TITLE PAGE

QUALITY ASSURANCE PROJECT PLAN/WORK PLAN FOR ASBESTOS ABATEMENT AND OVERSIGHT

LUXORA ELEMENTARY SCHOOL – 406 WASHINGTON AVENUE LUXORA, ARKANSAS 72358

On-Call Environmental Services Contract

Contract No. 4600054308

Prepared For:

Arkansas Department of Energy and Environment
Division of Environmental Quality
Office of Land Resources
5301 Northshore Drive
North Little Rock, Arkansas 72118-5317

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APPROVAL PAGE

12/18/2025

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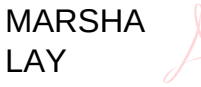

EPA Region 6 QA Technical Review — Date

Stephanie L. Cheaney, EPA Region 6 Regional Project Officer — Date

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A. PROJECT MANAGEMENT AND INFORMATION/DATA QUALITY OBJECTIVES

A.1 PROJECT PURPOSE, PROBLEM DEFINITION, AND BACKGROUND

Tetra Tech Inc. (Tetra Tech) prepared this quality assurance project plan (QAPP)/work plan for employees performing the asbestos-containing materials (ACM) abatement (the Abatement) of the Luxora Elementary School (the Site). The Site encompasses roughly 84,942 square feet (SF) or 1.95 acres in Luxora (the City), Mississippi County, Arkansas (Appendix A**, Figures 1, and 2**). The Site is depicted on the U.S. Geological Survey (USGS) Luxora, Arkansas 7.5-minute series topographic quadrangle map (USGS 2025). Approximate global positioning system (GPS) coordinates at the approximate center of the Site is 35.756719 degrees North and 89.931419 degrees West (Google Earth 2025). The street address associated with the Site is 406 Washington Avenue.

The Site includes the Luxora Elementary School, consisting of three one-story buildings, common areas, a playground, and parking lots. The three buildings are as follows: Building #7381 (Building A) is an 8,588-square-foot cafeteria and classroom building that has brick and mortar exterior walls and an asphalt roof; Building #7380 (Building B) is a 13,950-square-foot classroom building that has brick and mortar exterior walls and an asphalt room; Building #7383 (Building C) is a 2,080-square-foot fine arts building constructed of prefabricated external siding and shingles.

Environmental Science Services, Inc. (Es2) conducted a Phase I Environmental Site Assessment (ESA) of the Site, on behalf of the U.S. Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA). The Phase I ESA did not identify any recognized environmental conditions (RECs) for the Site (Es2 2024a). The Phase I ESA also included the following Non-Scope Consideration, which described the potential for presence of ACM and lead-based paint (LBP) at the Site and recommended an ACM and LBP inspection to identify presence and location, and determine volume(s) of any regulated material(s) (Es2 2024a).

Es2 performed a Phase II ESA at the Site to evaluate current site conditions prior to reuse and redevelopment of the Site, and contracted Altec Environmental Consulting (Altec) to conduct ACM and LBP inspections at the Site (Es2 2024b). Altec collected bulk samples of suspected ACM from all interior areas of on-Site buildings. Sampling of building materials accorded with National Emissions Standards for Hazardous Air Pollutants (NESHAP) as adopted by EPA, and with Asbestos Hazards Emergency Response Act (AHERA) of 1986 protocols. Samples of suspected ACM were analyzed via polarized light microscopy (PLM). AHERA defines ACM as any material or product that contains more than 1 percent (%) asbestos. Es2's Phase II ESA report is in Attachment 1.

This Asbestos Investigation identified ACM in the following materials:

- White 12-inch (") x 12" floor tile with associated black mastic (approximately 12,800 SF) throughout the hallways and classrooms in Building B;
- Sheetrock Joint Compound (approximately 900 SF) in the interior hallway walls of Building B;
- Teal Transite Panels (approximately 1,600 SF) under exterior windows throughout Building B;
- White Mudded Pipe Elbows (approximately 13 fittings – with chance of additional fittings present in pipe chases and wall cavities) in pipe fittings in the boiler room.

No LBP was identified during the survey. No other assessments are known to have occurred at the Site. Arkansas Department of Energy & Environment, Division of Environmental Quality (ADEE-DEQ) prepared an Analysis of Brownfield Cleanup Alternatives (ABCA) for the Site. The selected alternative was abatement of all ACM. Plans at the Site include either substantial rehabilitation/renovation or demolition; therefore, removal of the identified ACM would be required prior to initiation of those activities. Abatement of all ACM will remove need for continuing reinspection and maintenance of institutional controls.

Tetra Tech prepared this QAPP/Work Plan for sampling activities associated with the Abatement, intended to address concerns that could affect human health and the environment, and possible redevelopment at the Site. This QAPP/Work Plan presents the recommended framework for the Abatement, including sampling and oversight of an abatement contractor as necessary to remove ACM.

A.2 PROJECT AND TASK DESCRIPTION

The project objectives for this Abatement are to:

- Remove all ACM identified during the 2024 Phase II ESA completed by Es2 by a licensed State of Arkansas asbestos abatement contactor following the Arkansas Pollution Control and Ecology Commission (APC&EC) Regulation No. 21, Arkansas Asbestos Abatement Regulations (APC&EC 2015).
- The licensed abatement contractor will conduct all person monitoring of abatement workers required by the Occupational Safety and Health Administration (OSHA) for ACM abatement at the Site.
- The ACM will be removed from the site and sent for disposal as both friable and non-friable asbestos-containing waste.

- A licensed State of Arkansas Asbestos Air Monitor will conduct area air monitoring sampling to verify effectiveness of containment and/or engineering controls in place. Tetra Tech anticipates collection of as many as eight area air samples (six samples and two blanks) per work area during each day of the Abatement project. Area air sampling will conform to the EPA sampling protocol in *Guidelines for Controlling Asbestos Containing Materials in Buildings* (EPA 1985). Upon completion of area air sampling activities, Tetra Tech will analyze the area air sample according to National Institute of Occupational Safety and Health (NIOSH) Method 7400 via Phase Contrast Microscopy (PCM).
- Once the Abatement is completed in each area, final visual and area clearance sampling will occur to verify project completion. Tetra Tech anticipates collection of as many as seven clearance air samples (five samples and two blanks) per work area at conclusion of the Abatement project. Clearance air sampling will conform to the EPA sampling protocol in *Guidelines for Controlling Asbestos Containing Materials in Buildings* (EPA 1985). Tetra Tech will analyze the area air sample according to NIOSH Method 7400 via PCM.
- If redevelopment plans change, and ACM is left in the building, an Operations and Maintenance Plan (O&M) will be developed to address ACM not disturbed during renovation activities. If additional ACM is identified (not listed in the Phase II ESA [Es2 2024b]), the licensed abatement contractor will properly remove it and send it for disposal.

The project will not be deemed complete until clearance sample levels are below 0.01 fibers per cubic centimeter (f/cc). Air samples will be analyzed via PCM NIOSH Method 7400. If the PCM analysis fails, further testing via Transmission Electron Microscopy (TEM) NIOSH Method 7402 will be completed.

The Abatement will be completed in spring 2026. Tetra Tech will submit draft deliverables to ADEE-DEQ within 45 days after completion of abatement activities. Aspects of the project are described in the following sections of this QAPP/work plan.

A.3 INFORMATION, DATA QUALITY OBJECTIVES AND PERFORMANCE, AND ACCEPTANCE CRITERIA

The QA objective for the Abatement is to develop data of sufficient quality and quantity to design comprehensive response actions in accordance with APC&EC regulations and guidance or newly proposed guidance. Specific data quality objectives are discussed in terms of accuracy, precision, completeness, representativeness, and comparability.

For this project, accuracy is defined as percent recovery, based on analyses of lot blank and field blanks. Precision for this project is defined as a measure of agreement among lot blanks and field blanks. Data completeness will be expressed as the percentage of data generated that is considered valid.
A completeness goal of 100 percent will be applied to this project; however, if that goal is not met, site decisions may still be made based on the remaining data. Representativeness of collected samples is facilitated by establishing and following criteria and procedures identified in this QAPP/Work Plan. Data

comparability is achieved by requiring that all data generated for the project be reported in common units. Table 1 lists the various types of data that will be generated and specific reporting units.

TABLE 1: SPECIFIC DATA REPORTING UNITS

Parameter	Unit
Area Air Monitoring and Air Clearance sampling by NIOSH Method 7400 PCM and Method 7402 TECM	Fibers per cubic centimeter (f/cc)
Time	Military time (00:01 - 24:00)

A.4 DISTRIBUTION LIST

ADEE-DEQ	Addie McClain, Brownfields Coordinator and Project Manager (PM)
EPA, Region 6	Stephanie L. Cheaney, Project Officer
Tetra Tech, Inc. (Tetra Tech)	Michael Williams, Program Manager Allie Cook, PM Heather Wood, Quality Assurance (QA) Manager Jeffery Mitchell, Vice President, Operations Manager

A.5 PROJECT AND TASK ORGANIZATION

ADEE-DEQ tasked Tetra Tech to conduct the Abatement of the Luxora Elementary School (the Site) in Luxora, Mississippi County, Arkansas (ADEE-DEQ 2025). The project will be organized with the following roles:

- Addie McClain, ADEE-DEQ PM and Brownfields Coordinator, will serve as the primary liaison between ADEE-DEQ and EPA. She will oversee the project and the program, and will serve as the primary point of contact between ADEE-DEQ and Tetra Tech. Ms. McClain will be the State's PM for this activity, and will be responsible for review of project plans, including the QAPP/Work Plan and final deliverables, to help ensure compliance with the Federal Cooperative Agreement that funds this project.
- Stephanie Cheaney, Project Officer with EPA Region 6, will coordinate with EPA's Regional Quality Assurance Manager (RQAM) to review and approve the QAPP/Work Plan to ensure scientific integrity of planned activities and compliance with EPA's data quality standards.
- Allie Cook will serve as the Tetra Tech PM of project activities described in this QAPP/Work Plan. She will be responsible for ensuring implementation of abatement activities described in this QAPP/WP and providing periodic updates to ADEE-DEQ concerning the status of the project, as needed.
- Michael Williams will serve as the Tetra Tech Program Manager.
- Heather Wood will serve as the Tetra Tech QA Manager and provide technical assistance, as needed, to ensure that necessary QA issues are adequately addressed.
- Jeffery Mitchell will serve as the Tetra Tech officer and technical advisor.

Section A.7 provides an organizational chart for the project.

Preparation of this QAPP/work plan has accorded with EPA's *Quality Assurance Project Plan Standard*, CIO 2105-S-02.1 (EPA 2023), which superseded *EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5)* (EPA 2001). Procedures described in this QAPP/Work Plan may be altered in the field if warranted by site-specific conditions or unforeseen impediments that prevent or hinder implementation of any aspect of this QAPP/Work Plan. Such deviations will be recorded on field sheets. This QAPP/Work Plan will always be available to the field team during sampling activities to serve as a key reference to the proposed activities described herein. This QAPP/work plan must be reviewed annually, and, if it will be used for more than 5 years, it must be revised and resubmitted for review and approval at the end of the project period as defined on the title page.

A.6 PROJECT QA MANAGER INDEPENDENCE

As shown in the organization chart in Section A.7, ADEE-DEQ is the organization conducting environmental information operations under the conditions of this QAPP. The organization chart also shows ADEE-DEQ and contractor QA Managers' independence from environmental information operations (EIO); this independence is assured by different reporting lines and the management support and resources provided by ADEE-DEQ project manager and contractor contract administrators.

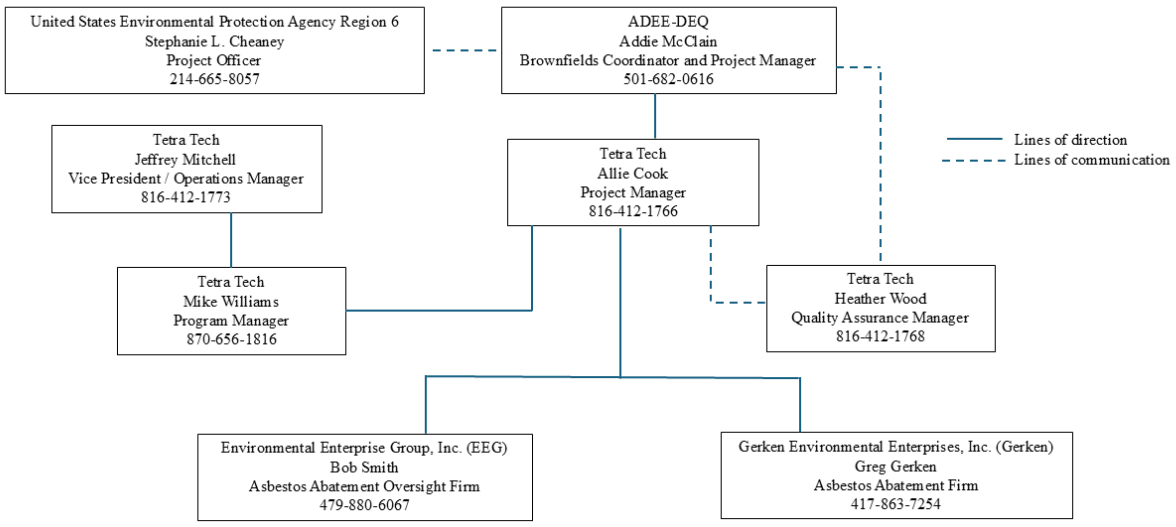
Should ADEE-DEQ or contractor QA Manager have concerns about quality, they have the authority to stop work on a project and/or reach out directly to the next highest QA manager for support, independent of mainline section or contract management. Similarly, QA Managers will have the authority to contact down-chain QA Managers directly to discuss any observed deviation from the requirements of the QAPP or other quality issues.

In addition, mainline EIO managers will not have authority to sign QAPPs for their associated QA Managers. Similarly, QA managers or their designees will not have authority to sign QAPPs for their corresponding EIO managers.

A.7 PROJECT ORGANIZATIONAL CHART AND COMMUNICATIONS

The hierarchy of communication is shown in the organization chart below; ADEE-DEQ project staff, contractors, and subcontractors can elevate discrepancies or QAPP non-conformance issues to their internal project management (for example, Contractor Project Manager or ADEE-DEQ Project Manager). Project management can raise issues to the program manager (for example, Contractor Program Manager or ADEE-DEQ Project Manager) or their corresponding QA Manager if they are not resolved by program

management. The Contractor QA Manager can elevate issues to the ADEE-DEQ Project Manager should issues not be resolved at the project or program level.



A.8 PERSONNEL TRAINING AND CERTIFICATION

All personnel to work on site will be required to have completed a basic 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and annual refreshers. All personnel collecting samples will also be certified as Arkansas Air Monitors. The Tetra Tech Project Manager, in coordination with the Tetra Tech health and safety manager, will ensure that all team members have received HAZWOPER training and are up-to-date on annual refreshers. She will also evaluate whether team members have adequate professional experience to collect the proposed samples. Any team member who do not have adequate training will not be allowed to collect air samples during the Abatement. Gerken Environmental Enterprises Inc. (Gerken), the abatement subcontractor, will provide licensed State of Arkansas Asbestos Workers and Contractor/Supervisors to complete the abatement work. All relevant Gerken certifications are in Attachment 2.

A.9 DOCUMENTS AND RECORDS

Tetra Tech personnel, and Environmental Enterprise Group, Inc. (EEG) under the supervision of Tetra Tech, will maintain field sheets to record all pertinent activities associated with the abatement and air monitoring activities. Appropriate documentation pertaining to photographs taken by Tetra Tech and EEG also will be recorded in the field sheets. Information pertaining to all samples (for example, sampling dates, times, and locations) obtained during this event will be recorded in the field sheets. Labels generated by the laboratory will be affixed to sample containers identifying sample numbers, dates collected, and requested analyses. Chain-of-custody records will be completed and maintained for all

samples from the time of sample collection until submittal of the samples to the on-site laboratory or off-site laboratory for analysis.

Prior to field activities, Tetra Tech, EEG, and Gerken will prepare a health and safety plan (HASP) addressing site-specific hazards. All field personnel will review and sign the HASP prior to field work, indicating that they understand the plan and its requirements. A copy of the HASP will be available to all personnel throughout sampling activities. The Project Manager will ensure availability of the approved QAPP/Work Plan to all personnel throughout sampling activities by Tetra Tech and EEG.

The samples will remain in the inspector's custody until completion of on-site analysis. Upon completion of area air sampling activities, EEG will analyze the area air sample according to NIOSH Method 7400 via PCM. EEG is a certified Asbestos Abatement Consultant, license number 000234-CCL-CT. All relevant EEG certifications are in Attachment 2. If sample analysis by NIOSH Method 7402 via TEM is necessary, air samples will be placed into plastic bags, and along with EEG's chain-of-custody documentation, will be submitted to EMSL Analytical Inc. (EMSL) in Dallas, Texas. EMSL will analyze air samples for asbestos fibers concentration according to NIOSH Method 7402 via TEM. EMSL is a certified member laboratory of the American Industrial Hygienist Association (AIHA) Laboratory Accreditation Program, certification number 2223278. EEG and/or EMSL will provide results for analytes identified in Section B.2 in this document. Air sample results will indicate constituent content in fibers per cubic centimeter (f/cc). EMSL will provide the samples results per its Quality Management Systems (QMS) (EMSL 2024).

Deliverables will be delivered to ADEE-DEQ electronically unless hardcopies are required. Tetra Tech will maintain all final reporting documents electronically for a minimum of 10 years, and the end user will maintain those documents for an undetermined amount of time.

B. IMPLEMENTING ENVIRONMENTAL INFORMATION OPERATIONS

The following sections discuss design and implementation of measurement and acquisition of data.

B.1 IDENTIFICATION OF PROJECT ENVIRONMENTAL INFORMATION OPERATIONS

The sampling design proposed in the following subsections has been selected to evaluate the presence of asbestos fiber contamination at the Site. Because no site visits specific to sampling activities (for example, asbestos containment locations) occurred prior to development of the work plan for area air sampling, all sampling locations are specified tentatively, based on the discretion of the license abatement contractor at the Site. Sample locations are subject to change based on site observations, and additional information obtained during abatement field activities.

B.1.1 Area Air Sampling for Asbestos

Asbestos Abatement activities will include area air monitoring sampling to verify effectiveness of containment and/or engineering controls in place. Under the supervision of Tetra Tech, EEG will conduct the area air sampling and abatement oversight. EEG anticipates collection of as many as eight area air samples (six samples and two blanks) per work area during each day of the Abatement project. Abatement is anticipated to take 10 business days.

Area air sampling will conform to the EPA sampling protocol in *Guidelines for Controlling Asbestos Containing Materials in Buildings* (EPA 1985). All samples will be stored in plastic bags pending analysis on the Site for asbestos fiber concentration.

The State of Arkansas Asbestos Air Monitor will assign a unique sample ID number to each sample. Sample IDs will consist of a unique letter and number combination. The letters will represent a unique location associated with the abatement project, and the number will reference the date and sample sequence. This ID number will be on the sampling cassette when it goes for analysis by an onsite technician or a certified laboratory. Sample cassettes will be labeled prior to sample collection to prevent potential confusion. The ID number and the sample location will be recorded on the sample area diagrams and also on field calibration sheets.

The samples will remain in the inspector's custody until completion of on-site analysis. Upon completion of area air sampling activities, EEG will analyze the area air sample according to NIOSH Method 7400 via PCM. EEG is a certified Asbestos Abatement Consultant, license number 000234-CCL-CT. All relevant EEG certifications are in Attachment 2. If sample analysis by NIOSH Method 7402 via TEM is

necessary, air samples will be placed into plastic bags, and along with EEG's chain-of-custody documentation, will be submitted to EMSL in Dallas, Texas. EMSL will analyze air samples for asbestos fibers concentration according to NIOSH Method 7402 via TEM. EMSL is a certified member laboratory of the AIHA Laboratory Accreditation Program, certification number 2223278.

B.1.2 Final Visual Inspection for Asbestos

Asbestos Abatement activities will include a final visual inspection to verify that the asbestos project contractor has removed all visible ACM. Under the supervision of Tetra Tech, EEG will conduct the final visual inspection.

The visual inspection will begin with an initial walk-through of the abatement area. The entire asbestos project area will be observed to verify that the asbestos abatement contractor has removed all visible ACM, dust, and debris from the work area.

If necessary, Tetra Tech personnel or EEG will re-clean areas that fail the inspection. A follow-up visual inspection will be conducted by Tetra Tech or EEG to verify that all ACM identified in the asbestos project permit has been removed, as well as related asbestos-containing waste, dust, and debris from the work area. The Tetra Tech personnel or EEG who conducted the visual clearance will complete a signed, written affidavit verifying that the Gerken has removed all ACM identified in the asbestos project permit and related asbestos-containing waste, dust, and debris.

B.1.3 Clearance Air Sampling for Asbestos

Once Abatement is completed in each containment area and a final visual inspection has been conducted, air clearance sampling will occur to verify project completion. EEG anticipates collection of as many as seven clearance air samples (five samples and two blanks) per work area at conclusion of the Abatement project.

Clearance air sampling will conform to the EPA sampling protocol in *Guidelines for Controlling Asbestos Containing Materials in Buildings* (EPA 1985). Once the work area has passed the final visual inspection, Tetra Tech or EEG will sweep an air stream from a high-speed blower or equivalent air-blowing device across all surfaces in the work area for a time adequate to disturb air in all areas of the work area prior to beginning final air clearance sampling. EEG will ensure the air is continually agitated (for example, by continually running fans), creating maximum air disturbance in all potentially occupied areas during the

collection of final air clearance samples. Agitating the air in the work area prior to final air clearance sampling is not required for unoccupied areas such as crawl spaces.

Immediately after agitating the air in the work area, EEG will begin collecting at least five final clearance air samples in the work area. For an asbestos project with more than a single isolated work area within a large space contained by four walls and a ceiling, the owner or operator of a renovation or demolition activity shall ensure the isolated work areas are sampled by taking at least one air sample within each isolated work area. If more than five isolated work areas are used in a space contained by four walls and a ceiling, at least five aggressive air samples must be collected. The first four air samples must be gathered from those isolated work areas where the greatest potential for asbestos exposure exists; the fifth sample must be taken in the last isolated work area in which the asbestos project occurred.

The persons conducting a final visual inspection and final air clearance sampling and testing shall record:

- The names of the asbestos project contractor/supervisor and the person or persons conducting final visual inspection and final air clearance sampling
- The name and address of the facility site and location of the asbestos project
- The number of the asbestos project permit issued by the department
- The date of final visual inspection and final air clearance sampling
- The number of samples collected
- The type of samples (i.e., PCM or TEM)
- A statement of whether final visual inspection and final air clearance sampling has documented the completion of the asbestos project.

The final visual inspection and air clearance sampling report must include the signatures of the project contractor/supervisor and final air clearance sampling person attesting to the completion of the asbestos project; and the results of the final visual inspection and final air clearance sampling and testing must be maintained by the asbestos project contractor and by the person who performed the sampling.

The person conducting final air clearance sampling shall collect five samples of air, with each sampling at least 1,199 liters of air, by using an air sampling pump capable of drawing a volume that is equal to or greater than 1,199 liters of air through each of the five millimeter filters, at a rate equal to or greater than one liter and less than 10 liters per minute for TEM samples and equal to or greater than one liter and less than 16 liters per minute for PCM samples; ensure that the flow rate for each air sampling pump is calibrated at the beginning and end of the sampling period; and ensure air sampling cassettes are placed four to six feet above the floor at a 45 degree angle down. The cassettes must be uniformly distributed

throughout the work area. At least one cassette must be located in each room. If the asbestos project was conducted in more than five rooms, a representative sample of rooms must be selected. Each cassette must be subject to normal air circulation, avoiding room corners, walls, ceilings, obstructed locations, and sites near windows, doors, or vents.

Tetra Tech personnel or EEG will document pertinent sample collection data on the Air Sample Field Calibration Sheet. At a minimum, the following data should be included; sample collection ID; sample collection location; sample pump number or ID; sample collection start and stop times; sample pre-calibration flow rates, post-calibration flow rates, and total sample flow rate averages; and sample volume (calculated following sample collection). Approximate sample collection locations should also be recorded on field drawings for further documentation purposes. All samples will be stored in plastic bags pending analysis on the Site for asbestos fiber concentration.

The clearance samples will remain in the inspector's custody until completion of on-site analysis. Upon completion of the final visual inspection and clearance air sampling activities, EEG will analyze the area air sample according to NIOSH Method 7400 via PCM. If sample analysis according to NIOSH Method 7402 via TEM is necessary, air samples will be placed into plastic bags, and along with EEG's chain-of-custody documentation, will be submitted to EMSL.

The project will not be deemed complete until clearance sample levels are within acceptable levels.

B.2 METHODS FOR ENVIRONMENTAL INFORMATION ACQUISITION

Each air sample for PCM and TEM analysis will be a composite sample, collected in a PCM cassettes with accordance with NIOSH Method 7400 and 7402.

The containers will be prepared according to specifications in EMSL's Quality Manual (included in Appendix B). Preservation and holding times of samples are specified in the Quality Manual.

Air samples will be analyzed for the contaminants of concern (COC) listed in Table 2.

TABLE 2: ANTICIPATED SAMPLE SUMMARY

Matrix	Number of Samples	Laboratory Analyses
Area Air Samples	60	NIOSH Method 7400 (PCM); NIOSH Method 7402 (TEM)
Clearance Air Samples	15*	
Field Blanks	26	

Notes:
*Assumes three separate containment areas
NIOSH National Institute of Occupational Safety and Health
PCM Phase Contract Microscopy
TEM Transmission Electron Microscopy

Disposal of investigation-derived wastes (IDW) in the form of disposable sampling supplies (for example, gloves or paper towels) will occur off site as uncontaminated debris. Sampling equipment used in the field will include air pumps. Additional support facilities will not be required for this project.

Air samples sent to EMSL will be accompanied by Tetra Tech's or EEG's chain-of-custody documentation (chain-of-custody procedures will be as specified by EMSL's Quality Manual in Appendix B to this document). An example chain-of-custody is also included with the Quality Manual. All samples will be analyzed according to the subcontracted laboratory's SOPs and analytical methods referenced in the QAPP/Work Plan (Appendix B). All detection limits will be below screening levels; standard detection limits will likely be adequate for most analytes. Appropriate containers and physical/chemical preservation techniques will be applied during field activities to help verify acquisition of representative analytical results. If off site laboratory analysis is need an expedited turnaround time (TATs) will suffice for this project.

EMSL's analytical detection limits for the air samples are below applicable levels for asbestos fibers. The requested analyses have been selected based on information obtained from the *Guidelines for Controlling Asbestos Containing Materials in Buildings* (EPA 1985) and information from the ADEE-DEQ. Table 3 lists analytical methods to be applied.

TABLE 3: ANALYTICAL METHODS

Analytical Parameter	Analytical Method
Area Air Sample	National Institute of Occupational Safety and Health (NIOSH) Method 7400 or 7402
Clearance Air Sample	NIOSH Method 7400 and 7402

Individual laboratory managers will be responsible for any corrective action that may be necessary per individual laboratory SOPs.

Tetra Tech anticipates that data generated by the off-site laboratory will be sufficient to determine the approximate extent of asbestos fiber contamination on site.

Tetra Tech has compiled previously obtained data and information pertaining to the Site from various sources (including other analytical data, reports, photographs, and maps referenced in this QAPP/Work Plan). Some of those data have not been verified; however, that unverified information will not be used for decision-making purposes without verification of its authenticity.

B.3 INTEGRITY OF ENVIRONMENTAL INFORMATION

Samples will remain in the inspector's custody until completion of on-site analysis. If sample analysis by NIOSH Method 7402 via TEM is necessary, samples will be submitted to an off-site laboratory for analysis. Sample containers and holding times will comply with procedures defined in the Quality Manual for the selected laboratory (EMSL) (Appendix B). Chain-of-custody procedures also will be specified by the laboratory's Quality Manual.

Immediately after sample collection, sample containers will be labeled with the appropriate identifiers. Samples will be analyzed on site according to NIOSH Method 7400 via PCM. If sample analysis by NIOSH Method 7402 via TEM is necessary, air samples will be placed into plastic bags, and along with chain-of-custody documentation, will be submitted to EMSL. The shipping container will be sealed with tape. Shipping container will remain in a secure area or in view of the sampler until delivered to the laboratory.

B.4 QUALITY CONTROL

Where applicable, the SOPs and chain-of-custody procedures referenced in the QAPP/Work Plan will be followed throughout sampling activities to verify integrity of samples from time of collection until submittal to the on-site or off-site laboratory for analysis.

Tetra Tech will evaluate field blanks samples to evaluate precision of analytical data generated during this project. Analytical errors (precision and accuracy) will be assessed via analyses of field blank samples. Table 4 is a QA/QC sample summary.

TABLE 4: QUALITY ASSURANCE/QUALITY CONTROL SAMPLE SUMMARY

Matrix	Number of Samples	Laboratory Analyses
Area Air Field Blank	2 per day of abatement	NIOSH Method 7400 or 7402
Clearance Air Field Blank	2 per clearance area	NIOSH Method 7400 or 7402

Notes:
Section B.2 provides details pertaining to laboratory analyses.
NIOSH National Institute of Occupational Safety and Health

To help ensure integrity of data, where applicable, the SOPs, instrument user manuals, and procedures referenced in the QAPP/Work Plan will be followed throughout data acquisition activities. Before the survey takes place the equipment/instruments will be calibrated, certified it has been inspected by its vendor, and tested under the manufacture's standards for operation. In addition, field team personnel will perform out-of-box tests and daily QC tests to ensure the instruments are working properly and achieving good data. Table 5 lists the field equipment calibration, maintenance, testing, and inspection schedule during the Survey to ensure precise and accurate data acquisition.

TABLE 5: SUMMARY OF FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION SCHEDULE

Field Equipment	Calibration Activity	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person (Verification)
Gilian Air Sampling Pumps	Calibrate pump using primary flow standard (ex. filter cassette)	Batteries fully charged, connect cables and power on	Power up equipment and let it warm up	Before each use	Airflow rate within +/- 5% of the initial set point	Recalibrate the pump	Tetra Tech Team Personnel

B.5 INSTRUMENT AND EQUIPMENT CALIBRATION, TESTING, INSPECTION, AND MAINTENANCE

Prior to deployment for field activities, Tetra Tech personnel will test, inspect, and maintain all sampling equipment and supplies. Testing, inspection, and maintenance of analytical instrumentation will accord with manufacturers' recommendations. Testing equipment includes an Gilian Air Pump. Any testing, inspection, or maintenance activities regarding the equipment will be documented on the field sheets for individual sampling activities. The vendor that rents out the instruments will be responsible for any malfunctions and repairs of instruments. Spare parts for all sampling equipment and supplies are available at either the Tetra Tech office in Kansas City, Missouri, or at the location of the instrument vendor.

Laboratory equipment will be calibrated by the laboratory according to the Quality Manual in Appendix B. Calibration of field screening and laboratory analytical instrumentation will accord with manufacturers' recommendations.

B.6 INSPECTION AND ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND SERVICES

Certificates of analysis will be provided with sampling supplies and reviewed by the field sampling team before samples are collected. Certificates of calibration will be provided with field instruments and reviewed by the field sampling team before data acquisition. Inspection procedures for the Gilian Air Pump include warm-up of the instruments and a calibration test. The warm-up procedure includes connecting the power cables and turning on the instrument to allow it time to properly turn on. All inspection procedures will occur before each use of the instrument. The laboratory will be evaluated based on the data validation.

B.7 DATA MANAGEMENT

Tetra Tech will maintain all laboratory data acquired from the on-site and off-site laboratory in the project files. All data acquired during field work will be maintained in field sheets. All field sheets will be maintained in the project files, in hard and electronic versions. Project files are routinely reviewed for quality purposes to ensure proper management of information and resources. Based on the small size of this project, no specialized hardware or software requirements apply. A copy of all laboratory data will be forwarded to the ADEE-DEQ.

C. ASSESSMENT AND OVERSIGHT

The following sections discuss assessment and oversight of sampling activities.

C.1 ASSESSMENTS AND RESPONSE ACTIONS

Corrective action will be taken at the discretion of the ADEE-DEQ Project Manager whenever problems appear that could adversely affect data quality or resulting decisions affecting future actions pertaining to the Site. Because of the short duration of the field activities, no field audits will be conducted. Individual laboratory managers will be responsible for any corrective action that may be necessary per the individual laboratory SOPs (Appendix B).

C.2 OVERSIGHT AND REPORTS TO MANAGEMENT

Tetra Tech will prepare an Abatement report for the City PM, describing abatement activities, sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results following completion of the abatement activities described herein. Laboratory analytical results from air samples will be compared to the EPA threshold value for air monitoring samples.

D. ENVIRONMENTAL INFORMATION REVIEW AND USABILITY DETERMINATION

The following sections discuss aspects of validating data and determining usability of the data.

D.1 ENVIRONMENTAL INFORMATION

A qualified laboratory analyst and each laboratory's section manager will perform data review and verification in accordance with the laboratory's QA program. The Tetra Tech PM will be responsible for overall assessment and final approval of the data, in accordance with the SOW provided in the request for proposal from the ADEE-DEQ. If the data provided do not cover the entire SOW, the Tetra Tech PM will identify the deficiencies and request completion of the SOW before the report is deemed final.

D.2 USEABILITY DETERMINATION

D.2.1 Validation and Verification Methods

Analytical data packages will be validated internally by the laboratory in accordance with the laboratory's established SOPs (Appendix B). Tetra Tech's PM will be responsible for overall validation and final approval of the data, in accordance with the projected use of results. Tetra Tech will compare sample descriptions with field sheets for consistency and will ensure appropriate documentation of any anomalies in the data. Tetra Tech also will compare data descriptions with information on field sheets for consistency and will ensure appropriate documentation of any anomalies in the data.

D.2.2 Reconciliation With User Requirements

If data quality indicators do not meet the project's requirements as outlined in this QAPP/Work Plan, the data may be discarded, and re-sampling or re-analysis may be required. The Tetra Tech PM is responsible for directing subsequent activities if data quality objectives are not met. Section A.3 describes data quality indicators.

E. REFERENCES

Arkansas Department of Environment and Energy, Division of Environmental Quality (ADEE-DEQ). 2025. Scope of Services and Cost Estimate – Development of Quality Assurance Project Plan and Asbestos Abatement and Oversight Request Letter. July 28, 2025.

Arkansas Pollution Control and Ecology Commission (APC&EC). 2015. Regulation No. 21. Arkansas Asbestos Abatement Regulation. August 28.

EMSL Analytical Inc. (EMSL). 2024. EMSL Analytical, Inc. Laboratory Quality Management System (QMS) Manual, Revision 26 – Dec. 15, 2023. January 5, 2024.

Environmental Science Services, Inc. (Es2). 2024a. Phase I Environmental Site Assessment, Luxora Elementary School. April 8.

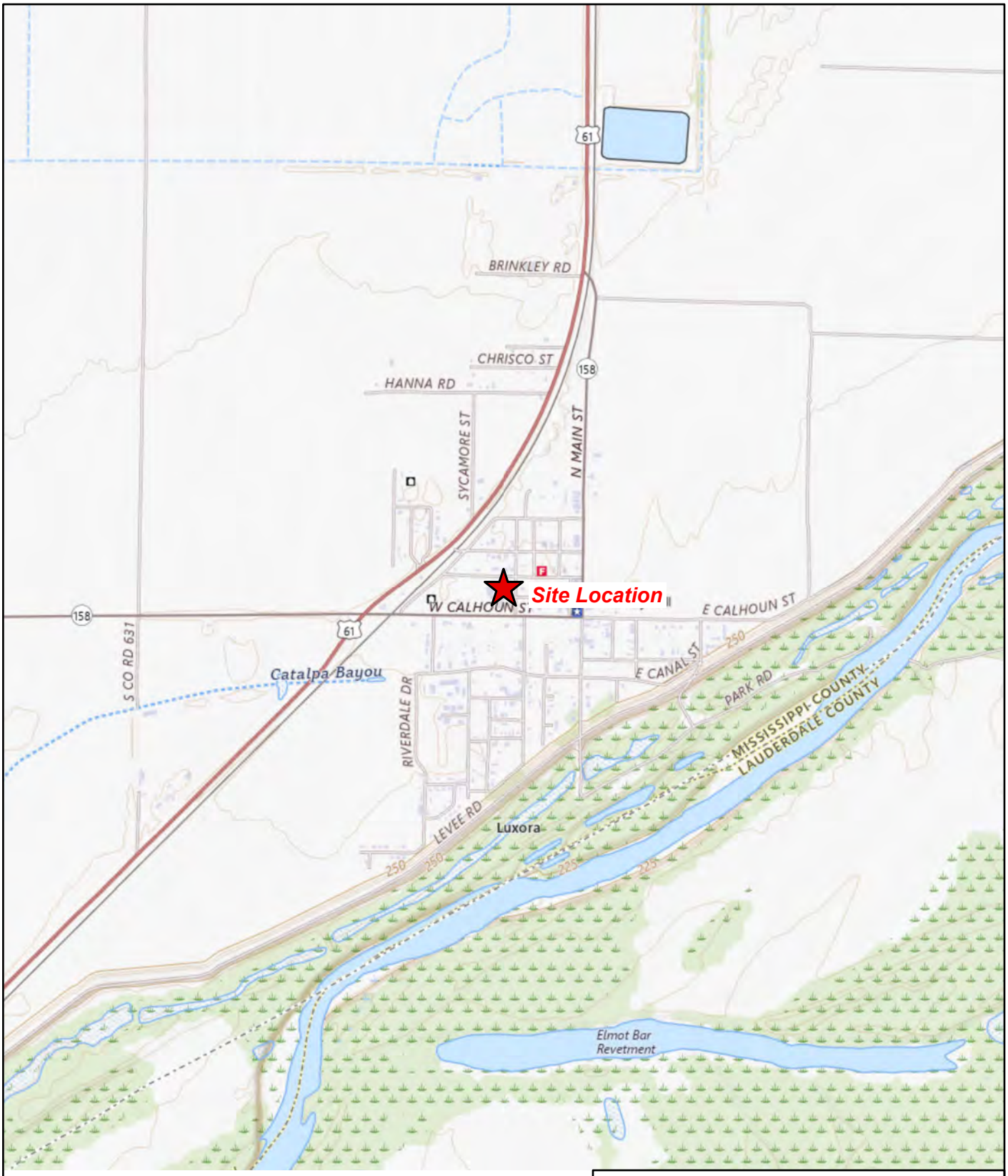
Es2. 2024b. Targeted Brownfields Assessment, Phase II Environmental Site Assessment, Luxora Elementary School. September 9.

Google Earth. 2025. Latitude and longitude at approximate center of the Luxora Elementary School, Luxora, Arkansas.

U.S. Environmental Protection Agency (EPA). 1985. *Guidelines for Controlling Asbestos Containing Materials in Buildings.* EPA 560/5-85-024. June.

U.S. Geological Survey (USGS). 2025. Luxora Quadrangle. 7.5-Minute Topographic Series.

APPENDIX A
FIGURES



N

0 1,000 2,000

Feet

Source: USGS Topo: USGS The National Map, Data refreshed July, 2025

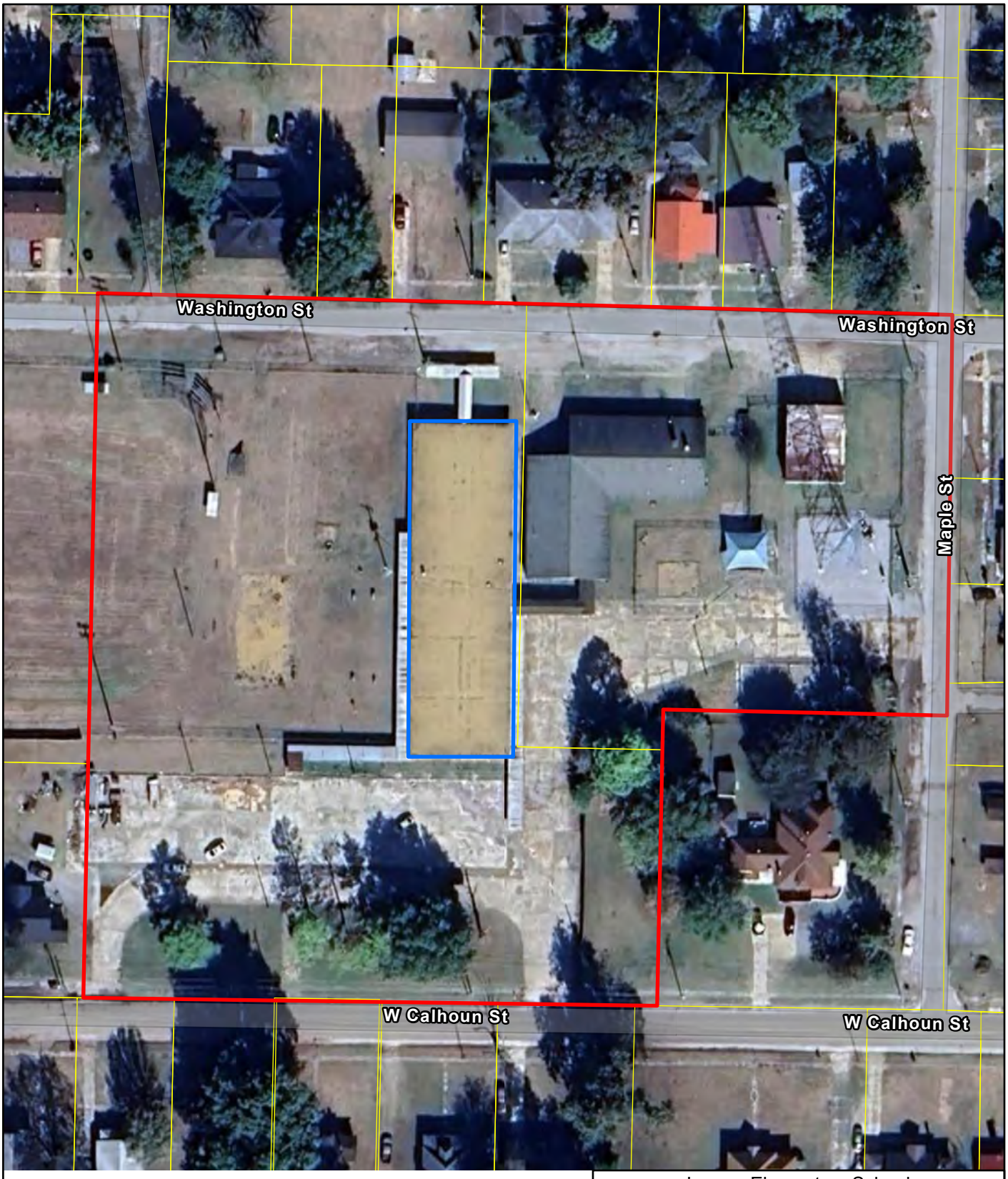
C:\X\P\9501014\0011\Projects\aprx\Luxora_Abatement.aprx

Luxora Elementary School
406 Washington Avenue
Luxora, Arkansas 72358

Figure 1
Site Location Map

TETRA TECH

Date: 8/4/2025 Drawn By: Susmita Shrestha Project No: 103Z9501014.001



Legend

- Building B
- Parcel
- Site Boundry

N

0 50 100

Feet

Source: Google Earth, Maxar Technologies, 2023

Luxora Elementary School
406 Washington Avenue
Luxora, Arkansas 72358

Figure 2
Site Layout Map

TETRA TECH

Date: 8/7/2025 Drawn By: Susmita Shrestha Project No: 103Z9501014.001

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APPENDIX B
EMSL STANDARD OPERATING PROCEDURES

The attached document contains privileged and confidential information, and is solely for reference by the sender's intended recipient(s). Any unauthorized review, use and dissemination of this document is strictly prohibited.

EMSL Analytical, Inc. Management

EMSL Analytical, Inc.

LABORATORY
QUALITY MANAGEMENT SYSTEM
(QMS) MANUAL

REVISION 26 – Dec. 15, 2023

For laboratory located at:

Lab specific Cover Pages can be found on E-link:
Quality Assurance>Quality Management System Manual>Lab Cover Pages

Approved by:

Laboratory Manager	Date
	12/15/2023
Nicholas Straccione Vice President of Quality Assurance	Date

Issued by: EMSL Analytical, Inc.
Corporate Headquarters
200 Route 130 North
Cinnaminson, NJ 08077
(800) 220-3675

Contains: QMS Manual Main Section

Mod A: Asbestos	Mod G: Food Sci.
Mod B: Env. Lead	Mod H: Molec. Biol.
Mod C: Env. Micro	Mod I: Materials Sci.
Mod D: IH	Mod K: Chemistry
Mod E: Radiochem	Mod L: Air Toxics
Mod F: Radon	

Authorized for use by Dr. Peter Frasca/President

COMPLIANCE and COMMITMENT AGREEMENT / SIGNATURE and INITIALS LOG

In executing this Agreement, I attest and confirm that I have read and understand the entire contents of this document. My signature represents that I agree to fully comply with, implement, and enforce all requirements, procedures, and protocols specified in these procedures set forth in this document and any supporting referenced materials or methodologies by the effective date. I acknowledge the proprietary nature of this document. Furthermore, I understand that this document is the most recent version and any revisions, modifications, additions, or amendments to this document will only be recognized and executed upon review, final approval, and reissue of this document by the Quality Assurance Department management.

Those individuals who have checked the column labeled "Lab Management Commitment" are further acknowledging they approve the document for use in their lab and are committed to enforcing the requirements stated herein. Those individuals holding positions of Laboratory, Department and/or Quality Manager, or who have been named to a position of authority for the purposes of state or independent accreditations shall mark this column.

After reviewing the main QMS Manual section and modules appropriate to the work you perform, sign, initial, date and check off those modules which you are acknowledging. **Print this page as many times as needed. A copy of this completed page shall be maintained as a Signature and Initials Log as per the requirements of Section 4.13.5 of this Manual.**

Print Name	*Signature*	*Initials*	*Lab Management Commitment*	*Date*	*Main Manual*	*A (Asb)*	*B (Lead)*	*C (Micro)*	*D (IH)*	*E (RadChem)*	*F (Radon)*	*G (Food)*	*H (MolecBiol)*	*I (MatSci)*	*K (Chem)*	*L (AirTox)*

QMS Manual Signatures/Initials Log, Page __ of __ (reprint page as necessary)

Table of Contents

PLEASE NOTE: This QMS Manual contains 86 pages of content, each page numbered as Page xx of 86. The initial six pages of the QMS Manual are uniquely identified using Roman numerals, as they contain information guiding the reader through the document.

Section 1.0: Scope

1.1 Scope of EMSL Quality Management System (QMS) Manual

Note: *Prior to Rev. 16 of this manual, the name of this manual was "EMSL Quality Assurance Manual." References to this term or the acronym (QAM) may appear on other management system documents but shall be read to reference this document. Out of date references will be updated as documents are revised.*

EMSL Analytical, Inc.'s commitment to providing quality services to our customers is embodied in EMSL's corporate policy on quality assurance (QA). The aims of the EMSL quality assurance program are to ensure the following:

- Quality, accuracy, and integrity of analytical results to minimize risk
- Conformance with analytical methodologies
- Conformance with corporate mandated QA/QC requirements
- Delivery of the highest quality of professional services and technical excellence to our customers
- Fulfillment of the requirements as set forth by of the American Industrial Hygiene Association Laboratory Accreditation Program (AIHA LAP, LLC), the National Voluntary Laboratory Accreditation Program (NVLAP), The NELAC Institute (TNI), A2LA, CALA, NYS ELAP, NJDEP, PALA, and other independent, state, and local accrediting authorities as relevant to the laboratories' qualifications. Test methods under which our laboratories perform accredited testing are listed on our certificates of accreditation found on the EMSL website – www.emsl.com.

To achieve these goals, this QMS Manual directs the implementation and maintenance of the quality management program, describes responsibilities and duties of personnel as related to quality, and establishes the required policies of the quality management system. This QMS Manual covers analytical services offered in the EMSL laboratories, Inc. (hereafter referred to as EMSL), which include asbestos, lead, environmental microbiology, industrial hygiene organics and inorganics, radon, food microbiology and chemistry, materials science, environmental chemistry metals, radiochemistry, and other developing service areas. General policies applicable to analytical areas are addressed in the main section of the QMS Manual, while policies, procedures and requirements for each specific service area are addressed in the program specific modules. These modules are organized as follows:

Module	Program Description
A	Asbestos
B	Environmental Lead
C	Environmental Microbiology
D	Industrial Hygiene
E	Radiochemistry
F	Radon
G	Food Microbiology and Chemistry
H	Molecular Biology (PCR)
I	Materials Science
K	Chemistry
L	Air Toxics

EMSL laboratories shall comply with the requirements detailed in this manual and the additional program

requirements specified in Modules A – L as applicable to the laboratory operations. This manual is posted to the EMSL E-link SharePoint site, and is accessible by all employees. Employees are responsible for being familiar with, and adhering to, its contents.

This manual is the property of EMSL and may not be used for any purposes other than those related to EMSL work. Under no circumstances, will this manual be removed from the laboratory facility, nor will any of its contents be disclosed to any outside entity unless prior approval has been granted by EMSL corporate management. Requests for copies of this manual must be made to the EMSL National Quality Assurance Department.

1.2 Quality Management System (QMS) Manual Maintenance and Update Procedures

As defined in the EMSL Control of Documents SOP (QA-SOP-301), the QMS Manual will be reviewed at least annually for continued suitability. Review will be conducted by the QA Department with assistance from national technical management and select others with appropriate knowledge and background in each area. Any revisions shall be reviewed and approved by the Vice President of Quality Assurance. Prior to publication, the QMS Manual revision will be authorized by the EMSL president. The revisions made to the QMS Manual are recorded in a Revision History in Section 6. A 'Notice from the Quality Assurance Department' may also be provided with the QMS Manual at distribution summarizing the additions and changes to the manual.

