Phase I Environmental Site Assessment

Boys & Girls Club

525 W 9th Street
Hawthorne, Nevada 89415

Mineral County
Assessor's Parcel Number 001-061-04

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Environmental Services

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STANDARD ABBREVIATIONS

ACM	Asbestos Containing Material
APN	Assessor's Parcel Number
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
AUL	Activity and Use Limitation
BER	Business Environmental Risk
bgs	Below Ground Surface
CEM	Certified Environmental Manager
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CORRACTS	Corrective Actions
CREC	Controlled Recognized Environmental Condition
DRI	Desert Research Institute
ECHO	Enforcement and Compliance History Online
EDR	Environmental Data Resources, Inc.
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
HREC	Historical Recognized Environmental Condition
LBP	Lead Based Paint
LUST	Leaking Underground Storage Tank
NDEP	Nevada Division of Environmental Protection
NFRAP	No Further Remedial Action Planned
NPL	National Priority List
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
SEMS	Superfund Enterprise Management System
SHWS	State Hazardous Waste Site
TSD	Treatment, Storage, and Disposal
UST	Underground Storage Tank
VEC	Vapor Encroachment Condition
WRCC	Western Regional Climate Center

COMMON UNITS OF MEASURE

°F	Degrees Fahrenheit
ft^2	Square foot
gal	Gallon
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
pCi/L	Picocuries per liter
ppb	Parts per billion
ppm	Parts per million
qt	Quart
yd^3	Cubic yard

µg/kg	Microgram per kilogram
µg/L	Microgram per liter

EXECUTIVE SUMMARY

BEC Environmental, Inc. (BEC) was retained by the Nevada Division of Environmental Protection (NDEP) Brownfields Program (Client) to perform a Phase I Environmental Site Assessment (ESA) of the Boys & Girls Club, located on Mineral County Assessor's Parcel Number (APN) 001-061-04. The NDEP Brownfields Program is funded by a U.S Environmental Protection Agency (EPA) 128(a) Brownfields Program Grant. The purpose of the Phase I ESA was to identify, to the extent feasible, recognized environmental conditions (RECs) in connection with the subject site. BEC performed the site reconnaissance on June 8, 9 and 10, 2021. As a part of the Scope of Work for the Phase I ESA, a Lead-Based Paint (LBP) Hazard Inspection and a Limited Asbestos Survey were conducted concurrent with the Phase I ESA. It should be acknowledged details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. In summary, the following items were noted:

- The Boys & Girls Club is comprised of a 2.58-acre parcel located in Hawthorne, Nevada on Mineral County APN 001-061-04. The Mineral County Assessor's indicates the parcel has one 10,956-square-foot (ft^2) building listed as "Detention Center" constructed in 1960 and one "outbuilding structure". The subject site was adjacent to Hawthorne Elementary School and adjoining properties included vacant land, residential properties, and the Lions Park.
- Documents obtained from the Mineral County Assessor's Office list the Mineral County Armory as the owner of the property at the time of this report. However, additional documents obtained from the Recorder's Office show the transfer of the property from the Nevada Army National Guard to the State of Nevada, Division of State Lands via Quitclaim Deed on April 25, 2006, and from the Division of State Lands to Mineral County via Quitclaim Deed on June 12, 2015.
- Based on field observations, local topography trends downward from the south-southeast toward the north-northwest. Groundwater flow direction was assumed to be toward the north-northwest.

The following is a summary of findings associated with the ESA performed for the subject site:

- The regulatory database report was purchased through Environmental Data Resources, Inc. (EDR) and the review of the report identified the following:
    - The subject site was listed in the Resource Conservation and Recovery Act (RCRA), Facility Index System/Facility Registry System (FINDS), and Enforcement & Compliance History Information (ECHO).
    - Seven State Hazardous Waste Site (SHWS), four US Brownfield Sites, one Formerly Used Defense Site (FUDS), one Department of Defense (DOD0, and one Unexploded ordnance (UXO) within their respective search radii from the subject site.
- Due to discrepancies in the location of some facilities in the databases arising from incomplete or incorrect addresses, some facilities were listed as un-mappable, otherwise known as "orphan sites". One orphan site was identified in the EDR Radius Map Report. The other orphan sites were determined to be outside the search radius and therefore did not affect this project.

The following is a summary of the LBP Inspection for the subject site:

- As a result of the LBP inspection and sample analysis conducted June 8, 9, and 10, 2021, at the subject site, the presence of lead-containing surface coatings was confirmed throughout the interior and exterior of the main building at levels the Occupational Safety and Health Administration (OSHA) considers hazardous to building occupants. Additionally, paint on the ceiling of the gym and on the exterior of the conex box located immediately outside the main

building had lead levels above the EPA Hazardous Levels of Lead regulations. Additional details are provided in the LBP Inspection Report provided as an appendix to this document.

The following is a summary of the Asbestos Survey for the subject site:

- As a result of the limited asbestos survey conducted on June 8, 9, and 10, 2021, at the subject site, Asbestos-Containing Material (ACM) was identified in four Homogeneous Areas at the Boys & Girls Club building. This included non-friable ACM in the mastic of the building's tile floor system and friable asbestos in the air unit insulation and two types of pipe insulation. Additional details are provided in the Limited Asbestos Survey Report provided as an appendix to this document.

BEC has performed this Phase I ESA in conformance with the scope and limitations of American Society of Testing and Materials (ASTM) Standard E1527-13. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except the following:

- A potential underground storage tank was observed on a blueprint for the Boys and Girls Club property by the Mineral County Public Works Director. However, the location and the condition of the potential underground fuel storage tank was unavailable at the time of publication for this report. This was considered a REC for the subject site at the time of this report.
- Lead-based paint (LBP) and lead containing surface coatings were identified throughout the subject building. This was considered a REC for the subject site at the time of this report.
- Asbestos Containing Materials (ACMs) were identified in four Homogeneous Areas within the main building. This was considered a REC for the subject site at the time of this report
- It is the opinion of BEC the identified conditions above warrant additional investigation and mitigation.

1 INTRODUCTION

BEC was retained by Nevada Division of Environmental Protection (NDEP) Brownfields Program (Client) to perform a Phase I ESA of the Boys & Girls Club, located on APN 001-061-04. According to the Mineral County Assessor's, the site is comprised of a 2.58-acre parcel with one 10,956 square foot (sq.ft.) building described as the Detention Center and one 19,420 sq.ft asphalt parking lot, built in 2000, and one 2,650 concrete flat, built in 1960. The location of the subject site is shown in the Vicinity Map and the Parcel Information Map (**Appendix 1, Figure 1** and **Figure 2**, respectively), and hereinafter referenced as the subject site. The subject site is located east of Armory Road and south of 9th Street in Hawthorne, Nevada as depicted in the Area Reconnaissance Map (**Appendix 1, Figure 3**). The following sections identify the purpose, detailed scope of services, significant assumptions, limitations and exceptions, and user reliance information relevant to the preparation of this Phase I ESA report.

1.1 Purpose

The purpose of this Phase I ESA was to identify any Recognized Environmental Conditions (RECs), Controlled Recognized Environmental Conditions (CRECs), Historical Recognized Environmental Conditions (HRECs), and/or Business Environmental Risks (BERs) that may be present due to past or present land use of the subject site and/or properties in the subject site vicinity, defined by ASTM E1527-13, *Standard Practice for Phase I Environmental Site Assessment* as follows:

> Recognized Environmental Condition (REC) means the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.
>
> A Controlled Recognized Environmental Condition (CREC) [is defined as] a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.
>
> A Historical Recognized Environmental Condition (HREC) [is defined as] a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.
>
> A Business Environmental Risk (BER) [is defined as] a risk which can have a material environmental or environmentally driven impact on the business associated with the current or planned use a parcel of commercial real estate.

This Phase I ESA reviewed the potential for Vapor Encroachment Conditions (VECs) that may be present due to past or present land use of the subject site and/or properties in the subject site vicinity. VECs are defined, by ASTM E2600-15, *Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions,* as the presence or likely presence of Chemicals of Concern that may migrate as vapors into the vadose zone (the area between the ground surface and the water table, in which vapors may migrate) of a property as a result of contaminated soil and/or groundwater on or near the property.

During the course of this assessment, specific existing, potential, or suspect conditions were evaluated that may pose an environmental liability with respect to hazardous substances and/or petroleum products for the current owner, future owners, or operators at the subject site (ASTM, 2013).

1.2 Scope of Work

The scope of work in performing this Phase I ESA included five main tasks: a regulatory records review, site reconnaissance, asbestos/lead-based paint sampling, personal interviews, and report preparation (Phase I ESA, Limited Asbestos Survey Report, and Lead-based paint Inspection Report).

BEC interviewed property Owner Representative Eric Hamrey on June 8th, 2021, to obtain additional current or historical site use information (**Appendix 2 – Interview Documentation**). BEC performed the site reconnaissance on June 8 & June 10, 2021, to make site observations of the subject site and nearby properties. BEC reviewed readily available records from Mineral County and the regulatory compliance files of the EDR Radius Map™ Report with Geocheck® dated June 9, 2021. BEC conducted a records review of the Mineral County Recorder's office on June 15, 2021. BEC conducted a regulatory compliance file review at the Nevada Division of Environmental Protection (NDEP) on June 16, 2021. This report comprises the fourth and final task of the Phase I ESA process.

1.3 Limitations and Exceptions

The scope of this evaluation did not include: subsurface exploration, soil or water sampling, chemical analysis, or an evaluation of biological agents, cultural and historic resources, ecological resources, endangered species, health and safety, indoor air quality (unrelated to releases of hazardous substances or petroleum products into the environment), industrial hygiene, mold, radon, regulatory compliance, or wetlands. Properties surrounding the site were visually inspected from public rights-of-way or fence lines. Our observations were made from readily accessible vantage points. Although a reasonable effort was made to view relevant site features, some features may have been concealed from view.

While this report provides an overview of potential environmental concerns, both past and present, the environmental assessment is limited by the availability of information at the time of the assessment. It is possible unreported disposal of waste or illegal activities impairing the environmental status of the property may have occurred but could not be identified by the assessment. The findings and opinions regarding environmental conditions presented in this report are based on a scope of work authorized by NDEP. Note, however, no scope of work, no matter how exhaustive, can identify all contaminants or all conditions above and below ground.

1.4 Significant Assumptions

BEC used the services of a computer database firm to provide a listing of sites within the ASTM standard search distance around the site. BEC assumed the information in this report was accurate unless conflicting information was obtained from credible sources or field observations made by BEC's environmental professional(s) during the site reconnaissance indicated otherwise. Deviations are subsequently noted in this report.

Information regarding the subject site was reasonably ascertainable. Therefore, no other significant assumptions have been made in this report.

1.5 Special Terms and Conditions

The findings, opinions, and conclusions are based on an analysis of the observed site conditions and the referenced literature. It should be understood the conditions of a site can change with time as a result of natural processes or the activities of man at the subject site or within the site vicinity. Additionally, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government

action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which neither NDEP nor BEC has any control. Neither NDEP nor BEC can warrant or guarantee that not finding indicators of any particular hazardous material means that this particular hazardous material or any other hazardous materials do not exist on the site. Additional research, including invasive testing, can reduce the uncertainty, but no techniques now commonly employed can eliminate the uncertainty altogether.

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard of care exercised by environmental consultants performing similar work in the State of Nevada. No other warranty, expressed or implied, is made regarding the professional opinions presented in this report. This document is intended to be used in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. NDEP or BEC should be contacted if the reader requires any additional information or has questions regarding the content, interpretations presented, or completeness of this document.

1.6 User Reliance

This report may be relied upon and is intended exclusively for use by NDEP and their assigns for the purposes stated within a reasonable time from issuance, but in no event later than 180 days from the date of the report. Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Since site activities and regulations beyond our control could change at any time after the completion of this report, our observations, findings, and opinions can be considered valid only as of the date of the site visit. This report should not be relied upon after 180 days from the date of its issuance (ASTM Standard). Any use or reuse of the findings, opinions, and/or conclusions of this report by parties' other than NDEP is undertaken at said parties' sole risk.

2 SITE DESCRIPTION

This section provides an overview of the subject site, as well as detailed information regarding site location, land use and zoning information, a description of the local and regional hydrogeological characteristics of the subject site, a list of structures and other improvements, and a general description of adjoining properties. Information regarding the current use of the site and adjoining properties was obtained during records research, site reconnaissance, and personal interviews.

2.1 Location and Site Description

The subject site is located at 525 W 9th Street, Hawthorne, Nevada 89415 and is comprised of 2.58 acres and three improvements. Please refer to the Vicinity Map (**Appendix 1, Figure 1**) and the Parcel Information Map (**Appendix 1, Figure 2**) for the location of the subject site addressed for the purposes of this study. The Area Reconnaissance Map (**Appendix 1, Figure 3**) depicts observations of adjoining and nearby properties. The Site Reconnaissance Map (**Appendix 1, Figure 4**) depicts observations within the subject site.

Based on information obtained from the Mineral County Assessor's Office, the subject site land use is Commercial Industrial – Retail or Office Use Combined with Industrial Use. The subject site is located in a residential neighborhood.

Current use of the property description includes a childcare facility for the community, storage of county records, and the office of the Mineral County Emergency Management.

Based on information received from the Mineral Assessor's Office, the subject site includes the following improvements: An outbuilding structure, 19,420 ft^2. of asphalt, and 2,650 ft^2, of concrete (**Appendix 3 – Local and Regulatory Records**). The building uses propane for their heating needs and Hawthorne Utilities provides water, sewage, and garbage to the surrounding area.

2.2 Current Use of Adjoining Properties

The current adjoining property uses are summarized in **Table 2-1**, below.

Table 2-1: Subject Site Adjoining Property Overview

Direction	Description
North:	Residential houses
East:	Hawthorne Elementary School
South:	Lions Park
West:	Armory Road; undeveloped land

2.3 Physical Setting - Topography and Hydrogeology

Mineral County is located on the western edge of the State of Nevada. It is bordered to the northwest by Lyon County and by Churchill County to the north. The northeast and southeast borders are shared with Nye County and Esmeralda County, respectively. Hawthorne, the county seat, is 314 miles northwest of Las Vegas and 134 miles southeast of Reno, Nevada. Mineral County is approximately 3,752 square miles, ranging from 3,933 feet above sea level at Walker Lake to 11,269 feet at Mount Grant's summit. There are 18 identified mountain ranges within the County, including the Wassuk Range, the Gillis Range, the Gabbs Valley Range, and the Pilot Mountains. Major valleys in the County include Gabbs Valley, Win Wan Valley, Queen Valley, Huntoon Valley, Alkali Valley, and Soda Spring Valley.

The dominant soil composition at land surface in the vicinity of the subject sites was based on information provided by Environmental Data Resources, Inc. (EDR), as supplied from the U.S. Department of Agriculture's Soil Conservation Service (**Appendix 4 – EDR Radius Report**). The soil surface texture typical of the subject site is Inmo, very gravelly loamy sand, excessively drained and Sodaspring, loamy sand, well drained. The hydrologic group for Inmo is Class A with high filtration rates. The hydrologic group for Sodasping is Class B with moderate infiltration rates.

The Federal Emergency Management Agency (FEMA) Flood Zone Map (**Appendix 1**, **Figure 5**) depicts the location of the subject site in FEMA special flood hazard area Zone AO. According to FEMA, Zone AO is an area "subjected to inundation by 1-percent(%)-annual-chances shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet (ft.)." (FEMA, 2020)

Groundwater flow is assumed to follow surface topography, which is to the north-northwest.

According to the Western Regional Climate Center (WRCC) the average January minimum temperature is 24.2 degrees Fahrenheit (°F), and the average July maximum temperatures is 96 °F, with a 4.04 inches (in.) precipitation throughout the year.

Additional physical setting documentation is provided in **Appendix 4** – **EDR Radius Map Report.**

3 USER PROVIDED INFORMATION

The following section discusses information provided during interviews with Mr. Eric Hamrey, Mineral County Public Works Director, and Mr. Curtis Schlepp, Vice Chairman, Mineral County Board of County

Commissioners. Both gentlemen were associated with the subject site and/or its representatives during the course of this study (**Appendix 2**).

3.1 Reason for Performing a Phase I

Mineral County requested a Phase I ESA through the Nevada Brownfields Program in advance of potential renovation of the Boys & Girls Club.

3.2 Owner, Property Manager, and Occupant Information

According to the Mineral County Assessor's Office, the subject site is owned by Mineral County Armory. However, additional documents obtained from the Recorder's Office show the transfer of the property from the Nevada Army National Guard to the State of Nevada, Division of State Lands via Quitclaim Deed on April 25, 2006, and from the Division of State Lands to Mineral County via Quitclaim Deed on June 12, 2015.

3.3 Environmental Liens or Activity and Use Limitations

Based on information provided during interviews with Mr. Hamrey, no environmental liens or activity and use limitation (AULs) are associated with the subject site (**Appendix 2**). This was also indicated after interviewing Mr. Schlepp. Additionally, no environmental liens or AULs were reported in the Mineral County Recorder's Office (**Appendix 3**).

3.4 Specialized Knowledge

When queried regarding specialized knowledge concerning the environmental status and potential issues of concern, Mr. Hamrey stated he has no knowledge concerning environmental status or potential issues of concerns for the property.

When queried regarding specialized knowledge concerning the environmental status and potential issues of concern, Mr. Schlepp stated the building was completely remodeled in 1999 for the Juvenile Detention Center that closed in 2013. Also, a fire suppression system was placed in the building that same year. In 2005, the boiler was replaced and there have been no USTs, to his knowledge, associated with the building. Mr. Schlepp also stated floor tiles were tested for asbestos, which resulted in a positive test, and abatement controls were implemented by wrapping hot water pipes.

3.5 Commonly Known or Reasonably Ascertainable Information

When queried regarding commonly known or reasonably ascertainable information concerning the environmental status and potential issues of concern, Mr. Hamrey stated the facility has numerous pasts uses that included: the National Guard Armory from the 50-90's, Vacant (years not stated), and Juvenile Detention Center (years not stated). The subject site was used as the Boys and Girls Club as of the date of this report. Mr. Schlepp had no additional information for past uses of the building.

3.6 Valuation Reduction for Environmental Issues

When queried regarding valuation reduction for environmental issues, Mr. Hamrey stated the property was gifted from Nevada State Lands to Mineral County.

4 RECORDS REVIEW

The following sections include results and discussion of the search of local, state, and federal standard record sources.

4.1 Title Records

Title records retrieved from the Mineral County Recorder's Office on June 14, 2021, confirmed Mineral County Armory as the current owner(s) of the subject site (**Appendix 3**).

The readily accessible history of ownership information is presented in **Table 4-1.**

Table 4-1: Ownership History

Lot Information	Document Date	Description	Document Type
001-06-104	6/25/2015	Transfer of property from State of Nevada, Division of State Lands to Mineral County	Quitclaim Deed
001-06-104	4/25/2006	Transfer of property from the National Guard of Nevada to the Nevada Division of State Lands	Quitclaim Deed
001-06-104	2/8/2000	Lease between the National Guard of Nevada and State of Nevada for the Mineral County Juvenile Probation Department.	Lease

4.2 Environmental Database Search

A search of available federal and state environmental records was obtained from EDR. A copy of the documents provided by EDR can be found in the below referenced appendix:

- **Appendix 3 – Local and Regulatory Records**
- **Appendix 4 – EDR Radius Map Report**
- **Appendix 5 – Historical Map Reports and Imagery Data**

The regulatory database search contained within the EDR Radius Map Report (**Appendix 4**) was reviewed to assess possible RECs within the ASTM approximate minimum search distances. Some records reviewed pertain not only to the property, but also to properties within an additional approximate minimum search distance in order to help assess the likelihood of migrating hazardous substances or petroleum products. Relevant regulatory records for the case files discussed below are included in **Appendix 3**.

Numerous databases were searched during the preparation of this report. Those required under ASTM Standards E1527-13 and E2600-15 (ASTM, 2015) have been selected for discussion, in addition to noteworthy sites returned from supplemental databases, as applicable. Minimum search distances established by the ASTM Standard were requested for each of the required federal and state databases. Where the ASTM Standard for Phase I Environmental Site Assessments requires the database to be searched for the property and adjoining properties the minimum search distance is 0.125 miles. The required databases, database update information, and search distances, as well as the number of sites identified within the associated search radii are summarized in **Table 4-2** and **Table 4-3**. Additional database results are summarized in **Table 4-4**.

Table 4-2: Federal Environmental Records

Record Source	ASTM / EDR Search Distance (miles)	Within Subject Site	Within Search Radii	REC Identified
National Priorities List (NPL) Facilities	1.0	0	0	No
Delisted NPL Facilities	0.5	0	0	No
Superfund Enterprise Management System (SEMS) Facilities [formerly Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Facilities]	0.5	0	0	No
SEMS - Archive [formerly CERCLIS No Further Remedial Action Planned (NFRAP) Facilities]	0.5	0	0	No
Resource Conservation and Recovery Act (RCRA), Corrective Actions (CORRACTS) Treatment, Storage, and Disposal (TSD Facilities)	1.0	0	0	No
RCRA Non-CORRACTS TSD Facilities	0.5	0	0	No
RCRA Non-Generators	0.125	1	0	No
RCRA Large Quantity Generators	0.125	0	0	No
RCRA Small Quantity Generators	0.125	0	0	No
RCRA Very Small Quantity Generators [formerly Conditionally Exempt Small Quantity Generators]	0.125	0	0	No
Federal Institutional/Engineering Control Registries	Property Only	0	0	No
Federal Emergency Response Notification System (ERNS) List	Property Only	NR	NR	No

Table 4-3: State Environmental Records

Record Source	ASTM / EDR Search Distance (miles)	Within Subject Site	Within Search Radii	REC Identified
Equivalent NPL Facilities	1.0	0	0	No
Equivalent SEMS-CERCLIS Facilities [State Hazardous Waste Site (SHWS)]	0.5	0	7	No
Leaking Underground Storage Tanks (LUST)	0.5	0	0	No

Record Source	ASTM / EDR Search Distance (miles)	Within Subject Site	Within Search Radii	REC Identified
Registered Underground Storage Tanks (UST)	0.125	0	0	No
Registered Above Ground Storage Tanks (AST)	0.125	0	0	No
Institutional/Engineering Control	0.5	0	0	No
Voluntary Cleanup Sites	0.5	0	0	No
Brownfield Sites (State and Local Records)	0.5	0	4	No
Landfill/Solid Waste Disposal Sites	0.5	0	0	No

Table 4-4: Additional Relevant Environmental Records

Record Source	EDR Search Distance (miles)	Within Subject Site	Within Search Radii	REC Identified
Formerly Used Defense Sites	1.00	0	3	No
Department of Defense Sites	1.00	0	1	No
Unexploded Ordnance Sites	1.00	0	1	No
Facility Index System/Facility Registry System	TP	1	0	No
Enforcement & Compliance History Information	TP	1	0	No

Target Property (TP) is the subject site.

United States EPA, NPL
The EPA NPL database comprises confirmed or proposed hazardous waste sites targeted for possible long-term remedial action under the Superfund Program.

Neither the subject site nor facilities/properties within a 1-mile radius of the subject site were listed.

United States EPA, Delisted NPL
The EPA Delisted NPL database is a subset of the NPL.

Neither the subject site nor facilities within a 0.5-mile radius of the site were listed.

United States EPA, SEMS (formerly the CERCLIS List)
The SEMS (formerly CERCLIS) list is an EPA list of sites that are either proposed for or are on the NPL and sites that are in the screening and assessment phase for possible inclusion on the NPL. CERCLIS was renamed to SEMS by the EPA in 2015. Facilities identified by the EPA, which may have the potential for releasing hazardous substances into the environment are provided in the SEMS facilities list.

Neither the subject site nor facilities within a 0.5-mile radius of the site were listed.

United States EPA SEMS- Archive (formerly CERCLIS-NFRAP)
The SEMS-Archive tracks sites that have no further Federal Superfund Program remedial actions based on available information. CERCLIS-NFRAP was renamed SEMS-Archive by the EPA in 2015. The

SEMS-Archive list is an EPA database of former SEMS sites where no further remedial action is planned under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). SEMS-Archive sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

Neither the subject site nor facilities within a 0.5-mile radius of the site were listed.

United States EPA, RCRA, CORRACTS List
This list is a database of facilities subject to corrective action under RCRA. The list generally identifies EPA-listed facilities that have reported a release of hazardous waste or constituents into the environment and are undergoing corrective action. Corrective action may be required beyond the facility's boundary and can be required regardless of when the release occurred.

Neither the subject site nor facilities within a 1-mile radius of the site were listed.

United States EPA, RCRA non-CORRACTS, TSD Facilities List
This database identifies EPA-listed facilities which report storage, treatment, and/or disposal of hazardous waste under the EPA's RCRA program.

Neither the subject site nor facilities within a 0.5-mile radius of the site were listed.

United States EPA, RCRA Non-Generators List
This database identifies EPA-listed facilities which may store or transport hazardous waste or meet other RCRA requirements but do not generate hazardous waste.

The EDR Radius Report identified 1 site on the subject site.

NVARNG Hawthorne Armory, EPA ID: NVD986770717, was located on the subject site at 525 W 9th Street, Hawthorne, NV 89415. No violations or evaluations were found for this site. Additionally, the EDR database listed the site as ""Not a generator, verified". Based on this information, this site was not considered a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

United States EPA, RCRA Generators List
This database identifies EPA-listed facilities which generate or transport hazardous waste or meet other RCRA requirements. The types of facilities within this database include Large Quantity Generators, Small Quantity Generators, and Conditionally Exempt Generators.

Neither the subject site nor facilities within a 0.125-mile radius of the site were listed.

Federal Institutional Control/Engineering Control Registries
These registries comprise information obtained from two main sources. The first source, the Brownfield Management System, is a database designed to assist the EPA in collecting, tracking, and updating information relevant to federal, state, and local Brownfield programs. The Small Business Liability Relief and Brownfields Revitalization Act ("Brownfields Law," Public Law 107-118) defines a brownfield site as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant," as defined in CERCLA. The second source is a database of Superfund sites that have either an engineering or institutional control.

The subject site was not listed.

Federal ERNS List
This list comprises a database of emergency response actions and may include reported CERCLA hazardous substance releases or spills in quantities greater than the reportable quantity, as maintained at the National Response Center. Data since January 2001 has been received from the National Response System database as EPA no longer maintains this data.

The subject site was not listed.

State/Tribal Equivalent NPL: NDEP, Superfund Branch
The EPA NPL database comprises confirmed or proposed hazardous waste sites targeted for possible long-term remedial action under the Superfund Program. In Nevada, state equivalent NPL Facilities and/or sites are designed and overseen by NDEP, Bureau of Corrective Actions, Superfund Branch.

Neither the subject site nor facilities within a 1-mile radius of the site were listed.

State/Tribal Equivalent SEMS (formerly CERCLIS): NDEP Bureau of Corrective Actions, SHWS List
The NDEP Bureau of Correction Actions maintains a list and oversees cleanup of releases of regulated substances.

The EDR Radius map identified 7 sites within a 0.5-mile radius of the subject site.

- Mineral County School Tans FAC, Facility ID 9-000051, located upgradient at 851 A Street, Hawthorne, NV, 0.213 miles east of the subject site.

  Files reviewed from NDEP include Notification Data for Underground Storage Tanks. Five USTs were registered at this site with the State of Nevada Petroleum Fund. The USTs were 1,500 to 10,000 gallons in size for the storage of gasoline and diesel. All five are registered as Permanently Out of Use. UST Tank ID 001 is stated as being closed in 1994, no information was found pertaining to closure of this UST. UST Tank ID's 002 – 005 were closed in 1997. Two of the UST systems were closed by removal and two were closed in place with concrete slurry due to their proximity to structures. Associated dispensers and piping were also removed during UST closure. Soil samples were collected from beneath the removed USTs and a geoprobe was used to collect soil samples from the USTs closed in place. Soil samples collected from beneath USTs were non-detect or below state action levels for TPH. A test pit was excavated in the vicinity of the dispenser island when impacted soil was observed. The test pit was excavated to approximately 12 feet below ground surface (bgs). A soil sample was collected from the bottom of the test pit that came back with TPH concentrations of 3,200 ppm. A limited subsurface investigation was performed that revealed contamination extended approximately 40 to 50 ft bgs and laterally 20 to 30 feet, however, much of the contaminated soil appeared to have been excavated during the preliminary subsurface investigation (test pit). Closure was granted by NDEP in 1998. Due to groundwater depth being estimated at over 200 feet bgs, and water wells not being within ½ mile radius, and the majority of the soil contamination removed, this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Coppola Motors Inc., Facility ID 9-000059, located cross gradient at 901 Sierra Way, Hawthorne, NV, 0.405 miles east of the subject site.

  This site is listed as having a release to soil that was closed in 1993 by NDEP. During area reconnaissance the address 901 Sierra Way was not located. This site received regulatory closure

and the release was described in the EDR report as to soil only. Based on the regulatory closure, this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Rosemore Auto Supply, Facility ID J-000034, located cross gradient 999 East Street, Hawthorne, NV, 0.407 miles east-northeast of the subject site.

  This site is listed as having a release of motor oil to soil that was closed in 1995 by NDEP. As this site received regulatory closure and was to soil only this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Redman Petroleum Company, Facility ID 9-000050, located cross gradient at 826 Sierra Way, Hawthorne, NV, 0.414 miles east of the subject site.

  This site is listed as having a release of an unreported substance that was closed in 1996 by NDEP. During area reconnaissance the address 826 Sierra Way was not located. As this site received regulatory closure and was to soil only, this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Exxon, Facility ID 9-00011, located cross gradient at 975 Sierra Way, Hawthorne, NV, 0.415 miles east-northeast of the subject site.

  During area reconnaissance, the above address was observed to be Mineral County Senior Center and not an Exxon. The listing is for a release of an unreported substance to soil that was closed in 1992 by NDEP. Due to the discrepancy of the site location and the listed release receiving closure, this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- ACE Grullis, Facility ID 9-00039, located cross gradient at 812 Sierra Way, Hawthorne, NV, 0.415 miles east of the subject site.

  This site is listed with three registered USTs that ranged in size from 500 to 8,000 gallons in size for the storage of used oil and gasoline. All three are Permanently Out of Use. A release of an unreported substance to soil was reported in 1990 and received closure by NDEP in 1994. During area reconnaissance the address 812 Sierra Way could not be located, due to possible address discrepancies. As the site has received regulatory closure and the release was to soil only, this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- E-Z Serve #138, Facility ID 9-000048, located cross gradient at 792 E Street, Hawthorne, NV, 0.425 miles southeast of the subject site.

  This site is listed with three registered USTs, all were 10,000 gallons in size for the storage of gasoline. The USTs were closed in 1993 and are listed as Permanently Closed. A release to soil from an unreported substance (likely gasoline) was reported in 1990 and received closure from NDEP in 1993. During area reconnaissance the site location was not observed and no longer appears to exist. Due to the unverified location of the facility, and receiving regulatory closure based on soil-only contamination, the site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

State/Tribal LUST: NDEP, Bureau of Corrective Actions, LUST List
The LUST Information System is maintained by NDEP, Bureau of Corrective Actions. The Bureau maintains an inventory of sites with leaking underground storage tanks, including sites with tanks under investigation for potential leaks, confirmed leaks, and those to be closed.

Neither the subject site nor facilities within a 0.5-mile radius of the site were listed.

State/Tribal UST/AST: NDEP, Bureau of Corrective Actions, UST/AST Registration
This list identifies facilities containing registered USTs and/or ASTs.

Neither the subject site nor facilities within a 0.125-mile radius of the site were listed.

State/Tribal Institutional Controls/Engineering Controls/Voluntary Cleanup Sites
Institutional controls (administrative and legal controls) and engineering controls (physical barriers or processes) are designed to minimize the potential for human exposure to contaminants. NDEP provides oversight for the Nevada Voluntary Cleanup Program, which provides relief from liability to owners who undertake cleanups of contaminated properties.

Neither the subject site nor facilities within a 0.5-mile radius of the site were listed.

State/Tribal Brownfield Sites
NDEP Bureau of Corrective Actions maintains a list of Brownfield sites as part of its listing of clean-up evaluations and actions regarding sites with actual or potential contamination.

The EDR Report identified 4 brownfields sites within a 0.5-mile radius of the subject site.

- Babbit Site #6, APN 06-640-17, located downgradient at 26th and 27th street, 0.394 miles northwest of the subject site.

  The Babbit Site, also known as Babbit Housing Area or Babbitt Bowling Alley, was constructed during WWII to provide housing for civilian workers. A Phase I Environmental Assessment was conducted that identified the use of DDT, USTs used for heating oil, and electrical transformers that may have contained PCB oil as recognized environmental conditions. A Phase II ESA was conducted in 2009. The investigation identified the presence of asbestos, and DDT in surface debris and soil. Clean up activities took place that abated asbestos containing materials. Subsurface excavation was not completed due to finances. The building was demolished and does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Sixth Street School located upgradient at 360 6th Street, 0.455 miles southeast of the subject site. The Sixth Street School is on the National Register of Historic Places. This site operated as a school from 1886 until the 1960's. A Phase I Environmental Assessment was completed on October 7, 2016, no additional information was provided. Given that no known releases are associate with the site and the distance from the subject site, this listing does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Cinema Building located upgradient at 405 6th Street, 0.455 miles southeast of the subject site.

  The site was previously used as a cinema building, with an unknown date of closure. A Phase I Environmental Site Assessment was started March 8, 2016 with no completion date listed. At this

time, it has only been indicated that building materials would be the media affected but no clean-up has been done. As impacted media is listed as building materials, this listing does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- MCSD Administration Building, located upgradient at 500 C Street, 0.467 miles southeast of the subject site.

  The property was built in 1918 and operated as an administration building and high school. A Phase I Environmental Assessment was completed on the property November 4, 2016 and concluded no contaminants were found or media was affected. There are no current cleanup activities associated with property. As such, this site does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

State/Tribal Solid Waste Landfill (SWF/LF): NDEP, Bureau of Waste Management, Landfill List
NDEP Bureau of Waste Management, Solid Waste Management Branch, maintains lists of facilities including active solid waste disposal sites, inactive or closed solid waste disposal sites, and transfer facilities.

The EDR Report identified no solid waste facilities within the 0.5-mile search radius.

State/Tribal Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the 40 Code of Federal Regulations (CFR) Part 257 or Part 258 Subtitle D Criteria, which establish revised minimum federal criteria that include location restrictions, facility design and operating criteria, groundwater and landfill gas monitoring requirements, corrective action requirements, financial assurance requirements, and closure and post-closure care requirements.

The EDR Report identified no open dump inventory listings within the 0.5-mile search radius.

Formerly Used Defense Sites
Formerly Used Defense Sites are properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

The report identified 3 Formerly Used Defense sites within the 1.0-miles search radius.

- Hawthorne USO Site is located cross gradient at 950 East Street, 0.440 miles east of the subject site. The property which opened in 1942 is listed on the National Register of Historic Places in Mineral County. The building now functions as the Convention Center and does not appear to present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- 1957 Armed Forces Day Area is located downgradient, 0.709 miles northeast of the subject site. The property was established in 1956 under the Naval Ammunition Deport on the south area of Hawthorne Municipal Airport. This area used to be used for demonstration of simulated assaults and battlefield maneuvers. Live ammunition or rockets were never released during these demonstrations, this facility does not present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

- Hawthorne Municipal Airport is located down gradient, 0.952 miles north of the subject site. The property was established in 1930 as the Hawthorne Naval Ammunition Depot. In 1947 the airport was used jointly by civilians. The site is currently known as the Hawthorne Municipal Airport

and used as a public facility with an industrial park and racetrack. The facility does not present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

Department of Defense Sites

Federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

The report identified one Department of Defense Site within the 1.0-miles search radius.

Hawthorne Army Ammunition Depot is located cross gradient , 0.081 miles west of the subject site. The site is 147,236 acres that serves as a military storage facility for munitions, explosives, and mercury. However, the EDR report provided no database reports or other information indicating a contaminant release or other environmental concern with the reportable radius. Additionally, no buildings or storage facilities were observed to the west or north of the subject site within approximately 0.7-miles of the subject site during site reconnaissance activities. Based on this information, this site was not considered a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

Unexploded Ordnance Sites

Site locations that contain a listing of unexploded ordnance.

The report identified 1 Unexploded Ordnance site within the 1.0-miles search radius.

- 1957 Armed Forces Day Area is located down gradient, 0.965 miles northeast of the subject site. The site is identified as a Firing Range and is located near the Hawthorne Municipal Airport. The facility does not present a REC, CREC, HREC, BER, or VEC for the subject site at the time of this report.

Facility Index System/Facility Registry System

A central and common inventory of facilities monitored or regulated by the EPA, with cross reference to the program office data bases that have additional programmatic information about facilities.

The report identified 1 Facility Index System/Facility Registry System site within the 1.0-miles search radius.

- NVARNG Hawthorne Armory, EPA ID: NVD986770717, was located on the subject site at 525 W 9th Street, Hawthorne, NV 89415.

  No violations or evaluations have been found for this site. Additionally, the EDR report states the site has been verified as "not a generator". Based on this information, this site was not considered a REC. CREC, HREC, BER, or VEC for the subject site at the time of this report.

Enforcement & Compliance History Information

Integrated compliance and enforcement information for about 800,000 EPA regulated facilities nationwide.

The report identified 1 Enforcement & Compliance History Information site on the subject site. The subject site identifies no violation for the past 12 quarters. The subject site was not considered a REC. CREC, HREC, BER, or VEC for the subject site at the time of this report.

Orphan Sites
Due to discrepancies in the location of some facilities in the databases arising from incomplete or incorrect addresses, some facilities were listed as un-mappable, otherwise known as "orphan sites."

The report identified one orphan sites. BEC determined this site was not located within 1-mile of the subject site.

4.3 Local Records Documentation

Information regarding the subject site was obtained from the offices of the Mineral County Assessor's, the Mineral County Recorder, and NDEP (**Appendix 3**).

A historical EDR-City Directory Image Report was prepared for this site. Refer to the EDR-City Directory Image Report specific details (**Appendix 3**).

In the late nineteenth century, companies, such as the Sanborn Company, began preparing maps of central business districts for use by fire insurance companies. These maps were updated periodically throughout the twentieth century. Fire insurance maps often indicate construction materials, specific property use, and the location of other features such as gasoline storage tanks. Please refer to the Certified Sanborn Map for specific details regarding the lack of coverage for the subject site (**Appendix 5**).

Information from these reports was used to develop the site history (further discussed in Section 4.4).

The University of Nevada Radon Education Program compiles short-term radon test results that were completed by Nevada homeowners from 1989 to the present. The results were compiled for each county by zip code and a corresponding geographical information systems (GIS) map based on zip codes was designed by the University of Nevada Cooperative Extension and the Nevada Bureau of Mines and Geology. The MyHazards interactive webmap was reviewed and the Radon Potential in the vicinity of the subject site appears to be 20%-100% (UNR, 2019).

4.4 Historical Use Information on Property and Adjoining Properties

This section describes the historical land use of the subject site and adjoining properties compiled from several resources, including the EDR-City Directory Image Report (**Appendix 3)** and the Certified Sanborn Map Report and the Historical Topo Map Report and Satellite Imagery Data (**Appendix 5**).

The objective of consulting historical sources is to develop the history of the previous uses of the surrounding properties in order to help identify the likelihood of past uses having led to recognized environmental conditions in connection with the property. The historical uses of the subject site and properties in the immediate vicinity of the subject site are summarized below in **Table 4-8**.

Table 4-5: Subject Site and Vicinity Historical Land Use Observations

Year	Subject Site	Vicinity	Source(s) of Information
1954	Subject site is not present.	City grid visible to the north, east and south of the subject site area. Undeveloped land and road visible to the west of subject site area.	Aerial Photo 1" = 500'

Year	Subject Site	Vicinity	Source(s) of Information
1955	Subject site is not depicted.	Highway 95 and Airport landing strip depicted to the north of the subject area. A cemetery depicted northeast of the subject site area. Mineral County High School and Hawthorne labelled to the southeast of subject site area. Athletic field depicted to the south of the subject site area.	TP, Hawthorne, 15-minute
1974	Subject site is visible. One structure is visible and is consistent with current structure.	Additional city grid visible to the north of the subject site. Potential baseball field is visible to the south of the subject site. A developed paved road visible to the west of the subject site.	Aerial Photo 1" = 500'
1982	No significant change from the 1974 aerial photo.	Residential properties visible to the north of the subject site. Paved parking area visible to the south of the subject site.	Aerial Photo 1" = 500'
1984	No significant change from the 1982 aerial photo.	No significant change from the 1982 aerial photo.	Aerial Photo 1" = 500'
1987	Subject site is not depicted.	Military Reservation Boundary is labelled north, east, and south of the subject site area. Athletic Field, and Hawthorne Municipal Airport labelled to the north of subject site area. A swimming pool is depicted to the south of the subject site area. A well, tanks, Hawthorne Naval Base, and Babbitt is depicted northwest of the subject site area.	TP, Hawthorne West, 7.5-minute NE, Hawthorne East, 7.5-minute
1992	Subject site not listed in City Directory.	Listings on Armory Road and 9th street are residential residents.	EDR Digital Archive
1994	No significant change from the 1984 aerial photo.	Additional ball fields constructed to the south of subject site.	Aerial Photo 1" = 500'
1995	No significant change from 1992 City Directory.	No significant change from 1992 City Directory.	EDR Digital Archive
2000	Subject site listed as Nevada National Guard on West 9th Street.	No significant change from 1995 City Directory.	EDR Digital Archive
2005	Subject site not listed in City Directory.	Listings on Armory Road and 9th street are residential residents.	EDR Digital Archive
2006	No significant change from the 1994 aerial photo.	Four buildings constructed to the east of the subject site. Potential vehicles identified on the property south of the subject site.	Aerial Photo 1" = 500'
2010	No significant change from the 2006 aerial photo.	No significant change from the 2006 aerial photo.	Aerial Photo 1" = 500'

Year	Subject Site	Vicinity	Source(s) of Information
2010	No significant change from 2005 City Directory.	No significant change from 2005 City Directory.	EDR Digital Archive
2013	No significant change from the 2010 aerial photo.	No significant change from the 2010 aerial photo.	Aerial Photo 1" = 500'
2014	No significant change from 2010 City Directory.	No significant change from 2005 City Directory.	EDR Digital Archive
2014	Subject site is not depicted.	10th Street labelled north of the subject site area. Highway 359, B Street, C Street, D Street, East 5th Street labelled to the east of the subject site area. East 4th Street, East 3rd Street, East 1st Street, Hospital, Fire Station, and Police Station depicted southeast of the subject site area. Armory Road labelled to the west of the subject site area.	TP, Hawthorne West, 7.5-minute NE, Hawthorne East, 7.5-minute
2017	Subject site listed as Boys and Girls Clubs of Mason Valley on West 9th Street.	No significant change from 1995 City Directory.	EDR Digital Archive
2017	No significant change from the 2013 aerial photo.	No significant change from the 2013 aerial photo.	Aerial Photo 1" = 500'

5 SITE RECONNAISSANCE

The site reconnaissance was conducted to obtain information indicating the likelihood of identifying historical, recognized, and controlled environmental conditions in connection with the property and adjacent area. BEC performed the site reconnaissance on June 8th and 10th, 2021, beginning at approximately 2:30 PM. Alana Holt-Hall, Environmental Scientist, and Kelly Sheehan, Environmental Scientist were present for the site reconnaissance. The temperature was approximately 68 degrees Fahrenheit with winds approximately 14 miles per hour according to the Mammoth Yosemite Airport Station of the Weather Underground, 2021.

BEC performed a visual survey of the adjoining properties to the north, east, south, and west of the subject site in order to evaluate the types of businesses, structures and any conditions of the neighboring properties that may pose an environmental risk to the subject site. Structures of particular note (i.e., exposed pipes, above ground storage tanks, etc.) were photographed and observations recorded in a field log.

Conditions of the subject site and adjoining properties were visually evaluated for potential RECs. Photos taken during the site reconnaissance are provided in **Appendix 6 – Site Reconnaissance Documentation**.

5.1 General Site Setting

The subject site is comprised of a 2.58-acre parcel with two improvements located at 525 W 9th Street, Hawthorne, NV 89415, APN 001-061-04. Features of adjoining and nearby properties are identified in the Area Reconnaissance Map **(Appendix 1, Figure 3**). Key observations made during the exterior portion of

the site visit are depicted in the Site Reconnaissance Map (**Appendix 1, Figure 4**). The current use of adjoining properties to the north, east, south, and west, are described in **Table 2-1**.

5.2 Exterior Observations

BEC walked the perimeter of the subject site and noted conditions inconsistent with those expected for a residential neighborhood. The initial observations were conducted around the perimeter beginning at the front of the building along 9th street. The front building exterior was constructed of stucco and cinderblock (**Appendix 6, Photo 1 and Photo 2**). Severe peeling of paint was observed on the cinderblock northwest corner of the exterior front building (**Appendix 6, Photo 3**).

A wooden fence observed extending on the Armory Road located on the west side of the building (**Appendix 6, Photo 4**). The west wall of the building, constructed on cinderblock, had severe peeling of the exterior paint and a chain link fence that outlines the south perimeter of the building (**Appendix 6, Photo 5 and Photo 6**).

Two 500-gallon propane tanks were observed behind the building located on the southeast corner of the south wall, constructed of cinderblock (**Appendix 6, Photo 7**). A Conex box contains juvenile records located on the southwest corner of the south wall (**Appendix 6, Photo 8**). The yard located on the south portion of the parcel behind the Boys and Girls Club building was observed to be a dirt and a basketball court (**Appendix 6, Photo 9**). On the southeast corner of the east wall constructed of cinderblock, a grey plastic shed and white wooden shed was observed (**Appendix 6, Photo 10 and 11**). The south portion of the parcel is adjacent to the Lions Park and contains concrete slab and concrete paths throughout the yard (**Appendix 6, Photo 12**). On the southeast portion of the parcel on the northeast corner of the chain link fence, a vintage fire extinguisher was observed (**Appendix 6, Photo 13 and 14**).

The east wall of the building was constructed of stucco with electrical boxes, two garbage bins, and a fence were observed (**Appendix 6, Photo 15**).

5.3 Interior Observations

BEC walked through the interior of the subject site and noted any conditions inconsistent with its use as a childcare facility. The subject site was occupied, each room was visually inspected when unoccupied by children.

The subject site contained an entry way with double doors and glass window (**Appendix 6, Photo 1**). The entryway opened to hallway one that contained white and teal walls with a greeting window on the west interior wall (**Appendix 6, Photo 2**). The subject site contained shotgun styled rooms on the northwest portion of the building. The first room was the Boys and Girls Club Greeting Room (**Appendix 6, Photo 3**), the second room was the Office (**Appendix 6, Photo 4**), and the CP room contained the children toy storage (**Appendix 6, Photo 5**). The three subsequent rooms are attached to the Gym by three different doors. The gymnasium, like Hallway one, has two tone walls of white and teal that were in good condition. The gymnasium floor was also observed to have teal paint in poor condition (**Appendix 6, Photo 6**). The gymnasium contained six doors, one leading outside to the west of the building, one located on the east side of the gym that lead to the fenced in south portion of the parcel, one that lead to the kitchen attachment, one to Hallway one (**Appendix 6, Photo 7**), the two doors that lead to the CP room and office. The kitchen is located along the east wall of the gym and contains a sink, oven, microwave, and serving window (**Appendix 6, Photo 8**). The kitchen is also attached to an additional room called Kitchen Storage, the kitchen storage room contains a food warmer, refrigerator, and computer (**Appendix 6, Photo 9**). In the adjacent room, there was a single bathroom with an attached janitor closet (**Appendix 6, Photo 11)** and common household chemicals (**Appendix 6, Photo 12**).

The office for the Emergency Manager was located opposite of the single bathroom (**Appendix 6, Photo 13**) with an un-operational greeting window to the building entry way. The adjacent room, located on the other side of the hallway two double doors, is the teen room (**Appendix 6, Photo 14**). The teen room contained the computer room and is joined to a storage room, once used as the armory (**Appendix 6, Photo 15**). The storage room stores arts and crafts for children's activities **(Appendix 6, Photo 16**).

Hallway two contains two bathrooms, a boy and girls' room that are constructed identical. Both possess three shower stalls that are no longer in use (**Appendix 6, Photo 17 & 18**). Hallway two contains four more additional classrooms, A Room (**Appendix 6, Photo 19**), B Room (**Appendix 6, Photo 20**), C Room (**Appendix 6, Photo 21**) that contain county records and is kept locked, and D Room (**Appendix 6, Photo 22**) used as Emergency Management storage for COVID supplies is also kept lock. An exit door that leads to the east side of the building is located at the end of hallway two.

