zone	Removal Description	Removal Date	Comments
				2008	
2008	AD-202037	OU99	Indoor/Outdoor	21-Jul-08	CDM Remediation - Interior and Exterior Removal
2008	AD-200618	OU7	Indoor/Outdoor	30-Jul-08	CDM Remediation - Interior and Exterior Removal
2008	AD-200767	OU7	Indoor/Outdoor	13-Aug-08	CDM Remediation - Interior and Exterior Removal
2008	AD-200619	OU7	Indoor/Outdoor	26-Aug-08	CDM Remediation - Interior and Exterior Removal
2008	AD-200347	OU7	Indoor/Outdoor	28-Aug-08	CDM Remediation - Interior and Exterior Removal
2008	AD-200771	OU7	Indoor/Outdoor	02-Sep-08	CDM Remediation - Demo and Exterior Removal
2008	AD-200592	OU7	Indoor	05-Sep-08	CDM Remediation - Interior Removal
2008	AD-200919	OU7	Indoor	25-Sep-08	CDM Remediation - Interior Removal
				2009	
2009	AD-200592	OU7	Indoor/Outdoor	17-Jul-09	CDM Remediation - Interior and Exterior Removal
2009	AD-200588	OU7	Indoor/Outdoor	21-Aug-09	CDM Remediation - Interior and Exterior Removal
2009	AD-202000	OU99	Indoor/Outdoor	21-Aug-09	CDM Remediation - Demo and Exterior Removal
2009	AD-202002	OU99	Indoor/Outdoor	21-Aug-09	CDM Remediation - Demo and Exterior Removal
2009	AD-202015	OU99	Indoor	01-Oct-09	USACE Remediation - Complete Interior Removal
2009	AD-200594	OU7	Indoor/Outdoor	01-Oct-09	USACE Remediation - Complete Interior and Exterior Removal
				2010	
2010	AD-200971	OU7	Indoor	06-May-10	USACE Remediation - Demolition and Exterior Removal
2010	AD-200629	OU7	Indoor	10-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200388	OU7	Indoor	11-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200960	OU7	Indoor	11-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-201158	OU7	Indoor	15-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200343	OU7	Indoor	16-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-201154	OU7	Indoor	17-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200515	OU7	Indoor	18-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-201134	OU7	Indoor	23-Jun-10	USACE Remediation - Complete Interior Removal

REMOVAL ACTION STATISTICS - PROJECT INCEPTION THROUGH 2011
OPERABLE UNIT 7 OF THE LIBBY ASBESTOS SUPERFUND SITE

Year	Property ID	Property Zone	Removal Description	Removal Date	Comments
2010	AD-200929	OU7	Indoor	24-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200654	OU7	Indoor	25-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-201193	OU7	Indoor	25-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200711	OU7	Indoor	28-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200512	OU7	Indoor	29-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200659	OU7	Indoor	30-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-201096	OU7	Indoor	30-Jun-10	USACE Remediation - Complete Interior Removal
2010	AD-200706	OU7	Indoor	01-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200538	OU7	Indoor	06-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200834	OU7	Indoor	06-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200759	OU7	Indoor	12-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200578	OU7	Indoor	13-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200658	OU7	Indoor	14-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-202018	OU99	Indoor	15-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200663	OU7	Indoor	21-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200510	OU7	Indoor	22-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-202005	OU99	Indoor	22-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200422	OU7	Indoor	23-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200417	OU7	Indoor	28-Jul-10	USACE Remediation - Complete Interior Removal
2010	AD-200458	OU7	Indoor	03-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-201495	OU7	Indoor	03-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200472	OU7	Indoor	04-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200518	OU7	Indoor	04-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200456	OU7	Indoor	09-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200438	OU7	Indoor	10-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200448	OU7	Indoor	11-Aug-10	USACE Remediation - Complete Interior Removal

REMOVAL ACTION STATISTICS - PROJECT INCEPTION THROUGH 2011
OPERABLE UNIT 7 OF THE LIBBY ASBESTOS SUPERFUND SITE

Year	Property ID	Property Zone	Removal Description	Removal Date	Comments
2010	AD-200527	OU7	Indoor	11-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200507	OU7	Indoor	16-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200564	OU7	Indoor	16-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200007	OU7	Indoor	17-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200723	OU7	Indoor	18-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200600	OU7	Indoor	20-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200865	OU7	Indoor	24-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200090	OU7	Indoor	25-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200241	OU7	Indoor	25-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200244	OU7	Indoor	25-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200277	OU7	Indoor	25-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200925	OU7	Indoor	25-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200316	OU7	Indoor	31-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-201041	OU7	Indoor	31-Aug-10	USACE Remediation - Complete Interior Removal
2010	AD-200342	OU7	Indoor/Outdoor	08-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200332	OU7	Outdoor	08-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-202008	OU99	Indoor	10-Sep-10	USACE Remediation - Demolition
2010	AD-200055	OU7	Indoor/Outdoor	13-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200752	OU7	Indoor/Outdoor	13-Sep-10	USACE Remediation - Demolition and Exterior Removal
2010	AD-200041	OU7	Outdoor	13-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-200265	OU7	Indoor/Outdoor	15-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200616	OU7	Outdoor	16-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-202007	OU99	Outdoor	20-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-200689	OU7	Indoor/Outdoor	21-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200074	OU7	Indoor	22-Sep-10	USACE Remediation - Complete Interior Removal
2010	AD-200264	OU7	Indoor	22-Sep-10	USACE Remediation - Demolition and Exterior Removal