Section 2.0: Normative References

The EMSL's Quality Management System (QMS) has been developed to comply with the requirements of the following current references as well as those of several other state and local accrediting agencies:

- ISO/IEC 17025:2017
- The NELAC Institute (TNI) standards, 2016 (or latest revision)
- A2LA General Requirements: Accreditation of 17025 Laboratories (R101), November 2021 (or latest revision)
- AIHA LAP, LLC Accreditation Policies, June 2022 (or latest revision)
- NIST Handbook 150:2020, August 2020, NVLAP Procedures and General Requirements (or latest revision)
- PALA, Analytical Laboratory Accreditation Program
- CALA, Canadian Association for Laboratory Accreditation, Inc.
- Applicable State Quality Policies

Section 3.0: Terms and Definitions

See *Appendix A – Glossary*

Section 4.0 - Management Requirements

4.1 Organization

4.1.1 Quality Policy Statement

EMSL is committed to providing a high standard of service and producing dependable, accurate and technically defensible test results in order to best serve our customers. EMSL will avoid involvement in activities that would diminish confidence in its competence, impartiality, judgment, or operational integrity. Our experienced and qualified technical personnel are committed to providing data of the highest quality achievable.

The senior management of EMSL is committed to adopting the quality standards utilized by the various accrediting agencies and those requirements documented in the ISO/IEC 17025, TNI standards and PALA, and continually improving the management system efficiency. Management ensures scientific rigor and professionalism for our customers for the parameters specified in DR-12-CDA. The major goal of the laboratory and its personnel will be toward constant improvement in the quality management system, which has been designed with the purpose of ensuring consistent operations leading to quality data.

The senior management staff of EMSL acknowledges and accepts the responsibility for the commitment towards the quality of the data produced by the laboratory, and makes a commitment toward continual improvement of the final product and the management system. In doing so, management provides the laboratory manager and the Quality Assurance Department with full authority to accomplish this end. Management is committed to providing the necessary resources to provide high quality analytical data.

EMSL Analytical, Inc. is committed to address any complaints about the quality of the reported analytical results. Any complaint about the quality of report results may be referred to the accrediting body if such complaints cannot be resolved directly with the customer.

Personnel concerned with testing within the laboratory must familiarize themselves with the quality documentation, and implement the policies and procedures addressed in this manual.

Commitment to ISO Standard

Starting with corporate management and extending to regional and local laboratory management, EMSL is committed to ensuring that the standards documented in ISO/IEC 17025:2017 (or the most recent revision of the 17025 standard) are upheld in the applicable aspects of company affairs. The range of activities include, but are not limited to:

- Organization of management system in accordance with Option A of ISO 17025:2017
- Management system - definition, establishment, and maintenance
- Document control
- Review of requests for work (contracts, etc.)
- Subcontracting services/inter-laboratory exchange of samples
- Purchasing supplies
- Service to the customer
- Complaints
- Control of non-conforming work
- Corrective and preventative action
- Control of records
- Internal audits
- Management reviews
- Personnel qualifications
- Method validation
- Traceability
- Assuring quality
- Reporting results
- Risk management

By way of authority, it is corporate management that implements, maintains, and monitors compliance.

This statement is issued under the authority of company president, Peter Frasca, Ph.D.

4.1.2 Relevance of Personnel Activities and Communication by Management

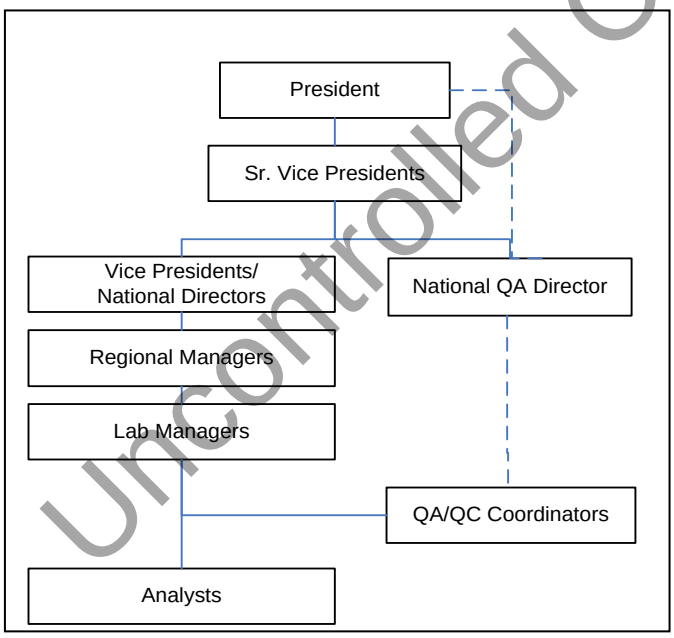
Management communicates to the staff the importance of their role in customer needs, regulatory requirements and involvement, to the achievement of the objectives of the management system through this QMS Manual, newsletters, management meetings and telephone and video conferences and periodic phone conversations.

Correspondence is also performed through the monthly quality control reports, the quarterly quality control reports, and the annual management review.

Management ensures employees are aware of their role in the achievement of the objectives of the quality management system by requiring employees to sign an acknowledgment of understanding of this QMS Manual, as well as relevant policies and procedures.

The management of EMSL Analytical, Inc. accepts legal responsibility for its actions associated with the analysis and reporting of samples in accordance with its Quality Management System.

4.1.3 General Organization Chart – Quality Management Structure



Individual Lab Organizational Charts are available on E-Link in Quality Assurance>QMS Manual>Org Charts.
Note: The terms 'Sr. Vice President,' 'Vice President,' 'National Director,' 'Regional Manager,' and 'Lab Manager,' wherever they appear in this document and its Modules shall be understood and read to mean 'Sr. Vice President(s),' 'Vice President(s),' 'National Director(s),' 'Regional Manager(s),' and 'Lab Managers(s),' where applicable.

4.1.4 Corporate Organization

The corporate headquarters of EMSL operates out of the Cinnaminson, New Jersey office location. The corporate headquarters oversee the laboratory operations located there, as well as the branch laboratory locations. Organizational charts for each laboratory are maintained by the corporate QA Department and are available on the company's intranet (E-link).

Corporate headquarters are responsible for the management of the company activities. These include:

- Fiscal management
- Personnel management
- Human resources
- Information technology (IT)
- Credit and collections
- Accounting
- Sales
- Customer service
- Contracts review
- Business development
- Quality assurance/quality control management systems
- Legal counsel
- Purchasing

The corporate laboratory and the branch laboratories perform the company's analytical services. They report to the corporate headquarters on quality control, productivity, staffing and marketing/sales matters.

4.1.4.1 EMSL Analytical, LA Testing, MPL Laboratories and Advanced MicroAnalytical

EMSL Analytical goes by three additional DBA names: LA Testing, operating in Southern California; MPL Laboratories, a GMP-microbial lab in Sparta, New Jersey; and Advanced MicroAnalytical, a materials testing lab in Salem, New Hampshire. The policies and procedures documented in this manual apply to all facilities, including those doing business as LA Testing and Advanced MicroAnalytical. MPL Laboratories operates under its own QMS Manual, and is not covered by this manual.

4.1.4.2 Products Division

EMSL also operates a products division which supplies environmental sampling equipment. No key personnel in this division have direct involvement or influence on the testing activities of our laboratories and, therefore, present no conflict of interest.

4.1.4.3 Roles of Administrative Support Groups

This section describes the basic role of the corporate administrative support groups in the laboratory organization. Administrative support consists of:

- Information technology
- Human resources
- Corporate counsel
- Accounting
- Credit/collection
- Sales and marketing
- Corporate customer service
- Purchasing

The departments of the support group are located in the corporate headquarters. Each department has defined roles which provide the laboratories with the support needed to maintain the business. Laboratory managers have direct access to employees of the individual departments in the administrative support group.

4.1.4.3.1 Information Technology (IT)

The IT Department is responsible for computer and technology services at EMSL including, but not limited to, servers, PCs, telecommunications, storage, security, web services, software licensing, repair, maintenance, support, and custom enhancement of EMSL's LIMS (Sample Master XP), LabConnect (report distribution engine) and all company databases. Requests for assistance are forwarded to IT through an e-mail help request system (itsupport@emsl.com). In addition, the IT Department is responsible for instructions for use of its products.

4.1.4.3.2 Human Resources

Human resource responsibilities are handled by EMSL's Human Resources Department. Responsibilities include, but are not limited to, employee recruitment and hiring, personnel record keeping, employee benefits and career development, as well as providing advice to laboratory management on topics such as employee discipline, conflicts of interest, and discrimination and harassment prevention.

4.1.4.3.3 Corporate Counsel

EMSL maintains an in-house corporate counsel. Corporate counsel advises EMSL corporate management on legal issues related to the business of EMSL.

4.1.4.3.4 Accounting

The Accounting Department has the fiduciary responsibility of ensuring the accuracy and timeliness of all accounting processes and financial reporting. This includes invoicing to customers, processing and payment of vendor bills, cash management, reconciliation of accounts, and satisfying financial reporting obligations to internal and external entities. The department ensures accounting transactions are recorded, flow through the general ledger, and are properly summarized to produce financial statements for management in accordance with Generally Accepted Accounting Principles (GAAP).

4.1.4.3.5 Credit/Collections

This is a sub-department within Accounting. The responsibility of this department is to act on the outstanding accounts receivable sub-ledger, which lists customers with outstanding invoices. Contacts are made in an effort to ensure outstanding debt is collected in a timely fashion. This department deposits daily cash receipts and applies customer payments to their accounts. It also reviews accounts in consideration for outside collection assistance.

4.1.4.3.6 Sales and Marketing

The Sales and Marketing Department develops new business for EMSL through advertising, marketing, and contacting potential customers. Each sales employee is assigned customers for whom they are responsible for negotiating contract terms. Marketing is responsible for the development of marketing materials including fliers, advertising, and informational materials distributed via the web and through the laboratories, as well as in-person through EMSL's participation in conferences and exhibitions.

4.1.4.3.7 Corporate Customer Service

The Corporate Customer Service team assists Marketing, Sales, and EMSL laboratories nationwide. Their current duties include, but are not limited to, answering incoming calls to the customer service extension, assisting customers who are seeking information on capabilities and technical questions, researching invoice discrepancies, finding, and sending

reports, assisting with LABConnect user issues, setting up LABConnect accounts, placing supply orders, and assisting with pricing inquiries.

4.1.4.3.8 Purchasing

The EMSL Purchasing Department is responsible for arranging for the procurement of supplies and services for the entire EMSL organization. Responsibilities include obtaining and reviewing suppliers for business-critical supplies and services, reviewing and approving service orders submitted by branch laboratories, and tracking performance of suppliers and service providers by being the main point of contact for complaints and supply/service problems. See § 4.6 for additional information.

4.1.5 Confidentiality, Ethics and Data Integrity Policy

4.1.5.1 Confidentiality (see also § 5.10.5)

It is understood that confidentiality and proprietary rights must be respected throughout the performance of services for any customer. Information will only be given to those for whom it is intended, and the proprietary rights of our customer shall be protected. EMSL does not place information related to our customers in the public domain. Data reports and/or other related information will not be given out to any person other than the customer, unless prior approval from the customer is received, or when EMSL is compelled to disclose records and/or information by law, subpoena, government entity, or other legal means. When the lab is contracted to notify the customer of the release of confidential information, it shall. Any information relayed to the laboratory by a third party (regulator, complainant, etc.) associated with the customer shall be kept confidential, unless agreed upon by the source.

This attention to confidentiality extends beyond the workplace. Employees, contractors, external assessors, and committee members shall be aware that revealing confidential information in a non-work social setting is still considered a breach of confidentiality requirements.

The laboratory manager is responsible for ensuring the sample results and related information is disseminated appropriately. In the event there is a question regarding applicability of confidentiality (including requests from government agencies or legal representatives), the vice president of quality assurance, national directors and/or vice presidents or Sr. vice presidents are to be consulted.

4.1.5.2 Ethics and Data Integrity Policies and Procedures

This section describes one of the key elements of this quality assurance program. A proper ethics and data integrity program establishes the principles which ensure the well-being of the company and its staff members. It presents the company values on honesty, integrity, excellence, and trust.

4.1.5.2.1 Ethics Policy

As a condition of hire, every employee (part-time or full-time, temporary, or permanent, including interns) is required to sign an acknowledgement of the Corporate Ethics Policy. The signed policy statement shall be maintained in the personnel files. This policy is as follows:

EMSL Analytical, Inc.
Corporate Ethics Statement

In order to comply with The NELAC Institute and ISO 17025 standards and to provide the highest level of proper, honest, reliable, legal, and ethical service to EMSL Analytical, Inc.'s customers, EMSL requires that each employee comply with the following Corporate Ethics Statement ("Ethics Statement"). This Ethics Statement mandates that each EMSL employee performs his/her jobs honestly, properly, ethically, and legally, and that each EMSL employee performs his/her assigned responsibilities with the utmost regard for the standards set forth in this Ethics Statement and in the EMSL Employee Handbook. Under no circumstances will any EMSL employee act dishonestly, unreliably, unethically, or unprofessionally while engaged in employment with EMSL. Without limiting what EMSL may consider acts that violate this Ethics Statement, examples of prohibited acts are as follows:

1) *Fabrication of data of any kind, including, but not limited to,*
   - *Reporting data for samples not analyzed*
   - *Quality control or customer results*
   - *Training records*
   - *Calibration measurements*
   - *Maintenance records*

2) *Intentional misuse of company resources, including but not limited to:*
   - *Changing documents without proper authorization or embezzling documentation (Manuals, Standard Operating Procedures, company generated forms)*
   - *Performing unauthorized services for personal use or for use by an EMSL competitor, or for any other non-EMSL purpose or use*
   - *Misuse of office resources (phone, fax, internet, etc.) for any non-EMSL purpose or use*

3) *Back-dating data*

4) *Misrepresenting or fabricating performance (e.g., sample productivity, billing)*

5) *Signing acknowledgements of policies or procedures (e.g., QMS Manual, SOPs, work instructions, policy statements) without having read, understood, and committed to their contents*

6) *Knowingly failing to follow said policies and procedures for any reason including, but not limited to, for the sake of productivity*

7) *Misrepresenting qualifications (e.g., experience, academic training, etc.)*

8) *Disclosing information in contravention to, or in disregard of, customer confidentiality agreements*

EMSL prohibits these and any other act that violates the Ethics Statement or the EMSL Employee Handbook. The officers, managers, and employees of EMSL will not condone, tolerate, encourage, or ignore any unprofessional, illegal, or unethical actions directed towards or impacting a person's work at EMSL, EMSL customers or potential customers, or a person's co-workers; or any act that violates the Ethics Statement or the Employee Handbook. In addition, no officers, managers, or employees of EMSL shall be offered, given or accept any encouragement, monetary or otherwise, to perform acts which violate the Ethics Statement or the Employee Handbook.

The management of EMSL strives to ensure laboratory employees (especially analysts) are not exposed to undue pressures such as:

- *Impossible time constraints (turnaround times)*
- *Customer influences that may affect analysis*
- *Pricing/marketing issues*
- *Productivity rates**

If employees feel they are exposed to any undue pressure, the situation should be brought to the attention of that staff member's immediate supervisor. If the supervisor is unable or unwilling to resolve the issue, or if the source of pressure originates with the supervisor and the staff member feels they cannot bring it to their attention, the situation may be reported to the Lab Manager or corporate management for review. These items may always be brought to the attention of the human resources department.

**NOTE: The corporate management of EMSL must monitor analyst's productivity rates as a normal course of business. Reasonable rates of analysis are used as guidelines to help determine analysts' ability. At no time are analysts given productivity goals that are unreasonable.*

Employees are required to report to managers located at EMSL branch offices, EMSL Corporate Officers/Managers or human resources department located in Cinnaminson, New Jersey, all acts by EMSL employees, managers or officers that may violate this Ethics Statement. The failure to report such actions may subject that person(s) to the punishments set forth below and in the Employee Handbook. Reporting unprofessional and/or unethical behavior will not negatively impact employment and will not jeopardize the employment status of any EMSL employee.

If an unfortunate event occurs where a customer or fellow employee asks a staff member to perform in an unethical manner, the situation will be brought to the attention of that staff member's immediate manager. If the cause of pressure comes from the immediate manager, or the immediate manager is unable to resolve the issue, the situation may be brought to the next level manager for resolution. At all times, an ethics issue may be brought to the human resources department or other corporate management by any staff member. Issues will be handled confidentially, whenever possible.

If a violation or potential violation of this ethics statement has been reported, it will be investigated by the laboratory manager and/or by corporate management. Investigations will be conducted confidentially until they are concluded. The findings shall be documented. Where customer data may have been affected, the customer shall be notified as soon as practical (no more than 15 days after close of investigation). These communications shall be documented in the integrity investigation records.

Depending on the findings of that investigation, any violation of the ethics statement may subject the offending employee to disciplinary or corrective action as outlined in this ethics statement or the Employee Manual. Following investigation, if it is determined that a violation has occurred, EMSL, in its sole discretion, may determine appropriate disciplinary or corrective action as outlined in the ethics statement or Employee Handbook, which may include:

- *Verbal warning*
- *Written warning*
- *Termination of employment*

In addition to the above, EMSL reserves all rights to take appropriate legal action when it deems necessary. Employees must also be aware that breaches of personal and legal data integrity may lead to civil liability/criminal prosecution and fines/punishment.

(end of Ethics Statement)

4.1.5.2.2 Ethics Committee

The Ethics Committee is a group of individuals selected from various departments to review potential ethical violations. Members of the group receive information from employees, customers, assessors, etc., and investigate the instance for validity. A lead person will be assigned, and additional members of the group, along with anyone else deemed necessary for investigation, will gather the information needed to decide whether or not the act in question was done with or without malicious intent. Should the committee decide the situation was unintentional, the matter is documented and filed on the secure QA drive, stating the findings. If an intentional ethical violation is determined, the committee will notify Human Resources, Legal Group and Senior Management of findings, with supporting documentation. The severity of the act will determine the disciplinary action taken, including possible termination. All documentation is filed in the secure QA drive.

4.1.5.2.3 Data Integrity

The data integrity policy is a portion of the ethics policy relating to fabrication of data and misrepresentation of results. EMSL complies with the TNI standard requirements addressing data integrity procedures as described below.

Ethics and Data Integrity Training

One of the objectives of the quality assurance program is to ensure the staff of EMSL is provided training in the aspects of ethics and data integrity as they pertain to corporate policy. The training is provided within three months of hiring, and annually thereafter. The goals of this training program are:

- To understand the responsibility to provide true and accurate information
- The understanding of the consequences of unethical conduct
- Provide direction to employees
- Define right and wrong (as it is job related)
- The understanding of the impact of our actions

Training will be provided in the form of required readings, staff meetings, workshops and/or corporate issued newsletters. Corporate management and the laboratory manager are responsible for ensuring this training is provided to the staff, and that records are maintained documenting the training.

Signed data integrity documentation: The ethics statement is signed by each employee as a condition of employment. In addition, a QMS Manual compliance disclosure form is executed by each employee (see *Compliance Disclosure* at beginning of this document). This compliance disclosure states that, "In executing this Compliance Disclosure, I attest and confirm that I have read and understand the entire contents of this document" (i.e., this manual).

Periodic Monitoring of Compliance - Methods of Monitoring Compliance May Include:

- Review of monthly and or quarterly quality control reports: Reports are submitted to the Quality Assurance Department for review. This review includes a check on integrity such as misrepresentation of data, falsification of

results, etc. Reports of review are completed and made part of the annual management review report.

- Monitoring of proficiency testing performance: Scores of PT samples are summarized in a report and reviewed by the QA Department, the national director and vice presidents
- Investigations initiated by a customer or internal complaint
- Internal audits
- Periodic submittal of blind samples by management
- Secondary data review

Confidential Reporting

As noted in the ethics agreement, issues that cannot be discussed directly with local lab management may always be directed to the corporate human resources department for review. Issues will be handled confidentially, whenever possible.

Data Integrity Investigations

When data integrity issues are reported, they will be reviewed by the party receiving the report. The issue shall be investigated as appropriate in order to determine its extent and impact, both potential and actual. Where detailed investigation is necessary, the person receiving the integrity complaint shall inform the vice president of quality assurance, or corporate QA manager, or human resources department to assist and review the investigation. Investigations shall be conducted in a confidential manner until they are completed. The investigation shall be documented including details on any notifications made to customers receiving affected data.

4.1.5.2.4 Impartiality

EMSL has reviewed laboratory activities and identified potential situations where impartiality can be affected:

- Financial
- Conflicts of interest
- Bias
- Prejudice
- Intimidation

The management staff and EMSL Quality Assurance personnel ensures impartiality through training, internal and external audits, peer review, ethics and integrity policies, conflict of interest, etc. Certain procedures are performed daily, while others are conducted annually; for example, annual data integrity and ethics training. As new situations present themselves, the management team reviews the potential conflict and brings the occurrence to the Human Resources department and Senior Management.

A more detailed description regarding how EMSL assesses impartiality can be found in QA-FM-10 Risk Assessment.

4.2 Management System

4.2.1 Program Objectives

The program described in this manual is designed to help plan and institute company policies and quality objectives throughout the laboratory facilities. This program is intended to provide procedures and policies, which provide:

- Development of company quality control programs
- Implementation of good laboratory technique
- Constant oversight of laboratory quality performance
- Establishment of training requirements
- Job descriptions of each employee delineating responsibilities
- Development and maintenance of internal quality audit program
- Use of appropriate analytical technology including review of current literature to capture recent applicable developments
- Proper documentation and quality review of analytical data
- A comfortable work atmosphere away from undue productivity pressures
- Maintenance of accreditation programs
- Assurance that national coherency is maintained through standardization of policies and procedures
- Control and maintenance of round robin programs
- Control of documents
- Respect for customer confidentiality
- Actions to address risks and opportunities

Quality policies and procedures are integrated into our daily work, and are constantly reviewed by national, regional and laboratory management and by the Quality Assurance Department.

The program is managed and maintained by the corporate QA Department.

4.2.2 Management System Review

The efficacy and appropriateness of the Management System is reviewed by the National QA Director and other management staff at least annually, as part of Annual Management Reviews. In addition, frequent periodic reviews are conducted in response to corrective and preventive actions. Per the EMSL document control program, documents which are part of the management system are reviewed at least once every three years, and the QMS Manual itself is reviewed annually. Revisions to the management system are discussed with technical and management personnel with the expertise to discuss the feasibility and acceptability of any requested changes.

4.2.3 Changes to the Quality Management System

The quality management system is designed to ensure the integrity of the system is maintained in the event any changes take place. If any changes to the management system are planned and implemented, the integrity of the management system will be maintained by senior management. Procedures include:

- Contingency plans
- Assignment of the same responsibility by multiple personnel (backups)
- Assignment of deputies or designated second person
- Implementation of procedural change
- Providing training if necessary for change

4.2.4 Departures from Quality Assurance Policies

Any departure from the procedures and policies as stated in this document must be reviewed by the Quality Assurance Department and corporate management prior to approval and effect. This review will include, at a minimum:

- Reason for deviation from policy and/or procedure
- Applicability of alternative policy and/or procedure
- Availability of resources
- For deviations of analytical procedures, assurance that data is reported with appropriate references and disclaimer on final reports affected by a policy and/or procedure change (if applicable)

A record of the review of the alternative procedure or policy is maintained as part of the project files.

No departures from the policies and procedures, as written in this document, are permitted without acceptance by the QA Director or corporate management.

4.2.5 Roles and Responsibilities of Technical and Quality Management

The roles and responsibilities of the technical and quality management of EMSL are described in the Personnel section of this manual (§ 5.2).

4.2.6 Addressing Risk and Opportunities

4.2.6.1 The policies and procedures in place, QMS Manual, SOPs, QA reports, Annual Management review, internal audits, test method assessments, corrective/ preventative action program, etc., ensure risk is limited during the activities of the laboratory. Each of the policies and procedures implemented are reviewed on a periodic basis by Technical Managers, along with the QA Department, to produce consistently high-quality data and reduce undesired outcomes.

4.2.6.1.1 Should any undesired outcomes arise, each case is evaluated on a case-by-case basis by supervisory personnel, along with the QA Department, through our non-conforming work policy and/or corrective action procedure.

4.2.6.1.2 Instances of questionable judgement are referred to the Ethics Committee. The committee researches the situation, and determines whether the act in question was intentional or accidental. Any intentional instances will result in disciplinary action that may result in termination. Other situations, deemed unintentional, can be addressed through corrective actions, training, or another form of correction.

4.2.6.2 EMSL management holds meetings with personnel on a weekly basis to discuss ongoing business opportunities, risk assessments, and continuous improvements that can be made. Upper Management is provided with information from the EMSL network, and the most appropriate course of action is determined based on the discussions at the meetings.

4.2.6.3 A more detailed description regarding how EMSL assesses risk can be found in QA-FM-10 Risk Assessment.

4.3 Document Control

EMSL document control procedures have been established to meet the requirements of ISO 17025 and the accreditation requirements of AIHA LAP, LLC; A2LA, The NELAC Institute (TNI), NVLAP, CALA and

state agencies. Procedures and policies apply to all EMSL laboratories. The program is overseen and administered by the Quality Assurance Department, including a designated Document Control Manager, who is the person mainly delegated to posting new and revised corporately approved documents on the E-Link SharePoint site, and sending out notifications when documents are added or revised.

The EMSL document control procedures are documented in the EMSL Controlled Documents SOP (QA-SOP-301), Document Master Lists SOP (QA-SOP-302) and related documents. EMSL controls documents to ensure the laboratories are performing analysis and reporting data following only the most up-to-date corporately approved EMSL policies and procedures. This program also establishes company-wide standardization and preserves company intellectual property. EMSL's document control SOPs referenced above covers the following topics in detail:

4.3.1 Structure of controlled document system
4.3.2 Required elements of a controlled document
4.3.3 Initiation, review, and approval of new or revised documents
4.3.4 Protection of controlled documents
4.3.5 Distribution of controlled documents by laboratory manager
4.3.6 Control of local documents and locally maintained copies
4.3.7 Retirement of obsolete documents
4.3.8 Periodic review of controlled documents
4.3.9 Amendments and revisions
4.3.10 Changes to LIMS final report templates

The list of corporately controlled documents is maintained in QA-FM-304 Corporate Master List of Controlled Documents. Each lab maintains a list of locally controlled documents in QA-FM-303 Local Master List of Controlled Documents. SOPs specific to cGMP are detailed in a locally controlled document, Cinnaminson cGMP Master List of Documents, available on Cinnaminson's local drive.

4.4 Review of Requests, Tenders and Contracts

4.4.1 General

EMSL services are generally offered as line-item tests which reference documented methodologies. Laboratory services are typically requested by the customer as "open order" requests. Samples may be delivered to the laboratory at any given time, without a firm documented arrangement. Analytical services are often performed on verbal contract. In these situations, our general terms and conditions apply. Management review procedures for open orders, verbal contracts and for the cases where a written contract is established are discussed in this section.

4.4.2 Procedures for Review of Contracts, Requests and Tenders

Requests, tenders, and contracts are three parts of the transaction process. Requests for service are made by the customer for a scope of work. The tender is the proposal from the lab to the customer, which could include clarifications of the work desired, proposal of turnaround time, and costs for the service. The contract is the actual agreement between customer and lab on finalized terms.

The customer's request for services may be made directly to the laboratory manager, corporate management, or sales staff. In any case, before the samples are accepted for analysis signifying acceptance of the contract, laboratory or corporate management must review the request. This review must cover:

- Requirements for analysis - method requested is a standard method (i.e., available on price list) and understood. Special handling procedures (if any) are noted.
- Customer's requirements for Laboratory Accreditation
- Applicability of the method requested - method is available and applicable for the sample type and result(s) will provide the customer with required information
- Technical capabilities- training, experience, and qualifications of the staff
- Understanding of the method(s) requested
- Equipment resources - equipment is available, in working order and calibrated
- Staff resources - number of personnel to perform the work and required QC is suitable
- Subcontracting - identification of outside services needed to support the request or contract (including other EMSL laboratories)

Under general circumstances, the status of the laboratory capabilities is well established. For example, technical ability and equipment resources are monitored with performance of QC analyses, proficiency testing and compliance with the QA policies documented in this manual (e.g., documentation of SOPs, training requirements, analytical specialist's qualifications, and calibration requirements). Applicability of method and staff resources is more subjective. It is the responsibility of the laboratory management to review the requests and ensure the laboratory (or laboratory to which the work will be subcontracted) can perform the services.

4.4.2.1 Documentation of Review

These reviews of customer requests are documented in a manner appropriate to the type of request. The majority of the work being received by EMSL is established as line item, open ended requests according to standard terms and conditions, or to prices which are negotiated with sales representatives ahead of time. Requests are generally made by the customer through the sales representative, corporate management, or laboratory management. Requests are reviewed and checked against the requirements listed above.

When work is received at the laboratory, the customer's COC defines the requested analysis and turnaround time. In addition, any requested deviations from standard terms and conditions or defined contractual requirements will be defined. If any clarification or modification of the request is necessary, the modified tender will be communicated to the customer and documented in writing, along with the customer's approval of these altered terms.

This review, and ultimately the acceptance of the work, is documented with the acceptance of the samples by the laboratory. The acceptance of a sample batch constitutes the review and acceptance of the request (or contract). The initials of the responsible laboratory staff member recorded on the internal chain of custody (in the 'sample accepted' box) documents the contract review.

Where standard terms and conditions are modified (e.g., special reporting requirements, non-standard pricing, modified methods, etc.), this shall be approved by a corporate sales representative. These approved contracts are maintained by the sales department and communicated to the laboratory as appropriate through special notes in SampleMaster. For more formal or complex contracts which involve review by the president or Sr. vice

president(s), documentation of review is evidenced with the signature of president or Sr. vice president on the contract.

4.4.2.2 Changes in Contracts, Requests and Tenders

If a laboratory is providing services under a written or verbal contract, that contract must be acceptable to both the laboratory and the customer. Any differences identified shall be resolved before the work begins. The customer shall be informed of any deviations to the contract or requests. Documentation of any pertinent discussions with the customer shall be documented.

Documentation of changes (or resolutions) is to be made as appropriate to the type of request. A simple notation on the chain of custody is sufficient for a change in turnaround time requirements, for example. More complex changes must be more formally recorded.

If a written contract needs to be amended after the commencement of the project, both the laboratory management and customer must agree to those amendments. These amendments must be documented.

4.4.3 Beginning New Work

The laboratory manager must not accept any new work without evaluating the current resources. This includes accreditation requirements, the availability of equipment and staffing. For example, a laboratory must not accept an increase in workload, if the laboratory staff is currently at capacity.

Any question regarding the capability of the laboratory to perform such new work must be brought to the attention of corporate management. The corporate management will either:

1) Provide the additional equipment and/or staff
2) Allocate work through the EMSL network
3) Reject the new work

4.4.4 New Technical Service

Prior to the implementation of any new technical service, corporate management performs a review. This review includes market applicability and availability of resources. The Sr. vice president(s) or the president must grant approval. The Sr. vice president or designated management personnel for the area being developed shall be notified of the expansion, and shall ensure standard operating procedures are written and quality control parameters are established for new methods.

4.5 Subcontracting of Tests

4.5.1 General

The EMSL subcontracting procedures are documented in the *EMSL Subcontract SOP (GEN-SOP-10)*. This SOP defines when a laboratory accepts samples to be subcontracted.

The network of EMSL laboratories provides the customer with a valuable resource. As per EMSL standard terms and conditions, EMSL reserves the right to subcontract samples to any EMSL branch lab, as long as the laboratory receiving samples holds equivalent relevant accreditations and scope of testing as the laboratory receiving the samples from the customer, and the customer is notified. By submitting samples for analysis, customers agree to these terms and conditions. In this way, samples may be shipped out for analysis to other EMSL laboratories when a laboratory is at workload capacity, turnaround time cannot be reached, or the laboratory temporarily does not have the analytical

capability (e.g., instrument is down, personnel are out). This flexibility is an added benefit to the customer, allowing drop-off of samples at any lab with the knowledge their requirements will be met.

When samples are subcontracted to an EMSL laboratory, a Sample Transfer Form or Standing Customer Agreement Form is completed electronically, or hard copy if necessary. These forms ensure the customer has agreed to the subcontract arrangements and is aware of the subcontractor's accreditation credentials, where applicable.

The laboratory receiving samples maintains responsibility for the subcontract lab's work except in those cases when the customer or regulatory authority specify which subcontractor is to be used, or when the receiving EMSL Lab is simply acting as a courier service (i.e., when they do not perform the analysis requested by the customer, or customer agrees beforehand that samples will be transferred).

In the event an outside, non-EMSL lab is required, the laboratory manager will ensure all testing is performed by qualified laboratories. Laboratories must subcontract only to outside laboratories that maintain accreditations appropriate for that analysis.

4.5.2 EMSL Courier Service

EMSL laboratories offer a courier service to customers that wish to drop off samples intended to be transferred to another EMSL laboratory for analysis. When a lab is acting as a courier, they are not seen to be part of the contract review for analytical process, and are not responsible for analytical results provided to the customer.

4.5.3 Selecting a Competent Subcontractor

Regardless of the situation, when subcontracting samples, the samples shall always be placed with a competent subcontractor. Where the customer specifically designates a laboratory to perform the analysis, this will override any other considerations and relieve the receiving laboratory of any responsibility for the selection.

In all other cases, the receiving laboratory shall select a laboratory which holds at least equivalent qualifications for the analysis. Relevant qualifications will depend on the needs of the customer, and should be determined prior to subcontracting. Where a laboratory is accredited for an analysis, the laboratory selected shall hold equivalent accreditations. If not accredited, it should be determined which accreditations are required by the customer and select a laboratory meeting those requirements.

Qualifications of EMSL laboratories are included in the "Laboratory Qualifications" pages on the EMSL website. The website includes copies of all accreditation certificates and scopes of accreditation, licenses, approval letters, etc., from 3rd party accreditors and regulators (e.g., state and federal departments).

If subcontracting to an external laboratory, the laboratory's qualifications shall be reviewed prior to selection. If the subcontract laboratory maintains accreditation for the analysis in question, a copy of their accreditation certificate shall be reviewed and kept on file. Where no accreditations are relevant to the analysis, information on laboratory personnel qualifications, quality system and proficiency testing participation may be requested at the user's discretion.

4.5.4 Customer Knowledge and Approval

As noted above, the EMSL standard terms and conditions reserves EMSL's option to transfer samples between EMSL branch laboratories with equivalent relevant qualifications. By submitting samples, customers agree to these terms, and accept a subcontracting arrangement with notification and

approval by the customer with the Sample Transfer Form or Standing Agreement Form. Unless otherwise documented on the chain of custody by specifying the lab to do the work, the transfer of samples may occur at the discretion of the laboratory manager as discussed in the EMSL Subcontracting SOP (GEN-SOP-10).

Under ordinary circumstances, the customer will be made aware of the laboratory and qualifications of the laboratory that will be performing the analysis at the time samples are submitted for analysis. In rare instances, a decision to subcontract may be made after the submission as a result of lab capacity, instrument problems, etc. In these cases, the laboratory will contact the customer to inform them the samples will be transferred. This communication will be documented in the customer correspondence logs or via e-mail. A Sample Transfer Form or Standing Agreement form is completed, documenting customer's approval.

In the case of outside subcontracting, the customer will be informed of the subcontract lab and their qualifications prior to sample submission. Unless the customer specifies the laboratory to be used, it is the lab manager and/or department manager's responsibility to select a competent laboratory for the work.

In any case, the test report submitted to the customer will make clear the location and identity of the laboratory which performed the work.

4.5.5 Responsibility to the Customer

The receiving laboratory (i.e., laboratory initially receiving the samples) is responsible to the customer for the work of any non-EMSL subcontractor, except in the case where the customer specifies which subcontractor is to be used.

In the case of subcontracting between EMSL laboratories, this responsibility is maintained regardless of whether the receiving laboratory is involved in the invoicing or direct reporting to the customer. Due to the corporate structure of EMSL, reporting is completed by the subcontracting lab, and invoicing is completed by the receiving lab, unless samples are relinquished. In this case, the samples are not considered to be subcontracted. Direct reporting from the analyzing laboratory ensures there is no confusion about the location at which the analysis was performed.

In all cases, the receiving laboratory remains the point of contact for the customer and will be involved in resolving disputes, arranging for reanalysis if requested, and generally acting as the responsible party for interacting with the subcontract laboratory.

4.5.6 Subcontract Register

As noted above, only competent laboratories shall be selected for subcontracting. Since EMSL laboratories may transfer samples to other EMSL laboratories with equivalent accreditations, the list of labs and qualifications on the EMSL website will be considered the registry of EMSL subcontract labs. This list is maintained and updated by the EMSL Corporate Quality Assurance Department.

In the case of outside laboratories used for subcontracting, a list of these labs shall be maintained in each branch laboratory that conducts external subcontracting, and these subcontractors shall be added to the EMSL Approved Vendor List and reviewed as per the EMSL vendor review process (see *QA-SOP-500: Evaluation of Suppliers and Service Providers*). In addition to the list, the information reviewed in making the determination of competence will be documented following the policies and procedures in QA-SOP-500.

4.5.7 Retention of Subcontracted Samples and Records

When samples are sent to another EMSL laboratory for analysis, the samples will be retained by the laboratory conducting the analysis, unless otherwise documented in project specific instructions. Technical records relating to the analysis (e.g., bench sheets, raw data, QC data) shall be retained by the analyzing lab, unless otherwise specified and documented.

When samples are subcontracted to an outside laboratory, the receiving laboratory shall ensure EMSL retention policies (for both samples and data) are communicated to the subcontracting lab, and samples are retained for the required period of time.

4.6 Purchasing Services and Supplies

4.6.1 General

The EMSL procedures for purchasing and evaluating of supplies and services that are critical to the analysis of samples are documented in two related SOPs:

QA-SOP-500: *Purchasing-Evaluation of Suppliers and Service Providers*
QA-SOP-501: *Purchasing-Receiving Supplies and Services*

These procedures help to ensure purchasing and vendor selection is consistent across all EMSL laboratories.

4.6.2 Purchasing

Prior to placing a purchase order for supplies or services, the laboratory manager shall refer to the EMSL List of Approved Vendors available on e-link. This list contains vendors for the following types of critical supplies and services:

- Laboratory equipment (consumable and permanent equipment)
- Subcontracted analytical work
- Proficiency testing providers
- Onsite services, such as balance calibration and repair
- Outside calibration services
- Reagents and standards

Approved vendors on the list have been evaluated by laboratory managers and the purchasing department on product/service quality, customer service, and delivery (see *QA-SOP-500*). New vendors will be added to the list after the Quality Assurance Department has verified the vendor has the necessary qualifications, and is then evaluated with the next annual evaluation survey. Any complaint regarding a vendor (e.g., defective product, poor customer service) will be communicated to the Purchasing Department, who will then investigate and help resolve the issue. Depending on the significance of the problem, a decision will be made between the national director, vice president, the Purchasing Department, and the Quality Assurance Department to discontinue use of the product, or place the vendor on probation.

Consumable supplies are to be purchased based on laboratory needs as determined by the laboratory manager. SOPs will indicate the specific grades and classes of consumable supply items to be used. Expendable materials intended for single use purposes such as microscope slides, plastic centrifuge tubes, etc., are not to be reused.

Selection of the appropriate grade of reagent(s) is designated in the reagent section of each analytical SOP, and in addition, may be specified by the laboratory manager in unusual circumstances. As a general practice, reagents will be of at least ACS reagent quality.

Reagents, reference standards and reference materials shall be purchased in accordance with the analytical needs of the laboratory as determined by the laboratory manager. Reference materials are crucial for ensuring traceability of results directly or indirectly tied to the quality and reliability of this material. Therefore, additional care must be taken to ensure qualified reference material providers are selected, and only grades of reference material that are fully accredited and NIST-traceable are purchased from qualified vendors. (See § 5.6.2 on more information on selecting reference material providers). Reference standards shall be NIST-traceable (where applicable) and include a certificate showing traceability. Reference materials and standard reagents shall be obtained from the vendor with a certificate of analysis (certificate must identify the lot number). These certificates shall be maintained in the laboratory files prior to initial use. If no certificate is received, laboratory shall contact the vendor.

For reference materials used in methods within the scope of ISO 17025 accreditations, reference materials shall be from a Reference Material Provider (RMP) accredited to ISO 17034:2016, and the product ordered shall be certified with a certificate bearing the Accredited RMP symbol.

Laboratory managers are to purchase reference materials and reagents in the smallest quantities practical to help reduce inventory. A reduced inventory will be used up more frequently, avoiding the possibility of having the standard stored in the laboratory past the expiration date.

Purchasing documents (e.g., order form submitted to purchasing via intranet, purchase order requests) shall contain technical details about the product or service being ordered. Prior to releasing to the vendor, these documents are reviewed for technical suitability by the laboratory management and/or the Purchasing Department. Most supplies are purchased through the EMSL 'Shopping Cart,' which is available on EMSL's intranet for placing purchase orders.

4.6.3 Approval of Service Providers

Outside services that are contracted and affect analytical testing, such as proficiency testing services, calibrations, repairs to equipment, adjustments to instrumentation, checks on performance, etc., require the vendor be accredited under the ISO 17025 standard, where applicable. Other considerations for the approval of providers (as per *QA-SOP-500*) include:

- Accreditation to appropriate standards (where relevant, e.g., ISO 17025, ISO 9001)
- Reputation in industry
- History of performance with EMSL
- Referrals

Services received must be documented and filed by the laboratory.

Note: When arranging calibrations with an external calibration provider, EMSL requirements for calibration certificates should be discussed with the provider at the time of contracting. See § 5.6.2 for requirements of a traceable calibration certificate.

4.6.4 Reception, Inspection and Acceptance of Reagents and Consumable Supplies

Procedures for the reception, inspection, acceptance, and storage of supplies are covered in QA-SOP-501. Generally, reagents and reference materials shall be verified against the product ordered, then dated and initialed, or a signature applied, with date received and expiration dates. Labels will also be dated and initialed, or a signature applied, when opened and/or when reagent mixtures are prepared. Materials shall be assigned an EMSL ID number and added to the Stock Standard and Reagent Log for the laboratory, along with required information.

4.6.4.1 Storage and Handling of Reagents, Reference Materials and Reference Standards

Reagents, reference materials and reference standards are to be stored in a manner which will conserve the purity and integrity. Reagents and reference materials are stored following manufacturer requirements (e.g., temperature, humidity). Care must be taken when handling reagents to avoid contamination or evaporation. Lids must be kept secure when not in use. Reference standards shall be stored according to manufacturer requirements.

All reagents shall be stored with bottle caps or stoppers securely sealed. If reagent materials have been spilled on the exterior of storage containers, containers should be wiped clean before being placed in storage. Storage cabinets shall be cleaned periodically to prevent deterioration. If storage cabinets show significant deterioration (e.g., rust) these shall be repaired or replaced to ensure their integrity.

General procedures for storage of reagents require the separation of incompatible materials. Organic solvents (e.g., acetone, THF, reagent alcohols) shall be maintained in a storage cabinet suitable for flammable materials (i.e., metal cabinet). Acids (nitric, hydrochloric, etc.) shall be stored separately from organic solvents in a cabinet away from them. Materials may be stored together when they are of similar classes that will not cause interferences or increase risk of cross contamination (e.g., hydrogen peroxide with acids).

4.6.4.2 Solution Preparation

Solutions prepared from neat materials shall be recorded on the *EMSL Standard Solution Prep Log* available on e-link. The log shall include a description of the solution, date of preparation, concentration and/or purity of solution, identification of parent material (i.e., the ID assigned on the *Stock Standards and Reagents Log*), preparer's initials, and expiration date. Solutions shall be labeled with the ID, ID number from preparation log, and expiration date (usually the expiration date of component materials which is closest to the date of preparation). Using preparation log and standards log, solutions shall be traceable back to parent material and certificates of analysis for that material.

4.6.4.3 Unique Identifier

For TNI labs: All containers of prepared standards, reference materials, and reagents shall bear a unique identifier and expiration date. When more than one container of a standard with the same lot number is received from a vendor, each container shall be labelled with a unique ID; for example, xxxA, xxxB, and xxxC. In the standard receipt log, one line entry for the standard may be made as xxx(A, B, C). This policy for labelling each container applies to standards and reagents prepared in-house as well.

4.7 Service to the Customer

Clear, continuous, and open communication between the laboratory and the customer is one of the keys to maintaining a successful, quality operation. Communication should be established prior to the start of any work. Information must be clearly understood between laboratory management and the customer. This information should include (but not be limited to):

- Type of analysis requested
- Turnaround times
- Expected deliverables (any requested changes to the standard report format)
- Sampling guidelines (media, recommended sample volume, etc.)
- Type of packaging for sample shipping

- Submission of final report (via fax, hard copy, mail, overnight shipment)

EMSL will cooperate with customer requests to monitor laboratory performance on their projects. Upon request, customers may be granted accompanied access to the laboratory to witness performance of testing or be provided with records (QC data, bench sheets, etc.) so long as doing so does not jeopardize the confidentiality of other customer information. Where a customer requests that we provide information on their project to an outside third party (their customer, for example), we must have written authority to do so. Text or email is acceptable.

Customer requests should be carefully considered and followed, as long as doing so is not detrimental to the business, integrity of the results, misleading, or in violation of any statutory, regulatory or accreditation requirements.

4.7.1 Documenting Customer Correspondence

Correspondence with customers shall be recorded by each EMSL laboratory in a manner fitting to the type of correspondence. Project related information may be recorded on the Chain of Custody forms for the project to ensure the information is available and associated with the project. Other correspondence may be manually recorded utilizing the Customer Correspondence Log template available on E-link, or commercially available bound phone message pads which are dated with initial and end dates, once full. Correspondence may also be recorded using electronic means when available to the laboratory (e.g., Outlook Journal feature, Maximizer, etc.). Regardless of how correspondence is recorded, the date of correspondence and initials of person making the entry is required. These records shall be maintained for 5 years, as per *QA-SOP-350: EMSL Record Control SOP,* or for the life of the project files, whichever is longer.

Customer complaints shall be documented utilizing the EMSL Complaint Resolution procedure (QA-SOP-600) and recorded on the Complaint Record form available from E-link. Where customer correspondence leads to corrective action, these corrective actions will be documented via the EMSL Corrective Action system (QA-SOP-200). When feedback is received via the web-based customer survey (rather than directly by the laboratory manager), the QA Department will forward this information to the laboratory manager for follow-up, as necessary.

4.7.2 Technical Support

EMSL provides quality assurance information and technical support to the customer to assure continued quality service. The support and information provided in relation to the work performed includes:

- Field sampling guides
- Availability of pertinent QC records
- Access to the Quality Assurance Department for technical assistance
- Security of data (confidentiality)
- Reasonable access to the relevant areas of the laboratory for the witnessing of analysis

EMSL also provides a variety of sampling equipment and procedures to support the customer's needs. Equipment is available such as sampling pumps, sampling cassettes and sampling media. Instructions are provided along with the equipment.

4.7.3 Customer Feedback Program

The EMSL customer feedback program includes:

- Continuous correspondence between customer and the customer service representatives
- Communication tools available on company website
- Direct contact with customer and Laboratory Manager
- Collecting comments offered by customers during seminars and conferences
- Periodic use of active solicitation of feedback such as through the use of customer survey

Summaries of feedback will be shared with laboratories in such a manner that customer confidentiality is maintained while providing the labs with feedback information. Ordinarily, this will be done in the Annual Management Review report.

4.7.4 Notice of Performance

The laboratory manager shall provide the customer with information as it relates to the performance of the analysis and turnaround time. The laboratory must notify the customer if:

- Analysis cannot be performed on time
- Integrity of the sample has been jeopardized (either by the laboratory or the customer)
- A discrepancy in the analysis has been found during QC analysis

4.7.5 Emergency Laboratory Closings

Where a laboratory's operating hours are affected by any emergency condition (e.g., weather events) the lab manager notifies the corporate Sr. vice president(s), the IT Department, and customers, where applicable. An intra-company email is broadcast with the information. Where possible, calls are re-directed to the corporate laboratory or other unaffected laboratory. The corporate customer service group and/or sales and marketing department representatives continue to contact customers as necessary.

4.8 Complaints

Complaints are considered any statement of dissatisfaction with the product or processes of the laboratory for which a reply is expected. Complaints may be received from any party, inside or outside of EMSL. They may be submitted in any form.

It is the policy of EMSL to take reasonable action to resolve complaints as quickly as possible. Whenever a complaint is received, it is investigated to determine whether the complaint is factually sound and whether resolution is within the control EMSL. If a complaint is not factually sound or EMSL is incapable of resolving the complaint (for example, the complaint is not about EMSL, or would require violating regulatory requirements), EMSL will follow-up with the complainant to ensure they are aware of why EMSL cannot resolve their complaint.

If a complaint is sound and capable of being fairly resolved, EMSL will take all reasonable actions to come to a resolution with the complainant that satisfies the complainant's needs, while not damaging or threatening the integrity of the laboratory, its personnel, or its results. EMSL's complaint resolution procedure is documented in QA-SOP-600 Complaint Resolution (QA-SOP-600-1 Complaint Resolution Overview is available for interested persons, upon request).

A complaint about the quality of reported results may be referred to the accrediting authorities who accredit the work being reported, if such complaints cannot be resolved directly with the customer.

4.8.1 Documentation of Customer Requested Re-analysis

There may be times when a customer will request re-analysis of samples.

4.8.1.1 Results Falling Within Quality Control Acceptance Limits

If the results from the re-analysis fall within the QC acceptance criteria, then the original report remains as the official report. The results should be communicated to the customer, this communication shall be documented, and the supporting data filed with the paperwork from the original analysis.

4.8.1.2 Results Falling Outside of Quality Control Acceptance Limits

If the results from the re-analysis fall outside of the acceptable QC range, and the original results have already been reported, the customer will be notified, and an amended report should be generated and submitted to the customer (See § 5.10.9). The discrepancy will need to be addressed with a corrective action report. All customer communication shall be documented, and the supporting data filed with the paperwork from the original analysis.