6 INTERVIEWS

The Phase I ESA is done to identify recognized environmental conditions that may be present due to past or present land use of the subject site, and/or properties in the site vicinity. BEC conducted interviews as discussed in Section 6.1 and Section 6.2 below. Interview documentation is provided in **Appendix 2**.

6.1 Interview with Owner Representative

BEC conducted an interview with Mr. Hamrey, owner representative, regarding the subject site on June 8, 2021. Mr. Hamrey stated he was not aware of any environmental liens or activity and use limitations involving the subject site. Mr. Hamrey had some specialized knowledge related to the property. He indicated the facility functioned as the National Armory form the 50's to the 90's, vacant, Juvenile Detention Center, and currently the Boys and Girls Club. He stated the property was gifted from the Nevada State Land. The property had no other known historical uses and Mr. Hamrey was unaware of any spills, chemical releases, or environmental cleanups on the property. Mr. Hamrey suggested to contact Curtis Schlep who may have additional information. However, Mr. Hamrey located the original blueprints for the Boys and Girls Club on June 29, 2021. He contacted BEC indicating that an underground fuel storage tank was depicted on the blueprints, and he would do further research on the whereabouts of the tank. As of June 30, 2021, Eric Hamrey has not provided a location or any further details pertaining to the tank.

6.2 Other Interviews

BEC conducted an interview with Mr. Schlepp, Vice President of the Mineral County Board, regarding the subject site on June 15, 2021. Mr. Schlepp stated the building was completely remodeled in 1999 for the Juvenile Detention Center. In the same year a fire suppression system was installed throughout the building. In 2005 the boiler was replaced in the building, and he indicated USTs have not been located on site. The building closed in 2013 as a Juvenile Detention Center. Mr. Schlepp also stated asbestos containing material had been found in the tiles and abatement was conducted on the hot water pipes in the form of sealing/covering exposed pipes.

7 LEAD-BASED PAINT INSPECTION

The limited lead-based paint inspection was performed on June 8, 9, and 10, 2021, as part of a due diligence study of the property in preparation for potential renovations and transfer of the property from Mineral County to the Boys & Girls Club. The inspection utilized the NDEP Brownfields Program Grant. The purpose of this investigation was to determine if any lead-based paint or lead-containing paint existed in the accessible portions of the building at the time of the limited survey. The following table summarizes components found "positive" for lead, as defined by the EPA and HUD. Results in **bold red**

indicate lead levels at or above the EPA Hazardous Levels of Lead regulations, concentrations equal to or greater than 5,000 µg/g. All surface coatings listed below are considered hazardous under OSHA regulations due to lead content.

Sample No.	Color	Component - Location	Lead	Threshold	Condition
Pb-4	White	Wall B – Pipe - Kitchen Storage	450 µg/g	5,000 µg/g	Intact
Pb-5	White	Wall D – Cinderblock – Kitchen Storage	320 µg/g	5,000 µg/g	Intact
Pb-6	**Green**	**Ceiling – Metal - Gym**	**13,000 µg/g**	**5,000 µg/g**	**Intact**
Pb-10	Gray	Wall A – Door Frame - Gym	860 µg/g	5,000 µg/g	Intact
Pb-19	Teal	Wall C – Pipe - Gym	1,000 µg/g	5,000 µg/g	Intact
Pb-20	Dark Grey	Wall B – Door - Gym	950 µg/g	5,000 µg/g	Intact
Pb-21	Light Grey	Wall B – Door - Gym	780 µg/g	5,000 µg/g	Intact
Pb-23	Light Grey	A Wall – Cinderblock – CP Room	46 µg/g	5,000 µg/g	Intact
Pb-28	Dark Grey	D Wall – Drywall - Office	140 µg/g	5,000 µg/g	Damaged
Pb-30	Light Grey	B Wall – Drywall - Office	37 µg/g	5,000 µg/g	Fair
Pb-31	Light Grey	C Wall – Cinderblock - Office	110 µg/g	5,000 µg/g	Intact
Pb-35	Light Grey	B Wall – Cinderblock – Greeting Room	140 µg/g	5,000 µg/g	Intact
Pb-36	Light Grey	C Wall – Cinderblock – Greeting Room	97 µg/g	5,000 µg/g	Intact
Pb-39	White	D Wall – Drywall – Staff Restroom	43 µg/g	5,000 µg/g	Damaged
Pb-40	White	B Wall – Drywall – Staff Restroom	40 µg/g	5,000 µg/g	Intact
Pb-44	White	B Wall – Drywall – Janitor Closet	47 µg/g	5,000 µg/g	Intact
Pb-47	White	C Wall – Drywall – Janitor Closet	46 µg/g	5,000 µg/g	Intact
Pb-56	White	B Wall – Brick - Kitchen	580 µg/g	5,000 µg/g	Intact
Sample No.	**Color**	**Component - Location**	**Lead**	**Threshold**	**Condition**
Pb-60	Dark Grey	A Wall – Entry Door - Entryway	160 µg/g	5,000 µg/g	Intact
Pb-61	Grey	A Wall – Entry Door/Window – Entryway	1,600 µg/g	5,000 µg/g	Intact
Pb-63	Teal	C Wall – Cinderblock – Hallway 1	42 µg/g	5,000 µg/g	Intact
Pb-64	Teal	A Wall – Cinderblock – Hallway 1	48 µg/g	5,000 µg/g	Intact
Pb-67	**Orange**	**Conex Box– Metal**	**45,000 µg/g**	**5,000 µg/g**	**Damaged**
Pb-68	White	B Wall – Cinderblock - Exterior	410 µg/g	5,000 µg/g	Deteriorated
Pb-70	White	D Wall – Cinderblock - Exterior	52 µg/g	5,000 µg/g	Damaged
Pb-72	White	A Wall – Cinderblock – Exterior	70 µg/g	5,000 µg/g	Deteriorated
Pb-73	White	Exterior Metal Fence	2,400 µg/g	5,000 µg/g	Deteriorated
Pb-76	White	A Wall – Cinderblock – Teen Room	85 µg/g	5,000 µg/g	Intact
Pb-77	Dark Grey	A Wall – Metal Door – Teen Room	2,100 µg/g	5,000 µg/g	Intact
Pb-78	Light Grey	A Wall – Metal Door Frame – Teen Room	4,100 µg/g	5,000 µg/g	Intact
Pb-79	Light Grey	B Wall – Cinderblock – Teen Room	65 µg/g	5,000 µg/g	Intact

Pb-81	Grey	Floor – Concrete - Storage	75 µg/g	5,000 µg/g	Damaged
Pb-82	White	B Wall – Cinderblock - Storage	41 µg/g	5,000 µg/g	Intact
Pb-92	White	A Wall – Drywall – A Room	170 µg/g	5,000 µg/g	Intact
Pb-93	Purple	B Wall – Drywall – A Room	150 µg/g	5,000 µg/g	Intact
Pb-96	Purple	C Wall - Metal Pipe – A Room	240 µg/g	5,000 µg/g	Intact
Pb-101	Yellow	A Wall – Cinderblock – B Room	140 µg/g	5,000 µg/g	Intact
Pb-106	White	C Wall – Wood Crown Molding – D Room	98 µg/g	5,000 µg/g	Intact
Pb-107	Yellow	C Wall – Drywall – D Room	130 µg/g	5,000 µg/g	Intact
Pb-109	Yellow	A Wall – Cinderblock – D Room	110 µg/g	5,000 µg/g	Intact
Pb-113	White	B Wall – Cinderblock – Hallway 2	230 µg/g	5,000 µg/g	Intact
Pb-129	White	B Wall – Cinderblock – C Room	290 µg/g	5,000 µg/g	Intact
Pb-131	White	C Wall – Cinderblock – C Room	250 µg/g	5,000 µg/g	Intact
Pb-132	White	Ceiling – Drywall – C Room	110 µg/g	5,000 µg/g	Intact
Pb-133	White	B Wall -Metal Heating Unit – C Room	130 µg/g	5,000 µg/g	Intact
Pb-137	White	B Wall – Stucco – Exterior	74 µg/g	5,000 µg/g	Intact
Pb-140	White	C Wall – Baseboard – D Room	70 µg/g	5,000 µg/g	Intact
Pb-141	White	Ceiling – Drywall – Hallway 2	42 µg/g	5,000 µg/g	Intact
Pb-152	White	D Wall – Cinderblock - Exterior	130 µg/g	5,000 µg/g	Damaged

The presence of lead within the subject site is a REC. Please see the attached Lead-Based Paint Report in **Appendix 8**.

8 ASBESTOS SURVEY

The limited asbestos survey was performed on June 8, 9, and 10, 2021, as part of a due diligence study of the property in preparation for potential renovations and transfer of the property from Mineral County to the Boys & Girls Club. The asbestos survey utilized the NDEP Brownfields Program Grant. The purpose of this investigation was to determine if any asbestos-containing materials (ACMs) existed in the accessible portions of the building at the time of the limited survey.

A total of 47 Homogeneous Areas (HAs) were identified during the visual assessment by a State of Nevada Licensed Asbestos Abatement Consultant and Building Inspector (Inspector). A total of 144 bulk ACM samples were collected and submitted to the Eurofins EMLab P&K (a TestAmerica Company) facility in Henderson, Nevada, under Chain of Custody (COC) protocol, for laboratory analysis of asbestos content. Based on a review of the laboratory analytical report, ACMs were identified in four HAs at the Boys & Girls Club building:

- EPA Category II Non-Friable ACM was identified in one HA:
    - BGA1: Rainbow Speckled Tile w/ Black Mastic
- EPA defined Friable ACM (Regulated ACM – RACM) was identified in three HAs:
    - BGA7: Yellow Air Unit Insulation

- BGA16: White Fabric Pipe Insulation
- BGA25: White Fabric Coated Pipe Insulation

The presence of ACM within the subject site is a REC. Please see the attached Limited Asbestos Survey Report in **Appendix 9**.

9 FINDINGS, OPINIONS, AND CONCLUSIONS

The following is a summary of findings associated with the ESA performed for the subject site:

- The regulatory database report was purchased through Environmental Data Resources, Inc. (EDR) and the review of the report identified the following:
  - The subject was listed in the Resource Conservation and Recovery Act (RCRA), Facility Index System/Facility Registry System (FINDS), and Enforcement & Compliance History Information (ECHO).
  - Seven State Hazardous Waste Site (SHWS), four US Brownfield Sites, one Formerly Used Defense Site (FUDS), one Department of Defense (DOD), and one Unexploded ordnance (UXO) within their respective search radii from the subject site.
- Due to discrepancies in the location of some facilities in the databases arising from incomplete or incorrect addresses, some facilities were listed as un-mappable, otherwise known as "orphan sites". One orphan site was identified in the EDR Radius Map Report but is not anticipated to present a REC for the subject site.

BEC has performed this Phase I ESA, Limited Asbestos Survey Report, and Lead-based Paint Inspection report in conformance with the scope and limitations of American Society of Testing and Materials (ASTM) Standard E1527-13, ASTM E2356-14, and Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2012 Edition) (HUD, 2012). Any exceptions to, or deletions from, this practice are described in Section 1.3 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except the following:

The following is a summary of the LBP Inspection for the subject site:

- As a result of the LBP inspection and sample analysis conducted June 8, 9, and 10, 2021, at the subject site, the presence of lead-containing surface coatings was confirmed throughout the interior and exterior of the main building at levels the Occupational Safety and Health Administration (OSHA) considers hazardous to building occupants. Additionally, paint on the ceiling of the gym and on the exterior of the conex box located immediately outside the main building had lead levels above the EPA Hazardous Levels of Lead regulations. Additional details are provided in the LBP Inspection Report provided as an appendix to this document.

The following is a summary of the Asbestos Survey for the subject site:

- As a result of the limited asbestos survey conducted on June 8, 9, and 10, 2021, at the subject site, Asbestos-Containing Material (ACM) was identified in four Homogeneous Areas at the Boys & Girls Club building. This included non-friable ACM in the mastic of the building's tile floor system and friable asbestos in the air unit insulation and two types of pipe insulation. Additional details are provided in the Limited Asbestos Survey Report provided as an appendix to this document.

BEC has performed this Phase I ESA in conformance with the scope and limitations of American Society of Testing and Materials (ASTM) Standard E1527-13. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this report. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except the following:

- A potential underground storage tank was observed on a blueprint for the Boys and Girls Club property by the Mineral County Public Works Director. However, the location and the condition of the potential underground fuel storage tank was unavailable at the time of publication for this report. This was considered a REC for the subject site at the time of this report.
- Lead-based paint (LBP) and lead containing surface coatings were identified throughout the subject building. This was considered a REC for the subject site at the time of this report. Asbestos Containing Materials (ACMs) were identified in four Homogeneous Areas within the main building. This was considered a REC for the subject site at the time of this report.
- It is the opinion of BEC the identified conditions above warrant additional investigation and mitigation.

10 PREPARER QUALIFICATIONS

The BEC Team members responsible for the development of this report are listed below and their qualifications are provided herein (**Appendix 7 – Environmental Professional Resumes and Certifications)**. The following statements are required in accordance with 40 CFR 312.21(d), and Section 12.13 *Environmental Professional Statement*, of ASTM E1527-13:

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professionals as defined in §312.10 of 40 CFR 312.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Alana Holt-Hall — 06/30/2021

Alana Holt-Hall
Preparer

Date

Stefanie Costa Rica — 6/30/2021

Stefanie Costa Rica, CEM
Reviewer

Date

Additionally, in accordance with the Nevada Revised Statutes 459.500, Section 1, a holder of a certificate who is responsible for service requiring certification shall ensure that each document relating to the service includes the following language:

I, Stefanie Costa Rica, hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state, and local statutes, regulations, and ordinances.

Stefanie Costa Rica — 6/30/2021

Stefanie Costa Rica, CEM
Certified Environmental Manager
No. 2453
Expires: March 29, 2022

Date

11 REFERENCES

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APPENDIX 1

Figures

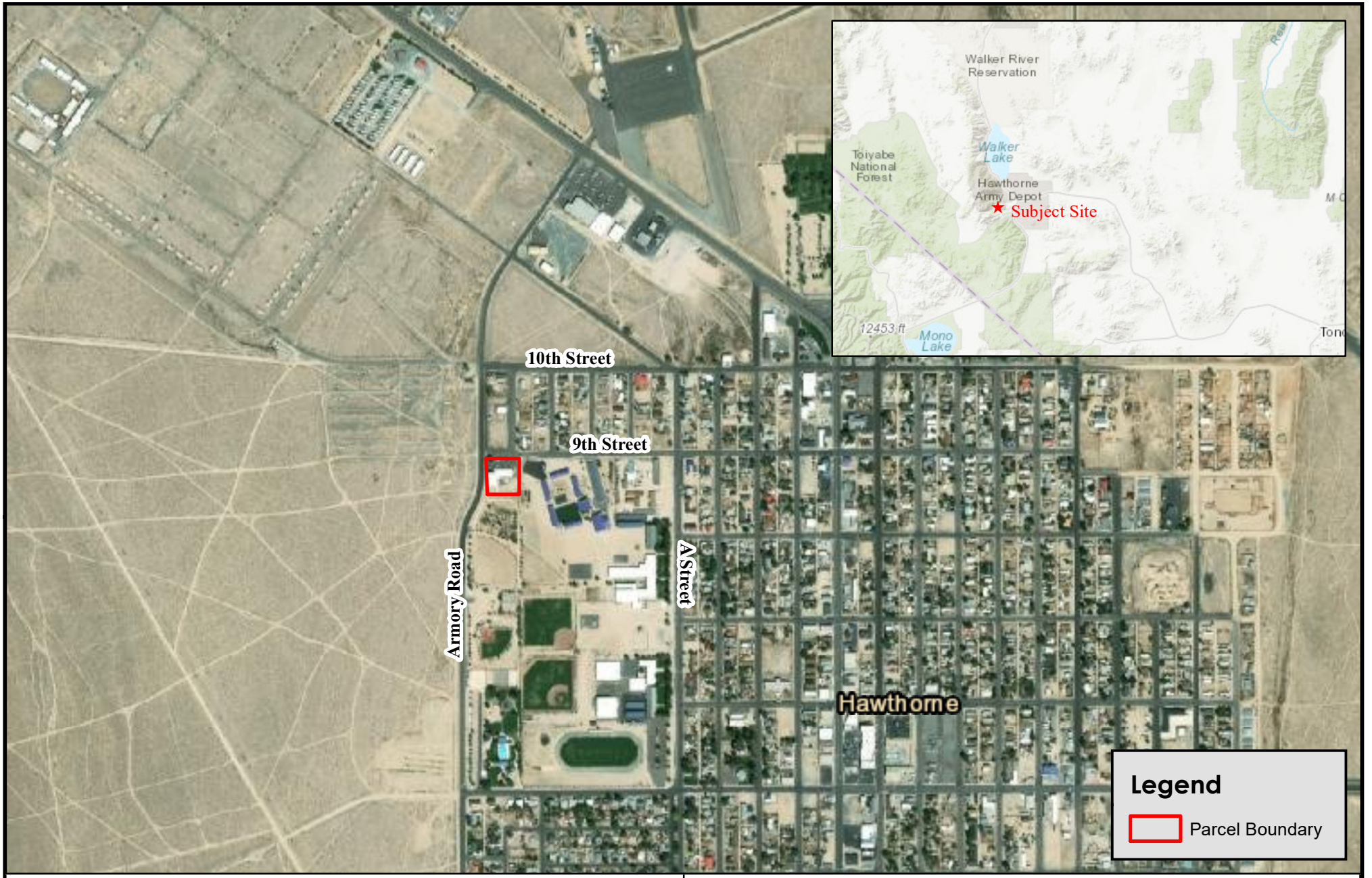


Figure 1 - Vicinity Map

Boys & Girls Club
525 W 9th Street
Hawthorne, NV 89415

bec environmental, inc.
Environmental Services

Figure 2 - Parcel Information Map

Boys & Girls Club
525 W 9th Street
Hawthorne, NV 89415

bec environmental, inc.
Environmental Services

Figure 3 - Area Reconnaissance Map

Boys & Girls Club
525 W 9th Street
Hawthorne, NV 89415

0 0.1 0.2 0.4
Miles

N

bec environmental, inc.
Environmental Services

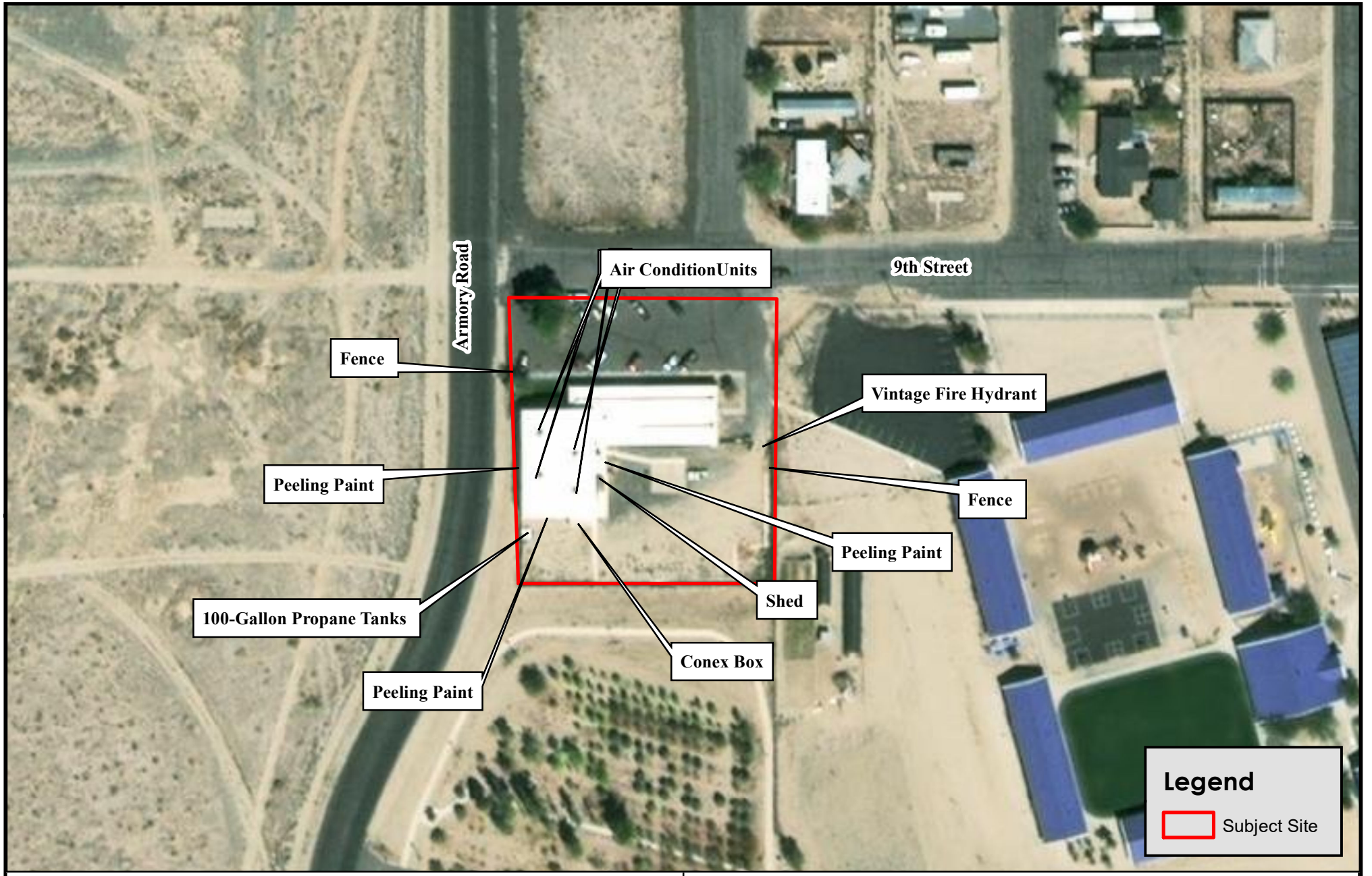


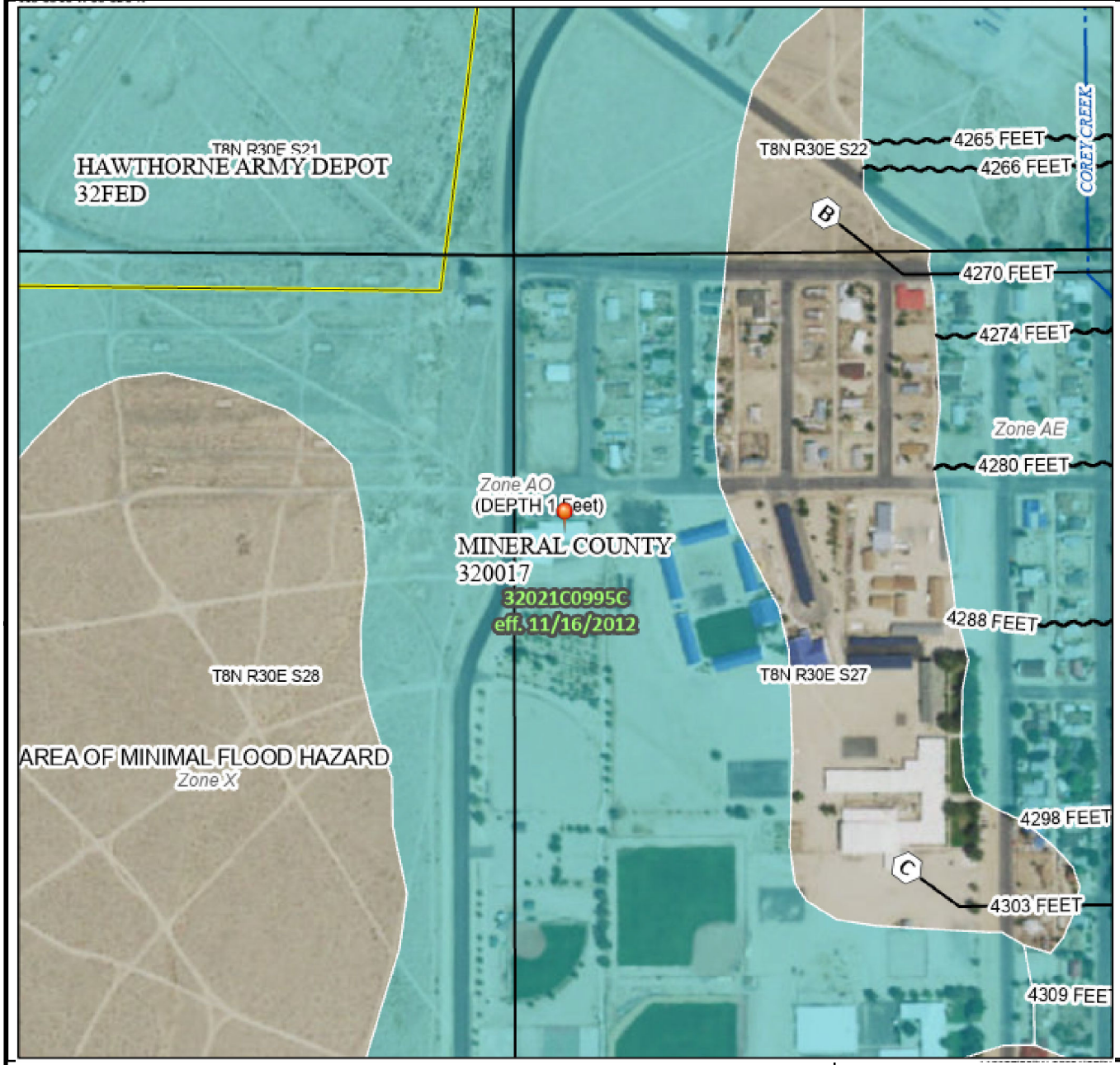
Figure 4 - Site Reconnaissance Map

Boys & Girls Club
525 W 9th Street
Hawthorne, NV 89415

0 162.5 325 650
Feet

N

bec environmental, inc.
Environmental Services



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/21/2021 at 12:03 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Figure 5 - Flood Zone Map

Boys & Girls Club
525 W 9th Street
Hawthorne, NV 89415

FEMA

NOT TO SCALE

N

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Environmental Services

APPENDIX 8

Lead-Based Paint Hazard Inspection Report

Lead-Based Paint Hazard Inspection Report

Boys & Girls Club

525 W 9th Street
Hawthorne, Nevada 89415

Mineral County
Assessor's Parcel Number 001-061-04

Prepared For:

Nevada Division of Environmental Protection
Ruben Ramos-Avina
901 South Stewart Street, Suite 4001
Carson City, Nevada 89701
(775) 687-9572
Task: BC15-21
Category:54
Organizational Code: 5420
Job Number: 6681717

Prepared By:

BEC Environmental, Inc.
7241 West Sahara Avenue, Suite 120
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(702)304-9830
www.becnv.com

June 30, 2021

BEC Project No. *018.17.001*

bec environmental, inc.
Environmental Services

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STANDARD ABBREVIATIONS

AIHA	American Industrial Hygiene Association
APN	Assessor's Parcel Number
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
ELLAP	Environmental Lead Laboratory Accreditation Program
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air
HUD	Housing and Urban Development
LBP	Lead-Based Paint
LCP	Lead-Containing Paint
NIST	National Institute of Standards and Technology
NLLAP	National Lead Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PCS	Performance Characteristic Sheet
RDSBC	Rural Desert Southwest Brownfields Coalition
RRP	Renovation, Repair, and Painting
SRM	Standard Reference Material
TCLP	Toxicity Characteristic Leaching Procedure
XRF	X-Ray Fluorescence

COMMON UNITS OF MEASURE

ft^2	Square-foot
mg/cm^2	Milligrams per square centimeter
mg/ft^2	Milligrams per square foot
mg/in^2	Milligrams per square inch
mg/kg	Milligrams per kilogram
ppm	Parts per million
$\mu g/ft^2$	Micrograms per square foot
µg/g	Micrograms per gram

EXECUTIVE SUMMARY

The Nevada Division of Environmental Protection (NDEP) retained BEC Environmental, Inc. (BEC), to perform a Lead-Based Paint (LBP) Inspection of the Boys & Girls Club, located at 525 W 9th Street, Hawthorne, Nevada on Mineral County Assessor's Parcel Number (APN) 001-061-04. The site consisted of a 2.58-acre parcel with an approximately 10,956-square-foot (ft^2) building listed as "Detention Center" by the Mineral County Assessor, constructed in 1960 and one "outbuilding structure" with an unknown square footage, constructed in 2020. The owner of the property is listed by the Mineral County Assessor's Office as Mineral County Armory. This site is currently used as a Boys and Girls Club, where children can spend the day when not in school.

Paint chip and soil sample collection was conducted by Alana Holt-Hall (BEC Environmental, Inc.), US Environmental Protection Agency (EPA) Certified Lead Risk Assessor (LBP R-I-30322-18-0016). A total of 151 paint chip samples were collected for lead content analysis, and one soil sample was collected from the bare dirt and gravel covered playground area.

As a result of the LBP inspection and sample analysis conducted at the subject site, the presence of lead-based surface coatings was confirmed on the subject property as of the date of the inspection (June 8, 9, and 10, 2021). The analytical results from the inspection identified the presence of LBP as defined by the EPA and US Housing and Urban Development (HUD) standards.

Confirmed LBP (surface coatings containing at least 5,000 micrograms per gram [µg/g] or ppm of lead) included:

Interior

- Gym
  - Green painted ceiling
  - Gray painted door frame
  - Teal painted pipe
  - Dark Grey painted door
  - Light Grey painted door
- Kitchen
  - White painted brick
- Kitchen Storage
  - White painted pipe
  - White painted cinderblock
- CP Room
  - Light Grey painted cinderblocks
- Office
  - Dark Grey painted wall
  - Light Grey painted wall
  - Light Grey painted cinderblocks
- Greeting Room
  - Light Grey painted cinderblocks
- Staff Restroom

    - White painted walls
- Janitor Closet
    - White painted walls
- Entryway
    - Dark Gray painted door
    - Grey painted entry door/window
- Hallway 1
    - Teal painted cinderblocks
- Hallway 2
    - White painted cinderblocks
    - White painted ceiling
- Teen Room
    - White painted cinderblocks
    - Light Gray painted cinderblocks
    - Light Gray painted door frame
    - Dark Gray painted door
- Storage
    - Grey painted floor
    - White painted cinderblocks
- A Room
    - White painted walls
    - Purple painted walls
    - Purple painted metal pipe
- B Room
    - Yellow painted cinderblocks
- C Room
    - White painted cinderblocks
    - White painted ceiling
    - White painted metal heating unit
- D Room
    - White painted crown molding
    - Yellow painted walls
    - Yellow painted cinderblocks
    - White painted baseboard

Exterior

- Orange painted Conex box
- White painted cinderblocks
- White painted stucco
- White painted metal fence

According to Chapter 7 HUD guidelines (Second Edition, 2012), if one testing combination (i.e., window, door, etc.) is positive for lead in an interior or exterior room equivalent, then all other similar testing combinations in those areas are also assumed to be positive for lead. Likewise, the same is true for negative readings. Inaccessible areas are generally assumed to be positive, even though they were not tested. Inaccessible areas encountered during the LBP inspection included the plumbing (water pipes).

Areas testing positive for the presence of LBP ranged from intact to damaged/deteriorated and therefore will require some form of hazard control measure to reduce or eliminate potential lead poisoning of site users. Since renovations are planned for the building, hazard control measures can include paint film stabilization (encapsulation) or LBP paint removal. Any workers and/or contractors at the site working with the LBP coatings must be trained in the hazards of working with LBP.

The analyzed soil sample had a lead level at less than 80 milligrams per kilogram (mg/kg). Current EPA and HUD Guidance for soil is 400 parts per million (ppm) (400 mg/kg equivalent) for bare soil in children's play areas and an average of 1,200 ppm (1,200 mg/kg) for other areas of bare soil. Using these criteria, the soil does not meet EPA or HUD thresholds for lead contaminated soil and no action is needed pertaining to soils.

Prior to initiating renovation activities at the site, an abatement plan should be prepared to address the stabilization, containment, packaging, handling, transport, and/or disposal of the regulated LBP identified at the site to satisfy regulatory requirements, as described in this report. If existing LBP is stabilized with non-LBP, a monitoring and maintenance plan would be necessary to monitor the condition of the painted surfaces at least annually or whenever the stabilizing paint becomes damaged, and to describe appropriate maintenance procedures.

After renovations and/or paint film stabilization (if selected for treatment of LBP) work has been completed, clearance dust samples should be taken to ensure the building is lead-safe before public use.

1 PURPOSE

The Nevada Division of Environmental Protection (NDEP) retained BEC Environmental, Inc. (BEC), to perform a Lead-Based Paint (LBP) Inspection of the of the Boys & Girls Club, located at 525 W 9th Street, Hawthorne, Nevada 89415, on Mineral County Assessor's Parcel Number (APN) 001-061-04. The NDEP Brownfields Program is funded by a U.S Environmental Protection Agency (EPA) 128(a) Brownfields Program Grant. The inspection was conducted by Alana Holt-Hall (BEC Environmental, Inc. – BEC), Environmental Protection Agency (EPA) Certified Risk Assessor (EPA License No. LBP-R-I212098-1) on June 9th, 2021. The purpose of the investigation was to determine if LBP hazards existed at the subject property and to determine the location, type, and magnitude of existing or potential health hazards associated with exposures to lead due to the condition of the LBP surface coatings and planned building renovations, identify the location of LBP, and identify the location of lead-containing paint (LCP).

LBP is defined by US Housing and Urban Development (HUD) regulations under Title X (Residential Lead-Based Paint Hazard Reduction Act of 1992) as a surface coating containing lead concentrations of 1.0 milligram per square centimeter (mg/cm²) or greater when measured by a portable X-ray fluorescence (XRF) instrument or 0.5% by dry weight [5,000 parts per million (ppm) or 5,000 micrograms per gram (µg/g)] when measured by laboratory analysis. Although Title X defines LBP hazards for residential facilities, industry standards have adopted the regulation for use in defining LBP hazards in all structures. However, in 40 Code of Federal Regulations (CFR) 745.83, the EPA defines a child-occupied facility as a building or portion of a building constructed prior to 1978, visited regularly by the same child under six years of age, on at least two different days within any week, provided that each day's visit lasts at least three hours, the combined weekly visits last at least six hours, and the combined annual visits last at least 60 hours; therefore non-residential buildings can be considered child-occupied facilities under some uses.

EPA requires individuals and firms who perform LBP activities including assessment and abatement to be certified and follow specific work practices, as described in 40 CFR Part 745 Requirements for Lead-Based Paint Activities in Target Housing and Child-Occupied Facilities (EPA, 1996). Renovation, repair, and painting activities of LBP are regulated by the EPA under 40 CFR Part 745 Renovation, Repair, and Painting Program. The Renovation, Repair, and Painting Rule does not apply to office buildings, stores, or other commercial buildings unless the renovation is taking place in a child-occupied facility (EPA, 2018).

The Occupational Safety and Health Administration (OSHA) regulates work activities where an employee may be occupationally exposed to LCP under 29 CFR 1926.62 (OSHA, 1993). Unlike the HUD and EPA regulations, OSHA has not established a lower threshold for lead in paint, because activities included in abatement, renovation, and demolition may entail exposures above the action levels even at extremely low concentrations of lead (OSHA, 2008). Assessment methodology is not outlined in 29 CFR 1926.62, thus, the LBP testing at this facility conformed with HUD guidelines in 24 CFR 35 Section 35.930 Subpart R.

2 INTRODUCTION

The following report details the results of the investigation. A summary of this report must be provided to each new lessee (tenant) or purchaser of this property under Federal and state law (24 CFR part 35 and 40 CFR part 745, and Nevada Revised Statute 645.194) before they become obligated under a lease or sales

contract, if the property or a portion of the property is a child-occupied facility. For residential properties or child-occupied facilities, the complete report must also be provided to purchasers, made available to tenants, and standard warning language must be included in leases or sales contracts.

EPA Certified Firms using Certified Renovators who have successfully completed the EPA-approved Renovation, Repair and Painting course should remove any lead-based paint hazards identified on this property. Refer to the EPA and state laws for additional requirements, depending on scope of work. For any partially or wholly federally funded project, all personnel disturbing the lead-based paint must be a Certified Renovator.

3 SCOPE

The scope of work for this project included conducting an LBP Inspection of one building in accordance with 40 CFR 745.227. The LBP inspection included components throughout the accessible interior and exterior areas of the site. Inspection work included a visual assessment, collecting paint chip and soil samples, and documentation of suspect and confirmed LBP as defined by the EPA. All painted and/or finished components were tested according to all applicable specifications described in protocols for LBP inspections from HUD Guidelines chapter 7 (revised 2012). In accordance with federal regulations an action level of 5,000 µg/g or ppm was used to determine the components which contained LBP.

The purpose for conducting the inspection was to determine the existence, nature, severity, location and amount of LBP hazards and to ensure all local, state and federal regulations related to hazardous waste are complied with during the planned renovation of the subject site. BEC's scope of work for this project did not include preparation of abatement plans or renovation guidance.

4 SITE DESCRIPTION

4.1 Narrative

The subject site is located at 525 W 9th Street, Hawthorne, Nevada 89415, Mineral County APN 001-061-04, a 2.58-acre parcel of land. Mineral County Assessor's Office data stated the subject site included one 10,956 square-foot structure with the description of "Detention Center," built in 1960, and one Outbuilding Structure with no floor area listed, built in 2020.

Based on interviews during the site inspection, the facility had numerous uses that included the National Guard Armory from the 1950's to 1990's, vacant for an unknown amount of time, a Juvenile Detention Center, and currently the Boys and Girls Club.

The site is located on the south side of 9th Street and to the east of Armory Road. Adjoining property to the north is residential, to the east is the Hawthorne Elementary School, to the south Lions Park and to the west is undeveloped land, Figure 1 (Attachment 2).

4.2 Building Condition

4.2.1 Exterior of the Building

Figure 2 (Attachment 2) shows the roof of the building and exterior portion of the site. The building is one-story and constructed of white painted brick with paint deterioration showing tan paint beneath. Paved parking lot and sidewalks appear to be in good condition.

4.2.2 Interior of the Building

Figures 3 and 4 (Attachment 2) show the building layout of the Boys and Girls Club. The **Entryway** leads to **Hallway 1** and **Hallway 2**. Access to **Hallway 2** is through a set of double-doors. The floors in these areas have 12 inch by 12 inch floor tiles and drywall walls and ceilings.

Hallway 1 provides access to the **Gym, Greeting Room**, **Pat's Office**, **Kitchen**, **Kitchen Storage**, **Staff Restroom**, and the **Janitors Closet**.

The **Gym** provides access to the **CP Room** and **Office**. The **Gym** contained blue painted concrete floors and blue painted and bare cinderblock walls. The ceiling was a green painted wood ceiling with metal beams. The **CP Room** contained white and dark grey painted cinderblock and drywall walls, carpeted floor, and two-foot by four-foot drop-in ceiling tiles. The **Office** contained white and dark gray painted drywall and cinderblock walls, carpeted floor, and two-foot by four-foot drop-in ceiling tiles.

The **Greeting Room** contained white painted cinderblock walls, with white piping and a heating register on the floor. The floor was carpeted, and the ceiling had two-foot by four-foot drop in ceiling tiles. **Pat's Office** contained two gray and white painted drywall walls and two yellow and white painted cinderblock walls with white piping and a heating register on the floor. The floor was carpeted, and the ceiling was two-foot by four-foot drop in ceiling tiles. The **Kitchen** and **Kitchen Storage** floors had 12 inch by 12 inch floor tiles and drywall walls/ceilings with a cinderblock wall separating the kitchen and the storage area. The **Staff Restroom** contained 12 inch by 12 inch floor tiles and white painted drywall walls and ceiling. The **Janitors Closet** contained a grey painted concrete floor with drywall walls.

Hallway 2 provides access to the **Teen Room**, **Storage**, **B Room, D Room, C Room, A Room, Girls Bathroom**, **and Boys Bathroom**. The **Teen Room** contained pink, blue, and white painted drywall walls and one white painted cinderblock wall with a white painted drywall ceiling. The floor was divided between carpet and 12 inch by 12 inch floor tiles with heat registers along the cinderblock wall. The **Storage Room** contained three white painted cinderblock walls and one white painted drywall wall with white painted drywall ceiling. The floor was gray painted concrete. **B Room** contained a cream painted cinderblock wall and three cream painted drywall walls and a white painted drywall ceiling. The floor had floor tiles. **D Room** contained one white painted cinder block wall, one yellow painted cinder block wall and two white painted drywall walls and ceiling. The floor was dark grey carpet.

C Room contained two white painted cinderblock walls, one white painted drywall wall, one purple painted drywall wall and one white painted drywall ceiling. The floor had 12 inch by 12 inch floor tiles. **A Room** contained one white painted cinderblock wall, two white painted drywall walls, one purple painted drywall wall and a white painted drywall ceiling. A green painted pipe traveled along the ceiling adjacent to the purple painted wall. The floor had 12 inch by 12 inch floor tiles.

The **Girls and Boys Bathrooms** were similarly designed with white and dark grey painted drywall walls, and white painted drywall ceiling. The floors were covered with cream ceramic tiles. Walls and shower stalls contained dark gray ceramic tiles. The **Boys Bathroom** shower stalls were boarded shut and inaccessible.

5 INVESTIGATION

5.1 Findings

The building appeared to be in overall good condition and its paint ranged from intact to deteriorated. The inspection showed lead hazards did exist throughout the building. The components listed in Table 5-1 were found "positive" for lead, as defined by the EPA and HUD. Results in **bold red** indicate lead levels at or above the EPA Hazardous Levels of Lead regulations, concentrations equal to or greater than 5,000 µg/g. All surface coatings listed below are considered hazardous under OSHA regulations due to lead content. Locations of lead-based paint samples are depicted on Figures 2, 3, and 4 – Lead Sample Locations for Exterior, Main Building and Gym.

Table 5-1. Identified Lead Containing Building Components

Sample No.	Color	Component - Location	Lead	Threshold	Condition
Pb-04	White	Wall B – Pipe - Kitchen Storage	450 µg/g	5,000 µg/g	Intact
Pb-05	White	Wall D – Cinderblock – Kitchen Storage	320 µg/g	5,000 µg/g	Intact
Pb-06	**Green**	**Ceiling – Metal - Gym**	**13,000 µg/g**	**5,000 µg/g**	**Intact**
Pb-10	Gray	Wall A – Door Frame - Gym	860 µg/g	5,000 µg/g	Intact
Pb-19	Teal	Wall C – Pipe - Gym	1,000 µg/g	5,000 µg/g	Intact
Pb-20	Dark Grey	Wall B – Door - Gym	950 µg/g	5,000 µg/g	Intact
Pb-21	Light Grey	Wall B – Door - Gym	780 µg/g	5,000 µg/g	Intact
Pb-23	Light Grey	A Wall – Cinderblock – CP Room	46 µg/g	5,000 µg/g	Intact
Pb-28	Dark Grey	D Wall – Drywall - Office	140 µg/g	5,000 µg/g	Damaged
Pb-30	Light Grey	B Wall – Drywall - Office	37 µg/g	5,000 µg/g	Fair
Pb-31	Light Grey	C Wall – Cinderblock - Office	110 µg/g	5,000 µg/g	Intact
Pb-35	Light Grey	B Wall – Cinderblock – Greeting Room	140 µg/g	5,000 µg/g	Intact
Pb-36	Light Grey	C Wall – Cinderblock – Greeting Room	97 µg/g	5,000 µg/g	Intact
Pb-39	White	D Wall – Drywall – Staff Restroom	43 µg/g	5,000 µg/g	Damaged
Pb-40	White	B Wall – Drywall – Staff Restroom	40 µg/g	5,000 µg/g	Intact
Pb-44	White	B Wall – Drywall – Janitor Closet	47 µg/g	5,000 µg/g	Intact
Pb-47	White	C Wall – Drywall – Janitor Closet	46 µg/g	5,000 µg/g	Intact
Pb-56	White	B Wall – Brick - Kitchen	580 µg/g	5,000 µg/g	Intact
Pb-60	Dark Grey	A Wall – Entry Door - Entryway	160 µg/g	5,000 µg/g	Intact
Pb-61	Grey	A Wall – Entry Door/Window – Entryway	1,600 µg/g	5,000 µg/g	Intact
Pb-63	Teal	C Wall – Cinderblock – Hallway 1	42 µg/g	5,000 µg/g	Intact
Pb-64	Teal	A Wall – Cinderblock – Hallway 1	48 µg/g	5,000 µg/g	Intact
Pb-67	**Orange**	**Conex Box– Metal**	**45,000 µg/g**	**5,000 µg/g**	**Damaged**

Pb-68	White	B Wall – Cinderblock - Exterior	410 µg/g	5,000 µg/g	Deteriorated
Pb-70	White	D Wall – Cinderblock - Exterior	52 µg/g	5,000 µg/g	Damaged
Pb-72	White	A Wall – Cinderblock – Exterior	70 µg/g	5,000 µg/g	Deteriorated
Pb-73	White	Exterior Metal Fence	2,400 µg/g	5,000 µg/g	Deteriorated
Pb-76	White	A Wall – Cinderblock – Teen Room	85 µg/g	5,000 µg/g	Intact
Pb-77	Dark Grey	A Wall – Metal Door – Teen Room	2,100 µg/g	5,000 µg/g	Intact
Pb-78	Light Grey	A Wall – Metal Door Frame – Teen Room	4,100 µg/g	5,000 µg/g	Intact
Pb-79	Light Grey	B Wall – Cinderblock – Teen Room	65 µg/g	5,000 µg/g	Intact
Pb-81	Grey	Floor – Concrete - Storage	75 µg/g	5,000 µg/g	Damaged
Pb-82	White	B Wall – Cinderblock - Storage	41 µg/g	5,000 µg/g	Intact
Pb-92	White	A Wall – Drywall – A Room	170 µg/g	5,000 µg/g	Intact
Pb-93	Purple	B Wall – Drywall – A Room	150 µg/g	5,000 µg/g	Intact
Pb-96	Purple	C Wall - Metal Pipe – A Room	240 µg/g	5,000 µg/g	Intact
Pb-101	Yellow	A Wall – Cinderblock – B Room	140 µg/g	5,000 µg/g	Intact
Pb-106	White	C Wall – Wood Crown Molding – D Room	98 µg/g	5,000 µg/g	Intact
Pb-107	Yellow	C Wall – Drywall – D Room	130 µg/g	5,000 µg/g	Intact
Pb-109	Yellow	A Wall – Cinderblock – D Room	110 µg/g	5,000 µg/g	Intact
Pb-113	White	B Wall – Cinderblock – Hallway 2	230 µg/g	5,000 µg/g	Intact
Pb-129	White	B Wall – Cinderblock – C Room	290 µg/g	5,000 µg/g	Intact
Pb-131	White	C Wall – Cinderblock – C Room	250 µg/g	5,000 µg/g	Intact
Pb-132	White	Ceiling – Drywall – C Room	110 µg/g	5,000 µg/g	Intact
Pb-133	White	B Wall -Metal Heating Unit – C Room	130 µg/g	5,000 µg/g	Intact
Pb-137	White	B Wall – Stucco – Exterior	74 µg/g	5,000 µg/g	Intact
Pb-140	White	C Wall – Baseboard – D Room	70 µg/g	5,000 µg/g	Intact
Pb-141	White	Ceiling – Drywall – Hallway 2	42 µg/g	5,000 µg/g	Intact
Pb-152	White	D Wall – Cinderblock - Exterior	130 µg/g	5,000 µg/g	Damaged

Based on this, untested areas of similar construction and look should be considered positive for LBP.

5.2 Determination of Lead-Based Paint Hazards

5.2.1 Soil Sample Results Summary

A composite soil sample was collected from bare soil along the southern portion of the property, as depicted on Figure 2 – Exterior, sample number Pb-151. The location was selected as it was bare gravel and dirt within the playground area.

The soil sample was collected in accordance with the requirements of American Society for Testing and Materials (ASTM) E1727, Standard Practice for Field Collection of Soil Samples for Lead Determination. A four-inch by four-inch area of surface soil (depth of less than 0.5 inches) was collected from six

locations within the playground area with a disposable plastic scoop. A standard resealable plastic bag was used to homogenize the soil before a four-ounce glass jar was filled with the composite soil sample.

This data (Table 5-2) is representative of the soil content determined via soil sample analysis at the time of the inspection. Analysis indicated the lead level in the soil at the playground area was below the EPA threshold to be considered lead contaminated soil. HUD reporting limits for lead in soil is considered a hazard at 1,200 µg/g or greater, or 400 µg/g or greater in children's play areas as defined in 40 CFR Part 745: Lead; Identification of Dangerous Levels of Lead (EPA, 2001) published on January 5, 2001.