REMOVAL ACTION STATISTICS - PROJECT INCEPTION THROUGH 2011
OPERABLE UNIT 7 OF THE LIBBY ASBESTOS SUPERFUND SITE

Year	Property ID	Property Zone	Removal Description	Removal Date	Comments
2010	AD-201102	OU7	Indoor	22-Sep-10	USACE Remediation - Complete Interior Removal
2010	AD-200334	OU7	Indoor/Outdoor	22-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-201526	OU7	Indoor/Outdoor	22-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200614	OU7	Outdoor	22-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-200480	OU7	Outdoor	27-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-201530	OU7	Indoor	28-Sep-10	USACE Remediation - Demolition and Exterior Removal
2010	AD-202043	OU99	Indoor	28-Sep-10	USACE Remediation - Demolition and Exterior Removal
2010	AD-200852	OU7	Outdoor	28-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-200634	OU7	Indoor/Outdoor	29-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-202012	OU99	Indoor/Outdoor	29-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200533	OU7	Indoor/Outdoor	30-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200759	OU7	Indoor/Outdoor	30-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-202010	OU99	Indoor/Outdoor	30-Sep-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200880	OU7	Outdoor	30-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-202009	OU99	Outdoor	30-Sep-10	USACE Remediation - Complete Exterior Removal
2010	AD-202011	OU99	Indoor/Outdoor	05-Oct-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-202040	OU99	Indoor/Outdoor	05-Oct-10	USACE Remediation - Complete Exterior Removal
2010	AD-202006	OU99	Indoor/Outdoor	06-Oct-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-200839	OU7	Indoor	08-Oct-10	USACE Remediation - Demolition and Exterior Removal
2010	AD-202001	OU99	Indoor/Outdoor	08-Oct-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-202020	OU99	Indoor/Outdoor	08-Oct-10	USACE Remediation - Complete Interior and Exterior Removal
2010	AD-202030	OU99	Outdoor	08-Oct-10	USACE Remediation - Complete Exterior Removal
2010	AD-202031	OU99	Outdoor	08-Oct-10	USACE Remediation - Complete Exterior Removal
2010	AD-200315	OU7	Outdoor	18-Oct-10	USACE Remediation - Complete Exterior Removal
				2011	
2011	AD-200713	OU7	Indoor	17-Jan-11	USACE Remediation - Complete Interior Removal

REMOVAL ACTION STATISTICS - PROJECT INCEPTION THROUGH 2011
OPERABLE UNIT 7 OF THE LIBBY ASBESTOS SUPERFUND SITE

Year	Property ID	Property Zone	Removal Description	Removal Date	Comments
2011	AD-202033	OU99	Indoor/Outdoor	16-Jun-11	Combo
2011	AD-201150	OU7	Indoor	28-Jun-11	USACE Remediation - Complete Interior Removal
2011	AD-200598	OU7	Indoor	29-Jun-11	Interior
2011	AD-200005	OU7	Indoor	14-Jul-11	Interior
2011	AD-200441	OU7	Indoor	02-Sep-11	

ATTACHMENT

Libby Asbestos Site, Troy OU7 Residential/Commercial Cleanup Criteria, Specific Use Area Visible Vermiculite Action Level Technical Memorandum

Libby Asbestos Site
Troy Operable Unit 07
Residential/Commercial Cleanup Criteria
Specific Use Area Visible Vermiculite Action Level
Technical Memorandum

I. Introduction

On December 15, 2003, the United States Environmental Protection Agency (EPA) issued a draft final Action Level and Clearance Criteria Technical Memorandum for the Libby Asbestos Site Residential/Commercial Cleanup (herein referred to as the "CCM"). The CCM provides detailed information regarding action levels that have been and continue to be used for determining which properties or situations require an emergency response cleanup. The action levels identified in the CCM are as follows:

Attics/Walls
- Visual confirmation of open, non-contained, or migrating vermiculite insulation.

Interiors
- Visual confirmation of vermiculite in the indoor living space.
- Concentration of Libby Amphibole (LA) in an indoor dust sample greater than 5,000 LA structures per square centimeter using AHERA counting methods.

Soils
- Visual confirmation of vermiculite or other vermiculite mine related materials in "specific use areas." A specific use area is defined as a garden, former garden, planter, or other defined area of a yard likely to receive significant use and generally not covered with grass.
- Concentration of LA in specific use areas or other yard soils by any analytical method greater than or equal to 1% Libby asbestos.