4.9 Control of Non-Conforming Testing

The control of non-conforming testing is addressed in detail the *EMSL SOP on Non-conformities and Corrective Actions* (QA-SOP-200). Non-conforming work can be identified by any person working in the laboratory, or brought to the attention of lab staff through an outside party (e.g., a complaint). Upon identification of any non-conforming work, it should immediately be documented using a *Non-Conformity/Corrective Action Record (CAR)* and forwarded to the laboratory or department manager for review. Any employee of EMSL may initiate a temporary work stoppage if it is believed non-conforming work will continue to be produced. The work stoppage shall be reported to the lab manager immediately. If the work stoppage is required for more than an hour, the lab manager must report the stoppage to corporate management.

The review of non-conforming work shall be documented on the CAR form and will include:

- An evaluation of the significance of the non-conforming work
- A determination of acceptability of non-conforming work
- An evaluation of whether the non-conforming work could recur, or whether it is a result of a failure to comply with EMSL policies or procedures

Remedial action will be taken immediately to correct non-conforming work based upon the level of risk evaluated by the lab. If a work stoppage was necessary, the lab or department manager will determine what action is necessary to begin work and document this on the CAR. Only the lab manager or corporate management has the authority to resume work once a stoppage is required.

If the evaluation determines the non-conforming work could recur, or is a result of a failure to comply with EMSL policies or procedures, formal corrective action is required. This shall be recorded on the form available on E-link according to QA-SOP-200 and § 4.11, below.

4.9.1 Notification of Non-Compliance

If a major deviation from policy or procedure is identified which significantly affects customer results, the customer shall be notified within 24 hours of confirmation of the deviation. Major non-conformities may be discovered during an internal audit, external audit, or a regular quality control review. In some cases, the report will require a disclaimer in order to ensure test results can be interpreted properly. Examples of major deviations may include (but are not limited to):

- Quality control reanalysis results outside acceptance limits which call into question test results

- Calibration measurements are outside acceptance limits and may have a negative impact on the results provided to customer
- Sample contamination is suspected (e.g., as a result of positive blanks)
- Failure to follow procedure as written resulting in possible erroneous results

For DOE associated projects:

- Clients must be notified within 15 business days of any potential deviations from policy or procedure that are identified, which may significantly affect customer results.
- The laboratory must report any instances of inappropriate and prohibited laboratory practices to the accrediting body within 15 business days of discovery. Lab will submit corrective actions to the accrediting body within 30 days of discovery of these occurrences.

4.10 Improvement

EMSL is committed to the continual improvement of the effectiveness of our quality system. As noted previously, the management system is reviewed annually as part of the annual management review, along with the continued efficacy of the quality policy and what progress was made on quality objectives. Management system documents are reviewed periodically and updated, as necessary. In addition, EMSL utilizes the feedback from customers, employees, and assessors in making changes to the management system in order to improve its efficiency. Other systems which are designed to provide feedback on both the design and implementation of the quality system include:

- Corrective and Preventive Action
- Internal Audit Program
- Customer Feedback Survey
- Monthly and Quarterly QC Reports

4.11 Corrective Action

This section briefly summarizes the procedures set forth in QA-SOP-200, which describes the mechanisms used to identify, prevent, and communicate conditions adverse to quality (a non-conformity), determine cause(s), initiate corrective action, document, and report the activities, and verify implementation of the corrective action.

A non-conformity is defined as any failure to meet stated requirements, whether these be technical (e.g., failure to meet internal statistically derived limits, use of wrong testing method), regulatory (e.g., state or federal requirements) or managerial requirements (e.g., corrective action procedures, log-in procedures).

Corrective actions serve as an indicator of the lab's performance. At the end of the year, these are reviewed, and a risk assessment can be conducted based on the type of corrective actions generated. For instance, if a lab has identified repeated training issues in the lab, then QA and management will work on a training program for the facility. This process is evaluated and recorded through the annual management review and the action items created from the document.

See the SOP for detailed procedures on how EMSL laboratories handle corrective actions.

4.11.1 Identification of Non-conformities

Non-conformities can be identified by anyone. Laboratory technical and support staff, internal and external auditors, and customers may all identify non-conformities in the laboratory's operation.

4.11.2 Documenting Non-conformities and Corrective Actions

Whenever a non-conformity is identified, the person who identified the non-conformity, or another responsible person, shall investigate. Corrective actions shall be taken when necessary, and shall be documented on the form available on E-link when appropriate, or if required by regulatory Standards. This form is used to document the non-conformity, the investigation of the non-conformity, and what actions (if any) were taken to resolve the non-conformity and prevent its recurrence. Its use is discussed in detail in the *Non-Conformities and Corrective Action SOP* (QA-SOP-200).

4.11.3 Evaluation of Non-conformities and Non-conforming Work

In order to evaluate the extent of effect a non-conformity may have on a result, the laboratory management will consider the following:

1) The significance of the nonconforming work
2) The acceptability of the non-conforming work (is it suitable for use?)
3) Whether customer notification is required
4) The most likely root cause(s) of the corrective actions
5) Whether it is necessary to stop work to prevent additional non-conforming work
6) Determine what is required to resume work (if work is stopped)

A stop work order may be given where a breach in the quality system jeopardizes analytical quality, or a failure in procedures presents an eminent safety concern.

4.11.4 Cause Analysis

Non-conformities must be handled in a manner which will provide a way to help ensure they are not repeated. This includes identification of the root cause(s) of the error, determination of corrective actions which will eliminate those root causes, and the initiation of those corrective actions. Identification of root cause(s) is one of the keys to corrective action and prevention. It helps identify the actual reason for the error. The *QA-SOP-200* contains a thorough discussion and guide to root cause analysis.

The investigation of the non-conformity will consist of a review of all steps leading up to the non-conforming condition or event. This may include review of QC data, sample tracking, data transcription, instrument calibration, training documentation, and discussion with personnel. See *QA-SOP-200* for additional details.

4.11.5 Selection and Implementation of Corrective Actions

Corrective actions are those actions which are taken to eliminate the root cause(s) of a non-conformity and prevent its recurrence. This should be contrasted with a remedial action, which is taken to eliminate the effects of a non-conformity (e.g., reissuing a corrected report is a remedial action, while improving the review process which allowed the faulty report may be a corrective action).

Corrective actions taken should be changes which will eliminate the deepest cause(s) possible and which are within the control of EMSL. The corrective action should be proportional to the severity of the non-conformity and the likelihood it will recur, and shall be documented and carried out within a reasonable time frame, so as to not jeopardize the quality of results. The investigation of the non-conformity includes an evaluation of the risk created from the situation, and an opportunity for improvement, to determine the appropriate plan to avoid recurrence.

The laboratory quality representative and/or laboratory's management personnel are responsible for ensuring corrective actions have been addressed in a timely manner. The lab's corrective action records must include proof of compliance with the Corrective Action Report. The laboratory quality

representative and/or laboratory management staff must indicate when corrective actions are complete.

4.11.6 Monitoring of Corrective Actions

Follow-up to corrective actions shall be scheduled and completed in order to determine whether the actions taken have been effective in preventing its recurrence. Follow-up actions shall be scheduled on a case-by-case basis as soon as practical, but far enough in the future so a recurrence might have had the opportunity to occur.

The follow-up shall indicate the corrective action has been satisfactorily completed, and will include a review of the effectiveness of the corrective action. The scheduled date for follow-up, date follow-up was conducted, and effectiveness of corrective action is documented on the form available on E-link.

The QA Department is responsible for following up on those corrective action reports submitted to the QA Department by the laboratory for further action.

4.11.7 Additional Audits

In some cases, a non-conformity may be cause to initiate an audit of related activities in order to: 1) help identify cause(s) of the error, 2) ensure no other areas are affected by the error, or 3) provide direction for preventative actions. For example, if a customer makes a complaint about a test result, an audit may be conducted involving:

- Review of calibration measurements and QC data associated with the analysis
- Check on analytical specialist qualifications
- Inspection of log-in procedures
- Review of other results that may be affected by the root cause(s) as determined

The audit can be 'free flowing' (no use of checklist), but must be documented.

4.12 Preventive Action

It is EMSL's intention to maintain an active program to prevent occurrences which require corrective actions, or where there is a trend in QC data or activities which may eventually result in an error. A proactive program is an important part of the objectives of this EMSL quality program. All staff members are encouraged to assist in identifying potential sources of non-conformities and to identify opportunities for improvement. EMSL's preventive action program is detailed in QA-SOP-250: *EMSL Preventive Action SOP.*

Preventive actions consist of the policies discussed in this QMS Manual. For example, the quality management system procedures and policies require:

- Analytical specialists satisfy training requirements
- Laboratories perform QC activities at required frequencies
- QC data is reported to the QA Department for review
- Management reports are submitted to corporate management
- Laboratories participate in proficiency testing programs
- Laboratories maintain accreditations from regulatory and other independent agencies

Preventive action measures also include those specific actions taken outside of the normal quality assurance/quality control activities. These actions are those opportunities for improvement associated with a potential non-conformity. This policy requires laboratory staff to attempt to identify potential non-

conformities, and apply actions which will prevent an occurrence. These actions are documented using the form located on E-link.

4.13 Control of Records

4.13.1 General

The EMSL control of records procedures are documented in the *EMSL Control of Records SOP (QA-SOP-350*). The SOP outlines the requirements of record maintenance, but each laboratory is responsible for the logistics of record control in their laboratory. Each laboratory is responsible for maintaining a *Records Management Log* (*QA-FM-350-1*) which documents where records are located and how they are indexed, accessed, and stored in the laboratory. General policies include:

- All laboratories will retain records of original observations in addition to derived information.
- All handwritten data shall be recorded using permanent ink.
- If a record contains a mistake that must be corrected, the mistake shall be single line crossed out and signed, initialed, and dated using indelible ink, and the correction made alongside.
- Records must never be corrected by erasing, deleting, or otherwise making the mistake illegible (e.g., use of correction fluid, correction tape, scratch-outs).
- Whenever a date is required to be entered by personnel on a document (i.e., COCs, internal COCs, reagent and standard logs, packing slips, etc.), the format used should be month/day/year.
- Records shall be retained in order to ensure sufficient information is maintained to allow for an audit trail. Therefore, records such as employee records, certificates of analysis for standards, calibration certificates, etc., shall be retained for the life of the activity to which they are related (e.g., until 5 years after an employee leaves, until 5 years after the standard is disposed of or completely used, until the next calibration is completed).
- The majority of records shall be retained for a minimum of 5 years or for the period of time established by relevant accrediting authorities or contract requirements (see *QA-SOP-350* for a list of exceptions to the 5-year hold time).
- Where records are removed from storage (e.g., archive boxes, file drawers) for any reason, the laboratory shall insert a Record Out Log card in place of the records, and record on the Log card the name of the person removing the file, the files removed, and the date removed. When replacing the file, the card shall be updated by noting “Replaced” and the date it was replaced in the file.
- Records shall be protected against fire, theft, loss, environmental deterioration, vermin, and, in the case of electronic records, electronic or magnetic sources.
- Records shall be disposed of in a manner that maintains customer confidentiality. Paper records containing customer information shall be shredded or incinerated before disposal. Electronic records shall be managed in such a way that access to backup files remains at least as restrictive as when on the EMSL servers. Specific means of destruction of records may vary from lab to lab and may include services such as a contracted shredding/incineration program by a professional archiving company (e.g., Iron Mountain), locally owned shredders within the lab, or by community shredding events.

- Electronic records are considered equivalent to paper records, and are to be maintained and controlled in an analogous manner. Backups of electronic records are to be protected according to the procedures in the Control of Records SOP (QA-SOP-350).
- All hardware and software necessary for the historic reconstruction of data must be maintained by the laboratory for the same period of time as the data produced.

4.13.2 Recording Analytical Information

Before beginning analysis of a batch of samples, the analytical specialist is responsible for checking to ensure the labels on the sample containers agree with the data recorded on the chain of custody for that sample. The analytical specialist is also responsible for checking (to the extent possible) the samples have been collected on appropriate sampling media. Any discrepancies are to be noted on the chain of custody and reported to the laboratory manager.

Data generated in the laboratory shall be recorded on preprinted analytical data worksheets or, where available, directly into the computer system via a Direct Data Entry (DDE) system (iL@b). Each analytical procedure has its own specific worksheet or iL@b module. Many of these worksheets, when used, are generated by the LIMS system at the time of log-in.

Observations, data, and hand calculations are recorded at the time they are made and are identifiable to the task. The analytical specialist is to ensure entries on all records are made legibly and using indelible ink. Corrections are made using a single line strikeout with the correct entry written in. Corrections are to be initialed and dated. Obliterating data using ink or correction fluid is prohibited.

Where iL@b DDE is available, data is recorded directly into the lab database. Any additional information recorded manually in hard copy shall be maintained along with the COC and ICOC in project records.

4.13.3 LIMS (SMXP/Element) Data and Security

SMXP/Element data is retained in a "live" redundant replicated instance of SQL Server 2014 Enterprise in a Master database for a minimum of 16 (SMXP) and 24 (Element) months. Data older than 16 or 24 months is migrated to an archive instance of SMXP/Element LIMS data. This production database contains analytical data for all local and remote company labs.

Although our computer equipment has proven to be reliable, unexpected problems do occasionally occur. Regarding EMSL Analytical, Inc. Computer Systems as one of the components of our Business Continuity and Disaster Recovery Plan, should EMSL experience an individual system and/or large-scale system outage, critical systems and data will fail-over to our disaster recovery systems. Critical systems include LIMS platforms; network and server infrastructure; phone systems; accounting; customer portal systems; e-mail; and customer service systems.

The process of restoring company systems to normal operations follows a tiered process prioritized to best support operational tasks. During the outage, recovery, and return to normal operations, department teams would continue to contact outside parties and perform manual processes, if needed.

All SMXP/Element data is replicated to a central SQL Server 2014 Enterprise database, which functions as the primary backup for the LIMS data. LIMS data is also copied (backed up) onto a backup disc subsystem nightly, and transferred to high density tapes which are relocated to secure, temperature controlled, fireproof vaults within Iron Mountain to prevent permanent data loss in the case of systems failure, accidents, or disasters. In most cases, duplicate equipment has been provided, so if

one computer experiences unexpected problems, a duplicate computer can be utilized while the other is being repaired.

More information on the backup and archiving of SMXP/Element data can be found in the *EMSL Control of Records SOP* (QA-SOP-350).

The security of the software is controlled by the corporate IT staff and the laboratory manager. Each computer user is assigned password protected rights and privileges specific to the tasks the user is allowed to perform. Access to all LIMS analytical related software is password protected on a user-by-user basis to ensure security. The IT staff is responsible for ensuring access to SMXP/Element is controlled, and assignments are held secure, using laboratory management approval.

The corporate IT staff is responsible for ensuring all computer systems, both hardware and software, are documented, inventoried, and adequate for use. All systems are operated in safe environments and maintained to ensure proper operation. The computer systems responsible for handling of analytical data have been set up to process data in a way that ensures data integrity with password specific approval assignments. Data integrity is also maintained by performance of daily tape backups as discussed in the *Control of Records SOP* (QA-SOP-350).

4.13.4 Electronic Record Retention Policies

Record retention policies for electronic records are analogous to policies for retention of non-electronic records maintained by EMSL laboratories. These policies are discussed fully in the *EMSL Control of Records SOP* (QA-SOP-350), including retention times and disposal.

All digital analytical records are permanently archived. The data is transferred to a disk-to-disk back-up system nightly, and once a week is transferred to high density tapes and transferred to Iron Mountain for storage. Access to these records is restricted and controlled by EMSL record policies and procedures. The record keeping system allows for the reconstruction of all activities required to produce an analytical result.

4.13.5 Signature and Initials Log

A log of the signatures and initials of laboratory staff is maintained with the Compliance and Commitment Agreement form found in this Manual. The information recorded includes

- Printed name
- Signature
- Initials (unique to laboratory; for duplicate initials, also use middle initial)
- Date of entry

This form helps identify the initials and/or signatures entered on laboratory documentation such as chain of custodies, analytical worksheets, final reports, etc.

4.13.6 Use of Electronic Signatures

Signatures are provided to the IT Department using *GEN-FM-901 Final Report Approval and Signature Sample*. Signatures are scanned, stored as an image, and forwarded back to the signatory via e-mail. The signatory maintains responsibility for the use of their signature. They may provide approval for its use through an e-mail or verbally. Documents are printed to PDF to secure signatures from alteration.

4.14 Internal Audits

An audit is an on-site, qualitative review of the various aspects of the total laboratory system. It represents an objective evaluation using an interactive program with respect to strengths, deficiencies, and potential areas of concern. Audits may also be performed remotely.

EMSL performs annual internal audits in laboratory facilities to verify work activities are being performed in full compliance with stated policies, established standard operating procedures, this quality assurance program, ISO 17025, TNI standards, and additional requirements as set forth by relevant accrediting authorities (e.g., AIHA LAP, LLC; NVLAP, A2LA, CALA). Audits will be conducted by laboratory management or by 3rd party personnel approved by the QA Department. Auditors and assistant auditors must complete the *QA-TC-700 Internal Auditor* training checklist.

The internal audit is scheduled by the Quality Assurance Department and covers aspects of the management system, including testing activities. Audit findings are recorded on an audit report, or on the *EMSL Internal Audit Checklist (QA-FM-700)* which is based on ISO 17025 requirements, with additions made for additional requirements of accrediting agencies. Non-conformities identified during the internal audit will be corrected and followed up according to EMSL corrective action process.

EMSL's internal audit procedures are located in the *EMSL Internal Audit Procedures SOP (QA-SOP-700).*

4.14.1 Test Method Assessments

As an added measure to evaluate methods and analysts, EMSL performs TMAs to ensure the laboratory is following the correct procedures, as set forth in EMSL SOPs. Test method assessments may be completed independently, or along with annual quality system audit.

In order to evaluate the performance of an analyst's compliance with method procedures, method specific assessments are performed every 3 years. PALA accredited labs are required to perform TMAs every 2 years. An assessor observes the analyst and evaluates every step of the method, from sample preparation to the reporting of results (QA-SOP-700).

4.15 Management Reviews

Management reviews are designed to provide the top management of EMSL with an overview of the performance of the management system and laboratory operations. They address the quality topics documented in the ISO 17025 and the TNI standard for each laboratory location, and include:

- The suitability of policies and procedures
- Reports from managerial and supervisory personnel
- The outcome of recent internal audits
- Corrective and preventive actions
- Assessments by external bodies
- Results of inter-laboratory comparisons or proficiency tests
- Changes in the volume and type of work
- Customer feedback
- Complaints
- Recommendations for improvement
- Review of quality policy objectives
- Status of previous management review action items and fulfillment of objectives
- Risk identification
- Effectiveness of improvements
- Changes to internal and external issues in laboratory
- Other relevant factors, such as quality control activities, resources, and staff training

During the first quarter of each year, the Quality Assurance Department, national directors, and vice presidents review labs for the previous calendar year.

The report shall be based on the recorded information and non-recorded observations made by the QA Department, national directors, vice presidents, outside accrediting agencies and customer feedback. It is a tool to ensure the laboratory activities comply with the procedures and policies of the quality assurance program, ensure the program's continued effectiveness, and to introduce any necessary changes or improvement.

Action items are created from the management review to address internal and external issues brought to management's attention. These items will include detailed objectives to be completed during the upcoming year, and a review of the past year's items identified to ensure completion. Improvements made as a result of the review are evaluated from year to year to verify effectiveness.

Follow-up on action items for improvement of laboratory activities identified in the management review is performed by corporate management, the QA Department, and EMSL branch laboratories. Those action items must be completed according to a reasonable schedule. Management Review procedures can be found in the *EMSL Annual Management Review SOP (QA-SOP-750).*

Section 5.0: Technical Requirements

5.1 General

This section discusses the general technical requirements of the EMSL management system which are applicable to lab operations. Specific and additional requirements for certain areas will be found in the program specific modules.

5.1.1 Selection of personnel is recorded in job requisition forms filed with the Human Resources Department.

5.2 Personnel

5.2.1 Laboratory Job Roles and Responsibilities

5.2.1.1 Scope

This section describes general laboratory job roles and responsibilities of the technical personnel in a basic laboratory operation of EMSL. It does not include specialized assignments or positions that may have been instituted for specific projects or special laboratory needs. It is possible that more than one of these job responsibilities is shared among one person. For example, an analytical specialist may also be assigned administrative support duties.

Minimum education and experience requirements are listed generally for each job role. Specific requirements for education, training and skills for specific positions are listed in each of the individual program modules where these are defined by outside agencies. Specific job titles/descriptions and responsibilities are maintained in personnel folders.

Roles discussed in this section include the responsibility to ensure compliance with the policies documented in this manual and the requirements of the quality standards including, but not limited to, ISO/IEC 17025, TNI, A2LA, AIHA LAP, LLC-specific requirements, NVLAP, CALA and state accreditation agencies where applicable.

5.2.1.2 Administrative Specialists

Job titles include: Administration, Administration Coordinators, Data Entry, Office Administrator, Administrative Assistant, Login

Administrative specialists report to the laboratory manager.

The minimum education and experience requirement is on the job training.

These are support positions for the laboratory including the analytical specialists. Responsibilities may include, but are not limited to, those listed below:

5.2.1.2.1 Sample Receipt Responsibilities

- Reviews paperwork for all incoming samples to ensure completeness and correctness
- Inspects samples to ensure sample integrity is retained and that packaging is not compromised, and informs the lab or department manager if there are any concerns noted regarding sample integrity
- Ensures laboratory has ability, capability, and capacity to analyze samples prior to log-in (with laboratory or department managers)
- Logs in all samples in a timely manner based on turnaround time
- Delivers incoming samples to the laboratory
- Ensures all samples are placed in the proper storage area to await analysis
- Informs the laboratory manager or analytical specialist of any special priorities regarding the samples

Administrative specialists with sample receipt responsibilities shall be aware of sample origin as it impacts regulatory requirements. The administrative specialist follows sample tracking protocols in handling samples, in particular, completing and verifying chain-of-custody forms as per EMSL *Sample Receiving and Chain of Custody SOP* (GEN-SOP-702).

Administrative specialists with receiving responsibilities are also responsible for ensuring proper sample numbering and labeling is performed, and sample information is transcribed correctly into the Laboratory Information Management System (LIMS) and onto applicable forms. The administrative specialist also ensures compliance with all relevant quality standards as related to job responsibilities.

5.2.1.2.2 Data Entry Responsibilities

- Generates analytical reports
- Enters data produced by the analytical specialists into the computer system for production of the final, customer-ready report
- Generates reports in the priority in which laboratory management staff assigns them
- Ensures the final report is prepared within the required time frames, and results are reported to the customer in a timely manner
- Reviews the information in the report and checks the data for any obvious errors
- Checks both technical and non-technical information, such as sample location, volume, and sample I.D. numbers for possible transcription

errors

- Reports any observations of erroneous or unusual data or apparent errors to the laboratory management
- Ensures compliance with all relevant quality standards as related to job responsibilities

The administrative specialist contributes to the achievement of EMSL quality objectives by ensuring they act as a professional interface between technical personnel and laboratory customers. Administrative specialists ensure samples are received with the appropriate paperwork, and data is transcribed accurately and in a manner which prevents questions about the integrity of laboratory data. They also ensure they record non-conformities as per the Corrective Action system, opportunities for improvement as per the Preventive Action system, and customer complaints as per the Complaint Resolution system, and reports these to the personnel authorized to handle these situations.

5.2.1.3 Technicians

Job titles include: Lab Technician, Prep Technician, Lab Prep Technician, Sorter

All technicians report directly to laboratory management.

Minimum education and experience requirements:

- In-house training documented by the EMSL qualifications checklist or SOP acknowledgement documentation

  Participation in ongoing training programs (in-house workshops, laboratory meetings, etc.)

Minimum requirements will vary depending on specific job title and responsibilities, and may include particular experience and/or education requirements as specified on job description posted.

A technician is responsible for non-administrative, non-analytical work performed in the laboratory. Assigned responsibilities may include preparation of samples, preparation of media or reagents, cleaning of glassware or equipment, transport of samples between administration and lab and ensuring proper storage, and performing calibrations or verifications of equipment. They are usually not involved in the analysis of customer samples, although they may act as analytical specialists in some areas, while remaining technicians in others.

The technician is responsible for maintaining any associated paperwork (e.g., logbooks, forms, notebooks) for the work performed in accordance with established laboratory procedures. He/she must ensure familiarity and compliance with all relevant quality standards as related to job responsibilities by reading and following EMSL policies and procedures which adopt these standards.

Technicians contribute to the EMSL quality objectives by ensuring they have read and understood all EMSL policies and procedures relevant to their job tasks, and follow SOPs in order to ensure integrity of samples and workflow are maintained. Technicians also ensure they record non-conformities as per the non-conformity/ Corrective Action system, possible

opportunities for improvement as per the Preventive Action system, and customer complaints as per the Complaint Resolution system, and report these to the attention to those personnel authorized to handle these situations.

Additionally, technicians contribute to the overall quality of EMSL final results by ensuring they avoid any actions which may call into question the integrity of their work.

5.2.1.4 Analytical Specialists

Job titles include: Analysts (including specialties, e.g., microscopist) and Scientists (including specialties, e.g., microbiologist, mycologist)

All analytical specialists report directly to laboratory management.

Minimum education and experience requirements:

- In-house training documented by the EMSL qualifications checklist
- Participation in ongoing training programs (in-house workshops, laboratory meetings, etc.)

Minimum requirements will vary depending on specific job title and responsibilities, and may include particular experience and/or education requirements as specified on job description posted.

The analytical specialist is responsible for performing calibrations of equipment, assigned analysis, and recording and maintaining analytical data according to established procedures including the Control of Records system. The analytical specialist must use good analytical technique and he/she must provide analytical results suitable for inclusion in a customer report.

The analytical specialist manages all work assigned and completes all paperwork in accordance with established laboratory procedures. The specialist reviews all paperwork for correctness and completeness and ensures that work progresses in a timely and productive manner.

The analytical specialist is responsible for performing required analysis on QC samples as directed by the laboratory management or designated quality representative, and for notifying the laboratory management or quality representative of any occurrence that could potentially affect the validity of an analytical result.

He/she must ensure familiarity and compliance with all relevant quality standards as related to job responsibilities by reading and following EMSL policies and procedures which adopt these standards.

The analytical specialist contributes to the EMSL quality objectives by ensuring they have read and understood all EMSL policies and procedures relevant to their job tasks, and follow all SOPs in order to ensure consistent and accurate analyses. The analytical specialist ensures all required QC functions of their job are performed in a timely manner, including calibration of equipment and analysis of QC samples at the required frequency. Analytical specialists also ensure they record non-conformities as per the Corrective Action system, possible opportunities for improvement as per the Preventive Action system, and customer complaints as per the Complaint Resolution system, and report these to the attention to those personnel authorized to handle these situations. Additionally, analytical specialists contribute to the

overall quality of EMSL final results by ensuring they avoid any actions which may call into question the integrity of their work.

For PALA accredited labs, only a PALA approved microbiologist can approve and send final reports.

5.2.1.5 Laboratory Quality Representatives

Job titles include: Quality Assurance Coordinator, Quality Coordinator, Quality Manager, Quality Officer, and Quality Associate (however named).

The laboratory quality representative works with the laboratory management (or regional manager if the laboratory quality representative is the laboratory manager) with direct reporting for quality responsibilities to a higher-level lab quality representative (e.g., a department quality coordinator reporting to the lab quality manager) or Vice President of Quality Assurance.

Minimum education and experience requirements:

- Basic understanding of EMSL QA/QC program (including statistical analysis)
- Participation in ongoing training programs (in-house workshops, laboratory meetings, etc.)

Minimum requirements will vary depending on specific job title and responsibilities, and may include particular experience and/or education requirements as specified on job description posted.

Laboratory quality responsibilities may be assigned to a single quality representative or to a group of quality representatives. In large labs, for instance, there may be a single quality manager who oversees quality representatives assigned to individual departments. Ultimate reporting responsibility is to the Corporate QA Department, specifically, the vice president of quality assurance.

The laboratory quality representative is responsible for ensuring all QA/QC procedures for which they are assigned responsibility are performed at the required frequencies for the laboratory or departments under their supervision. He/she collects and maintains all QC data for reporting to the laboratory manager.

He/she oversees the QA/QC program as assigned and is responsible for the laboratory's compliance with all standard policies as guided by the corporate quality assurance Director. An analytical specialist or laboratory manager may also function as the laboratory quality representative for a particular location.

The laboratory quality representative ensures the laboratory maintains compliance with the policies and procedures documented in this manual, and the requirements documented in all relevant quality standards listed in Section 2.0. The laboratory quality representative is responsible for reporting any non-compliance issues to the laboratory manager or, if necessary, directly to the Corporate QA Department.

The laboratory quality representative contributes to the EMSL quality objectives by ensuring quality management system requirements are being followed at all times and/or according to designated frequencies. The laboratory quality representative oversees the implementation of the system in their laboratory, and ensures it is consistently followed in such a manner that the

laboratory remains a coherent part of EMSL, and is not operating on its own set of policies and procedures. Quality representatives will oversee the quality reports being submitted to the Corporate QA Department to ensure they are generated on time, and that any problems reported have been handled and resolved in a manner which maintains the accuracy and integrity of laboratory data. They are responsible for designating qualified personnel (deputies) to assume temporary quality related responsibilities normally assigned in the event of absence.

5.2.1.6 Laboratory Management

Job titles include: Lab Director, Lab Manager, Technical Manager, Department Manager, Supervisor, Group Leader, Assistant Lab Manager, and Assistant Department Manager

Hierarchies of job positions make up the management team for a laboratory. In most branch laboratories, there is an individual who is designated a lab manager and is the technical head of that laboratory. Due to the diverse nature of services offered by EMSL, often a laboratory manager will be supported by other lab management positions, such as assistant managers, department managers, supervisors, group leaders, etc. In some cases, usually in larger laboratories, there may be multiple lab managers in charge of different aspects of the laboratory services.

Laboratory management personnel usually directly report to regional manager(s).

Minimum education and experience requirement for the lab management position is one (1) year of related analytical experience. Managers must also meet requirements specified in applicable regulatory standards.

The laboratory management position may be assigned various responsibilities depending on the role they serve within the laboratory. Lab and department managers will usually be responsible for technical decisions for the laboratory such as:

- Assuring requirements for laboratory equipment and supplies are met
- Resolution of analytical problems
- Development and implementation of training programs for analytical specialists
- Providing sufficient oversight of laboratory operations
- Review and approval of analytical results for release
- Development of new methodology and analysis
- For PALA accredited labs, only a PALA approved microbiologist can approve and send final reports. If the approved signatory is absent from the lab, final reports will not be approved or distributed.

Supervisors, group leaders, and assistant managers will be delegated some set of responsibilities over which they are responsible. Such duties may include supervising the workflow of the lab or a particular portion of the laboratory, overseeing a group of analysts and/or technicians, etc.

As a whole, laboratory management personnel are responsible for overall administration of laboratory operations. They ensure company policies are understood by all personnel, adequate supervision is provided to staff, work scheduling procedures adequately address customer needs, and are responsible for ensuring all customer complaints are resolved. They shall also approve all employee reviews and promotions, and provide regional or corporate

management with information regarding laboratory budgeting issues (e.g., purchase of equipment and supplies, expenses for out-of-house training, staffing requirements). The laboratory management staff shall ensure adequate supervision is provided for the laboratory technical personnel.

They are responsible for designating qualified personnel (deputies) to assume specific, temporary management responsibilities normally assigned to the laboratory management staff in the event of absence. The deputy is identified on the laboratory organization chart. For those single person laboratories, in the event the laboratory manager/analytical specialist/quality representative is absent, no analysis will be performed, and therefore the assignment of a deputy manager/quality representative is not applicable.

Laboratory management is also responsible for ensuring a comfortable working atmosphere, free from excessive pressures (including unreasonable productivity rates), for their laboratory employees. Laboratory management must ensure the policies and procedures of this quality management system are communicated to the laboratory staff.

Ultimately, laboratory management personnel are responsible for the data reported by the laboratory. He/she or approved designees review and approve the final customer reports for release to the customer. This responsibility includes the verification of the sample results which, include:

- Verification of sample number
- Correctness of sample result
- Check for typographical errors
- Completeness of chain of custody

Management personnel shall ensure any designees are fully capable of performing these reviews on their behalf. Management assigns designated personnel to perform the task of final review and approval following the *EMSL SOP for Final Report Approval and Electronic Signature* (GEN-SOP-901).

Management personnel or a designee shall ensure QA standards are established, understood, and administered. He/she is ultimately responsible for ensuring the QA program is conscientiously implemented. He/she reviews the QA program with the regional manager or national director to ensure completeness and effectiveness, and supports the local quality representatives, regional manager and/or the National Quality Assurance Department in carrying out the program by use of authority. Laboratory management is ultimately responsible for ensuring QC reports are submitted to the National QA Department in accordance with these QA program requirements.

Laboratory management personnel contribute to the EMSL quality objectives by ensuring the laboratory maintains compliance with the policies and procedures documented in this manual, and the requirements documented in relevant quality standards listed in Section 2.0. They oversee employee qualifications, ensuring they are properly qualified and trained prior to conducting analysis.

The management staff is ultimately responsible for the data reported from the laboratory. Management staff ensures non-conformities and complaints are resolved in a timely manner, leading to continual improvement at the laboratory.

In accredited labs, should the person identified with the accrediting body as the lab manager, technical director, technical manager, quality manager or quality assurance officer be absent for a period of time exceeding fifteen (15) consecutive calendar days, the laboratory shall designate another full-time staff member meeting the qualifications of said manager to temporarily perform this function. The Interim Manager shall also meet all the education and experience standards required of said manager, in order to function as Interim Manager.

If this absence exceeds twenty (20) consecutive business days, the appropriate accreditation body(ies) shall be notified in writing regarding how requirements will be met in the interim.

5.2.1.7 Regional Manager

The regional manager reports directly to the Vice President.

Minimum education and experience requirements:

- 2 years related analytical experience
- 1 year management experience

The regional manager assumes responsibility for the overall performance of two or more laboratory locations. He/she controls the analytical programs, reporting processes, general management and is accountable for the overall operational of the laboratories under authority.

The regional manager reports directly to the vice president and coordinates with the national director on technical issues, and initiates and controls operational policies in the areas of administrative and technical matters. The regional manager may also function as a laboratory manager.

The regional manager works closely with the National QA Department in developing and maintaining the QA program. He/she consults directly with the National QA Department regarding the effectiveness and applicability of the program, recommends needed changes, if any, and reports any problems with the program. The regional manager is responsible for ensuring annual technical QA/QC audits are performed at each of their laboratories.

The regional manager ensures the laboratory maintains compliance with the policies and procedures documented in this manual and the requirements documented in relevant quality standards.

The regional manager contributes to EMSL quality objectives by assisting laboratories in their implementation of the quality system, improving consistency across their laboratories. The input they provide to the National QA Department assists in the continual improvement of the quality system.

5.2.1.8 National Director/Vice President

The national director/vice president reports to the EMSL Sr. Vice Presidents.

Minimum educational/experience requirements:

- Associate of Science degree in related science
- 3 years related analytical experience
- 2 years management experience

The national director/vice president is responsible for the overall quality performance of the business service line they are responsible for, including the initiation, development, and maintenance of the quality management system. The national director/vice president advises the president and Sr. vice presidents on quality management system issues, and has the primary authority to ensure the integrity of the management system is maintained at all times, and initiates actions to prevent or minimize departures from the quality management system.

The national director/vice president ensures appropriate communication processes are established for implementation and effectiveness of the quality management system. He/she participates in the management review process and commits to continually improve the effectiveness of this system.

The national director/vice president provides input on decisions related to the status of laboratory certifications and accreditations.

The national director/vice president contributes to the quality objectives of the laboratory by ensuring the company maintains compliance with the policies and procedures documented in this manual, and the requirements documented in relevant quality standards.

As part of top laboratory management, the national director/vice president assists in setting the quality objectives of EMSL. In addition, the national director/vice president ensures these quality objectives are adequately communicated and understood by laboratory staff, and ensures they remain aware of the effectiveness of the EMSL quality system. The national director/vice president also contributes to the program by ensuring they are committed to the development, implementation, and continual improvement to the program. As part of top management, the national director/vice president shall ensure the integrity of the management system is maintained at all times when changes are made to laboratory operations.

5.2.1.9 National Quality Program Support Representatives

Titles include: Vice President of Quality Assurance, Quality Assurance Manager, Quality Assurance Specialist, Quality Assurance Coordinator, National [service area, i.e., asbestos] Manager.

The national quality program support representatives report to the vice president of quality assurance.

A minimum educational /experience requirement is 2 years related analytical experience.

The national quality program support representatives work under the direction of the vice president of quality assurance. They are responsible for providing support to the Quality Assurance Department, which includes:

- Participation in the development, implementation and maintenance of QA/QC policies and procedures
- Guidance to the laboratory operations on quality issues
- The monitoring and assurance of compliance with the QA plan
- Establishing and maintaining standardization throughout EMSL locations
- Processing accreditation applications and administration of documentation related to accreditation requirements

The national quality program support representatives provide reports of performance (frequency of report submittals and review of quality of reports) to the vice president of quality assurance, regional managers, national directors, and vice presidents.

The national quality program support representatives ensure the laboratory maintains compliance with the policies and procedures documented in this manual, and the requirements documented in relevant quality standards.

The national quality program support representatives contribute to the quality objectives by tracking whether quality control programs are being implemented at branch laboratories through the review of monthly and quarterly reports. This review of quality reports ensure QC is being properly documented and reviewed, thus improving the quality of data from all laboratories, and allowing corporate management to act when areas of concern are identified. The national quality program support representatives' participation in the annual management reviews includes feedback on individual lab performance and advice on areas for improvement.

5.2.1.10 Vice President of Quality Assurance (previously National Director of QA)

The vice president of quality assurance reports directly to the EMSL Sr. Vice Presidents. The vice president of quality assurance also has direct access to the EMSL President.

Minimum educational/experience requirements:

- 2 years related analytical experience
- 1 year management experience
- Course work on quality programs

The vice president of quality assurance has the authority to:

- Develop and implement quality assurance and quality control policies
- Implement change to ensure the effectiveness of the quality management program
- Participate in business decisions related to the development of additional service areas, accreditations, etc.
- Report non-conformities and breaches in ethics policies to senior corporate management
- Direct other departments in order to achieve the goals of the quality program
- Write and/or issue Standard Operating Procedures

The vice president of quality assurance director is responsible for establishing, implementing, and maintaining the entire QA program as described in this manual. He/she develops statistical protocols for data reduction and acceptance criteria. He/she defines requirements for submitting QC samples, controls results reporting policies, sets standards for analytical performance, and issues protocols for yearly on-site audits for the branch laboratories.

The vice president of quality assurance is also responsible for maintaining the QMS manual and all standard operating procedures (SOPs). He/she is responsible for conducting and/or establishing policies for QA audits, and setting the standards for laboratory practices. The vice president of quality assurance confers with the national directors, regional managers and/or the laboratory managers on QA policies, and supports the laboratory management and

laboratory quality representatives in the daily maintenance of the QC program. The vice president of quality assurance oversees laboratory accreditations including initial applications, maintenance of proficiency testing programs and responses to non-conformities identified during on site audits.

The vice president of quality assurance participates in the annual management review. The vice president of quality assurance also ensures the laboratory maintains compliance with all relevant quality standards.

The vice president of quality assurance assists top management in defining the EMSL quality objectives. As head of the quality unit, the vice president of quality assurance ultimately has oversight of the entire quality program of EMSL, and ensures the management systems meet the quality objectives.

The vice president of quality assurance is granted the authority by EMSL senior management to perform these tasks and ensures the EMSL quality management system is being implemented and followed at all times.

5.2.1.11 Senior Vice President - Technical Divisions

Titles include: Senior Vice President, laboratory services

The senior vice president (Sr. VP) is responsible for the overall quality performance of the entire company, including the initiation, development, and maintenance of the quality management system. The Sr. VP advises the president on quality program management issues, and has the ultimate authority to ensure the integrity of the management system is maintained at all times (including when changes are made) and initiates actions to prevent or minimize departures from the quality management system.

The Sr. VP ensures appropriate communication processes are established for implementation and effectiveness of the quality management system. He/she participates in the management review process and commits to continually improve the effectiveness of this system.

The Sr. VP makes all decisions related to the status of laboratory certifications and accreditations.

The Sr. VP contributes to the quality objectives of the laboratory by ensuring the company maintains compliance with the policies and procedures documented in this manual and the requirements documented in relevant quality standards.

As part of top laboratory management, the Sr. VP assists in setting the quality objectives of EMSL. In addition, the Sr. VP ensures these quality objectives are adequately communicated and understood by laboratory staff, and ensures they remain aware of the effectiveness of the EMSL quality system. The Sr. VP also contributes by ensuring they are committed to the development, implementation, and continual improvement of the laboratory quality system. As part of top management, the Sr. VP shall ensure the integrity of the management system is maintained at all times.

5.2.1.12 President

The president focuses and directs the path of the company and assumes complete responsibility for the success of the quality management system.

He provides the authority and approves the resources necessary to maintain compliance with the quality assurance program policies documented in this manual and applicable accreditation standards.

The president, as part of top laboratory management, assists in setting the quality objectives of EMSL, and issues the Quality Policy under which the company operates. The president contributes to the quality objectives by ensuring adequate resources to establish, maintain and improve the quality system of the laboratory, and by clearly communicating the company's commitment to its Quality Policy and quality system policies and procedures.

5.2.2 Training

5.2.2.1 Scope

This section describes the corporate procedures and policies of the EMSL training program. Additional requirements for training for each analytical methodology, if any, are discussed in the program modules. Details on documenting training for analytical specialists are available in the *Training on Analytical Methods SOP* (GEN-SOP-100) available on E-Link.

Analytical specialists must complete the EMSL training program in order to perform analysis independently and receive a completed Demonstration of Capability, authorizing the analyst to perform the methods listed on the certificate. All employees (full-time or part-time, permanent or temporary, including interns) must read the QMS manual and SOPs which are related to the work with which they will be responsible, ensure these are understood, and acknowledge the document, stating their commitment to follow the procedures and policies outlined therein.

Because the amount of training needed will vary based on the education, past experience and skills of the trainee, the requirements described in this section and the program-specific modules are considered minimums. Laboratory managers are responsible for ensuring appropriate training is provided to every analytical specialist, and they are completely competent, qualified, and signed off to perform analysis.

5.2.2.2 Identification of Training Needs and Goals of Training

The need and goals for training are determined by the laboratory manager or corporate management. Needs are identified considering:

- Cross training to increase laboratory productivity
- Decreasing trend in quality
- Change in type of work
- Change in requirements or procedure
- Addition of analytical services

The goals of training will differ based on the area of training. In general, training is intended to familiarize personnel with the policies and procedures of the laboratory, ensure personnel are aware of changes to policies and procedures, are knowledgeable and skilled in proper analytical and/or preparatory technique, and understand the theory underlying the work.

5.2.2.3 Types of Training

There are a variety of training programs offered. Documentation of these programs (certificates, training records, records of participation in training sessions, etc.) is considered the property of EMSL and not the trainees.

5.2.2.3.1 "In-House" Course

These are organized EMSL courses designed for a classroom setting (they can be scheduled in workshop type modules) with syllabus and course materials. These courses contain recommended contact hours. A certificate is issued which documents attendance.

Formal in-house courses are developed and implemented under the direction of corporate management. The trainer must follow the requirements of the EMSL training program and ensure all topics are covered according to the workshop outline or qualifications training checklist. The assignment of a trainer can be performed by laboratory management staff, regional manager, national director, QA manager, vice president or president. Capability will be determined based on knowledge, experience and demonstrated technical competence. The trainer must have a thorough and comprehensive understanding of the topics involved.

5.2.2.3.2 "On the Job" Technical Skills Training

This is training provided at the hands-on level. The amount of training time needed will vary for each method and for each trainee. If the training involves analytical procedures, the trainer must be a qualified analytical specialist with at least one (1) year of experience. Non-analytical procedures may be trained by any experienced EMSL employee with a thorough and comprehensive understanding of the topics involved.

5.2.2.3.3 "Out of House" Formal Training Courses

Under some circumstances, EMSL will provide staff members with formal, outside training. The certificate of training is maintained in the employee folder along with course outline. Courses will be selected based on applicability to job responsibilities. The qualifications of the course provider and instructor shall be reviewed prior to course approval. Contact hours vary based on the course.

5.2.2.4 Initial Training and Authorization of Analytical specialists

5.2.2.4.1 Training Checklist

Analytical specialists must satisfy theoretical and practical knowledge requirements in order to be authorized to independently analyze samples. Each EMSL program area utilizes a set of training checklist to document these requirements and track an analytical specialist's training. The EMSL training checklists are available on the E-link site and are referenced in the program specific modules.

The training checklist documents the aspects of the analytical specialist's training, from their understanding of the theory behind applicable concepts, to their ability to capably perform analysis of each method on which they are being trained. Specific requirements for each analysis are detailed in the QMS Manual Modules and the training checklists.

As training of an analytical specialist proceeds, the trainer and trainee sign and initial each item on the checklist as they are completed. There are a number of ways a new analytical specialist can satisfy the requirements presented in the training checklist.

The date the checklist is signed is the date on which the new analytical specialist demonstrated understanding or ability satisfying the requirement. This demonstration may be completed in a number of ways.

- The analytical specialist may receive training on the topic from a qualified trainer (an analytical specialist that has at least one year of experience and a completed DOC for the method being trained), and subsequent to the training, demonstrates their understanding and/or ability. Once the trainer is satisfied the analytical specialist has met the requirement, the trainer shall initial and date the training checklist for that requirement.
- Based on previous experience and training, a qualified trainer (as defined above) or the laboratory manager, may verify that knowledge or skills are already present through interviews and observed technique, and once satisfied the analytical specialist has met the requirement of the checklist, may initial and date the training checklist for that requirement without further training.

Note: Previous EMSL training policies allowed for a "qualifications statement" from the national director in lieu of a training checklist. This option was eliminated beginning with Revision 10 of this document. Analytical specialists must have each checklist item verified by laboratory manager or trainer and initialed on the checklist. "Qualification statements" issued prior to the removal of this option (Dec. 2008) will still be considered valid, and should remain a part of the analytical specialist's training records. Likewise, previous revisions of the training checklist are acceptable as it represents the state of training documentation at that time. Analytical specialist performance will have been demonstrated through acceptable QC analysis. However, if no training documentation exists, the current checklist should be used to document the current competency of the analytical specialist. Each item should be reviewed, and acceptable performance/knowledge documented by the analytical specialist and the department manager, or national director in the case of department managers.

Once all requirements of the training checklist have been completed and marked on the checklist by the analytical specialist and trainer, the laboratory manager signs off on the training checklist, stating the training of the analytical specialist has been completed.

Where no training checklist exists for a particular method, or if the checklist does not detail a method for initial demonstration of capability, an initial demonstration of capability shall be performed as per the method, or where the method does not specify, the method outlined in TNI Standard (2016) Sect. 1.6.2.2, or an equivalent method.

Frequency of Initial DOC

An initial DOC for each analyst shall be completed prior to a new method being introduced, or when there is a change in method or instrumentation. TNI also requires an initial DOC whenever an analytical specialist or the lab has not performed a method within the past twelve (12) months [six (6) months for AIHA LAP, LLC accredited laboratories]. This requirement shall be taken into account when considering accepting samples for a method that has not been performed in the past year.

Analytical specialists shall perform analysis with each method on QC samples at least once a year to maintain their capability with infrequently used methods.

5.2.2.4.2 Demonstration of Capability (DOC) Certificate

Following completion of the training checklist, the signed checklist is reviewed by the lab manager and regional manager, as needed.

EMSL utilizes a DOC certificate which is based on the sample provided in Appendix C of Section 5 of the 2016 TNI Standard. The form allows for the recording of all analyses for which demonstration has been completed for a particular analytical specialist.

The certificate is prepared by the lab manager, with assistance from the regional manager and/or QA Department, as needed, and signed by the department or lab manager, against the information provided by the laboratory manager on the training checklist, and supporting documentation for each matrix and method for which the analytical specialist is authorized to perform analysis. Each analyses type is listed, along with the date upon which Demonstration of Capability was completed. The date of the signature indicates the date upon which the information contained on the form was updated and confirmed, and the form issued by the lab manager or QA Department.

Once the DOC certificate is signed, the analytical specialist is authorized to perform work for those methods listed on the DOC certificate. (Note: When the analytical specialist being authorized is the laboratory manager, the DOC certificate shall be signed by either the regional manager or national director.)

The DOC certificate shall be revised whenever an analytical specialist completes a new demonstration of capability, or when their capability to perform the analysis changes. In such cases, the supporting material shall be sent to the laboratory designee, or the QA Department along with the most recent version of the DOC certificate. Once updated, the laboratory designee or QA Department will re-sign for re-affirmation of the information contained on the form. Thus, the dates of the signature always correspond to the date the certificate is issued, and the information contained therein is confirmed, not necessarily the date upon which specific demonstrations were completed.

5.2.2.4.3 Exception to Certification Form:

Where a method has been used in the laboratory since July 1999, and there have been no significant changes in instrumentation type, personnel or method, evidence of ongoing performance (see below) will be acceptable. The laboratory manager must have a record on file to demonstrate an initial DOC is not required.

5.2.2.4.4 Authorization to Perform Analysis

Analytical specialists must receive formal authorization to perform analysis. This is performed with the signature of the laboratory manager, regional manager, or national director and/or vice president of quality assurance on the qualifications/training checklists. These checklists are then followed up with the Demonstration of Capability certificate.