Table 5-2. Composite Soil Sample Summary

Sample No.	Location	Results	Threshold
Pb-151	Composite sample collected from the gravel/dirt area of the playground	< 80 µg/g	1,200 µg/g

5.2.2 Paint Sample Results Summary

BEC visually assessed the site for impact or friction surfaces and all other signs or presence of deteriorated paint. Surfacing materials on interior and exterior surfaces were tested in accordance with ASTM E1729-05, Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination, and/or Chapter 7 of the HUD Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2012).

Data for all paint chip samples collected is in Table 5-3. Either stabilization or abatement would be required for surfaces with an LBP reading/value equal to or greater than 5,000 µg/g if renovation activities are planned. Results in **bold red** indicate lead levels at or above the EPA Hazardous Levels of Lead regulations, published on January 5, 2001, and constitutes a paint-lead hazard for that room. Figures 2 – 4 – Lead Sample Locations Main Building, Gym and Outside depict sample locations.

Table 5-3.Paint Chip Sample Data

Sample No.	Color	Component - Location	Lead	Threshold
Pb-1	White	Wall C – Drywall - Kitchen Storage	<36 µg/g	5,000 µg/g
Pb-2	White	Wall B – Wood - Kitchen Storage	<39 µg/g	5,000 µg/g
Pb-3	White	Wall C – Drywall - Kitchen Storage	<37 µg/g	5,000 µg/g
Pb-4	White	Wall B – Pipe - Kitchen Storage	450 µg/g	5,000 µg/g
Pb-5	White	Wall D – Cinderblock – Kitchen Storage	320 µg/g	5,000 µg/g
Pb-6	**Green**	**Ceiling – Metal - Gym**	**13,000 µg/g**	**5,000 µg/g**
Pb-7	White	Ceiling – Air Conditioner Unit - Gym	<37 µg/g	5,000 µg/g
Pb-8	Gray	Wall A – Door - Gym	<130µg/g	5,000 µg/g
Pb-9	Teal	Wall A – Cinderblock - Gym	<36 µg/g	5,000 µg/g
Pb-10	Gray	Wall A – Door Frame - Gym	860 µg/g	5,000 µg/g
Pb-11	Red	Wall D – Bookcase - Gym	<55 µg/g	5,000 µg/g
Pb-12	Blue	Wall D – Bookcase - Gym	<49 µg/g	5,000 µg/g
Pb-13	Teal	Wall D – Cinderblock- Gym	<36 µg/g	5,000 µg/g

Sample No.	Color	Component - Location	Lead	Threshold
Pb-14	Teal	Floor – Concrete - Gym	<78 µg/g	5,000 µg/g
Pb-15	Grey	Wall D - Door - Gym	<140 µg/g	5,000 µg/g
Pb-16	Light Gray	Wall D – Door - Gym	<60 µg/g	5,000 µg/g
Pb-17	Teal	Wall C – Cinderblock - Gym	<130 µg/g	5,000 µg/g
Pb-18	Teal	Wall B – Cinderblock - Gym	<35 µg/g	5,000 µg/g
Pb-19	Teal	Wall C – Pipe - Gym	1,000 µg/g	5,000 µg/g
Pb-20	Dark Grey	Wall B – Door - Gym	950 µg/g	5,000 µg/g
Pb-21	Light Grey	Wall B – Door - Gym	780 µg/g	5,000 µg/g
Pb-22	Dark Grey	D Wall – Cinderblock – CP Room	<38 µg/g	5,000 µg/g
Pb-23	Light Grey	A Wall – Cinderblock – CP Room	46 µg/g	5,000 µg/g
Pb-24	Light Grey	B Wall – Drywall – CP Room	<38 µg/g	5,000 µg/g
Pb-25	White	C Wall – Drywall – CP Room	<40 µg/g	5,000 µg/g
Pb-26	Light Grey	A Wall – Concrete – Windowsill	<37 µg/g	5,000 µg/g
Pb-27	Grey	B Wall – Wood - Door	<38 µg/g	5,000 µg/g
Pb-28	Dark Grey	D Wall – Drywall - Office	140 µg/g	5,000 µg/g
Pb-29	Light Grey	A Wall – Cinderblock - Office	<36 µg/g	5,000 µg/g
Pb-30	Light Grey	B Wall – Drywall - Office	37 µg/g	5,000 µg/g
Pb-31	Light Grey	C Wall – Cinderblock - Office	110 µg/g	5,000 µg/g
Pb-32	Light Grey	A Wall – Concrete - Office	<37 µg/g	5,000 µg/g
Pb-33	Dark Grey	D Wall – Drywall – Greeting Room	<40 µg/g	5,000 µg/g
Pb-34	Light Grey	A Wall – Cinderblock – Greeting Room	<36 µg/g	5,000 µg/g
Pb-35	Light Grey	B Wall – Cinderblock – Greeting Room	140 µg/g	5,000 µg/g
Pb-36	Light Grey	C Wall – Cinderblock – Greeting Room	97 µg/g	5,000 µg/g
Pb-37	Light Grey	A Wall – Concrete – Greeting Room	<37 µg/g	5,000 µg/g
Pb-38	White	A Wall – Drywall – Staff Restroom	<37 µg/g	5,000 µg/g
Pb-39	White	D Wall – Drywall – Staff Restroom	43 µg/g	5,000 µg/g
Pb-40	White	B Wall – Drywall – Staff Restroom	40 µg/g	5,000 µg/g
Pb-41	White	C Wall – Door Frame – Staff Restroom	<36 µg/g	5,000 µg/g
Pb-42	White	Ceiling – Pipe – Staff Restroom	<290 µg/g	5,000 µg/g
Pb-43	White	Ceiling – Drywall – Staff Restroom	<40 µg/g	5,000 µg/g
Pb-44	White	B Wall – Drywall – Janitor Closet	47 µg/g	5,000 µg/g
Pb-45	White	A Wall – Drywall – Janitor Closet	<40µg/g	5,000 µg/g
Pb-46	White	D Wall – Drywall – Janitor Closet	<39 µg/g	5,000 µg/g
Pb-47	White	C Wall – Drywall – Janitor Closet	46 µg/g	5,000 µg/g
Pb-48	White	Ceiling – Drywall – Janitor Closet	<38 µg/g	5,000 µg/g
Pb-49	White	C Wall – Drywall – Pats Office	<38 µg/g	5,000 µg/g
Pb-50	White	C Wall – Drywall – Pats Office	<56 µg/g	5,000 µg/g
Pb-51	White	D Wall – Pipe Insulation – Pats Office	<39 µg/g	5,000 µg/g

Sample No.	Color	Component - Location	Lead	Threshold
Pb-52	Grey	D Wall – Cinderblock – Pats Office	<39 µg/g	5,000 µg/g
Pb-53	Yellow	A Wall – Cinderblock – Pats Office	<36 µg/g	5,000 µg/g
Pb-54	Grey	B Wall – Drywall – Pats Office	<39 µg/g	5,000 µg/g
Pb-55	White	A Wall – Drywall – Kitchen Storage	<37 µg/g	5,000 µg/g
Pb-56	White	B Wall – Brick - Kitchen	580 µg/g	5,000 µg/g
Pb-57	White	C Wall – Drywall - Kitchen	<34 µg/g	5,000 µg/g
Pb-58	White	D Wall – Drywall – Kitchen	<38 µg/g	5,000 µg/g
Pb-59	White	A Wall – Drywall – Kitchen	<39 µg/g	5,000 µg/g
Pb-60	Dark Grey	A Wall – Entry Door - Entryway	160 µg/g	5,000 µg/g
Pb-61	Grey	A Wall – Entry Door/Window – Entryway	1,600 µg/g	5,000 µg/g
Pb-62	Teal	B Wall – Cinderblock - Entryway	<36 µg/g	5,000 µg/g
Pb-63	Teal	C Wall – Cinderblock – Hallway 1	42 µg/g	5,000 µg/g
Pb-64	Teal	A Wall – Cinderblock – Hallway 1	48 µg/g	5,000 µg/g
Pb-65	White	Ceiling – Cinderblock – Hallway 1	<39 µg/g	5,000 µg/g
Pb-66	White	Wood - Shed	<37 µg/g	5,000 µg/g
Pb-67	**Orange**	**Metal – Conex Box**	**45,000 µg/g**	**5,000 µg/g**
Pb-68	White	B Wall – Cinderblock - Exterior	410 µg/g	5,000 µg/g
Pb-69	White	C Wall – Cinderblock - Exterior	<35 µg/g	5,000 µg/g
Pb-70	White	D Wall – Cinderblock - Exterior	52 µg/g	5,000 µg/g
Pb-71	White	D Wall – Metal – Exterior Voltage Box	<39 µg/g	5,000 µg/g
Pb-72	White	A Wall – Cinderblock – Exterior	70 µg/g	5,000 µg/g
Pb-73	White	Exterior Metal Fence	2,400 µg/g	5,000 µg/g
Pb-74	Grey	C Wall – Drywall – Teen Room	<34 µg/g	5,000 µg/g
Pb-75	Pink	D Wall – Drywall – Teen Room	<37 µg/g	5,000 µg/g
Pb-76	White	A Wall – Cinderblock – Teen Room	85 µg/g	5,000 µg/g
Pb-77	Dark Grey	A Wall – Metal Door – Teen Room	2,100 µg/g	5,000 µg/g
Pb-78	Light Grey	A Wall – Metal Door Frame – Teen Room	4,100 µg/g	5,000 µg/g
Pb-79	Light Grey	B Wall – Cinderblock – Teen Room	65 µg/g	5,000 µg/g
Pb-80	White	D Wall – Concrete - Storage	<33 µg/g	5,000 µg/g
Pb-81	Grey	Floor – Concrete - Storage	75 µg/g	5,000 µg/g
Pb-82	White	B Wall – Cinderblock - Storage	41 µg/g	5,000 µg/g
Pb-83	White	C Wall – Cinderblock - Storage	<39 µg/g	5,000 µg/g
Pb-84	White	A Wall – Cinderblock - Storage	<38 µg/g	5,000 µg/g
Pb-85	White	A Wall – Concrete – Teen Room	<35 µg/g	5,000 µg/g
Pb-86	Dark Grey	B Wall – Drywall – Girls Restroom	<40 µg/g	5,000 µg/g
Pb-87	Dark Grey	B Wall – Drywall – Girls Restroom	<35 µg/g	5,000 µg/g
Pb-88	Dark Grey	C Wall – Drywall – Girls Restroom	<36 µg/g	5,000 µg/g
Pb-89	White	D Wall – Drywall – Girls Restroom	<40 µg/g	5,000 µg/g

Sample No.	Color	Component - Location	Lead	Threshold
Pb-90	Maroon	B Wall – Wood – Girls Restroom	<460 µg/g	5,000 µg/g
Pb-91	Grey	B Wall – Drywall – Boys Restroom	<38 µg/g	5,000 µg/g
Pb-92	White	A Wall – Drywall – A Room	170 µg/g	5,000 µg/g
Pb-93	Purple	B Wall – Drywall – A Room	150 µg/g	5,000 µg/g
Pb-94	White	C Wall – Cinderblock – A Room	<35 µg/g	5,000 µg/g
Pb-95	White	D Wall – Drywall – A Room	<34 µg/g	5,000 µg/g
Pb-96	Purple	C Wall - Metal Pipe – A Room	240 µg/g	5,000 µg/g
Pb-97	Purple	C Wall – Concrete Windowsill – A Room	<38 µg/g	5,000 µg/g
Pb-98	Green	C Wall – Concrete Windowsill – A Room	<36 µg/g	5,000 µg/g
Pb-99	Purple	Metal Doorframe – A Room	<39 µg/g	5,000 µg/g
Pb-100	Yellow	D Wall – Cinderblock – B Room	<35 µg/g	5,000 µg/g
Pb-101	Yellow	A Wall – Cinderblock – B Room	140 µg/g	5,000 µg/g
Pb-102	White	A Wall – Concrete Windowsill – B Room	<95 µg/g	5,000 µg/g
Pb-103	Yellow	B Wall – Drywall – B Room	<33 µg/g	5,000 µg/g
Pb-104	Yellow	D Wall – Drywall – B Room	<38 µg/g	5,000 µg/g
Pb-105	Grey	B Wall – Cinderblock – D Room	<36 µg/g	5,000 µg/g
Pb-106	White	C Wall – Wood Crown Molding – D Room	98 µg/g	5,000 µg/g
Pb-107	Yellow	C Wall – Drywall – D Room	130 µg/g	5,000 µg/g
Pb-108	Grey	C Wall – Drywall – D Room	<35 µg/g	5,000 µg/g
Pb-109	Yellow	A Wall – Cinderblock – D Room	110 µg/g	5,000 µg/g
Pb-110	Grey	D Wall – Drywall – D Room	<38 µg/g	5,000 µg/g
Pb-111	Yellow	A Wall- Concrete Windowsill – D Room	<36 µg/g	5,000 µg/g
Pb-112	White	B Wall – Pipe – D Room	<36 µg/g	5,000 µg/g
Pb-113	White	B Wall – Cinderblock – Hallway 2	230 µg/g	5,000 µg/g
Pb-114	White	C Wall – Drywall – Hallway 2	<38 µg/g	5,000 µg/g
Pb-115	White	Metal Doorframe – Room B	<35 µg/g	5,000 µg/g
Pb-116	White	D Wall – Drywall – Hallway 2	<35 µg/g	5,000 µg/g
Pb-117	White	A Wall – Drywall – Hallway 2	<36 µg/g	5,000 µg/g
Pb-118	Grey	A Wall – Drywall – Boys Restroom	<39 µg/g	5,000 µg/g
Pb-119	Grey	C Wall – Drywall – Boys Restroom	<39 µg/g	5,000 µg/g
Pb-120	White	A Wall – Drywall – Boys Restroom	<37 µg/g	5,000 µg/g
Pb-121	White	B Wall – Drywall – Boys Restroom	<38 µg/g	5,000 µg/g
Pb-122	Grey	C Wall – Drywall – Boys Restroom	<40 µg/g	5,000 µg/g
Pb-123	Grey	D Wall – Drywall – Boys Restroom	<34 µg/g	5,000 µg/g
Pb-124	Dark Blue	C Wall – Plastic Stall Door – Boys Restroom	<37 µg/g	5,000 µg/g
Pb-125	Dark Blue	Metal Stall Door – Boys Restroom	<38 µg/g	5,000 µg/g
Pb-126	Dark Grey	A Wall – Drywall Girls Restroom	<35 µg/g	5,000 µg/g

Sample No.	Color	Component - Location	Lead	Threshold
Pb-127	White	Ceiling – Drywall – D Room	<36 µg/g	5,000 µg/g
Pb-128	Purple	D Wall – Drywall – C Room	<39 µg/g	5,000 µg/g
Pb-129	White	B Wall – Cinderblock – C Room	290 µg/g	5,000 µg/g
Pb-130	White	A Wall – Drywall – C Room	<38 µg/g	5,000 µg/g
Pb-131	White	C Wall – Cinderblock – C Room	250 µg/g	5,000 µg/g
Pb-132	White	Ceiling – Drywall – C Room	110 µg/g	5,000 µg/g
Pb-133	White	B Wall -Metal Heating Unit – C Room	130 µg/g	5,000 µg/g
Pb-134	White	A Wall – Baseboard – C Room	<41 µg/g	5,000 µg/g
Pb-135	White	Pipe – C Room	<300 µg/g	5,000 µg/g
Pb-136	Grey	A Wall – Metal - Exterior	<71 µg/g	5,000 µg/g
Pb-137	White	B Wall – Stucco – Exterior	74 µg/g	5,000 µg/g
Pb-138	No Sample Collected			
Pb-139	No Sample Collected			
Pb-140	White	C Wall – Baseboard – D Room	70 µg/g	5,000 µg/g
Pb-141	White	Ceiling – Drywall – Hallway 2	42 µg/g	5,000 µg/g
Pb-142	White	C Wall – Baseboard – Teen Room	<150 µg/g	5,000 µg/g
Pb-143	White	Ceiling – Drywall – Boys Restroom	<37 µg/g	5,000 µg/g
Pb-144	White	Ceiling – Drywall – Girls Restroom	<39 µg/g	5,000 µg/g
Pb-145	White	Ceiling – Drywall – A Room	<38 µg/g	5,000 µg/g
Pb-146	White	Ceiling – Drywall – B Room	<38 µg/g	5,000 µg/g
Pb-147	White	B Wall – Drywall – Hallway 1	<39 µg/g	5,000 µg/g
Pb-148	Teal	B Wall – Cinderblock - Entryway	<37 µg/g	5,000 µg/g
Pb-149	Teal	D Wall – Cinderblock – Hallway 1	<39 µg/g	5,000 µg/g
Pb-150	White	Ceiling – Drywall – Staff Restroom	<35 µg/g	5,000 µg/g
Pb-152	White	D Wall – Cinderblock - Exterior	130 µg/g	5,000 µg/g

5.3 Additional Lead-Based Paint Findings

No additional findings.

5.4 Methods

The inspection of the subject site was undertaken to locate the existence of lead containing paint, assess the extent and causes of deterioration if present, and identify other potential lead-based paint hazards.

The collected paint chip samples were analyzed by Eurofins EMLab P&K (Laboratory ID: 178697), 17461 Derian Avenue Suite 100, Irvine, California 92614, (866) 888-6653. Eurofins EMLab P&K is a member of the National Lead Laboratory Accreditation Program (NLLAP) list, accredited through the American Industrial Hygiene Association (AIHA) for Environmental Lead, Environmental Lead Laboratory Accreditation Program (ELLAP) certified lab, ELLAP number 178697. Paint chip samples

were analyzed for lead using method EPA 3050B/7000B with results reported in parts per million (ppm); ppm is an equivalent to microgram per gram (µg/g).

The collected soil sample was analyzed by Eurofins J3 Resources, Inc., 3113 Red Bluff Road, Pasadena Texas 77503, (713) 290-0223 (Laboratory ID: 157714). Eurofins J3 Resources, Inc. is a member of the National Lead Laboratory Accreditation Program (NLLAP) list, accredited through the American Industrial Hygiene Association (AIHA) for Environmental Lead, Environmental Lead Laboratory Accreditation Program (ELLAP) certified lab, ELLAP number 178697. The soil sample was analyzed for lead using EPA method 3050B/6010B, with results reported in mg/kg; mg/kg is an equivalent measurement to ppm.

6 BACKGROUND INFORMATION AND EDUCATIONAL INFORMATION

6.1 Health Effects of Lead Exposure

Lead is a naturally occurring heavy metal element whose toxicity in humans has been well documented. Lead has no useful purpose in the human body and acts as a toxin. It takes the place of essential minerals such as calcium, potassium, and iron, which are vital to the construction and repair of bones, organs and blood. Lead attacks many different organs and body systems adversely impacting functions, including neurological, cardiovascular, renal, gastrointestinal, reproductive (greater than 90 percent passes from mother to fetus), skeletal, skin, and other body systems. Lead is widely present in the environment due to its natural occurrence and human activities which have introduced it into the general environment such as using lead paint. Lead exposures are a major health concern, especially in young children under the age of six.

Children, due to their smaller body mass and higher metabolism, are affected by lead exposures much more severely than adults. They ingest lead through daily hand-to-mouth activities and may develop severe attention deficit disorders, irreversible brain injury, learning disabilities and aggressive behaviors. The symptoms of lead poisoning often mimic other afflictions such as flu, colic or general malaise.

6.2 Sources of Lead Poisoning

Since lead is ingested by routine daily activities such as eating, playing and working, it is important to understand the sources of lead exposures. The most common places to find lead are interior and exterior paint, and contaminated dust or soil. Lead-based paint is most hazardous when it is chipping, peeling, cracking, or chalking, or applied to friction surfaces of components such as doors, windows, and floors. The abrasive action of painted surfaces rubbing together causes lead-containing paints to be ground into a fine dust. Lead dust can also be created from decaying vinyl mini blinds. Lead dust then settles on furniture, floors, and countertops, where adults and children can be exposed during regular activities.

Several other sources of lead include lead dust brought into the home from occupational exposures; water pipes, fixtures, and joints; decorative china; “leaded” crystal; fishing lures and sinkers; firearms ammunition; and wine bottles (older than mid-1990’s). Some hobbies (i.e. target shooting, model painting, etc.) may also contribute to lead contamination. Exposures to all sources of lead should be minimized or eliminated for health reasons.

6.3 Methods to Reduce Exposure to Lead Hazards

The simplest and often most effective way to reduce lead exposures is through regular washing of hands and horizontal surfaces in the building with a liquid hand soap or dish soap and water. It is highly recommended disposable cleaning materials be used to wash surfaces, to not re-contaminate them with a used mop or cloth.

Other ways of reducing lead hazards include taking shoes off before entering living areas if you have been in an area with the potential for lead dust, letting water run prior to drinking or cooking if there are lead-containing water pipes, covering lead-exposed soil with plant materials, and vacuuming with a HEPA filtered vacuum.

For more information regarding lead poisoning and prevention, contact the EPA National Lead Information Center at 800-424-LEAD (5323) or https://www.epa.gov/lead/forms/lead-hotline-national-lead-information-center. Locate an EPA certified inspection, risk assessment, or abatement firm at https://cfpub.epa.gov/flpp/pub/index.cfm?do=main.firmSearchAbatement.

7 RE-EVALUATION AND MONITORING SCHEDULE

Selected LBP treatments will need to be reexamined periodically to make certain they remain effective and to ensure new LBP hazards do not appear. The owner should monitor the condition of the paint that has been used to encapsulate or cover LBP, if implemented, at least annually, or more frequently if there is some indication the paint might be failing, to provide timely maintenance.

Interim control measures are initially less expensive, but they may be more expensive overall since they need to be reevaluated more frequently. The replacement and paint removal methods are more expensive initially, but do not require any reevaluation.

Once identified LBP abatement, or site renovation, is completed (if conducted), a clearance examination will need to be done to ensure no LBP dust remains at the site.

8 CONCLUSION

The components listed in Table 5-1 were found “positive” for lead, as defined by the EPA and HUD as containing lead in concentrations equal to or greater than 5,000 µg/g . According to Chapter 7 HUD guidelines (2012), if one testing combination (i.e., window, door) is positive for lead in an interior or exterior room equivalent, then all other similar testing combinations in those areas are also assumed to be positive for lead. Likewise, the same is true for negative readings.

All paint in inaccessible areas is assumed to be positive, even though not tested. The building plumbing (water pipes) was not accessed or tested during the sampling event.

This evaluation was completed in accordance with Lead Safe Housing Rule 24 CFR Part 35 subpart R as amended (2004). Attachment 1 contains the personal certifications of the inspectors. The floor plan for the building and exterior property boundaries are in Attachment 2. Attachment 3 contains photographs of areas with LBP. The sampling results are presented in Attachment 4.

Some painted surfaces may contain levels of lead below 1.0 µg/g . These components could create lead dust or lead-contaminated soil hazards if the paint is turned into dust by abrasion, scraping, sanding or friction. If conditions of intact paint surfaces become destabilized, these conditions will need to be

addressed in the future. When construction (including demolition) or modernization work is done on the premises (renovations), this report should be given to the contractors, as well as to any future tenants (space leases).

9 LIMITATIONS

This lead Hazard Inspection summary was prepared based on information gathered during our site visit, phone conversations with the owner, and interpretations of samples collected during the inspection. The inspection was comprehensive to the referenced building. Supplemental inspection and sampling may be required if additional areas/surfaces are exposed during any excavation, demolition, or if the scope of work is expanded to include additional buildings or buried/underground piping that have not been inspected or analyzed for lead content. Conditions may change due to deterioration or maintenance. The results and material conditions noted within this report were accurate at the time of the evaluation and in no way reflect the conditions at the property after the date of evaluation. No other environmental concerns or conditions were addressed during the LBP evaluation.

10 CERTIFICATION

All inspectors utilized by BEC Environmental, Inc. have EPA licensure, and are licensed lead risk assessors who have completed and passed the HUD Lead-based Paint Visual Assessment Training Course.

"The Federal Residential Lead-based Paint Hazard Reduction Act," 42 USC 4852d, requires sellers and landlords of most residential housing built before 1978 to disclose all available records and reports concerning lead-based paint and/or lead-based paint hazards, including the test results contained in this notice, to purchasers and tenants at the time of sale or lease upon lease renewal. This disclosure must occur even if hazard reduction or abatement has been completed. Failure to disclose these test results is a violation of the US Department of Housing and Urban Development and the US Environmental Protection Agency regulations at 24 CFR Part 35 and 40 CFR Part 745, and can result in fines for each violation. To find out more information about your obligations under federal lead-based paint requirements, call 1-800-424-LEAD or go to the web to www.epa.gov/lead..."

By acceptance of this report, the receiver agrees BEC Environmental, Inc. (and by extent the risk assessor, agents and or contractor's liability) is limited to the field sampling date only identified on the front of this report. The information contained in this report is a true and accurate representation of the lead-based paint conditions at the subject property at the time of the investigation, based on the professional judgment of the person(s) who conducted and reported this lead-based paint inspection and risk assessment:

Alana Holt-Hall
Alana Holt-Hall
EPA Licensed Lead Risk Assessor
LBP-R-I212098-1

06/30/2021
Date

Erika Balderson
Erika Balderson
EPA Licensed Lead Risk Assessor
LBP-R-I196099-1

06/30/2021
Date

GLOSSARY

Abatement – any measure or set of measures to permanently eliminate existing lead-based paint hazards.

Bare Soil – soil with little or no surface vegetation.

Chewable Surface – an interior or exterior surface a young child can mouth or chew. Hard metal substrates and other materials that cannot be dented by the bite of a young child are not considered chewable.

Child-Occupied Facility –a building or portion of a building constructed prior to 1978, visited regularly by the same child, under six years of age, on at least two different days within any week, provided that each day's visit lasts at least three hours, the combined weekly visits last at least six hours, and the combined annual visits last at least 60 hours.

Clearance Survey/Testing – a determination, through comparison of lead dust wipes, whether post-renovation cleaning has been properly completed to eliminate to presence of lead-containing dust. An examination of a residential dwelling or a child-occupied facility following an abatement project to determine whether or not the abatement has been successfully completed.

Components – specific design or structural elements or fixtures of a building or residential dwelling distinguished from each other by form, function, and location. Examples include: ceilings, walls, doors, door trim, floors, shelves, shelf supports, stair treads, stair risers, stair stringers, newel posts, railing caps, balustrades, windows and, built in cabinets, columns, beams, counter tops, and air conditioners; and exterior components such as painted roofing, chimneys, flashing, gutters and downspouts, soffits, fascia, rake boards, corner boards, bulkheads, doors and door trim, fences, lattice work, railings and railing caps, siding, handrails, stair risers and treads, stair stringers, columns, balustrades, windowsills or stools and troughs, casings, and sashes.

De Minimis Level – too minor to be considered a hazard or warrant consideration (20 square feet on exterior surfaces, two square feet per an interior room, or 10% of the total surface area for a small surface).

Deteriorated Paint – any interior or exterior paint or other coating that is peeling, chipping, chalking or cracking, or any paint or coating located on an interior or exterior surface or fixture that is otherwise damaged or separated from the substrate.

Friction Surface – an interior or exterior surface that is subject to abrasion or friction, including, but not limited to, certain window, floor, and stair surfaces.

Impact Surface – an interior or exterior surface that is subject to damage by repeated sudden force such as certain parts of door frames.

Lead-Based Paint (LBP) – defined by EPA regulations under Title X (Residential Lead-Based Paint Hazard Reduction Act of 1992) as surface coatings containing lead concentrations above 1.0 mg/cm² when measured by a portable XRF instrument or 0.5% by weight (5,000 parts per million) when measured by laboratory analysis.

Lead-Based Paint (LBP) Hazard – hazardous lead-based paint, dust-lead hazard or soil-lead hazard. Any lead-based paint on a friction surface that is subject to abrasion and where the lead dust levels on the nearest horizontal surface underneath the friction surface (e.g., the window sill, or floor) are equal to or greater than dust-lead hazard level thresholds. Any damaged or otherwise deteriorated lead-based paint on an impact surface is caused by impact from a related building component (such as a doorknob that knocks into a wall or a door that knocks against its door frame. Any chewable lead-based painted surface on which there is evidence of teeth marks. Any other deteriorated lead-based paint in any residential building or child-occupied facility or on the exterior of any residential building or child-occupied facility.

Lead-Containing Paint (LCP) – defined by the Occupational Safety and Health Administration (OSHA) as paint containing **any** level of lead.

Paint and other similar surface-coating materials – any fluid, semi-fluid, or other material, with or without a suspension of finely divided coloring matter, which changes to a solid film when a thin layer. This definition does not include the glaze applied to ceramic tiles.

Play area – area of frequent soil contact by children of less than six years of age as indicated by, but not limited to, such factors including the following: the presence of play equipment (e.g., sandboxes, swing sets, and sliding boards), toys, or other children's possessions, observations of play patterns, or information provided by parents, residents, care givers, or property owners.

Risk assessment – an on-site investigation to determine and report the existence, nature, severity, and location of lead-based paint hazards in residential dwellings, including: Information gathering regarding the age and history of the housing and occupancy by children under age six; Visual inspection; Limited wipe sampling or other environmental sampling techniques; Other activity as may be appropriate; and Provision of a report explaining the results of the investigation.

Room Equivalent – an identifiable part of a residence or building, such as a room, an exterior, a foyer, a staircase, a hallway or a lobby area.

Soil Lead Hazard – bare soil on residential real property or on the property of a child-occupied facility that contains total lead equal to or exceeding 400 parts per million (ppm) or 400 micrograms per gram (µg/g) in a play area or average of 1,200 ppm of bare soil in the rest of the yard based on soil samples.

Substrate – an underlying substance or layer.

Test Location – a specific area on a testing combination where either an XRF reading or a paint chip sample was taken.

Testing Combination – a unique combination of room equivalent, building component type, and substrate.

REFERENCES

ASTM. (2011). *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process.* ASTM.

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BEC. (2018). *Gem Theatre Phase I Environmental Site Assessment.* Pioche.

BEC. (2019). *Sampling and Analysis Plan: Gem Theatre Limited Phase II Environmental Site Assessment.*

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OSHA. (1993). *1926.62 Safety and Health Regulations for Construction - Lead.* Retrieved 2019, from Occupational Health and Safety Administration.

OSHA. (2008, September 10). *Standard Interpretations.* Retrieved April 8, 2019, from OSHA: https://www.osha.gov/laws-regs/standardinterpretations/2008-09-10

ATTACHMENT 1

Risk Assessor Certifications

United States Environmental Protection Agency

This is to certify that

Alana E Holt-Hall

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires August 05, 2023

LBP-R-I212098-1

Certification #

July 22, 2020

Issued On

Adrienne Priselac, Manager, Toxics Office

Land Division

United States Environmental Protection Agency

This is to certify that

Erika K Balderson

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires March 28, 2022

LBP-R-I196099-1

Certification #

March 14, 2019

Issued On

Adrienne Priselac, Manager, Toxics Office

Land Division

AIHA Laboratory Accreditation Programs, LLC

acknowledges that

Eurofins EMLab P&K

17461 Derian Ave. Suite 100, Irvine, CA 92614

Laboratory ID: 178697

along with all premises from which key activities are performed, as listed above, has fulfilled the requirements of the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC accreditation to the ISO/IEC 17025:2017 international standard, *General Requirements for the Competence of Testing and Calibration Laboratories* in the following:

LABORATORY ACCREDITATION PROGRAMS

✓	**INDUSTRIAL HYGIENE**	Accreditation Expires: September 01, 2021
✓	**ENVIRONMENTAL LEAD**	Accreditation Expires: September 01, 2021
✓	**ENVIRONMENTAL MICROBIOLOGY**	Accreditation Expires: September 01, 2021
☐	**FOOD**	Accreditation Expires:
☐	**UNIQUE SCOPES**	Accreditation Expires:

Specific Field(s) of Testing (FoT)/Method(s) within each Accreditation Program for which the above named laboratory maintains accreditation is outlined on the attached **Scope of Accreditation**. Continued accreditation is contingent upon successful on-going compliance with ISO/IEC 17025:2017 and AIHA-LAP, LLC requirements. This certificate is not valid without the attached **Scope of Accreditation**. Please review the AIHA-LAP, LLC website (www.aihaaccreditedlabs.org) for the most current Scope.

Beth Bair

Elizabeth Bair
Chairperson, Analytical Accreditation Board

Cheryl O. Morton

Cheryl O. Morton
Managing Director, AIHA Laboratory Accreditation Programs, LLC

Revision 17 – 09/11/2018

Date Issued: 08/21/2019

AIHA Laboratory Accreditation Programs, LLC
SCOPE OF ACCREDITATION

Eurofins EMLab P&K
17461 Derian Ave. Suite 100, Irvine, CA 92614

Laboratory ID: **178697**
Issue Date: 08/21/2019

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Industrial Hygiene Laboratory Accreditation Program (IHLAP)

Initial Accreditation Date: 06/01/2011

IHLAP Scope Category	**Field of Testing (FoT)** (FoTs cover all relevant IH matrices)	**Technology sub-type/ Detector**	**Published Reference Method/Title of In-house Method**	**Method Description or Analyte** (*for internal methods only*)
Asbestos/Fiber Microscopy Core	Phase Contrast Microscopy (PCM)		NIOSH 7400	

A complete listing of currently accredited Industrial Hygiene laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

AIHA Laboratory Accreditation Programs, LLC
SCOPE OF ACCREDITATION

Eurofins EMLab P&K
17461 Derian Ave. Suite 100, Irvine, CA 92614

Laboratory ID: **178697**
Issue Date: 08/21/2019

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

Environmental Microbiology Laboratory Accreditation Program (EMLAP)

Initial Accreditation Date: 07/01/2005

EMLAP Category	Field of Testing (FoT)	Method	Method Description (*for internal methods only*)
Fungal	Air - Direct Examination	EM-MY-S-1038	Preparation and Analysis of Spore Trap (Air) Samples for Fungal Spores, Other Biological and Non-Biological Particles
	Bulk - Direct Examination	EM-MY-S-1039	Preparation and Analysis of Tape, Swab, Wipe, Bulk and Dust - Soil Samples for Qualitative Direct Microscopic Examination
	Surface - Direct Examination	EM-MY-S-1041	Preparation and Analysis of Tape, Swab, Wipe, Bulk, and Dust - Soil Samples for Quantitative Direct Microscopic Examination
Bacterial	Legionella	EM-BT-S-1045	Enumeration of Legionella. International Standard ISO 11731:2017
		EM-BT-S-1687	CDC Laboratory protocol 2016

A complete listing of currently accredited Environmental Microbiology laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

AIHA Laboratory Accreditation Programs, LLC
SCOPE OF ACCREDITATION

Eurofins EMLab P&K
17461 Derian Ave. Suite 100, Irvine, CA 92614

Laboratory ID: **178697**
Issue Date: 08/21/2019

The laboratory is approved for those specific field(s) of testing/methods listed in the table below. Clients are urged to verify the laboratory's current accreditation status for the particular field(s) of testing/Methods, since these can change due to proficiency status, suspension and/or withdrawal of accreditation.

The EPA recognizes the AIHA-LAP, LLC ELLAP program as meeting the requirements of the National Lead Laboratory Accreditation Program (NLLAP) established under Title X of the Residential Lead-Based Paint Hazard Reduction Act of 1992 and includes paint, soil and dust wipe analysis. Air and composited wipes analyses are not included as part of the NLLAP.

Environmental Lead Laboratory Accreditation Program (ELLAP)

Initial Accreditation Date: 03/01/2017

Field of Testing (FoT)	Technology sub-type/ Detector	Method	Method Description (*for internal methods only*)
Paint		EPA SW-846 7000B Modified	
		NIOSH 7082	
Settled Dust by Wipe		EPA SW-846 7000B Modified	
		NIOSH 7082	

A complete listing of currently accredited Environmental Lead laboratories is available on the AIHA-LAP, LLC website at: http://www.aihaaccreditedlabs.org

ATTACHMENT 2

Floor Plan and Sample Locations

Figure 1 - Project Location Map

Boys and Girls Club 525 W 9th Street
Hawthorne, NV 89415

bec environmental, inc.
Environmental Services

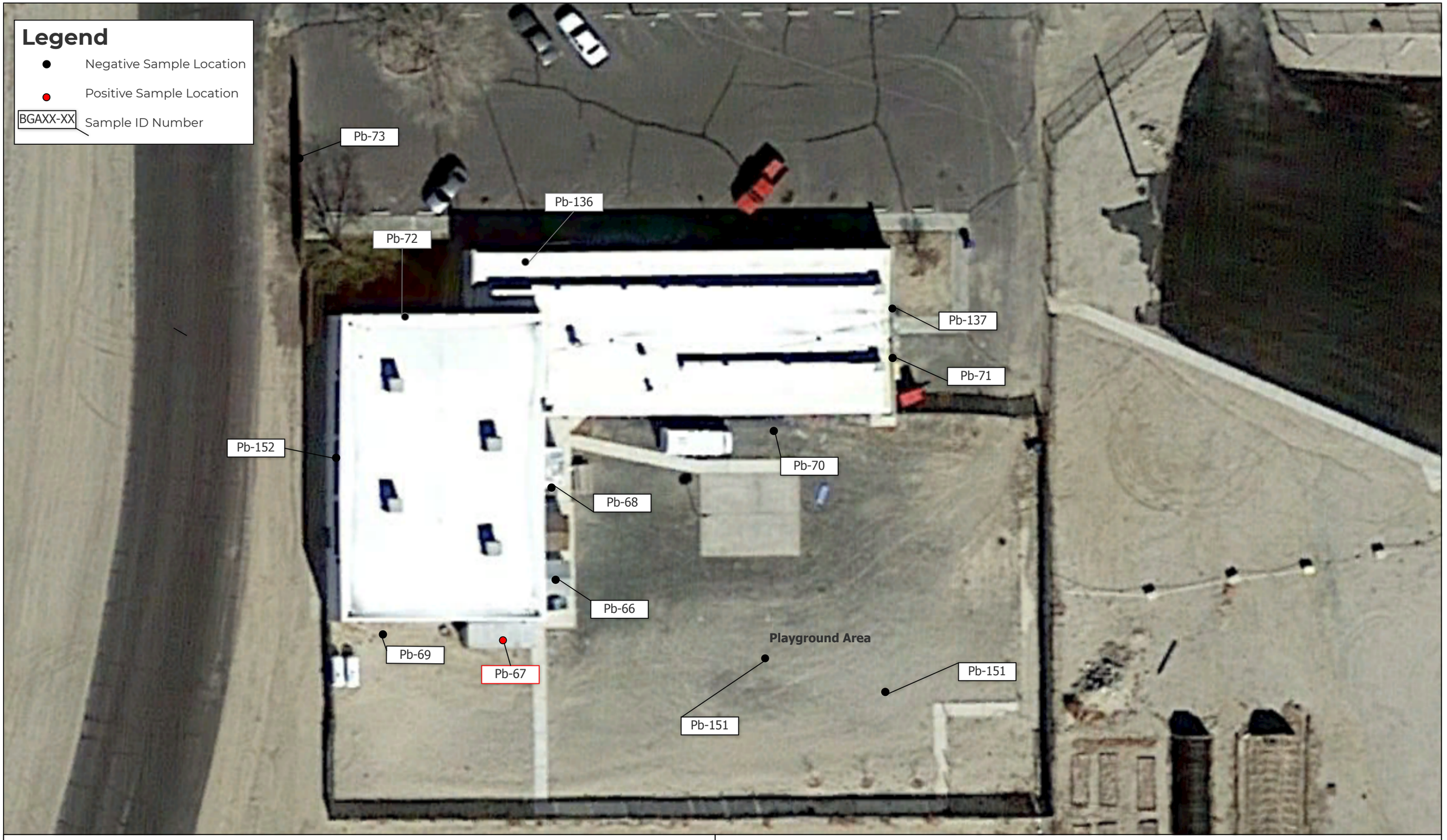

Figure 2 - Exterior
Boys & Girls Club
525 West 9th Street
Hawthorne, Nevada 89415

bec environmental, inc.
Environmental Services

NOT TO SCALE

N

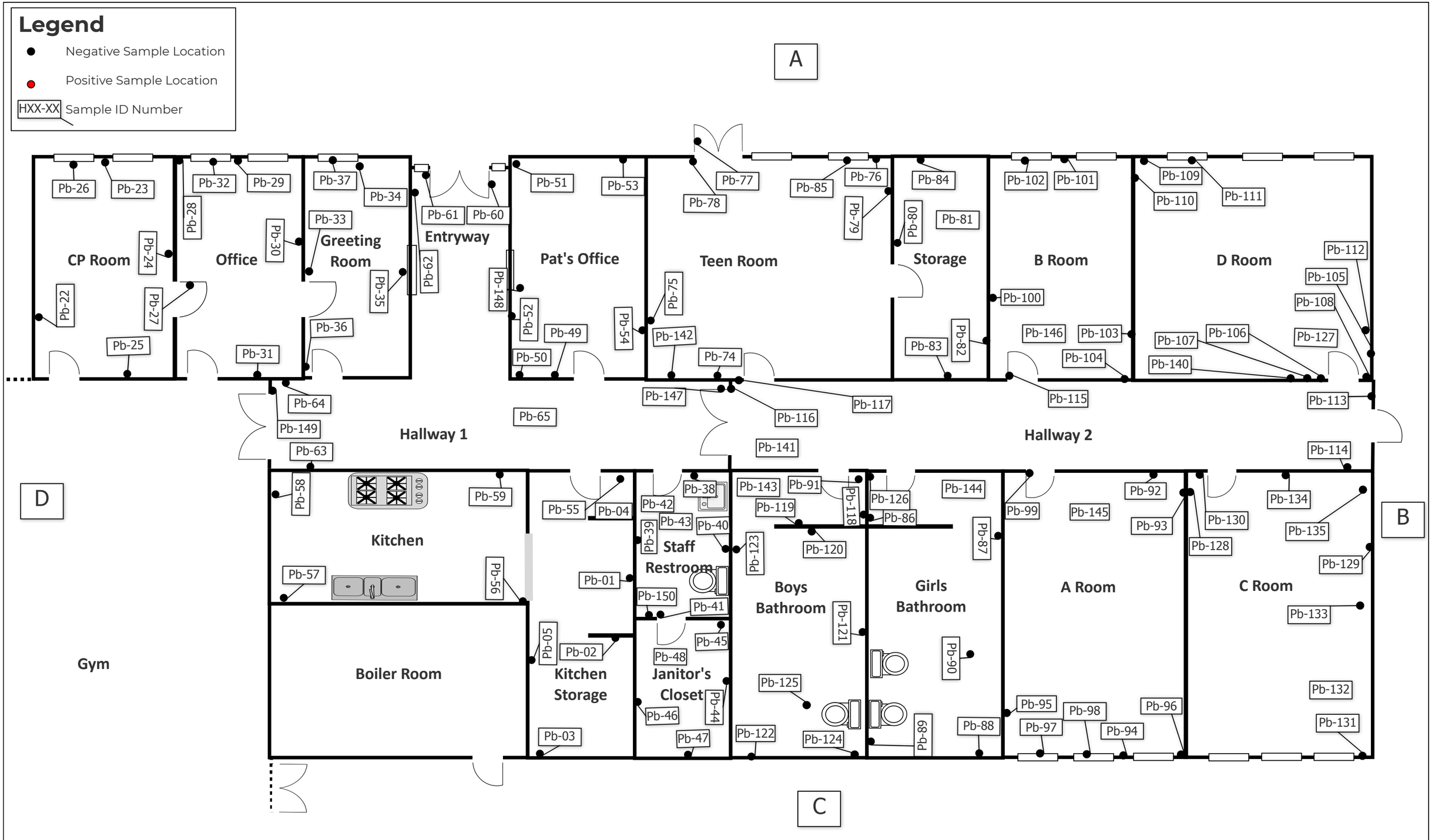

Figure 3 - Main Building

Boys and Girls Club
525 W 9th Street
Hawthorne, NV 89415

NOT TO SCALE

bec environmental, inc.
Environmental Services

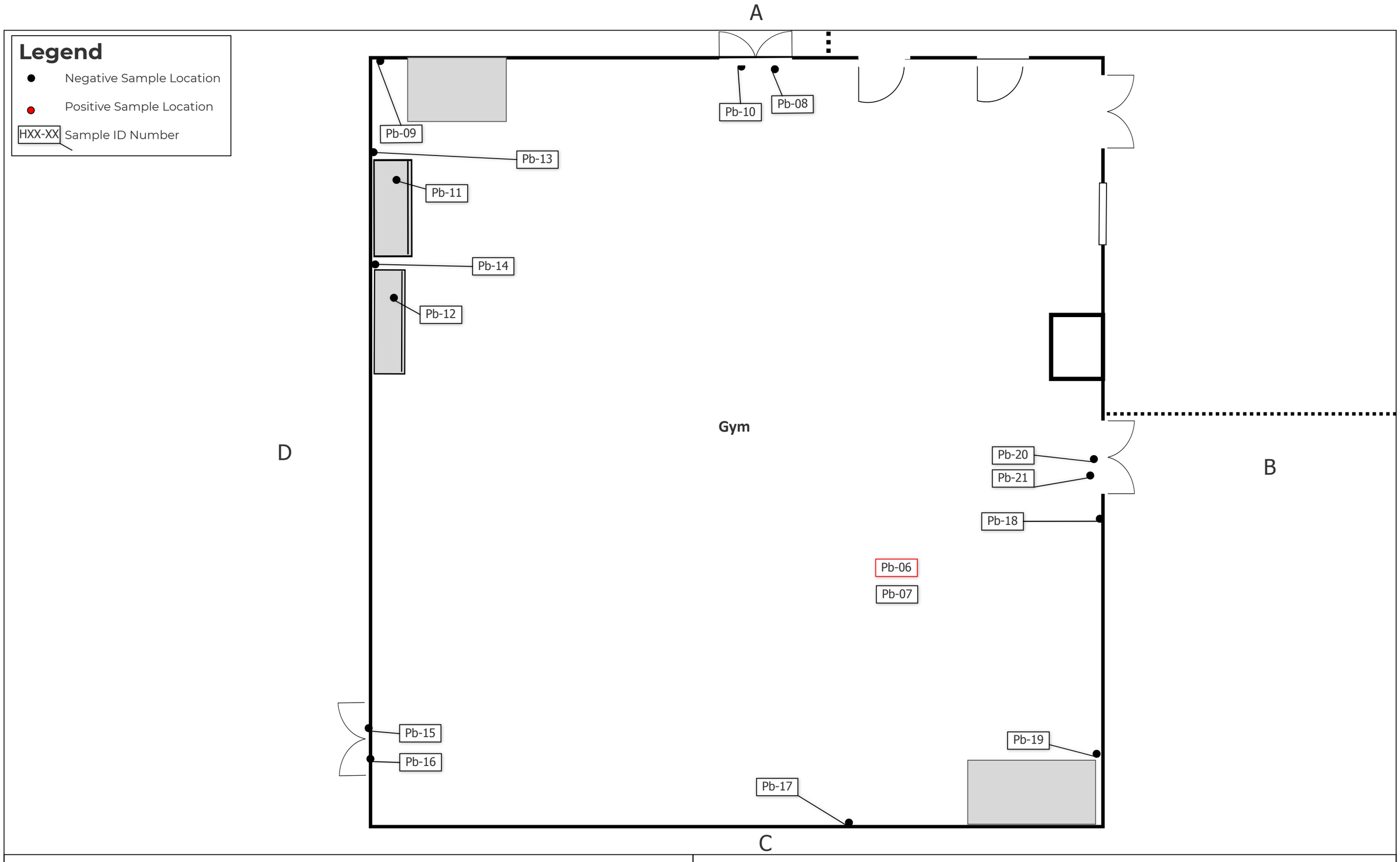

Figure ϕ - Gym
Boys and Girls Club
525 W 9th Street
Hawthorne, Nv 89415

NOT TO SCALE

bec environmental, inc.
Environmental Services

N

ATTACHMENT 3

Representative Photos

Photo 1

Conex box located on the C wall, southwest wall of the building.

Photo 2

Lead chip sample Pb-67 was taken from deteriorated peeling paint of conex box.

Photo 3

Over view of gym ceiling located in the southwest portion of the building.

Photo 4

Lead chip sample Pb-06 was taken from green ceiling beam with intact paint.