The CCM includes details to support the establishment of these action levels.

II. Contaminant Exposure Routes for Libby OU4 versus Troy OU7

W.R. Grace maintained numerous vermiculite processing facilities within and near the town of Libby. These processing facilities provided a low-cost or even free source of LA-contaminated vermiculite for local residents. Given the availability of the vermiculite, many local residents in Libby acquired vermiculite materials for their gardens and yards and would transport the vermiculite by truck load to their properties. This availability resulted in the wide-spread distribution and use of LA-contaminated vermiculite observed in Libby today. Troy is located approximately 20 miles to the northwest of Libby. The probability of such widespread use of LA-contaminated vermiculite via the same distribution as observed in Libby (personal trucks) throughout Troy is believed to be low. However, vermiculite attic insulation has been noted throughout Troy Operable Unit (OU) 7. The attic insulation was distributed in bags thus easier to transport to Troy.

III. Troy OU7 Investigations

In 2007, the Montana Department of Environmental Quality (DEQ) began inspections (both interior and exterior) of the residential and commercial areas of OU7. DEQ followed the basic protocol that had been established for OU4 with modifications based on “lessons learned” and updated data collection tools. The objective of the OU7 investigations is to identify those parcels that meet the emergency response cleanup criteria identified in the CCM.

One important fact to note is that not all vermiculite (commercially available or otherwise) contains LA. Thus, visual observation of vermiculite in soil does not necessarily confirm the presence of LA fibers. However, in OU4, through historical sampling and analysis a strong correlation between the visible confirmation of vermiculite in soil and the presence of LA fibers in soil samples has been observed. Given this experience, DEQ did not include the collection of soil samples from specific use areas that contained visible vermiculite initially in OU7. DEQ did semi-quantify the presence of visible vermiculite through a 30-point inspection and categorized the visible observations as none, low, intermediate, or high (CDM-Libby-06).

At the conclusion of the 2007 field season, anecdotal evidence reported to the field teams by property owners suggested that vermiculite observed in the specific use areas in OU7 did not come from the “local piles” or other sources in Libby. The property owners in OU7 reported the recent purchase of planting materials containing vermiculite from local hardware stores.

Based on this information, the OU7 sampling protocol changed in 2008 to include the collection of a soil sample from specific use areas and a description of the visible vermiculite. The field teams also returned to those parcels inspected in 2007 and collected a soil sample from specific use areas that had visible vermiculite. Thus, several lines of evidence could be considered when reviewing data from the exterior portion of a parcel potentially eligible for cleanup.

IV. Troy Results

In 2008, 392 soil samples were collected from specific use areas with visible vermiculite in OU7. The results of those samples along with pertinent parcel information (e.g., use area description, visible vermiculite counts, vermiculite descriptions, etc.) are provided in the attached spread sheet. Some notable statistics are in the following table.

Visible Vermiculite Description	# of Bin A/B1	# of Bin B2	Total # in Subset (description category)
Expanded Homeowner Purchase	1	0	1
Expanded Unknown Source	114	0	114
Unexpanded/Unexpanded Unknown Source	98	2	100
Unexpanded/Potting soil mix Homeowner purchase	170	1	171
Unknown	1	0	1

The Visible Vermiculite Description is based on the inspection team's discussions with the property owners and their own observations. The "Bin" categories allow for ease of grouping of PLM-VE soil analytical results. Bin A is non-detect, Bin B1 is "trace" or less than 0.2% LA, and Bin B2 is between 0.2 and 1% LA by weight. Bin C are those soils with LA greater than 1% by weight. Please note there are no Bin C results from the specific use areas with visible vermiculite in OU7.

In summary, out of 392 soil samples collected from specific use areas with visible vermiculite, only three have LA fibers detected above 0.2%.

V. Conclusions

The following conclusions can be drawn from the attached spread sheet and other evidence detailed in this memorandum:

- The majority of vermiculite present in soil in OU7 does not contain LA and did not come from the "local piles" in Libby;
- The vast majority of the 392 soil samples were semi-quantitatively categorized with very few "low" visible observations pursuant to the protocols in CDM-Libby-06. Therefore, the samples and use areas represented in the table do not include any "large piles of pure LA;" and
- There were five samples collected described as "expanded leaking from building" and only one of those had a Bin B2 (between 0.2 and 1% LA by weight) result.

VI. Recommendations

DEQ offers the following recommendations based on the above discussion:

- Continue to collect soil samples from all use areas;
- Continue to semi-quantify the presence of visible vermiculite in all use areas; and
- Do not apply the action level of "visual confirmation of vermiculite or other vermiculite mine related materials" in "specific use areas" in OU7 as an independent cleanup criterion. Instead, consider several lines of evidence and criteria for cleanup decisions, including, but not limited to, the presence of visible vermiculite in exterior use areas.