5.2.2.5 Ongoing Training and Continued Demonstration of Capability

5.2.2.5.1 Ongoing Training

Ongoing training of our staff is a very important piece of analytical quality. It provides an opportunity to sharpen skills and keep all employees up to date with the current procedures, techniques, regulations, etc.

Laboratory managers are to ensure ongoing training is provided to all employees on a consistent basis. The opportunity for ongoing training occurs in many different forms. The following list suggests a number of different types of ongoing training:

- Laboratory staff meetings – scheduled as needed, these can cover a variety of technical topics. There is no organized agenda and interaction between all attendees is encouraged (much like an open forum). Examples of topics could include technical subjects/analytical method updates, customer service issues, health and safety, etc. This training must be documented.
- Laboratory audits – the staff can consult with the auditor (of both internal and external audits) and ask questions to be advised on many topics.
- Workshops provided by professional organizations, regulatory agencies, or instrument/equipment vendors. If a certificate is not provided by the outside trainer, such as in a workshop, an open use training form is completed for each described topic covered during the training. A copy of this training record is maintained in the laboratory files.

5.2.2.5.2 Ongoing Demonstration of Capability

Continuous demonstration of capability by each analytical specialist is achieved through the QC reanalysis of samples by the same analytical specialist (intra-analyst), different analytical specialist (inter-analyst), inter-laboratory analysis, the analysis of standard reference samples/LCSs, and performance in proficiency testing programs. This is performed at a minimum of every 12 months, and is documented with:

- Copies of reports of individual analytical specialist's performance in proficiency testing programs (stored in employee training files)
- Copies of reports of individual analytical specialist's performance in round robin programs (stored in employee training files)
- Analytical quality control reports (QC results, standards analysis, etc.) generated during the course of analysis
- All target analytes shall be included in the DOC Study.

  ***Note**: This data is normally stored with the laboratory quality control data vs. in the individual analytical specialist's files.*

Whenever possible, inter-analyst QC should be performed by analytical specialists that have completed their training, and for whom certifications of demonstration have been completed.

When PT studies are used for ongoing demonstration of capabilities, only analytes that met PT acceptance criteria shall be used.

5.2.2.5.3 Recertification Statements

Every 12 months (or 6 months for lead methods within the scope of AIHA LAP, LLC ELLAP accreditation), the laboratory or department manager shall sign a Recertification Statement for each analytical specialist to document continued authorization to

perform analysis. If the laboratory/department manager is also authorized to perform analysis, the regional manager, national director, lab quality manager (if different), or designee shall review and sign the *Continuing Certification Statement* for the laboratory manager. The recertification statement will be attached to the original DOC certificate in the analytical specialist's folder.

5.2.2.6 New Manager Training

EMSL has created several video trainings describing the responsibilities a new manager must handle. Upon accepting a managerial position in an EMSL laboratory, the manager has approximately one to three months to view the training videos. After completion, a meeting will be conducted between the manager, QA, the Regional Manager, and or National Director/ Vice President, to discuss any questions the manager has related to their new responsibilities. GEN-TC-120 New Manager Training Checklist will then be approved and signed by the Regional Manager or other appropriate Corporate representative.

Supervisors and QA Representatives will view the applicable videos associated with their duties, and will follow the same process as above. These supervisory position employees have approximately six months to view the videos.

The QA Department will take note of new managers, and track their viewing of the video training sessions. Each month, the QA Department will contact the managers or supervisory personnel to address any questions they may have; this will also serve as a reminder to view their associated training videos to ensure completion.

5.2.2.7 Measurement of the Effectiveness of the Training Program

The effectiveness of our training program is evaluated using a number of identifiers. These include:

- Analytical specialist's performance in the quality control program (inter/intra analyst, analysis of standards, blanks)
- Performance in proficiency testing programs
- Evaluation of data generated in round robin programs
- Analysis of blind QC samples
- Performance at internal and external onsite site audits

The evaluation of any of these items may identify the need for additional training or modifications to the training program. Some examples of findings that may indicate training needs include:

- Poor performance in the quality control program
- Outliers reported in proficiency testing programs or round robin programs
- Findings noted during internal and external audits
- Feedback from laboratory staff self-identifying training needs
- Trends in non-conformities reported in the laboratory

5.2.2.8 Authorizations Log

Laboratory managers are responsible for authorizing lab personnel to perform critical tasks. This may be accomplished by utilizing a log which contains both technical tasks (preparation and analysis of samples), as well as any non-technical tasks which are critical to the operations of the laboratory (e.g., ordering supplies, discussing reports with customers, logging in samples). Alternatively, authorizations can be documented through Demonstration of Capabilities (DOCs), training records, job descriptions, and organizational charts.

The *Authorizations Log* spreadsheet and its "Instructions" tab is available on E-link.

5.2.2.9 Training and Personnel Files

Personnel and training files shall be maintained for all technical employees. Personnel files shall contain all general documentation associated with the employee. Training files shall include all files associated with the initial and ongoing training of the employee.

A completed personnel file must contain at a minimum:

- Resume/CV
- Signed Ethics Acknowledgment
- Diplomas for degreed employees (complete transcripts may also be used if showing graduation)
- Copies of any registrations/certifications held by analytical specialist

A completed training file must contain at a minimum:

- Training checklists for all analyses for which the analytical specialist is qualified
- Demonstration of Capability certificate (DOC) which lists all the methods the analytical specialist is authorized to perform
- Raw data supporting initial DOC for all analyses*
- Summaries of data reviewed to demonstrate ongoing capability*
- Misc. training records (certificates from classes taken and in-house training sheets)
- For Asbestos: NIOSH 582 training certificates
- For Lead: 4 independent runs for each matrix
- Results of performance on proficiency testing samples/round robin samples

*** Note:** Copies of raw data supporting the initial and ongoing demonstration of capability for the analytical specialist may be referenced in the personnel folder, instead of being included. Copies of the original raw data shall be maintained for the length of employment and for five (5) years after the end of employment. For ongoing demonstration of capability, summaries of data reviewed with references to the original data are sufficient in the training folders.

Files are to be maintained and updated by the laboratory manager.

5.2.3 Reporting of Significant Changes

Any changes in laboratory ownership, location (except for mobile and field operations laboratories), management, laboratory key personnel, or any other change that significantly affects the laboratory's capability, scope of accreditation, or ability to meet the policy

requirements, shall be reported in writing to the appropriate accrediting body within their required time frame. Any absence of personnel for an accredited body's required period, that impacts the laboratory's ability to perform its scope of testing, shall be reported to the appropriate accrediting body within their required time frame.

5.3 Accommodation and Environmental Conditions

5.3.1 General

EMSL is committed to ensuring laboratory facilities are appropriate for ensuring the correct performance of tests. For example, attention will be paid to energy sources, lighting and environmental conditions, and separation between neighboring areas in which there are incompatible tests.

Any specific technical requirements for a specific method are documented in the program specific modules of the QMS Manual, or in the specific technical SOPs. Examples of specific environmental conditions that may affect tests and will be documented in the modules or SOPs include sterility of work area, electromagnetic disturbances, temperature, and/or humidity, radiation, and vibration levels.

Where it is determined controlled environmental conditions are crucial for the performance of a test or the interpretation of results, the lab will monitor, control, and record these conditions as necessary (i.e., through the use of temperature logs, humidity logs, readings included on bench sheets, etc.).

Should a laboratory or department manager determine the facility must be modified to meet requirements, these requests will be sent to the President or Senior Vice President of Laboratory Services for approval.

Access to the laboratory beyond the receiving area is restricted to laboratory employees or contracted employees. If non-laboratory personnel wish to enter these areas, they shall be accompanied by authorized lab personnel. Applicable employees are provided keys or electronic fob keys by Management or Human Resources Department when hired, and must return keys when their employment ends.

The laboratory manager is responsible for ensuring good housekeeping practices are in place in the laboratory. This includes periodic wipes of areas prone to contamination, proper cleaning of lab glassware, disposal of disposable consumables following use, and general cleanliness of the laboratory facility, including non-analytical areas. Where specific procedures must be followed, these will be documented in the QMS Manual program specific modules or in analytical SOPs.

5.3.2 Contamination Management

This section describes reagent control and contamination management. Proper observance of these procedures is necessary to guarantee accuracy of results and the safety of laboratory staff members.

Contamination of samples, the laboratory environment and reagents used in analysis must be avoided to provide the highest quality, legally defensible data to our customers. In order to achieve this goal, laboratory staff must adhere to various preventative measures and use the testing procedures for contamination detection.

Contamination control is focused both on sources and on targets of contamination. Sources of contamination include samples and laboratory debris. Targets include things such as, samples, equipment (e.g., tools), supplies (e.g., microscope slides and reagents) and work areas.

Contamination control consists of 3 parts:

- Avoidance
- Detection
- Resolution

5.3.3 Contamination Avoidance

To avoid contamination, the following procedures must be followed:

- Maintain good housekeeping
- Clean all tools before and after preparing each sample
- Clean tool sets at the end of the workday
- Dispose of wipers after use; do not let them pile up during the workday
- Wipe all work surfaces before and after sample preparation. Surfaces include bench tops, slide trays, stereo microscope stage, and slide preparation surface.
- Control work areas
- Work only on clean surfaces

Only one active sample should be processed at each time. The sample containers are kept closed when not being processed. Inactive samples are stored in a suitable, out-of-the-way area. Target items (samples, reagents, and containers) are opened one at a time, as practical.

5.3.4 Detection of Contamination

Contamination control is verified by the evaluation of blank sample analysis and results of air/surface sampling.

5.3.4.1 Blank Analysis

The number of blank samples analyzed is specified in the quality control section in the appropriate SOP. This data is generated and tracked for the purposes of monitoring any possible contamination only, and is not to be used for statistical quality control.

5.3.4.2 Ambient Air Monitoring/Wipe Sampling

On a quarterly basis, or if there is a reason to suspect contamination, the laboratory is to perform ambient air monitoring and/or wipe sampling throughout the facility. This procedure not only helps to monitor possible sample contamination, but also provides data to evaluate any possible personnel exposure.

For air samples, a sampling pump is set up in a location that represents areas of most activity. The pump's rotameter must be calibrated against a primary standard, annually. Sampling is conducted according to the appropriate NIOSH, OSHA, or other published method as available. Flow rates, sampling times, media and all other parameters will be in accordance with appropriate methods and good scientific practice.

Specific sample volume, method of analysis, and acceptance criteria for the targeted compounds are listed in the individual modules.

Results of these samples are filed in the laboratory. If any result is above the contamination/exposure limit, the laboratory manager must immediately notify the Quality Assurance Department and/or the corporate health and safety officer. An investigation into

the source of contamination/exposure is performed, and a corrective action implemented. All actions are documented.

See the program specific modules for specific details on what quarterly contamination monitoring is required.

5.3.5 Resolution

If contamination is detected in any situation, the source of contamination must be traced, and the problem resolved to prevent reoccurrence. A Corrective Action Record (CAR) should be completed to document the analysis of the source of the contamination, as well as actions taken to resolve a contamination circumstance.

After corrective actions have been completed, and the contaminated areas have been cleaned, re-sampling and analysis shall be performed in order to ensure the contamination has been eliminated. A subsequent contamination check prior to the scheduled quarterly check may be warranted depending on source and/or type of contamination in order to ensure effectiveness of corrective actions.

5.4 Test Methods and Method Validation

5.4.1 General

Instructions or procedures for the activities affecting the quality of our analytical services shall be developed by management. This quality assurance program shall be used as a guideline for their development, use, and revision.

Technical standard operating procedures are documented in the SOP Manuals, located at each laboratory facility. These SOPs include step by step procedures for the preparation, analysis, and reporting of data.

Note: Not all methods written in our SOPs are applicable to all EMSL laboratories.

General and Administrative SOPs include, but may not be limited to:

- **EMSL Complaint Resolution SOP (QA-SOP-600)** – *Standard Operating Procedures for Complaint Handling and Resolution*
- **EMSL Corrective Action SOP (QA-SOP-200)** – *Standard Operating Procedures for Non-Conformities and Corrective Actions*
- **EMSL Preventive Action SOP** (**QA-SOP-250)** – *Standard Operating Procedure for Preventive Actions*
- **EMSL Final Report Approval and Electronic Signature SOP (GEN-SOP-901)** - *Procedures and Policy for Final Report Approval Using Electronic Signature*
- **EMSL Controlled Document SOP (QA-SOP-301)** – *Standard Operating Procedures for Document Control Program*
- **EMSL Document Master List SOP (QA-SOP-302)** – *Standard Operating Procedures for Maintaining Master Lists of Documents*
- **EMSL Control of Records SOP (QA-SOP-350)** – *Standard Operating Procedure for Control of Laboratory Records*
- **EMSL Internal Audit SOP (QA-SOP-700)** – *Standard Operating Procedure for Internal Quality Assurance Audits*

- **EMSL Annual Management Review SOP (QA-SOP-750)** – *Standard Operating Procedure for Annual Management Review Reporting*
- **Purchasing: Evaluation of Suppliers and Services SOP** (**QA-SOP-500**) – *Standard Operating Procedure addresses the evaluation and selection of suppliers and services critical to the analysis of samples*
- **Purchasing: Receiving Supplies and Services (QA-SOP-501)** – *Standard Operating Procedure addresses procedures for receiving and approving supplies and services for use upon receipt*
- **Prep and QC of Materials SOP-Micro (GEN-SOP-810)** – *Standard Operating Procedure for the receipt, preparation, handling, storage, quality control and disposal of consumables, kits, media, reagents, solutions, and standards used in Microbiology*
- **Safe Sample Handling Log-In Personnel (GEN-SOP-701)** – *Standard Operating Procedure covering the practices personnel shall use to prevent potential exposure to hazardous customer samples*
- **Sample Receiving and Chain of Custody SOP (GEN-SOP-702)** – *Standard Operating Procedure to track the custody of samples using the Chain of Custody form*
- **EMSL Method Validation SOP (GEN-SOP-310)** – *Standard Operating Procedure for Validation of Methods and Method Modifications*
- **EMSL Training on Analytical Methods SOP (GEN-SOP-100)** – *Standard Operating Procedure for Documentation of Training on Analytical Procedure*
- **EMSL Sample Transfer and Subcontracting SOP (GEN-SOP-10)** – *Standard Operating Procedure for the distribution of samples to other laboratories for analysis, including transfer of samples to other EMSL laboratories*
- **Amending Final Reports SOP (GEN-SOP-902)** – *Standard Operating Procedure to ensure all EMSL amended reports are appropriately and consistently identified as an amended report*
- **Analytical SOPs** – *Relevant analytical SOPs for each analytical method are found in the appropriate modules. These SOPs cover methodology for analytical procedures, calibrations, contamination checks, reporting procedures and quality control frequency.*

A list of the SOPs for each test method the laboratory is accredited for can be found on form 'List of Accredited Methods Validated by Use,' on EMSL's intranet. The link to each laboratory's list (located in individual laboratory folders) is https://elink.emsl.com/labs/default.aspx

The laboratory manager is responsible for ensuring the SOPs reflect the actual laboratory procedures. Managers are to submit suggestions for revisions to the vice president of quality assurance for review. The vice president of national quality assurance is responsible for controlling revisions and distribution of the SOPs. (See *Document Control and Control of Records* section of this manual.)

If analysis is performed using modifications to the EMSL SOP or the standard published methods, the final report will describe the modification in the report title or in the form of a disclaimer. See method SOPs for specific detail.

5.4.2 Selection of Method

EMSL always uses test methods which meet the requirements of its customers. Whenever published and widely accepted methods are available, these standard methods shall be reviewed and adopted when deemed appropriate. Where EMSL specific adjustments or modifications are necessary, these

shall be documented in the SOP for that method. Continued use of laboratory developed methods (vs. ASTM, for example) can be consistent with our policy of using standard methods when possible.

Methods shall be labeled as "Modified" if they are non-performance-based methods, and the changes to the methods are such that they alter the chemistry of the method, or change the determinative step of the SOP as compared to the approved method. Adjustments to the method which do not change the determinative step or chemistry shall be clearly stated in the SOP, or an addendum to the SOP which is referenced from the SOP itself. Reasons for the change, as well as any supporting data showing adjustments do not adversely affect the performance of the method, shall also be documented.

Most tests offered by EMSL are included on the standard chain of custody forms and selected by the customer by use of this form, or by documenting the test number selected on their own chain of custody. If a method is not selected by the customer, the laboratory shall communicate with the customer to determine which methods are most appropriate. If a customer selects an inappropriate method, they will be contacted immediately to determine the most appropriate method for their needs.

Where no standard methods are available, laboratory developed or modified standard methods may be used once they are appropriately validated, and once the laboratory confirms it can operate the procedure. The customer will always be made aware of the procedure to be used prior to testing.

5.4.3 Laboratory-Developed Methods

As noted above, where published standard methods are not available, EMSL will develop its own methods for an analysis, or modify existing methods to ensure they are appropriate for the test requested. Validation of these methods is discussed below. Development of new methods is a planned activity and assigned to personnel with appropriate expertise. The SOP will be reviewed and approved by the national director for that area of analysis.

5.4.4 Non-Standard Methods

5.4.4.1 Use of Non-Standard Methods

Before any non-standard method, including modified methods, is implemented, the customer (or other recipient) must be consulted on the new procedures. The customer should provide approval prior to beginning the work.

Non-standard analytical procedures must be written and validated. The method validation process should prove that the alternate method:

- Meets acceptable criteria for precision and accuracy (see validation section below)
- Meets or exceeds analytical sensitivities required by the customer
- Does not introduce uncontrolled or unknown biases, including matrix interferences

5.4.4.2 Departures from Standard Operating Procedures

Major departures from the EMSL standard operating procedures, whether technically adjustments or modifications, must go through a review by the national directors, regional managers, or quality assurance manager prior to use. Major departures include, but are not limited to:

- Different sample preparation procedures

- Use of alternative analytical instrumentation
- Use of additional or different reagents

Departures from standard operating procedures may be a result of a customer request. Review and documentation of major departures include:

- Reason for deviation from method
- Validation of procedure
- Applicability of alternative method
- Availability of needed resources (if applicable)
- Assurance data is reported with appropriate references and disclaimers (if applicable)
- Record of alternative procedure or policy is maintained as part of the corporate files

Where departures from standard operating procedures are not a result of a customer request, the laboratory must gain the customer's approval.

Validation of Non-Standard Methods or Departures from SOPs

A validation study must be performed before analysis is performed on customer samples for any non-standard method or departure from method. A validation study involves:

- Comparison against established methods (if available)
- Effects of deviation
- The assurance results are equal to or better than the original method (if original method exists)

The procedure used to validate a method also involves an ongoing process with continuous review of the QC data, including analysis of standards, inter/intra analyst reanalysis of samples, participation in round robin programs and proficiency testing programs.

Standard quality control acceptance criteria are applied to monitor performance of the method unless other QC criteria are established. If other criteria are used, they should follow general Good Laboratory Practice (GLP) guidelines.

5.4.5 Validation and Verification of Methods

The majority of the procedures utilized by EMSL laboratories are based on published methods issued through governmental regulatory agencies and independent standards organizations. These methods must be validated following the *EMSL Method Validation SOP* (GEN-SOP-310) to verify acceptable method performance. Validation must occur before performing analysis on customer samples.

TNI requires an initial DOC be conducted for each method and analytical specialist prior to using any method, and at any time there is a change in instrument type, personnel or method, or any time that a method has not been performed by the laboratory or analytical specialist in a twelve (12) month period.

In cases where a lab analyzes samples using a method that has been in use by the laboratory for at least one year prior to applying for TNI accreditation, and there have been no significant changes in

instrument type, personnel or method, the ongoing DOC shall be acceptable as an initial DOC. The laboratory shall have records on file to demonstrate an initial DOC is not required.

Methods used by EMSL are also continually validated through the review of QC analysis including analysis of known standards, inter/intra analyst reanalysis of samples, and participation in round robin programs and proficiency testing programs. When new services/methods are implemented in a laboratory location with newly trained analysts, a data review period will be set up by corporate QA and the National Director/Vice President of the related division. This process is created to ensure the data originating from the laboratory has the proper oversight to confirm its accuracy, and to provide any guidance necessary. During this time period, QA and the head of the related department will inform laboratory personnel of any issues/concerns discovered during the review. Once both the QA department and head of the related department are comfortable with the data, and a sufficient period of time for review has elapsed, the review period can end. The review period will be flexible, and the amount of data to review will be determined by QA and the head of the related department. A minimum data review period is one month, but is recommended to extend up to three months. The volume of data/reports reviewed is also based on the number of samples received, and can be adjusted as time progresses. For example, 50% of the data will be reviewed for the first month, 25% for the second month, and 10% for the third month, as long as no issues or concerns are detected.

5.4.5.1 **Verification of Methods**

When a new published method is implemented in a laboratory, a verification package shall be compiled. This package would include initial calibration of the instrument; proficiency tests (if available); a new demonstration of capability, if required; any quality control associated with the method; and other specific requirements written into the method, if applicable. Once the package is compiled, it is sent to the QA department for recording. When new method versions are released, the QA department or related head of the department will notify the laboratory if a method validation package is required.

5.4.6 Estimation of Uncertainty of Measurement

The QMS Manual program-specific modules and SOPs address the estimation of analytical uncertainty for each program area. EMSL's policy is to have a procedure for the reasonable estimation of analytical uncertainty for its quantitative tests.

EMSL's uncertainty procedures address only analytical uncertainty and do not account for contributors to uncertainty resulting from sampling procedures. Contributors are listed in the workbooks and/or the SOPs. Unless stated otherwise in the analytical procedure or QMS Manual Modules, EMSL uses measurands from repeated analysis of prepared standards over time as a basis for determining uncertainty for a test method (Type A approach). In general, replicate and/or duplicate quality control measurands are used to generate mean recoveries and standard deviations for the method over time. Using this mean recovery, each method will be evaluated upon request to determine the uncertainty and probable bias of the method. Expanded uncertainty will then be derived by multiplying the standard uncertainty by a k factor (i.e., the student t value at 95% confidence interval which is related to the degrees of freedom (v) of the data set used in the calculation (v=n-1)).

Uncertainty is determined using QC template Excel workbooks which have been designed to calculate sample results, chart control chart data for precision and accuracy of each run, and which calculate uncertainty data for each measurand. Instructions on the use of these workbooks can be found in the workbooks themselves. References to the proper workbooks can be found in the program specific QMS Manual Modules.

Each method (either in the SOP or in a separate document, such as an uncertainty worksheet) contains an evaluation of the sources of uncertainty, as well as the procedure for estimating uncertainty. Uncertainty will be reported if requested by the customer, when required by the analytical method, when necessary for interpretation of results, or when uncertainty affects compliance with a known specification limit. Even if not requested, all necessary data for evaluating uncertainty will be retained in the laboratory. When uncertainty is reported, it shall be reported in the same units as the measurand, and shall include the coverage factor and confidence interval used in the estimations. Bias will be reported separately where it exists and is uncorrected.

Uncertainty shall be re-estimated when changes to operations occur that could affect it, such as changes in instrumentation, modifications to methodology or technique, etc.

5.4.7 Control of Data

5.4.7.1 Continuous Data Validation

Data validation is a continuing process that takes place every time samples arrive at the laboratory and is carried through during log-in, analysis and final reporting. If any of the errors found during this proofing process are not traced back to transcription or analytical error, then the computer system is suspect and will be investigated. The processes that undergo this continuous validation include:

5.4.7.1.1 Sample Receiving

At completion of the log-in phase, the internal chain of custody and bench sheets appropriate to the analysis requested are produced by LIMS (SMXP or Element). Also at this time, an internal chain of custody is produced. This document summarizes the sample set with customer and sample information (including IDs), and generates a chain of custody log that is initialed and dated by everyone that handles the samples in the laboratory. The laboratory manager checks the accuracy of this information generated in LIMS.

Only labs and methods approved by corporate management for remote log-in may follow this process.

5.4.7.1.2 Sample Preparation

After log-in, the samples and all its corresponding paperwork are sent to the lab for preparation prior to analysis. Upon receipt, the prep person and/or analytical specialist initials the customer chain of custody confirming the requested analysis is being performed. At this stage too, any problems with the samples or paperwork are noted and brought to the attention of the laboratory manager.

5.4.7.1.3 Sample Analysis

After sample prep, the samples and all corresponding paperwork are sent to the analytical specialist. The analytical specialist initials the requested analytical method on the original chain of custody. At this stage, any problems with the paperwork (or samples) are documented on the sample paperwork and also brought to the attention of the laboratory manager. Upon completion of analysis, the analytical specialist dates and initials the internal chain of custody in the appropriate section.

The analytical process is obviously one of the most important stages in assuring data validity. The procedures taken to ensure the validity of the sample result include

calibration of equipment, formulation of method detection limits, instrument detection limits, determination of analytical specialist qualifications, instrument, and method precision and bias, etc., are very specific to the particular analysis being performed. Details of these procedures can be found in the SOPs for the various analyses.

5.4.7.1.4 Analytical Results Entry

iL@b is a custom module developed for the EMSL LIMS. It allows analytical specialists to input data directly into the lab database rather than relying on the added step of transcribing from paper bench sheets to the database, and does not utilize predefined default optical properties. iL@b is being rolled out gradually to all departments. Once approved by the analytical specialist, the data is available in the database for future review as discussed below, both as raw data and in the final report format.

For analyses not covered by iL@b, once sample analysis has been completed, all paperwork including field data sheets, field chain of custodies, internal chain of custodies, sample bench sheets, and any other paperwork generated to this point is sent to the data entry personnel. At this stage, results are transcribed from the bench sheets and instrument printouts into the LIMS (or Excel) reporting spreadsheet. Analytical results are entered either by personnel approved for data entry, or by the analytical specialists themselves. The software stores the analytical data, performs calculations, and generates the final report. The person performing the data entry would be aware of any error or unusual performance of the LIMS and would bring this to the attention of the laboratory manager.

This final report is reviewed by the laboratory manager (or designee) and approved before being forwarded to the customer. Chains of custody are copied and placed in the laboratory master files along with the analytical worksheets and raw data.

5.4.7.1.5 Proofing of Reports

After data entry, reports are sent to the laboratory manager or designee for review. The reports are reviewed for completeness and accuracy. A check on the quality control analysis performed in association with the results is also performed. This is also another point where transcription errors are caught and corrected. In addition, if the analytical data looks questionable for any reason, hand calculations are performed to verify results.

If errors are found, the report is returned to data entry for transcription error corrections or back to the lab if there are problems with the data. Where errors are determined to be a result of non-conformities in lab process, a corrective action will be initiated. Random errors, such as typographical errors, do not need to initiate corrective action unless they occur frequently, indicating a systematic problem which needs correction.

5.4.7.2 Computer Software

5.4.7.2.1 General

EMSL utilizes an automated Laboratory Information Management System (LIMS) to record, document, and assimilate pertinent field, laboratory, and administrative data. The LIMS system is referred to as SampleMaster XP (SMXP) or Promium Element.

The validation of the SMXP software, including final report templates, are performed by the corporate IT Department and the Quality Assurance Department and the SampleMaster Beta testing team, which consists of several EMSL Subject Matter experts.

The IT Department is responsible for maintaining updates and revisions and for tracking distribution. Release notes for each release of SMXP are prepared and distributed by the IT Department. A complete release history and historical release notes can be obtained from the IT Department at any time.

Validation of Element was conducted by Promium, and is maintained by Promium through routine service. New versions are tested at Promium, and implemented at EMSL, when available.

5.4.7.2.2 Validation of Computer Software and Data

Analytical data storage, processing, and reporting are facilitated through use of SMXP. SMXP software is run on Windows-based, PC computers. EMSL-developed Excel spreadsheets are used to track QC data, equipment calibrations, and environmental conditions. These spreadsheets are validated before being made available on E-link. The corporate IT staff are responsible for ensuring all computer systems, hardware, and software, are documented, inventoried and adequate for use. All systems are operated in safe environments and maintained to ensure proper operation. The computer systems responsible for handling of analytical data have been set up to process data in a way that ensures integrity.

Additional information on the EMSL Software Development Life Cycle, which includes the validation of LIMS software, can be found in the *General Guidelines for EMSL Information Technology* document found on E-link.

All computerized systems, especially the software used for data reporting, must be initially validated prior to use, and then subsequently periodically re-checked during the ongoing validation process.

All calculations and reporting performed by the software is implemented by the laboratory management, the corporate IT staff, or the QA manager. This coordination between the QA Department, laboratory management, and the IT Department allows the software to be reviewed and altered as necessary to comply with regulatory agencies and/or accrediting organizations requirements.

EMSL employs a system to periodically test and verify the software used for sample log-in and report generation is performing properly. To do this, a “dummy” set of samples has been created for each type of analysis the lab performs. Each set has a sufficient number of samples to be able to test as many variables as possible. Examples are:

- No volume
- Low volume / low sample weight
- High volume
- Low concentration
- High concentration
- None detected
- Overloaded sample

The "dummy" sample reports are proofread for accuracy of all text fields, and all results have been verified by hand calculation. The results of each periodic software validation are documented along with the date performed. If there is any discrepancy from the master that cannot be attributed to data entry error, the QA Department is notified, and corrective actions implemented.

5.5 Equipment

5.5.1 Local Equipment Inventory and Logbook

Each laboratory is required to maintain an inventory of all critical equipment in use at the laboratory. Since each laboratory's inventory varies according to size and scope of work performed at the laboratory, it is the responsibility of the lab manager to ensure this equipment inventory reflects actual equipment at that laboratory and includes wherever available, the manufacturer, model, serial number, date put into service and date taken out of service. This equipment inventory is maintained in the "Equipment Inventory" tab of *GEN-FM-450 Equipment Inventory and Maintenance Log*. The column indicating 'Date Taken Out of Service' on the "Equipment Inventory" tab refers to the date when non-functioning equipment was moved to storage in a lab, returned to EMSL's corporate office, or otherwise disposed of. For non-functioning equipment removed from the lab, the lab will add a copy of the "Equipment Inventory" tab, rename it "Out of Service Equip. Inventory," and list only equipment no longer present in the lab. On that tab, the lab will enter 'Returned to EMSL Corporate office' or 'Disposed of' in the 'Equipment Location' column.

In addition, a logbook shall be maintained for each piece of critical equipment in use at the laboratory. All maintenance, repairs, calibrations performed on the instrument shall be recorded, along with the identity of the equipment and software, mfg. name, type ID and serial number, and current location (if appropriate). For most labs, this is done within *GEN-FM-450 Equipment Inventory and Maintenance Log*. However, in some circumstances this will be maintained in a separate Equipment Log notebook. Labs are strongly encouraged to use the spreadsheet whenever possible. Each instrument service entry shall contain the following information:

- Date and time
- Initials of servicing individual (include if in-house or outside agency)
- Description of problem, evaluation of equipment and any data that may have been affected; notify client if necessary
- Maintenance element examined (note if any repairs or replacement of component were made); or, make the Certificate of Analysis available, detailing the equipment's service or repairs
- Description of equipment's acceptability to return to service and name of personnel approving; or, make the Certificate of Analysis available, detailing the equipment's acceptability, i.e., passing calibration, criteria, etc.
- Pertinent comment(s)

NOTE: All information from the items listed above may be entered into the Description of Problems and Action Taken sections of *GEN-FM-450 Equipment and Maintenance Log*.

5.5.2 Subcontracted or Leased Equipment

Any laboratory equipment which is to be used during analysis, other than EMSL equipment, (e.g., equipment borrowed/eased from an outside organization such as an academic institution), must undergo complete calibration, applicable start-up procedures and QC checks, as described in the laboratory SOP for the utilized instrument. These procedures must be performed prior to the start of

any sample analysis. All maintenance records, manuals, and performance records must be made available for review and approval by EMSL staff.

Records are to be maintained which include:

- Type of instrument subcontracted
- Date and purpose
- All raw QC data generated including calibration information

5.5.3 Instrument Calibration

Analytical instruments including GC, GC/MS, ICP/MS are calibrated following applicable SOPs, as per associated analytical method requirements, and also meeting regulatory Standards.

Accrediting authorities and standard published methods have specified the frequency and manner in which a laboratory must calibrate their support equipment (including thermometers, balances, weights, pipettes, etc.). For laboratories maintaining ISO 17025 accreditations (e.g., AIHA LAP, LLC; NVLAP, A2LA, TNI), calibrations of equipment used in accredited tests must be performed internally by trained personnel using approved accreditation procedures, or by an outside calibration firm accredited to the ISO/IEC 17025 standard. The calibration must be performed following the ISO standard.

Before being placed into service, or returned to service after repairs or modifications, the equipment and its software is calibrated and checked to establish it meets EMSL and method specifications. Thereafter, calibration schedules established in this QMS Manual and related program specific modules, as well as related SOPs shall be followed. Intermediate calibrations may be required, as necessary. All calibrations should be documented in *GEN-FM-450 Equipment Inventory and Maintenance Log.*

Labels shall be placed on all calibrated equipment and reference standards, where space permits, which include date of last calibration and date calibration is next due, along with any correction factor, where applicable. Where space does not permit the use of a label, a label shall be placed near the instrument or standard and shall be associated with the instrument by serial number or equipment ID.

Whenever calibration leads to a set of correction factor, these correction factors shall be referenced on the accreditation label or otherwise affixed to the equipment, and shall be included in any calculations for which the correction factor is relevant.

Specific analytical instrument calibration requirements are found in the appropriate program module or related SOPs. Requirements for the calibration of common support equipment are included below. Also see § 5.6 of this manual for requirements for calibration/verification of common Reference Standards.

Note: References to ***calibrations*** refer to EMSL internal procedures or those performed for EMSL by outside calibration providers. EMSL does not provide external calibration services to customers.

5.5.3.1 Balances

Balances shall be calibrated upon installation, then annually thereafter, by an outside 17025-accredited calibration provider.

Balances are verified in the laboratory to stated tolerances each day of use against working calibration weights traceable to NIST as per *GEN-SOP-410 Balance and Weights Calibration Verification.* Acceptance criteria are established in the SOP and included in *GEN-FM-410 Balance Calibration Verification Workbook,* which is used to record verification data.

Where verifications do not meet set acceptance criteria, the instrument shall be cleaned and re-checked. If verification still does not pass, instrument shall be taken out of service until it can be repaired.

5.5.3.2 Pipettes

Pipettes used for quantitative measurement shall be calibrated upon initial use, and verified quarterly thereafter, at a minimum. Pipettes may also be verified daily as described in *GEN-SOP-411 Pipette and Dispenser Verification and Calibration.* Measurements of dispensed weight are taken as per *GEN-SOP-411*, and results calculated using *GEN-FM-411 Pipette and Dispenser Verification.*

Acceptance criteria are established in *GEN-SOP-411 Pipette and Dispenser Verification and Calibration.* Where verification results are outside acceptance limits, the instrument shall be removed from service and adjusted or replaced, as appropriate. For adjustable pipettes, a failure at any check point requires the entire calibration to be repeated after adjustment.

Additional pipette, bottle top dispenser, and syringe verification or calibration forms are available for specific uses, including GEN-FM-411-1, GEN-FM-411-2, GEN-FM-412 and GEN-FM-413.

5.5.3.3 Working Thermometers/Thermocouples

All working thermometers shall be verified against a NIST-traceable reference thermometer (See § 5.6 below) following *GEN-SOP-401 Thermometer Calibration Verification.* Data shall be recorded on *GEN-FM-401 Thermometer Verification Calibration*. If deviations between the working and reference thermometers are within acceptable criteria range as defined by the SOP, the thermometer shall be labeled with the Correction Factor (CF) and use continued by applying the CF. If acceptance criterion is not met, the thermometer shall be immediately removed from use and repaired or replaced as appropriate.

NOTE: When recording results from Thermometers/Thermocouples for which a CF is necessary, the log where temperature is recorded shall make clear whether the CF has been applied. One approach is to record as Temp + CF (example: Instead of recording "31.8°C," record as "32.0 - 0.2°C CF").

5.5.3.4 Anemometer:

Thermal anemometer used for measuring laboratory hood flow shall be calibrated annually by an external service provider. The unit must have a valid NIST traceable ISO 17025 compliant calibration certificate.

5.5.4 Requirements for Calibration Certificates from External Calibration Services

When obtaining calibration services from an outside calibration service, it is crucial the calibration certificates received meet accreditation requirements. The following information must be present on the certificate, or if provided supplemental to the certificate, it shall be explicitly related to the certificate (e.g., by use of a calibration certificate number):

5.5.4.1 Evidence the measurements are traceable to NIST or an equivalent National Metrology Institute

5.5.4.2 The report or certificate shall be endorsed by the recognized AB's symbol (or otherwise make reference to accredited status by a specific, recognized AB) with an indication of the type of entity that is accredited.

5.5.4.3 An estimate of uncertainty for the measurements made

5.5.4.4 Date of calibration, reference standard ID, and due date for next calibration

Note: While many reports contain a "best" uncertainty capability for calibrations performed under ideal conditions in the lab [a Calibration and Measurement Capability (CMC)], this does not meet the requirement of uncertainty of measurement for the specific measurements being reported.

5.5.5 Equipment Maintenance

The laboratory manager, in cooperation with the corporate QA Department, shall determine whether an instrument is maintained and repaired in-house or by an outside service firm. Servicing will also be performed when a need has been identified by calibration or other QC checks. When special service is needed, the laboratory manager should notify the national director and corporate QA manager of the need and reasons for service.

Where regular maintenance schedules are necessary (spectrophotometric instrumentation, for example), the schedules are documented in the analytical SOP. The laboratory manager is responsible for ensuring maintenance schedules are met.

As noted above, all maintenance shall be recorded in *GEN-FM-450 Equipment Inventory and Maintenance Log,* or in a laboratory-assigned notebook. This record includes all minor and major equipment maintenance. Thorough maintenance records provide valuable information regarding the equipment, and can serve as a tool to aid in future repairs. Once the maintenance/repair is completed, the laboratory is responsible for entering a description detailing what maintenance or repair was performed, in order to close the entry. In addition, laboratory management must ensure all areas of the maintenance log are completed, including but not limited to software and firmware versions, date in and out of service, model and serial numbers, EMSL asset ID (if applicable), etc.

5.5.6 Equipment Handling, Transport and Storage

The management of major laboratory instrumentation is performed at the corporate level by the Department of Instrumentation and Planning. This department purchases, tracks and ships primary analytical instrumentation and a variety of support equipment.

5.5.6.1 Shipping

Equipment is assigned a serial number and inventoried. Packaging and shipping are handled internally for equipment which is relatively easy to handle such as optical microscopes, hot plates, etc. When microscopes are shipped, each microscope is placed into a Pelican case for safe handling. Each item of the microscope must be placed into its specific area in the case, to ensure no damage to the microscope, and to maintain the microscope's proper functionality.

A professional hauling service vendor may be used for large equipment (generally > 100 lbs.) such as TEMs, spectrophotometers and fume hoods, or where equipment is fragile.

Once equipment has been received by the laboratory, the instrumentation must undergo performance checks including:

- Calibrations

- IDL and MDL study (where applicable)
- Quality control checks

These performance checks may be completed by the laboratory manager and/or the Department of Instrumentation and Planning depending on the type of instrument and the ability of the laboratory manager. All checks must be documented electronically or in the laboratory equipment maintenance log.

Note: See also the analytical SOP for that test applicable to the specific instrumentation.

5.5.6.2 Storage

Laboratories are to adhere to the manufactures' requirements for the storage of instrumentation.

5.5.7 Equipment Serviced or Calibrated by an Outside Vendor

In the event any major equipment is sent out of house for repair, the laboratory manager will maintain a file documenting:

- Date of shipment
- Vendor information
- Service needed
- Date of return

This information is to be recorded on *GEN-FM-450 Equipment Inventory and Maintenance Log*.

The laboratory is responsible for ensuring all equipment is calibrated prior to placing back into service. Calibrations must meet the acceptance criteria established for that equipment.

For laboratories maintaining ISO 17025 accreditation, outside calibrations must be performed to ISO 17025 standards by a calibration laboratory accredited to ISO 17025. The certificate of calibration must indicate the calibration has been performed following the ISO standards.

5.5.8 Authorization to Operate Equipment

The laboratory manager is responsible for ensuring only authorized personnel operate the major laboratory instrumentation. Authorization is granted based on training and experience as detailed in each of the method sections. Authorization may be given to personnel through the completion of the qualifications checklist or verbally, depending upon type of instrumentation. For example, approval for operation of the transmission electron microscope or spectrophotometer is recorded on the training checklist for the test method, while the approval for an acetone vaporizer or water bath may be done verbally.

5.5.9 Instrument Manuals

The laboratory manager is responsible for maintaining and reviewing all instrument manuals pertaining to use, calibration and maintenance. Instrument manuals are to be made available to the analytical specialists. The laboratory manager is responsible to be informed of, and keep current with, all new releases of information on all equipment.

5.5.10 Defective Equipment

Analytical and support equipment found to be defective or performing poorly (out of calibration) is removed from operations until it can be repaired. The defective equipment is to be clearly labeled as "out of service." In PALA accredited labs, defective equipment must be subject to control of non-

compliant work. The laboratory manager is to investigate whether the defect has affected any reported analytical results.

5.5.11 Changes to Equipment Inventory

In the event equipment is replaced, this information is recorded on the equipment maintenance log.

5.6 Measurement Traceability

5.6.1 General

According to the International Vocabulary of Basic and General Terms in Metrology (VIM), traceability is the "property of the results of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparison, all having stated uncertainties." Any material used for calibration purposes in the laboratory must have its value traceable to NIST, if possible. Procedures have been developed following AIHA LAP, LLC's *Guidelines for Traceability*.

EMSL is committed to ensuring the traceability of data to national standards. This is accomplished by setting specific requirements, including:

- Use of Standard Reference Materials (SRMs) as certified and traceable to the National Institute of Standards and Technology (NIST). SRMs are used for QC analysis and training for achieving measurements of analytical specialists and overall laboratory accuracy. Certificates of analysis for SRMs must be on file in the laboratory before using the material.
- Calibration of instrumentation against NIST-traceable standards. Wherever possible, reference materials used in the calibration and verification of instruments shall be obtained from a recognized National Metrology Institute (NMI) (e.g., NIST), or a producer accredited to ISO 17034:2016 in combination with ISO 17025 calibration. For labs accredited to ISO 17025 by A2LA or AIHA LAP, LLC, the 17025-accrediting body of the producer shall also be an APLAC signatory (e.g., A2LA, ACLASS, and NVLAP).
- Analysis of consensus standards or proficiency testing samples where a qualified NIST-traceable reference material is not available
- Ensuring results are traceable to lots of consumables used in the prep and analysis of samples

5.6.2 Reference Standards and Reference Materials

EMSL strives for reference materials used by the laboratory to be traceable to certified reference materials or other well-categorized reference materials, where applicable. Reference materials shall be obtained from a vendor with a certificate of analysis which identifies the lot number. When selecting sources for reference material, sources should be from a national metrology institute or an accredited reference material provider (RMP) that conforms with ISO 17034:2016 in combination with ISO/IEC 17025, or *ILAC Guidelines for the Competence of Reference Material Producers, ILAC G12*. For laboratories accredited by AIHA LAP, LLC or A2LA, reference material providers must be selected which hold accreditations by accrediting bodies recognized directly or indirectly by ILAC. The two major North American accreditors of RMPs are A2LA and ACLASS. Accredited RMP lists can be found on their websites. Care must be taken when ordering standards to ensure the material ordered is under the RMP Accreditation. Accredited RMPs often have several classes of reference materials, with only one or two classes being compliant with ISO G34 guidelines. Certificates shall be endorsed with the ISO 17034:2016 RMP accreditation, when available. ISO 17025 accreditation symbols are insufficient for

reference materials under new ILAC guidelines, but are good intermediate quality signifiers when no ISO 17034:2016 compliant material is available.

Reference standards shall be NIST-traceable where applicable, and include a 17025 calibration certificate showing traceability and uncertainty of measurement in compliance with the requirements in § 5.5.4 above. The reference standards shall be with ±10% of the requested concentration, unless the method or other requirement is more stringent. Standards received within this tolerance are considered acceptable, and may be used without applying a correction factor. Should the standard be received outside the ±10% tolerance, a correction factor will be applied, or a new standard will be purchased. Recording the standard/reagent in the logbook is verification of review for the acceptance criteria. Certified reference materials received that are produced under ISO 17034 and/or NIST, do not require review, as they undergo strict testing and tolerance to meet method specifications. Reference standards of measurement (e.g., NIST traceable thermometer, calibrated weights) maintained by the laboratory should only be used for verification of calibrations, when possible.

Having multiple laboratory operations can facilitate the cost savings associated with the variety of standard materials required to check the performance of both instrument and analytical specialists. EMSL Analytical allocates and distributes these standard reference materials, where possible from 3 sources:

- The corporate laboratory facility
- The Quality Assurance Department
- The regional managers or national directors

In order to track the transfer of standards and reference materials between the original sources and the laboratory(ies), a chain of custody type form must be completed (see *EMSL Standard and Reference Material Traceability Form*). This form ensures traceability of measurements to a national standard and verification of measurements to reference samples. Reference materials are to be clearly labeled and stored as to maintain integrity.

As with equipment, specific procedures for which reference standards and reference materials are required are detailed in the QMS Manual program-specific modules and analytical procedures.

Reference materials shall be stored according to manufacturer recommendations. If no expiration date is included on the material, then a date shall be assigned that is appropriate for the material.

Common measurement standards and general policy requirements for verification/recertification are listed below:

5.6.2.1 Laboratory Working Weights:

Laboratory working weights used to verify balances and other equipment must be checked annually in-house using reference weights.

5.6.2.2 Reference Thermometer/Thermocouple:

The laboratory shall send at least one thermometer to an outside ISO 17025-accredited calibration service for calibration annually. Additional details regarding thermometer calibration frequency can be found in department-specific modules. This thermometer shall have readability (e.g., the smallest division which can be distinguished) at least as precise as the most precise temperature measuring instrument in the laboratory. Each temperature measuring instrument shall be verified to this Reference Thermometer at least every twelve

(12) months. See *GEN-SOP-401 Thermometer Calibration Verification* for additional requirements.

5.6.2.3 Stage Micrometers

Stage micrometers used in the verification of microscope performance as per the program specific QMS Manual modules and technical SOPs shall be calibrated prior to first use, and if damaged, by an ISO 17025-accredited calibration service. The calibration certificate shall meet the requirements of § 5.5.4 above. If a laboratory does not own its own calibrated Stage Micrometer, one can be loaned from the corporate QA Department upon request.

5.7 Sampling

With the exception of certain customers for whom EMSL performs wastewater sampling (see *GL-SOP-026*), EMSL does not conduct sampling for its customers. Sampling guides are available from the EMSL website for tests conducted by EMSL. Customers are instructed to ship samples in clearly labeled, non-breakable airtight containers, and to package such samples so as to minimize damage or change in condition of the samples. Samples shipped by air must be placed in containers that minimize jostling and damage. Samples should be packaged in non-static packaging, as applicable.

As EMSL is not present at the time of sampling, (except as noted above), we take no responsibility for the quality of the sampling performed or information provided (e.g., sampling method, identity of sampler, locations, times, or volumes). EMSL procedures cover only the analysis of the samples submitted. Any specific comments about sampling that the customer wishes to add to the report should be communicated on the chain of custody form, or in written correspondence to the lab.

Compliance samples may be rejected if it is determined they have been inappropriately sampled (e.g., improper volumes, containers, preservation, holding times). The customer is notified immediately if it is clear sampling has been performed incorrectly in such a manner as it may affect the analysis. Reports may contain disclaimers if the sampling may affect the analysis.

5.8 Handling of Test and Calibration Items

Rigorous sample tracking is fundamental to a QA program. The most thorough and complete analysis is useless if performed on the wrong sample.

The EMSL sample-tracking system is designed, to the extent that it is possible, to meet all litigation requirements. It is also designed to have redundancy safeguards wherever possible.

The procedures summarized below are described in greater detail in the *EMSL Sample Chain of Custody SOP* (GEN-SOP-702).

5.8.1 Chain of Custody

In order to ensure the integrity of any sample, records of its custody must be maintained throughout the sample collection in the field, acknowledgement of receipt, acceptance by the laboratory and analysis. The custody of the sample will be tracked via the completion of a chain of custody form.

With the exception of the sampling of wastewater for a select group of customers, EMSL Analytical, Inc. does not collect samples. Therefore, the chain of custody begins with the customer in the field, with the exception of TO-15 equipment, where the chain of custody begins with the preparation of the canisters and flow controllers. EMSL maintains chain of custody documents that customers are encouraged to use where they do not have their own form. Customers delivering samples without a chain of custody form will be required to complete a chain of custody prior to samples being logged-in

at the laboratory. EMSL takes possession of samples by signing the "Received" section of the chain of custody form. The chain of custody then accompanies the samples through the laboratory until analysis and final reporting is complete. Original chain of custody forms are returned to the customer with the final test report.

In those instances referenced above where EMSL collects wastewater samples for a customer, an EMSL chain of custody will be initiated by the collector in the field as per *SOP GL-026,* and submitted for testing with the samples.

In most instances, information provided by the customer related to samples is received through the chain of custody. Disclaimers are included in the report when the information received can affect the validity of the data. Typical disclaimers state EMSL does not accept responsibility for sample collection or analytical method limitations, and the results only relate to the materials received.

5.8.2 Sample Receipt

Upon receipt of samples, the administrative specialist will check for obvious signs the sample integrity has not been compromised. Any problems with the samples will be reported to the customer immediately. The customer chain of custody will be signed indicating samples have been received by the laboratory.

5.8.3 Sample Acceptance

Samples are not accepted for analysis until they have been received and reviewed by the analytical specialist or preparatory personnel. This review includes verification of receipt of all samples against the customer chain or custody. If samples are found to be unacceptable for analysis (see SOP for examples of reasons for unacceptability) this will be communicated to the customer immediately, and this communication and any resulting instructions recorded. Refer to GEN-SOP-702 Sample Receiving and Chain of Custody for more information.