ATTACHMENT 4

Laboratory Results

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Marlton, NJ: 3000 Lincoln Dr E, Ste. A, Marlton, NJ 08053 * (856) 871-1984
Phoenix, AZ: 1501 West Knudsen Drive, Phoenix, AZ 85027 * (800) 651-4802
SSF, CA: 9000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6653

WEATHER	Fog
LEVEL None	
Light	
Moderate	
Heavy	

002661874

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117	
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9696	alana@becnv.com; eileen@becnv.com; becky@becnv.com	

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

REQUESTED SERVICES

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)
Pb - 01	White paint, dry wall substrate	B	STD	4 sq. in	
Pb - 02	White paint, wood substrate	B	STD	4 sq. in	
Pb - 03	White paint, dry wall substrate	B	STD	4 sq. in	
Pb -04	White paint, fabric pipe insulation	B	STD	4 sq. in	
Pb- 05	White paint, cinder block	B	STD	4 sq. in	
Pb - 06	Green paint, metal substrate	B	STD	4 sq. in	
Pb - 07	White paint, metal substrate	B	STD	4 sq. in	
Pb -08	Grey paint, metal substrate	B	STD	4 sq. in	
Pb - 09	Teal paint, cinder block	B	STD	4 sq. in	
Pb - 10	Light Grey paint, metal substrate	B	STD	4 sq. in	
Pb - 11	Red paint, wood substrate	B	STD	4 sq. in	
Pb - 12	Blue paint, wood substrate	B	STD	4 sq. in	
Pb - 13	Teal paint, cinder block	B	STD	4 sq. in	
Pb - 14	Teal paint, concrete substrate	B	STD	4 sq. in	
Pb - 15	Grey paint, metal substrate	B	STD	4 sq. in	

Requested Services	Trap	Tape, Swab, Bulk	BioCassette™, Andersen, SAS, Swab, Water, Bulk, Dust, Soil, Contact Plate	Other Requests
Spore Trap Analysis				
Other biological particles - supplement				
Direct Microscopic Exam (Qualitative)				
Quantitative spore count direct exam				
Dust Characterization				
1-Media Surface Fungi (Genus ID + Asp. spp.)				
Culturable Air Fungi (Genus ID + Asp. spp.)				
Gram Stain and Counts (Culturable Air and Surface Bacteria)				
Legionella culture				
Total Coliform, E.coli (Presence/Absence)				
Quantitative Sewage Screen				
OTHER: (please specify test)				
Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)				
Asbestos Bulk - PLM				
Lead (Pb) - Flame AA				X
PCR (please specify test)				
Allergens (please specify test)				

SAMPLE TYPE CODES

BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME
Kelly Sheehan	6/11/21 1440		6/11/21

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Phoenix, AZ: 1501 West Knudsen Drive, Phoenix, AZ 85027 * (800) 651-4802
SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6653

WEATHER	Fog	Rain	Snow	Wind	Clear
LEVEL: None					
Light					
Moderate					
Heavy					

002661874

Non-C

ICES

CONTACT INFORMATION			
Company:	BEC Environmental, Inc.	Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117	
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9930		

PROJECT INFORMATION				TURN AROUND TIME CODES - (TAT)	
Project ID:	018.17.001 - BCXX - Boys and Girls Club			STD - Standard (Default)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
Project Description:	Boys and Girls Club Lead Inspection			ND - Next Business Day	
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21	SD - Same Business Day	
PO Number:		Sampled By:	Alana Holt-Hall	WH - Weekend/Holiday/ASAP	

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)
Pb - 16	Light grey paint, metal substrate	B	STD	4 sq. in	
Pb - 17	Teal paint, cinder block substrate	B	STD	4 sq. in	
Pb - 18	Teal paint, cinder block	B	STD	4 sq. in	
Pb - 19	Teal paint, metal substrate	B	STD	4 sq. in	
Pb - 20	Dark grey paint, metal substrate	B	STD	4 sq. in	
Pb - 21	Light grey paint, metal substrate	B	STD	4 sq. in	
Pb - 22	Dark grey paint, cinder block	B	STD	4 sq. in	
Pb - 23	Light grey paint, cinder block	B	STD	4 sq. in	
Pb - 24	Light grey paint, drywall substrate	B	STD	4 sq. in	
Pb - 25	White paint, drywall	B	STD	4 sq. in	
Pb - 26	Light grey paint, concrete substrate	B	STD	4 sq. in	
Pb - 27	Grey paint, wood substrate	B	STD	4 sq. in	
Pb - 28	Dark grey paint, drywall substrate	B	STD	4 sq. in	
Pb - 29	Light grey paint, cinder block	B	STD	4 sq. in	
Pb - 30	Light grey paint, drywall	B	STD	4 sq. in	

	Spore Trap	Tape, Swab, Bulk	Anderson, SAS, Swab, Water, Bulk, Dust, Soil, Contact Plate											Other Requests					
	Spore Trap Analysis	Other biological particles - supplement	Direct Microscopic Exam (Qualitative)	Quantitative spore count direct exam	Dust Characterization	T-Media Surface Fungi (Genus ID + Asp. spp.)	Culturable Air Fungi (Genus ID + Asp. spp.)	Gram Stain and Counts (Culturable Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	Quanti-Tray Sewage Screen	OTHER: (please specify test)		Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCR (please specify test)	Allergens (please specify test)	
Pb - 16																X			
Pb - 17																X			
Pb - 18																X			
Pb - 19																X			
Pb - 20																X			
Pb - 21																X			
Pb - 22																X			
Pb - 23																X			
Pb - 24																X			
Pb - 25																X			
Pb - 26																X			
Pb - 27																X			
Pb - 28																X			
Pb - 29																X			
Pb - 30																X			

SAMPLE TYPE CODES			
BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan KS	6/11/21 1120		6/11/21

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Phoenix, AZ: 1501 West Knudsen Drive, Phoenix, AZ 85027 * (800) 661-4802
SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-8653

WEATHER		Fog	Rain	Snow	Wind	Clear
LEVEL	None					
	Light					
	Moderate					
	Heavy					

002661874

CONTACT INFORMATION			
Company:	BEC Environmental, Inc.	Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117	
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830	alana@becnv.com; eileen@becnv.com; casey@becnv.com	

PROJECT INFORMATION				TURN AROUND TIME CODES - (TAT)	
Project ID:	018.17.001 - BCXX - Boys and Girls Club			STD - Standard (Default)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
Project Description:	Boys and Girls Club Lead Inspection			ND - Next Business Day	
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21	SD - Same Business Day	
PO Number:		Sampled By:	Alana Holt-Hall	WH - Weekend/Holiday/ASAP	

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.):
Pb - 31	Light grey paint, cinder block substrate	B	STD	4 sq. in	
Pb - 32	Light grey paint, concrete substrate	B	STD	4 sq. in	
Pb - 33	Dark grey paint, drywall substrate	B	STD	4 sq. in	
Pb - 34	Light grey paint, cinder block	B	STD	4 sq. in	
Pb - 35	Light grey paint, cinder block	B	STD	4 sq. in	
Pb - 36	Light grey paint, cinder block	B	STD	4 sq. in	
Pb - 37	Light grey paint, concrete	B	STD	4 sq. in	
Pb - 38	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 39	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 40	White paint, drywall	B	STD	4 sq. in	
Pb - 41	White paint, metal	B	STD	4 sq. in	
Pb - 42	White paint, metal	B	STD	4 sq. in	
Pb - 43	White paint, drywall	B	STD	4 sq. in	
Pb - 44	White paint, drywall	B	STD	4 sq. in	
Pb - 45	White paint, drywall	B	STD	4 sq. in	

Non-C	Spore Trap	Swab	Bulk	Soil	Other Requests
Spore Trap Analysis					
Other biological particles - supplement					
Direct Microscopic Exam (Qualitative)					
Quantitative spore count direct exam					
Dust Characterization					
1-Media Surface Fungi (Genus ID + Asp. spp.)					
Culturable Air Fungi (Genus ID + Asp. spp.)					
Gram Stain and Counts (Cultured Air and Surface Bacteria)					
Legionella culture					
Total Coliform, E.coli (Presence/Absence)					
Dust-Tray-Swipe Screen					
OTHER: (please specify test)					
					Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)
					Asbestos Bulk - PLM
				X	Lead (Pb) - Flame AA
					PCR (Please specify test)
					Allergens (Please specify test)
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	
				X	

SAMPLE TYPE CODES			
BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME
Kelly Sheehan	6/11/21 1300

RECEIVED BY	DATE & TIME
	6/11/21

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SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6653

WEATHER	Fog	Rain	Snow	Wind	Clear
LEVEL None					
Light					
Moderate					
Heavy					

002661874

Non-C

CONTACT INFORMATION			
Company:	BEC Environmental, Inc.	Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117	
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830	alana@becnv.com; oliver@becnv.com; becky@becnv.com	

PROJECT INFORMATION				TURN AROUND TIME CODES - (TAT)	
Project ID:	018.17.001 - BCXX - Boys and Girls Club			STD - Standard (Default)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
Project Description:	Boys and Girls Club Lead Inspection			ND - Next Business Day	
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21	SD - Same Business Day	
PO Number:		Sampled By:	Alana Holt-Hall	WH - Weekend/Holiday/ASAP	

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)
Pb - 46	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 47	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 48	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 49	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 50	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 51	White paint, fabric pipe insulation	B	STD	4 sq. in	
Pb - 52	Gray paint, cinder block	B	STD	4 sq. in	
Pb - 53	Yellow paint, cinder block	B	STD	4 sq. in	
Pb - 54	Gray paint, drywall substrate	B	STD	4 sq. in	
Pb - 55	White paint, drywall substrate	B	STD	4 sq. in	
Pb - 56	White paint, cinder block	B	STD	4 sq. in	
Pb - 57	White paint, drywall	B	STD	4 sq. in	
Pb - 58	White paint, drywall	B	STD	4 sq. in	
Pb - 59	White paint, drywall	B	STD	4 sq. in	
Pb - 60	Dark grey, metal substrate	B	STD	4 sq. in	

SAMPLE TYPE CODES			
BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

	Spore Trap	Tape, Swab, Bulk	BioCassette - Andersen, SAS, Swab, Water, Bulk, Dust, Soil, Contact Plate											Other Requests					
	Spore Trap Analysis	Other biological particles - supplement	Direct Microscopic Exam (Qualitative)	Quantitative spore count direct exam	Dust Characterization	1-Media Surface Fungi (Genus ID + Asp. spp.)	Outdoor Air Fungi (Genus ID + Asp. spp.)	Gram Stain and Counts (Outdoor Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	QuantiTray-Sewage Screen	OTHER: (please specify test)		Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCR (please specify test)	Allergens (please specify test)	
Pb - 46																X			
Pb - 47																X			
Pb - 48																X			
Pb - 49																X			
Pb - 50																X			
Pb - 51																X			
Pb - 52																X			
Pb - 53																X			
Pb - 54																X			
Pb - 55																X			
Pb - 56																X			
Pb - 57																X			
Pb - 58																X			
Pb - 59																X			
Pb - 60																X			

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/21 1300		6/11/21

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SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6853

WEATHER	Fog	Rain	Snow	Wind	Clear
LEVEL None					
Light					
Moderate					
Heavy					

Non-Culturable

002661874

Spore Trap | Tape, Swab, Bul.

hor Requests

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830		alana@becnv.com; aileen@becnv.com; bookyn@becnv.com

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)	Spore Trap Analysis	Other Biological particles - supplement	Direct Microscopic Exam (Qualitative)	Quantitative spore count direct exam	Dust Characterization	Media Surface Fungi (Genus ID + Asp. spp.)	Culturable Air Fungi (Genus ID + Asp. spp.)	Gram Stain and Counts (Culturable Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	Quanti-Tray-Sewage Screen	OTHER: (please specify test)	Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCR (please specify test)	Allergens (please specify test)
Pb - 61	Grey paint, metal substrate	B	STD	4 sq. in																X		
Pb - 62	Teal paint, cinder block	B	STD	4 sq. in																X		
Pb - 63	Teal paint, cinder block	B	STD	4 sq. in																X		
Pb - 64	Teal paint, cinder block	B	STD	4 sq. in																X		
Pb - 65	White paint, drywall substrate	B	STD	4 sq. in																X		
Pb - 66	White paint, wood substrate	B	STD	4 sq. in																X		
Pb - 67	Orange paint, metal substrate	B	STD	4 sq. in																X		
Pb - 68	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 69	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 70	White paint, stucco	B	STD	4 sq. in																X		
Pb - 71	White paint, metal substrate	B	STD	4 sq. in																X		
Pb - 72	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 73	White paint, metal substrate	B	STD	4 sq. in																X		
Pb - 74	Grey paint, drywall	B	STD	4 sq. in																X		
Pb - 75	Pink paint, drywall	B	STD	4 sq. in																X		

SAMPLE TYPE CODES

BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME
Kelly Sheehan	6/11/21 4pm

RECEIVED BY	DATE & TIME
	6/11/21

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SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6553

WEATHER	Fog	Rain	Snow	Wind	Clear
None					
Light					
Moderate					
Heavy					

LEVEL

002661874

Non-Culturabl

Spore Trap | Tape Swab, I

Other Requests

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-8630		alana@becnv.com; alison@becnv.com; bedoyh@becnv.com

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)	Spore Trap Analysis	Other Biological particles - supplemental	Direct Microscopic Exam (Qualitative)	Quantitative spore count direct exam	Dust Characterization	T-Media Surface Fungi (Genus ID + Asp. spp.)	Culturable Air Fungi (Genus ID + Asp. spp.)	Gram Stain and Counts (Culturable Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	Quant/Trap-Sewage Screen	OTHER: (please specify test)	Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCR (please specify test)	Allergens (please specify test)
Pb - 76	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 77	Dark gray, metal substrate	B	STD	4 sq. in																X		
Pb - 78	Light gray, metal substrate	B	STD	4 sq. in																X		
Pb - 79	Light grey, cinder block	B	STD	4 sq. in																X		
Pb - 80	White paint, concrete substrate	B	STD	4 sq. in																X		
Pb - 81	Gray paint, concrete substrate	B	STD	4 sq. in																X		
Pb - 82	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 83	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 84	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 85	White paint, concrete	B	STD	4 sq. in																X		
Pb - 86	Dark grey paint, drywall substrate	B	STD	4 sq. in																X		
Pb - 87	Dark gray paint , drywall	B	STD	4 sq. in																X		
Pb - 88	Dark gray paint, drywall	B	STD	4 sq. in																X		
Pb - 89	White paint, drywall	B	STD	4 sq. in																X		
Pb - 90	Maroon paint, drywall	B	STD	4 sq. in																X		

SAMPLE TYPE CODES

BC - BioCassette™	**CP** - Contact Plate	**T** - Tape	**O** - Other:
AIS - Anderson	**ST** - Spore Trap	**SW** - Swab	
SAS - Surface Air Sampler	**B** - Bulk	**SO** - Soil	
NP - Non-potable Water	**P** - Potable Water	**D** - Dust	

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
Kelly Sheehan	6/11/21 430p		6/11/21

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LEVEL	WEATHER	Fog	Rain	Snow	Wind	Clear
	None					
	Light					
	Moderate					
	Heavy					

Non-Culturable

002661874

Spore Trap | Tape, Swab, Bul | Other Requests

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830		alana@becnv.com; alana@beamv.com; becky@beamv.com

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)	Spore Trap Analysis	Other biological particles - supplement	Direct Microscopic Exam (Qualitative)	Quantitative spore count/direct exam	Dust Characterization	1-Media Surface Fungi (Genus ID + Asp. spp.)	Culturable Air Fungi (Genus ID + Asp. spp.)	Gram Stain and Counts (Culturable Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	Chlor/Tray-Sewage Screen	OTHER: (please specify test)	Asbestos in Air - PCM Airborne Fibre Count (NIOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCM (please specify test)	Allergens (please specify test)
Pb - 91	Grey paint, drywall	B	STD	4 sq. in																X		
Pb - 92	White paint, drywall	B	STD	4 sq. in																X		
Pb - 93	Purple paint, drywall	B	STD	4 sq. in																X		
Pb - 94	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 95	White paint, drywall	B	STD	4 sq. in																X		
Pb - 96	Purple paint, metal substrate	B	STD	4 sq. in																X		
Pb - 97	Purple paint, concrete	B	STD	4 sq. in																X		
Pb - 98	Green paint, concrete	B	STD	4 sq. in																X		
Pb - 99	Purple paint, metal substrate	B	STD	4 sq. in																X		
Pb - 100	Yellow paint, cinder block	B	STD	4 sq. in																X		
Pb - 101	Yellow paint, cinder block	B	STD	4 sq. in																X		
Pb - 102	White paint, concrete substrate	B	STD	4 sq. in																X		
Pb - 103	Yellow paint, drywall	B	STD	4 sq. in																X		
Pb - 104	Yellow paint, drywall	B	STD	4 sq. in																X		
Pb - 105	Grey paint, cinder block	B	STD	4 sq. in																X		

SAMPLE TYPE CODES

BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/21 4:20p		6/11/21

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SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6663

WEATHER	Fog	Rain	Snow	Wind	Clear
LEVEL: None					
Light					
Moderate					
Heavy					

Non-Cul

Spore Trap | Swa 002661874

ES

Other Requests

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117	
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830	alana@becnv.com; eileen@becnv.com; becky@becnv.com	

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)	Spore Trap Analysis	Other biological particles - supplement	Direct Microscopic Exam (Qualitative)	Quantitative spore count direct exam	Dust Characterization	1-Media Surface Fungi (Genus ID+ Asp. spp.)	Culturable Air Fungi (Genus ID+ Asp. spp.)	Gram Stain and Counts (Culturable Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	QuantiTray-Sewage Screen	OTHER: (please specify test)	Asbestos in Air - PCM Airborne Fiber Count (NLOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCR (please specify test)	Allergens (please specify test)
Pb - 106	White paint, wood substrate	B	STD	4 sq. in																X		
Pb - 107	Yellow paint, wood substrate	B	STD	4 sq. in																X		
Pb - 108	Grey paint, drywall substrate	B	STD	4 sq. in																X		
Pb - 109	Yellow paint, cinder block	B	STD	4 sq. in																X		
Pb - 110	Grey paint, drywall	B	STD	4 sq. in																X		
Pb - 111	Yellow paint, concrete	B	STD	4 sq. in																X		
Pb - 112	White paint, fabric pipe insulation	B	STD	4 sq. in																X		
Pb - 113	White paint, cinder block	B	STD	4 sq. in																X		
Pb - 114	White paint, drywall	B	STD	4 sq. in																X		
Pb - 115	White paint, metal	B	STD	4 sq. in																X		
Pb - 116	White paint, drywall	B	STD	4 sq. in																X		
Pb - 117	White paint, drywall	B	STD	4 sq. in																X		
Pb - 118	Grey paint, drywall	B	STD	4 sq. in																X		
Pb - 119	Grey paint, drywall	B	STD	4 sq. in																X		
Pb - 120	White paint, drywall	B	STD	4 sq. in																X		

SAMPLE TYPE CODES

BC - BioCassette	CP - Contact Plate	T - Tape	O - Other:
A1S - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME
Kelly Sheehan	6/11/21 430p

RECEIVED BY	DATE & TIME
	6/11/21

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SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6653

LEVEL	WEATHER	Fog	Rain	Snow	Wind	Clou
	None					
	Light					
	Moderate					
	Heavy					

002661874

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830		alana@becnv.com; eileen@becnv.com; beckyh@becnv.com

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
ND - Next Business Day	
SD - Same Business Day	
WH - Weekend/Holiday/ASAP	

SERVICES

Contact Plate / Tape, SAS, Dust, Soil: Spore Trap Analysis; Other biological particles - supplement; Direct Microscopic Exam (Qualitative); Quantitative spore count direct exam; Dust Characterization; 1-Media Surface Fungi (Genus ID + Asp. spp.); Culturable Air Fungi (Genus ID + Asp. spp.); Gram Stain and Counts (Culturable Air and Surface Bacteria); Legionella culture; Total Coliform, E.coli (Presence/Absence); Quant Iny-Sewage Screen; OTHER (please specify test)

Other Requests: Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400); Asbestos Bulk - PLM; Lead (Pb) - Flame AA; PCR (please specify test); Allergens (please specify test)

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)	Lead (Pb) - Flame AA
Pb - 121	White paint, drywall	B	STD	4 sq. in		X
Pb - 122	Grey paint, drywall	B	STD	4 sq. in		X
Pb - 123	Grey paint, drywall substrate	B	STD	4 sq. in		X
Pb - 124	Dark blue, drywall	B	STD	4 sq. in		X
Pb - 125	Dark blue, metal substrate	B	STD	4 sq. in		X
Pb - 126	Dark grey, drywall substrate	B	STD	4 sq. in		X
Pb - 127	White paint, drywall substrate	B	STD	4 sq. in		X
Pb - 128	Purple paint, drywall	B	STD	4 sq. in		X
Pb - 129	White paint, cinder block	B	STD	4 sq. in		X
Pb - 130	White paint, drywall	B	STD	4 sq. in		X
Pb - 131	White paint, cinder block	B	STD	4 sq. in		X
Pb - 132	White paint, drywall	B	STD	4 sq. in		X
Pb - 133	White paint, metal substrate	B	STD	4 sq. in		X
Pb - 134	White paint, wood substrate	B	STD	4 sq. in		X
Pb - 135	White paint, fabric pipe insulation	B	STD	4 sq. in		X

SAMPLE TYPE CODES

BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other
A1S - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/21 4:30p		6/11/21

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Phoenix, AZ: 1501 West Knudsen Drive, Phoenix, AZ 85027 * (800) 651-4802
SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-8553

WEATHER:	Fog	Rain	Snow	Wind	Clear
LEVEL: None					
Light					
Moderate					
Heavy					

Non

Spore Trap 002661874

SAS, Soil,

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830		alana@becnv.com; elson@becnv.com; becky.h@becnv.com

PROJECT INFORMATION

Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)
Pb - 138	Gray paint, metal	B	STD	4 sq. in	
Pb - 139	White paint, stucco	B	STD	4 sq. in	
[redacted]	White paint, stucco	B	STD	4 sq. in	
[redacted]	[redacted]	B	STD	4 sq. in	
Pb - 140	White paint, wood substrate	B	STD	4 sq. in	
Pb - 141	White paint, dry wall	B	STD	4 sq. in	
Pb - 142	White paint, drywall	B	STD	4 sq. in	
Pb - 143	White paint, drywall	B	STD	4 sq. in	
Pb - 144	White paint, drywall	B	STD	4 sq. in	
Pb - 145	White paint, drywall	B	STD	4 sq. in	
Pb - 146	White paint, drywall	B	STD	4 sq. in	
Pb - 147	White paint, drywall	B	STD	4 sq. in	
Pb - 148	Teal paint, cinder block	B	STD	4 sq. in	
Pb - 149	Teal paint, cinder block	B	STD	4 sq. in	
Pb - 150	White paint, drywall	B	STD	4 sq. in	

Spore Trap Analysis	Other biological particles - Supplement	Direct Microscopic Exam (Qualitative)	Quantitative spore count direct exam	Dust Characterization	T-Media Surface Fungi (Genus ID+ Asp. spp.)	Culturable Air Fungi (Genus ID + Asp. spp.)	Gram Stain and Counts (Culturable Air and Surface Bacteria)	Legionella culture	Total Coliform, E.coli (Presence/Absence)	Quanti-Tray-Sewage Screen	OTHER: (please specify test)	Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400)	Asbestos Bulk - PLM	Lead (Pb) - Flame AA	PCR (please specify test)	Allergens (please specify test)
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		
														X		

SAMPLE TYPE CODES

BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
A1S - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/21		6/11/21

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SSF, CA: 6000 Shoreline Ct, Ste. 205, S. San Francisco, CA 94080 * (866) 888-6553

WEATHER	Fog	Rain	Snow	Wind	Clear
LEVEL: None					
Light					
Moderate					
Heavy					

Non-Culture 002661874

CONTACT INFORMATION			
Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Alana Holt-Hall	Special Instructions:	
Phone:	702-304-9830		alana@becnv.com; alison@becnv.com; bookyh@becnv.com

PROJECT INFORMATION			
Project ID:	018.17.001 - BCXX - Boys and Girls Club		
Project Description:	Boys and Girls Club Lead Inspection		
Project Zip Code:	89415	Sampling Date/Time:	06/9/21 - 06/10/21
PO Number:		Sampled By:	Alana Holt-Hall

TURN AROUND TIME CODES - (TAT)

STD - Standard (Default)
ND - Next Business Day
SD - Same Business Day
WH - Weekend/Holiday/ASAP

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

SAMPLE ID	DESCRIPTION	Sample Type (Below)	TAT (Above)	Total Volume/Area (as applicable)	NOTES (Time of day, Temp, RH, etc.)	Other Requests: Lead (Pb) - Flame AA
Pb - 151	soil	SO	STD	8 oz		X
Pb - 152	White paint, stucco	B	STD	4 sq in.		X
						X

Other Requests: Spore Trap Analysis; Other biological particles - supplement; Direct Microscopic Exam (Qualitative); Quantitative spore count direct exam; Dust Characterization; Tape, Swab, Bulk: 1-Media Surface Fungi (Genus ID + Asp. spp.); Culturable Air Fungi (Genus ID + Asp. spp.); Gram Stain and Counts (Culturable Air and Surface Bacteria); Legionella culture; Total Coliform, E.coli (Presence/Absence); QuantiTray-Sewage Screen; OTHER: (please specify test); Contact Plate: Asbestos in Air - PCM Airborne Fiber Count (NIOSH 7400); Asbestos Bulk - PLM; Lead (Pb) - Flame AA; PCR (please specify test); Allergens (please specify test)

SAMPLE TYPE CODES			
BC - BioCassette™	CP - Contact Plate	T - Tape	O - Other:
AIS - Andersen	ST - Spore Trap	SW - Swab	
SAS - Surface Air Sampler	B - Bulk	SO - Soil	
NP - Non-potable Water	P - Potable Water	D - Dust	

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/21 420p		6/11/21

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Report for:

Alana Hall
BEC Environmental Inc.
7241 W. Sahara Ave
suite 120
Las Vegas, NV 89117

Regarding: Project: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection
EML ID: 2661874

Approved by:

Laboratory Manager
Danny Li

Dates of Analysis:
Lead - Flame AA: 06-16-2021 to 06-18-2021

Service SOPs: Lead - Flame AA (EM-BC-S-8443)

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. Due to the nature of the analyses performed, field blank correction of results is not applied. The results relate only to the samples as received and tested. Sample size, as it relates to Wipe samples only, is supplied by the client.

Eurofins EMLab P&K ("the Company") shall have no liability to the client or the client's customer with respect to decisions or recommendations made, actions taken or courses of conduct implemented by either the client or the client's customer as a result of or based upon the Test Results. In no event shall the Company be liable to the client with respect to the Test Results except for the Company's own willful misconduct or gross negligence nor shall the Company be liable for incidental or consequential damages or lost profits or revenues to the fullest extent such liability may be disclaimed by law, even if the Company has been advised of the possibility of such damages, lost profits or lost revenues. In no event shall the Company's liability with respect to the Test Results exceed the amount paid to the Company by the client therefor.

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17461 Derian Ave, Suite 100, Irvine, CA 92614
(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-1: White Paint, Dry Wall Substrate	Pb-2: White Paint, Wood Substrate	Pb-3: White Paint, Dry Wall Substrate	Pb-4: White Paint, Fabric Pipe Insulation	Pb-5: White Paint, Cinder Block
Comments (see below)	None	None	None	None	None
Lab ID-Version‡:	12723479-1	12723480-1	12723481-1	12723482-1	12723483-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	36 ppm	39 ppm	37 ppm	52 ppm	39 ppm
Sample size	0.2796 grams	0.2554 grams	0.2725 grams	0.1925 grams	0.2591 grams
§Total Lead Result	< 36 ppm	< 39 ppm	< 37 ppm	450 ppm	320 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-6: Green Paint, Metal Substrate	Pb-7: White Paint, Metal Substrate	Pb-8: Grey Paint, Metal Substrate	Pb-9: Teal Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723484-1	12723485-1	12723486-1	12723487-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	140 ppm	37 ppm	130 ppm	36 ppm
Sample size	0.0690 grams	0.2722 grams	0.0743 grams	0.2787 grams
§Total Lead Result	13000 ppm	< 37 ppm	< 130 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

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Client: BEC Environmental Inc.
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Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-10: Light Grey Paint, Metal Substrate	Pb-11: Red Paint, Wood Substrate	Pb-12: Blue Paint, Wood Substrate	Pb-13: Teal Paint, Cinder Blcok
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723488-1	12723489-1	12723490-1	12723491-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	58 ppm	55 ppm	49 ppm	36 ppm
Sample size	0.1712 grams	0.1833 grams	0.2029 grams	0.2788 grams
§Total Lead Result	860 ppm	< 55 ppm	< 49 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-14: Teal Paint, Concrete Substrate	Pb-15: Grey Paint, Metal Substrate	Pb-16: Light Grey Paint, Metal Substrate	Pb-17: Teal Paint, Cinder Block Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723492-1	12723493-1	12723494-1	12723495-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	78 ppm	140 ppm	60 ppm	130 ppm
Sample size	0.1290 grams	0.0703 grams	0.1671 grams	0.0764 grams
§Total Lead Result	< 78 ppm	< 140 ppm	< 60 ppm	< 130 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-18: Teal Paint, Cinder Block	Pb-19: Teal Paint, Metal Substrate	Pb-20: Dark Grey Paint, Metal Substrate	Pb-21: Light Grey Paint, Metal Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723496-1	12723497-1	12723498-1	12723499-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	35 ppm	35 ppm	44 ppm	58 ppm
Sample size	0.2819 grams	0.2827 grams	0.2273 grams	0.1737 grams
§Total Lead Result	< 35 ppm	1000 ppm	950 ppm	780 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-22: Dark Grey Paint, Cinder Block	Pb-23: Light Grey Paint, Cinder Block	Pb-24: Light Grey Paint, Dry Wall Substrate	Pb-25: White Paint Drywall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723500-1	12723501-1	12723502-1	12723503-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	38 ppm	38 ppm	38 ppm	40 ppm
Sample size	0.2643 grams	0.2651 grams	0.2601 grams	0.2509 grams
§Total Lead Result	< 38 ppm	46 ppm	< 38 ppm	< 40 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-26: Light Grey Paint, Cinder Block	Pb-27: Grey Paint, Wood Substrate	Pb-28: Dark Grey Paint, Dry Wall Substrate	Pb-29: Light Grey Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723504-1	12723505-1	12723506-1	12723507-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	37 ppm	38 ppm	39 ppm	36 ppm
Sample size	0.2737 grams	0.2624 grams	0.2568 grams	0.2755 grams
§Total Lead Result	< 37 ppm	< 38 ppm	140 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-30: Light Grey Paint, Dry Wall	Pb-31: Light Grey Paint, Cinder Block Substrate	Pb-32: Light Grey Paint, Concrete Substrate	Pb-33: Dark Grey Paint, Dry Wall Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723508-1	12723509-1	12723510-1	12723511-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	37 ppm	40 ppm	37 ppm	40 ppm
Sample size	0.2695 grams	0.2529 grams	0.2694 grams	0.2516 grams
§Total Lead Result	37 ppm	110 ppm	< 37 ppm	< 40 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

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Eurofins EMLab P&K
17461 Derian Ave, Suite 100, Irvine, CA 92614
(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-34: Light Grey Paint, Cinder Block	Pb-35: Light Grey Paint, Cinder Block	Pb-36: Light Grey Paint, Cinder Block	Pb-37: Light Grey Paint, Concrete
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723512-1	12723513-1	12723514-1	12723515-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/16/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	36 ppm	36 ppm	35 ppm	37 ppm
Sample size	0.2764 grams	0.2800 grams	0.2882 grams	0.2693 grams
§Total Lead Result	< 36 ppm	140 ppm	97 ppm	< 37 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-38: White Paint, Dry Wall Substrate	Pb-39: White Paint, Dry Wall Substrate	Pb-40: White Paint, Dry Wall	Pb-41: White Paint, Metal
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723516-1	12723517-1	12723518-1	12723519-1
Analysis Date:	06/16/2021	06/16/2021	06/16/2021	06/17/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	37 ppm	38 ppm	35 ppm	36 ppm
Sample size	0.2711 grams	0.2625 grams	0.2886 grams	0.2799 grams
§Total Lead Result	< 37 ppm	43 ppm	40 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
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Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-42: White Paint, Metal	Pb-43: White Paint, Dry Wall	Pb-44: White Paint, Dry Wall	Pb-45: White Paint, Dry Wall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723520-1	12723521-1	12723522-1	12723523-1
Analysis Date:	06/17/2021	06/17/2021	06/17/2021	06/17/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	290 ppm	40 ppm	38 ppm	40 ppm
Sample size	0.0350 grams	0.2512 grams	0.2624 grams	0.2513 grams
§Total Lead Result	< 290 ppm	< 40 ppm	47 ppm	< 40 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-46: White Paint, Dry Wall Substrate	Pb-47: White Paint, Dry Wall Substrate	Pb-48: White Paint, Dry Wall Substrate	Pb-49: White Paint, Dry Wall Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723524-1	12723525-1	12723526-1	12723527-1
Analysis Date:	06/17/2021	06/17/2021	06/17/2021	06/17/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	39 ppm	36 ppm	35 ppm	38 ppm
Sample size	0.2549 grams	0.2808 grams	0.2824 grams	0.2638 grams
§Total Lead Result	< 39 ppm	46 ppm	370 ppm	< 38 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-50: White Paint, Dry Wall Substrate	Pb-51: White Paint, Fabric Pipe Insulation	Pb-52: Grey Paint, Cinder Block	Pb-53: Yellow Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723528-1	12723529-1	12723530-1	12723531-1
Analysis Date:	06/17/2021	06/17/2021	06/17/2021	06/17/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	56 ppm	39 ppm	39 ppm	36 ppm
Sample size	0.1794 grams	0.2544 grams	0.2577 grams	0.2761 grams
§Total Lead Result	< 56 ppm	41 ppm	< 39 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-54: Grey Paint, Dry Wall Substrate	Pb-55: White Paint, Dry Wall Substrate	Pb-56: White Paint, Cinder Block	Pb-57: White Paint, Dry Wall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723532-1	12723533-1	12723534-1	12723535-1
Analysis Date:	06/17/2021	06/17/2021	06/17/2021	06/17/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	39 ppm	37 ppm	37 ppm	34 ppm
Sample size	0.2539 grams	0.2713 grams	0.2678 grams	0.2904 grams
§Total Lead Result	< 39 ppm	< 37 ppm	580 ppm	< 34 ppm

Comments:

Sample results have not been corrected for blank values.

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Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-58: White Paint, Dry Wall	Pb-59: White Paint, Dry Wall	Pb-60: Dark Grey Paint, Metal Substrate	Pb-61: Grey Paint, Metal Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723536-1	12723537-1	12723538-1	12723539-1
Analysis Date:	06/17/2021	06/17/2021	06/17/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	38 ppm	39 ppm	39 ppm	37 ppm
Sample size	0.2637 grams	0.2551 grams	0.2555 grams	0.2734 grams
§Total Lead Result	< 38 ppm	< 39 ppm	160 ppm	1600 ppm

Comments:

Sample results have not been corrected for blank values.

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Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-62: Teal Paint, Cinder Block	Pb-63: Teal Paint, Cinder Block	Pb-64: Teal Paint, Cinder Block	Pb-65: White Paint, Dry Wall Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723540-1	12723541-1	12723542-1	12723543-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	36 ppm	38 ppm	39 ppm	39 ppm
Sample size	0.2743 grams	0.2625 grams	0.2597 grams	0.2560 grams
§Total Lead Result	< 36 ppm	42 ppm	48 ppm	< 39 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-66: White Paint, Wood Substrate	Pb-67: Orange Paint, Metal Substrate	Pb-68: White Paint, Cinder Block	Pb-69: White Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723544-1	12723545-1	12723546-1	12723547-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	37 ppm	34 ppm	36 ppm	35 ppm
Sample size	0.2697 grams	0.2901 grams	0.2806 grams	0.2844 grams
§Total Lead Result	< 37 ppm	45000 ppm	410 ppm	< 35 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-70: White Paint, Stucco	Pb-71: White Paint, Metal Substrate	Pb-72: White Paint, Cinder Block	Pb-73: White Paint, Metal Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723548-1	12723549-1	12723550-1	12723551-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	39 ppm	39 ppm	40 ppm	37 ppm
Sample size	0.2556 grams	0.2569 grams	0.2520 grams	0.2714 grams
§Total Lead Result	52 ppm	< 39 ppm	70 ppm	2400 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-74: Grey Paint, Dry Wall	Pb-75: Pink Paint, Drywall	Pb-76: White Paint, Cinder Block	Pb-77: Dark Grey Paint, Metal Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723552-1	12723553-1	12723554-1	12723555-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	34 ppm	37 ppm	38 ppm	34 ppm
Sample size	0.2980 grams	0.2725 grams	0.2632 grams	0.2920 grams
§Total Lead Result	< 34 ppm	< 37 ppm	85 ppm	2100 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-78: Light Grey Paint, Metal Substrate	Pb-79: Light Grey Paint, Cinder Block	Pb-80: White Paint, Concrete Substrate	Pb-81: Grey Paint, Concrete Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723556-1	12723557-1	12723558-1	12723559-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	48 ppm	53 ppm	33 ppm	53 ppm
Sample size	0.2085 grams	0.1901 grams	0.2991 grams	0.1874 grams
§Total Lead Result	4100 ppm	65 ppm	< 33 ppm	75 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-82: White Paint, Cinder Block	Pb-83: White Paint, Cinder Block	Pb-84: White Paint, Cinder Block	Pb-85: White Paint, Concrete
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723560-1	12723561-1	12723562-1	12723563-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	37 ppm	39 ppm	38 ppm	35 ppm
Sample size	0.2721 grams	0.2584 grams	0.2656 grams	0.2893 grams
§Total Lead Result	41 ppm	< 39 ppm	< 38 ppm	< 35 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-86: Dark Grey Paint, Drywall Substrate	Pb-87: Dark Grey Paint, Drywall	Pb-88: Dark Grey Paint, Drywall	Pb-89: White Paint, Drywall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723564-1	12723565-1	12723566-1	12723567-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	40 ppm	35 ppm	36 ppm	40 ppm
Sample size	0.2524 grams	0.2875 grams	0.2800 grams	0.2522 grams
§Total Lead Result	< 40 ppm	< 35 ppm	< 36 ppm	< 40 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Eurofins EMLab P&K
17461 Derian Ave, Suite 100, Irvine, CA 92614
(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-90: Maroon Paint, Drywall	Pb-91: Grey Paint, Drywall	Pb-92: White Paint, Dry Wall	Pb-93: Purple Paint, Dry Wall
Comments (see below)	A	None	None	None
Lab ID-Version‡:	12723568-1	12723569-1	12723570-1	12723571-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	460 ppm	38 ppm	37 ppm	39 ppm
Sample size	0.0218 grams	0.2639 grams	0.2697 grams	0.2567 grams
§Total Lead Result	< 460 ppm	< 38 ppm	170 ppm	150 ppm

Comments: A) Sample weight is below method requirement and was analyzed at client's request

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-94: White Paint, Cinder Block	Pb-95: White Paint, Drywall	Pb-96: Purple Paint, Metal Substrate	Pb-97: Purple Paint, Concrete
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723572-1	12723573-1	12723574-1	12723575-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	35 ppm	34 ppm	35 ppm	38 ppm
Sample size	0.2859 grams	0.2934 grams	0.2866 grams	0.2652 grams
§Total Lead Result	< 35 ppm	< 34 ppm	240 ppm	< 38 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-98: Green Paint, Concrete	Pb-99: Purple Paint, Metal Substrate	Pb-100: Yellow Paint, Cinder Block	Pb-101: Yellow Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723576-1	12723577-1	12723578-1	12723579-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	36 ppm	39 ppm	35 ppm	39 ppm
Sample size	0.2767 grams	0.2537 grams	0.2850 grams	0.2533 grams
§Total Lead Result	< 36 ppm	< 39 ppm	< 35 ppm	140 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-102: White Paint, Concrete Substrate	Pb-103: Yellow Paint, Drywall	Pb-104: Yellow Paint, Drywall	Pb-105: Grey Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723580-1	12723581-1	12723582-1	12723583-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	95 ppm	33 ppm	38 ppm	36 ppm
Sample size	0.1054 grams	0.3013 grams	0.2604 grams	0.2741 grams
§Total Lead Result	< 95 ppm	< 33 ppm	< 38 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-106: White Paint, Wood Substrate	Pb-107: Yellow Paint, Wood Substrate	Pb-108: Grey Paint, Drywall Substrate	Pb-109: Yellow Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723584-1	12723585-1	12723586-1	12723587-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	33 ppm	40 ppm	35 ppm	38 ppm
Sample size	0.3020 grams	0.2509 grams	0.2892 grams	0.2627 grams
§Total Lead Result	98 ppm	130 ppm	< 35 ppm	110 ppm

Comments:

Sample results have not been corrected for blank values.

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Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

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† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-110: Grey Paint, Drywall	Pb-111: Yellow Paint, Concrete	Pb-112: White Paint, Fabric Pipe Insulation	Pb-113: White Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723588-1	12723589-1	12723590-1	12723591-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	38 ppm	36 ppm	36 ppm	37 ppm
Sample size	0.2661 grams	0.2792 grams	0.2754 grams	0.2694 grams
§Total Lead Result	< 38 ppm	< 36 ppm	< 36 ppm	230 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-114: White Paint, Drywall	Pb-115: White Paint, Metal	Pb-116: White Paint, Drywall	Pb-117: White Paint, Drywall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723592-1	12723593-1	12723594-1	12723595-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	38 ppm	35 ppm	35 ppm	36 ppm
Sample size	0.2617 grams	0.2817 grams	0.2820 grams	0.2782 grams
§Total Lead Result	< 38 ppm	< 35 ppm	< 35 ppm	< 36 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-118: Grey Paint, Drywall	Pb-119: Grey Paint, Drywall	Pb-120: White Paint, Drywall	Pb-121: White Paint, Drywall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723596-1	12723597-1	12723598-1	12723599-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	39 ppm	39 ppm	37 ppm	38 ppm
Sample size	0.2584 grams	0.2593 grams	0.2725 grams	0.2637 grams
§Total Lead Result	< 39 ppm	< 39 ppm	< 37 ppm	< 38 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-122: Grey Paint, Drywall	Pb-123: Grey Paint, Drywall Substrate	Pb-124: Dark Blue, Drywall	Pb-125: Dark Blue, Metal Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723600-1	12723601-1	12723602-1	12723603-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	40 ppm	34 ppm	37 ppm	38 ppm
Sample size	0.2530 grams	0.2971 grams	0.2721 grams	0.2639 grams
§Total Lead Result	< 40 ppm	< 34 ppm	< 37 ppm	< 38 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-126: Dark Grey Paint, Drywall Substrate	Pb-127: White Paint, Drywall Substrate	Pb-128: Purple Paint, Drywall	Pb-129: White Paint, Cinder Block
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723604-1	12723605-1	12723606-1	12723607-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	35 ppm	36 ppm	39 ppm	34 ppm
Sample size	0.2863 grams	0.2743 grams	0.2557 grams	0.2952 grams
§Total Lead Result	< 35 ppm	< 36 ppm	< 39 ppm	290 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-130: White Paint, Drywall	Pb-131: White Paint, Cinder Block	Pb-132: White Paint, Drywall	Pb-133: White Paint, Metal Substrate
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723608-1	12723609-1	12723610-1	12723611-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	38 ppm	38 ppm	37 ppm	36 ppm
Sample size	0.2613 grams	0.2620 grams	0.2736 grams	0.2762 grams
§Total Lead Result	< 38 ppm	250 ppm	110 ppm	130 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-134: White Paint, Wood Substrate	Pb-135: White Paint, Fabric Pipe Insulation	Pb-136: Grey Paint, Metal	Pb-137: White Paint Stucco
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723612-1	12723613-1	12723614-1	12723615-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	41 ppm	300 ppm	71 ppm	35 ppm
Sample size	0.2459 grams	0.0336 grams	0.1418 grams	0.2894 grams
§Total Lead Result	< 41 ppm	< 300 ppm	< 71 ppm	74 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-140: White Paint, Wood Substrate	Pb-141: White Paint, Drywall	Pb-142: White Paint, Drywall	Pb-143: White Paint, Drywall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723618-1	12723619-1	12723620-1	12723621-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	63 ppm	39 ppm	150 ppm	37 ppm
Sample size	0.1584 grams	0.2540 grams	0.0661 grams	0.2693 grams
§Total Lead Result	70 ppm	42 ppm	< 150 ppm	< 37 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Eurofins EMLab P&K
17461 Derian Ave, Suite 100, Irvine, CA 92614
(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-144: White Paint, Drywall	Pb-145: White Paint, Drywall	Pb-146: White Paint, Drywall	Pb-147: White Paint, Drywall
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723622-1	12723623-1	12723624-1	12723625-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	39 ppm	38 ppm	38 ppm	39 ppm
Sample size	0.2535 grams	0.2658 grams	0.2648 grams	0.2563 grams
§Total Lead Result	< 39 ppm	< 38 ppm	< 38 ppm	< 39 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

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Client: BEC Environmental Inc.
C/O: Alana Hall
Re: 018.17.001 - BCXX - Boys and Girsl Club; Boys and Girls Club Lead Inspection

Date of Sampling: 06-09-2021
Date of Receipt: 06-14-2021
Date of Report: 06-21-2021

LEAD: FLAME ATOMIC ABSORPTION SPECTROMETRY

Location:	Pb-148: Teal Paint, Cinder Block	Pb-149: Teal Paint, Cinder Block	Pb-150: White Paint, Drywall	Pb-152: White Paint, Stucco
Comments (see below)	None	None	None	None
Lab ID-Version‡:	12723626-1	12723627-1	12723628-1	12723630-1
Analysis Date:	06/18/2021	06/18/2021	06/18/2021	06/18/2021
Sample type	Paint Chip sample	Paint Chip sample	Paint Chip sample	Paint Chip sample
Method*	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified	NIOSH 7082 & EPA 7000B modified
† Method Reporting Limit	37 ppm	39 ppm	35 ppm	38 ppm
Sample size	0.2685 grams	0.2578 grams	0.2893 grams	0.2635 grams
§Total Lead Result	< 37 ppm	< 39 ppm	< 35 ppm	130 ppm

Comments:

Sample results have not been corrected for blank values.

Bulk samples are not covered under the AIHA-LAP, LLC service accreditation.

Wipe samples must meet ASTM E1792 criteria. Method Reporting Limits may not be valid for non-ASTM E1792 wipe samples.

*Sample preparation and analytical methods are based upon NIOSH 7082 and EPA 7000B.

† The Method Reporting Limit is the minimum concentration of Lead that the laboratory can confidently detect in the sample.

§ Total Lead Result has been rounded to two significant figures to reflect analytical precision.

‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Eurofins J3 Resources, Inc.
3113 Red Bluff Road Pasadena, Texas 77503
Phone: (713) 290-0223 – Fax: (832) 831-5669
j3resources.com

Lead in Soil Performed by Flame AA – USEPA SW846 7420/3050B (Mod.)

Marcela Hodge
Eurofins EMLab P&K
1501 W Knudsen Dr
Phoenix, AZ 85027

Order #: JP211027930
Project #: N/A
Receipt Date: 15-Jun-2021
Analysis Date: 17-Jun-2021
Report Date: 18-Jun-2021

EMLab ID: 2661874

SAMPLE ID	SAMPLE DESCRIPTION	LEAD CONCENTRATION (mg/kg)
Pb-151	**Soil**	**< 80**

Reporting Limit = 80 mg/kg N/A = Not Applicable
INS = Insufficient Sample Weight NS = Not Submitted

Analyst: Shervin Aghaabbasi

Scott Ward, Ph.D. Lab Director

These results apply to the samples as received and are dry weight corrected. The analysis has been conducted according to the method(s) listed above. Blank corrections are not applied to data unless requested by the customer. This report is for the exclusive use of the addressed customer and shall not be reproduced except in full without written approval by Eurofins J3 Resources, Inc. (EJ3). EJ3 is an EPA NLLAP recognized lab by the AIHA-LAP, LLC ELLAP (Lab ID: 157714). Unless otherwise noted, all quality control samples performed within specifications established by the laboratory. The estimated accuracy is solely based on recovery data from internal laboratory control samples at the 95% confidence interval of the level of concern, derived from a 764 mg/kg lead contaminated soil matrix reference material. The estimated accuracy does not account for uncertainty associated with the sampling process. Accuracy = +/-10%

☐ Open Lab Fee

IH CHAIN OF CUSTODY

27930

J3 resources, inc.

Submitter Name:	Marcela Hodge	**Bill to:**	Eurofins Aerotech- EMLab Las Vegas
Company:	Eurofins -Aerotech dba EMLab P&K	**Address:**	6100 Mountain Vista#160Henderson
Address:	1501 West Knudsen Drive		
		City/State:	Henderson NV **Zip:** 89014
City/State:	Phoenix AZ **Zip:** 85027	**PO #:**	

Project Information

Project Name: EMLab ID: 2661874	Project Manager: Marcela Hodge
Project #:	Telephone – Office/Cell 623-445-6111
Reports - Email Address: Marcela.Hodge@eurofinset.com	
Invoice - Email Address: Marcela.Hodge@eurofinset.com	Notification By: Email: ☑ Verbal: ☐ Text: ☐
Special Instructions:	

Turnaround Times – Please Select One

Emergency* ☐	1 Day ☐	2 Day ☐	3 Day ☑	5 Day ☐

ASBESTOS

PLM - Bulk	PCM - Air	TEM - Air	TEM - Bulk	TEM - Water	TEM - Dust	TEM/PLM Soil/Vermiculite/Ore
EPA 600/R-93/116 ○ Visual Estimation (<1%) ○ 400 Point Count 0.25% ○ 1,000 Point Count 0.1% ○ Gravimetric Reduction ○ Matrix Reduction (+/-) ○ **NIOSH 9002** ○ **OSHA ID-191**	○ **NIOSH 7400** ○ **ASTM D7201** ○ **ISO 8672** ○ **OSHA ID-160**	○ **AHERA** ○ **NIOSH 7402** ○ **ASTM D6281** ○ **ISO 10312** ○ **ISO 13794**	○ Gravimetric Reduction (<1%) ○ Matrix Reduction (+/-) ○ Qualitative (+/-) ○ Drop Mount ○ Filtration	○ **EPA 100.2** Drinking Water ○ >10 µm fibers ○ ≥0.5 µm fibers ○ **EPA 100.2** Effluent / WW	○ **ASTM D5755** Microvac ○ **ASTM D6480** Wipe ○ **600/J-93/167** Carpet - EPA ○ Bulk Dust Qualitative	○ **ASTM 7521**-TEM (+/-) ○ **ASTM 7521**-TEM (<1% ○ **CARB 435**-Modified ○ Soil – PLM Only (+/-) ○ Vermiculite - TEM (+/-) ○ Vermiculite-Cincinnati ○ Erionite ID

METALS

Flame AA	Graphite Furnace AA - LEAD	ICP
○ Lead in Paint – **SW846 7420/3050B** ○ Lead in Air – **NIOSH 7082** ○ Lead in Wipes – **SW846 7420/3050B** ☒ Lead in Soil – **SW846 7420/3050B**	○ Drinking Water – **EPA 200.9** ○ Wastewater – **SW846-7421** ○ Soil/Sludge – **SW846-7421** ○ Air – **NIOSH 7105**	○ Elements in Air – **NIOSH 7300** ○ Wipe/Soil – **SW846-6010B** ○ Effluent – **SW846-6010B** ○ Welding Fume – **NIOSH 7300M** ○ TCLP – **SW846-1311/6010B**

SILICA/PARTICULATES

X-Ray Diffraction / Gravimetric
○ Respirable Crystalline Silica **NIOSH 7500 / OSHA 142**
○ **NIOSH 0500** – Total Particulates
○ **NIOSH 0600** – Respirable Particulates

Total Number of Samples Submitted: 1/mg **Positive Stop:** ☐ **YES** ☐ **NO**

Signatures

Relinquished By:		**Date:**		**Time:**	
Received By:	M. Guerra	**Date:**	6/15/21	**Time:**	1:10P
Relinquished By:		**Date:**		**Time:**	
Received By:		**Date:**		**Time:**	

** Emergency TAT requires prior lab notification. All samples analyzed outside normal business hours are charged at Emergency rate.*
***TAT's are in Business Days rather than Hours (i.e.1 Day TAT = End of Next Business Day)*

IH CHAIN OF CUSTODY

Project Name/Number EMLab ID: 2661874 **Page** _____ **of** _____

SAMPLE IDENTIFICATION

SAMPLE NUMBER	SAMPLE LOCATION / MATERIAL	VOLUME
Pb-151	Soil	

Comments/Special Instructions:

J3 Resources, Inc. ◆ 6110 West 34th Street ◆ Houston, Texas 77092 ◆ tel: 713/290-0221 ◆ fax: 713/290-0248

Quality Assurance Manual Cover Page

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FLORIDA **(FL)** 6301 NW 5th Way, Ste. 1410 Ft. Lauderdale, FL 33309	HOUSTON **(HS)** 10900 Brittmoore Park Dr., Suite G Houston, TX 77041	IRVINE **(IV)** 17461 Derian Ave. Suite 100 Irvine, CA. 92614
VIRGINIA **(VA)** 3929 Old Lee Highway, Unit 91C Fairfax, VA 22030	DENVER **(DE)** 4955 Yarrow St. Arvada, CO 80002	SACRAMENTO **(SA)** 180 Blue Ravine Rd. Folsom, CA 95603
CHICAGO **(CH)** 1815 W. Diehl Rd. Suite 800 Naperville, IL 60563	LAS VEGAS. **(LV)** 6100 Mountain Vista St. Suite 160 Las Vegas, NV 89014	NORTH SEATTLE **(SE)** 19515 North Creek Pkwy N. Suite 100 Bothell, WA 98011
ATLANTA **(AT)** 6500 McDonough Dr. Suite C-10 Norcross, GA 30093	GLENDALE **(GL)** 1010 N Central Avenue Ste. 420 Glendale, CA 91202	SAN DIEGO **(SD)** 8304 Clairemont Mesa Blvd., Ste. 103 San Diego, CA 92111
MONROVIA **(MV)** 750 Royal Oaks Dr., Suite 100 Monrovia, CA 91016	ORLANDO **(OR)** 5750 S. Semoran Blvd Orlando, FL 32822	

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www.emlab.com

Facility Distribution No. _____ **Distributed To:_____**

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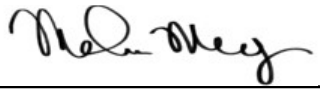
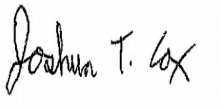
Quality Assurance Manual

Approval Signatures



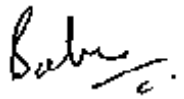
West Cluster Leader – Malcolm Moody — 10/1/2020 Date

Central Cluster Leader – Kamash Pillai — 10/1/2020 Date



Aerotech Cluster Leader – Joshua Cox — 10/2/2020 Date

Technical Director – Michael Berg (Deputy for East Cluster Leader) — 10/2/2020 Date



South Cluster Leader – Balu Krishnan — 10/2/2020 Date

Quality Assurance Manager - Urooj Sagheer — 10/1/2020 Date

Quality Assurance Manager - Dan Shelby — 10/1/2020 Date

Senior Quality Assurance Manager - Claudia Palermo — 10/2/2020 Date

SECTION 2. TABLE OF CONTENTS

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3.0 INTRODUCTION, SCOPE AND APPLICABILITY

3.1 Introduction and Compliance References

Eurofins EMLab P&K's Quality Assurance (QA) Manual is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving Eurofins EMLab P&K's data quality goals. Governing SOPs are in place within the organization to ensure the proper execution of this QA Manual (refer to Appendix 1). This manual and referenced documents are required reading for all personnel within the Eurofins EMLab P&K network, which is comprised of two legal entities, EMLab P&K, LLC and Aerotech Laboratories, Inc.

The laboratory is a team of people who work together to serve the health and environmental needs of society through science and technology. The Eurofins EMLab P&K network of laboratories maintains a local perspective in its scope of services and client relations and maintains a national perspective in terms of quality.

The QA Manual has been prepared to assure compliance with The NELAC Institute (TNI) Standard, dated 2009 and 2016; ISO/IEC Guide 17025:2005 and 2017. Policies and procedures listed in Appendix 1 are compliant with the National Divisional Support Center (NDSC) Quality Management Plan (QMP) for Eurofins TestAmerica; Eurofins EMLab P&K and the various accreditation and certification programs which are held by the laboratory to support environmental work (Appendix 2).
Refer to Appendix 3 for a list of additional references for which this QA Manual is compliant.

3.2 Terms and Definitions

A Quality Assurance Program is a company-wide system designed to ensure that data produced by the laboratory conforms to the standards set by state and/or federal regulations (i.e. CA-ELAP, TCEQ, NYS DOH, etc.), as well as applicable accrediting bodies. The program functions at the local management level through company goals, from guidance at the executive management level, and at the analytical level through Standard Operating Procedures (SOPs) and quality control. Our program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization.

Refer to Appendix 4 for the Glossary/Acronyms.

3.3 Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples. Sample matrices vary, but are not limited to, air, potable and non-potable waters, bulks, wipes, swabs, dust, soils, etc. The Quality Assurance Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Program also contains guidelines on maintaining documentation of analytical processes, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all analytical requests are thoroughly evaluated before commitments are made to accept the work. Measurements are made using published reference methods or methods developed and validated by the laboratory.

The methods covered by this manual include the most frequently requested methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found in LabServe, under the services list. Additional information, such as facility specific scopes of accreditation, may be found on the Eurofins EMLab P&K, LLC website.

The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet these requirements. All methods performed by the laboratory shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases, the laboratory will abide by the requested criteria following review and acceptance of the requirements by the Cluster Leader and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements. The Cluster Leader and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements.

3.4 Management of the Manual

3.4.1 Review Process

Eurofins National Divisional Support Center (NDSC) which houses the Quality Assurance leadership team for Eurofins Environment Testing America. NDSC QA will assure that the template remains in compliance with Section 3.1. This manual itself is reviewed annually by Cluster Leaders and Quality Assurance Managers, to assure that it reflects current practices and meets the requirements of the laboratory's clients and regulators as well as the QMP. Occasionally, the manual may need changes in order to meet new or changing regulations and operations. The QA Manager will review the changes in the normal course of business and incorporate changes into revised sections of the document. All updates will be reviewed by the Cluster Leaders and Quality Assurance Managers. The laboratory updates and approves such changes according to our Document Control & Updating procedures (refer to SOP No. EM-QA-S-2059).

4.0 MANAGEMENT REQUIREMENTS

4.1 Overview

Eurofins EMLab P&K, LLC is a is a business unit of Eurofins Environment Testing America Built Environment The laboratory's operational and support staff have the day-to-day independent operational authority under the direction of the Eurofins Built Environment Laboratory President, Business Unit Manager, and Cluster Leaders and is supported by the NDSC QA team. The laboratory operational and support staff work under the direction of the Cluster Leaders. The organizational chart of the management staff are presented in Figure 4-1. Individual departmental staff lists are maintained in the laboratory's internal intranet.

4.2 Selection of Personnel

Where individual facility updates, changes or goals necessitate, hiring or transfer of personnel either into new or existing roles is driven by cluster leaders. Once defined as a need, all aspects of the hiring process at Eurofins EMLab P&K are managed via the Eurofins US Recruitment

team. All position requests are submitted to the Eurofins US Recruitment team for coordination and planning of position details (requirements, location, salary, etc.). The process includes the review and setting of timelines, selection of posting sites, and defining recruitment team and hiring manager responsibilities associated with the available position.

4.3 Roles and Responsibilities

In order for the Quality Assurance Program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to the quality program. The responsibility for quality resides with every employee of the laboratory. All employees have access to the QA Manual, are trained to this manual, and are responsible for upholding the standards therein. Each person carries out his/her daily tasks impartially and in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs. The following descriptions briefly define each role in its relationship to the Quality Assurance Program.

4.3.1 Vice President of Quality and Environmental Health and Safety (VP-QA/EHS)

The Vice President (VP) of QA/EHS reports directly to Eurofins Environment Testing America Chief Operating Officer (COO). With the aid of the NDSC Quality Team Members, Business Unit Managers, Laboratory Directors, the VP-QA/EHS has the responsibility for the establishment, general overview and maintenance of the Quality Assurance and EH&S Programs within Eurofins Environment Testing America. Additional responsibilities include:

- Review of QA/QC and EHS aspects of NDSC Official Document, national projects and expansions or changes in services.
- Work with various organizations outside of the laboratory to further the development of quality standards and represent the laboratory at various trade meetings.
- Prepare monthly reports for quality and EH&S metrics across the environmental testing laboratories and a summary of any quality and EH&S related initiatives and issues.
- With the assistance of the Executive Management, and the EHS Managers, maintenance and implementation of the Eurofins Environment Testing America Environmental, Health and Safety Program.

4.3.2 Quality Directors

There are four (4) Quality Directors within NDSC that report directly to the VP-QA/EHS. These Quality Directors have oversight of the general overview and maintenance of the QA Program within the Eurofins Environment Testing America laboratories. Supported tasks include:

- Monitors laboratory internal audit findings;
- Identifies common laboratory weaknesses and monitors corrective action closures.
- Develops NDSC quality guidance documents and management tools for ensuring and improving compliance;
- Monitors and communicates DoD/DoE requirements;
- Monitors and communicates regulatory and certification requirements;
- Training and OnBoarding
- Laboratory assessments, mentoring, and interventions

- Track/drive root cause investigations and corrective action plans
- Builds knowledge base for preventive actions

4.3.3 Quality Information Manager

The Quality Information works directly with the NDSC Quality Directors and EHS Managers; and reports directly to the VP-QA/EHS. The Quality Information Manager is responsible for the management of:

- NDSC Official Documents
- TALS/LIMS Certification Module Data
- Company's Intranet website
- Company's Regulatory Limits Database
- Subcontract laboratory and approved vendor information
- Internal and External client support for various company groups (e.g., Client Services, EH&S, Legal, IT, Sales) for both quality and operational functions
- Communicate regulatory information and lists

4.3.4 Environmental Health and Safety (EH&S) Managers

There are 3 EH&S Managers within NDSC that report directly to the VP-QA/EHS. These EH&S Managers have oversight of the general overview and maintenance of the EH&S Program within the Eurofins Environment Testing America laboratories. Supported tasks include:

- Consolidation and tracking all safety and health-related information and reports for the company, and managing compliance activities for Eurofins Environment Testing America locations.
- Coordination/preparation of the Environmental, Health and Safety Manual Template that is used by each laboratory to prepare its own laboratory-specific Safety Manual/ CHP.
- Preparation of information and training materials for laboratory EHS Coordinators.
- Assistance in the coordination of employee exposure and medical monitoring programs to insure compliance with applicable safety and health regulations.
- Serving as Department of Transportation (D.O.T.) focal point and providing technical assistance to location management.
- Serving as Hazardous Waste Management main contact and providing technical assistance to location management.

4.3.5 Ethics and Compliance Officers (ECOs)

The NDSC VP-QA/EHS and Corporate Counsel are designated Each ECO acts as a back-up to the other ECO and both are involved when data investigations occur. Each ECO has a direct line of communication to the entire executive management personnel and lab management staff.
The ECOs monitor and audit procedures to determine compliance with policies and to make recommendations for policy enhancements to the President, COO, Laboratory Director or other appropriate individuals within the laboratory. The ECO will assist the laboratory QA Manager in the coordination of internal auditing of ethical policy related activities and processes within the laboratory, in conjunction with the laboratory's regular internal auditing function.

The ECOs will also participate in investigations of alleged violations of policies and work with the appropriate internal departments to investigate misconduct, remedy the situation, and prevent recurrence of any such activity.

4.3.6 Business Unit Manager

The Business Unit Manager is responsible for the overall quality, safety, financial, technical, human resource and service performance of the network of Eurofins EMLab P&K laboratories and reports to their business unit President. The Business Unit Manager provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program. Provides support to the laboratory management of all clusters and is responsible for the overall performance and viability of the lab's profitability. The GM is also responsible for generating positive operating margin and growing revenues for the company at the business unit level by supporting business and market strategy plans. Responsibilities include, but are not limited to:

- Manages labs in accordance with business plan and analyzes financial performance to meet the business objectives.
- Monitors progress of business units toward objectives and key performance indicators (KPI's) to improve financial performance, customer service and revenue growth daily. Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Provides weekly and monthly reports to management to ensure that goals and objectives are being achieved and to recognize opportunities for development.
- Conducts supervisory responsibilities with direct reports to foster and maintain strong staff performance.
- Prepares annual capital and operating budgets for business units yearly to meet financial goals and objectives.
- Responsible for establishing new business developments and additive growth to meet financial objectives.
- Facilitates local and company-wide initiatives and activities weekly to promote cooperation and consistency across their group and the company.
- Communicates with employees daily concerning objectives, company direction and expectations to create a positive work environment and improve staff performance.
- Supports all company policies and procedures daily to ensure compliance with standard operating procedures (SOP's).
- Meets with clients on a regular basis to evaluate lab performance and respond to changing customer requirements
- Reviews audit findings and ensures corrective actions are taken as needed to maintain compliance.
- Assists laboratory management personnel with operational issues including contract negotiations, sales and service issues, customer relations, and key proposals in order to ensure smooth operating systems and meet customer needs.
- Participates in corporate and group lab meetings to support key Eurofins TestAmerica initiatives and provide supervision at remote facilities.

4.3.7 Cluster Leader

The Cluster Leaders are responsible for maintaining positive operating margin to the company at the laboratory level and for meeting and exceeding the annual budget. The Cluster Leaders are responsible for overseeing operations personnel of the Eurofins EMLab P&K, LLC laboratories in their individual cluster, and providing guidance and direction as needed. Eurofins EMLab P&K, LLC's laboratories are grouped in clusters, as defined in organization charts, Figure 4-1. These positions represent the analytical departments in corporate planning and implementation of policies. This includes assuring the quality of all processes through training and placement of departmental personnel in key roles and coordination of department activities with other corporate departments and assuring the smooth flow of work on a daily basis. The Cluster Leader directly or indirectly manages their client service personnel who are the contacts for clients regarding analytical services and advice. The Cluster Leader will work closely with the Business Unit Manager in monitoring, reviewing and directing laboratory personnel, including through the individual Laboratory Managers and Supervisors. The Cluster Leaders are also responsible for implementing the safety policies for their facilities. Responsibilities include but are not limited to:

- Overall responsibility for the operation of the analytical laboratories in their cluster
- Coordinates and supervises all activities related to Eurofins EMLab P&K, LLC analytical processes Manages the laboratory to provide positive operating margin for the company and meet annual budgetary goals.
- Approves of all laboratory purchases including capital spending approvals to support the business plan and maintain profitability.
- Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensures that this training has been documented. Works with Eurofins Environment Testing Human Resources for hiring of new personnel.
- Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Ensures company human resource policies are adhered to and maintained.
- Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory. Assesses laboratory capacity and workload.
- Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits.
- Communicates facility specific goals and objectives to employees.
- Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.
- Pursues and maintains appropriate laboratory certification and contract approvals. Supports ISO 17025 requirements.
- Maintains positive customer relationships through direct interaction with customers, as needed.
- Ensures client specific reporting and quality control requirements are met.
- Contributes to the continuous improvement of the laboratory operations.
- Maintains an awareness of technical developments and regulatory requirements.
- Represents analytical services in corporate planning and vision
- Develops new and alternate analytical services
- Performs periodic reviews of their direct staff and oversees evaluation of analyst and/or laboratory technician performance and provides written feedback regarding performance

- Reviews analytical methods on an biennial basis
- Ensures that the EHS program is enforced and the EHS Manual is implemented in the facilities under their control
- Can act as a Technical Manager or NVLAP Approved Signatory if approved by respective regulatory agency.
- This individual may serve as report signatory.

Departmental Relations

- Reports directly to the Business Unit Manager.
- Works directly with the Quality Assurance Manager to ensure accuracy and precision of all analytical results
- Works with Facility Managers and personnel to coordinate implementation of company policies

Qualifications (Minimum)

- An earned life science degree, minimally at the baccalaureate level and a minimum of two years of full time equivalent documented relevant environmental microbiological work experience (mycological and/or bacteriological) and/or an earned physical or biological science degree, minimally at the baccalaureate level.
- The individual must be familiar with indoor air quality, bacteriological sampling and analytical methodology.

4.3.8 Senior Quality Assurance (QA) Manager

The Senior Quality Assurance (QA) Manager, in addition to all the responsibilities of a QA Manager (Section 4.2.4), is also responsible for managing the QA Managers or Quality Coordinators of assigned laboratories. The Senior QA Manager oversees the assigned laboratories to ensure that these labs have implemented an effective quality management system and that the labs drive continuous improvement. This includes identifying or developing quality management tools and training quality staff in the implementation of quality management systems, techniques and tools. The Senior QA Manager reports directly to the General Manager. In addition to those responsibilities listed in Section 4.2.4, responsibilities of the Senior QA Manager include, but are not limited to:

- Act as the QA representative and a representative of senior management in client meetings, regulatory meetings, open forums for discussing regulation changes, etc.
- Generate and submit monthly QA reports for the Management team to keep the team informed of the QA activities
- Provide the necessary support to drive and lead the initiative in making improvements to different processes/functions/procedures within the Quality Assurance program by closely working with other QA Managers, Operations, IT and the Management team
- Assist Business Unit Manager in QA personnel decisions including: staffing, hiring, evaluations, and disciplinary actions as requested.
- Supervise and coordinate the activities of the QA staff at assigned laboratories. Serve as a resource to all laboratory personnel on QA issues.
- Captains the QA team to enable communication and to distribute duties and responsibilities.

4.3.9 Quality Assurance (QA) Manager

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system. The QA Manager reports directly to the Senior Quality Assurance Manager. This position is able to evaluate data objectively and perform assessments without outside (e.g., managerial) influence. The NDSC Team may be used as a resource in dealing with regulatory requirements, certifications and other quality assurance related items. The Senior QA Manager directs the activities of the QA Managers to accomplish specific responsibilities, which include, but are not limited to:

- Serves as the focal point for QA/QC in the laboratory.
- Have functions independent from laboratory operations for which he/she has quality assurance oversight.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Arrange for or conducting internal audits on quality systems and the technical operation
- Implements and oversees the Eurofins EMLab P&K, LLC Quality Assurance program for the main laboratories and satellite laboratories (microlabs).
- Maintains and updates the Quality Assurance Manual.
- Maintains all quality control statistical data and other quality control documentation.
- Annually audits the Quality Assurance program, reporting procedures, and other documentation for each assigned facility.
- Works with supervisors to review, develop, and implement appropriate QA steps throughout process flow to ensure high quality of work and reasonable documentation.
- Assesses and implements requirements for current ISO/IEC 17025:2017, AIHA-LAP, LLC EMLAP, IHLAP, and NVLAP accreditation, along with any other accreditations, such as state specific accreditations/certifications (i.e. CA-ELAP, NY-ELAP, etc.).
- Responsible for ensuring that the laboratory is compliant to the current ISO/IEC 17025 standard, the AIHA-LAP, LLC, the NVLAP accreditation policies, and additional accreditations as they apply.
- Produces the monthly quality assurance report
- Responsible for training in Quality Assurance department.
- Maintains and controls all Quality Assurance documents and records.
- Researches and obtains new accreditations/licensing as required.
- Maintains regional facility accreditations/licensing and proficiency testing programs.
- Notifying laboratory management of non-conformances in the quality system and ensuring corrective action is taken. Procedures that do not meet the standards set forth in the QAM or laboratory SOPs shall be investigated following procedures outlined in Section 12 and if deemed necessary may be temporarily suspended during the investigation.
- Communication to the relevant regulatory authorities when there are management or facility changes that impact the laboratory.
- Monitoring and evaluating laboratory accreditations, certifications, and licenses; scheduling proficiency testing samples, where applicable.
- Monitoring and communicating regulatory changes that may affect the laboratory to management.
- Training and advising the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.

- The laboratory QA Manager will maintain records of all ethics-related training, including the type and proof of attendance.
- Maintain, improve, and evaluate the corrective action database and the corrective and preventive action systems.
- Objectively monitor standards of performance in quality control and quality assurance without outside (e.g., managerial) influence.
- Ensuring Communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Evaluation of the thoroughness and effectiveness of training.

Qualifications (Minimum)

- A baccalaureate degree in an applicable basic or applied science and have at least one year of non-academic analytical experience.
- Quality Assurance Manager shall have documented training in statistics or laboratory quality assurance/quality control.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Have a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).

4.3.10 Quality Assurance (QA) Assistant / Environmental Health and Safety Coordinator

The combined role of Quality Assurance Assistant / Environmental Health and Safety Coordinator holds dual responsibilities within the Quality Assurance team and the EH&S program for Eurofins EMLab P&K and reports directly to the Senior Quality Assurance Manager. The role of Quality Assurance Assistant includes assisting Quality Assurance Managers in the maintenance and continual improvement of the Quality Management System for the environmental microbiology, asbestos, lead, and radon programs. The role of Environmental Health and Safety Coordinator (EHSC) is responsible for administering the EH&S program across all Eurofins EMLab P&K locations, and working with facility management and local safety committee teams to provide a safe, healthy working environment and maintain regulatory compliance with local, state, and federal laws. The EH&S Coordinator role enforces environmental, health, and safety policies and procedures. Responsibilities include, but are not limited to:

QA Assistant Role:

- Assist QA Managers with data entry and QC reporting
- Assisting QA Managers with document control, including tracking and assignment of reviews
- Assisting QA Managers in maintaining the laboratory's reference data, preparation of certification applications
- Assisting with maintenance of training records for all employees
- Assist with maintenance of technical records including SOPs, QC records, laboratory data, etc.
- Performs additional tasks as needed and directed by Quality Assurance Manager.
- May perform customer service requests for Project Management staff, supply SOP's, certification information, etc.

EHS Coordinator Role:

- Works with facility management and local safety committee members to ensure facility compliance with the EH&S Manual and applicable policies/procedures.
- Works with laboratory management and corporate EH&S to ensure all Eurofins EMLab P&K facilities are monitored for unsafe conditions, acts, and potential hazards, proper personal protective equipment is available and used, and personnel are properly trained in its use.
- Completes monthly and annual EH&S reports, both internal and external.
- Investigates accidents, incidents, and near misses and identifies root causes, and works with management to eliminate those root causes. Completes accident investigation and reporting in reporting suite.
- Works with facility management to ensure that routine facility inspections for compliance with health, safety and environmental regulations and procedures are completed at each facility.
- Works with facility management to ensure that safety equipment checks are completed at each location to ensure proper working order and sufficient inventory.
- Plans, delivers and tracks completion of monthly refresher and general awareness training sessions and compliance training, including new employee EH&S orientation.
- Participates in and conducts routine EH&S committee meetings.
- Conducts annual EH&S audits for Eurofins EMLab P&K

Qualifications (Minimum)

- A high school diploma or GED and documented on-the-job experience training and experience in general laboratory quality assurance/quality control.

4.3.11 Laboratory Manager

The Laboratory Manager, where applicable, is responsible for overseeing facility specific analytical operations. The Facility Manager will work closely with the Cluster Leader in monitoring, reviewing and directing laboratory work, analytical quality, and overall capacity evaluations. Responsibilities include, but are not limited to:

- Overall responsibility for the operation of the analytical laboratory
- Coordinates and supervises all activities related to Eurofins EMLab P&K, LLC analytical processes
- Implements any Corrective Actions in the laboratory regarding analytical procedures or processes.
- Oversees training programs, if applicable
- Provides assistance with Quality Assurance SOPs for the facility – through the Cluster Leader – and ensures their implementation so that the facility is operated in a compliant manner that allows it to produce defensible data.
- Responsible for ensuring that the laboratory is compliant to the current ISO/IEC 17025 standard, the AIHA-LAP, LLC accreditation policies, the NVLAP accreditation policies, and additional accreditations as they apply.
- Interfaces with analysts to assure that quality analytical data is provided to clients and on – time delivery dates are met.
- Ensures that the employee health and safety procedures are implemented and followed to maintain facility operations that are compliant with appropriate policies and regulations.
- Maintains positive customer relationships through direct interaction with customers, as needed.

- Ensures client specific reporting and quality control requirements are met.
- Can act as the Technical Manager or NVLAP Approved Signatory if approved by respective regulatory agency.
- This individual may serve as report signatory.

Departmental Relations

- Reports directly to the Cluster Leader.
- Works directly with the Quality Assurance Manager to ensure accuracy and precision of all analytical results.
- Works with Cluster Leaders to coordinate implementation of company policies.
- Works with facility personnel staff to implement company policies.

Qualifications (Minimum)

- An earned life science degree, minimally at the baccalaureate level and a minimum of two years of full time equivalent documented relevant environmental microbiological work experience (mycological and/or bacteriological) and/or an earned physical or biological science degree, minimally at the baccalaureate level.
- The individual must be familiar with indoor air quality, bacteriological sampling and analytical methodology.

4.3.12 Technical Manager or Designee

Technical Manager Qualifications

- An earned science degree, minimally at the baccalaureate level, with a minimum of one year of relevant laboratory experience, three months of which must be full time equivalent documented environmental work experience applicable to analyses performed (i.e. mycological and/or bacteriological microbiology, asbestos fibers by PCM, lead analyses).
- The individual must be experienced in the selection and use of bioaerosol, surface, fluid and raw material sampling methods and in sample processing for the quantification and identification of mesophilic and thermophilic bacteria, and mesophilic, xerophilic, hydrophilic and thermotolerant fungi (molds and yeasts) isolated by those methods, as applicable.
- The individual must be experienced in the sampling methods and sample processing for the quantification of asbestos and other fibers by PCM analysis, as applicable.
- The individual must be experienced in the sampling methods and sample processing for the quantification of lead, as applicable to AIHA-LAP, LLC ELLAP.
- The technical manager or their designee shall be responsible for all technical operations and shall be available to address technical issues for laboratory staff and customers concerning analyses, as applicable.
- This individual may serve as report signatory.
- The individual must be present on-site at least 20 hours per week, or 50% of the laboratory working hours (whichever is greater) to address technical issues for laboratory staff and clients.

4.3.13 Senior Analyst

Senior analysts may oversee other departmental analyses, such as mycology and/or bacteriology. Senior Analysts will provide leadership to analytical and support staff. A Senior Analyst is responsible for providing high quality analyses and excellent client service. Senior analysts may also oversee asbestos, allergen and other analytical testing done in the laboratory. Responsibilities may include, but are not limited to:

- May supervise and coordinate laboratory work flow and analyses

- Performs analysis
- May train new analysts
- Maintains client relations and technical support when applicable
- Assists in research and development of new analytical services as required
- Assists the QA manager in development, implementation and data collection of QA processes for analytical services
- Performs independent data reviews for other analyst's work

Departmental Relations

- Reports to the Cluster Leader or Facility Manager.
- Implements and performs mycological, bacteriological, asbestos and other analytical training as required by the Cluster Leader
- Supports other Supervisors, Facility Managers or Cluster Leader when necessary
- Can act as the facility Technical Manager or NVLAP Approved Signatory if approved by respective regulatory agency.

Qualifications (Minimum)

Environmental Microbiology Laboratory Program (Fungi and Bacteria)

- An earned science degree, minimally at the baccalaureate level and a minimum of three years of full time equivalent documented environmental microbiological work experience (mycological and/or bacteriological).

Industrial Hygiene Laboratory Accreditation Program (PCM Asbestos)

- An earned physical or biological science degree, minimally at the baccalaureate level and a minimum of three years relevant nonacademic analytical chemistry experience. A minimum of two years' experience must be in asbestos analyses. The remaining one year can be substituted for work experience.
- Completion of NIOSH 582 (or equivalent) training course for PCM analyses.

National Voluntary Laboratory Accreditation Program (PLM Asbestos)

- Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index) Analysts are competent with the polarized light microscope, Can properly align the microscope and identify all of the crucial parts.
- Completion of McCrone (or equivalent) training course for PLM analyses if deemed necessary.

4.3.14 Analyst

Analysts perform a range of analyses based upon specific area of responsibility, including but not limited to, aerobiological, environmental, asbestos and drinking water samples. Analysts are responsible for high quality analyses and excellent client service. Responsibilities may include, but are not limited to:

- Analyzes samples for fungal and/or bacterial parameters
- Identify macrofungi and microfungi
- Analyzes samples for bacterial parameters, including drinking waters for coliforms and *E. coli*
- Process and prepare samples for analysis Analyze samples for asbestos
- Analyze samples for allergens

- Digest and analyze samples for lead analysis.
- Accurately records and reports analytical data
- Performs specific tasks related to Quality Control
- Maintains analytical quality control records
- Performs regular analysis of reference materials and other quality control samples
- Performs independent data reviews for other analysts' work

Departmental Relations

- Reports to Cluster Leader, or Facility Manager.
- Works with management and support staff for optimal teamwork
- Works with project management staff to clarify technical matters.
- Can act as the facility Technical Manager and NVLAP Approved Signatory if approved by respective regulatory agency

Qualifications (Minimum)

- Environmental Microbiology Laboratory Program (Fungi and Bacteria)
- A bachelor's degree in physical or biological science and documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.
- Industrial Hygiene Laboratory Accreditation Program (Asbestos)
- A bachelor's degree in a physical or biological science, and a minimum of one year relevant nonacademic analytical chemistry experience.
- Completion of training courses for PCM analyses.

Environmental Lead Laboratory Accreditation Program (ELLAP)

- A bachelor's degree in physical or biological science and one month of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.
- National Voluntary Laboratory Accreditation Program (PLM Asbestos)
- Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index). Analysts are competent with the polarized light microscope, and can properly align the microscope and identify all of the crucial parts.
- Completion of McCrone (or equivalent) training course for PLM analyses if deemed necessary.

4.3.15 Laboratory Technician/Assistant

Laboratory technicians and assistants prepare bioaerosol and microbial samples for fungal and bacteriological analysis. Receive samples and complete required paperwork for processing and analysis of samples, where applicable. Responsibilities may include, but are not limited to:

- Prepares bioaerosol and microbial samples for fungal and bacterial analysis
- Cultures fungi and bacteria from environmental samples for analysis
- Works with a variety of sampling media for optimal results
- Analyzes samples for fungal parameters
- Identify macrofungi and microfungi
- Analyzes samples for bacterial parameters, including drinking waters for coliforms and *E. coli*
- Analyze water samples for analysis

- Analyze samples for asbestos
- Analyze samples for allergens
- Digest and analyze samples for lead analysis.
- Accurately enters and reports analytical data
- Performs specific tasks related to Quality Control
- Performs required Quality Control procedures
- Maintenance of laboratory supplies, equipment, and routine lab reagents
- Prepare samples for ELISA analysis and perform ELISA analysis

Departmental Relations

- Reports to Cluster Leader or Facility manager
- Work with analysts to complete samples by required deadlines
- Work with log-in and receiving supervisors to control flow of work through the laboratory.
- Can act as the NVLAP Approved Signatory if approved by respective regulatory agency.

Qualifications (Minimum)

Environmental Microbiology Laboratory Program (Fungi and Bacteria)

- A high school diploma or GED and documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.

Environmental Lead Laboratory Accreditation Program (ELLAP)

- A high school diploma or GED and documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.

National Voluntary Laboratory Accreditation Program (PLM Asbestos)

- Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index); b) analysts are competent with the polarized light microscope, Can properly align the microscope and identify all of the crucial parts.
- Completion of McCrone (or equivalent) training course for PLM analyses if deemed necessary.

4.3.16 Project Manager (PM)

Members of the laboratory Client Services/Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager who serves as their primary contact at the laboratory. It is the PM's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements – including all verbal communications. The PM reports to the Cluster Leader and serves as the interface between the laboratory's technical departments and the laboratory's clients. With the overall goal of total client satisfaction, the functions of this position are outlined below:

- Scheduling sample submissions, sample container orders and sample pick-up via the laboratory courier service.
- Confirming certification status
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution and coordinating technical details with the laboratory staff.

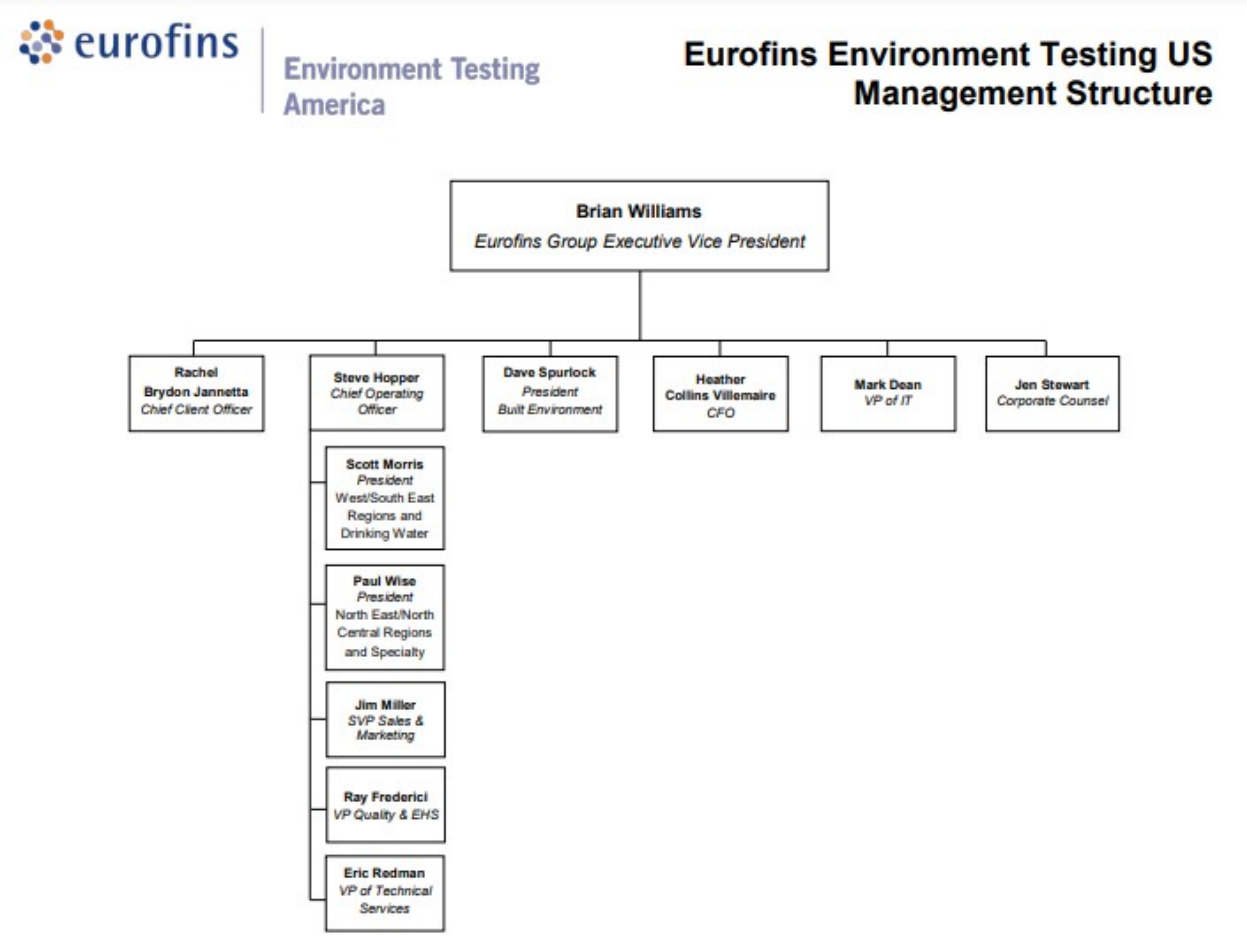
- Responsible to ensure that clients receive the proper sampling supplies.
- Accountable for response to client inquiries concerning sample status.
- Responsible for assistance to clients regarding the resolution of problems concerning COC.
- Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory.
- Notifying the supervisors of incoming projects and sample delivery schedules.
- Responsible for discussing with client any project-related problems, resolving service issues, and coordinating technical details with the laboratory staff.
- Responsible for staff familiarization with specific quotes, sample log-in review, and final report completeness.
- Monitor the status of all data projects in-house to ensure timely and accurate delivery of reports.
- Inform clients of data project-related problems and resolve service issues.
- Coordinate requests for sample containers and other services (data packages).

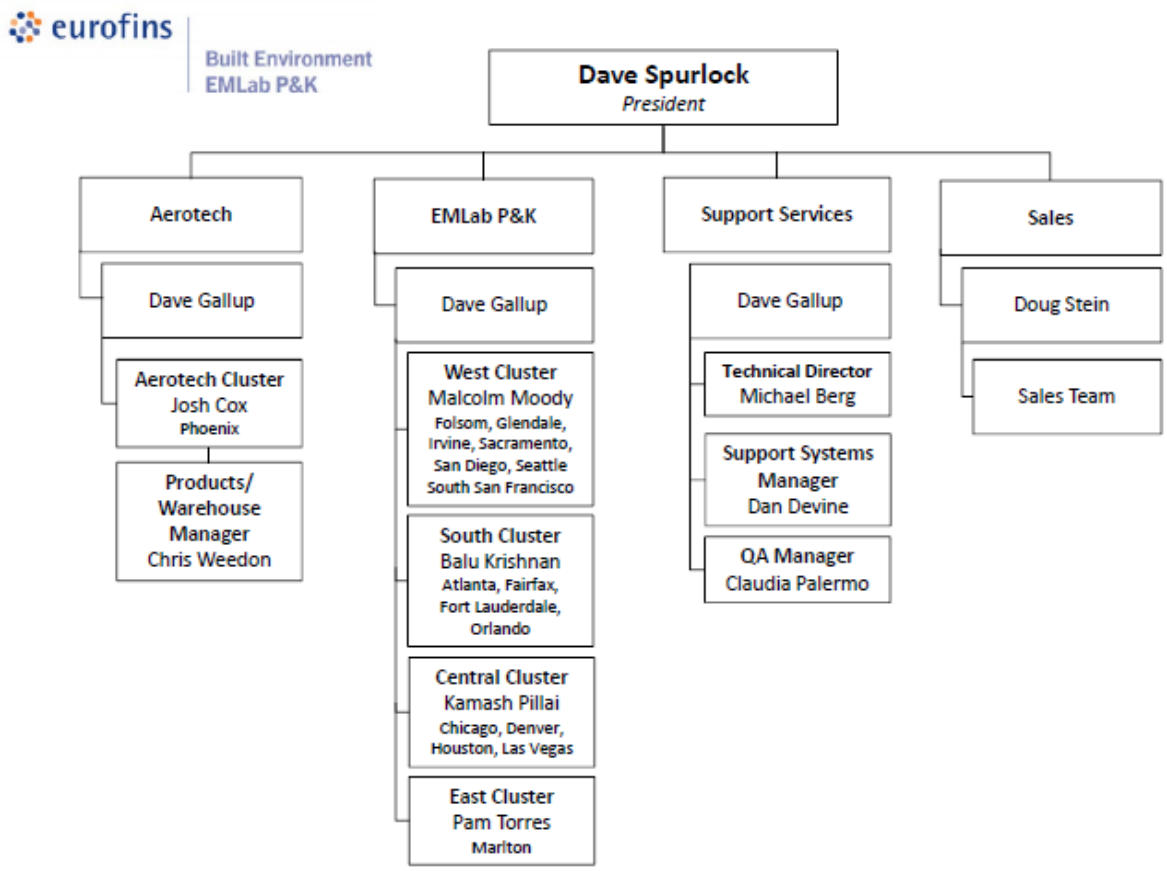
4.4 Business Continuity and Contingency Plans

Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur. Deputies are identified for all key management personnel. Deputies would temporarily fill a role if the primary is absent for more than 15 consecutive calendar days. The deputies must meet the same qualifications as the primary person should they be required to take on the responsibilities. The QA Manager communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory. Changes in the technical director must be communicated within a period of time and in the manner dictated by each regulatory authority.

The Eurofins EMLab P&K Deputy List, document EM-QA-R-7794, defines who assumes the responsibilities of key personnel in their absence for the western region and the eastern region respectively.

Figure 4-1. Corporate and Laboratory Organization Charts




eurofins
Built Environment
EMLab P&K
Dave Spurlock
President
Aerotech
Dave Gallup
Aerotech Cluster
Josh Cox
Phoenix
Products/ Warehouse Manager
Chris Weedon
EMLab P&K
Dave Gallup
West Cluster
Malcolm Moody
Folsom, Glendale, Irvine, Sacramento, San Diego, Seattle South San Francisco
South Cluster
Balu Krishnan
Atlanta, Fairfax, Fort Lauderdale, Orlando
Central Cluster
Kamash Pillai
Chicago, Denver, Houston, Las Vegas
East Cluster
Pam Torres
Marlton
Support Services
Dave Gallup
Technical Director
Michael Berg
Support Systems Manager
Dan Devine
QA Manager
Claudia Palermo
Sales
Doug Stein
Sales Team

5.0 PERSONNEL

5.1 Overview

The laboratory's management believes that its highly qualified and professional staff is the single most important aspect in assuring a high level of data quality and service. The staff consists of professionals and support personnel.

All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to perform their job function on their own. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities. Personnel may perform laboratory activities in more than one facility as directed by Cluster Leaders. Authorized analysts may be employed across more than one facility as needed to meet operational and personnel needs, Where personnel are deployed to a secondary facility, records are to be maintained detailing the dual facility assignments, anticipated timeframe of assignment, and organizational charts must reflect the use of dual location analysts where long term arrangements are in place (greater than 15 business days).

All personnel are responsible for complying with all QA/QC requirements that pertain to the laboratory and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

Laboratory management is responsible for formulating goals for lab staff with respect to education, training and skills and ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the lab staff.

The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competency standards of the laboratory and work in accordance to the laboratory's quality system.

5.2 Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staffs that possess a college degree (AA, BA, BS) in an applied science with some biology in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. Selection of qualified candidates for laboratory employment begins with documentation of minimum education, training, and experience prerequisites needed to perform the prescribed task. Minimum education and training requirements for laboratory employees are outlined in job descriptions maintained by Eurofins Environment Testing America Human Resources.

Experience and specialized training are occasionally accepted in lieu of a college degree (basic lab skills such as using a balance, colony counting, aseptic or quantitation techniques, etc., are also considered).

As a general rule for analytical staff, refer to Table 5-1:

Table 5-1. Analytical Staff Education and Experience Requirements

Specialty	Education	Experience
Sample Processing	H.S. Diploma or GED	On the job training (OJT)
Laboratory Technician / Assistant	H.S. Diploma or GED	One year of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst. For fungal air direct exam (spore trap) and/or lead, analysts are required to undergo six months of documented on-the-job training as a spore trap analyst trainee under the supervision of a Senior Analyst.
Laboratory Technician / Assistant (PLM Asbestos)	H.S. Diploma or GED Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.	Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index). Analysts are competent with the polarized light microscope, and can properly align the microscope and identify all of the crucial parts. Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.

Specialty	Education	Experience
Senior Analyst – Mycology/Bacteriology	An earned science degree, minimally at the baccalaureate level.	Minimum of three years of full time equivalent documented environmental microbiological work experience (mycological or bacteriological)
Senior Analyst – PCM Asbestos	An earned physical or biological science degree, minimally at the baccalaureate. Level. Completion of NIOSH 582 (or equivalent) training course for PCM analyses.	A minimum of three years relevant nonacademic analytical chemistry experience. A minimum of two years' experience must be in asbestos analyses. The remaining one year can be substituted for work experience.
Senior Analyst – PLM Asbestos	A bachelor's degree in physical or biological science. Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.	Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index) Analysts are competent with the polarized light microscope. Can properly align the microscope and identify all crucial parts.
Analyst (Fungi/Bacteria)	A bachelor's degree in physical or biological science.	Six months of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst (For fungal air direct exam (spore trap), analysts are required to undergo three months of documented on-the-job training as a spore trap analyst trainee under the supervision of a Senior Analyst.)
Analyst (PCM Asbestos)	A bachelor's degree in a physical or biological science. Completion of training course for PCM analysis.	A minimum of one year relevant nonacademic analytical chemistry experience.

Specialty	Education	Experience
Analyst (PLM Asbestos)	A bachelor's degree in physical or biological science. Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.	Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index). Analysts are competent with the polarized light microscope, and can properly align the microscope and identify all of the crucial parts.
Analyst (Lead)	A bachelor's degree in physical or biological science.	One month of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.
Technical Managers	An earned science degree, minimally at the baccalaureate level. (For bacteria/fungi: The individual must be experienced in the selection and use of bioaerosol, surface, fluid and raw material sampling methods and in sample processing for the quantification and identification of mesophilic and thermophilic bacteria, and mesophilic, xerophilic, hydrophilic and thermotolerant fungi (molds and yeasts) isolated by those methods.)	A minimum of one year of relevant laboratory experience, three months of which must be full time equivalent documented environmental microbiological work experience (mycological and/or bacteriological).

When an analyst does not meet these requirements, they can perform a task under the direct supervision of a qualified analyst, peer reviewer or Technical Manager, and are considered an analyst in training. The person supervising an analyst in training is accountable for the quality of the analytical data and must review and approve data and associated corrective actions.

5.3 Training

The laboratory is committed to furthering the professional and technical development of employees at all levels.