5.8.4 Log-in and Internal Chain of Custody

Log-in of samples is accomplished by authorized personnel using the Laboratory Information Management System (SampleMaster XP (SMXP) or Element). It is at this point that unique order ID numbers and Sample ID numbers are assigned. This order number is physically attached to the sample batch and serves to identify the sample set throughout the analysis. This, in combination with the customer ID number, uniquely identifies each sample. An internal chain of custody is also generated at log-in which documents the handling of samples throughout the laboratory. See the EMSL *Sample Receiving and Chain of Custody SOP* (GEN-SOP-702) for additional details on log-in and internal chain of custody procedures.

5.8.5 Archival and Disposal of Samples

Once the analysis is complete and the analytical worksheet is signed, the analytical specialist stores any remaining portion of the sample in an appropriate storage area. All storage boxes are to be stored in a safe manner for the period indicated for that category of waste, in accordance with regulatory requirements. When a storage box is full, the month in which the samples were analyzed (or similar reference numbering system as appropriate for the operations, i.e., billing number), is marked on it. A new storage box replaces the old one, which is then stored until time of disposal. All samples will be stored so as to provide protection from any possible contamination or loss of integrity.

Any specific storage requirements are documented in the analytical SOPs or in the QMS Manual program-specific modules. Default retention times for samples are established in the program-specific Modules in this manual.

Upon request, samples will be returned to the customer.

5.9 Assuring the Quality of Test and Calibration Results

Laboratory performance will be determined by use of results from the following sources:

- Results from intra-lab and inter-lab testing
- Performance in on-site assessments from accrediting agencies
- Performance in proficiency testing programs
- Completion of internal quality audits
- Continued analysis of standard and reference materials traceable to third party programs
- Quality control reanalysis
- Calibration measurements

Quality control is performed continuously throughout the course of laboratory operations regardless of laboratory productivity, and is made part of the normal course of laboratory sample analysis. Frequency and volume of QC analysis is based on regulatory requirements and good laboratory practice. The frequency of QC analysis must be consistent and reflect the sample volume at any given time.

Performance criteria will be maintained for both individual analytical specialists and for the entire laboratory. The standards for acceptance criteria, frequency and volume are documented in the program modules.

5.9.1 Quality Control Program and Review

The overall quality control program is established and overseen by the Vice President of QA and national directors in order to ensure each EMSL laboratory produces quality data. Each branch laboratory's QA program is implemented and managed by the laboratory quality representative for that location. This process ensures fulfillment of our commitment to our customers, that our data is legally defensible, and that all personnel perform their responsibilities properly.

In addition to the review of quality control data for final report approval, the overall QC performance of the laboratory shall be reviewed on a regular basis in accordance with regulatory agency requirements. Specific quality control procedures are detailed in the program modules.

In general, QC analysis represents at least 10% of all analysis performed. QC analysis will entail inter-analyst reanalysis, intra-analyst reanalysis, intra-laboratory reanalysis, analysis of reference standards and blanks at the frequencies required by the analytical method and/or program specific QMS Manual Modules.

Where a specific percentage of QC is required, the lab manager or lab quality representative must ensure this is considered the minimum percentage of QC performed. If QC is to be performed with each run, even if the run is smaller than the maximum allowed run-size, QC shall be performed with the run. If the maximum allowed run size is exceeded, the required QC shall be increased accordingly to maintain the required percentage. Where a specific number of samples between QC is not specified, the lab shall strive to conduct QC in as real-time as possible, and should be completed prior to the reporting of analytical results for samples used for QC. The intent of percentage requirements is to suggest an approximate frequency at which QC should be performed. Likewise, QC results should be reviewed in real-time and prior to reporting of results, in order to identify potential problems without calling into question associated samples.

The laboratory manager or designee reviews the quality assurance data on a monthly basis (minimum). If the quality control analyses are within control limits, the results will be cleared for reporting. As long as those statistics are deemed acceptable, customer reports will continue to be processed.

If the difference between duplicate analyses exceeds statistically derived control limits, the laboratory manager and the analytical specialist will review the sample data and resolve the differences. A detailed corrective action report recording all activity is submitted to the QA manager. (See "Control of non-conforming work" and "Corrective action" sections of this manual.)

The quality review also includes a check on verification checks of the instruments and/or analysts (standards). Measurements are checked against the acceptance criteria. If any measurement is out of compliance, the laboratory manager is responsible for investigating the cause(s) and initiating a corrective action.

In cases where analytical specialists are transferred temporarily to another laboratory, QC data produced by that analytical specialist will be associated with the laboratory at which the data was produced for purposes of determining percentages of QC analysis performed. Likewise, inter-analyst data produced by that analytical specialist will be associated with the lab at which it was produced. The analytical specialist's CV from their original lab shall be utilized when applicable.

However, a transfer analytical specialist's QC data will also be associated with the analytical specialist for purposes of determining on-going capability. A copy of the data may be held by the analytical specialist and placed in their ongoing training records at their home lab. This may include intra-analyst samples as well as analysis of known samples or PT/RR results.

5.9.2 Quarterly Report

The person responsible for overseeing the QA in the lab (i.e., laboratory quality representative or laboratory manager) completes a report every quarter for the laboratory manager. In the cases where the laboratory manager is the laboratory quality representative, the report is written for the national director or corporate QA manager. These reports are designed to express concerns, address needs, and report any major changes to management. They are ultimately submitted to the corporate QA Department for review.

Format shall include the following topics:

- Summary of quality control data (e.g., QC reanalysis that may have been out of control limits and the corrective action)
- Uncertainty measurements – Sr for Micro; CV for PCM asbestos
- Summary of the number of corrective actions initiated and closed along with detail on any major issues (CAR/PAR workbook attached to report)
- Summary of preventative actions (CAR/PAR workbook attached to report)
- Calibration/Instrument maintenance; dates of any quarterly, semi-annual, or annual equipment calibrations and any non-routine maintenance performed
- Equipment issues; summary of any outstanding equipment issues
- Summary of quarterly contamination monitoring
- Customer problems
- Safety issues and results of safety audits
- Report of findings from any internal audits or external audits conducted during quarter
- Results of proficiency testing and/or round robin analysis
- Summary of staffing issues or changes
- Risk identification, improvements, and internal/external issues

- Miscellaneous
- Review of corporate website to ensure lab accreditations, open hours, etc. are accurate

5.9.3 Proficiency Testing Programs

Laboratories participating in proficiency testing (PT) programs will ensure the analysis is performed using the same sample tracking procedures and analytical methodology, and is analyzed by the same analytical specialist(s) as under normal, customer sample conditions. At no time is there inter-laboratory exchange of proficiency samples.

- Asbestos
    - NVLAP – for PLM bulk and TEM airborne asbestos analysis
    - AIHA LAP, LLC-IHPAT
    - New York State ELAP – for asbestos in air, bulk, and water
- Env. Micro
    - AIHA LAP, LLC-EMPAT – for environmental microbiology
    - NYS ELAP – water microbiology
    - ERA – microbiology
    - CDC Elite for Legionella
    - Wisconsin State Laboratory of Hygiene for Cryptosporidium and Giardia
    - Sigma Aldrich for Legionella
- Env. Lead
    - ERA – Environmental lead
    - NYS ELAP – Lead (wipes, paint, soil, air)
    - AIHA LAP, LLC-ELPAT Lead (wipes, paint, soil, air)
- IH/Chem
    - IHPAT, organics, metals, silica
    - NYS ELAP – non-potable water chemistry
    - ERA – TO-15, organics, inorganics
    - WASP – for formaldehyde
- Food
    - API for Food Micro and Food Chemistry
- Radiochemistry/Radon
    - Bowser-Morner – for radon
    - ERA – for radiochemistry
- Materials Science
    - ASTM for Carbon and Alloy Steel (Materials Science)

Samples with instructions and accompanying report sheets are distributed to the appropriate laboratory staff or designee. The samples are incorporated into the normal sample load and analyzed as a normal customer sample, on a rotating basis, between qualified analysts. Results are calculated and reported on the supplied forms. The result forms are double-checked against the raw data for data entry transcription or omission errors.

Records of proficiency testing analysis are to be completed and maintained in a separate laboratory PT file. This data may also be maintained for each participating analytical specialist in his or her personal training file.

PT samples are scheduled, analyzed, reviewed, and reported similar to customer samples.

Note, for Asbestos only: For laboratories with multiple analysts, only one analyst analyzes the PT sample. Once the results are reported and the scored results are received from the PT provider, all qualified analytical specialists shall analyze the proficiency samples. Results from all analytical specialists are reviewed by the laboratory manager and compared to the official results.

The data is reported using the appropriate format and method. Data may be reported by mail, fax or by the internet, depending on the requirements. If email results are required, the instructions given by the submitting agency are followed. Copies of confirmation of "data sent and received" are placed in the file with the data. The laboratory manager is responsible for submitting the scored results from each PT round to the Quality Assurance Department, where they are tracked for trends and evaluated against acceptance limits.

Whenever a laboratory reports an outlier on a proficiency testing round, a Corrective Action shall be initiated to review the root cause(s) of the outlier. As this is equivalent to reporting incorrect results to a customer, a PT outlier should be treated accordingly. This process shall be completed within thirty (30) days of receipt of results.

The laboratory must maintain Proficiency status, "P," for all parameters tested and reported. If the laboratory becomes non-proficient, this will be indicated in the report to the laboratory containing the results of a given study. The lab manager, lab quality representative or designee shall investigate the reasons for the poor performance. A corrective action plan will be developed by the QA manager and the lab manager. The plan will be written by the laboratory manager, who will submit the plan to QA manager for review. The plan will include all actions that will be taken (along with a timetable) to bring the quality of data to an acceptable level. Once the plan is acceptable, this should be forwarded to the corporate quality assurance manager for review and approval.

All records for proficiency samples are kept in files for each analytical specialist, along with the scored results.

Several accreditation bodies (ABs) require that, as a condition of accreditation, results from proficiency testing (PT) programs used as a demonstration of competency for methods for which the laboratory is accredited be reported to the AB on a regular basis. EMSL authorizes the release of proficiency testing results from the proficiency testing provider to its various accrediting authorities whenever such disclosures are required. When possible, standing authorizations are granted. The QA Department is responsible for ensuring the distribution of proficiency testing results to outside agencies when requested or required. See *GEN-SOP-851 3rd Party PT Reporting* for current requirements. A list of ABs that require PT results be forwarded on receipt is included in the SOP, along with details on how results should be reported.

In addition, for food accreditations, A2LA requires form F237 be submitted with the application specifying the four-year testing plan for accredited food tests.

Where commercial proficiency testing programs are not available, proficiency is obtained by:

- Participation in a round robin program, and/or
- A minimum of 20 QC data points are obtained initially to determine upper and lower control limits at three standard deviations. Program shall offer at least 2 rounds per year, separated by a six-month time period. Each set of samples must include 4 blind spikes.

5.9.4 EMSL Round Robin Programs

Periodically, the Quality Assurance Department, national directors and/or technical division VPs, will provide a company-wide round robin program. Samples are to be analyzed by all active analytical specialists. The laboratory manager is to submit results of all analytical specialists who participated in the round to the Quality Assurance Department, where all results will be scored and graphed using standard deviation statistics.

The laboratory manager is responsible for ensuring any results falling outside of the control limits be investigated, and a corrective action report completed.

5.9.5 Infrequent Analysis

In cases where a laboratory may receive few or infrequent samples for which they hold accreditation programs, they must maintain analysts' skills and proficiency, and continue to follow the procedures for proficiency testing and participation in RR programs.

5.9.6 Trend Analysis

QC data is charted over time in order to evaluate analyst and laboratory performance. This data shall be reviewed by the laboratory and/or the Quality Assurance Department. Statistically relevant trends should trigger an evaluation.

Items being monitored:

- Failures exceeding the Control Limits (3s)
- Two consecutive points above or below the Warning Limits (2s)
- Seven (7) consecutive data points on either side of the mean
- Seven consecutive points moving in the same direction

Trend analysis shall be documented along with conclusions. If any actions are taken as a result, these may be documented as preventive actions unless a failure has occurred. Failures should be documented as a corrective action. Trend evaluations shall be included in quality reports submitted to the laboratory manager and corporate Quality Assurance Department, where appropriate.

5.10 Reporting the Results

The customer report is, ultimately, our "final product." This report reflects on our standard of quality. This section describes EMSL corporate policy on the procedures, policies, and formats for reporting analytical data. Additional, test specific requirements are listed in the program modules.

5.10.1 Test reports

Each final report will have at a minimum the following information:

- Laboratory identification and address
- Name and address of customer
- Date of receipt by laboratory (or original chain of custody attached)
- Unique sample IDs
- Description of sample (or original chain of custody attached)
- Identification and description of test procedures performed
- Results of testing and analysis
- Sample preparation date (where applicable)
- Analysis date, and time (if holding time is <72 hours)
- Any deviations or additions to test specifications
- Name and signature of responsible person (laboratory manager or designee)
- Any applicable disclaimers and statements (See specific SOPs)

- Notification of any deviations from the test method
- An estimation of uncertainty when requested by customer, required in the analytical SOP, or when necessary for the interpretation of data
- For reports issued under NVLAP, a statement that the report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government
- For PALA accredited labs, including the following: Title; unique ID number on report; page numeration, including end point; units of measure; disclaimer stating report relates only to samples tested and not reproduced; and date of sampling
- Information on any analyses that had been subcontracted (attach subcontract lab's report)

The signature of the analytical specialist is not made a part of the final report unless requested by the customer. Analytical specialists accept responsibility for the data generated by entering the data electronically, or signing the worksheets where applicable.

Any modifications to the methods cited on the report will include all applicable comments and disclaimers as issued by the QA manager.

When by written agreement any of these items are excluded from the final report, a copy of the written agreement shall be maintained in the laboratory, and all information not reported shall be readily available upon request. Where requests to remove required disclaimers are received, the laboratory should consult with the QA Department or national directors prior to proceeding, since these are in many cases designed to protect EMSL by qualifying results.

5.10.1.1 Use of Significant Figures

Where stated, results are to be reported to the amount of significant figures prescribed by the analytical method or accrediting agency. In the absence of a method requirement for significant figures, the value reported can be based on either significant figures, or decimal places, in order to report values that show significant detail to comply with various regulatory requirements and accommodate sensitivity requests/requirements.

5.10.1.2 Reference to Accreditation

Each accreditation agency sets its own requirements for use of its symbol on customer reports. Likewise, additional requirements may be set for references made to accreditation. EMSL adheres to policies of the accrediting authorities. NVLAP Policies are found in Handbook 150:2020 (August 2020), specifically Annex A, NVLAP accreditation, and Annex E, Accredited Laboratory Combined ILAC MRA Mark. PALA accredited laboratories reference accreditation is based on PALA requirements in document DR-12-SCA-01. EMSL's general policies can be found in § 5.11, below.

5.10.1.3 Listing of Accreditation/Required Statements (See also § 5.11, below)

Laboratory accreditation is presented on the report with a reference to the agency, followed by the Lab ID code (such as: NVLAP Lab Code 000000-0) or via the use of approved accredited laboratory symbol.

The citation of the accreditation will not be used in a manner which misrepresents a laboratory's accreditation status. Citation of accreditation will be provided for the type of analytical test applicable to that accreditation only. If a particular analysis is performed which is not covered by an accreditation program, the report contains no reference to that

accreditation agency or contains the statement, “This report contains data that are (is) not covered by the XXXX accreditation.” If a final report contains a combination of data for both accredited and non-accredited analysis, the non-accredited tests will be marked as such.

Reference to an accreditation by an applicant laboratory that has not yet achieved accreditation shall include a statement accurately reflecting the laboratory’s status. Certificates of accreditation (applicable to the analysis) may be made part of the report if requested by the customer.

The title of the approval signatory shall appear on the final report that displays the accreditation.

In the rare cases where the analysis (or part of the analysis) has been subcontracted, the report will clearly state the data had been subcontracted. The report will include the statement “This report contains data that were produced under subcontract by Laboratory X.” If the subcontract laboratory is accredited, the report will cite the accreditation agency and the Lab’s ID code.

5.10.1.4 Proficiency Testing

Ambiguous reference to a Proficiency Testing Program (PAT) must be avoided. For example, listing of a PAT Identification number must be clearly identified with a statement such as *“EMSL XXXX (location) Participates in the AIHA LAP, LLC Proficiency Analytical Testing (PAT) Program for Asbestos: ID #123546”* to avoid inappropriate representation of full accreditation.

5.10.1.5 Statement on Quality Control Results – ELLAP AIHA LAP, LLC Requirement

For those laboratories which maintain the ELLAP AIHA LAP, LLC certification, final reports will state: “The QC data associated with the sample results included in this report meet the recovery and precision requirements established by AIHA LAP, LLC unless specifically indicated otherwise.”

5.10.1.6 Suspension of Accreditation

In the unlikely event a laboratory’s accreditation is revoked or suspended, reference (symbol and lab code number) to the accreditation and the scope of accreditation will be removed from all applicable documentation until accreditation is reinstated. Documentation includes:

- Final reports
- Marketing materials such as brochures, mailers, etc.
- EMSL website

In addition, at the discretion of the laboratory manager, national director and QA Department, samples may be subcontracted to a laboratory with equivalent accreditations.

In the case of AIHA LAP, LLC ELLAP matrix suspensions, the laboratory shall inform AIHA LAP, LLC in writing within ten (10) business days, of procedures for any samples that are received by the laboratory for analysis in the suspended FoT(s) until accreditation is restored.

5.10.1.7 Reporting to Governing Agencies (Notification of Compliance Reports)

At the request of the customer, EMSL can report analytical results directly to a compliance agency (state water authority, state environmental department, etc.). Results can be submitted on the agency’s specialized forms, if requested. In these cases, the original EMSL report must also be submitted.

5.10.2 Final Report Approval

Final customer reports are released only after the data has been reviewed by an approved reviewer. In almost all cases, the review is independent and performed by a qualified individual other than the analytical specialist (some exceptions are listed below). This review is documented with the initials of the reviewer on the "Screened" line on the Internal Chain of Custody form. This review includes:

Quality Control Review

Quality control analysis performed for that specific batch of customer sample is compared against acceptance criteria.

Note: Our quality control program is designed to comply with the requirement of state, federal and independent accrediting authorities' policy for reanalysis. Specific batch QC requirements are specified in the Program Specific QMS Manual Modules and/or Method SOPs. For percentage-based QC requirements, the quality control samples may or may not include samples associated with the set of results being approved for reporting.

In addition to QC review, analytical data is reported with confidence based on compliance with this QA program. The quality of the data reported is ensured through the procedures and policies as documented in this manual, including:

- Delineation of responsibility
- Compliance with analytical standard operating procedures
- Following calibration protocols
- Fulfillment of the required amount of quality control analysis
- Satisfaction of training requirements

Review of Data

- Raw data (e.g., from bench sheets, prep logs, printouts from instrumentation) and the information on the chain of custody are reviewed for correctness and compared against the typed information on the final report to check for any transcription errors.
- Date derived from calculations will be reviewed to ensure they appear correct based on the recorded data (this may be a brief overview).
- Where appropriate, correlations between data will be reviewed to ensure the sensibility of the data.

Appropriate Methodology

The review also verifies the correct methodology was performed on the samples. This is done by checking on the customer's request as documented on the chain of custody, as well as any supplemental conversations with customer as recorded in laboratory records (if any).

5.10.2.1 Approved Signatories

An approved signatory is responsible for the technical content of the report, and is the person to be contacted by the accrediting authorities or customers in case of questions or problems with the report. Signatories shall be persons with responsibility, authority and technical capability for the results provided. Technical capability is defined as having the aptitude for understanding the analysis and ability to recognize an error. It does not mean the approval signatory must be an approved analytical specialist. For PALA accredited labs, a PALA approved microbiologist is an approved signatory.

The Quality Assurance Department, regional manager or national director can qualify the laboratory manager as an approved EMSL signatory. (See *GEN-FM-901 Final Report Approval and Signature Sample.*)

The laboratory manager may assign designated personnel to perform the task of final review and approval. This designation must be clearly documented (See *GEN-FM-901 Final Report Approval and Signature Sample.*)

Exceptions to Peer Review Requirement

5.10.2.1.1 All AIHA LAP, LLC and/or NLLAP* accredited analysis must be independently reviewed before it is released to the customer. No exceptions can be applied to work done under the AIHA LAP, LLC and/or NLLAP* accreditation. If work must be released prior to independent review, it must be marked "Preliminary" as per § 5.10.7 below.

***NOTE:** National Lead Laboratory Accreditation Program (NLLAP) is an EPA program which provides a list of accredited environmental lead laboratories. AIHA LAP, LLC and A2LA are both recognized NLLAP accrediting bodies. In addition, as of the time of this publication, Perry Johnson Lab Accreditation, Inc. (PJLA), ANSI-ASQ National Accreditation Board/ACLASS, and Laboratory Accreditation Bureau (L-A-B) are also recognized as NLLAP accreditation bodies. The most recent list of accrediting bodies can be found on the NLLAP website:

http://www2.epa.gov/lead/national-lead-laboratory-accreditation-program-nllap

5.10.2.1.2 For analysis not covered by AIHA LAP, LLC/NLLAP accreditations, an independent review shall always be performed, except under the specific circumstances identified below. In all other cases, work being reported prior to customers prior to independent review must be marked as "Preliminary" as per § 5.10.7, below.

5.10.2.1.3 Only in the following circumstances can a report be issued as Final without a second independent review being performed. In these circumstances, the report shall be reviewed by the original analytical specialist prior to release. Whenever an exception is being applied, the number of the exception which appears below shall be documented next to the "Screened" line of the Internal Chain of Custody to document the circumstances.

(1) Non-AIHA LAP, LLC analysis performed outside of a laboratory's regular business hours (i.e., 8-5 M-F) when a reviewer is not available to review work before the TAT.
(2) Non-AIHA LAP, LLC analysis performed during a laboratory's regular business hours when a reviewer is not available to review work before the TAT due to extended leave.

5.10.3 Opinions and Interpretations

EMSL generally discourages statements of opinions and interpretations on reports; however, a specialized report which contains results and interpretations as to whether the results are in or outside criteria is available. Any statement included in the test report shall be reviewed by the manager, QA,

or upper management team prior to release. The source of the decision rule or interpretation will be cited, when applicable.

Specialized statements included on test reports are communicated to the customer either by phone or email prior to the report being sent. These types of statements are related to samples that have non-typical components to the analysis, and prompt the lab to communicate the situation with the customer before the report is sent. The communication with the customer is documented through email or a phone call, and noted on the internal COC.

5.10.4 Testing Obtained from Subcontractors

When a test report contains results obtained from a subcontractor, these will be clearly identified. This can be done either by scanning in the subcontracted report stating which laboratory performed the work, or by entering the data into Sample Master, commenting who completed the analysis. See the *EMSL Subcontract SOP* (GEN-SOP-010) for detailed procedures.

5.10.5 Confidential Transmission of Results

All EMSL employees have signed confidentiality agreement on file. Customer confidentiality is maintained when results are reported.

There are a number of forms of result transmission used by EMSL. These include:

1) Fax through Sample Master – A fax cover sheet is automatically included with the transmission. The fax cover sheet includes the standard confidentiality statement, *"This information may contain privileged and confidential information and is solely for the use of the sender's intended recipient(s). If you receive this information in error, please notify the sender and delete all copies."*

2) Email through SampleMaster – The confidentiality statement is (automatically) included in the body of the e-mail, *"This email may contain privileged and confidential information and is solely for the use of the sender's intended recipient(s). If you received this email in error, please notify the sender by reply email and delete all copies and attachments. Thank you."*

3) Manual fax – The cover page and report are printed through SampleMaster and manually faxed to the customer. The cover page includes the confidentiality statement, *"This information may contain privileged and confidential information and is solely for the use of the sender's intended recipient(s). If you receive this information in error, please notify the sender and delete all copies."* Note: Evidence of transmittal (fax receipt or email record) is to be retained and will serve as a formal record of receipt.

4) Use of LabConnect – The user must agree to the terms before using this service. The agreement includes the statement: *"The results available on this site are provided as a matter of service and convenience for customers of EMSL. They are intended for use only by authorized parties and are confidential in nature. It is the responsibility of our customers to maintain and update their user accounts to ensure that no unauthorized access is allowed by its employees. If you are not an authorized user, do not attempt to enter. While the results have been verified for accuracy against our analytical reports, they are not intended as a substitute for a hard copy or approved electronic report. Please contact your Account Representative if you have any questions regarding the available information.*" The user is prompted to check *"I accept the legal conditions above" or "I do not accept the legal conditions above."*

5) Mail (US Postal Service) – The front of the mailing envelope includes a statement, *"The information contained in this correspondence may contain privileged and confidential information and is solely for*

the use of the sender's intended recipient. If you received this correspondence in error, please notify EMSL Analytical and return to sender."

5.10.6 Verbal Results

Where it is necessary to provide verbal results, it is EMSL policy to discuss analytical methodology and results only. Results are provided 'verbatim' by giving sample number and concentration only. Under no circumstances are results given as fail, pass, meeting acceptance criteria, etc. Interpretation of results is the responsibility of the customer. A note to the file must be made each time verbal results are given (note on the chain of custody and/or the customer communication log).

5.10.7 Preliminary Reports

Corporate policy discourages the issue of draft or preliminary data (for example, results that have not yet gone through a quality control review). However, there are circumstances where this may be unavoidable as a result of turnaround time issues, staffing situations, etc. If the laboratory manager chooses to provide preliminary data, the report is not signed and will clearly state "preliminary results."

A report is defined as 'preliminary' when it has not been reviewed following the procedures in § 5.10.2.1.2, above.

A final, signed report must eventually be provided to the customer. If any changes are made between the preliminary and final reports, the customer is notified with a statement on the final report, or by verbal contact. Verbal notifications must be recorded in writing on the internal chain of custody and/or in the customer correspondence log.

5.10.8 Exported Data

Exported data is provided in a variety of formats, (generally PDF format) depending on the specific needs of our customers. Export formats for data deliverables are implemented and controlled by the corporate IT staff, which has the flexibility to implement new export formats as required. Final, signed customer reports are to be submitted in addition to delivery by email or CD. Electronically delivered data is not intended to replace hard copy results unless otherwise requested by a customer. In this way, exported data can be verified. Electronically transmitted results meet the requirements of the QA policies as documented in this manual.

5.10.9 Amendments to Test Reports

In the event of any change to the final report after issue, the amended report must indicate the report is revised, the date of the revision and the reason for the amendment. The revisions must include the original reference number. A statement indicating the report is amended, the date and time of amended and original reports, and an amendment reason code, is included in the report footer for all amended reports. Customers must be informed immediately of the changes.

The laboratory sample set is not re-logged into the LIMS program. Tracking is done with the laboratory files, which include a printout of the original and amended report. When amendments to the final report result from a non-conformity, a corrective action form will be completed and filed by appropriate personnel following the EMSL Non-Conformities and Corrective Action SOP (QA-SOP-200).

Changes requiring an amended report include, but are not limited to:

- Errors in sample results
- A typographical error (sample location, sample volume, sample ID, etc.) that impacts the final results

- Reports issued to incorrect customer
- Changes requested by customer

5.11 Use of Accreditation Symbols and/or References to Accreditation in Advertising and Customer Reports

EMSL has defined the requirements for referencing accreditation in reports, advertising, and promotional materials in the *EMSL Referencing Accreditation – Advertising Policy SOP* (QA-SOP-310). This procedure has been developed based on the requirements *of ISO/IEC 17025:2017, A2LA – P101*, *NVLAP* Handbook 150:2020 (August 2020**),** *AIHA LAP, LLC Policy Module,* among others.

Section 6.0: Revision History

Rev. 20	12/15/2017
Rev. 20.1	10/02/2018
Rev. 21	12/17/2018
Rev. 22	12/13/2019
Rev. 23	12/16/2020
Rev. 24	12/17/2021
Rev. 25	12/21/2022

Rev. #	Rev. Date	Changes in this Revision
26	12/15/2023	Added Appendix C to cross reference the QMS Manual to ISO 17025:2017 sections Removed reference to MDDELCC in Section 1.1 Updated national director of quality assurance to vice president of quality assurance throughout Noted EMSL does not place information related to our customers in the public domain in Section 4.1.5.1 Added cGMP Cinnaminson local SOP master list information in Section 4.3 Added 'however named' to clarify quality representative job titles in Section 5.2.1.5 Added language emphasizing the DOC lists all methods analyst is authorized to perform in Sections 5.2.2.1, and 5.2.2.9 Revised title for Section 5.4.5 to include 'and verification' and added requirement for QA and head of department data review when new services/methods are implemented in lab with newly trained analysts Added Section 5.4.5.1 to require verification package when new published methods are implemented in lab Added requirements to update GEN-FM-450 when differentiating between out of service equipment present or removed from the lab in Section 5.5.1 Revised to all checks must be documented electronically or in the log in Section 5.5.6.1 Added CAR/PAR workbook to be attached to report; corporate website reviewed for lab accuracy to quarterly report requirements in Section 5.9.2

APPENDIX A: Glossary

ACS – American Chemical Society

Accuracy – The closeness of a measured result to a known, theoretical or target value. This should be distinguished from "Precision" below.

AHERA – Asbestos Hazard Emergency Response Act

AIHA LAP, LLC – American Industrial Hygiene Association Laboratory Accreditation Program

Alternative Method (procedure) – A major modification to standard methods and EMSL Standard Operating Procedures

Amended Report (see also revised report) – A report which reflects a change or correction to an original report

Analyte – A substance, organism, physical parameter, property, or chemical constituent(s) for which an environmental sample is being analyzed

Analytical Sensitivity – The lowest concentration that can be detected by the method, based upon the amount or portion of sample analyzed (e.g., for methods involving a count = 1 raw count per amount or portion of sample analyzed, calculated, and expressed in the final reporting units)

Analytical Worksheet (Bench Sheet) – The form used by the analytical specialist to collect the raw analytical data during analysis

Bench Sheet – (see "**Analytical Worksheet**")

Branch Laboratory – All EMSL laboratories excluding those located at 200 Route 130 North, Cinnaminson, NJ 08077

CALA – Canadian Association for Laboratory Accreditation

Chain of Custody (COC) – An unbroken trail of accountability that ensures the physical security of samples, data, and records

Chemical Hygiene Plan – A program which defines the work practices and procedures to ensure that employees of EMSL Analytical are protected from health hazards associated with hazardous chemicals with which they may work or be exposed. EMSL's chemical hygiene plan also includes its Biosafety Guide.

Coefficient of Variation (CV) – Standard deviation divided by the mean. Note: The Relative Standard Deviation (RSD) is the absolute value of the coefficient of variation.

Consensus Standards – Samples with values assigned based on a statistically significant number of repetitive analyses

Corporate Management – Staff members which include the Company President, Vice Presidents, QA Manager, National Directors, MIS Manager, Controller, Collection Manager and Equipment Manager

Culturable – Capable of, or fit for, being cultivated (antonym: non-culturable)

> **Note:** Prior to Revision 10 of this document the terms Viable/Non-viable were used in place of Culturable/Non-culturable. This terminology may still occur in some documents published prior to the date of publication of Revision 10.

Customer – Any person or entity that receives products or services from EMSL

Demonstration of Capability – A procedure to establish the ability of the analyst to perform analyses with acceptable accuracy and precision

Detection Limit – The minimum result, which can be reliably discriminated from a blank with a predetermined confidence level; also used as Method Detection Limit

Document (*noun*) – A written policy, procedure, instruction, form, template, etc., which is revision sensitive. If an outdated revision is used it could cause the wrong process to be followed (e.g., not all required information is included on a previous revision of a form template). Contrast with "Record" below.

EMSL Environmental Laboratories – Laboratory facilities/locations performing the analysis for the analytical programs including asbestos, environmental lead, environmental microbiology, various IH parameters (organics, metals, etc.) and environmental chemistry parameters (metals, organics, inorganics, wet chemistry)

Integrity – Sound, honest, true

Inter-analyst/lab – Re-analysis of the same sample by a different analyst/lab

Intra-analyst/lab – Re-analysis of the same sample by the same analyst/lab

Limits of Quantitation (LOC) – The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence; also used as Reporting Level

Lot – A definite amount of material produced during a single manufacturing cycle, and intended to have uniform character and quality

Measurand – The quantity intended to be measured. This varies depending on the test, and takes into account the type of substance carrying the quantity.

Measurement Uncertainty – The uncertainty (or range of dispersion) of a measurement resulting from random and systematic errors in each step of the measurement process. Where a systematic bias exists and is not corrected for, it should be reported separately.

Method Detection Limit (MDL)/Detection Limit (DL) – The minimum measured concentration of a substance that can be reported with 99% confidence the measured concentration is distinguishable from method blank results

Method Validation – See *Validation, Methods*

NIST – National Institute of Standards and Technology

NLLAP — National Lead Laboratory Accreditation Program

NMI – National Metrology/Measurement Institute (e.g., NIST)

Non-conformity – A deficiency, error, or a lack of compliance with the procedures or policies documented in this manual

Non-Standard Method – An analytical procedure, which is developed in-house, or a significant modification to a published procedure which requires validation prior to being introduced into the laboratory. See also *Standard Method*.

NVLAP – National Voluntary Laboratory Accreditation Program

NYS ELAP – New York State Environmental Laboratory Approval Program

Precision – Closeness of repeated measurements to one another. This should be distinguished from "Accuracy" above.

Proficiency Testing (PT) – As systematic program in which one or more standardized samples is analyzed by one or more laboratories to determine the capability of each participant

Program Module – Sections of this QMS Manual which address analytical method specific requirements (e.g., asbestos, lead, microbiology, IH organics and IH inorganics)

Quality Assurance (QA) – The total integrated program for assuring reliably of the measurement and monitoring of data

Quality Assurance Department – The QA Department is headed by the Quality Assurance Director. The Department minimally consists of the QA Manager and Document Control Manager, but may also include other EMSL staff members or outside consultants assigned to special projects or teams as assigned.

QAM – Quality Assurance Manager

Quality Control (QC) – The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process

Quality Management System – A set of policies, processes and procedures required for planning and execution

Quality Management System (QMS) Manual – This manual and related program modules; previously named "Quality Assurance Manual" or "QAM" prior to Revision 16. Older references in other management system documents to the "Quality Assurance Manual" or "QAM" refer to this document.

Reagents – A substance reacting with another substance. Lab reagents are compounds such as hydrochloric acid used in the analysis.

Reanalysis – A second analysis of the same sample (see also inter or intra)

Record (noun) – A written record of events which are not revision sensitive. Data records related to analytical activities should form an unbroken trail between sample receipt and reporting, including records of custody, prep and analytical steps, customer correspondence, equipment used, calibration records of that instrument, etc. Records are controlled as per the *EMSL Control of Records SOP* (QA-SOP-350). Contrast with a "Document" defined above. A form template is a document (revision sensitive); once information is entered on form, the completed form is considered a record (cannot be revised, only corrected, as per SOP).

Reference Materials – General term used to describe samples which have a known value. These could include standards, proficiency testing samples and consensus standards.

Reference Material Provider (RMP) – EMSL requires that for tests accredited by AIHA LAP, LLC or A2LA, all reference materials purchased after January 1, 2013 be purchased from ISO 17034:2016 accredited RMPs. A2LA and ACLASS both accredit to the ISO 17034:2016 guideline.

Reference Method (to be used to determine the extent of method validation in Modules 3-7) – A reference method is a published method issued by an organization generally recognized as competent to do so. (When the ISO language refers to a 'standard method,' that term is equivalent to 'reference method.') When a laboratory is required to analyze by a specified method due to a regulatory requirement, the analyte/method combination is recognized as a reference method. If there is not a regulatory requirement for the analyte/method combination, the analyte/method combination is recognized as a reference method if it can be analyzed by another reference method of the same matrix and technology.

Relative Standard Deviation (Sr, **S_r**, or **RSD)** – See "Coefficient of Variation" above

Reference Weights – Set of weights which are used only to calibrate working weights in the laboratory. They may also be used for periodic calibrations of other equipment, but not on a routine basis (e.g., for daily balance verifications). Reference weights shall be calibrated at least every five (5) years. Extra care shall be taken to maintain the integrity of the standard.

Reporting Limit/LOQ– The lowest concentration of analyte in a sample that can be reported with a defined, reproducible level of certainty. This value is based on the low standard used for instrument calibration. For environmental lead analyses, the reporting limit must be at least twice the MDL/DL.

Revised Report (see also amended report) – A report which reflects a change or correction to an original report

Round Robin – An exchange of samples with other laboratories; may be 2 or more

RPD – Relative Percent Difference; calculated as $RPD = \frac{|R1 - R2|}{R} \times 100$

Where: R1-R2 = difference in two values
R = average of the two values

SRM – Standard Reference Material

Standards – Samples (materials) of known concentrations

Standard Methods – Methods published by regulatory agencies such as EPA, NIOSH, OSHA, State agencies. Also includes methods developed by recognized scientific agencies and/or individual groups, such as ASTM and Chatfield. If a method is significantly modified (e.g., changes to the method which may affect the principle of analysis), it shall no longer be considered Standard and shall be validated as a non-standard method.

Standard Operating Procedure – A written document that details the method of an operation, analysis, or action whose techniques and procedures are thoroughly prescribed, and which is accepted as the method for performing certain routine or repetitive tasks

Sub-facility – Term used in association with the NVLAP program. A sub-facility is considered an extension of the Main Facility (Cinnaminson, NJ). It receives technical direction and quality management from the Main Facility.

Traceability – A process whereby the result from a measuring instrument (or a material measure) can be compared, in one or more stages, with a national or international standard for the measurand in question

Validation, Method – Planned process which must be completed prior to adoption of a new method by which the method's performance criteria are determined and documented. Performance criteria may include accuracy, precision, linearity, LOQ, LOD, and/or ruggedness.

Verification, Equipment – Process whereby equipment is checked against acceptance criteria to ensure that it is operating properly. Generally, a routine scheduled check performed by the laboratory.

Verification, Methods – A process whereby a laboratory verifies that it can perform a standard method or previously validated method within acceptable criteria at the location, and with analytical specialists and equipment at the location at which verification is performed

Working Weights – A set of weights which are used during routine measurements and verifications in the laboratory. Working weights shall be calibrated annually in-house using a set of reference weights as defined above, or by an outside vendor if lab does not have a set of in-house reference weights.

APPENDIX B: Personal Conflict of Interest Statement

It is the policy of EMSL Analytical, Inc. (hereafter, "EMSL") that all employees avoid any conflict between their personal interests and those of EMSL. A conflict of interest is defined as any relationship between an Employee and another entity that may impair the objectivity of the Employee in performing their work. In order to avoid such situations, it is crucial that any *potential** conflict of interest is reported to EMSL Human Resources. A report of any potential conflict of interest, even where none actually exists, protects the employees and EMSL by ensuring transparency.

The participation of the Employee or a member of the Employee's immediate family in the following activities may be considered to be a conflict of interest:

- Holding a controlling interest in, or accepting free or discounted goods from any organization that does, or is seeking to do business with EMSL, by any employee who is in a position to directly or indirectly influence either EMSL's decision to do business, or the terms upon which business would be done with such organization. A "Controlling Interest" means that through ownership (i.e., stockholder, partner, sole owner) or position (i.e., director, officer, trustee) the individual has the capacity to control the actions of the organization in question.
- Holding an interest in an organization that competes with EMSL. There is no conflict of interest if one owns diversified mutual funds, money market funds and/or other diversified investments where the individual does not control the choice of specific investments.
- Being employed by (including as a consultant) or serving on the board of any organization which does, or is seeking to do, business with EMSL or which competes with EMSL. There is no conflict if Employee family members are employed by, but cannot influence the relationship between an organization and EMSL.
- Profiting personally from any organization seeking to do business with EMSL (except as noted above).
- Performing services for another employee similar to the services provided by the Employee to EMSL, on or off EMSL property, without the express prior permission of Dr. Frasca, President of EMSL, which may or may not be granted.
- Employees may not accept gifts from vendors or customers of a value greater than $50.00.

It is the Employee's responsibility to report any actual, potential, or apparent conflict of interest that may exist between the Employee or their immediate family and EMSL. In the absence of a report, violations of the principles and standards contained in this policy statement may subject the Employee to discipline, up to and including termination of employment. This report can be made in writing and appended to this form.

Employees who become aware of an actual or potential conflict of interest as defined above are responsible for and authorized to confidentially report the conflict to the Human Resources Department immediately, not to exceed 3 business days from recognizing the conflict.

Conflict of interest situations will be reviewed by Human Resources and/or Senior Management. Dr. Frasca, in his capacity as President of EMSL, retains sole discretion to determine appropriate actions to alleviate an actual conflict.

My signature below is evidence that I have read and understand the policy stated above, and declare that no unreported potential conflict of interest exists between me, my immediate family, and EMSL.

Printed Name	Signature
	Date

**Reports of potential or apparent conflicts do not automatically trigger any actions other than review. Each case will be considered case-by-case based on facts. In most cases, no action is necessary other than ensuring the relevant details are on record in order to defend both Employee and EMSL from future potential accusations of improper practices.*

APPENDIX C: Cross Reference EMSL QMS Manual to ISO 17025:2017

EMSL QMS Manual and Related Modules	ISO/IEC 17025:2017
Section 1.0	**1.0 Scope**
Section 2.0	**2.0 Normative references**
Appendix A - Glossary	**3.0 Terms and definitions**
Section 4.0 Management requirements	**4.0 General requirements**
Section 4.1.5.2.4	4.1 Impartiality
Section 4.1.5	4.2 Confidentiality
Section 4.1	**5.0 Structural requirements**
	6.0 Resource requirements
Section 5.1	6.1 General
Section 5.2	6.2 Personnel
Section 5.3	6.3 Facilities and environmental conditions
Section 5.5	6.4 Equipment
Section 5.6	6.5 Metrological traceability
Section 4.6	6.6 Externally provided products and services
	7.0 Process requirements
Section 4.4	7.1 Review of requests, tenders and contracts
	7.2 Selection, verification and validation of methods
Section 5.4.2	7.2.1 Selection and verification of methods
Section 5.4.5	7.2.2 Validation of methods
Section 5.7	7.3 Sampling
Section 5.9	7.4 Handling of test or calibration items
Section 4.13	7.5 Technical records
Section 5.4.6	7.6 Evaluation of measurement uncertainty
Section 5.9	7.7 Ensuring the validating of results
Section 5.10	7.8 Reporting of results
Section 5.10	7.8.1 General
Section 5.10.1	7.8.2 Common requirements for reports
Section 5.10.1	7.8.3 Specific requirements for test reports
Section 5.8	7.8.4 Specific requirements for calibration certificates
Section 5.7	7.8.5 Reporting sampling-specific requirements
Section 5.10.3	7.8.6 Reporting statements of conformity
Section 5.10.3	7.8.7 Reporting opinions and interpretations
Section 5.10.9	7.8.8 Amendments to reports
Section 4.8	7.9 Complaints
Section 4.9	7.10 Non-conforming work
Section 5.4.7	7.11 Control of data and information management
	8.0 Management system requirements
	8.1 Options (8.1.1 General; 8.1.2 Opt. A; 8.1.3 Opt. B-N/A to EMSL)
Section 4.2	8.2 Management system documentation
Section 4.3	8.3 Control of management system documents
Section 4.13	8.4 Control of records
Section 4.2.6	8.5 Actions to address risks and opportunities
Section 4.10	8.6 Improvement
Section 4.11	8.7 Corrective actions
Section 4.14	8.8 Internal audits
Section 4.15	8.9 Management reviews

ATTACHMENT 1
LUXORA ELEMENTARY SCHOOL PHASE II ESA REPORT

TARGETED BROWNFIELDS ASSESSMENT

Phase II Environmental Site Assessment
Luxora Elementary School
406 Washington Avenue
Luxora, Arkansas 72358

Prepared for:

U.S. Army Corps of Engineers
New Orleans District
7400 Leake Avenue
New Orleans. Louisiana 70118

U.S. Environmental Protection Agency
Region 6
1201 Elm Street, Suite 500
Dallas. Texas 75270-2101

Prepared by:

Environmental Science Services, Inc.
145 Del Orleans Avenue, Suite B
Denham Springs, Louisiana 70726

September 9, 2024

TARGETED BROWNFIELDS ASSESSMENT

Phase II Environmental Site Assessment
Luxora Elementary School
406 Washington Avenue
Luxora, Arkansas 72358

Prepared for:

U.S. Army Corps of Engineers
New Orleans District
New Orleans, Louisiana

and

U.S. Environmental Protection Agency Region 6
1201 Elm Street, Suite 500
Dallas, Texas 75270-2102

Prepared by:

William J Grant
Senior Environmental Scientist

September 9, 2024

EXECUTIVE SUMMARY

On behalf of U.S. Army Corps of Engineers – New Orleans District (USACE), Environmental Science Services, Inc. (Es2) has completed a Phase II Environmental Site Assessment (ESA) at the Luxora Elementary School at 406 Washington Street, Luxora, Mississippi Country, Arkansas (Subject Property). This Phase II ESA was provided through the U.S. Environmental Protection Agency's (EPA's) Targeted Brownfields Assessment (TBA) program.

A Phase I ESA conducted at the Subject Property in April 2024 identified potential asbestos-containing materials (ACM) and lead-based paint (LBP) may be present at the property. This Phase II ESA was tasked to the USACE by the EPA Region 6 in response to an application from the Luxora City Council for additional inspections to determine whether ACM and LBP are present in the three buildings located at the Subject Property. The USACE contracted Es2 to conduct a Phase II ESA to evaluate current site conditions prior to reuse and redevelopment of the site. Es2 retained Altec Environmental Consulting (Altec) to conduct ACM and LBP inspections at the Subject Property.

ACM is present at the Subject Property in the 13,950-square foot classroom building (Building #7380 also referred to as Building B). The following ACM were identified: white 12x12 floor tile and associated black mastic, sheetrock joint compound, teal transite panels, and mudded pipe elbows. The floor tile, joint compound, and transite panels are considered Category I and Category II non-friable ACM in their current condition and state. The pipe elbows are considered friable ACM. All ACM identified at the Subject Property was noted to be in fair to good condition at the time of the inspection.

It is recommended that an Asbestos Operations and Management Plan be developed for Building B. This plan should incorporate the necessary actions and alternatives for management in-place of the ACM and procedures to follow if damage occurs to, or disturbance of the ACM is required during other building maintenance activities. If the re-use plan for the building involves removal, replacement, or disturbance of any of the ACM materials, then they should be removed by a licensed abatement contractor prior to building renovations.

Results of the LBP survey indicate that LBP is not present in painted components associated with the property. Although not considered regulated LBP, the presence of lead paint below regulatory levels was identified on painted components. These painted components, if disturbed, may create a lead dust hazard or exposure issue for workers. Appropriate precautions should be taken when disturbing painted surfaces and worker safety regulations may apply.

Table of Contents

1.0 INTRODUCTION

1.1 Purpose

On behalf of U.S. Army Corps of Engineers – New Orleans District (USACE), Environmental Science Services, Inc. (Es2) has completed a Phase II Environmental Site Assessment (ESA) at the Luxora Elementary School at 406 Washington Street, Luxora, Mississippi Country, Arkansas (Subject Property). This Phase II ESA was provided through the U.S. Environmental Protection Agency's (EPA's) Targeted Brownfields Assessment (TBA) program.

A Phase I ESA conducted at the Subject Property in April 2024 identified potential asbestos containing materials (ACM) and lead-based paint (LBP) may be present at the property. This Phase II ESA was tasked to the USACE by the EPA Region 6 in response to an application from the Luxora City Council for additional inspections to determine whether ACM and LBP are present in the three buildings located at the Subject Property. The USACE contracted Es2 to conduct a Phase II ESA to evaluate current site conditions prior to reuse and redevelopment of the site. Es2 retained Altec Environmental Consulting (Altec) to conduct ACM and LBP inspections at the Subject Property.

Funding for this project was provided by the TBA program. EPA's Brownfields program empowers states, communities, and other stakeholders to work together to assess, clean up, and sustainably reuse Brownfields. A Brownfield is a property, expansion, redevelopment, or reuse of a property which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. The TBA program provides communities with environmental services such as environmental site assessments or investigations, and cleanup planning needed for revitalization projects at no cost to the stakeholders.

The purpose of this Phase II ESA was to determine the presence and quantity of ACM and LBP potentially present in the three classroom buildings present on-site. Altec conducted ACM and LBP inspections and sampling in accordance with an EPA-approved Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) dated June 2024 and the site-specific Site Safety and Health Plan (SSHP).

1.2 Special Terms and Conditions

A TBA is a study conducted by the EPA to investigate environmental concerns and/or non-scope considerations associated with underutilized properties. TBAs are available to public, quasi-public or non-profit entities such as municipalities, tribal governments, and community development organizations interested in redeveloping abandoned or underutilized properties. To qualify for an assessment, there must be a potential release of hazardous substances at the site, and the entity must have redevelopment plans for the site once the assessment is complete. Redevelopment can involve the creation of commercial, industrial, recreational or conservation uses.

1.3 Limiting Conditions and Methodology Used

Es2 has conducted this Phase II ESA in accordance with applicable portions of ASTM E1903-19 *Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process* and federal and state of Arkansas regulations pertaining to asbestos and lead to identify and quantify ACM and LBP at the site. The opinions expressed by Es2 and Altec with reference to the Subject Property pertain to the conditions existing at the time in which the site reconnaissance was conducted.

2.0 BACKGROUND

2.1 Site Description and Features

The Subject Property is located near the downtown area of the City of Luxora, Arkansas (Figures 1 and 2, Appendix A). The Subject Property contains three separate former school buildings connected by covered walkways and sidewalks. A playground, maintained grass lawn areas, and parking lots are present adjacent to the buildings. A cellular phone tower is located inset along the eastern boundary fronting Maple Street on a leased portion of the Subject Property. Access to all three buildings is from Washington Avenue.