Orientation to the laboratory's policies and procedures, in-house method training, and employee attendance at outside training courses and conferences all contribute toward employee proficiency. Below are examples of various areas of required employee training:

Table 5-2. Examples of Required Training

Required Training	Time Frame	Employee Type
Environmental Health & Safety	Prior to lab work	All
Ethics – New Hires	1 week of hire	All
Ethics – Comprehensive	60 days of hire	All
Data Integrity	60 days of hire	Technical and PMs
Quality Assurance	90 days of hire	All
Ethics – Comprehensive Refresher	Annually	All
Initial Demonstration of Capability (DOC)	Prior to unsupervised method performance	Technical

The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as well as the date that approval/authorization was given. These records are kept on file at the laboratory. Authorizations are applicable across the Eurofins EMLab P&K network of laboratories for shared procedures. Also refer to "Demonstration of Capability" in Section 19.

The training of technical staff is kept up to date by:

- Each employee must have documentation in their training file that they have read, understood and agreed to follow the most recent version of the laboratory QA Manual and SOPs in their area of responsibility. This documentation is updated as SOPs are updated.
- Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics.
- Documentation of proficiency (refer to Section 19).
- An Ethics Agreement signed by each staff member (renewed each year) and evidence of annual ethics training.
- A Confidentiality Agreement signed by each staff member signed at the time of employment.
- Human Resources maintains documentation and attestation forms on employment status and records; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics violations). This information is maintained in the employee's secured personnel file.

Evidence of successful training could include such items as:

- Adequate documentation of training within operational areas, including one-on-one technical training for individual technologies, and particularly for people cross-trained.
- Analysts knowledge to refer to QA Manual for quality issues.
- Analysts following SOPs, i.e., practice matches SOPs.

- Analysts regularly communicate to supervisors and QA if SOPs need revision, rather than waiting for auditors to find problems.

Further details of the, laboratory's training program are described in the Laboratory Training SOP (EM-AD-S-1646, General Training).

5.4 Data Integrity and Ethics Training Program

The laboratory's Ethics and Data Integrity Program is discussed in Section 7.2. Employees are trained as to the legal and environmental repercussions that result from data misrepresentation. Key topics covered in the presentation include:

- Organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting.
- Ethics Policy
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping.
- Discussion regarding data integrity procedures.
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion)
- Internal monitoring. Investigations and data recalls.
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution.
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be usable but are in one sense or another partially deficient.

Additionally, a data integrity hotline (1-800-736-9407) is maintained by The NDSC.

6.0 ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS

6.1 Overview

Each Eurofins EMLab P&K laboratory is a secure laboratory facility with controlled access and designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. All visitors sign in and are escorted by laboratory personnel. Access is controlled by various measures.

Each laboratory is equipped with structural safety features. Each employee is familiar with the location, use, and capabilities of general and specialized safety features associated with their workplace. The laboratory provides and requires the use of protective equipment including safety glasses, protective clothing, gloves, etc., OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded.

Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, microbiological sample analysis, asbestos sample analysis, lead sample analysis, and administrative functions.

6.2 Environment

Laboratory accommodation, test areas, energy sources, and lighting are adequate to facilitate proper performance of tests. Each facility is equipped with heating, ventilation, and air conditioning (HVAC) systems appropriate to the needs of environmental testing performed at this laboratory. The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

Each laboratory provides for the effective monitoring, control and recording of environmental conditions that may affect the results of environmental tests as required by the relevant specifications, methods, and procedures. Such environmental conditions include temperature of in use equipment and within the laboratory, where applicable. Monitoring also includes environmental monitoring for airborne molds, bacterial contaminants, surface lead and total airborne fibers, including asbestos, which is performed on a predetermined schedule per facility.

When any of the method or regulatory required environmental conditions change to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels.

Environmental conditions of the facility housing the computer network and Labserve are regulated to protect against raw data loss.

When the laboratory performs laboratory activities at sites or facilities outside its permanent control, it shall ensure that the requirements related to facilities and environmental conditions of this document are met.

Specific requirements for facility and environmental conditions, as well as periodic monitoring of conditions, are given in the Environmental Health & Safety Manual plus each laboratory's Facility Addendum. Procedures and requirements for routine environmental monitoring are found in EM-HS-S-1585.

6.3 Work Areas

There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include:

- Microbiological culture handling and sample incubation areas.
- Asbestos sample handling and preparation of reagents.
- Chemical handling areas, including reagent preparation and waste disposal areas.

Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described below in the Building Security section.

Adequate measures are taken to ensure good housekeeping in each laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular cleaning to control dirt and dust within the laboratory. Work areas are available to ensure an unencumbered work area. Work areas include:

- Access and entryways to the laboratory.
- Sample receipt areas.
- Sample storage areas.
- Chemical and waste storage areas.
- Data handling and storage areas.
- Sample processing areas.
- Sample analysis areas.

Refer to the following documents and procedures for specific requirements for microbiological laboratory facility requirements.

- Standard Methods, 20th Ed., 9020B, Sec. 2
- TNI V1M5, 1.7.3.7.a
- CW-E-M-001, Eurofins TestAmerica Environmental Health and Safety Manual, Section 16
- EM-HS-S-1639, Housekeeping and Decontamination
- EM-HS-S-1286, Procedure for the Retention and Disposal of Samples

6.4 Responding to Emergencies

Employees must be aware of procedures to respond to all emergencies that might occur in the workplace. Employees must be familiar with the location and proper operation of all emergency equipment, evacuation routes and designated assembly areas for all areas where they work. Refer to the NDSC EH&S Manual Document No. CW-E-M-001. Sec. 7 and the laboratory's local EH&S addendum for complete details. These documents provide direction for situations where normal operations of the laboratory are not possible (e.g., electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, etc.)

In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Facility Management, Maintenance, Safety, Laboratory/Executive Management, Public Relations, IT, QA and other applicable personnel depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

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6.5 Building Security

Building keys and/or key fobs are distributed to employees as necessary.

Visitors to the laboratory sign in and out in a visitor's logbook. A visitor is defined as any person who visits the laboratory who is not an employee of the laboratory. In addition to signing into the laboratory, the Environmental Health and Safety policies require the completion of specific EH &S forms by all visitors and vendors. Visitors (with the exception of company employees) are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

7.0 QUALITY SYSTEM

7.1 Quality Policy Statement

The Quality Policy statement gives employees clear requirements for the production of analytical data. As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients.

We strive to provide the highest quality data achievable by:

- Reading and understanding all of the quality documents applicable to each position and implementing the process in our work.
- Following all recordkeeping requirements; describing clearly and accurately all activities performed; recording "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- Ensuring data integrity through the completeness, consistency, impartiality and accuracy of the data generated. Data is attributable, legible, contemporaneously recorded, original or a true copy, and accurate (ALCOA). This applies to manual paper documentation and electronic records.
- Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification/validation, analysis, and reporting; establishing an audit trail (the who, what, when, and why) that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- Emphasizing a total quality management process which provides impartiality, accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only after discussion with the client on the data limitations and acceptability of this approach.
- Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and applicable corrective action; documenting these activities completely, including the reasons for the decisions made.

- ❖ Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concerns on quality issues to management. Eurofins recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff
- ❖ Continually improve systems and manage risk to support quality improvement efforts in laboratory, administrative and managerial activities

7.2 Ethics and Data Integrity

Eurofins Environment Testing America is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The laboratory operates our Ethics and Data Integrity program under the guidance of Eurofin's Key Guidance Document (KGD). The elements of our Ethics and Data Integrity Program include:

- An Ethics Policy (NDS Document No. CW-L-P-004) and Employee Ethics Statements.
- Ethics and Compliance Officer/s (ECOs).
- A Training Program.
- Self-governance through disciplinary action for violations.
- A confidential mechanism for anonymously reporting alleged misconduct and a means for conducting internal investigations of all alleged misconduct. (NDSC Document No. CW-L-S-002).
- Procedures and guidance for recalling data if necessary (NDSC Document No. CW-Q-S-005).
- Effective external and internal monitoring system that includes procedures for internal audits (Section 17).
- Produce results, which are accurate and include QA/QC information that meets client pre-defined Data Quality Objectives (DQOs).
- Present services in a confidential, honest and forthright manner.
- Provide employees with guidelines and an understanding of the Ethical and Quality Standards of our Industry.
- Provide procedures and guidance to ensure the impartiality and confidentiality of all data and customer information.
- Operate our facilities in a manner that protects the environment and the health and safety of employees and the public.
- Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same.
- Educate clients as to the extent and kinds of services available.
- Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made.
- Promote the status of environmental laboratories, their employees, and the value of services rendered by them.

7.3 Quality System Documentation

The laboratory's Quality System is communicated through a variety of documents.

- Quality Assurance Manual – Eurofins EMLab P&K has one quality assurance manual to address the quality management system applicable to all Eurofins EMLab P&K facilities.NDSC Official Documents – Each laboratory may use the Guidance (instructional use) documents at their discretion. Template documents are process documents that the laboratory's need to implement locally by using the document as is or as an outline to define their internal practices that meet the minimum requirements of the template. Required documents need to be implemented as is and listed in the laboratory's document control list.
- Key Guidance Documents (KGDs) - Documents compiled at the Group Service Centre (GSC) level by Functional Leaders (document owners) aimed at providing specific Eurofins groups of employees with guidelines necessary for the good conduct of their respective work.
- Laboratory SOPs and Policies– General and Technical
- Laboratory QA/QC Policy Memorandums

7.3.1 Order of Precedence

In the event of a conflict or discrepancy between policies, the order of precedence is as follows:

- Quality Management Plan (QMP)
- NDSC Guidance Documents
- KGDs
- Laboratory Quality Assurance Manual (QAM)
- Laboratory SOPs and Policies
- Other (Work Instructions (WI), memos, flow charts, etc.)

NOTE: The laboratory has the responsibility and authority to operate in compliance with regulatory requirements of the jurisdiction in which the work is performed. Where the QMP conflicts with those regulatory requirements, the regulatory requirements of the jurisdiction shall hold primacy. The laboratory's QA Manual shall take precedence over the QMP in those cases.

7.4 QA/QC Objectives for the Measurement of Data

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of NELAP, ISO 17025, and any other regulatory agencies (i.e., states) in which the laboratory maintains accreditation.
Quality Control (QC) is generally understood to be limited to the analyses of samples and to be synonymous with the term *"analytical quality control"*. QC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The QC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPP) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. In order to ensure the ability

of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. The client is responsible for developing the QAPP; however, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

Historically, laboratories have described their QC objectives in terms of precision, accuracy, representativeness, comparability, completeness, selectivity and sensitivity (PARCCSS).

7.4.1 Precision

The objective is to meet the performance for precision demonstrated for the methods on similar samples and to meet data quality objectives (DQOs) of the EPA and/or other regulatory programs. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). Precision is documented on the basis of replicate analysis, usually duplicate or matrix spike (MS) duplicate samples.

7.4.2 Accuracy

The objective is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet data quality objectives (DQOs) of the EPA and/or other regulatory programs. Accuracy is defined as the degree of bias in a measurement system. Accuracy may be documented through the use of laboratory control samples (LCS) and/or MS. A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery.

7.4.3 Representativeness

The objective is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is a measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

The representativeness of the data from the sampling sites depends on both the sampling procedures and the analytical procedures. Refer to laboratory SOPs for subsampling and homogenization techniques appropriate to the analytical method.

7.4.4 Comparability

The objective is to provide analytical data for which the accuracy, precision, representativeness, and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by the laboratory over time.

Comparability objective is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision, and reporting limits with those of other laboratories.

7.4.5 Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid data to the total data over the course of the project. Data will be

considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope, or regulatory requirement. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

7.4.6 Selectivity

Selectivity is defined as the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: extractions (separation), digestions (separation), interelement corrections (separation), use of matrix modifiers (separation), specific retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), and specific electrodes (separation and identification).

7.4.7 Sensitivity

Sensitivity refers to the amount of analyte necessary to produce a detector response that can be reliably detected (above the Method Detection Limit) or quantified (above the Reporting Limit).

7.5 Criteria for Quality Indicators

The laboratory maintains a *Quality Control Criteria Summary that contains tables* that summarize the precision and accuracy acceptability limits for performed analyses (EM-QA-R-5730). This summary includes an effective date, is updated each time new limits are generated, and are managed by the laboratory's QA department. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, the laboratory has developed limits from evaluation of data from similar matrices. Criteria for development of control limits is contained in EM-AD-S-3548, Selection and Validation of Analytical Methods.

7.6 Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as NIOSH 7400) and programs (such as the AIHA-LAP, LLC Laboratory Accreditation Program). The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The current limits in the laboratory are entered into the Laboratory Information Management System (LIMS), also referenced as LabServe. An archive of all limits used within the laboratory is maintained within the LIMS/LabServe and Bugzilla records. If a method defines the QC limits, the method limits are used.

If a method requires the generation of historical limits, the lab develops such limits from recent data in the QC database of LIMS/LabServe following the guidelines described in Section 24. All calculations and limits are documented and dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

Current QC limits are entered and maintained in the LIMS/LabServe analyte database. As sample results and the related QC are entered into LIMS/LabServe, the sample QC values are compared with the limits in LIMS/LabServe to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be re-analyzed.

7.6.1 QC Charts

All QC analyses (duplicates, replicates, daily references) including data reviews, must be completed prior to release of results to clients**.** When QC analysis cannot be completed on the same day, the results must be qualified with a report comment.

Proficiency Testing results, and data from additional QC analyses may be used in determining analyst accuracy and precision, where applicable, for demonstration of continuing capability. If proficiency testing problems arise, the analysts will be asked to review the samples again to determine the source of error. If necessary, corrective actions will be implemented as determined by Quality Assurance, the facility manager and/or the Cluster Leader based on the nature of the problems.

Asbestos-PLM (Document EM-AS-S-1267)
Quality Control Requirements include duplicate analysis, Monthly Reference Sample, and Proficiency testing.

- Replicate and duplicate analyses are performed to evaluate the precision of a particular analysis. The routine analysis portion is processed through the laboratory in a normal manner. After the analysis has been completed, LabServe automated programming triggers the selection of 5% of the completed bulk samples for replicate analysis and 5% for duplicate analysis, based upon service, analyst and batch. The primary data along with the replicate and duplicate data will be statistically analyzed and control limits will be determined for the analyses (also automated by Labserve).
- Proficiency Testing results and data from additional QC analyses may be used in determining analyst accuracy and precision, where applicable, for demonstration of continuing capability. If proficiency testing problems arise, the analysts will be asked to review the samples again to determine the source of error. If necessary, corrective actions will be implemented as determined by Quality Assurance, the facility manager and/or the Cluster Leader based on the nature of the problems.

Asbestos - PCM (Document EM-AS-S-1260)

- Microscopes must be adjusted at least once a day, per analyst. Also, the phase-shift detection limit of the microscope must be checked weekly using the HSE/NPL phase-contrast test slide.
- Quality Control Requirements include duplicate analysis at the rate of 10%, Daily Reference Sample, Round Robin and Proficiency testing.
- The Reference Sample Quality Control Analysis (PCM) is performed by each analyst per day of analysis to evaluate the precision and accuracy of each analyst for fiber identification. The goal of performing Daily Reference Sample Quality Control Analysis is for continuous improvement. The samples for the Daily Reference Sample Quality Control Analysis consist of reference permanent slides, each of which contains varying asbestos or non-asbestos fiber. Each analyst will analyze a randomly selected slide for each day, recording their

results for the fiber counts. The identification by each analyst will be compared with the known standard through LabServe QC criteria automation. Any discrepancies in data comparison trigger an automated failure task for the analyst, who will be required to review the slide again to determine the source of error, and document any associated corrective actions.

- Biannual ongoing demonstration of analyst proficiency using Proficiency Analytical Testing (PAT) samples is required.

Training of Analysts (Document EM-AD-S-1646 and EM-AS-S-1261)

- All new analysts will receive documented training on Eurofins EMLab P&K, LLC analysis and sample preparation procedures as it relates to their individual job functions. The extent and duration of the training will depend on the level of education and experience of the trainee as outlined in Documents EM-AD-S-1646 and EM-AS-S-1261.
- All analytical training will include, but not be limited to, maintaining documentation of the training procedures and duration, a list of criteria documenting that the required steps involved have been addressed during the training, testing using reference materials where available, comparison of trainee results against analyst results, and providing the trainee with training documents and reference texts.
- Analysts and technicians will be authorized to perform a specific task and operate specific instruments once the applicable Training Acknowledgment and Authorization forms have been completed and signed by the trainee and trainer and all related data, reviews, and records have been submitted to Quality Assurance for final review and inclusion in analyst training records.

Analysis of Unknown Samples and Reference Materials

- Where applicable to job responsibilities, analysts will analyze unknown bacterial and/or fungal organisms at least monthly to ensure the consistency of identification. Selection of organisms will be made randomly from laboratory stock cultures.
- Where applicable to job responsibilities, analysts will analyze unknown samples for asbestos identification and quantitation.
- Documentation of the analyses will be maintained by the Quality Assurance department.
- Reference Materials
- Eurofins EMLab P&K, LLC maintains a library of reference materials that are accessible to all analysts. Each facility is responsible for maintaining an individual list of reference texts which are maintained in LabServe.
- Eurofins EMLab P&K, LLC maintains a library of cultures and reference slides. EMPAT and other microbiological reference materials are grown and analyzed by the laboratory on a routine basis.
- Asbestos reference samples such as NIST SRM #1866 and SRM #1867, or equivalent, are also maintained in applicable laboratories, if available.
- The laboratory retains and utilizes proficiency testing materials for use as in-house instructional materials. The proficiency test results are used to verify accuracy and precision for each analyst and to judge the analysts' overall performance. Proficiency test results are used for inter-analyst comparisons and entered into the laboratory’s management system

records. The laboratory determines precision on the qualitative and quantitative analyses of samples by: repeatability - repeat analyses by the same analyst; -comparison of results from multiple slide mounts of the same material; reproducibility - analysis of samples by multiple analysts if possible (single analyst laboratories require more interlaboratory data); and interlaboratory analysis - analysis of samples by other laboratories. The laboratory also determines the accuracy of the qualitative and quantitative analyses of samples by: analysis of proficiency testing materials; analysis of standards either prepared in-house or purchased; and analysis of samples using independent methods (e.g., XRD, gravimetric, etc.).

- When analyzing QC samples (duplicates, replicates) or reference samples, analysts must complete the analysis and enter the results into Labserve or record them on appropriate data sheets, without any assistance from or discussions with other analysts.
- Analysts should not edit the result they reported in Labserve or recorded on appropriate data sheets.

Demonstration of Capability: (Document EM-AD-S-1646)

Semi-annual demonstrations of capability may be accomplished by successful completion of:

- duplicate analyses;
- replicate analyses;
- daily reference analyses and
- proficiency testing samples.
- Acceptable performance criteria for Ongoing Demonstrations of competency are based on the performance characteristics for the method, established either from the data collected from the analysis of QC check samples, those already promulgated by the method, those set by an outside provider or an error rate of ≤1% for Asbestos PLM, and ≤5% for other analyses over a six month period.
- For example, if an analyst is qualified to perform bacterial analyses and is required to participate in the AIHA EMPAT Bacterial Culturable Proficiency Testing program, the acceptable performance for their Ongoing Demonstration of Competency would be a score of ≥85%, which is set by the provider

7.7 Quality System Metrics

In addition to the QC parameters discussed above, the entire Quality System is evaluated on a monthly basis through the use of specific metrics (refer to Section 18). These metrics are used to drive continuous improvement in the laboratory's Quality System.

8.0 DOCUMENT CONTROL

8.1 Overview

The QA Department is responsible for the control of documents used in the laboratory to ensure that approved, up-to-date documents are in circulation and out-of-date (obsolete) documents are archived or destroyed. The following documents, at a minimum, must be controlled:

- Laboratory Quality Assurance Manual
- Laboratory Standard Operating Procedures (SOP)
- Laboratory Policies
- Work Instructions and Forms
- NDSC Documents[1]
- KGDs[1]

[1]Includes locally implemented documents that are document controlled within the laboratory's document control system. The NDSC and/or KGD documents are only considered controlled when they are read on the intranet site. Printed copies are considered uncontrolled unless the laboratory physically distributes them as controlled documents. A detailed description of the procedure for issuing, authorizing, controlling, distributing, and archiving NDSC Official Documents is found in Document CW-Q-S-001, NDSC Document Control and Archiving. The laboratory's internal document control procedure is defined in SOP No. EM-QA-S-2059. All documents that are part of the Eurofins EMLab P&K quality assurance system, either internally generated or external are controlled through the Eurofins EMLab P&K LabServe Document Control system. The formal distribution of documents to Eurofins EMLab P&K employees is conducted through a companywide electronic release of revisions in LabServe. All users with log in credentials are afforded access to current revisions of released documents through the LabServe Document control module.

The laboratory QA Department also maintains access to various references and document sources integral to the operation of the laboratory. This includes reference methods and regulations. Instrument manuals (hard or electronic copies) are also maintained by the laboratory.

The laboratory maintains control of records for raw analytical data and supporting records such as audit reports and responses, logbooks, standard logs, training files, MDL studies, Proficiency Testing (PT) studies, certifications and related correspondence, and corrective action reports *(however named)*. Raw analytical data consists of bound logbooks, instrument printouts, any other notes, magnetic media, electronic data, and final reports.

8.2 Document Approval and Issue

The pertinent elements of the document control system include a unique document title and number, pagination, the total number of pages of the item or an 'end of document' page, the effective date, revision number, and the laboratory's name. The QA personnel are responsible for the maintenance of this system.

Controlled documents are authorized by the QA Department and Regional Laboratory Directors. In some cases, the document owner and/or facility technical managers/approved signatories, may be asked to review controlled documents prior to release. In order to develop a new document, a document owner/author submits an electronic draft to the QA Department for

suggestions, review, and approval before use. Upon approval, QA personnel add the identifying version information to the document and retain that document as the official document on file. That document is then electronically registered and distributed to applicable facilities via LabServe Document Control. Changes to documents stored electronically will be strictly controlled by the LabServe document control system. Handwritten changes to SOPs are not allowed.

The QA Department maintains a list of the official versions of controlled documents. A Master List of Eurofins EMLab P&K Controlled Documents is maintained in LabServe and can be accessed by all employees using the “My Docs" tab on the LabServe home page.

Quality System Policies and Procedures will be reviewed at a minimum of every two years and revised as appropriate. Changes to documents occur when a procedural change warrants.

8.3 Procedures for Document Control Policy

For changes to the QA Manual, and all other quality documents, refer to SOP No. EM-QA-S-2059. Uncontrolled copies must not be used within the laboratory. Printing of Eurofins EMLab P&K SOPs is not permissible unless strictly and exclusively used for review or training purposes. Any document printed for this purpose must be labeled as “UNCONTROLLED” or “OBSOLETE” to indicate it is not a controlled copy. Any official document printed for these purposes must be discarded/shredded immediately following completion of review or training. Previous revisions are removed from general access points and stored within the LabServe Document Control module, and are not accessible to lab personnel. Current electronic copies are stored within LabServe Document Control and are accessible to personnel via the “MyDocs” link after logging in with individual system credentials.

For changes to SOPs, refer to SOP No. EM-QA-S-2059, Document Control and Control of Records.

Forms, worksheets, work instructions and information are organized by department in the LabServe Document Control module. The procedure for the care of these documents is in SOP EM-QA-S-2059.

8.4 Obsolete Documents

All invalid or obsolete documents are removed, or otherwise prevented from unintended use. The laboratory has specific procedures as described above to accomplish this. In general, obsolete documents are removed from general access points in LabServe Document Control. A copy of the obsolete document is archived within LabServe Document Control according to SOP No. EM-QA-S-2059.

9.0 SERVICE TO THE CLIENT

9.1 Overview

The laboratory has established procedures for the review of work requests and contracts, oral or written. The procedures include evaluation of the laboratory's capability and resources to meet the contract's requirements within the requested time period. All requirements, including the methods to be used, must be adequately defined, documented and understood. For many environmental sampling and analysis programs, testing design is site or program specific and does not necessarily fit into a standard laboratory service or product. It is the laboratory's intent to provide both standard and customized environmental laboratory services to our clients.

A thorough review of technical and QC requirements contained in contracts is performed to ensure project success. The appropriateness of requested methods, and the lab's capability to perform them must be established. Projects, proposals, and contracts are reviewed for adequately defined requirements and the laboratory's capability to meet those requirements. Alternate test methods that are capable of meeting the clients' requirements may be proposed by the lab. A review of the lab's capability to analyze non-routine analytes is also part of this review process.

All projects, proposals and contracts are reviewed for the client's requirements in terms of compound lists, test methodology requested, sensitivity (detection and reporting levels), accuracy, and precision requirements (% Recovery and RPD). The reviewer ensures that the laboratory's test methods are suitable to achieve these requirements and that the laboratory holds the appropriate certifications and approvals to perform the work. The laboratory and any potential subcontract laboratories must be certified, as required, for all proposed tests.

Electronic or hard copy deliverable requirements are evaluated against the laboratory's capacity for production of the documentation.

If the laboratory cannot provide all services but intends to subcontract such services, whether to another Eurofins facility on the same LIMS or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 10 for Subcontracting Procedures.)

The laboratory informs the client of the results of the review if it indicates any potential conflict, non-conformance, lack of accreditation, or inability of the lab to complete the work satisfactorily. Any discrepancy between the client's requirements and the laboratory's capability to meet those requirements is resolved in writing before acceptance of the contract. It is necessary that the contract be acceptable to both the laboratory and the client. Amendments initiated by the client and/or Eurofins EMLab P&K are documented in writing.

All contracts, QAPPs, Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the project record.

The same contract review process used for the initial review is repeated when there are amendments to the original contract by the client, and the participating personnel are informed of the changes.

9.2 Review Sequence and Key Personnel

Appropriate personnel will review the work request at each stage of evaluation.

For routine projects and other simple tasks, a review of standard COC submissions by the receiving and log in staff is considered adequate. The receiving and log in staff confirm that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the clients turn around needs. Routine project submission reviews are performed according to SOP No. EM-SM-S-1288, Sample Receiving, and EM-SM-S-1993, Sample Log-In.

For new, complex or large projects, the proposed contract is given to the Regional Account Manager or Project Manager, who will decide which lab will receive the work based on the scope of work and other requirements, including certification, testing methodology, and available capacity to perform the work. The contract review process is outlined in NDSC Document No. CA-L-P-002**,** Contract Compliance Policy.

This review encompasses all facets of the operation. The scope of work is distributed to the appropriate personnel, as needed based on scope of contract, to evaluate all of the requirements shown above (not necessarily in the order below)**:**

- Contract Administrator
- Laboratory Project Manager
- Laboratory Cluster Leaders and/or Technical Managers
- Account Executives
- Quality Managers
- Laboratory Environmental Health and Safety Managers/Directors
- The Laboratory Director reviews the formal laboratory quote and makes final acceptance for their facility.

The Sales Director, Contract Administrator, Account Executive or Proposal Coordinator then submits the final proposal to the client.

In the event that one of the above personnel is not available to review the contract, his or her back-up will fulfill the review requirements.

9.3 Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the Business Unit Manager, Cluster Leaders, Facility Managers, and Client Services. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large and complex projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule is met. Regularly scheduled meetings are held between laboratory management, PMs, Client Services and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory. Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Sample Information System (LIMS) including turnaround time, and work in-house.

9.4 Documentation

Copies of all signed and/approved contracts are maintained within LabServe account records.

Appropriate records are maintained for every contract or work request. All stages of the contract review process are documented and include records of any significant changes.

The contract will be distributed to and maintained by the appropriate sales/marketing personnel and the Account Executive. A copy of the contract and formal quote will be filed with the laboratory PM and the Laboratory Director.

Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract. The PM keeps a phone log of conversations with the client.

9.4.1 Project-Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM is assigned to each client. It is the PM's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PM's are the primary client contact and they ensure resources are available to meet project requirements, they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to maximize production and client satisfaction, while maintaining quality.Project notes may be associated with each sample batch as a reminder upon sample receipt and analytical processing.

Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been signed by both parties.

Such changes are also communicated to the laboratory either during operations meetings or via LabServe project tasks. Such changes are updated to the project notes and are introduced to the managers at these meetings. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Technical Manager. After the modification is implemented into the laboratory process, documentation of the modification is made in the case narrative of the data report(s), where applicable.

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

9.5 Special Services

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements. The laboratory has procedures to ensure confidentiality to clients (Section 15 and 25).

The laboratory's standard procedures for reporting data are described in Section 25. Special services are also available and provided upon request. These services include:

- Reasonable access for our clients or their representatives to the relevant areas of the laboratory for the witnessing of tests performed for the client.
- Assisting client-specified third party data validators as specified in the client's contract.
- Supplemental information pertaining to the analysis of their samples. Note: An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

When the client requests a statement of conformity to a specification or standard based on the analysis performed by the laboratory (e.g., pass/fail, in-tolerance/out-of-tolerance), the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to the client. Associated reporting requirements are addressed in Section 25.2.18.

9.6 Client Communication

PMs are the primary communication link to the clients. They shall inform their clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

Technical Managers and/or Regional Laboratory Directors are available to discuss any technical questions or concerns that the client may have.

9.7 Reporting

The laboratory works with our clients to produce any special communication reports required by the contract.

9.8 Client Surveys

The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service. Eurofins Sales and Marketing teams periodically develop lab and client specific surveys to assess client satisfaction.

When a complaint is received, we determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information

and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The person receiving the complaint is responsible for entering client concerns into Labserve via the task system, ensuring that concerns selections are marked. In some cases, an ICAT is initiated to address and document the situation. While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will issue an ICAT if a trend is evident.

10.0 SUBCONTRACTING OF TESTS

10.1 Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the Eurofins EMLab P&K. The phrase “work sharing” refers to internal transfers of samples between the Eurofins EMLab P&K laboratories. The term outsourcing refers to the act of subcontracting tests.

When contracting with our clients, the laboratory makes commitments regarding the services to be performed and the data quality for the results to be generated. When the need arises to outsource testing for our clients because project scope, changes in laboratory capabilities, capacity, or unforeseen circumstances, we must be assured that the subcontractors or work sharing laboratories understand the requirements and will meet the same commitments we have made to the client. Refer to Eurofins EMLab P&K’s Sample Receiving SOP (EM-SM-S-1288) for Subcontracting Procedures and the Work Sharing Process.

When outsourcing analytical services, the laboratory will assure, to the extent necessary, that the subcontract or work sharing laboratory maintains a program consistent with the requirements of this document, the requirements specified in the current ISO/IEC 17025 and/or the client’s Quality Assurance Project Plan (QAPP). All QC guidelines specific to the client’s analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-TNI accredited work where required.

Project Managers (PMs) or other responsible Client Service members, for the Export Lab (i.e., the Eurofins EMLab P&K laboratory that transfers samples to another laboratory) are responsible for obtaining client approval prior to subcontracting any samples. The laboratory will advise the client of a subcontract arrangement in writing and when possible approval from the client shall be obtained and retained in the project folder. Standard Eurofins EMLab P&K Terms & Conditions include the flexibility to work-share samples within the Eurofins EMLab P&K laboratories. Therefore, additional advance notification to clients for intra-laboratory work-shares is not necessary unless specifically required by a client contract. Unless the client has specified a particular location where Eurofins EMLab P&K, LLC is to perform its services, Eurofins EMLab P&K, LLC may perform services for the client at any laboratory in its network provided that for the samples being work-shared, the receiving lab has the same requested services on its Scope of Accreditation as the lab to which the samples were originally sent. Before samples are work-shared, Eurofins EMLab P&K, LLC will advise the client of the arrangement in writing by

requesting a Transfer Approval/Disapproval Agreement to be completed by the client. These agreements will be kept on file for future use. Every attempt will be made to gain the client's approval in writing using the Transfer Approval/Disapproval Agreement. If the client does not respond to the approval request, Eurofins EMLab P&K, LLC retains the right, at its discretion, to work-share services ordered by the client to another Eurofins EMLab P&K, LLC laboratory or other laboratories.

Note: In addition to the client, some regulating agencies (e.g., USDA) or contracts require notification prior to placing such work**.**

10.2 Qualifying and Monitoring Subcontractors

Whenever a PM or Regional Account Manager becomes aware of a client requirement or laboratory need where samples must be outsourced to another laboratory, the other laboratory(s) shall be selected based on the following:

- Subcontractors specified by the client - In these circumstances, the client assumes responsibility for the quality of the data generated from the use of a subcontractor.
- Subcontractors reviewed by Eurofins EMLab P&K – Firms which have been reviewed by the company and are known to meet standards for accreditations (e.g., AIHA-LAP, LLC, NVLAP, State specific accreditations, TNI, etc.); technical specifications; legal and financial information.

A listing of vendors is available on the Eurofins Environment Testing TestAmerica intranet site.

All Eurofins EMLab P&K laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations and can adhere to the project/program requirements. Client approval is not necessary unless specifically required by the contract. In these cases, the client must provide acknowledgement that the samples can be sent to that facility (an e-mail is sufficient documentation or if acknowledgement is verbal, the date, time, and name of person providing acknowledgement must be documented). The originating laboratory is responsible for communicating all technical, quality, and deliverable requirements as well as other contract needs. (NDSC Document No. CA-C-S-001, Work Sharing Process).

Eurofins EMLab P&K, LLC will be held responsible for data produced as a result of subcontracting of work, except in the case where the client or a regulatory authority specifies which subcontractor is to be used.

Prior to submitting samples to subcontractors the samples may be logged into the LIMS/LabServe and assigned a Eurofins EMLab Project ID number. A Chain of Custody (COC) must be signed to document transfer to the subcontracting laboratory. All data reported from a subcontractor shall list the name of the laboratory performing the analysis. A copy of the COC must be part of the report sent to Eurofins EMLab P&K, LLC after completion of the analysis by the subcontractor.

10.2.1 When the potential sub-contract laboratory has not been previously approved, RAMs or PMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory must be approved by the Business Unit Manager or Cluster Leader. The Business Unit Manager or Cluster Leader requests that the QA Manager or PM begin the process of

approving the subcontract laboratory as outlined in NDSC Document No. CW-L-S-004, Subcontracting Procedures.

Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability and forwarded to the NDSC Quality Information Manager (QIM) for review. After the NDSC QIM reviews the documents for completeness, the information is forwarded to the Finance Department for formal signature and contracting with the laboratory. The approved vendor will be added to the approved subcontractor list on the intranet site, and the finance group is concurrently notified.

The client will assume responsibility for the quality of the data generated from the use of a subcontractor they have requested the lab to use. The qualified subcontractors on the intranet site are known to meet minimal standards. Eurofins EMLab P&K does not certify laboratories. The subcontractors on our approved list can only be recommended to the extent that we would use them.

10.3 Oversight and Reporting

The status and performance of qualified subcontractors will be monitored by NDSC, and includes an annual review process (see NDSC Document No. CW-L-S-004). Any problems identified will be brought to the attention of NDSC and/or Procurement personnel.

- Complaints shall be investigated. Documentation of the complaint, investigation, and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints are posted using the Vendor Performance Report.
- Information shall be updated on the intranet when new information is received from the subcontracted laboratories.
- Subcontractors in good standing will be retained on the intranet listing. Client Services personnel will notify all Eurofins EMLab P&K laboratories, NDSC, and Corporate Contracts if any laboratory requires removal from the intranet site. This notification will be posted on the intranet site and e-mailed to all Client Services Personnel, Cluster Leaders, QA Managers, and Sales Personnel.

Prior to initially sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it's current and scope-inclusive. The information is documented within the project records.

10.3.1 All subcontracted samples must be accompanied by a Eurofins EMLab P&K Chain of Custody (COC). A copy of the original COC sent by the client must be available in LIMS for all samples workshared within Eurofins EMLab P&K. Client COCs are only forwarded to external subcontractors when samples are shipped directly from the project site to the subcontractor lab. Under routine circumstances, client COCs are not provided to external subcontractors.

Through communication with the subcontracted laboratory, the PM monitors the status of the subcontracted analyses, facilitates successful execution of the work, and ensures the timeliness and completeness of the analytical report.

Non-TNI accredited work must be identified in the subcontractor's report as appropriate. If TNI accreditation is not required, the report does not need to include this information.

Reports submitted from subcontractor laboratories are not altered and are included in their original form in the final project report. This clearly identifies the data as being produced by a subcontractor facility. If subcontract laboratory data is incorporated into the laboratory's EDD (i.e., imported), the report must explicitly indicate which lab produced the data for which methods and samples.

Note: The results submitted by a Eurofins EMLab P&K work sharing laboratory may be transferred electronically and the results reported by the Eurofins EMLab P&K work sharing lab are identified on the final report. The report must explicitly indicate which lab produced the data for which methods and samples. The final report must include a copy of the completed COC for all work sharing reports.

10.4 Contingency Planning

The full qualification of a subcontractor may be waived to meet emergency needs. This decision and justification must be documented in the project files, and the 'Purchase Order Terms And Conditions For Subcontracted Laboratory Services' must be sent with the samples and COC.

In the event this provision is utilized, the laboratory (e.g., PM) will be required to verify and document the applicable accreditations of the subcontractor. All other quality and accreditation requirements will still be applicable, but the subcontractor need not have signed a subcontract agreement with Eurofins EMLab P&K at this time.

The use of any emergency subcontractor will require the PM to complete a ~~JDE~~ New Vendor Add Form in order to process payment to the vendor and add them to LIMS/LabServe. This form requires the user to define the subcontractor's category/s of testing and the reason for testing.

10.4 Use of NELAP and A2LA Logo

It is not laboratory policy to use these logos on any company letterhead, including analytical reports.

11.0 PURCHASING SERVICES AND SUPPLIES

11.1 Overview

Evaluation and selection of suppliers and vendors is performed, in part, on the basis of the quality of their products, their ability to meet the demand for their products on a continuous and short term basis, the overall quality of their services, their past history, and competitive pricing. This is achieved through evaluation of objective evidence of quality furnished by the supplier, which can include certificates of analysis, recommendations, and proof of historical compliance with similar programs for other clients. To ensure that quality critical consumables and equipment conform to specified requirements, which may affect quality, all purchases from

specific vendors are approved by a member of the supervisory or management staff. Capital expenditures are made in accordance with Eurofins TestAmerica's Fixed Asset Acquisition, Retention and Safeguarding SOP No. CW-F-S-007.

Contracts will be signed in accordance with the laboratory's authorization matrix, or refer to NDSC Document No. CW-F-P-002. Request for Proposals (RFP's) will be issued where more information is required from the potential vendors than just price. Process details are available in NDSC Document No. CW-F-P-004, Guidance on Procurement and Contracts Policy. RFP's allow the laboratory to determine if a vendor is capable of meeting requirements such as supplying all of the Eurofins TestAmerica facilities, meeting required quality standards and adhering to necessary ethical and environmental standards. The RFP process also allows potential vendors to outline any additional capabilities they may offer.

11.2 Glassware

Glassware used for volumetric measurements must be Class A or verified for accuracy according to laboratory procedure. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

11.3 Reagents, Standards & Supplies

Purchasing guidelines for equipment, consumables, and reagents must meet the requirements of the specific method and testing procedures for which they are being purchased.

11.3.1 Purchasing

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Materials used in the analytical process must be of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method SOP. Requests for reagents, standards, or supplies are directed to facility managers, Cluster Leaders, or designee. For labs using on-site consignment, analyst may check the item out of the on-site consignment system that contains items approved for laboratory use.

11.3.2 Receiving

It is the responsibility of the facility manager, or designee, to receive the shipment. It is the responsibility of the receiving personnel to document the date materials were received. Once the ordered reagents or materials are received, the receiver compares the information on the label or packaging to the original order to ensure that the purchase meets the quality level specified. This is documented through the addition of the received date and initials to the information present on the packing slip. All reagents and media received by the laboratory for internal use must be dated and initialed upon receipt, and assigned an expiration date if one is not assigned by the manufacturer. All items are to be stored according to manufacturer's instructions and SDS requirements. The Certification of Analysis and other Quality Control records for specific medium and reagent lots supplied by the vendors are maintained at each facility. (Supply Receiving and Distribution East, Document EM-MR-S-1209, and Supply Receiving and Distribution West, Document EM-MR-S-7350)

Materials may not be released for use in the laboratory until they have been inspected, verified as suitable for use, and the inspection/verification has been documented. Materials which are found to not meet expected requirements and level of quality either at receiving or upon initial use, are to be set aside for return to the vendor. Facility managers, or designees, are to be notified of any negative trend noted in quality of vendor materials for further evaluation and vendor replacement as needed. Trends are reported immediately by the laboratory staff to the Purchasing Group.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.

Any media or reagents generated by the laboratory must follow the prescribed procedure for quality control checking prior to use in analysis. **I**n-house generated standards or reagents must complete quality control checks, before being used in the processing of samples. All standards and reagents produced by the laboratory are produced with a description of content, preparer's initials, manufacturer and lot number of parent material, pH (if applicable), assigned lot numbers and expiration dates.

All standards used to calibrate instruments or measuring devices must be traceable to the NIST, or equivalent national or international standard.

Safety Data Sheets (SDSs) are available online through the Company's intranet website. Anyone may review these for relevant information on the safe handling and emergency precautions of on-site chemicals.

11.3.3 Specifications

Methods used in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, analytical reagent grade will be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

Reagents, media, and chemicals must not be used past the manufacturer's expiration date and must not be used past the expiration time noted in a method SOP. If expiration dates or recommended retest dates are not provided, the laboratory may contact the manufacturer to determine an expiration date. If no recommended expiration is available, the laboratory will assume a 5 year expiration from date of manufacture.

Wherever possible, standards must be traceable to national or international standards of measurement or to national or international reference materials. Records to that effect are available to the user.

Where applicable, compressed gases in use are checked for pressure and secure positioning daily. To prevent a tank from going to dryness, or introducing potential impurities, the pressure should be closely watched as it decreases to approximately 15% of the original reading, at which point it should be replaced. For example, a standard sized laboratory gas cylinder containing 3,000 psig of gas should be replaced when it drops to approximately 500 psig. The

quality of the gases must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

Water used in the preparation of samples, standards or reagents must meet the applicable water quality requirements noted in individual method SOPs.

The laboratory may purchase reagent grade (or other similar quality) water for use in the laboratory. This water must be certified clean by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

Purchased bottleware used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottleware is purchased, all lots must be verified clean prior to use. This verification must be maintained. (Reference SOPs EM-MR-S-1209 and EM-MR-S-7350.)

11.3.4 Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown-glass containers. Storage conditions are per the NDSC Environmental Health & Safety Manual Document No. CW-E-M-001, the local laboratory EH&S manual addendum and method SOPs or manufacturer instructions.

11.4 Purchase of Equipment / Instruments / Software

When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or supervisor makes a supply request to the Facility Manager, Cluster Leader, or the Business Unit Manager. If they agree with the request, the procedures outlined in NDSC Document No. CA-T-P-001, Qualified Products List, are followed. A decision is made as to which piece of equipment can best satisfy the requirements. The appropriate written requests are completed and purchasing places the order.

Upon receipt of a new or used piece of equipment, an identification name is assigned and added to the equipment list. Its capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, Demonstration of Capabilities (DOCs), and other relevant criteria (refer to Section 19). For software, its operation must be deemed reliable and evidence of instrument verification must be retained by the QA Department. Software certificates supplied by the vendors are filed with the QA Department. The manufacturer's operation manual is retained locally at each facility.

11.5 Services

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 20. The need for service is determined by analysts and/or Technical Managers. The service providers that perform the services are approved by the Facility Manager.

Analytical balances are serviced and calibrated annually in accordance with SOP EM-EQ-S-1584. The calibration and maintenance services are performed on-site, and the balances are returned to use immediately following successful calibration. Calibration certificates are filed for reference. If the calibration was unsuccessful, the balance is immediately removed from service and segregated pending either further maintenance or disposal.

Calibration services for support equipment such as thermometers, weight sets, autopipettors, etc., are obtained from vendors with current and valid ISO/IEC 17025 accreditation for calibration of the specific piece of equipment. Prior to utilizing the vendor's services, the vendor's accreditation status is verified. Once the equipment has been calibrated, the calibration certificates are reviewed by the QA department, and documentation of the review is filed with the calibration certificates. The equipment is then returned to service within the laboratory.

11.6 Suppliers

The laboratory selects vendors through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts). This process is defined in the NDSC Procurement & Contracts Policy (Document No. CW-F-P-004). The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on the laboratory's business. Vendors that provide test and measuring equipment, solvents, standards, certified containers, instrument related service contracts or subcontract laboratory services shall be subject to more rigorous controls than vendors that provide off-the-shelf items of defined quality that meet the end use requirements. The purchasing system includes all suppliers/vendors that have been approved for use.

Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.

Any issues of vendor performance are to be reported immediately by the laboratory staff to thePurchasing Group by completing a Vendor Performance Report.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.

Suppliers are subject to re-evaluation, as deemed appropriate, through the use of Vendor Performance Reports used to summarize and review to determine corrective action necessary, or service improvements required by vendors

The laboratory has access to a listing of all approved suppliers of critical consumables, supplies and services. This information is provided through the purchasing system.

11.6.1 New Vendor Procedure

Laboratory employees who wish to request the addition of a new vendor must complete a Vendor Add Request Form.

New vendors are evaluated based upon criteria appropriate to the products or services provided as well as their ability to provide those products and services at a competitive cost. Vendors are also evaluated to determine if there are ethical reasons or potential conflicts of interest with laboratory employees that would make it prohibitive to do business with them as well as their

financial stability. The QA Department and/or the Cluster Leaders and Business Unit Manager are consulted with vendor and product selection that have an impact on quality.

12.0 COMPLAINTS

12.1 Overview

The laboratory considers an effective client complaint handling processes to be of significant business and strategic value. Listening to and documenting client concerns captures client knowledge that enables our operations to continually improve processes and client satisfaction. An effective client complaint handling process also provides assurance to the data user that the laboratory will stand behind its data, service obligations and products.

A client complaint is any expression of dissatisfaction with any aspect of our business services (e.g., communications, responsiveness, data, reports, invoicing and other functions) expressed by any party, whether received verbally or in written form. Client inquiries, complaints or noted discrepancies are documented, communicated to management, and addressed promptly and thoroughly.

The laboratory has procedures for addressing both external and internal complaints with the goal of providing satisfactory resolution to complaints in a timely and professional manner.

The nature of the complaint is identified, documented and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the QA Department must evaluate whether a special audit must be conducted to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken is recommended as part of the overall action taken.

The process of complaint resolution and documentation utilizes the procedures outlined in Section 12 (Corrective Actions) and is documented following EM-CS-S-1709, Resolving Client Concerns and Soliciting Client Feedback, and/or EM-QA-S-3553, Root Cause and Corrective Actions, as applicable.

12.2 External Complaints

An employee that receives a complaint initiates the complaint resolution process by first documenting the complaint according to (EM-CS-S-1709).

Complaints fall into two categories: correctable and non-correctable. An example of a correctable complaint would be one where a report re-issue would resolve the complaint. An example of a non-correctable complaint would be one where a client complains that their data was repeatedly late. Non-correctable complaints should be reviewed for preventive action measures to reduce the likelihood of future occurrence and mitigation of client impact.

The general steps in the complaint handling process are:

- Receiving and documenting complaints
- Acknowledging receipt of complaint, whenever possible

- Complaint investigation and service recovery
- Process improvement

The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action taken, if any.

12.3Internal Complaints

Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 12. In addition, Executive Management, Sales and Marketing and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 14.

12.4Management Review

The number and nature of client complaints is reported by the QA Manager to the Laboratory Director and Quality Director in the QA Monthly report. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the Annual Management Systems Review (Section 18).

13.0 CONTROL OF NON-CONFORMING WORK

13.1Overview

When data discrepancies are discovered or deviations and departures from laboratory SOPs, policies and/or client requests have occurred, corrective action is taken immediately. First, the laboratory evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated incident, the plan could be as simple as adding a qualifier / report comment to the final results and/or making a notation in the project log. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (refer to Section 12).

Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed. When an analyst encounters such a situation, the problem is presented to the supervisor for resolution. (this may be done via LabServe task system.) The supervisor may elect to discuss it with the Technical Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, it must be documented via the LabServe project task system. This information can then be supplied to the client in the form of a report comment, where applicable.

Project Management may encounter situations where a client may request that a special procedure be applied to a sample that is not standard lab practice. Based on a technical evaluation, the lab may accept or opt to reject the request based on technical or ethical merit. An example might be the need to report an analyte that the lab does not normally report. The

lab would not have validated the method for this compound following the procedures in Section 19. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the QA Manager and the Cluster Leader, documented and included in the project record. Deviations **must** also be noted on the final report with a statement that the analyte is not reported in compliance with the analytical method requirements and the reason. Data being reported to a non-TNI state would need to note the change made to how the method is normally run.