2.2 Physical Setting

According to the April 2024 Phase I ESA, the Subject Property is a 1.95-acre former elementary school consisting of three one-story buildings located at 406 Washington Steet in Luxora, Mississippi County, Arkansas (Figures 1 and 2). Approximate coordinates are 35.75691298 N, -89.9315496 W. The Subject Property is bounded to the north by Washington Avenue, to the south by West Calhoun Street, to the east by Maple Street, and to the west by playgrounds and sports fields.

An 8,588-square foot cafeteria and classroom building (Building #7381, Building A) is present on the central portion of the property. A 13,950-square foot classroom building (Building #7380, Building B) is present along the western boundary of the property. A 2,080-square foot fine arts building (Building #7383, Building C) with an auditorium and stage is located along the eastern portion of the property (Figure 3). Land uses in the vicinity are commercial and residential.

3.0 PHASE II ACTIVITIES

A SAP/QAPP was prepared for this site and was approved by EPA Region 6 in June 2024. This Phase II ESA was executed in accordance with the approved SAP/QAPP, ASTM E1903-19, ASTM E2356-14 *Standard Practice For Comprehensive Building Asbestos Surveys*, U.S. Housing and Urban Development (HUD), EPA, and Arkansas Division of Environmental Quality (ADEQ) regulations pertaining to asbestos, Arkansas Department of Health (ADH) regulations pertaining to lead, and best engineering practices. All field work was conducted in accordance with a site-specific SSHP.

3.1 Asbestos Inspection and Sampling

Asbestos samples were collected by ADEQ certified asbestos inspectors Adam Callender (Certification No. 017814) and Edward Myers (Certification No. 018721) of Altec Environmental Consulting (Altec) on August 5, 2024. Asbestos samples were collected in accordance with the Asbestos Hazard Emergency Response Act (AHERA) (40 Code of Federal Regulations [CFR] 763, Subpart E), applicable portions of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) (40 CFR Part 61, Subpart M), ASTM Standard E2356-14, and state of Arkansas regulations. The number of samples collected depended on the sizes of the various homogeneous areas present at each building. A total of 32 samples representing 12 homogenous areas were collected and submitted to EMSL Analytical Laboratories (EMSL) for analysis of bulk asbestos using the polarized light microscopy (PLM) method (EPA method 600/R-93-

116). Multiple samples were broken into layers by the laboratory; therefore, a total of 49 analyses were completed.

Samples for ACM focused on the identification of (1) surfacing materials, (2) thermal system insulation (TSI) and (3) miscellaneous materials. Once these materials were located, homogenous sampling areas (uniform by color, texture, construction/application date and general appearance) were delineated, and the suspect materials were sampled and analyzed in accordance with AHERA and ADEQ asbestos regulations. A minimum of three samples were collected from homogeneous areas of surfacing materials less than 1,000 square-feet in size. A minimum of five samples were collected from homogeneous areas of surfacing materials greater than 1,000 square-feet but less than 5,000 square-feet. A minimum of seven samples were collected from homogeneous areas of surfacing materials greater than 5,000 square-feet in size. A minimum of three random samples were collected from homogenous areas of TSI with the following exceptions: one sample was collected from patched TSI if was less than six linear or square feet, and one sample was collected from mudded joints and fittings. Only one representative sample was collected from most miscellaneous materials, unless the amount and/or condition of the miscellaneous materials present warranted collecting more than one sample.

Bulk asbestos samples were collected by removing a small piece of suspected ACM from the subject site using a razor knife or chisel under wet conditions. ACM samples were individually placed into new, single use plastic bags labeled with a unique identifying number. This number was recorded along with identifying remarks in the field logbook/forms and on the chain–of-custody form sent to the laboratory for analysis. Analytical sampling was performed in accordance with EPA 40 CFR Part 763, Appendix E, ADEQ asbestos regulations, and laboratory-specific requirements. Latex/nitrile gloves were worn during sample collection. Decontamination of non-disposable sample equipment and tools was performed to prevent the introduction of off-site contaminants into sampling points, to prevent cross contamination of sampling points, and to prevent the removal of contaminants from the site. Samples were delivered to EMSL in Cinnaminson, New Jersey (NVLAP Code 101048-0) for bulk asbestos analysis by polarized light microscopy (PLM) EPA method 600/R93/116 analysis.

A full report detailing methodology, field notes, and sample location maps is included in Appendix B.

3.2 Lead Paint Inspection

Painted surfaces were analyzed for lead content by ADH accredited lead inspector Adam Callender (Certification No. 000381) of Altec, on August 6 and 7, 2024, in accordance with HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* (HUD-006700), EPA's Hazard Standards for Lead, Dust and Soil, and ADH regulations. The LBP inspection included the identification of testing combinations (unique combination of room equivalent, building component type, and substrate) present at the site. Once the testing combinations were identified, they were evaluated using a RMD LPA-1 Model X-Ray Fluorescence Analyzer (XRF), Serial Number 1955, portable lead paint analyzer. The RMD LPA-1 portable XRF is a direct reading instrument therefore no substrate correction is required. Pre and post calibration readings were taken per guidance and lead paint was identified as paint with lead above the regulatory limit equal to or in excess of 1.0 milligrams per centimeter squared (mg/cm^2). The Subject Property was evaluated with a total of 372 XRF readings, 21 of which were calibration readings, and 351 were surfaces within the Subject Property.

Per the HUD guidelines, paint chip samples were to be collected and analyzed in three instances: 1) inaccessible area that cannot be tested using an XRF, 2) a building component has an irregular (non-flat) surface that cannot be tested using an XRF, and 3) the XRF renders an inconclusive reading. No paint chip samples were required for this inspection.

Refer to Appendix B for the full report detailing methodology, results, testing materials, and testing combination for each component.

4.0 EVALUATION AND PRESENTATION OF RESULTS

4.1 Asbestos Containing Materials

Asbestos greater than one percent (>1%) was identified in building materials tested in the 13,950-square foot classroom building (Building #7380, Building B). A summary of ACM found at the Subject Property is presented below.

Material Description	Location	% Asbestos	Condition	Estimated Quantity
White 12x12 Floor Tile with Black Mastic	Building B / #7380 Throughout building, hallways and classrooms	2% to 4% Chrysotile	Fair - Good	12,800 ft^2
Sheetrock Joint Compound	Building B / #7380 Interior hallway walls	2% Chrysotile	Fair - Good	900 ft^2
Teal Transite Panels	Building B / #7380 Under exterior windows throughout	15% - 20% Chrysotile	Good	1,600 ft^2
White Mudded Pipe Elbows	Building B / #7380 Pipe fittings in boiler room	30% - 40% Chrysotile	Fair	Approx. 13 fittings*
Total ACM for Buildings	12,800 ft^2 Flooring and Mastic 900 ft^2 Sheetrock Joint Compound 1,600 ft^2 Transite Panels 13 Mudded Pipe Elbows			

* Additional fittings may be present in pipe chases and wall cavities

Asbestos analytical results, diagrams detailing confirmed ACM locations, and photographs of confirmed ACM are available in Appendix B.

4.2 Lead Based Paint

Lead was not detected above the regulatory limit equal to or in excess of 1.0 mg/cm^2 in any of the readings by XRF. Although not considered regulated LBP, the presence of lead paint below regulatory levels was identified on painted components throughout the Subject Property.

A spreadsheet detailing XRF field readings, representative photographs, and building diagrams are included in Appendix B.

5.0 DISCUSSION OF FINDINGS

5.1 Asbestos

ACM is present at the Subject Property in the 13,950-square foot classroom building (Figure 3, Building #7380, also referred to as Building B). The white 12x12 floor tile and associated mastic, sheetrock joint compound and the transite panels are considered Category I and Category II Non-Friable ACM in their current condition and state. The mudded pipe elbows identified in the boiler room are considered friable ACM. All ACM identified at the Subject Property was noted to be in fair to good condition at the time of the inspection.

There are three options with respect to ACM located on the property: (1) management in place, (2) removal, or (3) a combination of management in place and removal. It is recommended that prior to reoccupation of Building B that an Asbestos Operations and Maintenance Plan be developed by an Arkansas Certified Asbestos Management Planner. An abatement design should be developed prior to renovations and/or demolition of Building B. Should renovations and/or demolition be performed, then a licensed asbestos abatement contractor should be used to properly remove the asbestos before the renovations and/or demolition. For compliance with the EPA's NESHAP Standard, a notification of building material removal should be submitted to ADEQ at least 10 working days prior to commencement of any work activities. All friable asbestos removal over the NESHAP threshold will require an approved asbestos project design, asbestos project checklist, and a 10-day notification process prior to abatement activities.

Depending upon the planned reuse activities selected, the intact ACM floor tile, sheetrock joint compound, transite panels, and the intact mudded pipe elbows present in the 13,950-square foot classroom building may be managed in place.

Abatement (removal and disposal) costs vary considerably, depending on the management options employed for each ACM component and the planned use of the building (i.e., renovation or demolition). The following costs are estimated in association with subsequent asbestos management options for the site:

- Asbestos Operations and Maintenance Plan $ 2,000.00

The following estimated costs are associated with the abatement of the asbestos from the buildings:

- Asbestos Project Design $ 2,500.00
- Complete abatement and removal of ACM:
  - ~ 12,800 ft^2 of flooring and mastic $64,000.00
  - ~ 900 ft^2 of sheetrock with ACM joint compound $ 4,500.00
  - ~ 1,600 ft^2 transite panels $ 2,400.00
  - ~ 13 mudded pipe fittings $ 1,300.00

The above costs are based upon general, per-unit, abatement costs for sampled materials only. Costs do not include replacement of removed materials, mobilization fees, third-party daily air monitoring or third-party final clearance. The projected cost of air monitoring and clearance are as follows:

- Daily PCM Area Air Monitoring $1,200.00/day
- PCM Air Clearance $1,600.00/work area

5.2 Lead-Based Paint

Regulated LBP was not identified in painted components associated with the property. Although not considered regulated LBP, many tested areas contain levels of lead below regulatory levels. These painted components, if disturbed, may create a lead dust hazard or exposure issue for workers. Appropriate precautions should be taken when disturbing any painted surfaces and worker safety regulations stipulated in the Occupational Safety and Health Administration's (OSHA's) 29 Code of Federal Regulations (CFR) 1926 may apply.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Es2 and Altec have completed a Phase II ESA at the Luxora Elementary School at 406 Washington Street, Luxora, Mississippi Country, Arkansas in conformance with the scope and limitations of ASTM Practice E 1903-19 and Arkansas regulations pertaining to asbestos and lead to identify and quantify potential ACM and/or LBP located at the property. The objectives of the Phase II ESA have been met.

It is recommended that as Asbestos Operations and Management Plan be developed for Building B. This plan should incorporate the necessary actions and alternatives for management in-place of the ACM and procedures to follow if damage occurs to, or disturbance of the ACM is required during other building maintenance activities. If the reuse plan for the building involves removal, replacement, or disturbance of any of the ACM materials, then they should be removed by a licensed abatement contractor prior to building renovations.

Regulated LBP was not identified in painted components associated with the property. Although not considered regulated LBP, the presence of lead paint below regulatory levels was identified on painted components throughout the Subject Property. These painted components, if disturbed, may create a lead dust hazard or exposure issue for workers. Appropriate precautions should be taken when disturbing these painted surfaces and worker safety regulations may apply.

APPENDIX A

SITE MAPS

Figure 1 Site Location Map
Figure 2 Site Vicinity Map
Figure 3 Site Diagram

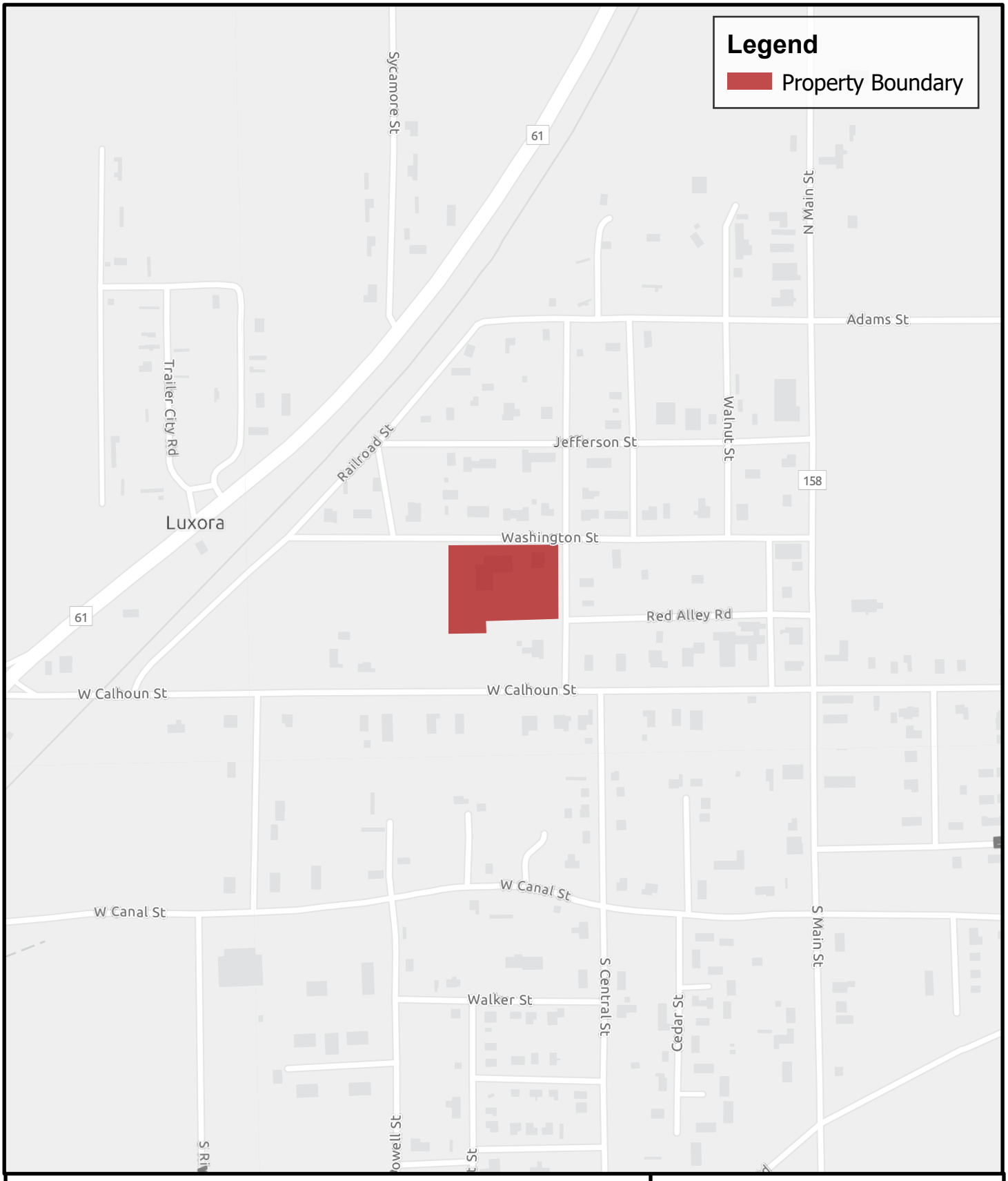


Figure 1: Site Location Map
406 Washington Avenue
Luxora, AR 72358

USACE

Environmental Science Services, Inc.
145 Del Orleans Avenue, Suite B
Denham Springs, Louisiana 70726
(225) 927-7171

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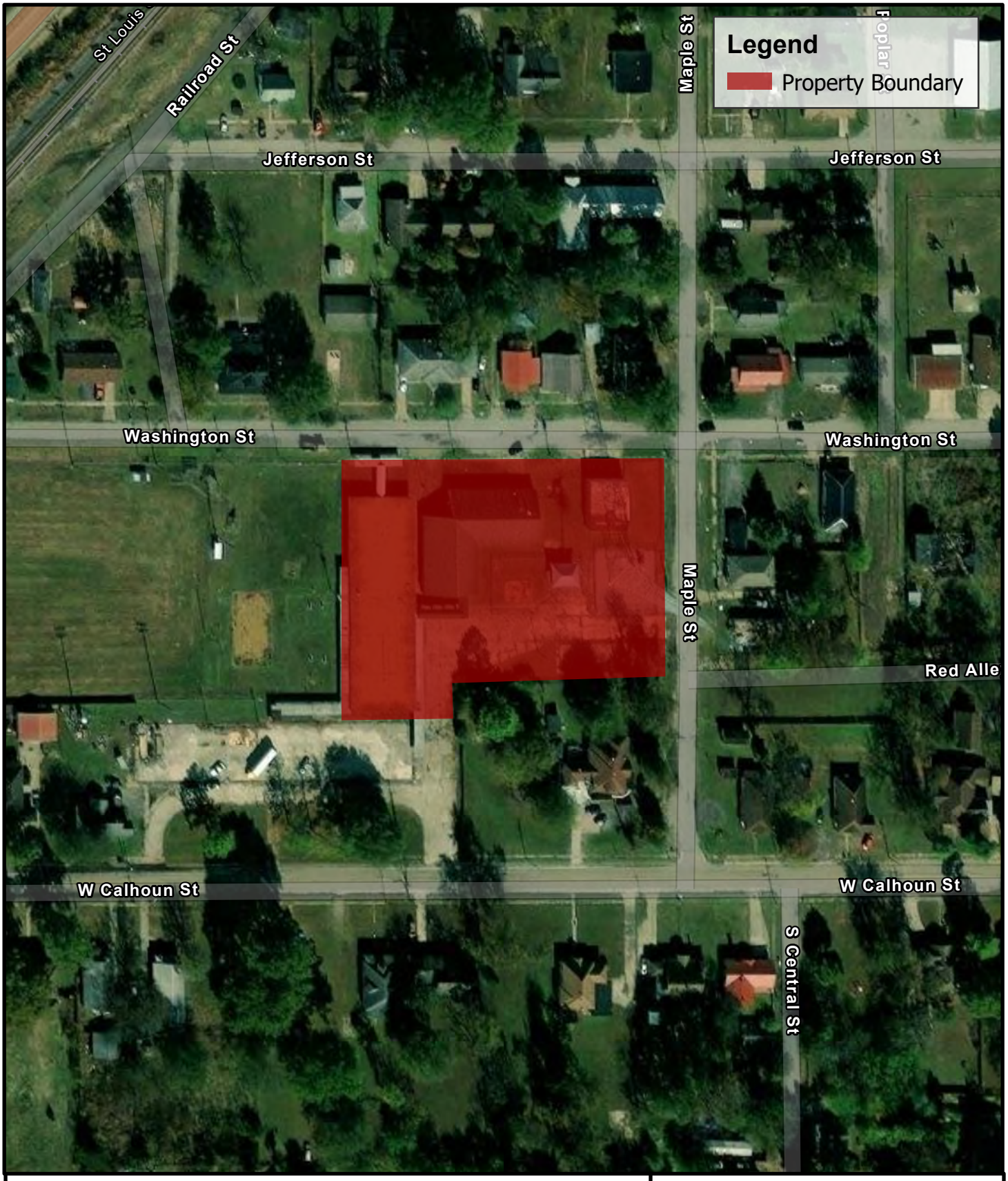

Figure 2: Site Location Map
406 Washington Avenue
Luxora, AR 72358

USACE

Environmental Science Services, Inc.
145 Del Orleans Avenue, Suite B
Denham Springs, Louisiana 70726
(225) 927-7171

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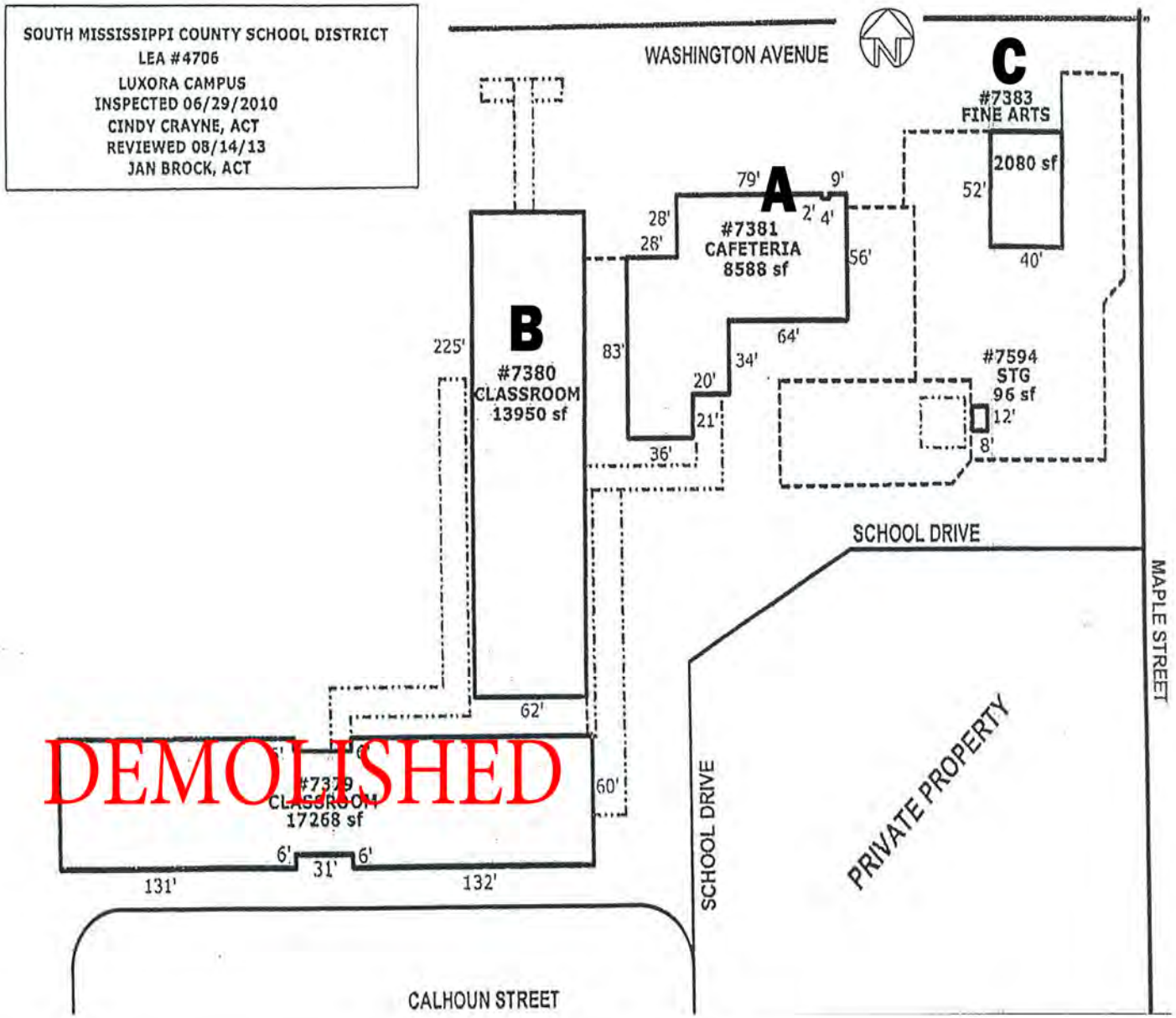

Figure 3: Site Diagram
406 Washington Avenue
Luxora, AR 72358

USACE

Environmental Science Services, Inc.
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Denham Springs, Louisiana 70726
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APPENDIX B

ASBESTOS and LEAD DATA

Altec Asbestos and Lead Inspection Report

REPORT OF ENVIRONMENTAL ASSESSMENT

Luxora Elementary School
122 W. Calhoun Street
Luxora, Arkansas

August 5-7, 2024

FOR

Environmental Science, Inc.

BY

1111A Hawn Avenue
Shreveport, Louisiana 71107
(318) 687-3771

Asbestos Assessment & Lead Risk Assessment

LUXORA ELEMENTARY SCHOOL
122 W. CALHOUN STREET
LUXORA, ARKANSAS
AUGUST 5, 2024

Report of Environmental Assessment

ALTEC Environmental Consulting, LLC was contracted by Environmental Science Inc. to provide an environmental assessment of Luxora Elementary School located at 122 W. Calhoun Street in Luxora, Arkansas. The following sections give a narrative of each phase of the project:

1. Limited Asbestos Assessment
2. Limited Lead-Based Paint Inspection

LIMITED ASBESTOS ASSESSMENT

A limited inspection of Luxora Elementary School located at 122 W. Calhoun Street in Luxora, Arkansas, was conducted by ALTEC Environmental Consulting, LLC on August 5, 2024, to identify asbestos-containing materials. Samples suspect materials were collected from throughout the facility. The samples were analyzed using the Polarized Light Microscopy method by EMSL Analytical in Cinnaminson, New Jersey.

ASBESTOS HISTORY AND HEALTH EFFECTS

Use of asbestos began during the Industrial Revolution and remains in use today. Asbestos products are still widely used. Two thirds of asbestos used is in asbestos cement products. Asbestos fibers have a high tensile strength and thermal stability. It is also non-combustible, a good noise absorber and thermal insulator.

The unique physical properties of asbestos are the same reasons it is so hazardous to human health. Once asbestos fibers become lodged in the lungs, they will not be expelled. In addition to several types of cancer, asbestos can cause severe irreversible damage to the lungs. The type and severity of health effects are dependent on the length and type of asbestos exposure.

Three types of asbestos-related diseases are most prominent. Asbestosis is a progressive, irreversible scarring of the lung tissue. Lung cancer is the most serious health risk to asbestos workers and is enhanced by smoking. Mesothelioma is cancer of the chest lining and the membrane of the abdominal cavity. It is extremely rare.

REGULATIONS

In October, 1986, the U.S. Environmental Protection Agency (EPA) at the direction of the U.S. Congress implemented the Asbestos Hazard Emergency Response Act (AHERA), outlined in the Code of Federal Regulations 40 CFR Part 763.88, October 30, 1987 (Ref 1), amended by 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants; Asbestos NESHAP Revision, Final Rule, November 20, 1990 (Ref 3). This act provides minimal standards that must be followed with respect to asbestos in schools.

Under the Clean Air Act, the EPA instituted a set of guidelines known as National Emission Standards for Hazardous Air Pollutants (NESHAP) concerning the "manufacturing, spraying and fabricating of ACM." The asbestos NESHAP regulation covers asbestos demolition and renovation projects in all facilities.

DEFINITIONS

The EPA, as a part of NESHAP, has established the following definitions:

1. Category I non-friable asbestos-containing material (ACM) - This includes asbestos-containing packings, gaskets, resilient floor covering, and asphalt roofing products containing more than 1% asbestos.

2. Category II non-friable ACM - This includes any material, excluding Category I non-friable ACM, containing more than 1 percent asbestos that, when dry, cannot be crumbled, pulverized or reduced to powder by normal hand pressure.

3. Friable asbestos material - This includes any material containing more than 1 percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

4. Regulated asbestos-containing material (RACM) - This includes friable asbestos material, Category I non-friable ACM that has become friable, Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, and Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

5. Cutting - To penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.

6. Demolition - The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.

7. Emergency renovation operation - A renovation operation that was not planned but results from a sudden, unexpected event that, if not immediately attended to, presents a safety or public health hazard, is necessary to protect equipment from damage, or is necessary to avoid imposing an unreasonable financial burden.

8. Grinding - To reduce to powder or small fragments and includes mechanical chipping or drilling.

9. Owner or operator of a demolition or renovation activity - Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated, or any person who owns, leases, operates, controls, or supervises the demolition or renovation operations, or both.

10. Poor condition - Material where the binding is losing its integrity as indicated by peeling, cracking, or crumbling.

11. Quality control (QC) - Is required for analytical procedures to document the reliability of the data and to identify potential problems as they occur.

12. Renovation - Altering a facility, or one or more facility components, in any way, including the stripping or removal of RACM from a facility component. Operations in which load-supporting structural members are wrecked or taken out are demolitions.

13. Resilient floor covering - Asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos.

FACILITY ASSESSMENT

ALTEC Environmental Consulting, LLC, represented by Adam Callender, conducted a limited asbestos assessment of Luxora Elementary School located at 122 W. Calhoun Street in Luxora, Arkansas, at the request of Environmental Science Inc.

PROCEDURE

The limited asbestos inspection was performed on August 5, 2024. All accessible areas of the facility were inspected for potential asbestos-containing materials. Samples of suspect materials were collected for analysis.

ALTEC performed its services consistent with the level of care and expertise by asbestos professionals performing the same or similar services at the same time and in the same geographic area. No express or implied warranties apply to these services or this report. ALTEC cannot and does not imply, warrant or guarantee that materials not sampled contain no asbestos. This Asbestos Survey was intended to identify reasonably accessible materials most likely to contain asbestos in quantities subject to regulation.

All conclusions and recommendations in this report represent the professional opinions of ALTEC personnel involved with the project. The results, findings, conclusions and recommendations expressed in this report are based on access provided, conditions observed and samples taken during ALTEC's survey. The information contained in this report is relevant as of the date on which the fieldwork was performed and should not be relied upon to represent the site's condition at a later date. This study and report was prepared on behalf of and for the exclusive use of ALTEC's client and solely for its use and reliance in determining the presence of asbestos in identified areas of the site. The results of this report are not intended to be construed as legal interpretation of existing federal, state, or local environmental, health and safety laws or regulations. ALTEC assumes no responsibility or liability for errors in information or data provided to ALTEC by the Client or any third party or developments resulting from activities or situations outside the scope of this project.

SAMPLE ANALYSIS

Asbestos can only be positively identified using microscopical techniques. Samples collected in this survey were analyzed using Polarized Light Microscopy (PLM). EMSL Analytical, Cinnaminson, New Jersey, analyzed the samples from this assessment. EMSL Analytical is a National Voluntary Laboratory Accredited Program (NVLAP).

The analysis procedure followed for asbestos determination was published in *Method for the Determination of Asbestos in Bulk Building Materials, EPA/600/R-193/116 (1993)*. This method is referred to as the "Improved Method" and is recommended by the EPA as a preferred substitute to the Interim Method. Based on these guidelines, suspect material was considered not to contain ACM only if the results of all samples required to be collected from the homogeneous area were determined to have asbestos in amounts of 1% or less. Those materials analyzed and determined to contain greater than 1% were considered ACM.

SAMPLE RESULTS

Thirty-two (32) bulk samples were collected from Luxora Elementary School located at 122 W. Calhoun Street in Luxora, Arkansas, on August 5, 2024, to verify visual assessment, and submitted for analysis. Nine (9) of the samples were positive for asbestos.

Sample ID	Material Description	Location	Asbestos % Type
LMS-24-220-001	Layer 1 - White 12x12 Floor Tile	Center of Room 6, Building B	2% Chrysotile
LMS-24-220-001	Layer 2 - Black Mastic	Center of Room 6, Building B	3% Chrysotile
LMS-24-220-002	White 12x12 Floor Tile w/Black Mastic	Entrance of Room 17, Building B	2% Chrysotile
LMS-24-220-003	Layer 1 - White 12x12 Floor Tile	Entrance of Room 2, Building B	3% Chrysotile
LMS-24-220-003	Layer 2 - Black Mastic	Entrance of Room 2, Building B	4% Chrysotile
LMS-24-220-006	Layer 2 - Sheetrock Wall (Joint Compound)	East Wall of Room 4, Building B	2% Chrysotile
LMS-24-220-007	Layer 2 - Sheetrock Wall (Joint Compound)	West Wall of Room 10, Building B	2% Chrysotile
LMS-24-220-008	Teal Transite Panel under Window	West Wall of Room 5, Building B	15% Chrysotile
LMS-24-220-009	Teal Transite Panel under Window	East Wall of Room 9, Building B	20% Chrysotile
LMS-24-220-013	Layer 1 - 1/2" White Pipe Elbow (Elbow Vertical)	North End of Boiler Room 12, Building B	30% Chrysotile
LMS-24-220-015	Layer 1 - 1/2" White Pipe Elbow (Elbow Vertical)	South End of Boiler Room 12, Building B	40% Chrysotile

RECOMMENDATIONS

The following recommendations are provided for the building owner dependent on the intended use of the property.

- **Floor Tile Mastic**
  The floor tile mastic is a Category I non-friable asbestos-containing material. The floor tile mastic would need to be abated prior to renovation of the affected areas.

- **Texture Material and Joint Compound (MUD):** The texture material and joint compound are Category I non-friable Asbestos-Containing Materials. This material will have to be removed by a licensed abatement contractor before any renovation or demolition activities occur.

- **Transite:** Transite is a Category II non-friable Asbestos-Containing Material. This material will have to be removed by a licensed abatement contractor before any renovation or demolition activities occur.

- **Thermal System Insulation:** The thermal system insulation is a friable Asbestos-Containing Material. This material will have to be removed by a licensed abatement contractor before any renovation or demolition activities occur.

DOCUMENTATION

Included in this report is the following documentation:

- **Asbestos Inspection Log**
  - Information on all the samples obtained during the assessment is provided in this section.

- **Drawings**
  - Homogenous drawings reference all location within the building that contains asbestos-containing materials.
  - All sample locations are provided in this section on drawings.

- **Photographs**
  - Photographs of all sample locations are provided in this section.

- **Analytical Results**
  - Analytical results are provided for all samples taken.

ALTEC offers a wide range of environmental services to their clients. ALTEC professionals can prepare detailed technical specifications for the performance of abatement projects at a wide variety of locations. ALTEC can develop the design package and assist the client in competitively bidding the project. ALTEC can assist the client in selecting the best bid offer for the project. During the abatement project, ALTEC can oversee the project every step of the way. We serve as the client's third party to see that all requirements of the abatement specifications are met and that the control measures are functioning as planned. Our professionals perform air monitoring to document the effectiveness of required work procedures. All of our field and office analysts participate in the American Industrial Hygiene Association (AIHA) Proficiency Analytical Testing (PAT) program. Our professionals can conduct visual inspections and final air clearance sampling to provide the client with the necessary documentation required for the completion of the project.

ALTEC can assist Environmental Science Inc. in preparing an asbestos abatement plan.

INSPECTORS:

Adam Callender
Arkansas Certificate No. 017814 – Asbestos Inspector

Edward Myers
Arkansas Certificate No. 018721 – Asbestos Inspector

PROJECT MANAGER:

Robert B. Raines, III
Arkansas Certificate No. 012413 – Management Planner

Accreditation Agency: State of Arkansas Department of Health

LIMITED LEAD-BASED PAINT INSPECTION

ALTEC performed a limited lead-based paint inspection of Luxora Elementary School located at 122 W. Calhoun Street in Luxora, Arkansas, on August 6-7, 2024. Adam Callender, an ADH-accredited Lead Inspector, used an RMD LPA-1 model X-Ray Fluorescence analyzer to acquire the lead content of the various painted interior surfaces of the building.

Three hundred seventy-two (372) readings were obtained from the building. Twenty-one (21) of these readings were calibrations; therefore, three hundred fifty-one (351) surfaces were tested. None of the samples were above the HUD level of 1.0 mg/cm^2 for lead-based paint.

DOCUMENTATION

Included in this report is the following documentation:

- **Lead Inspection Results**
  - Results of all the lead readings obtained during the inspection are provided in this section.

- **Lead Drawing**
  - All sample locations are provided in this section on a drawing. The sample numbers of all locations exceeding the HUD level are highlighted in red.

LEAD INSPECTOR:

Adam Callender
Arkansas Certificate No.000381 – Lead Inspector

PROJECT MANAGER:

Robert B. Raines, III
Arkansas Certificate No. 000354 – Lead Supervisor

Accreditation Agency: State of Arkansas Department of Health

Asbestos Inspection Log

ASBESTOS INSPECTION LOG

Client: Environmental Science Inc.
Location: Luxora Elementary School, 122 W. Calhoun St., Luxora, AR

Date: August 6, 2024
Inspector(s): Adam Callender & Edward Myers

Please use the following guidelines when reading this report:
Material Category: T=TSI S=Surfacing M=Miscellaneous
ND=None Detected
Friability: F=Friable NF=Non-Friable
NA=Not Analyzed
Condition: Good = 8, 9, 10 Fair = 4, 5, 6, 7 Poor = 1, 2, 3

Note: Red = Asbestos-Containing Material Blue = Non Asbestos-Containing Material Green = Non Asbestos-Containing Material (determined by Point Count analysis)

Sample ID	Material Description	Material Category	Friability	Condition	Location	Asbestos % Type
LMS-24-220-001	Layer 1 - White 12x12 Floor Tile	M	NF	7	Center of Room 6, Building B	2% Chrysotile
LMS-24-220-001	Layer 2 - Black Mastic	M	NF	7	Center of Room 6, Building B	3% Chrysotile
LMS-24-220-002	White 12x12 Floor Tile w/Black Mastic	M	NF	8	Entrance of Room 17, Building B	2% Chrysotile
LMS-24-220-003	Layer 1 - White 12x12 Floor Tile	M	NF	7	Entrance of Room 2, Building B	3% Chrysotile
LMS-24-220-003	Layer 2 - Black Mastic	M	NF	7	Entrance of Room 2, Building B	4% Chrysotile
LMS-24-220-004	White 2x4 Ceiling Tile	M	F	7	North End of Hallway, Building B	ND
LMS-24-220-005	White 2x4 Ceiling Tile	M	F	8	South End of Hallway, Building B	ND
LMS-24-220-006	Layer 1 - Sheetrock Wall (Drywall)	M	NF	8	East Wall of Room 4, Building B	ND
LMS-24-220-006	Layer 2 - Sheetrock Wall (Joint Compound)	M	NF	8	East Wall of Room 4, Building B	2% Chrysotile
LMS-24-220-007	Layer 1 - Sheetrock Wall (Drywall)	M	NF	7	West Wall of Room 10, Building B	ND
LMS-24-220-007	Layer 2 - Sheetrock Wall (Joint Compound)	M	NF	7	West Wall of Room 10, Building B	2% Chrysotile
LMS-24-220-008	Teal Transite Panel under Window	M	NF	8	West Wall of Room 5, Building B	15% Chrysotile
LMS-24-220-009	Teal Transite Panel under Window	M	NF	8	East Wall of Room 9, Building B	20% Chrysotile
LMS-24-220-010	White Fibrous Ceiling	M	NF	7	Center of Room 1, Building B	ND

ASBESTOS INSPECTION LOG

Client: Environmental Science Inc.
Location: Luxora Elementary School, 122 W. Calhoun St., Luxora, AR

Date: August 6, 2024
Inspector(s): Adam Callender & Edward Myers

Please use the following guidelines when reading this report:
Material Category: T=TSI S=Surfacing M=Miscellaneous

ND=None Detected
Friability: F=Friable
NF=Non-Friable

NA=Not Analyzed
Condition: Good = 8, 9, 10 Fair = 4, 5, 6, 7 Poor = 1, 2, 3

Note: Red = Asbestos-Containing Material Blue = Non Asbestos-Containing Material Green = Non Asbestos-Containing Material (determined by Point Count analysis)

Sample ID	Material Description	Material Category	Friability	Condition	Location	Asbestos % Type
LMS-24-220-011	White Fibrous Ceiling	M	NF	8	Center of Storage Room 13, Building B	ND
LMS-24-220-012	1/2" Pipe, Brown Wrap w/Reflective Inside, Yellow Fiberglass Insulation (Straight Run/Horizontal)	T	F	7	North End of Boiler Room 12, Building B	ND
LMS-24-220-013	Layer 1 - 1/2" White Pipe Elbow (Elbow Vertical)	T	F	8	North End of Boiler Room 12, Building B	30% Chrysotile
LMS-24-220-013	Layer 2 - White Block Insulation	T	F	8	North End of Boiler Room 12, Building B	NA
LMS-24-220-014	1/2" Brown Pipe Wrap w/Reflective Inside, Yellow Fiberglass Insulation	T	F	8	South End of Boiler Room 12, Building B	ND
LMS-24-220-015	Layer 1 - 1/2" White Pipe Elbow (Elbow Vertical)	T	F	6	South End of Boiler Room 12, Building B	40% Chrysotile
LMS-24-220-015	Layer 2 - White Block Insulation	T	F	6	South End of Boiler Room 12, Building B	NA
LMS-24-220-016	Black Cove Molding w/Yellow Adhesive	M	NF	7	East Wall of Main Hallway, Building B	ND
LMS-24-220-017	Black Cove Molding w/Yellow Adhesive	M	NF	8	East Wall of Room 3, Building B	ND
LMS-24-220-018	White 2x4 Ceiling Tile	M	F	8	Northwest Corner of Dining Area, Building A	ND
LMS-24-220-019	White 2x4 Ceiling Tile	M	F	9	North End of Hallway, Building A	ND
LMS-24-220-020	White 2x4 Sheetrock Ceiling Tile	M	NF	7	Southeast End of Kitchen, Building A	ND
LMS-24-220-021	White 2x4 Sheetrock Ceiling Tile	M	NF	7	Northeast End of Kitchen, Building A	ND
LMS-24-220-022	Sheetrock Ceiling	M	NF	8	Center of Dining Area Closet, Building A	ND

ASBESTOS INSPECTION LOG

Client: Environmental Science Inc.
Location: Luxora Elementary School, 122 W. Calhoun St., Luxora, AR

Date: August 6, 2024
Inspector(s): Adam Callender & Edward Myers

Please use the following guidelines when reading this report:
Material Category: T=TSI S=Surfacing M=Miscellaneous
ND=None Detected
Friability: F=Friable NF=Non-Friable
NA=Not Analyzed
Condition: Good = 8, 9, 10 Fair = 4, 5, 6, 7 Poor = 1, 2, 3

Note: Red = Asbestos-Containing Material Blue = Non Asbestos-Containing Material Green = Non Asbestos-Containing Material (determined by Point Count analysis)

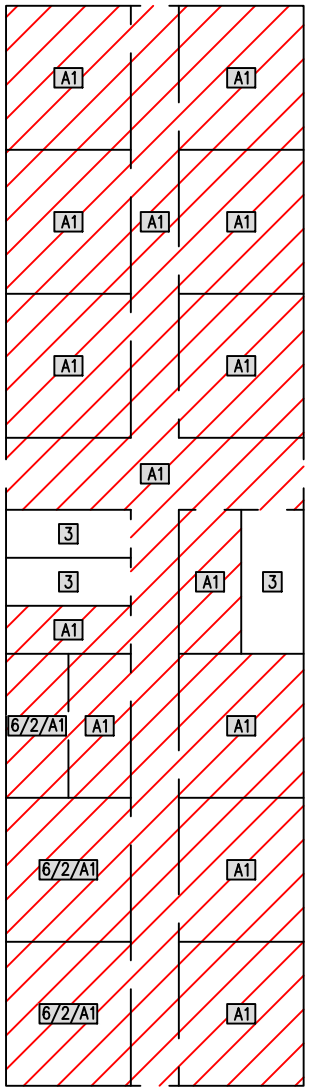
Sample ID	Material Description	Material Category	Friability	Condition	Location	Asbestos % Type
LMS-24-220-023	Sheetrock Ceiling	M	NF	8	Center of Closet 1, Building A	ND
LMS-24-220-024	White 12x12 Floor Tile w/Black Mastic	M	NF	7	South End of Room 2, Building A	ND
LMS-24-220-025	White 12x12 Floor Tile w/Black Mastic	M	NF	8	South End of Hallway, Building A	ND
LMS-24-220-026	White 12x12 Floor Tile w/Black Mastic	M	NF	8	North End of Dining Area, Building A	ND
LMS-24-220-027	Brown Cove Molding w/Yellow Adhesive	M	NF	9	Southwest Corner of Room 14, Building A	ND
LMS-24-220-028	Brown Cove Molding w/Yellow Adhesive	M	NF	8	East Wall of Room 1, Building A	ND
LMS-24-220-029	Sheetrock, Tape & Mud	M	NF	10	South Wall on East End of Stage	ND
LMS-24-220-030	Sheetrock, Tape & Mud	M	NF	10	South Wall on West End of Stage	ND
LMS-24-220-031	White 2x4 Ceiling Tile	M	F	10	South Wall on East End of Stage	ND
LMS-24-220-032	White 2x4 Ceiling Tile	M	F	10	South Wall on West End of Stage	ND

Please use the following guidelines when reading this report: ND=None Detected NA=Not Analyzed
Material Category: T=TSI S=Surfacing M=Miscellaneous Friability: F=Friable NF=Non-Friable Condition: Good = 8, 9, 10 Fair = 4, 5, 6, 7 Poor = 1, 2, 3

GOOD = Surfacing material has no visible damage or small amounts of damage; covering on thermal system insulation is intact or has small amounts of damage; miscellaneous materials intact; no visible debris or small amounts of debris. FAIR = Surfacing material has moderate but not extensive amounts of visible damage; covering on thermal system insulation is cut or torn, exposing moderate but not extensive amounts of insulation; moderate but not extensive damage to miscellaneous materials such as floor tile; moderate but not extensive amounts of visible dust and debris. POOR = Extensive damage to surfacing material; covering on thermal system insulation is cut or torn extensively and insulation itself is damaged; miscellaneous materials such as floor tile extensively damaged and underlying mastic exposed; extensive amounts of dust and debris.

HOMOGENEOUS DRAWING(S)

PLAN NORTH



TITLE

BUILDING B
ASBESTOS FLOORING
HOMOGENEOUS AREAS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

HMA-01 FLOOR TILE & MASTIC
(APPROX. 12,800 SQ FT)

FLOORING LEGEND

1 BLACK MASTIC
2 YELLOW MASTIC
3 CONCRETE
4 WOOD
5 CERAMIC TILE
6 CARPET
7 TERRAZZO
A WHITE 12"X12" FT

ALTEC
ENVIRONMENTAL CONSULTING, LLC

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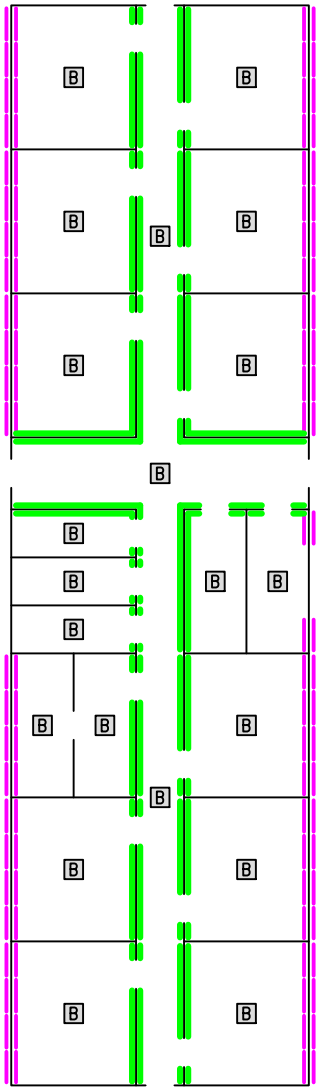
1	BB
SHEET	**DATE**
A – 8.5" X 11"	08/13/24

PLAN NORTH



TITLE

BUILDING B
ASBESTOS MISCELLANEOUS
HOMOGENEOUS AREAS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

HMA-03 SHEETROCK
(APPROX. 900 FT)

HMA-04 TRANSITE WALL PANELS
(APPROX. 200 PANELS)

CEILING LEGEND

- A 12" X 12" CEILING TILE
- B 12" X 12" CEILING TILE W/GLUE DOTS
- C 2' X 2' CEILING TILE
- D 2' X 4' CEILING TILE
- E SHEETROCK
- F PLASTER
- G TRANSITE
- H SPRAY-ON INSULATION
- I FIBERGLASS
- J WOOD
- K METAL
- L CONCRETE

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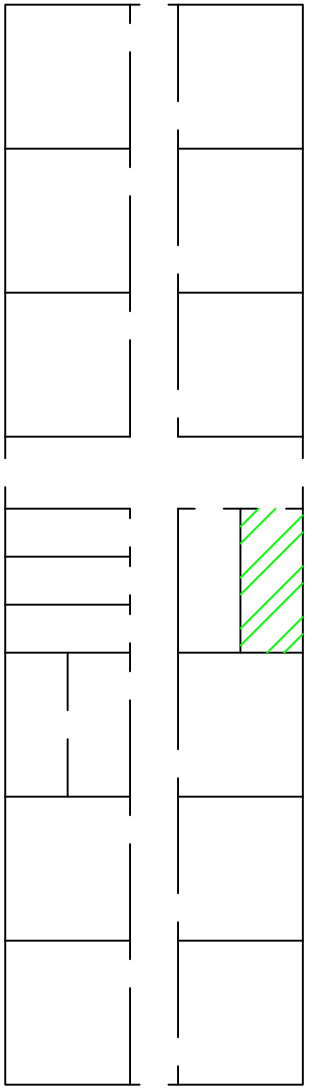
PLAN NORTH



TITLE

BUILDING B
ASBESTOS PIPING
HOMOGENEOUS AREAS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

HMA-02 1/2" 90° ELBOW (APPROX. 13 PIPE FITTINGS LOCATED)

NOTE:
ADDITIONAL FITTINGS PRESUMED TO BE PRESENT WITHIN WALL CAVITIES OF BATHROOMS AND OTHER LOCATIONS WHERE WATER IS SERVICED.

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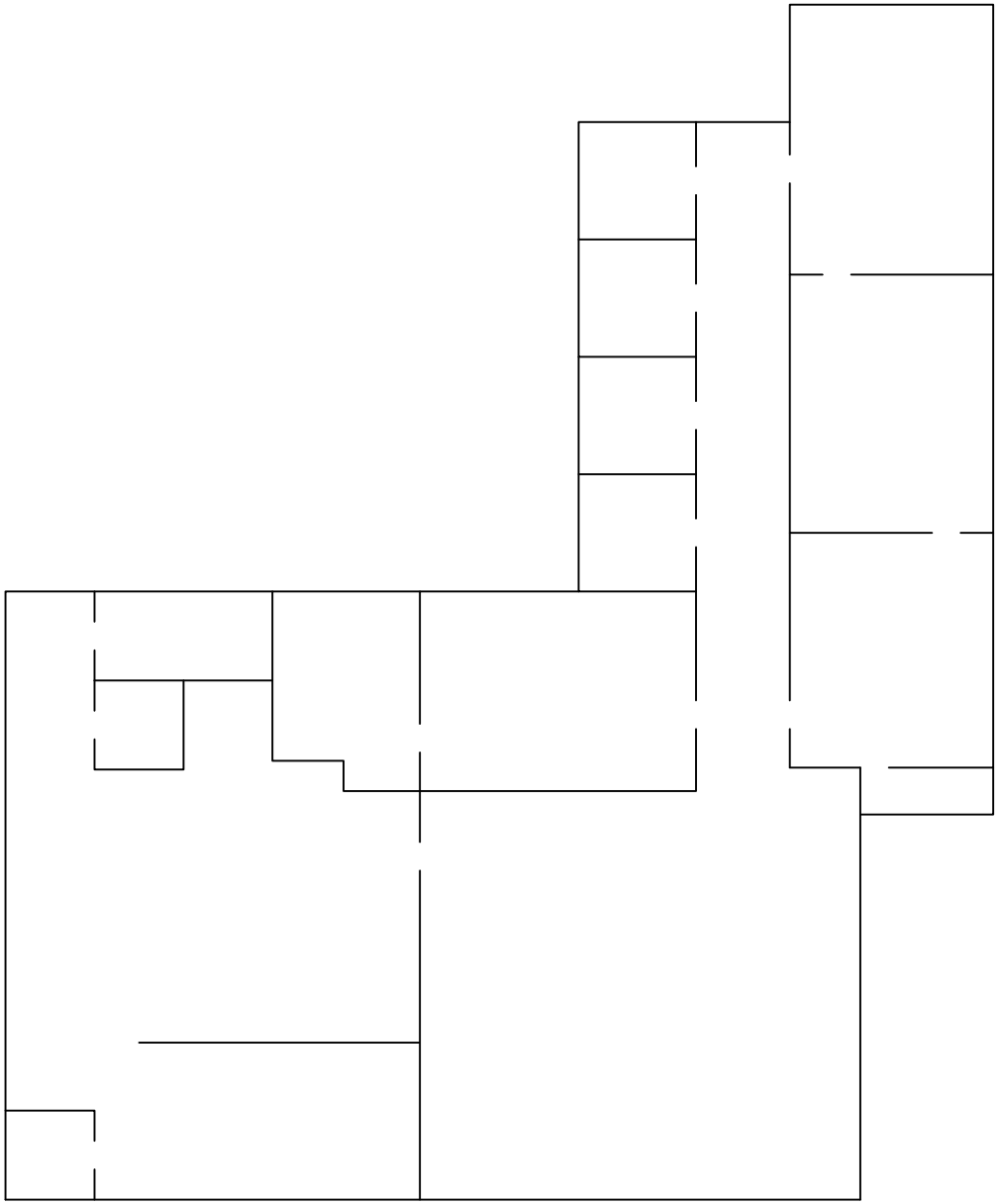
Asbestos Sample Location Drawing(s)

PLAN NORTH



TITLE

BUILDING A
SITE PLAN

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

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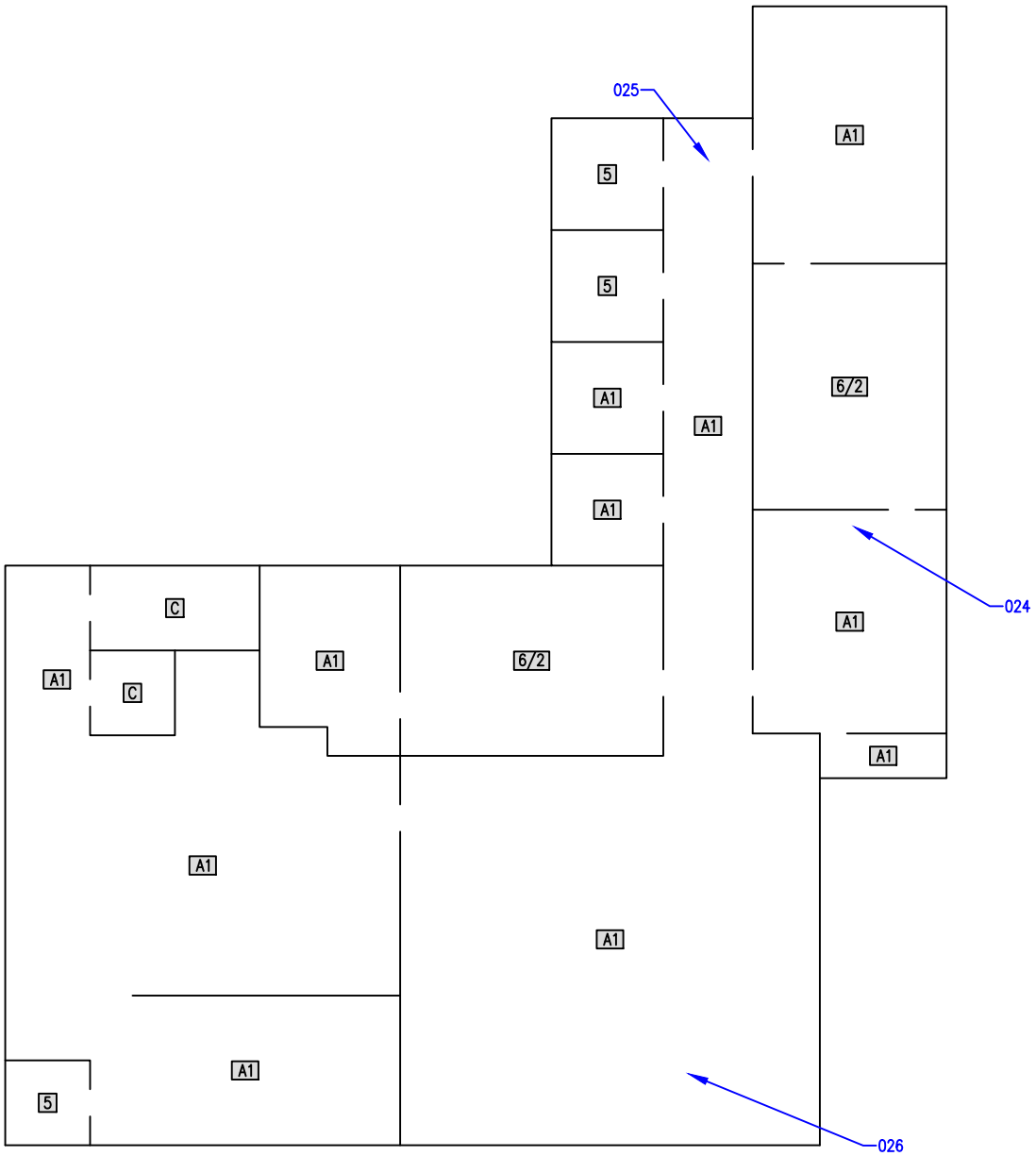
PLAN NORTH



Sample ID	Material Description	Asbestos % Type
LMS-24-220-024	White 12x12 Floor Tile w/Black Mastic	ND
LMS-24-220-025	White 12x12 Floor Tile w/Black Mastic	ND
LMS-24-220-026	White 12x12 Floor Tile w/Black Mastic	ND

TITLE

BUILDING A
ASBESTOS FLOORING
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

001 POSITIVE FOR ACBM
001 NEGATIVE FOR ACBM
001 RETESTED & FOUND NOT TO CONTAIN ASBESTOS

FLOORING LEGEND

1 BLACK MASTIC
2 YELLOW MASTIC
3 CONCRETE
4 WOOD
5 CERAMIC TILE
6 CARPET
7 TERRAZZO
A WHITE 12"X12" FT

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
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SHEET	**DATE**
A – 8.5" X 11"	08/12/24

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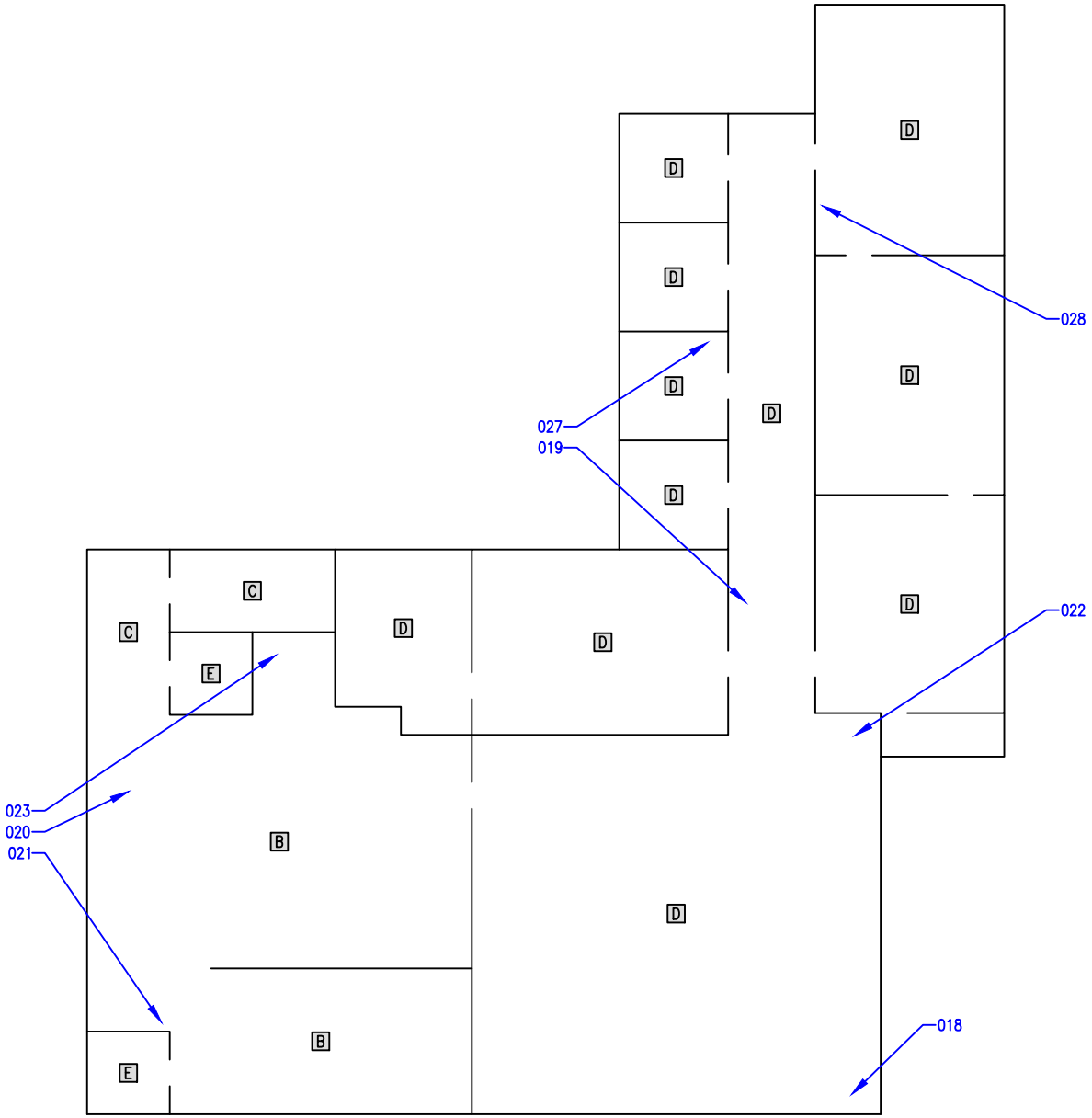
PLAN NORTH



Sample ID	Material Description	Asbestos % Type
LMS-24-220-018	White 2x4 Ceiling Tile	ND
LMS-24-220-019	White 2x4 Ceiling Tile	ND
LMS-24-220-020	White 2x4 Sheetrock Ceiling Tile	ND
LMS-24-220-021	White 2x4 Sheetrock Ceiling Tile	ND
LMS-24-220-022	Sheetrock Ceiling	ND
LMS-24-220-023	Sheetrock Ceiling	ND
LMS-24-220-027	Brown Cove Molding w/Yellow Adhesive	ND
LMS-24-220-028	Brown Cove Molding w/Yellow Adhesive	ND

TITLE

BUILDING A
ASBESTOS MISCELLANEOUS
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

001 POSITIVE FOR ACBM

001 NEGATIVE FOR ACBM

001 RETESTED & FOUND NOT TO CONTAIN ASBESTOS

CEILING LEGEND

A 12" X 12" CEILING TILE
B 12" X 12" CEILING TILE W/GLUE DOTS
C 2' X 2' CEILING TILE
D 2' X 4' CEILING TILE
E SHEETROCK
F PLASTER
G TRANSITE
H SPRAY-ON INSULATION
I FIBERGLASS
J WOOD
K METAL
L CONCRETE

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
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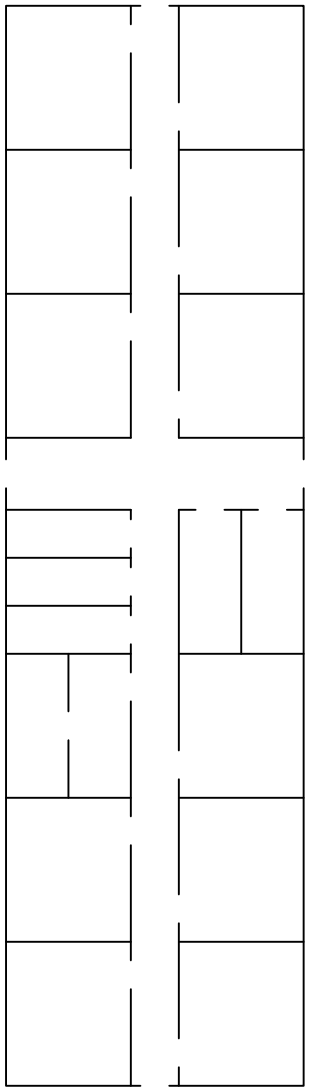
PLAN NORTH



TITLE

BUILDING B
SITE PLAN

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
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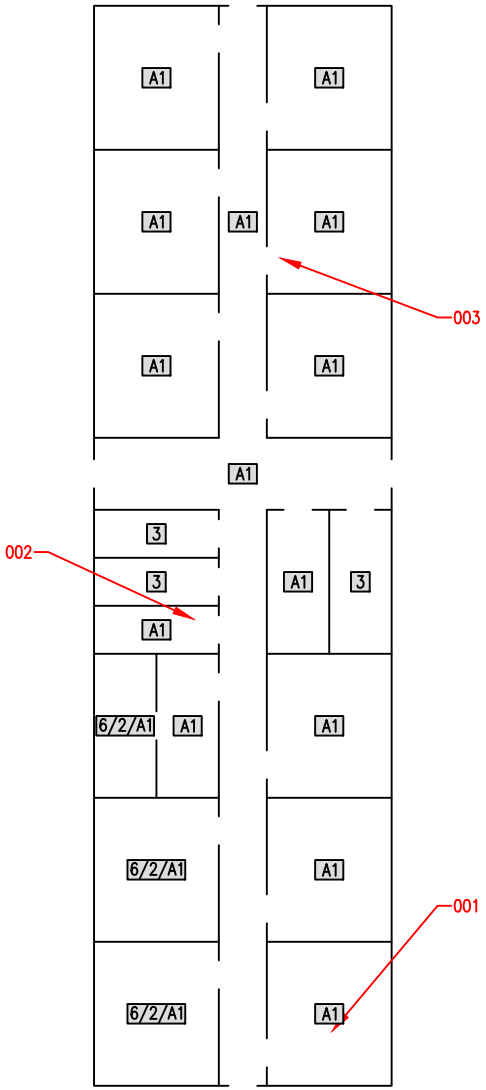
A – 8.5" X 11"	08/02/24

PLAN NORTH



Sample ID	Material Description	Asbestos % Type
LMS-24-220-001	Layer 1 - White 12x12 Floor Tile	2% Chrysotile
LMS-24-220-001	Layer 2 - Black Mastic	3% Chrysotile
LMS-24-220-002	White 12x12 Floor Tile w/Black Mastic	2% Chrysotile
LMS-24-220-003	Layer 1 - White 12x12 Floor Tile	3% Chrysotile
LMS-24-220-003	Layer 2 - Black Mastic	4% Chrysotile

TITLE

BUILDING B
ASBESTOS FLOORING
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

001 POSITIVE FOR ACBM
001 NEGATIVE FOR ACBM
001 RETESTED & FOUND NOT TO CONTAIN ASBESTOS

FLOORING LEGEND

1 BLACK MASTIC
2 YELLOW MASTIC
3 CONCRETE
4 WOOD
5 CERAMIC TILE
6 CARPET
7 TERRAZZO
A WHITE 12"X12" FT

ALTEC ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
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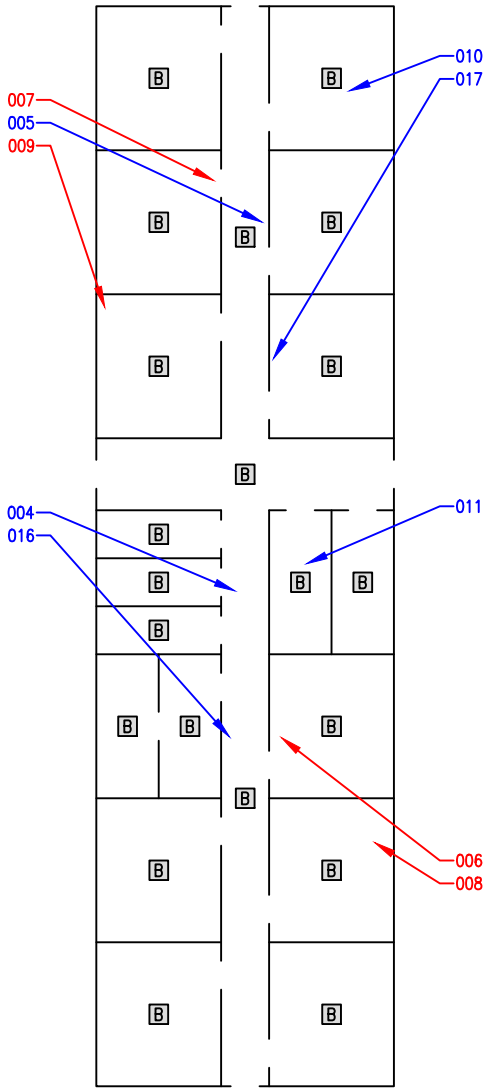
PLAN NORTH



Sample ID	Material Description	Asbestos % Type
LMS-24-220-004	White 2x4 Ceiling Tile	ND
LMS-24-220-005	White 2x4 Ceiling Tile	ND
LMS-24-220-006	Layer 1 - Sheetrock Wall (Drywall)	ND
LMS-24-220-006	Layer 2 - Sheetrock Wall (Joint Compound)	2% Chrysotile
LMS-24-220-007	Layer 1 - Sheetrock Wall (Drywall)	ND
LMS-24-220-007	Layer 2 - Sheetrock Wall (Joint Compound)	2% Chrysotile
LMS-24-220-008	Teal Transite Panel under Window	15% Chrysotile
LMS-24-220-009	Teal Transite Panel under Window	20% Chrysotile
LMS-24-220-010	White Fibrous Ceiling	ND
LMS-24-220-011	White Fibrous Ceiling	ND
LMS-24-220-016	Black Cove Molding w/Yellow Adhesive	ND
LMS-24-220-017	Black Cove Molding w/Yellow Adhesive	ND

TITLE

BUILDING B
ASBESTOS MISCELLANEOUS
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

001 POSITIVE FOR ACBM

001 NEGATIVE FOR ACBM

001 RETESTED & FOUND NOT TO CONTAIN ASBESTOS

CEILING LEGEND

A 12" X 12" CEILING TILE
B 12" X 12" CEILING TILE W/GLUE DOTS
C 2' X 2' CEILING TILE
D 2' X 4' CEILING TILE
E SHEETROCK
F PLASTER
G TRANSITE
H SPRAY-ON INSULATION
I FIBERGLASS
J WOOD
K METAL
L CONCRETE

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
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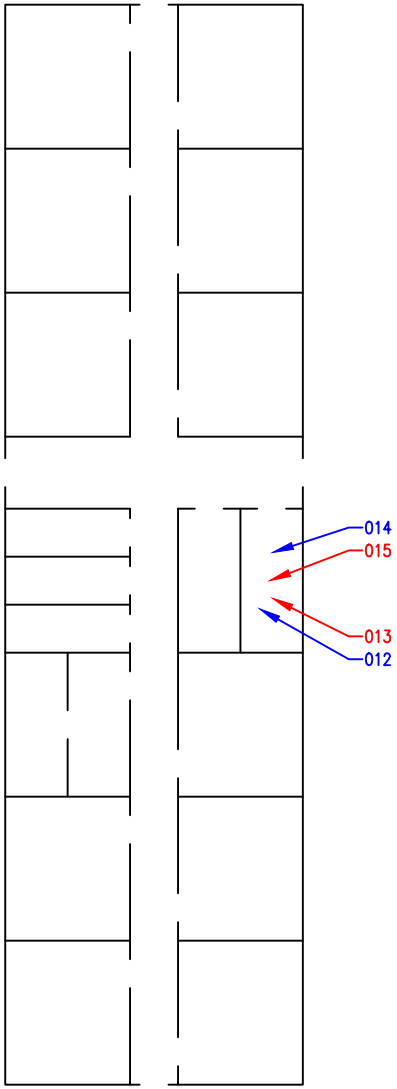
PLAN NORTH



Sample ID	Material Description	Asbestos % Type
LMS-24-220-012	1/2" Pipe, Brown Wrap w/Reflective Inside, Yellow Fiberglass Insulation (Straight Run/Horizontal)	ND
LMS-24-220-013	Layer 1 - 1/2" White Pipe Elbow (Elbow Vertical)	30% Chrysotile
LMS-24-220-013	Layer 2 - White Block Insulation	NA
LMS-24-220-014	1/2" Brown Pipe Wrap w/Reflective Inside, Yellow Fiberglass Insulation	ND
LMS-24-220-015	Layer 1 - 1/2" White Pipe Elbow (Elbow Vertical)	40% Chrysotile
LMS-24-220-015	Layer 2 - White Block Insulation	NA

TITLE

BUILDING B
ASBESTOS PIPING
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

001 POSITIVE FOR ACBM

001 NEGATIVE FOR ACBM

001 RETESTED & FOUND NOT TO CONTAIN ASBESTOS

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ENVIRONMENTAL CONSULTING, LLC

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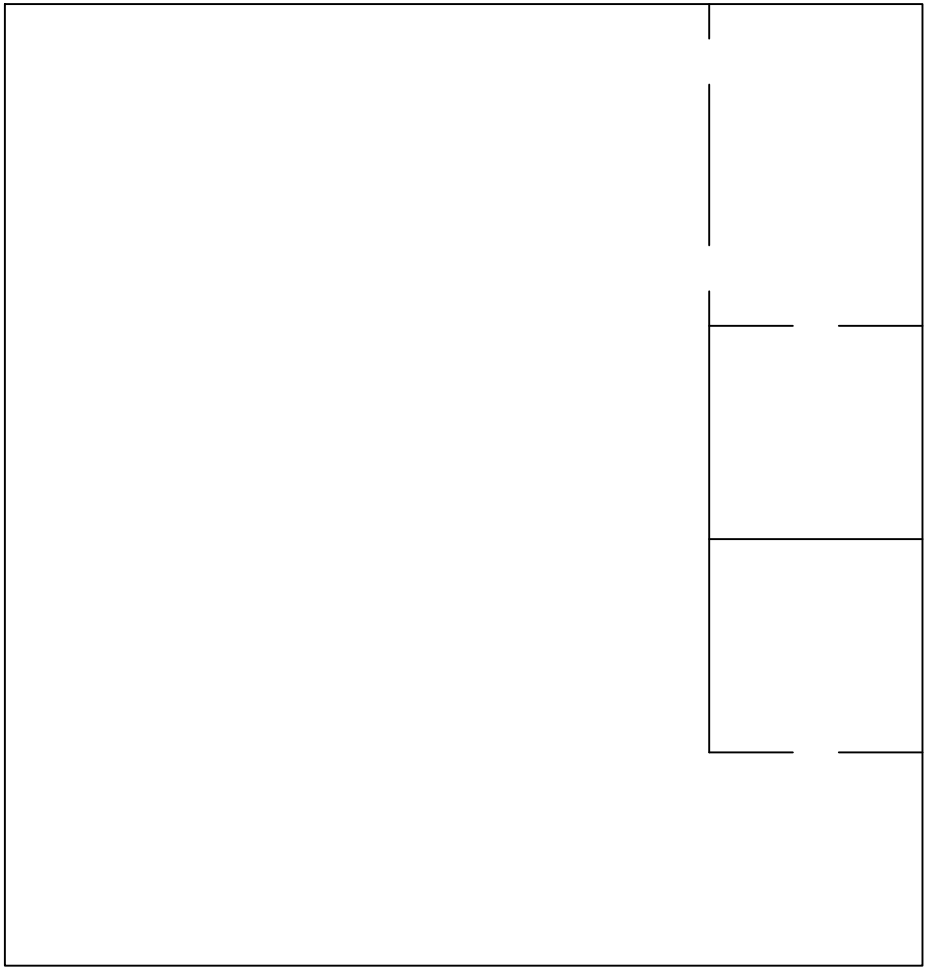
PLAN NORTH



TITLE

BUILDING C
SITE PLAN

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
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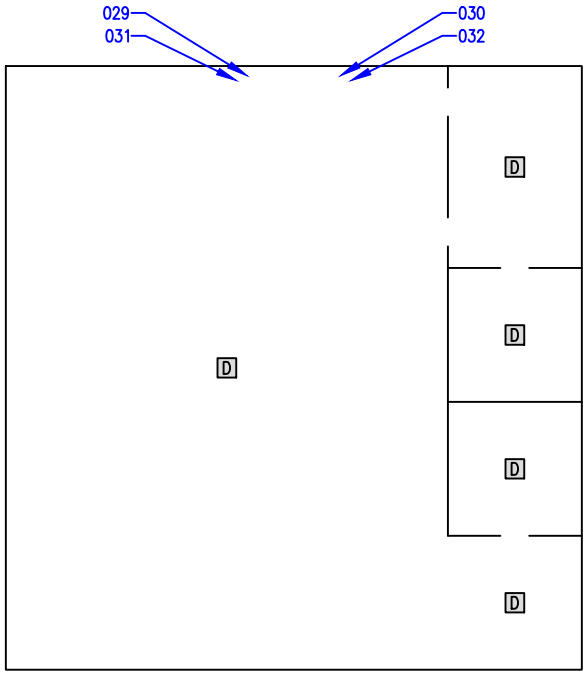
A – 8.5" X 11"	08/02/24

PLAN NORTH



Sample ID	Material Description	Asbestos % Type
LMS-24-220-029	Sheetrock, Tape & Mud	ND
LMS-24-220-030	Sheetrock, Tape & Mud	ND
LMS-24-220-031	White 2x4 Ceiling Tile	ND
LMS-24-220-032	White 2x4 Ceiling Tile	ND

TITLE

BUILDING C
ASBESTOS MISCELLANEOUS
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

001 POSITIVE FOR ACBM
001 NEGATIVE FOR ACBM
001 RETESTED & FOUND NOT TO CONTAIN ASBESTOS

CEILING LEGEND

A 12" X 12" CEILING TILE
B 12" X 12" CEILING TILE W/GLUE DOTS
C 2' X 2' CEILING TILE
D 2' X 4' CEILING TILE
E SHEETROCK
F PLASTER
G TRANSITE
H SPRAY-ON INSULATION
I FIBERGLASS
J WOOD
K METAL
L CONCRETE

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
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A – 8.5" X 11"	08/12/24

Asbestos Analytical Results

EMSL Analytical, Inc.

200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042416662
Customer ID:	ALT50
Customer PO:	
Project ID:	

Attention: Justin Holcomb
ALTEC Environmental Consultants, Inc.
1111 Hawn Ave
Shreveport, LA 71107

Phone:	(318) 687-3771
Fax:	(318) 687-9923
Received Date:	08/09/2024 9:30 AM
Analysis Date:	08/09/2024 - 08/10/2024
Collected Date:	08/08/2024

Project: SA08670 / Luxora Elementary School Inspection / 503 West Calhoun St, Luxora, AR

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
LMS-24-220-001-Floor Tile *042416662-0001*	Center of Room 6 Bldg B - White 12x12 FT	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	**2% Chrysotile**
LMS-24-220-001-Mastic *042416662-0001A*	Center of Room 6 Bldg B - Black Mastic	Black Non-Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
LMS-24-220-002-Floor Tile *042416662-0002*	Entrance of Room 18 Bldg B - White 12x12 FT	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	**2% Chrysotile**
LMS-24-220-002-Mastic *042416662-0002A*	Entrance of Room 18 Bldg B - Black Mastic	Black Non-Fibrous Homogeneous		98% Non-fibrous (Other)	**2% Chrysotile**
LMS-24-220-003-Floor Tile *042416662-0003*	Entrance of Room 2 Bldg B - White 12x12 FT	White Non-Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
LMS-24-220-003-Mastic *042416662-0003A*	Entrance of Room 2 Bldg B - Black Mastic	Black Non-Fibrous Homogeneous		96% Non-fibrous (Other)	**4% Chrysotile**
LMS-24-220-004 *042416662-0004*	North End of Hallway Bldg B - White 2x4 Ceiling Tile	Gray/Tan/White Fibrous Homogeneous	50% Cellulose 25% Min. Wool	25% Non-fibrous (Other)	None Detected
LMS-24-220-005 *042416662-0005*	South End of Hallway Bldg B - White 2x4 Ceiling Tile	White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (Other)	None Detected
LMS-24-220-006-Drywall *042416662-0006*	East Wall of Room 4 Bldg B - Drywall	Brown/Gray/White Fibrous Homogeneous	12% Cellulose	88% Non-fibrous (Other)	None Detected
LMS-24-220-006-Joint Compound *042416662-0006A*	East Wall of Room 4 Bldg B - Joint Compound	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	**2% Chrysotile**
LMS-24-220-007-Drywall *042416662-0007*	West Wall of Room 10 Bldg B - Drywall	White Fibrous Homogeneous	15% Cellulose 2% Glass	83% Non-fibrous (Other)	None Detected
LMS-24-220-007-Joint Compound *042416662-0007A*	West Wall of Room 10 Bldg B - Joint Compound	White Non-Fibrous Homogeneous		97% Non-fibrous (Other)	**3% Chrysotile**
LMS-24-220-008 *042416662-0008*	West Wall of Room 5 Bldg B - Teal Transite Panel Under Window	Gray Fibrous Homogeneous		85% Non-fibrous (Other)	**15% Chrysotile**
LMS-24-220-009 *042416662-0009*	East Wall of Room 9 Bldg B - Teal Transite Panel Under Window	Gray Fibrous Homogeneous		80% Non-fibrous (Other)	**20% Chrysotile**

Initial report from: 08/10/2024 12:49:45

EMSL Analytical, Inc.
200 Route 130 North Cinnaminson, NJ 08077
Tel/Fax: (800) 220-3675 / (856) 786-5974
http://www.EMSL.com / cinnasblab@EMSL.com

EMSL Order:	042416662
Customer ID:	ALT50
Customer PO:	
Project ID:	

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
LMS-24-220-010 *042416662-0010*	Center of Room 1 Bldg B - White Fiberous Ceiling	Brown/Tan/White Fibrous Homogeneous	70% Cellulose	30% Non-fibrous (Other)	None Detected
LMS-24-220-011 *042416662-0011*	Center of Storage Room 13 Bldg B - White Fiberous Ceiling	White Fibrous Homogeneous	80% Cellulose	20% Non-fibrous (Other)	None Detected
LMS-24-220-012-Pipe Wrap *042416662-0012*	North End of Boiler Room 12 Bldg B - 1/2" Brown Pipe Wrap w/Reflective Inside	Brown Fibrous Homogeneous	75% Cellulose	25% Non-fibrous (Other)	None Detected
LMS-24-220-012-Insulation *042416662-0012A*	North End of Boiler Room 12 Bldg B - Yellow Fiberglass Insulation	Yellow Fibrous Homogeneous	80% Glass	20% Non-fibrous (Other)	None Detected
LMS-24-220-013-PIpe Elbow *042416662-0013*	North End of Boiler Room 12 Bldg B - 1/2" White Elbow	Gray/White Fibrous Homogeneous		70% Non-fibrous (Other)	**30% Chrysotile**
LMS-24-220-013-Insulation *042416662-0013A*	North End of Boiler Room 12 Bldg B - White Block Insulation				**Layer Not Present**
LMS-24-220-014-Pipe Wrap *042416662-0014*	South End of Boiler Room 12 Bldg B - 1/2" Brown Pipe Wrap w/Reflective Inside	Brown Fibrous Homogeneous	90% Cellulose	10% Non-fibrous (Other)	None Detected
LMS-24-220-014-Insulation *042416662-0014A*	South End of Boiler Room 12 Bldg B - White Block Insulation	Yellow Fibrous Homogeneous	90% Glass	10% Non-fibrous (Other)	None Detected
LMS-24-220-015-PIpe Elbow *042416662-0015*	South End of Boiler Room 12 Bldg B - 1/2" White Elbow	Tan Fibrous Homogeneous		60% Non-fibrous (Other)	**40% Chrysotile**
LMS-24-220-015-Insulation *042416662-0015A*	South End of Boiler Room 12 Bldg B - Yellow Fiberglass Insulation				**Layer Not Present**
LMS-24-220-016-Cove Molding *042416662-0016*	East Wall of Main Hallway Bldg B - Black Cove Molding	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-016-Adhesive *042416662-0016A*	East Wall of Main Hallway Bldg B - Yellow Adhesive	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-017-Cove Molding *042416662-0017*	East Wall of Room 3 Bldg B - Black Cove Molding	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-017-Adhesive *042416662-0017A*	East Wall of Room 3 Bldg B - Yellow Adhesive	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-018 *042416662-0018*	NW Corner of Dining Area Bldg A - White 2x4 Ceiling Tile	Brown/Tan/White Fibrous Homogeneous	50% Cellulose 25% Min. Wool	25% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
LMS-24-220-019 *042416662-0019*	North End of the Hallway Bldg A - White 2x4 Ceiling Tile	White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (Other)	None Detected
LMS-24-220-020 *042416662-0020*	SE End of the Kitchen Bldg A - White 2x4 Sheetrock Ceiling Tile	Brown/Gray/White Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
LMS-24-220-021 *042416662-0021*	NE End of the Kitchen Bldg A - White 2x4 Sheetrock Ceiling Tile	White Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected
LMS-24-220-022 *042416662-0022*	Center of Dining Area Closet Bldg A - Sheetrock Ceiling	Brown/Gray/White Fibrous Homogeneous	12% Cellulose	88% Non-fibrous (Other)	None Detected
LMS-24-220-023 *042416662-0023*	Center of Closet Bldg A - Sheetrock Ceiling	White Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
LMS-24-220-024-Floor Tile *042416662-0024*	South End of Room 2 Bldg A - White 12x12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-024-Mastic *042416662-0024A*	South End of Room 2 Bldg A - Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-025-Floor Tile *042416662-0025*	South End of Hallway Bldg A - White 12x12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-025-Mastic *042416662-0025A*	South End of Hallway Bldg A - Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-026-Floor Tile *042416662-0026*	North End of Dining Area Bldg A - White 12x12 Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-026-Mastic *042416662-0026A*	North End of Dining Area Bldg A - Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-027-Cove Molding *042416662-0027*	SW Corner of Room 14 Bldg A - Brown Cove Molding	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-027-Adhesive *042416662-0027A*	SW Corner of Room 14 Bldg A - Yellow Adhesive	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-028-Cove Molding *042416662-0028*	East Wall of Room 1 Bldg A - Brown Cove Molding	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-028-Adhesive *042416662-0028A*	East Wall of Room 1 Bldg A - Yellow Adhesive	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-029 *042416662-0029*	South Wall on East of the Stage - Sheetrock Tape and Mud	White Fibrous Homogeneous	15% Cellulose	85% Non-fibrous (Other)	None Detected
LMS-24-220-030-Sheetrock Tape *042416662-0030*	South Wall on West End of the Stage - Sheetrock Tape	Brown/White Fibrous Homogeneous	20% Cellulose	80% Non-fibrous (Other)	None Detected

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Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
LMS-24-220-030-Mud *042416662-0030A*	South Wall on West End of the Stage - Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
LMS-24-220-031 *042416662-0031*	South Wall on East End of Stage - White 2x4 Ceiling Tile	White Fibrous Homogeneous	50% Cellulose 30% Min. Wool	20% Non-fibrous (Other)	None Detected
LMS-24-220-032 *042416662-0032*	South Wall on West End of the Stage - White 2x4 Ceiling Tile	White Fibrous Homogeneous	60% Cellulose 15% Min. Wool	25% Non-fibrous (Other)	None Detected

Analyst(s)

Amiri Lewis (21)
Emilie Kalbach (5)
Rebecca Kelly (21)

Samantha Rundstrom, Laboratory Manager
or Other Approved Signatory

Initial report from: 08/10/2024 12:49:45

PLM ANALYSIS

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 042416662

ALTEC ENVIRONMENTAL CONSULTING, LLC
1111 HAWN AVE
SHREVEPORT, LA 71107
Phone # (318) 687-3771
Fax # (318) 687-9923

Project Number: SA08670	**Project Manager: Justin L. Holcomb**
Project Name: Lakeview elementary school inspection	**ALTEC's Client:** Environmental Science Services
Date: 8-8-24	

Email results to: justin.holcomb@altecenv.com; tana.walsh@altecenv.com

Fed Ex No. 7968-5809-7267

ANALYSIS METHOD	TURNAROUND TIME					
INTERIM METHOD PLM	3 hours	6 hours	24 hours	2 days	3 days	
POINT COUNT - (NESHAPS) PLM	3 hours	6 hours	24 hours	2 days	3 days	

SAMPLE NUMBER	SAMPLE LOCATION AND DESCRIPTION
LMS-24-220-001	See Inspection log
LMS-24-220-032	

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24 AUG -9 AM 11:33

Relinquished by: Adam Caldwell	**Date:** 8-8-24	**Time:** 19:00	**Received by:** EFT	**Date:** 8/9/24	**Time:** 9:30
Relinquished by:	**Date:**	**Time:**	**Received by:**	**Date:**	**Time:**

Send to: EMSL Analytical, Inc. - 200 Route 130 North, Cinnaminson, New Jersey 08077
Phone:(800) 220-3675 Fax: (856) 786-5974

042416662

Proj.# SA0867.20 **ASBESTOS INSPECTION LOG**

ALTEC ENVIRONMENTAL CONSULTING, LLC

PAGE 1 of 4

DATE: 8-8-24

Facility: Luxora Elementary School Inspection Address/Location: 503 West Calhoun St, Luxora, AR Inspector(s): A. C. & F. M

Sample ID	Photo	Material Description	Category	Friability	Condition	Location
LMS-24-220-001	1	White 12X12 FT w/Black mastic	M	NF	7	Center of room 6 Bldg B
LMS-24-220-002	2	White 12X12 FT W/Black mastic	M	NF	8	entrance of Room 17 Bldg B
LMS-24-220-003	3	White 12X12 FT w/Black mastic	M	NF	7	entrance of room 2 Bldg B
LMS-24-220-004	4	White 2X4 ceiling tile	M	F	7	North end of Hallway Bldg B
LMS-24-220-005	5	White 2X4 ceiling tile	M	F	8	South end of Hallway Bldg B
LMS-24-220-006	6	Sheetrock Wall	M	NF	8	East wall of room 4 Bldg B
LMS-24-220-007	7	Sheetrock Wall	M	NF	7	West Wall of room 10 Bldg B
LMS-24-220-008	8	Teal transite panel under window	M	NF	8	West Wall of room 5 Bldg B
LMS-24-220-009	9	Teal transite panel under window	M	NF	8	East Wall of room 9 Bldg B
LMS-24-220-010	10	White Fibrous ceiling	M	NF	7	Center of room 1 Bldg B

N=North S=South E=East W=West NE=Northeast NW=Northwest SE=Southeast SW=Southwest NS=North Side SS=South Side ES=East Side WS=West Side
Quad=Quadrant '=foot "=inch Hz=Horizontal Pipe Run Vt=Vertical Pipe Run Ins=Insulation FG=Fiberglass Vib=Vibration w/=with Bldg=Building Rm=Room Ent=Entrance
CT=Ceiling Tile FT=Floor Tile CM=Cove Molding Blk=Black Brn=Brown Grn=Green Wht=White Ylw=Yellow Lt=Light Dk=Dark SA=Same As

Material Category: T=TSI S=Surfacing M=Miscellaneous **Friability:** F=Friable NF=Non-Friable **Condition:** Good = 8, 9, 10 Fair = 4, 5, 6, 7 Poor = 1, 2, 3

GOOD = Surfacing material has no visible damage or small amounts of damage; covering on thermal system insulation is intact or has small amounts of damage; miscellaneous materials intact; no visible debris or small amounts of debris. **FAIR** = Surfacing material has moderate but not extensive amounts of visible damage; covering on thermal system insulation is cut or torn, exposing moderate but not extensive amounts of insulation; moderate but not extensive damage to miscellaneous materials such as floor tile; moderate but not extensive amounts of visible dust and debris. **POOR** = Extensive damage to surfacing material; covering on thermal system insulation is cut or torn extensively and insulation itself is damaged; miscellaneous materials such as floor tile extensively damaged and underlying mastic exposed; extensive amounts of dust and debris.

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Proj.# SA08670 **ASBESTOS INSPECTION LOG** ALTEC ENVIRONMENTAL CONSULTING, LLC

PAGE 2 of 4
DATE: 8-8-24

Facility: Luxora Elementary School Inspections
Address/Location: 503 West Calhoun St. Luxora, AK
Inspector(s): AC & EM

Sample ID	Photo	Material Description	Category	Friability	Condition	Location
LMS-24-220-011	11	White Fibrous ceiling	M	NF	8	Center of storage room 13 Bldg B
LMS-24-220-012	12	1/2" pipe Brown wrap w/reflective inside/ yellow fiber glass insulation (Straight run/Horizontal)	TSI	F	7	North end of boiler room 12 Bldg B
LMS-24-220-013	13	1/2" white Elbow w/ white block insulation (Elbow vertical)	TSI	F	8	North end of boiler room 12 Bldg B
LMS-24-220-014	14	1/2" Brown pipe wrap w/reflective inside/yellow Fiber glass insulation	TSI	F	8	South end of boiler room 12 Bldg B
LMS-24-220-015	15	1/2" white elbow w/white block insulation (Elbow vertical)	TSI	F	6	South end of boiler room 12 Bldg B
LMS-24-220-016	16	Black cove molding w/yellow Adhesive	M	NF	7	East wall of the main hallway Bldg B
LMS-24-220-017	17	Black cove molding w/yellow Adhesive	M	NF	8	East wall of room 3 Bldg B
LMS-24-220-018	18	White 2x4 ceiling tile	M	F	8	NW corner of the dining Area Bldg A
LMS-24-220-019	19	white 2x4 ceiling tile	M	F	9	North end of the Hallway Bldg A
LMS-24-220-020	20	White 2x4 Sheetrock ceiling tile	M	NF	7	SE end of the Kitchen Bldg A

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Proj.# 6A08670 **ASBESTOS INSPECTION LOG** ALTEC ENVIRONMENTAL CONSULTING, LLC PAGE 3 of 4 DATE: 8-8-24

Facility: Luxora Elementary School Inspections Address/Location: 503 West Calhoun St. Luxora, AR Inspector(s): ACA EW

Sample ID	Photo	Material Description	Category	Friability	Condition	Location
LMS-24-220-021	21	White 2X4 Sheetrock ceiling tile	M	NF	7	NE end of the kitchen Bldg A
LMS-24-220-22	22	Sheetrock ceiling	M	NF	8	Center of dining Area closet Bldg A
LMS-24-220-023	23	Sheetrock ceiling	M	NF	8	Center of closet 1 Bldg A
LMS-24-220-024	24	White 12x12 FT W/Black mastic	M	NF	7	South end of room 2 Bldg A
LMS-24-220-025	25	White 12X12 FT W/Black mastic	M	NF	8	South end of Hallway Bldg A
LMS-24-220-026	26	White 12X12 FT W/Black mastic	M	NF	8	North end of Dining Area Bldg A
LMS-24-220-027	27	Brown cove molding W/Yellow adhesive	M	NF	9	SW corner of room 14 Bldg A
LMS-24-220-028	28	Brown cove molding W/ Yellow adhesive	M	NF	8	East wall of room 1 Bldg A
LMS-24-220-029	29	Sheetrock tape and mud	M	NF	10	South wall on east end of the stag
LMS-24-220-030	30	Sheetrock tape and mud	M	NF	10	South wall on west end of the stage

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Proj.# - JA08670 **ASBESTOS INSPECTION LOG** ALTEC ENVIRONMENTAL CONSULTING, LLC PAGE 4 of 4 DATE: 8-8-24

Facility: Luxora Elementary School Inspections Address/Location: 503 West Calhoun St. Luxora AR Inspector(s): ACX EM

Sample ID	Photo	Material Description	Category	Friability	Condition	Location
LMS-24-220-031	31	White 2X4 ceiling tile	M	F	10	South wall on east end of stage
LMS-24-220-032	32	White 2x4 ceiling tile	M	F	10	South wall on west end of stage

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Asbestos Photographs

LMS-24-220-001

LMS-24-220-002

LMS-24-220-003

LMS-24-220-004

LMS-24-220-005

LMS-24-220-006

LMS-24-220-007

LMS-24-220-008

LMS-24-220-009

LMS-24-220-010

LMS-24-220-011

LMS-24-220-012

LMS-24-220-013

LMS-24-220-014

LMS-24-220-015

LMS-24-220-016

LMS-24-220-017

LMS-24-220-018

LMS-24-220-019

LMS-24-220-020

LMS-24-220-021


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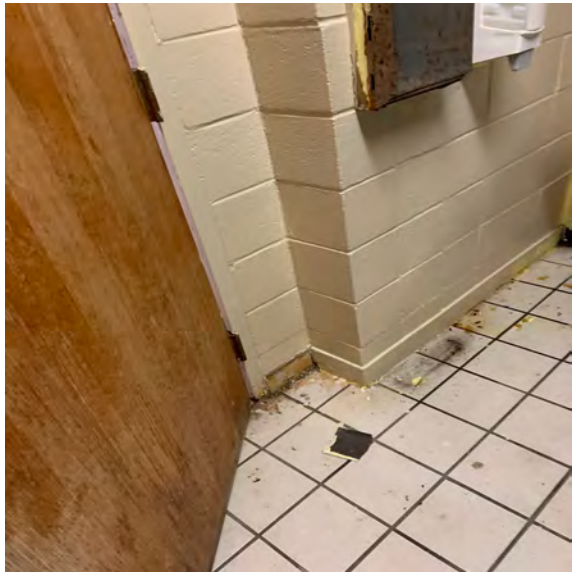
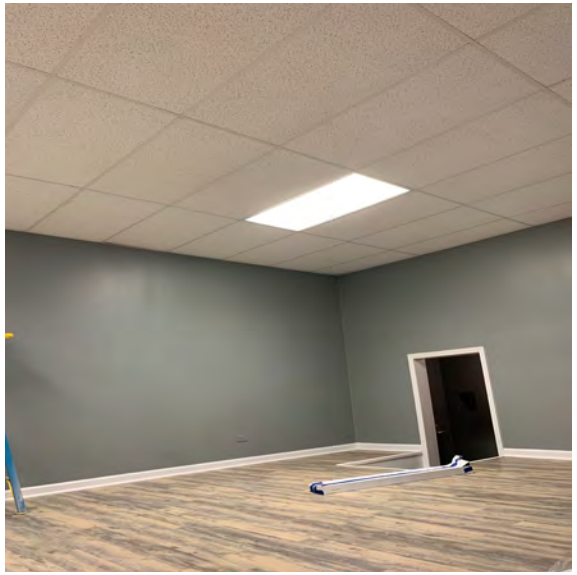
LMS-24-220-026

LMS-24-220-027

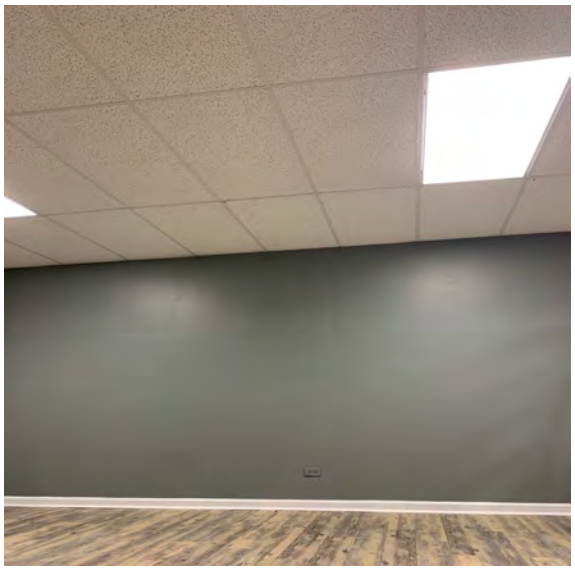


LMS-24-220-028

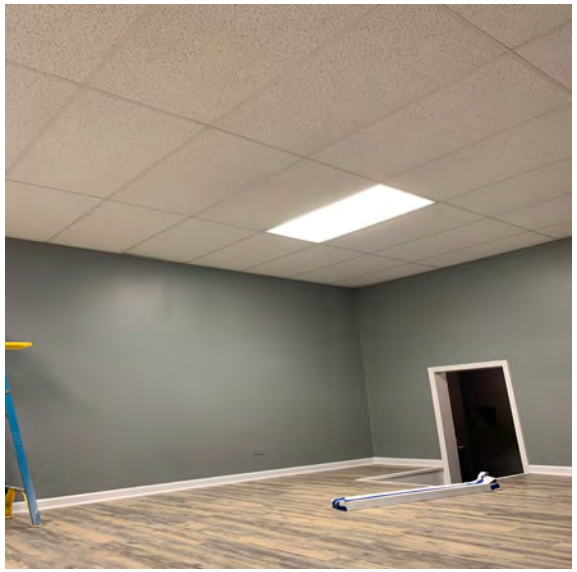
LMS-24-220-029



LMS-24-220-030



LMS-24-220-031



LMS-24-220-032

Lead Inspection Table

Lead Inspection Results

Project Name: Luxora Elementary School

Project Location: 122 W. Calhoun St., Luxora, AR

Start Date: 8/6/2024 **End Date: 8/7/2024** **Lead Inspector: Adam Callender**

Start Time: 07:30 **End Time: 16:00** **XRF Serial #1955** **Project No. SA08670**

Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
1	1.2	Calibration								
2	0.9	Calibration								
3	0.9	Calibration								
4	-0.5	1	A	Wall	Center	Wall	Fair	Brick	Purple	Negative
5	0	1	B	Wall	Center	Wall	Fair	Brick	Purple	Negative
6	-0.1	1	C	Wall	Center	Wall	Fair	Brick	Purple	Negative
7	0	1	D	Wall	Center	Wall	Fair	Brick	Purple	Negative
8	-0.1	1	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	White	Negative
9	-0.2	1	Floor	Floor	Center	Floor	Poor	Tile	White	Negative
10	0.4	1	C	Wall	Center	Wall	Fair	Brick	White	Negative
11	-0.1	1	D	Door	Center	Door	Poor	Metal	Purple	Negative
12	0	1	D	Door Seal	Center	Door Seal	Poor	Metal	Purple	Negative
13	0	1	D	Door Jam	Center	Door Jam	Poor	Metal	Purple	Negative
14	0.3	1	A	Wall	Center	Wall	Fair	Brick	white	Negative
15	-0.3	1	D	Door	Center	Door	Poor	Wood	Unpainted	Negative
16	0.3	1	D	Door Seal	Center	Door Seal	Poor	Metal	Purple	Negative
17	0	1	D	Door jam	Center	Door jam	Poor	Metal	Purple	Negative
18	0	1	A	Widow Casing	Center	Window casing	Fair	Brick	Purple	Negative
19	-0.2	1	A	Window Sill	Center	Window Sill	Fair	Brick	Purple	Negative
20	-0.4	1	A	Window Sash	Center	Window Sash	Fair	Metal	Black	Negative
21	0	2	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
22	-0.3	2	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
23	-0.3	2	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
24	-0.2	2	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
25	-0.2	2	Ceiling	Ceiling	Center	Ceiling	Poor	Metal	White	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
26	-0.2	2	Floor	Floor	center	Floor	Poor	Tile	White	Negative
27	-0.5	2	B	Window Frame	Center	Window Frame	Fair	Brick	Tan	Negative
28	0	2	B	Window Sill	Center	Window Sill	Fair	Brick	Tan	Negative
29	-0.1	2	B	Window Sash	Center	Window Sash	Fair	Metal	Black	Negative
30	-0.1	2	B	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
31	0	2	D	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
32	-0.1	2	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
33	-0.2	2	D	Door Casing	Center	Door Casing	Fair	Metal	Tan	Negative
34	-0.2	2	D	Door Jam	Center	Door jam	Fair	Metal	Tan	Negative
35	0.1	3	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
36	-0.1	3	C	Wall	center	Wall	Fair	Brick	Tan	Negative
37	-0.5	3	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
38	0.5	4	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
39	0.2	4	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
40	-0.2	4	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
41	-0.1	4	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
42	-0.2	4	Ceiling	Ceiling	Center	Ceiling	Fair	Sheetrock	Tan	Negative
43	-0.6	4	Floor	Floor	Center	Floor	Fair	Ceramic Tile	White	Negative
44	-0.2	5	A	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
45	-0.2	5	B	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
46	-0.3	5	C	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
47	0	5	D	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
48	-0.2	5	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	Unpainted	Negative
49	0	5	Floor	Floor	Center	Floor	Fair	Metal	Unpainted	Negative
50	0.4	6	A	Wall	Center	Wall	Fair	Metal	Unpainted	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
51	0.4	6	B	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
52	-0.4	6	C	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
53	-0.1	6	D	Wall	Center	Wall	Fair	Metal	Unpainted	Negative
54	0.2	6	Ceiling	Ceiling	Center	Ceiling	Fair	metal	Unpainted	Negative
55	-0.3	6	Floor	Floor	Center	Floor	Fair	Metal	Unpainted	Negative
56	0.2	2	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
57	0.3	2	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
58	-0.2	2	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
59	-0.3	2	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
60	0	2	Ceiling	Ceiling	Center	Ceiling	Fair	Sheetrock	Tan	Negative
61	-0.3	2	Floor	Floor	Center	Floor	Fair	Tile	white	Negative
62	-0.3	7	A	Wall	Center	Wall	Fair	Brick	Blue	Negative
63	0.1	7	B	wall	Center	Wall	Fair	Brick	Blue	Negative
64	-0.4	7	C	Wall	Center	Wall	fair	Brick	Blue	Negative
65	-0.3	7	D	wall	Center	Wall	Fair	Brick	Blue	Negative
66	-0.1	7	Ceiling	Ceiling	Center	ceiling	Fair	Metal	white	Negative
67	-0.3	7	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
68	-0.2	7	D	Window Frame	center	Window Frame	Fair	Brick	Blue	Negative
69	-0.3	7	D	Window Sill	Center	window Sill	Fair	Brick	Blue	Negative
70	-0.2	7	D	Window Sash	Center	Window Sash	fair	metal	black	Negative
71	-0.2	7	B	Door	Center	Door	Fair	wood	unpainted	Negative
72	-0.1	7	B	Door Frame	Center	Door Frame	Fair	metal	white	Negative
73	-0.3	7	B	Door Jam	Center	Door jam	Fair	Metal	white	Negative
74	-0.3	7	A	Wall	Center	Wall	Fair	Brick	White	Negative
75	-0.1	7	B	Wall	Center	Wall	Fair	Brick	White	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
76	-0.2	7	C	wall	Center	Wall	Fair	Brick	White	Negative
77	-0.1	7	A	Wall	Center	Wall	Fair	Brick	White	Negative
78	0	7	B	Wall	Center	Wall	Fair	Brick	White	Negative
79	0	7	C	Wall	Center	Wall	Fair	Brick	White	Negative
80	-0.6	7	D	Wall	Center	Wall	Fair	Brick	White	Negative
81	0.4	8	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	white	Negative
82	-0.3	8	D	Window Frame	Center	Window Frame	Fair	metal	black	Negative
83	-0.8	8	D	Window Sash	Center	Window Sash	Fair	Metal	black	Negative
84	-0.5	8	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
85	-0.2	8	D	Door Frame	Center	Door Frame	Fair	Metal	White	Negative
86	-0.3	8	D	Door Jam	Center	Door Jam	Fair	Metal	White	Negative
87	-0.3	8	B	Wall	Center	Wall	Fair	Brick	White	Negative
88	-0.1	8	B	Wall	Center	Wall	Fair	Brick	White	Negative
89	0.2	8	B	Wall	Center	Wall	Fair	Brick	White	Negative
90	-0.2	9	A	Wall	Center	Wall	Fair	Brick	White	Negative
91	-0.5	9	B	Wall	Center	Wall	Fair	Brick	White	Negative
92	-0.8	9	C	Wall	Center	Wall	Fair	Brick	White	Negative
93	-0.1	9	D	Wall	Center	Wall	Fair	Brick	White	Negative
94	-0.3	9	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	White	Negative
95	-0.2	9	Floor	Floor	Center	Ceiling	Fair	Tile	White	Negative
96	0.5	10	A	Wall	center	Wall	Fair	Brick	Tan	Negative
97	-0.2	10	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
98	-0.6	10	D	Wall	center	Wall	Fair	Brick	Tan	Negative
99	0	10	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
100	-0.2	10	Floor	Floor	Center	Floor	Fair	Tile	White	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
101	-0.1	EXT	A	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
102	-0.2	EXT	B	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
103	0.6	EXT	C	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
104	-0.1	EXT	D	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
105	-0.4	EXT	A	Soffit	Center	Soffit	Fair	Metal	White	Negative
106	1.1	Calibration								
107	1	Calibration								
108	1	Calibration								
109	-0.2	10	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
110	-0.4	11	A	Wall	Center	Wall	Fair	Brick	white	Negative
111	-0.1	11	B	Wall	Center	Wall	Fair	Brick	white	Negative
112	-0.3	11	C	Wall	Center	Wall	Fair	Brick	white	Negative
113	-0.5	11	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
114	-0.4	11	D	Door Jam	Center	Door Jam	Fair	Metal	white	Negative
115	0.2	11	D	Door Jam	Center	Door Jam	Fair	Metal	white	Negative
116	-0.4	12	A	Wall	Center	Wall	Fair	Brick	Blue	Negative
117	-0.1	12	B	Wall	Center	Wall	Fair	Brick	Blue	Negative
118	-0.4	12	C	Wall	Center	Wall	Fair	Brick	Blue	Negative
119	-0.1	12	D	Wall	Center	Wall	Fair	Brick	Blue	Negative
120	-0.4	12	D	Door	Center	Door	Fair	wood	Unpainted	Negative
121	-0.2	12	D	Door Frame	Center	Door Frame	Fair	Metal	White	Negative
122	-0.2	12	D	Door Jam	Center	Door Jam	Fair	Metal	White	Negative
123	-0.3	13	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
124	-0.2	13	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
125	-0.2	13	C	Wall	Center	Wall	Fair	Brick	Tan	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
126	-0.2	13	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
127	-0.2	13	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
128	-0.2	13	D	Door Frame	Center	Door Frame	Fair	Metal	Tan	Negative
129	-0.1	13	D	Door Jam	Center	Door Jam	Fair	Metal	Tan	Negative
130	-0.3	14	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
131	-0.2	14	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
132	-0.4	14	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
133	0.1	14	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
134	-0.2	14	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
135	-0.3	14	D	Door Frame	Center	Door Frame	Fair	Metal	Tan	Negative
136	-0.3	14	D	Door Jam	Center	Door Jam	Fair	Metal	Tan	Negative
137	-2	11	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	white	Negative
138	-0.4	11	Floor	Floor	Center	Floor	Fair	Tile	white	Negative
139	-0.5	12	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	white	Negative
140	-0.5	12	Floor	Floor	Center	Floor	Fair	Tile	white	Negative
141	-0.1	13	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	white	Negative
142	-0.2	13	Floor	Floor	Center	Floor	Fair	Ceramic Tile	Grey	Negative
143	-0.7	14	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	white	Negative
144	-0.2	14	Floor	Floor	Center	Floor	Fair	Ceramic Tile	Grey	Negative
145	-0.1	15	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
146	0.2	15	B	Wall	Center	Wall	Fair	Brick	Tan	Negative
147	-0.2	15	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
148	0	15	D	Wall	Center	Wall	Fair	Brick	Tan	Negative
149	-0.3	15	Ceiling	Ceiling	center	Ceiling	Fair	Metal	White	Negative
150	-0.4	15	Floor	Floor	Center	Floor	Fair	Tile	white	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
151	-0.1	15	C	Window Frame	center	Window Frame	Fair	Brick	Tan	Negative
152	-0.1	15	C	Window sill	Center	Window Sill	Fair	Metal	black	Negative
153	-0.5	15	C	Window Sash	center	Window Sash	Fair	Metal	black	Negative
154	-0.4	15	B	Door	Center	Door	Fair	Wood	Unpainted	Negative
155	-0.1	15	B	Door Frame	center	Door Frame	Fair	metal	Tan	Negative
156	-0.3	15	B	Door Jam	Center	Door Jam	Fair	Metal	Tan	Negative
157	-0.5	16	A	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
158	-0.6	16	B	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
159	-0.2	16	C	Wall	Center	Wall	fair	brick	Unpainted	Negative
160	-0.6	16	D	Wall	center	Wall	fair	brick	Unpainted	Negative
161	-0.4	16	Ceiling	Ceiling	Center	Ceiling	fair	Metal	White	Negative
162	-0.3	EXT	Overhang Sup	Overhang Sup	Center	Overhang Sup	fair	Concrete	White	Negative
163	-0.1	EXT	Overhang Sup	Overhang Sup	Center	Overhang Sup	fair	Concrete	White	Negative
164	-0.1	EXT	Overhang	Overhang	Center	Overhang	fair	Vinyl	White	Negative
165	0.1	EXT	Soffit	Soffit	Center	Soffit	fair	Metal	White	Negative
166	0.7	17	A	Wall	Center	Wall	fair	Brick	Unpainted	Negative
167	-0.3	17	B	Wall	Center	Wall	fair	Concrete	Purple	Negative
168	-0.2	17	C	Wall	Center	Wall	fair	Brick	purple	Negative
169	0.2	17	D	Wall	Center	Wall	fair	Sheetrock	Purple	Negative
170	-0.4	17	Ceiling	Ceiling	Center	Ceiling	fair	Metal	White	Negative
171	-0.2	17	D	Door	Center	Door	Fair	metal	White	Negative
172	-0.3	17	D	Door Frame	Center	Door Frame	Fair	metal	White	Negative
173	-1.1	17	D	Door Jam	Center	Door Jam	Fair	metal	White	Negative
174	-0.3	18	A	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
175	-0.3	18	B	Wall	Center	Wall	Fair	Sheetrock	yellow	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
176	-0.2	18	C	Wall	Center	Wall	Fair	Brick	Yellow	Negative
177	-0.4	18	D	Wall	Center	Wall	Fair	Metal	Yellow	Negative
178	-0.3	18	Ceiling	ceiling	Center	ceiling	Fair	Metal	Yellow	Negative
179	-0.2	18	Floor	Floor	center	Floor	fair	Tile	White	Negative
180	-0.3	18	B	Door	Center	Door	Fair	Wood	White	Negative
181	0	18	B	Door Frame	Center	Door Frame	Fair	Wood	white	Negative
182	-0.1	18	B	Door jam	Center	Door Jam	Fair	Wood	White	Negative
183	-0.4	19	A	Wall	Center	Wall	Good	brick	Yellow	Negative
184	-0.6	19	B	Wall	Center	Wall	Good	Sheetrock	yellow	Negative
185	-0.5	19	C	Wall	Center	Wall	Good	Brick	Yellow	Negative
186	-0.4	19	D	Wall	Center	Wall	Good	metal	yellow	Negative
187	-0.2	19	Ceiling	ceiling	Center	ceiling	Good	Metal	White	Negative
188	-0.3	19	Floor	Floor	center	Floor	Good	Tile	White	Negative
189	-0.3	19	B	Door	Center	Door	Good	wood	Red	Negative
190	-0.3	19	B	Door Frame	Center	Door Frame	Good	Wood	White	Negative
191	-0.2	19	B	Door Jam	Center	Door Jam	Fair	Wood	White	Negative
192	-0.2	20	A	Wall	Center	Wall	Fair	Brick	Purple	Negative
193	-0.3	20	B	Wall	Center	Wall	Fair	Sheetrock	Purple	Negative
194	-0.3	20	C	Wall	Center	Wall	Fair	brick	Yellow	Negative
195	-0.5	20	D	Wall	Center	Wall	Fair	metal	Purple	Negative
196	0	20	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
197	-0.4	20	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
198	-0.2	20	B	Door	Center	Door	Fair	Wood	Unpainted	Negative
199	-0.2	20	B	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
200	-0.3	20	B	Door jam	Center	Door Jam	Fair	Wood	White	Negative

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Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
201	-0.3	21	A	Wall	Center	Wall	Fair	Brick	White	Negative
202	-0.4	21	B	Wall	Center	Wall	Fair	Brick	Blue	Negative
203	-0.2	21	C	Wall	Center	Wall	Fair	brick	Blue	Negative
204	-0.4	21	D	Wall	Center	Wall	Fair	metal	white	Negative
205	-0.1	21	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
206	-0.2	21	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
207	-0.5	21	D	Door	Center	Door	Fair	Wood	unpainted	Negative
208	-0.5	21	D	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
209	-0.3	21	D	Door jam	Center	Door Jam	Fair	Wood	White	Negative
210	0.9	Calibration								
211	0.9	Calibration								
212	1	Calibration								
213	0	22	A	Wall	Center	Wall	Fair	Brick	White	Negative
214	-0.1	22	B	Wall	Center	Wall	Fair	Metal	White	Negative
215	-0.2	22	C	Wall	Center	Wall	Fair	brick	White	Negative
216	-0.1	22	D	Wall	Center	Wall	Fair	brick	White	Negative
217	-0.1	22	Ceiling	Ceiling	Center	Ceiling	Fair	metal	Pink	Negative
218	-0.4	22	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
219	-0.2	22	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
220	0	22	D	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
221	-0.1	22	D	Door jam	Center	Door Jam	Fair	Wood	White	Negative
222	-0.2	23	A	Wall	Center	Wall	Fair	Brick	Pink	Negative
223	-0.4	23	B	Wall	Center	Wall	Fair	Brick	Pink	Negative
224	-0.2	23	C	Wall	Center	Wall	Fair	brick	Pink	Negative
225	-0.1	23	D	Wall	Center	Wall	Fair	Brick	Pink	Negative

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226	-0.3	23	Ceiling	Ceiling	Center	Ceiling	Fair	metal	Pink	Negative
227	0.2	23	Floor	Floor	Center	Floor	Fair	Tile	Grey	Negative
228	-0.2	23	A	Door	Center	Door	Fair	Wood	Unpainted	Negative
229	-0.2	23	A	Door Frame	Center	Door Frame	Fair	Wood	Pink	Negative
230	-0.3	23	A	Door jam	Center	Door Jam	Fair	Wood	Pink	Negative
231	-0.1	24	A	Wall	Center	Wall	Fair	Brick	Green	Negative
232	-0.6	24	B	Wall	Center	Wall	Fair	Brick	Green	Negative
233	-0.1	24	C	Wall	Center	Wall	Fair	brick	Green	Negative
234	-0.2	24	D	Wall	Center	Wall	Fair	Sheetrock	Green	Negative
235	-0.2	24	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
236	0.1	24	Floor	Floor	Center	Floor	Fair	Tile	Grey	Negative
237	-0.2	24	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
238	-0.4	24	D	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
239	-0.4	24	D	Door jam	Center	Door Jam	Fair	Wood	White	Negative
240	-0.5	25	A	Wall	Center	Wall	Fair	Brick	Grey	Negative
241	-0.2	25	B	Wall	Center	Wall	Fair	Brick	Grey	Negative
242	-0.3	25	C	Wall	Center	Wall	Fair	brick	Grey	Negative
243	-0.4	25	D	Wall	Center	Wall	Fair	Brick	Grey	Negative
244	-0.3	25	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
245	-0.1	25	Floor	Floor	Center	Floor	Fair	Concrete	Grey	Negative
246	-0.1	25	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
247	-0.1	25	D	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
248	-0.3	25	D	Door jam	Center	Door Jam	Fair	Wood	White	Negative
249	-0.2	26	A	Wall	Center	Wall	Fair	Brick	Grey	Negative
250	-0.6	26	B	Wall	Center	Wall	Fair	Brick	Grey	Negative

Lead Inspection Results

Project Name: Luxora Elementary School

Project Location: 122 W. Calhoun St., Luxora, AR

Start Date: 8/6/2024 **End Date: 8/7/2024** **Lead Inspector: Adam Callender**

Start Time: 07:30 **End Time: 16:00** **XRF Serial #1955** **Project No. SA08670**

Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
251	-0.5	26	C	Wall	Center	Wall	Fair	Sheetrock	Grey	Negative
252	-0.2	26	D	Wall	Center	Wall	Fair	Sheetrock	Grey	Negative
253	-0.1	26	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
254	-0.2	26	Floor	Floor	Center	Floor	Fair	Concrete	Grey	Negative
255	-0.3	26	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
256	-0.4	26	D	Door Frame	Center	Door Frame	Fair	Wood	white	Negative
257	-0.1	26	D	Door jam	Center	Door Jam	Fair	Wood	white	Negative
258	0	27	A	Wall	Center	Wall	Fair	Brick	Blue	Negative
259	-0.1	27	B	Wall	Center	Wall	Fair	Brick	Blue	Negative
260	0.1	27	C	Wall	Center	Wall	Fair	Sheetrock	Blue	Negative
261	-0.5	27	D	Wall	Center	Wall	Fair	Sheetrock	Blue	Negative
262	-0.1	27	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
263	-0.4	27	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
264	0.2	27	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
265	-0.2	27	D	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
266	-0.2	27	D	Door jam	Center	Door Jam	Fair	Wood	White	Negative
267	-0.3	28	A	Wall	Center	Wall	Fair	Brick	Blue	Negative
268	-0.4	28	B	Wall	Center	Wall	Fair	Brick	Blue	Negative
269	-0.2	28	C	Wall	Center	Wall	Fair	brick	Blue	Negative
270	-0.2	28	D	Wall	Center	Wall	Fair	Sheetrock	blue	Negative
271	-0.1	28	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	White	Negative
272	-0.4	28	Floor	Floor	Center	Floor	Fair	Concrete	Unpainted	Negative
273	-0.3	28	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
274	-0.5	28	D	Door Frame	Center	Door Frame	Fair	Wood	White	Negative
275	-0.4	28	D	Door jam	Center	Door Jam	Fair	Wood	White	Negative

Lead Inspection Results

Project Name: Luxora Elementary School

Project Location: 122 W. Calhoun St., Luxora, AR

Start Date: 8/6/2024 **End Date: 8/7/2024** **Lead Inspector: Adam Callender**

Start Time: 07:30 **End Time: 16:00** **XRF Serial #1955** **Project No. SA08670**

Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
276	0.2	29	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
277	-0.2	29	B	Wall	Center	Wall	Fair	Metal	Purple	Negative
278	-0.2	29	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
279	-0.5	29	D	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
280	0	29	Ceiling	Ceiling	Center	Ceiling	Fair	Metal	White	Negative
281	-0.3	29	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
282	-0.1	29	D	Side Panel	Center	Side panel	Fair	metal	Tan	Negative
283	-0.3	29	D	Locker Door	Center	Locker door	Fair	metal	Purple	Negative
284	0	29	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
285	-0.4	29	D	Door Frame	Center	Door frame	Fair	Wood	White	Negative
286	-0.2	29	D	Door Jam	Center	Door jam	Fair	Wood	White	Negative
287	-0.4	30	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
288	-0.3	30	B	Wall	Center	Wall	Fair	Metal	Tan	Negative
289	-0.3	30	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
290	-0.1	30	D	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
291	-0.3	30	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
292	-0.2	30	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
293	-0.2	30	D	Side Panel	Center	Side panel	Fair	metal	Brown	Negative
294	-0.3	30	D	Locker Door	Center	Locker door	Fair	metal	Brown	Negative
295	-0.1	30	D	Door	Center	Door	Fair	Wood	Yellow	Negative
296	-0.5	30	D	Door Frame	Center	Door frame	Fair	Wood	White	Negative
297	-0.3	30	D	Door Jam	Center	Door jam	Fair	Wood	White	Negative
298	-0.2	31	A	Wall	Center	Wall	Fair	Brick	Blue	Negative
299	-0.1	31	B	Wall	Center	Wall	Fair	Metal	Blue	Negative
300	0.1	31	C	Wall	Center	Wall	Fair	Brick	Unpainted	Negative

Lead Inspection Results

Project Name: Luxora Elementary School

Project Location: 122 W. Calhoun St., Luxora, AR

Start Date: 8/6/2024 **End Date: 8/7/2024** **Lead Inspector: Adam Callender**

Start Time: 07:30 **End Time: 16:00** **XRF Serial #1955** **Project No. SA08670**

Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
301	-0.3	31	D	Wall	Center	Wall	Fair	Sheetrock	Blue	Negative
302	-0.2	31	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
303	-0.3	31	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
304	-0.3	31	D	Side Panel	Center	Side panel	Fair	metal	Blue	Negative
305	-0.1	31	D	Locker Door	Center	Locker door	Fair	metal	Blue	Negative
306	-0.1	31	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
307	-0.1	31	D	Door Frame	Center	Door frame	Fair	Wood	Blue	Negative
308	-0.2	31	D	Door Jam	Center	Door jam	Fair	Wood	Blue	Negative
309	-0.2	32	A	Wall	Center	Wall	Fair	Brick	Yellow	Negative
310	-0.5	32	B	Wall	Center	Wall	Fair	Sheetrock	Brick	Negative
311	-0.4	32	C	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
312	-0.7	32	D	Wall	Center	Wall	Fair	Metal	Yellow	Negative
313	-0.2	32	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
314	-0.4	32	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
315	-0.2	32	B	Side Panel	Center	Side panel	Fair	metal	Yellow	Negative
316	-0.2	32	B	Locker Door	Center	Locker door	Fair	metal	Yellow	Negative
317	-0.2	32	B	Door	Center	Door	Fair	Wood	Green	Negative
318	-0.2	32	B	Door Frame	Center	Door frame	Fair	Wood	Yellow	Negative
319	-0.1	32	B	Door Jam	Center	Door jam	Fair	Wood	Yellow	Negative
320	0.9	Calibration								
321	1	Calibration								
322	1	Calibration								
323	-0.2	33	A	Wall	Center	Wall	Fair	Brick	White	Negative
324	-0.2	33	B	Wall	Center	Wall	Fair	Sheetrock	White	Negative
325	0	33	C	Wall	Center	Wall	Fair	Brick	White	Negative

Lead Inspection Results

Project Name: Luxora Elementary School

Project Location: 122 W. Calhoun St., Luxora, AR

Start Date: 8/6/2024 **End Date: 8/7/2024** **Lead Inspector: Adam Callender**

Start Time: 07:30 **End Time: 16:00** **XRF Serial #1955** **Project No. SA08670**

Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
326	-0.4	33	D	Wall	Center	Wall	Fair	Metal	White	Negative
327	-0.3	33	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
328	-0.4	33	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
329	-0.4	33	D	Side Panel	Center	Side panel	Fair	metal	White	Negative
330	-0.3	33	D	Locker Door	Center	Locker door	Fair	metal	White	
331	0	33	D	Door	Center	Door	Fair	Wood	Blue	Negative
332	-0.4	33	D	Door Frame	Center	Door frame	Fair	Wood	White	Negative
333	-0.4	33	D	Door Jam	Center	Door jam	Fair	Wood	White	Negative
334	-0.4	34	A	Wall	Center	Wall	Fair	Brick	Tan	Negative
335	-0.5	34	B	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
336	-0.1	34	C	Wall	Center	Wall	Fair	Brick	Tan	Negative
337	-0.2	34	D	Wall	Center	Wall	Fair	Metal	Tan	Negative
338	-0.2	34	Ceiling	Ceiling	Center	Ceiling	Fair	metal	White	Negative
339	-0.9	34	Floor	Floor	Center	Floor	Fair	Tile	White	Negative
340	-0.5	34	D	Side Panel	Center	Side panel	Fair	metal	tan	Negative
341	-0.2	34	D	Locker Door	Center	Locker door	Fair	metal	Tan	Negative
342	-0.3	34	D	Door	Center	Door	Fair	Wood	Unpainted	Negative
343	-0.4	34	D	Door Frame	Center	Door frame	Fair	Wood	White	Negative
344	-0.5	34	D	Door Jam	Center	Door jam	Fair	Wood	White	Negative
345	-0.1	35	A	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
346	-0.3	35	B	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
347	-0.4	35	C	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
348	-0.4	35	D	Wall	Center	Wall	Fair	Sheetrock	Tan	Negative
349	-0.1	EXT	Soffit	Soffit	Center	Soffit	Fair	Metal	White	Negative
350	-0.1	EXT	Soffit Sup	Soffit Sup	Center	Soffit Sup	Fair	Metal	White	Negative

Lead Inspection Results

Project Name: Luxora Elementary School

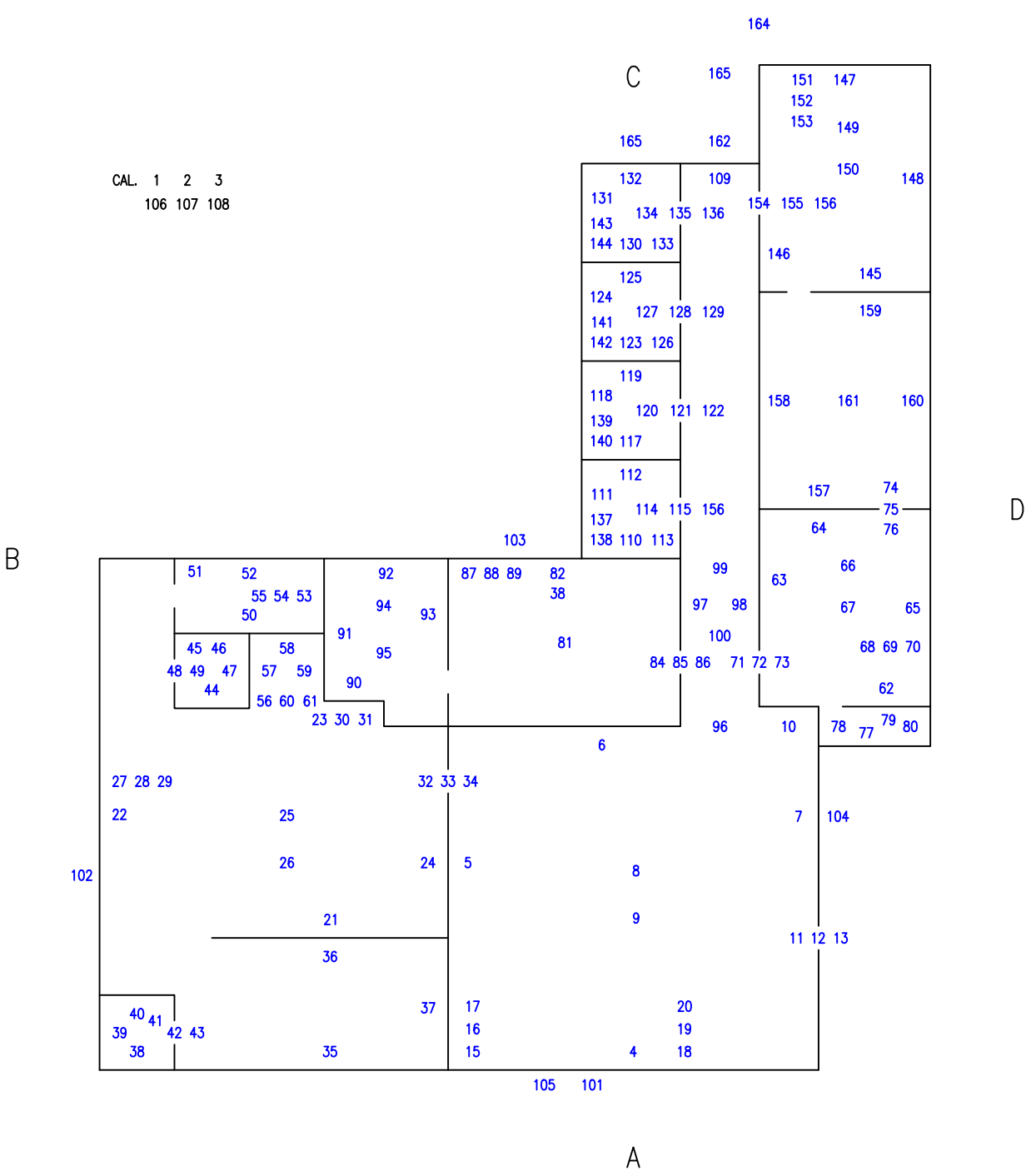
Project Location: 122 W. Calhoun St., Luxora, AR

Start Date: 8/6/2024 **End Date: 8/7/2024** **Lead Inspector: Adam Callender**

Start Time: 07:30 **End Time: 16:00** **XRF Serial #1955** **Project No. SA08670**

Reading No.	XRF Result (mg/cm^2)/(%)	Room Number	Wall Orientation	Component	Component Location	Component Information	Condition	Substrate	Color	Classification
351	-0.3	EXT	Wind panel	Wind panel	Center	Wind panel	Fair	Metal	Teal	Negative
352	-0.3	EXT	Soffit	Soffit	Center	Soffit	Fair	Metal	White	Negative
353	-0.3	EXT	Soffit Sup	Soffit Sup	Center	Soffit Sup	Fair	Metal	White	Negative
354	-0.2	EXT	Wind panel	Wind panel	Center	Wind panel	Fair	Metal	Teal	Negative
355	-0.2	EXT	A	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
356	-0.4	EXT	B	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
357	-0.3	EXT	C	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
358	-0.3	EXT	D	Wall	Center	Wall	Fair	Brick	Unpainted	Negative
359	1	Calibration								
360	1.1	Calibration								
361	1.1	Calibration								
362	0.9	Calibration								
363	0.8	Calibration								
364	1.1	Calibration								
365	-0.1	36	A	Wall	Center	Wall	Good	Sheetrock	Grey	Negative
366	-0.2	36	B	Wall	Center	Wall	Good	Sheetrock	Grey	Negative
367	-0.3	36	C	Wall	Center	Wall	Good	Sheetrock	Grey	Negative
368	-0.3	36	D	Wall	Center	Wall	Good	Sheetrock	Grey	Negative
369	-0.5	36	D	Baseboard	Center	Baseboard	Good	Wood	White	Negative
370	0.9	Calibration								
371	1	Calibration								
372	0.8	Calibration								

Lead Sample Location Drawing (s)



TITLE

BUILDING A
LEAD SHOT
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
PAGE	**DRAWN BY**
1	BB
SHEET	**DATE**
A – 8.5" X 11"	08/15/24

103S9501014
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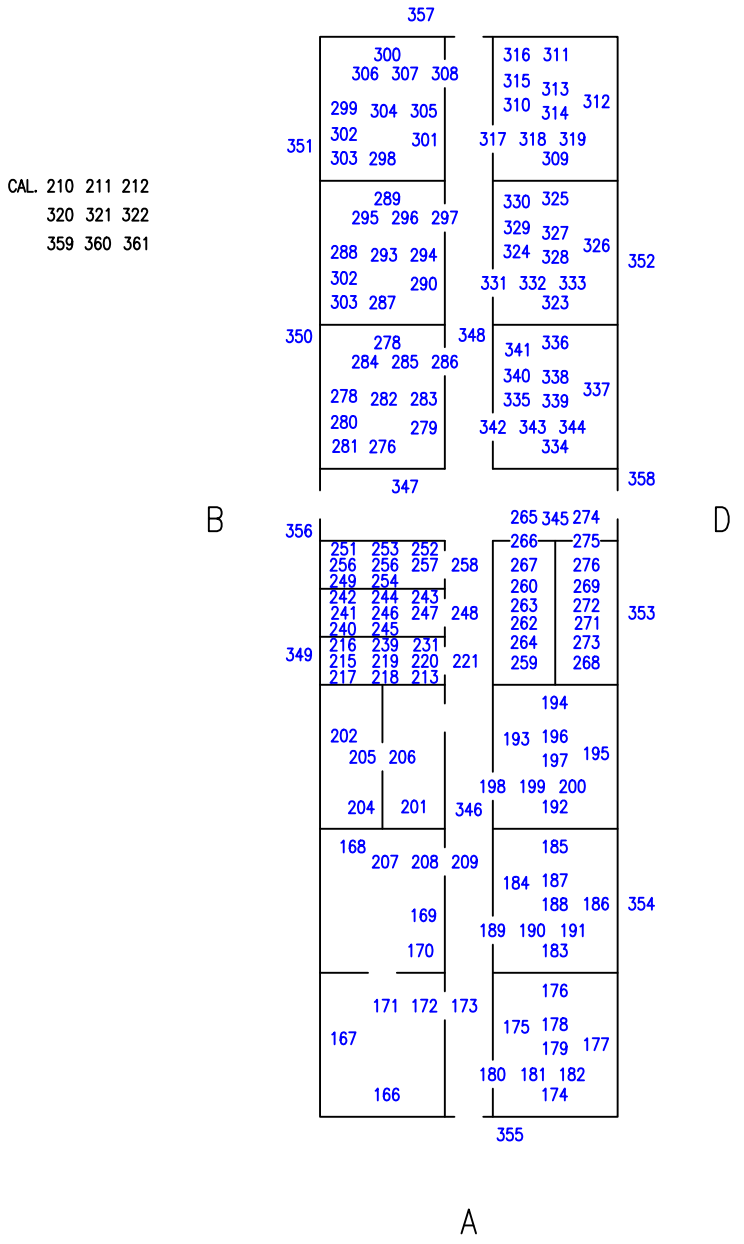
PLAN NORTH



CAL. 210 211 212
320 321 322
359 360 361

TITLE

BUILDING B
LEAD SHOT
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

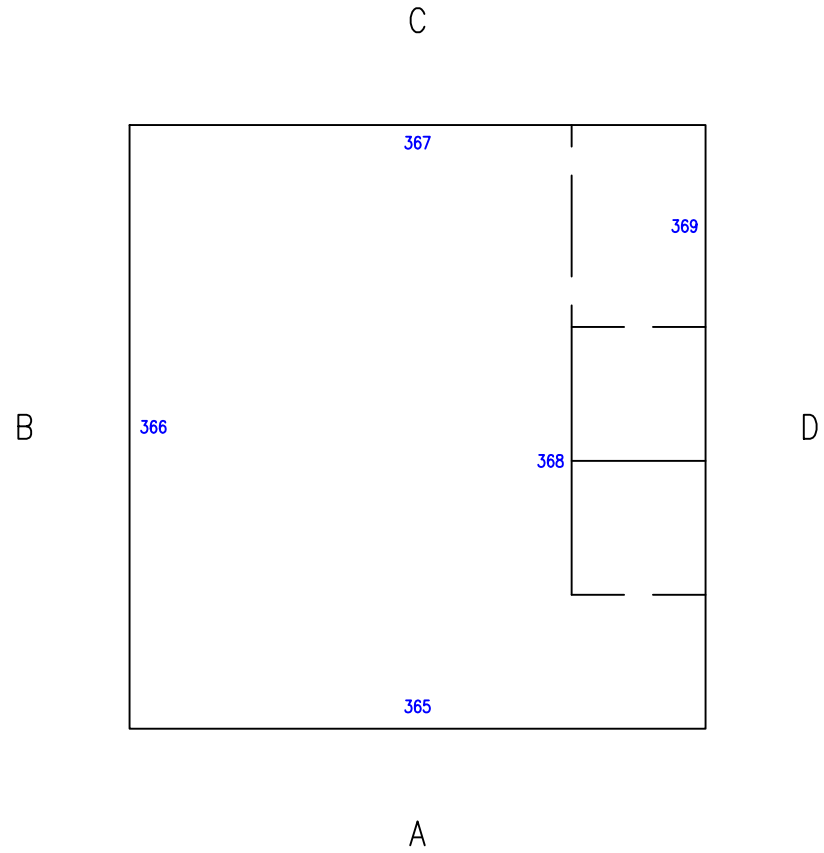
LEGEND

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
PAGE	**DRAWN BY**
1	BB
SHEET	**DATE**
A – 8.5" X 11"	08/15/24

PLAN NORTH

CAL. 362 363 363
370 371 372



TITLE

BUILDING C
LEAD SHOT
SAMPLE LOCATIONS

LOCATION

LUXORA ELEMENTARY SCHOOL
406 WASHINGTON AVE
LUXORA, ARKANSAS

LEGEND

ALTEC
ENVIRONMENTAL CONSULTING, LLC

PROJECT NO.	SCALE
SA08670	NTS
PAGE	**DRAWN BY**
1	BB
SHEET	**DATE**
A – 8.5" X 11"	08/15/24

BUILDING A

REFERENCE PHOTOGRAPHS

001

002

003

004

005

006

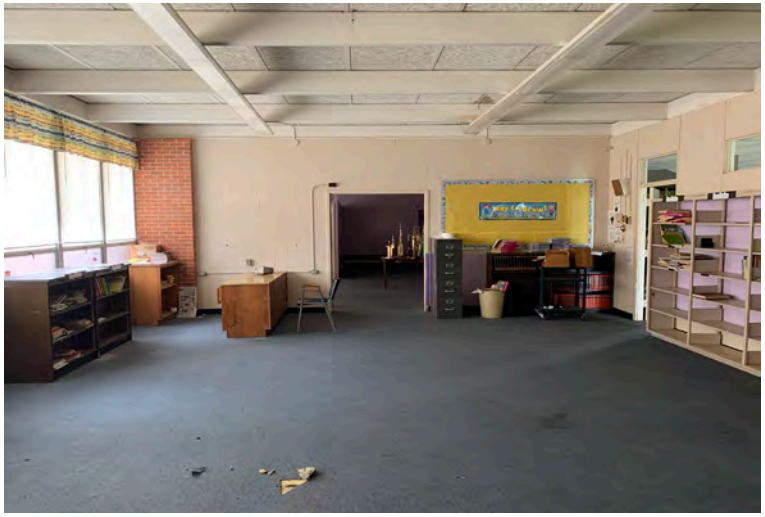
007

BUILDING B

REFERENCE PHOTOGRAPHS

001

002



003

004

BUILDING B
(BOILER ROOM)

REFERENCE PHOTOGRAPHS

001

002

003

004

005

BUILDING B
(TRANSITE)

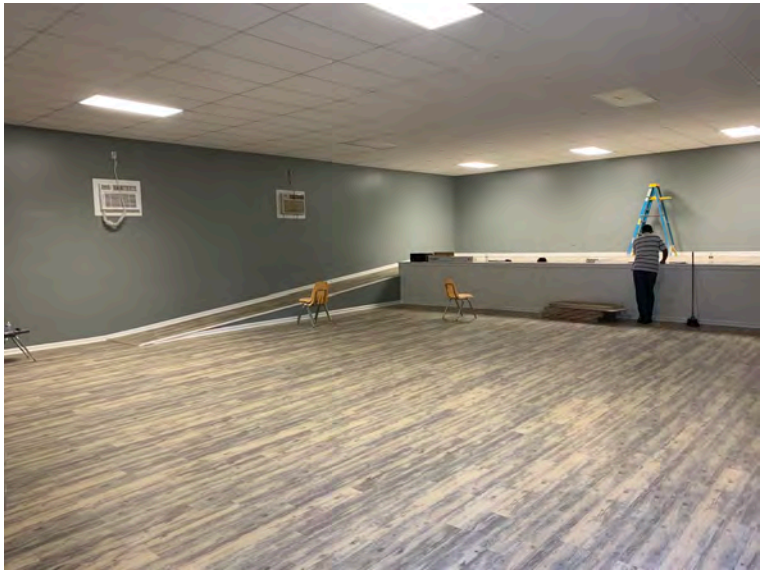
REFERENCE PHOTOGRAPHS

001

002

BUILDING C

REFERENCE PHOTOGRAPHS



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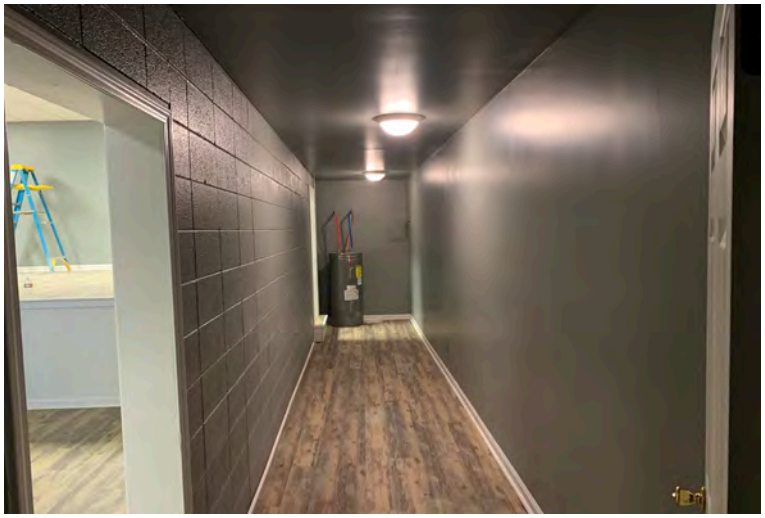
002



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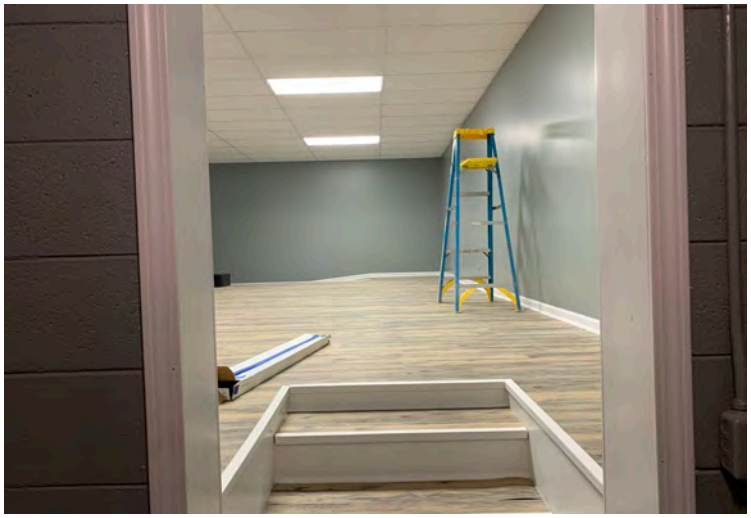

004

005

006

007

008

009

010

Certifications

ATTACHMENT 2
SUBCONTRACTOR CERTIFICATIONS

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ADAM CALLENDER

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Inspector	11/30/2024
Contractor/Sup	11/30/2024
Air Monitor	11/30/2024

Certification Number: 017814

Caleb J. Osborne
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

EDWARD MYERS

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Inspector.....	03/31/2025
Contractor/Sup	03/31/2025

Certification Number: 018721

Caleb J. Osborne
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ROBERT B. RAINES III

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Mgmt Planner	11/30/2024
Contractor/Sup	11/30/2024
Proj Designer	03/31/2025

Certification Number: 012413

Caleb J. Osborne
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

State of Arkansas

Department of Health

Adam Callender

having satisfied the requirements necessary to meet the provisions of TSCA Title IV and the Arkansas Board of Health's Rules Pertaining to Lead-Based Paint Activities and is hereby certified in the State of Arkansas in the discipline(s) of Lead

Inspector
Certificate Number: 000381

Issue Date: December 14, 2023

Expire Date: December 14, 2024

Lead-Based Paint Program Coordinator

State of Arkansas

Department of Health

Robert B. Raines, III

having satisfied the requirements necessary to meet the provisions of TSCA Title IV and the Arkansas Board of Health's Rules Pertaining to Lead-Based Paint Activities and is hereby certified in the State of Arkansas in the discipline(s) of Lead

Supervisor
Certificate Number: 000354

Issue Date: May 18, 2024

Expire Date: May 18, 2025

Lead-Based Paint Program Coordinator

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101048-0

EMSL Analytical, Inc.

Cinnaminson, NJ

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique on ISO/IEC 17025).

2024-07-01 through 2025-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

103S9501014

APPENDIX C

References

ANSI Z88, latest edition. *American National Standard for Respiratory Protection*.

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ASTM E2356-14. *Standard Practice for Comprehensive Building Asbestos Surveys.*

Arkansas Pollution Control and Ecology Commission, Regulation No. 21 Arkansas Asbestos Abatement Regulation. August 28, 2015.

Arkansas State Board of Health. Rules Pertaining to Lead-Based Paint Activities. Promulgated Under the Authority of A.C.A Section 20-27-2501 *et seq.* September 27, 2021.

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EPA. 2023. IT/IM Directive Standard. Quality Assurance Project Plan Standard. March 2023.

EPA. Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP), EPA regulation 40 CFR Part 61, latest edition.

Es2. 2024. Phase I Environmental Site Assessment, Luxora Elementary School, 406 Washington Avenue, Luxora, Arkansas 72358. April 2024.

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https://www.hud.gov/program_offices/healthy_homes/lbp/hudguidelines

NIOSH/OSHA/USCG/EPA - "Occupational; Safety & Health Guidance Manual for Hazardous Waste Site Activities", Section 8-20; Heat Stress and Other.

U.S Occupational Safety and Health Administration (OSHA). Final Rules Title 29, Part 1910, Section 1001 of the Code of Federal Regulations (CFR).

OSHA. Construction Industry Standards. Final Rules Title 29, Part 1926, Section 1101 of the CFR.

OSHA. Occupational Safety and Health Standards. Final Rules Title 29, Part 1910, Section 120 of the CFR.

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ENVIRONMENTAL ENTERPRISE GROUP (EEG), INC.

is qualified to perform certain asbestos-related work within the State of Arkansas, under Rule 21 of the Arkansas Pollution Control and Ecology Commission and Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby licensed as an

Asbestos Abatement Consultant

License Number: 000234-CCL-CT

Expiration Date: November 30, 2025

Bailey Taylor

Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ROBERT E. SMITH

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Contractor/Sup	08/31/2026
Inspector	08/31/2026
Air Monitor	08/31/2026
Mgmt Planner	08/31/2026
Proj Designer	08/31/2026

Certification Number: 011927

Bailey Taylor

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ARMANDO JOSEPH GARCIA

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Contractor/Sup	09/30/2025

Certification Number: **015015**

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ANTONIO GARCIA

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Contractor/Sup	09/30/2025

Certification Number: **017683**

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

CARLOTA GARCIA

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Contractor/Sup	09/30/2025

Certification Number: **015014**

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

BERNABE LUNA

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Worker	09/30/2025

Certification Number: **018805**

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

CRISTIAN IZQUIERDO DORANTES

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Worker	**09/30/2025**

Certification Number: **013437**

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment

ARKANSAS DIVISION OF ENVIRONMENTAL QUALITY

ASBESTOS PROGRAM

ABEL RIVERA

has satisfied the requirements of AHERA/ASHARA under TSCA Title II, and those of Rule 21 of the Arkansas Pollution Control and Ecology Commission, pursuant to Ark. Code Ann. § 20-27-1001 *et seq.*, and is hereby certified to perform certain asbestos-related work, within the State of Arkansas, in the following discipline(s):

Discipline	Expiration Date
Worker	09/30/2025

Certification Number: **014403**

Bailey Taylor
Director, Division of Environmental Quality
Chief Administrator of the Environment
Arkansas Department of Energy and Environment