13.2Responsibilities and Authorities

Under certain circumstances, the Cluster Leader, a Technical Manager, or a member of the QA team may authorize departures from documented procedures or policies. The departures may be a result of procedural changes due to the nature of the sample; a one-time procedure for a client; QC failures with insufficient sample to reanalyze, etc. In most cases, the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action procedures. This information may also be documented in logbooks and/or data review checklists as appropriate**.** Any impacted data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

Any misrepresentation or possible misrepresentation of analytical data discovered by any laboratory staff member must be reported to facility Senior Management within 24-hours. The Senior Management staff is comprised of the Business Unit Manager,Cluster Leader, the QA Manager, and the Facility/Technical Managers. The reporting of issues involving alleged violations of the company's Data Integrity or Manual Integration procedures must be conveyed to an ECO (e.g., the VP-QA/EHS) and the laboratory's Quality Manager within 24 hours of discovery.

Whether an inaccurate result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow SOPs, the data must be evaluated to determine the possible effect.

The Business Unit Manager, Cluster Leader, QA Manager, ECOs, VP of Operations and the Quality Directors have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause as well as authorize the resumption of work.

13.3Evaluation of Significance and Actions Taken

For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its impact on the final data, whether or not it is an isolated or systematic issue, and how it relates to any special client requirements.

The NDSC Document entitled Data Recalls (CW-Q-S-005) is the procedure to be followed when it is discovered that erroneous or biased data may have been reported to clients or regulatory agencies.

The NDSC Document entitled Internal Investigations (CW-L-S-002) is the procedure to be followed for investigation and correction of situations involved alleged incidents of misconduct or violation of the company's ethics policy.

Laboratory level decisions are documented and approved using the laboratory's standard nonconformance/corrective action reporting in lieu of the data recall determination form contained in NDSC Document No. CW-Q-S-005.

13.4 Prevention of Nonconforming Work

If it is determined that the nonconforming work could recur, further corrective actions must be made following the laboratory's corrective action system. Periodically as defined by the laboratory's preventive action schedule, the QA Department evaluates non-conformances to determine if any nonconforming work has been repeated multiple times. If so, the laboratory's corrective action process may be followed.

13.5 Method Suspension / Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target analyte which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by any of the persons noted in Section 13.2, Paragraph 5.

Prior to suspension/restriction, confidentiality will be respected, and the problem with the required corrective and preventive action will be stated in writing and presented to the Cluster Leader.

The Cluster Leader shall arrange for the appropriate personnel to meet with the QA Manager as needed. This meeting shall be held to confirm that there is a problem, that suspension/restriction of the method is required and will be concluded with a discussion of the steps necessary to bring the method/target or test fully back on line. In some cases, that may not be necessary if all appropriate personnel have already agreed there is a problem and there is agreement on the steps needed to bring the method, target or test fully back on line. The QA Manager will also initiate a corrective action report as described in Section 12 if one has not already been started. A copy of any meeting notes and agreed upon steps should be e-mailed by the laboratory to their Business Unit President, Business Unit Manager, and VP-QA & EHS . This e-mail acts as notification of the incident.

After suspension/restriction, the lab will hold all reports to clients pending review. No faxing, mailing or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the Laboratory Director to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (e.g., Project Management, Log-in, etc.). Clients will NOT generally be notified at this time. Analysis may proceed in some instances depending on the non-conformance issue.

Within 72 hours, the QA Manager will determine if compliance is now met and reports can be released, OR determine the plan of action to bring work into compliance, and release work. A team, with all principals involved (e.g., Cluster Leader, Facility/Technical Manager, QA Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Project Management and the Directors of Client Services and Sales and Marketing must be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work. The QA Manager must approve start-up or elimination of any restrictions after all corrective action is complete.

14.0 CORRECTIVE ACTION

14.1Overview

A major component of the laboratory's Quality Assurance (QA) Program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence. Eurofins EMLab P&K employs two systems to manage non-conformances. Issues suspected of being systematic in nature and for which root cause analysis and a formal Corrective Action Report (CAR) are documented in the Incident Corrective Action Tracking (ICAT) database. Routine batch non-conformances, events that are understood to be isolated in nature, are documented in the LabServe task system.

14.2General

Problems within the quality system or within analytical operations may be discovered in a variety of ways, such as QC sample failures, internal or external audits, proficiency testing (PT) performance, client complaints, staff observation, etc.

The purpose of a corrective action system is to:

- Identify non-conformance events and assign responsibility for investigating.
- Resolve non-conformance events and assign responsibility for any required corrective action.
- Identify systematic problems before they become serious.
- Identify and track client complaints and provide resolution.

14.2.1 LabServe Task System - is used to document the following types of corrective actions:

- Deviations from an established procedure or SOP
- QC outside of limits
- Isolated reporting / calculation errors
- Client complaints

14.2.2 Corrective Actions Documented In the ICAT Database

- Internal and external audit findings
- Failed or unacceptable PT results
- Identified poor process or method performance trends
- Issues found while reviewing tasks that warrant further investigation
- Systematic reporting / calculation errors
- Data recall investigations
- Questionable trends that are found in the review of NCMs.
- Client complaints

- Excessive revised reports
- Health and Safety violations

The ICAT database is used to document background information, track the results of corrective action investigations and root cause analysis, and to provide reports of corrective action plans.

14.3Closed Loop Corrective Action Process

Any employee in the company can initiate a corrective action. There are four main components to a closed-loop corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of the Corrective Actions, and Follow-up.

14.3.1 Cause Analysis

- Upon discovery of a non-conformance event, the event must be defined and documented. A LabServe task or entry into the ICAT system must be initiated, someone is assigned to investigate the issue and the event is investigated for cause. Table 12-1 provides some general guidelines on determining responsibility for assessment.
- The cause analysis step is the key to the process as a long term corrective action cannot be determined until the cause is determined.
- If the cause is not readily obvious, the Technical Manager, Laboratory Director, or QA Manager (or QA designee) is consulted.

14.3.2 Selection and Implementation of Corrective Actions

- Where corrective action is needed, the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.
- The laboratory must additionally consider potential risks and opportunities in the development and implementation of corrective actions. Where any identified risk and/or opportunity needs to be updated as a result of a nonconformity, this shall be performed and documented during the planning of the corrective action.
- Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.
- Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes. This documentation may be recorded within the context of the originating nonconformity and using the applicable tool (QA-zilla, iCat, LabServe task, etc.)

14.3.3 Root Cause Analysis

Root Cause Analysis is a class of problem solving (investigative) methods aimed at identifying the basic or causal factor(s) that underlie variation in performance or the occurrence of a significant failure. The root cause may be buried under seemingly innocuous events, many steps preceding the perceived failure. At first glance, the immediate response is typically directed at a symptom and not the cause. Typically, root cause analysis would be best with three or more incidents to triangulate a weakness. NDSC Document Root Cause Analysis (No. CA-Q-S-009) provides guidance on this, as well as Eurofins EMLab P&K SOP, Conducting

Root Cause Investigations and Implementing Corrective Actions,(Document EM-QA-S-3553)describe the procedure.

Systematically analyze and document the root causes of the more significant problems that are reported. Identify, track, and implement the corrective actions required to reduce the likelihood of recurrence of significant incidents. Trend the root cause data from these incidents to identify root causes that, when corrected, can lead to dramatic improvements in performance by eliminating entire classes of problems.

Identify the one event associated with problem and ask why this event occurred. Brainstorm the root causes of failures; for example, by asking why events occurred or conditions existed; and then why the cause occurred consecutive times until you get to the root cause. For each of these sub events or causes, ask why it occurred. Repeat the process for the other events associated with the incident.

Root cause analysis does not mean the investigation is over. Look at technique or other systems outside the normal indicators. Often creative thinking will find root causes that ordinarily would be missed and continue to plague the laboratory or operation.

14.3.4 Monitoring of the Corrective Actions

- The Cluster Leader, Facility Manager and/or Technical Manager and QA Manager are responsible to ensure that the corrective action taken was effective.
- Ineffective actions are documented and re-evaluated until acceptable resolution is achieved. Technical Managers are accountable to the Laboratory Director to ensure final acceptable resolution is achieved and documented appropriately.
- The QA Manager reviews monthly ICAT records for trends. Highlights are included in the QA monthly report (refer to Section 18). If a significant trend develops that adversely affects quality, an audit of the area is performed and corrective action implemented.
- Any out-of-control situations that are not addressed acceptably at the laboratory level may be reported to the NDSC Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

14.3.5 Follow-up Audits

- Follow-up audits may be initiated by the QA Manager and shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements.
- These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered.

(Also refer to Section 17.1.4, Special Audits.)

14.4Technical Corrective Actions

In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when

departures from the documented policies and procedures and quality control have occurred (refer to Section 13). The documentation of these procedures is through the use of a LabServe task or record in the ICAT system.

Table 14-1 includes examples of general technical corrective actions. For specific criteria and corrective actions, refer to the analytical methods or specific method SOPs. The laboratory may also maintain Work Instructions on these items that are available upon request.

Table 14-1 provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The table also provides general guidance on how a data set should be treated if associated QC measurements are unacceptable. Specific procedures are included in Method SOPs, Work Instructions, QAM Sections 19 and 20. All corrective actions are reviewed monthly, at a minimum, by the QA Manager and highlights are included in the QA monthly report.

To the extent possible, samples shall be reported only if all quality control measures are acceptable. If the non-conformance does not impair the usability of the results, data will be reported with an appropriate data qualifier. Where sample results may be impaired, the Project Manager is notified by a LabServe task and appropriate corrective action (e.g., reanalysis) is taken and documented**.**

14.5Basic Corrections

When mistakes occur in records, each mistake shall be crossed-out, [not obliterated (e.g. no white-out)], and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction. In the case of records stored electronically, the original uncorrected file must be maintained intact and a second corrected file is created. This same process applies to adding additional information to a record. All additions made later than the initial must also be initialed (or signed) and dated. When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented.

Table 14-1. Example – General Corrective Action Procedures

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Initial Instrument Blank *(Analyst)*	- Instrument response < MDL.	- Prepare another blank. - If same response, determine cause of contamination: reagents, environment, instrument equipment failure, etc..

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Initial Calibration Standards *(Analyst, Technical Manager(s))*	- Correlation coefficient > 0.99 or standard concentration value. - % Recovery within acceptance range. - See details in Method SOP.	- Reanalyze standards. - If still unacceptable, remake standards and recalibrate instrument.
Independent Calibration Verification (Second Source) *(Analyst, Technical Manager(s))*	- % Recovery within control limits.	- Remake and reanalyze standard. - If still unacceptable, then remake calibration standards or use new primary standards and recalibrate instrument.
Continuing Calibration Standards *(Analyst, Data Reviewer)*	% Recovery within control limits.	- Reanalyze standard. - If still unacceptable, then recalibrate and rerun affected samples.
Matrix Spike / Matrix Spike Duplicate (MS/MSD) *(Analyst, Data Reviewer)*	- % Recovery within limits documented in ***(state where limits are maintained)***.	- If the acceptance criteria for duplicates or matrix spikes are not met because of matrix interferences, the acceptance of the analytical batch is determined by the validity of the LCS. - If the LCS is within acceptable limits the batch is acceptable. - The results of the duplicates, matrix spikes and the LCS are reported with the data set. - For matrix spike or duplicate results outside criteria the data for that sample shall be reported with qualifiers.
Laboratory Control Sample (LCS) *(Analyst, Data Reviewer)*	- % Recovery within limits specified in ***(state where limits are maintained).***	- Batch must be re-prepared and re-analyzed. This includes any allowable marginal exceedance. When not using marginal exceedances, the following exceptions apply: 1) when the acceptance criteria for the positive control are exceeded high (i.e., high bias) and there are associated samples that are non-detects, then those non-detects may be reported with data qualifying codes; 2) when the acceptance criteria for the positive control are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level with data qualifying codes. **Note:** If there is insufficient sample or the holding time cannot be met, contact client and report with flags.

QC Activity ***(Individual Responsible for Initiation/Assessment)***	**Acceptance Criteria**	**Recommended Corrective Action**
Method Blank (MB) *(Analyst, Data Reviewer)*	< Reporting Limit	- Reanalyze blank. - If still positive, determine source of contamination. If necessary, reprocess (i.e. digest or extract) entire sample batch. Report blank results. - Qualify the result(s) if the concentration of a targeted analyte in the MB is at or above the reporting limit AND is > 1/10 of the amount measured in the sample.
Proficiency Testing (PT) Samples *(QA Manager, Technical Manager(s))*	- Criteria supplied by PT Supplier.	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat a PT sample to show the problem is corrected.
Daily References *(QA Manager(s), Analysts)*	SOP EM-QA-S-1194, Quality Control for Sample Analysis SOP EM-QA-S-1259, Quality Control for Asbestos Analysis Reference EM-QA-R-5730, Quality Control Criteria Summary	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat sample analysis to show the problem is corrected.
Duplicate Samples *(QA Manager(s), Analysts)*	SOP EM-QA-S-1194, Quality Control for Sample Analysis SOP EM-QA-S-1259, Quality Control for Asbestos Analysis Reference EM-QA-R-5730, Quality Control Criteria Summary	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat sample analysis to show the problem is corrected.
Replicate Samples *(QA Manager(s), Analysts)*	SOP EM-QA-S-1194, Quality Control for Sample Analysis SOP EM-QA-S-1259, Quality Control for Asbestos Analysis Reference EM-QA-R-5730, Quality Control Criteria Summary	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat sample analysis to show the problem is corrected.
Internal / External Audits *(QA Manager, Technical Manager(s), Laboratory Director)*	- Defined in Quality System documentation such as SOPs, QAM, etc..	- Non-conformances must be investigated through CAR system and necessary corrections must be made.

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Reporting / Calculation Errors (Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Technical Managers, QA Manager, Corporate QA, Corporate Management)	- NDSC Document No. CW-Q-S-005, Data Recall	- Corrective action is determined by type of error. Follow the procedures in NDSC Document No. CW-L-S-002 or EM-QA-S-3533.
Client Complaints *(Project Managers, Lab Director/Manager, Sales and Marketing)*	-	- Corrective action is determined by the type of complaint. For example, a complaint regarding an incorrect address on a report will result in the report being corrected and then follow-up must be performed on the reasons the address was incorrect (e.g., database needs to be updated).
QA Monthly Report (Refer to Section 16 for an example) (QA Manager, Lab Director/Manager, *Technical Manager(s)*)	- QAM, SOPs.	- Corrective action is determined by the type of issue. For example, CARs for the month are reviewed and possible trends are investigated.
Health and Safety Violation (Safety Officer, Lab Director/Manager, *Technical Manager(s)*)	- Environmental Health and Safety (EHS) Manual.	- Non-conformance is investigated and corrected through CAR system.

15.0 PREVENTIVE ACTION / IMPROVEMENT

15.1 Overview

The laboratory's preventive action programs improve or eliminate potential causes of nonconforming product and/or nonconformance to the quality system. This preventive action process is a proactive and continuous process of improvement activities that can be initiated through feedback from clients, employees, business providers, and affiliates. The QA Department has the overall responsibility to ensure that the preventive action process is in place, and that relevant information on actions is submitted for management review. (EM-QA-S-7577, Continuous Improvement and Preventive Actions.)

Dedicating resources to an effective preventive action system emphasizes the laboratory's commitment to its QA Program. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, the laboratory continually strives to improve customer service and client satisfaction through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered through any of the following:

- review of the monthly QA Metrics Report,
- trending Labserve tasks or iCAT corrective actions,
- review of control charts and QC results,
- trending proficiency testing (PT) results,
- performance of management system reviews,
- trending client complaints,
- review of processing operations, or
- staff observations.

The monthly Management Systems Metrics Report shows performance indicators in all areas of the laboratory and quality system. These areas include revised reports, corrective actions, audit findings, internal auditing and data authenticity audits, client complaints, PT samples, holding time violations, SOPs, ethics training, etc. The metrics report is reviewed monthly by the laboratory management, NDSC QA Team, Local and Executive Management. These metrics are used in evaluating the management and quality system performance on an ongoing basis and provide a tool for identifying areas for improvement.

Items identified as continuous improvement opportunities to the management system may be issued as goals from the annual management systems review, recommendations from internal audits, white papers, Lessons Learned, Technical Services audit report, Technical Best Practices, or as Executive or management initiatives.

The laboratory's corrective action process is integral to implementation of preventive actions. A critical piece of the corrective action process is the implementation of actions to prevent further occurrence of a non-compliance event. Historical review of corrective action and non-conformances provides a valuable mechanism for identifying preventive action opportunities.

15.1.1 The following elements are part of a preventive action/process improvement system:

- Identification of an opportunity for preventive action or process improvement.
- Process for the preventive action or improvement.
- Define the measurements of the effectiveness of the process once undertaken.
- Execution of the preventive action or improvement.
- Evaluation of the plan using the defined measurements.

- Verification of the effectiveness of the preventive action or improvement.
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action or Process Improvement. Documentation of Preventive Action/process Improvement is incorporated into the monthly QA reports, corrective action process and management review.

15.1.2 Any preventive actions/process improvement undertaken or attempted shall be taken into account during the annual Management Systems Review (Section 16). A highly detailed report is not required; however, a summary of successes and failures within the preventive action program is sufficient to provide management with a measurement for evaluation.

16.0 CONTROL OF RECORDS

The laboratory maintains a records management system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five years after it has been issued. Exceptions for programs with longer retention requirements are discussed in Section 14.1.2.

16.1 Overview

The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. A record index is listed in Table 16-1. More detailed information on retention of specific records is provided in EM-QA-S-2059, Document Control and Control of Records. Quality records are maintained by the QA department in a database, which is backed up as part of the regular laboratory backup. Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records are maintained by local facility management. Laboratory technical records are maintained by IT.

Table 16-1. Record Index[1]

	Record Types [1]:	**Retention Time:**
Technical Records	- Raw Data - Logbooks[2] - Standards - Certificates - Analytical Records - MDLs/IDLs/DOCs - Lab Reports	5 Years from analytical report issue*

	Record Types [1]:	**Retention Time:**
Official Documents	- Quality Assurance Manual (QAM) - Work Instructions - Policies - SOPs - Policy Memorandums - Manuals - Published Methods	Indefinitely
QA Records	- Certifications - Method and Software Validation / Verification Data	Indefinitely
QA Records	- Internal & External Audits/Responses - Corrective/Preventive Actions - Management Reviews - Data Investigation	5 Years from archival* **Data Investigation:** 5 years or the life of the affected raw data storage whichever is greater (beyond 5 years if ongoing project or pending investigation)
Project Records	- Sample Receipt & COC Documents - Contracts and Amendments - Correspondence - QAPP - SAP - Telephone Logbooks - Lab Reports	5 Years from analytical report issue*
Administrative Records	Financial and Business Operations	Refer to NDSC Document No. CW-L-WI-001
	EH&S Manual, Permits	Indefinitely
	Disposal Records	Indefinitely
	Employee Handbook	Indefinitely
	Personnel files, Employee Signature & Initials, Administrative Training Records (e.g., Ethics)	Refer to HR Manual
	Administrative Policies	Indefinitely
	Technical Training Records	7 years
	Legal Records	Indefinitely
	HR Records	Refer to NDSC Document No. CW-L-WI-001
	IT Records	Refer to NDSC Document No. CW-L-WI-001
	Corporate Governance Records	Refer to NDSC Document No. CW-L-WI-001
	Sales & Marketing	5 years
	Real Estate	Indefinitely

[1] Record Types encompass hardcopy and electronic records.
[2] Examples of Logbook types: Maintenance, Instrument Run, Preparation (standard and samples), Standard and Reagent Receipt, Archiving, Balance Calibration, Temperature (hardcopy or electronic records).
* Exceptions listed in Table 14-2.

16.1.1 All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility or main regional facility that provides a suitable environment to prevent damage or deterioration and to prevent loss. All records shall be protected against fire, theft, loss, environmental deterioration, and vermin. In the case of electronic records, electronic or magnetic sources, storage media are protected from deterioration caused by magnetic fields and/or electronic deterioration.

Access to the data is limited to laboratory and company employees and shall be documented with an access log**.** Records archived off-site are stored in a secure location where a record is maintained of any entry into the storage facility. Whether on-site or off-site storage is used, logs are maintained in each storage box to note removal and return of records. Retention of records are maintained on-site at the laboratory for at least 1 month after their generation and moved offsite for the remainder of the required storage time. Records are maintained for a minimum of five years unless otherwise specified by a client or regulatory requirement.

For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as NDSC and or KGD, Controlled Documents, QA, or Administrative Records, the retention time is calculated from the date the record is formally retired. Records related to the programs listed in Table 16-2 have lengthier retention requirements and are subject to the requirements in Section 16.1.3.

16.2 Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in Table 16-2 with their retention requirements. In these cases, the longer retention requirement is enacted. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to who to contact for authorization prior to destroying the data.

Table 16-2. Example: Special Record Retention Requirements

Program	**[1]Retention Requirement**
Drinking Water – All States	10 years (lab reports and raw data)
AIHA-LAP ELLAP (Lead)	5 years (project records) (quality control laboratory records required to support retained data and associated reporting for AIHA-LAP ELLAP (lead) will be maintained for a minimum of 6 years)
NYS DOH	5 years (quality control laboratory records required to support retained data and associated reporting for NYS DOH will be maintained for a minimum of 6 years)
OSHA	30 years

[1]Note: Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

16.2.1 The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained as hard copy or in a secure readable electronic format. For analytical reports that are maintained as copies in PDF format, refer to Section 19.13.1 for more information.

16.2.2 The record keeping system allows for historical reconstruction of all laboratory activities that produced the analytical data, as well as rapid recovery of historical data (Records stored off

site should be accessible within 2 days of a request for such records). The history of the sample from when the laboratory took possession of the samples must be readily understood through the documentation. This shall include inter-laboratory transfers of samples.

- The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the COC is stored in chronological order. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a work order, they are kept with this package.

- All information relating to the laboratory facilities' equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented.

- The record keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes (e.g., set format for naming electronic files, set format for what is included with a given analytical data set. Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run log or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data, where applicable and not part of LabServe direct entry. Standard and reagent information is recorded in logbooks or entered into LabServe for each method as required.

- Changes to hardcopy records shall follow the procedures outlined in Section 12 and 19. Changes to electronic records in LabServe or instrument data are recorded in audit trails.

- The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by," "prepared by," "reviewed by", or "analyzed by".

- All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.

- Hard copy data may be scanned into PDF format for record storage as long as the scanning process can be verified in order to ensure that no data is lost and the data files and storage media must be tested to verify the laboratory's ability to retrieve the information prior to the destruction of the hard copy that was scanned.

- Also refer to Section 19.13.1 'Computer and Electronic Data Related Requirements'**.**

16.3Technical and Analytical Records

16.3.1 The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless otherwise specified by a client or regulatory requirement. The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for the subsampling,

performance of each analysis and reviewing results.

16.3.2 Observations, data and calculations are recorded real-time and are identifiable to the specific task.

16.3.3 Changes to hardcopy records shall follow the procedures outlined in Section 12 and 19. Changes to electronic records in LabServe or instrument data are recorded in audit trails.

The essential information to be associated with analysis, such as strip charts, tabular printouts, computer data files, analytical notebooks, and run logs, include:

- laboratory sample ID code**;**
- Date of analysis; time of analysis is also required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet.
- Instrumentation identification and instrument operating conditions/parameters. Operating conditions/parameters are typically recorded in instrument maintenance logs where available.
- analysis type**;**
- all manual calculations and manual integrations**;**
- analyst's or operator's initials/signature**;**
- sample preparation including cleanup, sample processing/dilution/plating, incubation periods or subculture, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents**;**
- test results**;**
- standard and reagent origin, receipt, preparation, and use**;**
- calibration criteria, frequency and acceptance criteria**;**
- data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions**;**
- quality control protocols and assessment**;**
- electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and
- Method performance criteria including expected quality control requirements. These are indicated both in LabServe and on specific analytical report formats**.**

16.3.4 All logbooks used during receipt, preparation, storage, analysis, and reporting of samples or monitoring of support equipment shall undergo a periodic, documented supervisory or peer review.

16.4Laboratory Support Activities

In addition to documenting all the above-mentioned activities, the following are retained QA records and project records (previous discussions in this section relate where and how these data are stored):

- all original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records)**;**
- a written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value**;**
- copies of final reports**;**
- archived SOPs**;**
- correspondence relating to laboratory activities for a specific project**;**
- all corrective action reports, audits and audit responses**;**
- proficiency test results and raw data; and
- results of data review, verification, and crosschecking procedures

16.4.1 Sample Handling Records

Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

- sample preservation including appropriateness of sample container and compliance with holding time requirement;
- sample identification, receipt, acceptance or rejection and login;
- sample storage and tracking including shipping receipts, sample transmittal / COC forms; and
- procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

16.5Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form. Refer to Table 14-1.

16.6Records Management, Storage and Disposal

All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification related records are available upon request.

All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval.

Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access**.**

The laboratory has a record management system (a.k.a., document control) for control of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Records are considered archived when noted as such in the records management system (a.k.a., document control.)

16.6.1 Transfer of Ownership

In the event that the laboratory transfers ownership or goes out of business, the laboratory shall ensure that the records are maintained or transferred according to client's instructions. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of the NDSC. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous 5 years of such action.

16.6.2 Records Disposal

Records are removed from the archive and destroyed after 5 years unless otherwise specified by a client or regulatory requirement. On a project specific or program basis, clients may need to be notified prior to record destruction. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration. (Refer to Tables 16-1 and 16-2).

Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

If a third party records management company is hired to dispose of records, a "Certificate of Destruction" is required.

17.0 AUDITS

17.1Internal Audits

Internal audits are performed to verify that laboratory operations comply with the requirements of the lab's quality system and with the external quality programs under which the laboratory operates. Audits are planned and organized by the QA staff. Personnel conducting the audits should be independent of the area being evaluated. Auditors will have sufficient authority, access to work areas, and organizational freedom necessary to observe all activities affecting quality and to report the assessments to laboratory management and**,** when requested**,** to Executive management.

Audits are conducted and documented as described in the NDSC Document on performing Internal Auditing, No. CW-Q-S-003. The types and frequency of routine internal audits are

described in Table 15-1. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

Table 17-1. Types of Internal Audits and Frequency

Description	Performed by	Frequency
Quality Systems Audits	QA Department, QA approved designee, or NDSC QA	All areas of the laboratory annually
Method Audits QA Technical Audits	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to NDSC Document No. CW-Q-S-003)	QA Technical Audits Frequency: 50% of methods annually
SOP Method Compliance	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to CW-Q-S-003)	SOP Compliance Review Frequency: • Every 2 years • 100% of SOPs annually (DoD/DOE Labs)
Special	QA Department or Designee	Surveillance or spot checks performed as needed, e.g., to confirm corrective actions from other audits.
Performance Testing	Analysts with QA oversight	Two successful per year for each TNI-field of testing or as dictated by regulatory requirements

17.1.1 Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, Eurofins Data Integrity and Ethics Policies (See Section 7.2), TNI quality systems, AIHA-LA LLC quality systems, NIST NVLAP quality systems, client and state requirements, and the effectiveness of the internal controls of the analytical process, including but not limited to data review, quality controls, preventive action and corrective action. The completeness of earlier corrective actions is assessed for effectiveness & sustainability. The audit is divided into sections for each operating or support area of the lab, and each section is comprehensive for a given area. The area audits may be performed on a rotating schedule throughout the year to ensure adequate coverage of all areas. This schedule may change as situations in the laboratory warrant.

17.1.2 QA Technical Audits

QA technical audits assess data authenticity and analyst integrity. These audits are based on client projects, associated sample delivery groups, and the methods performed. Reported results are compared to raw data to verify the authenticity of results. The validity of calibrations and QC results are compared to data qualifiers, footnotes, and report comments. Manual calculations are checked. QA technical audits will include all methods within a two-year period.

17.1.3 SOP Method Compliance

Compliance of all SOPs with the source methods and compliance of the operational groups with the SOPs will be assessed by the Technical Manager or qualified designee at least every two years.

17.1.4 Special Audits

Special audits are conducted on an as needed basis, generally as a follow up to specific issues such as client complaints, corrective actions, PT results, data audits, system audits, validation comments, regulatory audits or suspected ethical improprieties. Special audits are focused on a specific issue, and report format, distribution, and timeframes are designed to address the nature of the issue.

17.1.5 Performance Testing

Eurofins EMLab P&K, LLC participates in external proficiency testing programs consistent with the requirements outlined by the Laboratory's accreditation, licensing, or registration bodies, and at the frequency required to remain compliant with such programs. The laboratory generally participates in the following types of PT studies, where applicable and/or required by external accreditation, licensing, or registration bodies: AIHA-PAT LLC (EMLAP, IHLAP), NIST NVLAP Bulk Asbestos, Legionella proficiency testing, potable and non-potable water, etc.

It is Eurofins policy that PT samples be treated as typical samples in the production process. Furthermore, where PT samples present special or unique problems, in the regular production process they may need to be treated differently, as would any special or unique request submitted by any client. The QA Manager must be consulted and in agreement with any decisions made to treat a PT sample differently due to some special circumstance.

When the analysis includes subjective analyst evaluation (e.g., microscopic identification and/or quantitation), all analysts, including those in sub-facilities, are required to participate in proficiency testing, with each analyst separately analyzing, recording, and reporting test results. All proficiency testing samples are to be analyzed by the receiving facility. Transfer to alternate laboratory is prohibited, as is discussion of proficiency round details with other facilities prior to completion of a round. Where a facility employs analysts who perform analyses across more than one facility, these analysts are restricted to participation in one facility's proficiency testing, and any discussion of details with personnel outside of the analyst's participation location is strictly prohibited.

Written investigations for unacceptable PT results are required. In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

17.2External Audits

External audits are performed when accrediting and/or certifying agencies or clients conduct on-site inspections or submit performance testing samples for analysis. It is Eurofins policy to cooperate fully with regulatory authorities and clients. The laboratory makes every effort to provide the auditors with access to personnel, documentation, and assistance. Laboratory supervisors are responsible for providing corrective actions to the QA Manager who coordinates

the response. Audit responses are due in the time allotted by the client or agency performing the audit.

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

17.2.1 Confidential Business Information (CBI) Considerations

During on-site audits, auditors may come into possession of information claimed as business confidential. A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or "company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found in within the 2009 TNI standards.

17.3 Audit Findings

Audit findings are documented using the corrective action process and database (see Section 12). The laboratory's corrective action responses may include action plans that could not be completed within a predefined timeframe. In these instances, a completion date must be set and agreed to by operations management and the QA Manager.

Developing and implementing corrective actions to findings is the responsibility of the Cluster Leader and/or Facility Manager where the finding originated. Findings that are not corrected by specified due dates are reported monthly to management in the QA monthly report.

If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up audit is scheduled to ensure that the problem has been corrected.

Clients must be notified promptly in writing of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24 hours of discovery of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

18.0 MANAGEMENT REVIEWS

18.1 Quality Assurance Report

The QA Department is responsible for preparing a comprehensive monthly metrics report to Management to keep them apprised of current quality issues. This report fosters communication, review, and refinement of the QA system to evaluate the suitability of policies and procedures to meet both regulatory and laboratory quality objectives.

The NDSC QA team compiles information from all of the Environment Testing laboratories monthly metrics reports for the Executive Management team. This report includes notable information and concerns regarding the laboratories QA program and a listing of new regulations that may potentially impact the laboratories.

18.2 Annual Management Review

The Laboratory Management team (Cluster Leader, Facility Managers/Technical Manager, QA Manager) conducts a review annually of its quality systems to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. It will also provide a platform for defining goals, objectives and action items that feed into the laboratory planning system. The LabServe review consists of examining any audits, complaints or concerns that have been raised through the year that are related to LabServe. The laboratory will summarize any critical findings that cannot be solved by the lab and report them to Corporate IT.

This management systems review (NDSC Document No. CW-Q-S-004 and Work Instruction No. CW-Q-WI-003) uses information generated during the preceding year to assess the “big picture” by ensuring that routine actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review should keep the quality systems current and effective, therefore, the annual review is a formal senior management process to review specific existing documentation. Significant issues from the following documentation are compiled or summarized by the QA Manager prior to the review meeting:

- Matters arising from the previous annual review.
- Prior Monthly QA Reports issues.
- Laboratory QA Metrics.
- Review of report reissue requests.
- Review of client feedback and complaints.
- Issues arising from any prior management or staff meetings.
- Minutes from prior senior lab management meetings. Issues that may be raised from these meetings include:
    - Adequacy of staff, equipment and facility resources.
    - Adequacy of policies and procedures.
    - Future plans for resources and testing capability and capacity.
- The annual internal double blind PT program sample performance (if performed),
- Compliance to the Ethics Policy and Data Integrity Plan. Including any evidence/incidents of inappropriate actions or vulnerabilities related to data Integrity.

- Evaluation of overall risk, including risks to impartiality, confidentiality, reporting statements of conformity, and nonconforming work.

A report is generated by the QA Manager and management. The report is distributed to the Business Unit Manager, Cluster Leader, Facility/Technical Manager, and QA Manager. The report includes, but is not limited to:

- The date of the review and the names and titles of participants.
- A reference to the existing data quality related documents and topics that were reviewed.
- Quality system or operational changes or improvements that will be made as a result of the review [e.g., an implementation schedule including assigned responsibilities for the changes (Action Table)].

Changes to the quality systems requiring update to the laboratory QA Manual shall be included in the next revision of the QA Manual.

18.3 Potential Integrity Related Managerial Reviews

Potential integrity issues (data or business related) must be handled and reviewed in a confidential manner until such time as a follow-up evaluation, full investigation, or other appropriate actions have been completed and issues clarified. NDSC Internal Investigations Document shall be followed (NDSC Document No. CW-L-S-002). All investigations that result in finding of inappropriate activity are documented and include any disciplinary actions involved, corrective actions taken, and all appropriate notifications of clients.

Eurofins Built Testing President, Business Unit Manager, Cluster Leader, and NDSC Team are informed of any current data integrity or data recall investigations via the monthly metrics report.

19.0 **TEST METHODS AND METHOD VALIDATION**

19.1 Overview

The laboratory uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

19.2 Standard Operating Procedures (SOPS)

The laboratory maintains SOPs that accurately reflect all phases of the laboratory such as assessing data integrity, corrective actions, handling customer complaints as well as all analytical methods and sampling procedures. Where method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory.

- All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.
- Procedures for writing an SOP are incorporated by reference to SOP EM-QA-S-2059, Document Control and Control of Records.
- SOPs are reviewed at a minimum of every 2 years (annually for Drinking Water and DoD/DOE SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

19.3 Laboratory Methods Manual

For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP.

Note: If more stringent standards or requirements are included in a mandated test method or regulation than those specified in this manual, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed. Any exceptions or deviations from the referenced methods or regulations are noted in the specific analytical SOP.

The laboratory maintains an SOP Index for both technical and non-technical SOPs. Technical SOPs are maintained to describe a specific test method. Non-technical SOPs are maintained to describe functions and processes not related to a specific test method.

19.4 Selection of Methods

Since numerous methods and analytical techniques are available, continued communication between the client and laboratory is imperative to assure the correct methods are utilized. Once client methodology requirements are established, this and other pertinent information is summarized by the Project Manager. These mechanisms ensure that the proper analytical methods are applied when the samples arrive for log-in. For non-routine analytical services (e.g., special matrices, non-routine compound lists), the method of choice is selected based on client needs and available technology. The methods selected should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

19.4.1 Sources of Methods

Routine analytical services are performed using both in-house developed methodology and standard EPA-approved methodology. In some cases, modification of standard approved

methods may be necessary to provide accurate analyses of particularly complex matrices. When the use of specific methods for sample analysis is mandated through project or regulatory requirements, only those methods shall be used.

When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data. Refer to Appendix 3 for a list of the currently accepted U.S. EPA analytical method references used by the laboratory.

The laboratory reviews updated versions to all the aforementioned references for adaptation based upon capabilities, instrumentation, etc., and implements them as appropriate. As such, the laboratory strives to perform only the latest versions of each approved method as regulations allow or require.

Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been informed, and they wish to proceed contrary to the laboratory's recommendation, it will be documented.

19.4.1.1 Client Supplied Methods

Most of the client-supplied method requirements presented to us involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The PM notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

Occasionally, we are asked to transfer a non-standardized method from a client into our lab or to develop a new method, when one is not available. In the case of a method transfer, we set up the client's method and perform some initial evaluation. After the initial evaluation, we may make recommendations on how to improve method performance. If the method appears to be adequate, we determine linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and IDOC studies.

In the case of method development, we work with the client and/or data user to determine the level of validation required ensuring that the method meets its intended purpose. In addition to the elements above, we also determine standard and sample stability and robustness depending on the scope of the project. Typically, a standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of field samples. Data related to the setup of the method are archived.

19.4.1.2 Procedural Deviations

Analysts are required to follow a documented method for all tests performed; and any deviations from analytical methods must be documented, approved, and justified in an appropriate and consistent manner. We classify method deviations as either being a planned deviation or an unplanned deviation. In general, the following information is captured to document both types of situations:

- Description of the situation
- Reason or justification for the deviation
- Impact the deviation had on the testing
- Signature/date of analyst performing the test (may also be LabServe user identification and timestamp)
- Signature/date of QA and Laboratory management approving the deviation (may also be LabServe user identification and timestamp)
- Signature/date of client approval, if necessary (may also be electronic communication from client)

Deviations to written procedures are documented in raw data records, LabServe Task System, or through ICAT. All types of documentation require management and QA review and approval.

19.4.2 Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly operate the method. In general, this demonstration does not test the performance of the method in real world samples, but in an applicable and available clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

A demonstration of capability (DOC, Lab SOP # EM-AD-S-1646) is performed whenever there is a change in instrument type (e.g., new instrumentation), matrix, method or personnel (e.g., analyst has not performed the test within the last 12 months).

Note: The laboratory shall have a DOC for all analytes included in the methods that the laboratory performs, and proficiency DOCs for each analyst shall include all analytes that the laboratory routinely performs. Addition of non-routine analytes does not require new DOCs for all analysts if those analysts are already qualified for routine analytes tested using identical chemistry and instrument conditions.

The initial demonstration of capability must be thoroughly documented and approved by the Facility Manager, Technical Manager (where appropriate), and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratory's archiving procedures.

The laboratory must have an approved SOP, demonstrate satisfactory performance, and conduct an MDL study (when applicable). There may be other requirements as stated within the published method or regulations (e.g., retention time window study).

Note: In some instances, a situation may arise where a client requests that an unusual analyte be reported using a method where this analyte is not normally reported. If the analyte is being reported for regulatory purposes, the method must meet all procedures outlined within this QA Manual (SOP, MDL, and Demonstration of Capability). If the client states that the information is not for regulatory purposes, the result may be reported as long as the following criteria are met:

- The client request is documented and the lab informs the client of its procedure for working with unusual compounds. The final report must be footnoted: *Reporting Limit based on the low standard of the calibration curve.*

19.4.3 Initial Demonstration of Capability (IDOC) Procedures

19.1.1.1 All analysts and technicians are required to demonstrate their ability to produce reliable results before they perform analysis without direct supervision and document on an Initial Demonstration of Capability (IDOC) form. This form is to be completed by the QA Manager and maintained as part of the employee's training record. (SOP EM-AD-S-1646). The Initial Demonstration of Capability (IDOC) form is to be completed per procedure/analysis prep.

19.1.1.2 Training timeframes and minimum sample counts are defined by analysis type and are applicable to initial training. A list of training requirements may be found in the General Training SOP, EM-AD-S-1646. Where training requirements are undefined, a detailed training plan is required.

19.1.1.3 Where an analyst has previous documented training, and has met the required timeframe and minimum sample count for same/like analytical methods, the timeframe and noted sample count will not be required. Sample training in these situations require development of a training plan with an appropriate timeframe and appropriate number of minimum samples.

19.1.1.4 An authorization statement (refer to Figure 19-1 as an example shall be used to document the completion of each initial demonstration of capability.) A copy of the authorization is archived in the analyst's training folder.

19.5 Laboratory Developed Methods and Non-Standard Methods

Eurofins EMLab P&K employs the use of in-house developed methods as well as published reference methods. Any new method developed by the laboratory must be fully defined in an SOP and validated by qualified personnel with adequate resources to perform the method. Method specifications and the relation to client requirements must be clearly conveyed to the client if the method is a non-standard method (not a published or routinely accepted method). The client must also be in agreement to the use of the non-standard method.

19.6 Validation of Methods

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

All non-standard methods, laboratory designed/developed methods, standard methods used outside of their scope, and major modifications to published methods must be validated to confirm they are fit for their intended use. The validation will be as extensive as necessary to meet the needs of the given application. The results are documented with the validation procedure used and contain a statement as to the fitness for use.

19.6.1 Method Validation and Verification Activities for All New Methods

While method validation can take various courses, the following activities can be required as part of method validation. Method validation records are designated QC records and are archived accordingly.

When changes are made to any validated methods, the influence of such changes shall be documented and, if appropriate, a new validation shall be performed.

19.6.1.1 Determination of Method Selectivity – Method selectivity is the demonstrated ability to discriminate the analyte(s) of interest from other compounds in the specific matrix or matrices from other analytes or interference. In some cases to achieve the required selectivity for an analyte, a confirmation analysis is required as part of the method.

19.6.1.2 Determination of Method Sensitivity – Sensitivity can be both estimated and demonstrated. Whether a study is required to estimate sensitivity depends on the level of method development required when applying a particular measurement system to a specific set of samples. Detection limit studies are conducted as described in Section 19.7 below. Where other protocols for estimations and/or demonstrations of sensitivity are required by regulation or client agreement, these shall be followed.

19.6.1.3 Relationship of Limit of Detection (LOD) to the Limit of Quantitation (LOQ) – An important characteristic of expression of sensitivity is the distinction between the LOD and the LOQ. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The LOQ is the minimum concentration of analyte that can be quantitatively determined with acceptable precision and bias, equivalent to the laboratory's routine reporting limit (RL). For most instrumental measurement systems, there is a region where semi-quantitative data is generated around the LOD (both above and below the estimated MDL or LOD) and below the LOQ. In this region, detection of an analyte may be confirmed but quantification of the analyte is unreliable within the accuracy and precision guidelines of the measurement system. When an analyte is detected below the LOQ, and the presence of the analyte is confirmed by meeting the qualitative identification criteria for the analyte, the analyte can be reliably reported, but the amount of the analyte can only be estimated. If data is to be reported in this region, it must be done so with a qualification that denotes the semi-quantitative nature of the result.

19.6.1.4 Determination of Interferences – A determination that the method is free from interferences in a blank matrix is performed.

19.6.1.5 Determination of Range – Where appropriate to the method, the quantitation range is determined by comparison of the response of an analyte in a curve to established or targeted criteria. Generally the upper quantitation limit is defined by highest acceptable calibration concentration. The lower quantitation limit or QL cannot be lower than the lowest non-zero calibration level, and can be constrained by required levels of bias and precision.

19.6.1.6 Determination of Accuracy and Precision – Accuracy and precision studies are generally performed using replicate analyses, with a resulting percent recovery and measure of reproducibility (standard deviation, relative standard deviation) calculated and measured against a set of target criteria.

19.6.1.7 Documentation of Method – The method is formally documented in an SOP. If the method is a minor modification of a standard laboratory method that is already documented in an SOP, an SOP Attachment describing the specific differences in the new method is acceptable in place of a separate SOP.

19.6.1.8 Continued Demonstration of Method Performance – Continued demonstration of method performance is addressed in the SOP. Continued demonstration of method performance is generally accomplished by batch specific QC samples such as LCS, method blanks or PT samples.

19.7 Method Detection Limits (MDL) / Limits of Detection (LOD)

The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017. The MDL is equivalent to the TNI LOD, and is also equivalent to the DoD/DOE Quality Systems Manual (QSM) DL. The working or final MDL is the higher of the MDL value determined from spikes (MDLs) and the MDL value determined from blanks (MDLb). An initial MDL study shall be performed during the method validation process and when the method is altered in a way that can reasonably be expected to change its sensitivity. On-going data are collected during each quarter in which samples are being analyzed. At least once every 13 months the MDLs and MDLb are re-calculated and re-evaluated using data collected during the preceding period. Refer to the laboratory's SOP No. EM-AD-S-3548 for details on the laboratory's method validation process.

19.8 Verification of Detection Limits

If it is found during the re-evaluation of detection limit results that more than 5% of the spiked samples do not return positive numeric results that meet all method qualitative identification criteria, then then spiking level shall be increased and the initial MDL study pre-performed at the new spiking concentration.

19.9 Instrument Detection Limits (IDL)

The IDL is sometimes used to assess the reasonableness of the MDL or in some cases required by the analytical method or program requirements. IDLs are most commonly used in metals analyses but may be useful in demonstration of instrument performance in other areas.

IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs are calculated either using 7 replicate spike analyses, like MDL but without sample preparation, or by the analysis of 10 instrument blanks and calculating 3 x the absolute value of the standard deviation.

19.10 Limit of Quantitation

The LOQ shall be at a concentration equivalent to the lowest calibration standard concentration, with the exception of methods using a single-point calibration, and shall be greater than the

MDL. The LOQ is verified by preparing and analyzing spikes at concentrations 1-2 times the selected LOQ, employing the complete analytical process.

When the laboratory establishes a quantitation limit, it must be initially verified by the analysis of a low level standard or QC sample at 1-2 times the reporting limit and annually thereafter. The annual requirement is waived for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

19.11 Estimation of Uncertainty of Measurement

19.11.1 Uncertainty is “a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand” (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result’s validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation organizations require the use of an “expanded uncertainty” defined as the range within which the value of the measurand is believed to lie within at least a 95% confidence level with the coverage factor k=2.

19.11.2 Uncertainty is not error. Error is a single value (i.e., the difference between the true result and the measured result). On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

19.11.3 The minimum uncertainty associated with results generated by the laboratory can be determined by using the Laboratory Control Sample (LCS) accuracy range for a given analyte. The LCS limits are used to assess the performance of the measurement system since they take into consideration all of the laboratory variables associated with a given test over time (except for variability associated with the sampling and the variability due to matrix effects). The percent recovery of the LCS is compared either to the method-required LCS accuracy limits or to the statistical, historical, in-house LCS accuracy limits.

19.11.4 To calculate the uncertainty for the specific result reported, refer to SOP EM-QA-S-1960.

19.11.5 In the case where a well-recognized test method specifies limits to the values of major sources of uncertainty of measurement (e.g., 524.2, 525, etc.) and specifies the form of presentation of calculated results, no further discussion of uncertainty is required.

19.12 Sample Reanalysis Guidelines

Because there is a certain level of uncertainty with any analytical measurement, a sample re-preparation (where appropriate) and subsequent analysis (hereafter referred to as ‘reanalysis’) may result in either a higher or lower value from an initial sample analysis. There are also

variables that may be present (e.g., sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats. Client specific Contractual Terms & Conditions for reanalysis protocols may supersede the following items.

- If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation if sufficient sample is available.

- Any potential charges related to reanalysis are discussed in the contract terms and conditions or discussed at the time of the request. The client will typically be charged for reanalysis unless it is determined that the lab was in error.

- Due to the potential for increased variability, reanalysis may not be applicable to Non-homogenous, Encore, and Sodium Bisulfate preserved samples. See the Area Supervisor or Laboratory Director if unsure.

19.13 Control of Data

The laboratory has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory.

19.13.1 Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below.
The laboratory is currently using the Eurofins EMLab P&K LabServe system, a proprietary in-house developed LIMS system. It is referred to as LabServe for the remainder of this section. Labserve utilizes a Microsoft SQL database which is an industry standard relational database platform.

19.13.1.1 Maintain the Database Integrity – Assurance that data is reliable and accurate through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal LIMS permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, documentation of system failures and corrective actions taken, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use. Cells containing calculations must be lock-protected and controlled.
- Instrument hardware and software adjustments are safeguarded through maintenance logs, audit trails and controlled access.
- Custom built software applications, as well as significantly modified off the shelf software, are validated for performing accurate mathematical calculations and transposition of non-numerical information. Whenever the computer software is edited or changed, the computation and transposition processes are revalidated using a computerized test suite in the potentially affected areas prior to the software being used to gather or report data. Data are checked for the following processes:

  - Data accuracy during data collection and storage
  - Data integrity and confidentiality during data storage
  - Integrity of data following electronic transmission to clients
- All software validations and associated process checks are to be fully documented within the Bugzilla system. All supporting spreadsheets, documents, etc. are to be attached to the validation record within Bugzilla.

19.13.1.2 Ensure Information Availability – Protection against loss of information or service is ensured through scheduled back-ups, stable file server network architecture, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

19.13.1.3 Maintain Confidentiality – Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

19.13.2 Data Reduction

The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values.

Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. Calculations and data reduction steps for various methods are summarized in the respective analytical SOPs or program requirements.

19.13.2.1 All raw data must be retained with the project folder, computer file (if appropriate), and/or appropriate log. All criteria pertinent to the method must be recorded. The documentation is recorded at the time observations or calculations are made and must be signed or initialed/dated (month/day/year). It must be easily identifiable who performed which tasks if multiple people were involved.

19.13.2.2 Detection and reporting limits for analyses are unique to the method being performed. Detection and reporting limits are defined within the respective analytical procedures, where applicable. They are also listed on final reports, where applicable.

19.13.2.3 Due to the nature of biological data the number of significant figures that are used for interpretation should generally be one or two. Therefore data generated by the laboratory is reported with a maximum of two significant figures, unless the use of additional significant figures is warranted by specific analytical reporting requirements.

19.13.2.4 For those methods that do not have an instrument printout or an instrumental output compatible with the LabServe System, the raw results and dilution factors are entered directly into LabServe by the analyst, and the software calculates the final result for the analytical report. LabServe has a defined significant figure criterion for each analyte.

19.13.2.5 The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible with LabServe, the raw results and dilution factors are transferred into LabServe electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The analyst prints a copy of what has been entered to check for errors. This printout and the instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained with the data file. The data file is stored in a monthly folder on the instrument computer; periodically, this file is transferred to the server and, eventually, to a tape file.

19.13.3 Logbook / Worksheet Use Guidelines

Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task. (e.g. calibrations, standards, analyst, sample ID, date, time on short holding time tests, temperatures when applicable, calculations are traceable, etc.)

- Corrections are made following the procedures outlined in Section 12.
- Logbooks are controlled by the QA department. A record is maintained of all logbooks in the lab.
- Unused portions of pages must be "Z"'d out, signed and dated.
- Worksheets are created with the approval of the Regional Manager and QA Manager at the facility. The QA Manager controls all worksheets following the procedures in Section 6.

19.13.4 Review / Verification Procedures

Review procedures are outlined in several SOPs (e.g. Sample Receiving (EM-SM-S-1288), Sample Log In (EM-SM-S-1993), Technical Report Review and Release Procedures (EM-SM-S-1637) to ensure that reported data are free from calculation and transcription errors, that QC parameters have been reviewed and evaluated before data is reported. The general review concepts are discussed below, more specific information can be found in the SOPs.

19.13.4.1 Log-In Review - The data review process starts at the sample receipt stage. Sample control personnel review chain-of-custody forms and project instructions from the project management group. This is the basis of the sample information and analytical instructions entered into LabServe. The log-in instructions are reviewed by the personnel entering the information, and a second level review is conducted by the project management staff.

19.13.4.2 First Level Data Review - The next level of data review occurs with the analysts. As data are generated, analysts review their work to ensure that the results meet project and SOP requirements. First level reviews include inspection of all raw data (e.g., raw data sheets, logs, etc.), evaluation of calibration/calibration verification data in the day's analytical run, evaluation of QC data, and reliability of sample results. The analyst transfers data not already directly entered into LabServe, data qualifiers are added as needed. All first level reviews are documented.

19.13.4.3 Second Level Data Review – All analytical data are subject to review by a second qualified analyst or supervisor. Second level reviews include inspection of all raw data including 100% of data associated with any changes made by the primary analyst. The second review also includes evaluation of QC data, reliability of sample results, qualifiers, and project tasks. Manual calculations are checked in second level review. All second level reviews are documented.

Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes are observed
- Samples having unusually high results
- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Transcription errors
- Results outside of calibration range

19.13.4.4 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Manager, Technical Manager, or Supervisor for further investigation. Corrective action is initiated whenever necessary.

19.13.4.5 The review process includes, but is not limited to, verifying that the COC is followed, report comments are present where necessary, comments are appropriate, and project specific requirements are met.

20.0 EQUIPMENT and CALIBRATIONS

20.1 Overview

The laboratory purchases the most technically advanced analytical instrumentation for sample analyses. Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in SOP EM-EQ-S-1584. A list of available laboratory instrumentation, per facility, is maintained by Quality Assurance in QA server folders.

Equipment is only operated by authorized and trained personnel. Manufacturer’s instructions for equipment use are readily accessible to all appropriate laboratory personnel.

20.2 Preventive Maintenance

The laboratory follows a well-defined maintenance program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

Routine preventive maintenance procedures and frequency, such as cleaning and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

Scheduled routine maintenance is defined in SOP EM-EQ-S-1584. It is the responsibility of each Facility Manager and/or designee to ensure that instrument maintenance logs are kept for all equipment in his/her facility. Preventative maintenance procedures are outlined in EM-EQ-S-1584 and may also be outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to monitor performance is also the maintenance log. Multiple pieces of equipment may share the same log as long as it is clear as to which instrument is associated with an entry.)

Instrument maintenance logs are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logs shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

- Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.
- Each entry in the instrument log includes the analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control. e.g. instrument recalibrated on ‘date’ with acceptable verification, etc.) must also be documented in the instrument records.
- When maintenance or repair is performed by an outside agency, service receipts detailing the service performed are to be maintained as part of facility equipment records.

If an instrument requires repair (subjected to overloading or mishandling), gives suspect results, or otherwise has shown to be defective or outside of specified limits it shall be taken out of operation and tagged as out-of-service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses.

In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back-up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted.

At a minimum, if an instrument is sent out for service or transferred to another facility, it must be verified as functional upon return or repair prior to return to lab operations.

20.3 Support Equipment

This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, temperature measuring devices, and volumetric dispensing devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance. Additional information and requirements may be found in SOP EM-EQ-S-1584.

20.3.1 Weights and Balances

The accuracy of the balances used in the laboratory is checked every working day, before use. All balances are placed on stable counter tops.

Each balance is checked prior to initial serviceable use with at least two certified ASTM type 1 weights spanning its range of use (weights that have been calibrated to ASTM type 1 weights may also be used for daily verification). ASTM type 1 weights used only for calibration of other weights (and no other purpose) are inspected for corrosion, damage or nicks at least annually and if no damage is observed, they are calibrated at least every 5 years by an outside calibration laboratory. Any weights (including ASTM Type 1) used for daily balance checks or other purposes are recalibrated/recertified every two years to NIST standards (this may be done internally if laboratory maintains “calibration only” ASTM type 1 weights).
All balances are serviced annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to the NIST standards.

All of this information is recorded in logs, and the recalibration/recertification certificates are kept on file.

20.3.2 pH, Conductivity, and Turbidity Meters

The pH meters used in the laboratory are accurate to $\pm$ 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions before each use.

Conductivity meters are also calibrated before each use with a known standard to demonstrate the meters do not exceed an error of 1% or one umhos/cm.

Turbidity meters are also calibrated before each use. All of this information is documented in logs.

Consult pH, Conductivity, and Turbidity SOPs for further information.

20.3.3 Thermometers

All thermometers are calibrated on an annual basis with a NIST-traceable thermometer.

- If the temperature measuring device is used over a range of 10°C or less, then a single point verification within the range of use is acceptable;
- If the temperature measuring device is used over a range of greater than 10°C, then the verification must bracket the range of use.

IR thermometers and digital thermometers are calibrated every 6 months, (or quarterly where required by external accrediting bodies).

The NIST reference thermometer is recalibrated every five years (unless thermometer has been exposed to temperature extremes or apparent separation of internal liquid) by an approved outside service and the provided certificate of traceability is kept on file. The NIST thermometer(s) have increments of 1 degree (0.5 degree or less increments are required for drinking water microbiological laboratories), and have ranges applicable to method and certification requirements. The NIST traceable thermometer is used for no other purpose than to calibrate other thermometers.

All of this information is documented in logs. Monitoring method-specific temperatures, including incubators, heating blocks, water baths, and ovens, is documented in equipment-specific logs. More information on this subject can be found in the *Calibration and Maintenance of Lab Equipment* SOP, EM-EQ-S-1584.

20.3.4 Refrigerators/Freezer Units, Water baths, Ovens and Incubators

The temperatures of all refrigerator units and freezers used for sample and standard storage are monitored each working day, at minimum. Temperatures are recorded twice daily, with a minimum 4 hours between readings for days in use.

Ovens, water baths and incubators are monitored on days of use.

All of this equipment has a unique identification number, and is assigned a thermometer for monitoring.

Sample storage refrigerator temperatures are kept between 2ºC and 8 ºC.

Specific temperature settings/ranges for other refrigerators, ovens, water baths, and incubators can be found in method specific SOPs.

All of this information is documented in Daily Temperature Logs and/or electronic data logger records.

20.3.5 Autopipettors, Dilutors, and Syringes

Mechanical volumetric dispensing devices are given unique identification numbers and the delivery volumes are verified, at a minimum, on a monthly basis. Monthly pipette verification and annual calibration procedures are found in SOP EM-EQ-S-1584.

For those dispensers that are not used for analytical measurements, a label can be applied to the device stating that it is not calibrated and not for use in analysis. Any device not regularly verified cannot be used for any quantitative measurements.

20.3.6 Autoclaves

Each autoclave requires routine maintenance and cleaning to ensure functionality of the unit. Process controls are in place daily, weekly, and quarterly to ensure that the unit is performing as required with respect to time, temperature and sterilization requirements. Details of required maintenance can be found in manufacturer manuals as well as SOP Autoclave Operation and Maintenance SOP, EM-EQ-S-1198.

20.3.7 Microscopes

The routine maintenance of microscopes is outlined in Document EM-EQ-S-1586 "Routine Maintenance of Microscopes". Microscope Ocular Micrometers are calibrated annually with an NIST traceable micrometer per Document EM-EQ-S-1588 "Ocular Micrometer Calibration". Records of the maintenance and ocular micrometer calibrations are maintained as part of the Quality System documentation.

For those microscopes used in PCM analysis, routine maintenance and alignment requirements are outlined with the analytical Document EM-AS-S-1260 "PCM Analysis for Asbestos and Other Fibers".

For those microscopes used in Asbestos PLM analysis, routine maintenance and alignment requirements are outlined with the analytical Document EM-AS-S-1267 "Sample Preparation and Analysis for Asbestos Fibers by Polarized Light Microscopy (PLM)".

20.3.8 Ventilation and Decontamination

Class II Biosafety hoods are certified on an annual basis by a NSF accredited field certifier to ensure that the hoods are functioning according to the specifications outlined in NSF Standard 49 and the Chapter 13 of the ASHRAE Applications Notebook (1999). The records for the hood calibration are maintained at each facility.

All other Biohazard hoods, including Class I with HEPA filter used for asbestos, are certified on an annual basis by an ISO/IEC 17025:2017 accredited vendor.

Hoods used for asbestos analyses must operate at a minimum 75 fpm or they shall not be used for asbestos work.

20.4 Instrument Calibrations

Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method detection limits, the working range of the analytical instrumentation and any fluctuations that may occur from day to day.

Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response,

and type of calibration (Avg RF, curve, or other calculations that may be used to reduce instrument responses to concentration.)

Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers (refer to Section 12).

Note: Instruments are calibrated initially and as needed after that and at least annually.

20.4.1 Calibration Standards

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP. If a reference method does not specify the number of calibration standards, a minimum of 3 calibration points will be used.

Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to national or international standards of measurement, or to national or international standard reference materials.

The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).
The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to at least the same number of significant figures used to report the data) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative).

All initial calibrations are verified with a standard obtained from a second source and traceable to a national standard, when available (or vendor certified different lot if a second source is not available). For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst at a different time or a different preparation would be considered a second source. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

20.4.1.1 Calibration Verification

The calibration relationship established during the initial calibration must be verified initially and at least daily as specified in the laboratory method SOPs in accordance with the referenced analytical methods and in the 2009 and 2016 TNI Standard. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. Initial calibration verification (ICV) is with a standard source secondary (second source standard) to the calibration standards, but

continuing calibration verifications (CCV) may use the same source standards as the calibration curve.

Note: The process of calibration verification referred to here is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during calibration are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration.

All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met, i.e., RPD, per 2009 and 2016 TNI Std. EL-V1M4 Sec. 1.7.2.

All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs.

Note: If an internal standard calibration is being used then bracketing calibration verification standards are not required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the calibrations must be verified by an ICV analyzed immediately following initial calibration and before sample analysis. The ICV may be used as the first bracketing CCV, if criteria for both are met.

A continuing instrument calibration verification (CCV) is generally analyzed at the beginning of each 12-hour analytical shift during which samples are analyzed. The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample, QC, or standard that can be injected within 12-hours of the beginning of the shift. For methods that have quantitation by external calibration models, a CCV is analyzed at the end of each analytical sequence. Some methods have more frequent CCV requirements. See specific SOPs. Most inorganic methods require the CCV to be analyzed after ever 10 samples or injections, including matrix or batch QC samples.

Note: If an internal standard calibration is being used (e.g., GCMS) then bracketing standards are not required, only daily verifications are needed, except as specified by program or method requirements.

If the results of a CCV are outside the established acceptance criteria and analysis of a second consecutive (and immediate) CCV fails to produce results within acceptance criteria, corrective action shall be performed. Once corrective actions have been completed and documented, the laboratory shall demonstrate acceptable instrument / method performance by analyzing two consecutive CCVs, or a new initial instrument calibration shall be performed.

Sample analyses and reporting of data may not occur or continue until the analytical system is calibrated or calibration verified. However, data associated with an unacceptable calibration

verification may be fully useable reported based upon discussion and approval of the client under the following special conditions:

a). when the acceptance criteria for the CCV are exceeded high (i.e., high bias) and the associated samples within the batch are non-detects, then those non-detects may be reported case narrative comment explaining the high bias. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted; or

b). when the acceptance criteria for the CCV are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted.

Samples reported by the 2 conditions identified above will be appropriately flagged.

20.4.1.2 Verification of Linear and Non-Linear Calibrations

Calibration verification for calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard. (These calculations are available in the laboratory method SOPs.) Verification standards are evaluated based on the % Difference from the average CF or RF of the initial calibration or based on % Drift or % Recovery if a linear or quadratic curve is used.

Regardless of whether a linear or non-linear calibration model is used, if initial verification criterion is not met, then no sample analyses may take place until the calibration has been verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

- When the acceptance criteria for the calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise, the samples affected by the unacceptable calibration verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.

- When the acceptance criteria for the calibration verification are exceeded low, i.e., low bias, those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise, the samples affected by the unacceptable verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit standard may be analyzed to demonstrate that the laboratory can still support non-detects at their reporting limit.

21.0 MEASUREMENT TRACEABILITY

21.1 Overview

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy. At a minimum, these must include procedures for checking specifications of ancillary equipment: balances, thermometers, temperature, Deionized (DI) and Reverse Osmosis (RO) water systems, automatic pipettes and other volumetric measuring devices. (Refer to Section 20.3). With the exception of Class A Glassware and glass microliter syringes, quarterly accuracy checks (at minimum) are performed for all mechanical volumetric devices. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards. Class A Glassware and glass microliter syringes should be routinely inspected for chips, acid etching or deformity (e.g., bent needle). If the Class A glassware or syringe is suspect, the accuracy of the glassware will be assessed prior to use.

All reusable glassware and plasticware that is used in the analysis of samples must be cleaned, and where appropriate, sterilized according to Document EM-EQ-S-5810 "Glassware Cleaning". All glassware shall be inspected for cracks and chips before each time it is used. If cracks or chips are found, the glassware shall not be used and shall be repaired or discarded.

21.2 NIST-Traceable Weights and Thermometers

Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

For NIST-traceable weights and thermometers, the laboratory requires that all calibrations be conducted by a calibration laboratory accredited by A2LA, NVLAP (National Voluntary Laboratory Accreditation Program), or another accreditation organization that is a signatory to a MRA (Mutual Recognition Arrangement) of one or more of the following cooperations – ILAC (International Laboratory Accreditation Cooperation) or APLAC (Asia–Pacific Laboratory Accreditation Cooperation). A calibration certificate and scope of accreditation is kept on file at the laboratory.

21.3 Reference Standards / Materials

Reference standards/materials, where commercially available, are traceable to certified reference materials. Commercially prepared reference standards, to the extent available, are purchased from vendors that are accredited to ISO Guide 34 and ISO/IEC Guide 17025:2017. All reference standards from commercial vendors shall be accompanied with a certificate that includes at least the following information:

- Manufacturer
- Analytes or parameters calibrated
- Identification or lot number
- Calibration method
- Concentration with associated uncertainties

- Purity

If a standard cannot be purchased from a vendor that supplies a Certificate of Analysis, the purity of the standard is documented by analysis. The receipt of all reference standards must be documented. Reference standards are labeled with a unique ID and expiration date. All documentation received with the reference standard is retained as a QC record and references the unique ID.

All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or material from the true value does not exceed method requirements. The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a vendor certified different lot is acceptable for use as a second source. For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst would be considered a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs. In most cases, the analysis of an Initial Calibration Verification (ICV) or LCS (where there is no sample preparation) is used as the second source confirmation. These checks are generally performed as an integral part of the analysis method (e.g. calibration checks, laboratory control samples).

All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. Refer to the Environmental Health & Safety Manual or laboratory SOPs. For safety requirements, please refer to method SOPs and the laboratory's Environmental Health and Safety Manual.

Standards and reference materials shall not be used after their expiration dates unless their reliability is verified by the laboratory and their use is approved by the Quality Assurance Manager. The laboratory must have documented contingency procedures for re-verifying expired standards.

21.4 Documentation and Labeling of Standards, Reagents, and Reference Materials

Reagents must be at a minimum the purity required in the test method. The date of reagent receipt and the expiration date are documented.

All manufacturer or vendor supplied Certificate of Analysis or Purity must be retained, stored appropriately, and readily available for use and inspection. These records are maintained on-site with each facility's current QA/QC records. Records must be kept of the date of receipt and date of expiration of standards, reagents and reference materials. In addition, records of preparation of laboratory standards, reagents, and reference materials must be retained, stored appropriately, and be readily available for use and inspection. For detailed information on documentation and labeling, please refer to facility Supply Receiving and Distribution SOPs.

Wherever possible, cultures purchased for use as control or reference cultures and inclusion in laboratory stock must be obtained from external sources traceable to Guide 34 such as, but not limited to, American Type Culture Collection (ATCC), Hardy Diagnostics and other commercially available traceable culture catalogs. It is not permissible to retain AIHA-EMPAT proficiency

testing rounds for inclusion in stock culture collections due to licensing agreements in place with AIHA-PAT, LLC.
All standards, reagents, and reference materials must be labeled in an unambiguous manner.
Records are maintained for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

Commercial materials purchased for preparation of calibration solutions, spike solutions, etc.., are usually accompanied with an assay certificate or the purity is noted on the label. If the assay purity is 96% or better, the weight provided by the vendor may be used without correction. If the assay purity is less than 96% a correction will be made to concentrations applied to solutions prepared from the stock commercial material. Blended gas standard cylinders use a nominal concentration if the certified value is within +/-15%, otherwise the certified values is used for the canister concentration.

21.4.1 All standards, reagents, and reference materials must be labeled in an unambiguous manner.

Records are maintained for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

21.4.2 All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Lot number
- Expiration Date (include prep date for reagents)
- Standard ID
- Special Health/Safety warnings if applicable

Records must also be maintained of the date of receipt for commercially purchased items or date of preparation for laboratory prepared items. Special Health/Safety warnings must also be available to the analyst. This information is maintained on-site with each facility's current QA/QC records.

21.4.3 In addition, the following information may be helpful:

- Date opened (for multi-use containers, if applicable)
- Description of standard (if different from manufacturer's label or if standard was prepared in the laboratory)
- Recommended Storage Conditions
- Concentration (if applicable)
- Initials of analyst preparing standard or opening container

All containers of prepared reagents must include an expiration date and an ID number to trace back to preparation.

Procedures for preparation of reagents can be found in the Method SOPs.

Standard ID numbers must be traceable through associated logbooks, worksheets and preparation/analytical batch records.

All reagents and standards must be stored in accordance to the following priority: 1) with the manufacturer's recommendations; 2) with requirements in the specific analytical methods as specified in the laboratory SOP.

22.0 SAMPLING

22.1 Overview

Eurofins EMLab P&K, LLC does not offer sampling services. Rare exceptions have been made upon high profile client request. Such requests are to include client specified sampling plans and are reviewed and approved on a case by case basis by the General Manager and Cluster Leader. Such requests and dictated protocols are documented as part of the client account records. Clients of the laboratory are supplied, upon request, with Eurofins EMLab P&K, LLC Chain of Custody (COC) forms, and written information regarding the use of sampling devices and sampling procedures. Clients may also obtain these materials and a detailed list of sampling procedures from the Eurofins EMLab P&K, LLC internet site.

22.2 Sampling Containers

The laboratory offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers. Certificates of cleanliness for bottles and preservatives are provided by the supplier and are maintained at the laboratory. Alternatively, the certificates may be maintained by the supplier and available to the laboratory on-line. Internally, a representative sample from new lots of sample containers are checked for sterility and records maintained per lot.

22.2.1 Preservatives

Upon request, preservatives are provided to the client in pre-cleaned sampling containers. In some cases containers may be purchased pre-preserved from the container supplier. Whether prepared by the laboratory or bought pre-preserved, the grades of the preservatives are at a minimum:

- Sodium Thiosulfate – ACS Grade or equivalent

22.3 Definition of Holding Time

The date and time of sampling documented on the COC form establishes the day and time zero. As a general rule, when the maximum allowable holding time is expressed in days (e.g., 14 days, 28 days), the holding time is based on calendar day measured. Holding times expressed in hours (e.g., 6 hours, 24 hours, etc.) are measured from date and time zero. Holding times for analysis include any necessary reanalysis. However, there are some programs that determine

holding time compliance based on the date and specific time of analysis compared to the time of sampling regardless of how long the holding time is.

22.4 Sampling Containers, Preservation Requirements, Holding Times

The preservation and holding time criteria specified in the laboratory SOPs are derived from the source documents for the methods. If method required holding times or preservation requirements are not met, the reports will be qualified using a report comment. As soon as possible or “ASAP” is an EPA designation for tests for which rapid analysis is advised, but for which neither EPA nor the laboratory have a basis for a holding time.

22.5 Sample Aliquots / Subsampling

Taking a representative sub-sample from a container is necessary to ensure that the analytical results are representative of the sample collected in the field. The size of the sample container, the quantity of sample fitted within the container, and the homogeneity of the sample need consideration when sub-sampling for sample preparation. It is the laboratory’s responsibility to take a representative subsample or aliquot of the sample provided for analysis.

Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses (where applicable), gloves, and lab coats must be worn when preparing aliquots for analysis.

Only open asbestos samples in appropriate HEPA filtered hoods with a minimum flow rate of 75 fpm.

Guidelines on taking sample aliquots & subsampling are located in individual method SOPs.

23.0 HANDLING OF SAMPLES

Sample management procedures at the laboratory ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

Consider every sample as potentially dangerous. Handle samples in manner that reduces the potential of contamination to others and the laboratory environment.

Wipe every surface involved in the processing of samples with disinfectant after working with the samples.

Do not leave the lids off of plates at any time, and if necessary reseal plates with parafilm after analysis.

It is every employee's responsibility to report any safety concerns or incidence of non-compliance to supervisors, quality assurance officer, safety coordinator, or corporate management.

23.1 Chain of Custody (COC)

The COC form is the written documented history of any sample and is initiated when bottles are sent to the field, or at the time of sampling. This form is completed by the sampling personnel

and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the COC form is to provide a legal written record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary written request for analyses from the client to the laboratory. The COC form acts as a purchase order for analytical services when no other contractual agreement is in effect. An example of a COC form may be found in Figure 23-1.

23.1.1 Field Documentation

When the sampling personnel deliver the samples directly to Eurofins EMLab P&K personnel, the samples are stored in a cooler with ice, as applicable, and remain solely in the possession of the client's field technician until the samples are delivered to the laboratory personnel. The sample collector must assure that each container is in his/her physical possession or in his/her view at all times, or stored in such a place and manner to preclude tampering. The field technician relinquishes the samples in writing on the COC form to the sample control personnel at the laboratory or to a Eurofins courier. When sampling personnel deliver the samples through a common carrier (Fed-Ex, UPS), the CoC relinquished date/time is completed by the field personnel and samples are released to the carrier. Samples are only considered to be received by the laboratory when personnel at the fixed laboratory facility have physical contact with the samples.

Note: Independent couriers are not required to sign the COC form. The COC is usually kept in the sealed sample cooler. The receipt from the courier is stored in log-in by date; it lists all receipts each date.

23.1.2 Legal / Evidentiary Chain-of-Custody

If samples are identified for legal/evidentiary purposes on the COC, standard COC and sample handling procedures apply. Eurofins EMLab P&K does not provide internal chain of custody.

23.2 Sample Receipt

Samples are received at the laboratory by designated sample receiving personnel and a unique laboratory project identification number is assigned. Each sample container shall be assigned a unique sample identification number that is cross-referenced to the client identification number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a durable sample identification label. Sample acceptance, receipt, tracking and storage procedures are detailed in SOP EM-SM-S-1288, and summarized in the following sections.

23.2.1 Laboratory Receipt

The integrity of all samples received is checked during the Sample Receipt process outlined in Document EM-SM-S-1288 "Sample Receipt" prior to sample Log-in. It is the duty of the individual receiving the samples to ensure that the samples received are intact and not compromised in any fashion. The sample acceptance policy to be used as a guideline for assessing the integrity of received samples is contained within Document EM-SM-S-1288 "Sample Receiving".

During sample receipt and log in, the receiving staff separates the individual analysis types into bins and makes copies of the original COC for each bin as needed. The types of analyses, the number of samples received for each analysis, the type of sample and the requested turnaround time are recorded into the database. Any missing or extra samples received are recorded on the original COC and into the database. If any of the previous information is missing or incomplete, the information is documented into the database and the client is contacted. Samples are categorized by projects and analysis types into individual bins and queued for the Log-in process. The laboratory maintains a sample storage area that protects the samples from deterioration, loss, damage or from unauthorized access.

Whenever a compromised sample is encountered, the information is documented in LabServe (Report Comments, Project Log, Project Tasks, Log-in Field or Account Details). The client must be contacted and at the very least, if possible, a message left to inform the client of the situation. If, at the client's request, a compromised sample is analyzed, a qualifying statement must be submitted with the written report describing that the integrity of the results are potentially compromised and that the interpretation of the data is left to the client. Clients are informed on the condition of the sample in the final report. A record of pertinent discussions with clients must be maintained in LabServe (for example in the account details, project logs, tasks, etc.).

23.2.1.1 Unique Sample Identification

All samples that are processed through the laboratory receive a unique sample identification to ensure that there can be no confusion regarding the identity of such samples at any time. This system includes identification for all samples.

The laboratory assigns a unique identification (e.g., Sample ID) code to each sample container received at the laboratory.

23.3 Sample Acceptance Policy

The laboratory has a written sample acceptance policy noted in Document EM-SM-S-1288 "Sample Receipt" (Example in Figure 23-2) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include, but are not limited to:

- sample holding times must be adhered to (Sampling Guide);
- all samples submitted must have a Chain of Custody (COC), or an equivalent sample request, to be received by the laboratory;
- samples are checked for unique identifiers on each sample and that the number of samples matches the information on the COC;
- proper sample containers with adequate volume for the analysis (Sampling Guide) and necessary QC;
- samples must be preserved according to the requirements of the requested analytical method (Sampling Guide);
- the project manager will be notified if any sample is received in damaged condition.

Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined.

23.3.1 After inspecting the samples, the sample receiving personnel sign and date the COC form, make any necessary notes of the samples' conditions and store them in appropriate refrigerators or storage locations, as needed.

23.3.2 Any deviations from these checks that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance policy criteria are not met, the laboratory shall either:

- Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or
- Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

Once sample acceptance is verified, the samples are logged into the LIMS/LabServe according SOP No. EM-SM-S-1993. and assigned an Eurofins EMLab P&K, LLC Project Number and unique laboratory identifiers for each sample in the project.

All client information, project information, analysis requests, sample identifier information, sample descriptions and miscellaneous notes are entered into the database. The information logged into the database is checked against the information on the original COC and Project Log before the samples are sent to a Receiving and Log- in Quality Control check.

In an effort to meet the needs of the client, Eurofins EMLab P&K, LLC offers the client the ability to log samples in via the internet. Clients enter Chain of Custody (COC) information into the internet log-in screen and then print a COC form which is sent with the samples to the laboratory.
Upon receipt of the samples at the laboratory the COCs are signed by the receiving laboratory staff and the information logged in by the clients is compared with the samples received and the information on the printed client produced COC. Additional information regarding Sample Log In via the internet can be found in SOP EM-SM-S-1993.

23.4 Sample Storage

In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in refrigerators, freezers or protected locations suitable for the sample matrix. Samples are never to be stored with reagents, standards or materials that may create contamination.

Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically demands it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the refrigerator and laboratory areas unless accompanied by an employee of Eurofins.

23.5 Hazardous Samples and Foreign Soils

To minimize exposure to personnel and to avoid potential accidents, hazardous and foreign soil samples are stored in an isolated area designated for hazardous waste only. For any sample that is known to be hazardous at the time of receipt or, if after completion of analysis the result exceeds the acceptable regulatory levels, a Hazardous Sample Notice must be completed by the analyst. This form may be completed by Sample Control, Project Managers, or analysts and must be attached to the report. The sample itself is clearly marked with a red stamp, stamped on the sample label reading “HAZARDOUS” or “FOREIGN SOIL” and placed in a colored and/or marked bag to easily identify the sample. The date, log number, lab sample number, and the result or brief description of the hazard are all written on the Hazardous & Foreign Soil Sample Notice. A copy of the form must be included with the original COC and Work Order and the original must be given to the Sample Control Custodian. Analysts will notify Sample Control of any sample determined to be hazardous after completion of analysis by completing a Hazardous Sample Notice. All hazardous samples are either returned to the client or disposed of appropriately through a hazardous waste disposal firm that lab-packs all hazardous samples and removes them from the laboratory. Foreign soil samples are sent out for incineration by a USDA-approved waste disposal facility.

23.6 Sample Shipping

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice where necessary to ensure the samples remain within required temperature range for desired analysis during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature where necessary). The chain-of-custody form is signed by the sample control technician and included in the shipment. Samples are generally shipped overnight express or hand-delivered by a Eurofins TestAmerica courier to maintain sample integrity. All personnel involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice, where necessary. The Environmental, Health and Safety Manual contains additional shipping requirements.

23.7 Sample Disposal

Samples should be retained for a minimum of 30 days after the project report is sent, however, provisions may be made for earlier disposal of samples once the holding time is exceeded. Some samples are required to be held for longer periods based on regulatory or client requirements (e.g., 60 days after project report is sent). The laboratory must follow the longer sample retention requirements where required by regulation or client agreement. Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory’s waste disposal procedures (SOP EM-HS-S-1286). All procedures in the laboratory’s Environmental Health and Safety Manual are followed during disposal. Samples are normally maintained in the laboratory no longer than one month from receipt unless otherwise requested. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work.

Figure 23-1 . Example: Sample Acceptance Policy

All incoming work will be evaluated against the criteria listed below and found with SOP EM-SM-S-1288. Where applicable, data from any samples that do not meet the criteria listed below will be noted on the laboratory report defining the nature and substance of the variation. In addition the client will be notified ASAP after the receipt of the samples.

Per State and/or Federal Regulation, the client is responsible to ensure that samples are shipped in accordance with DOT/IATA requirements, and that radioactive materials may only be delivered to licensed facilities. Any samples containing (or suspected to contain) Source, Byproduct, or Special Nuclear Material as defined by 10 CFR should be delivered directly to facilities licensed to handle such radioactive material. Natural material or ores containing naturally occurring radionuclides may be delivered to any Eurofins facility or courier as long as the activity concentration of the material does not exceed 270 pCi/g alpha or 2700 pCi/g beta (49 CFR Part 173).

Samples received are expected to display the following features:

- Sealed correctly to eliminate cross contamination.
- Clearly discernible markings and identifications.
- Packing materials sufficient to appropriate to eliminate the risk of damage during delivery.
- Sample volume/amount must meet minimum and maximum amount requirements for each analysis, if applicable.
- Lead wipes must meet ASTM E1792 criteria.
- Culture media within expiration dates and lot numbers clearly identified on the plate.
- Asbestos PCM cassettes should not be packaged in Styrofoam and should be separated from PLM samples.
- Bacteriology samples, where a state certification is applicable, should only be shipped to labs holding that certification and should meet the analysis' temperature and holding time requirements.

Samples will be placed on the Project Manager will contact the client if any of the following are observed:

- Leakage from a sample.
- Water intrusion into a sample.
- Physical damage to a sample due to improper packaging during transport.
- Breaking or otherwise discernible compromise to the integrity of the sample.
- Illegible, ambiguous, or missing sample identification information.
- Sample volume/amount does not meet minimum and maximum amount requirements for each analysis, if applicable.
- Lead wipes do not meet the ASTM E1792 criteria.
- Culture media that is expired, dried, or detached from the culture plate.
- Asbestos PCM cassettes packaged in Styrofoam or with asbestos bulk samples.
- Bacteriology samples submitted for an analysis for which state certification is not held at the laboratory of receipt, and/or not adhering to the temperature and hold time requirements

Sample and hold time requirements vary per method. These can be found in SOP EM-SM-S-1288.

Eurofins EMLab P&K will make every effort to analyze samples within the regulatory holding time. Samples must be received in the laboratory with enough time to perform the sample analysis. Except for short holding time samples (< 48hr HT) sample must be received with at least 48 hrs (2 working days) remaining on the holding time for us to ensure analysis.

24.0 ASSURING THE QUALITY OF TEST RESULTS

24.1 Overview

In order to assure our clients of the validity of their data, the laboratory continuously evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration as discussed in Section 20, but also by routine process quality control measurements (e.g. Blanks, Laboratory Control Samples (LCS), Matrix Spikes (MS), duplicates (DUP), replicates (REP), daily reference slides, and routine quality control checks). These quality control checks are performed as required by the method or regulations to assess precision and accuracy. Quality control samples are to be treated in the exact same manner as the associated field samples being tested. In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

24.2 Controls

Sample preparation or pre-treatment is commonly required before analysis. Typical preparation steps vary per method and may include homogenization, drying, acid digestion filter concentration, heat treatment, acid treatment, dilution, centrifugation, etc.. During these pre-treatment steps, samples are arranged into discreet manageable groups referred to as preparation (prep) batches, where applicable. Prep batches provide a means to control variability in sample treatment. Control samples are added to each prep batch to monitor method performance and are processed through the entire analytical procedure with investigative/field samples.

Quality Control Requirements include, but are not limited to, duplicate analysis, replicate analysis, daily reference analysis, round robin and proficiency testing as applicable to the method being performed. Quality control requirements, acceptance criteria, frequency and required trending practices are outlined in Document EM-QA-S-1994, Quality Control for Sample Analysis, Document EM-QA-S-1259, Quality Control for Asbestos Analysis, or within method specific documents.

A Quality Control and Acceptance Criteria Summary is available as Document EM-QA-R-5730.

24.3 Negative Controls

Table 24-1. Example – Negative Controls

Control Type	Details
Negative Control (NC)	are used to assess preparation and analysis for possible contamination during the preparation and processing steps.
	The specific frequency of use for method blanks during the analytical sequence is defined in the specific standard operating procedure for each analysis. Generally it is 1 per day of analysis.
	The method blank is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (e.g., Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.).
	Reanalyze or qualify associated sample results when the concentration of a targeted analyte in the blank is at or above the reporting limit as established by the method or by regulation, AND is greater than 1/10 of the amount measured in the sample.

Table 24-1. Example – Negative Controls

Control Type	Details
Calibration Blanks	are prepared and analyzed along with calibration standards where applicable. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve.
Instrument Blanks	are blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.
Field Blanks [1]	are sometimes used for specific projects by the field samplers.

[1] When known, these field QC samples should not be selected for matrix QC as it does not provide information on the behavior of the target compounds in the field samples. Usually, the client sample ID will provide information to identify the field blanks with labels such as "FB", "EB", or "TB."

Evaluation criteria and corrective action for these controls are defined in the specific standard operating procedure for each analysis.

24.3.1 Negative Controls for Microbiological Methods – Microbiological Methods utilize a variety of negative controls throughout the process to ensure that false positive results are not obtained. These controls are critical to the validity of the microbiological analyses. Details of required negative controls are located within in each method SOP.

Table 24-2. Examples of Negative Controls for Microbiology

Control Type	Details
Sterility Checks (Media)	are analyzed for each lot of pre-prepared media, ready-to-use media and for each batch of medium prepared by the laboratory.
Sterility checks (Sample Containers)	are performed on at least one container per lot of purchased, pre-sterilized containers. If containers are prepared and sterilized by the laboratory, one container per sterilization batch is checked. Container sterility checks are performed using non-selective growth media.
Sterility Checks (Dilution Water)	are performed on each batch of dilution water prepared by the laboratory and on each batch of pre-prepared dilution water.
Sterility Checks (Filters)	are also performed on at least one filter from each new lot of membrane filters using non-selective growth media.

Negative culture controls demonstrate that a media does not support the growth of non-target organisms and ensures that there is not an atypical positive reaction from the target organisms. Prior to the first use of the media, each lot of pre-prepared selective media or batch of laboratory prepared selective media is analyzed with at least one known negative culture control as appropriate to the method.

24.4Positive Controls

Each regulatory program and each method within those programs specify the control samples that are prepared and/or analyzed with a specific batch

Note that frequency of control samples vary with specific regulatory, methodology and project specific criteria. Complete details on method control samples are as listed in each analytical SOP.

Cultures for quality control testing of media and for use as reference organisms are stored appropriately based on procedural requirements. Details can be found in EM-AD-S-5745.

24.4.1 Controls for Microbiological Methods

Laboratory produced media and reagents are checked against quality control organisms, where applicable, and for sterility according to media type recipes/instructions prior to use in analytical procedures. Documentation for the quality control of media and reagents are kept on file. Quality Control records for media produced by outside vendors are kept on file.

24.5Acceptance Criteria (Control Limits)

As mandated by the test method and regulation, each individual QC sample (daily reference, duplicate, replicate, positive control, negative control, etc.) is evaluated against the control limits published in the test method. Where there are no established acceptance criteria, the laboratory calculates in-house control limits with the use of control charts or, in some cases, utilizes client project specific control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

Note: For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

Once control limits have been established, they are verified, reviewed, and updated if necessary on a biennial basis unless the method requires more frequent updating. Control limits are established per method (as opposed to per instrument) regardless of the number of instruments utilized.

Laboratory generated % Recovery acceptance (control) limits are generally established by taking $\pm$ 3 Standard Deviations (99% confidence level) from the average recovery of a minimum of 20-30 data points (more points are preferred).

- Regardless of the calculated limit, the limit should be no tighter than the Calibration Verification (ICV/CCV) where applicable. (Unless the analytical method specifies a tighter limit).

- In-house limits cannot be any wider than those mandated in a regulated analytical method. Client or contract required control limits are evaluated against the laboratory's statistically derived control limits to determine if the data quality objectives (DQOs) can be achieved. If

laboratory control limits are not consistent with DQOs, then alternatives must be considered, such as method improvements or use of an alternate analytical method.

24.5.1 The lab must be able to generate a current listing of their control limits and track when the updates are performed. In addition, the laboratory must be able to recreate historical control limits.

24.5.2 A LCS that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action process (see Section 12) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

- The analyte results are below the reporting limit and the LCS is above the upper control limit.
- If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.

24.5.3 If the MS/MSDs do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference. A more detailed discussion of acceptance criteria and corrective action can be found in the lab's method SOPs and in Section 12.

24.6 Additional Procedures to Assure Quality Control

The laboratory has written and approved method SOPs to assure the accuracy of the test method including calibration (see Section 20), use of certified reference materials (see Section 21) and use of PT samples (see Section 15).

A discussion regarding MDLs, Limit of Detection (LOD) and Limit of Quantitation (LOQ) can be found in Section 19.

- Use of formulae to reduce data is discussed in the method SOPs and in Section 20.
- Selection of appropriate reagents and standards is included in Section 9 and 21.
- A discussion on selectivity of the test is included in Section 5.
- Constant and consistent test conditions are discussed in Section 18.
- The laboratories sample acceptance policy is included in Section 23.

25.0 REPORTING RESULTS

25.1 Overview

The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is conflict between client requests and laboratory ethics or regulatory requirements, the laboratory's ethical and legal requirements are paramount, and the laboratory will work with the client during project set up to develop an acceptable solution. Refer to Section 9.

A variety of report formats are available to meet specific needs.

In cases where a client asks for simplified reports, there must be a written request from the client. There still must be enough information that would show any analyses that were out of conformance (QC out of limits) and there should be a reference to a full report that is made available to the client. Review of reported data is included in Section 19.

25.2 Test Reports

Analytical results are reported in a format that is satisfactory to the client and meets all requirements of applicable accrediting authorities and agencies. A variety of report formats are available to meet specific needs. Data results are predominantly made available to clients directly through electronic means. Eurofins EMLab P&K, LLC additionally offers hard copy reporting by special client request only. At a minimum, the standard laboratory report shall contain the following information:

25.2.1 A report title (e.g., Analytical Report)

25.2.2 The cover page shall include the laboratory name, address and telephone number.

25.2.3 A unique identification of the report (e.g., Eurofins EMLab P&K Project #) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end.

Note: Page numbers of report are represented as page # of ##. Where the first number is the page number and the second is the total number of pages.

25.2.4 A copy of the chain of custody (COC).

- Any COCs involved with Subcontracting are included.

25.2.5 The name and address of client and a project name/number, if applicable.

25.2.6 Description and unambiguous identification of the tested sample(s) including the client identification code.

25.2.7 Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours.

25.2.8 Date reported or date of revision, if applicable.

25.2.9 Method of analysis including method code (EPA, Standard Methods, etc.).

25.2.10 Reporting limits, where applicable

25.2.11 Method detection limits (if requested)

25.2.12 Definition of Data qualifiers and reporting acronyms (e.g. ND).

25.2.13 Sample results.

25.2.14 Condition of samples at receipt.

25.2.15 A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory, except when information is provided by the client. When data is provided by the client there shall be a clear identification of it, and a disclaimer shall be put in the report when the client supplied data can affect the validity of the test.

25.2.16 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory.

25.2.17 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue.

25.2.18 When TNI accreditation is required, the lab shall certify that the test results meet all requirements of TNI or provide reasons and/or justification if they do not.

25.2.19 Appropriate laboratory certification number for the state of origin of the sample, if applicable.

25.2.20 If only part of the report is provided to the client (client requests some results before all of it is complete), it must be clearly indicated on the report (e.g., preliminary report). A complete report must be sent once all of the work has been completed.

25.2.21 Any non- Eurofins EMLab P&K subcontracted analysis results are provided as a separate report on the official letterhead of the subcontractor. All Eurofins TestAmerica subcontracting is clearly identified on the report as to which laboratory performed a specific analysis.

Note: Refer to Eurofins EMLab P&K SOP EM-QA-2059 for details on internally applying electronic signatures of approval.

25.2.22 Electronic Data Deliverables (EDDs)

EDDs are routinely offered as part of Eurofins Eurofins EMLab P&K's services in addition to the test report as described in Section 25.2. When NELAP accreditation is required and both a test report and EDD are provided to the client, the official version of the test report will be the combined information of the report and the EDD. Eurofins EMLab P&K offers a variety of EDD formats including Excel and custom files.

EDD specifications are submitted to the IT department by the PM for review and undergo the contract review process. Once the facility has committed to providing data in a specific electronic format, the coding of the format may need to be performed. This coding is documented and validated. The validation of the code is retained by the IT staff coding the EDD.

EDDs shall be subject to a review to ensure their accuracy and completeness. If EDD generation is automated, review may be reduced to periodic screening if the laboratory can demonstrate that it can routinely generate that EDD without errors. Any revisions to the EDD format must be reviewed until it is demonstrated that it can routinely be generated without errors. If the EDD can be reproduced accurately and if all subsequent EDDs can be produced error-free, each EDD does not necessarily require a review.

25.3 Supplemental Information for Test

The lab identifies any unacceptable QC analyses or any other unusual circumstances or observations such as environmental conditions and any non-standard conditions that may have affected the quality of a result. This is typically in the form of a footnote or a qualifier and/or a report comment explaining the discrepancy in the front of the report.

Numeric results with values outside of the calibration range, either high or low are qualified as estimated.

Where quality system requirements are not met, a statement of compliance/non-compliance with requirements and/or specifications is required, including identification of test results derived from any sample that did not meet TNI sample acceptance requirements such as improper container, holding time, or temperature.

Where applicable, a statement on the estimated uncertainty of measurements; information on uncertainty is needed when a client's instructions so require.

When, as requested by the client and agreed to by Eurofins EMLab P&K, the report includes a statement of conformity to specification or standard (see Special Services, Section 7.4), the report shall clearly identify:

- to which results the statement applies,
- which specifications, standard or parts thereof are met or not, and
- the decision rule that was applied (unless the decision rule is inherent in the requested specification or standard, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule.

Opinions and Interpretations - The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the Laboratory Director will determine if a response can be prepared. If so, the Laboratory Director will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the Laboratory Director, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

Note: Review of data deliverable packages for submittal to regulatory authorities requires responses to non-conforming data concerning potential impact on data quality. This necessitates a limited scope of interpretation, and this work is performed by the QA Department. This is the only form of “interpretation” of data that is routinely performed by the laboratory.

When opinions or interpretations are included in the report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added suggesting that the client verify the opinion or interpretation with their regulator.

25.4 Environmental Testing Obtained From Subcontractors

If the laboratory is not able to provide the client the requested analysis, the samples would be subcontracted following the procedures outlined in the Eurofins EMLab P&K SOP on Subcontracting (SOP No. EM-SM-S-1288).

Data reported from analyses performed by a subcontractor laboratory are clearly identified as such on the analytical report provided to the client. Results from a subcontract laboratory outside of Eurofins EMLab P&K are reported to the client on the subcontract laboratory’s original report stationary and the report includes any accompanying documentation.

25.5 Client Confidentiality

The laboratory will ensure the highest standards of quality and integrity of the data and services provided to our clients.

The laboratory is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity’s proprietary rights will not be released.

Should it be necessary to place any client information in a public domain, the customer shall be informed in advance, unless the client already provides the same information publically and/or has agreed to the release by the laboratory.

Information about the client obtained from sources other than the client (e.g., complainant, regulators) shall be confidential between client and the laboratory. The source of this

information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

Note: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

25.5.1 Report deliverable formats are discussed with each new client. If a client requests that reports be faxed or e-mailed, the reports are to meet all requirements of this document, including cover letter.

25.6 Format of Reports

The format of reports is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse.

25.7 Amendments to Test Reports

Corrections, additions, or deletions to reports are only made when justification arises through supplemental documentation. Justification is documented using the laboratory's corrective action system (refer to Section 12).

The revised report is retained in the LIMS/LabServe, under the "Deliverables" section of the project details page. The original report is maintained in the LIMS/LabServe, under the "Reports" section of the project details page. The revised report will have the word "revised" or "amended" on the report cover page and a unique report ID in LabServe. The "Delivery" section of the project details page in the LIMS/LabServe provides a delivery record of reports and packages.

When the report is re-issued, a notation of "revised report" is placed on the cover/signature page of the report with a brief explanation of reason for the re-issue._

25.8 Policies on Client Requests for Amendments

25.8.1 Policy on Data Omissions or Reporting Limit Increases

Fundamentally, our policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND. This policy has few exceptions. Exceptions are:

- Laboratory error.
- Sample identification is indeterminate (confusion between COC and sample labels).

- An incorrect analysis (not analyte) was requested (e.g., COC lists 8315 but client wanted 8310). A written request for the change is required.
- Incorrect limits reported based on regulatory requirements.
- The requested change has absolutely *no possible* impact on the interpretation of the analytical results and there is *no possibility* of the change being interpreted as misrepresentation by anyone inside or outside of our company.

25.8.2 Multiple Reports

Eurofins EMLab P&K does not issue multiple reports for the same work order where there is different information on each report (this does not refer to copies of the same report) unless required to meet regulatory needs and approved by QA.

26.0 ACCREDITATION AND LOGO ADVERTISING POLICY

26.1 Eurofins EMLab P&K, LLC strives to comply with the advertising and logo requirements of all external licensing/accrediting bodies. As such, the accreditation and logo advertising polices of all external licensing/accrediting bodies (i.e. NIST NVLAP, AIHA-LAP, LLC EMLAP and ELLAP, IHLAP, TCEQ, and NYS DOH programs etc.) must be reviewed and all conditions adhered to prior to use in advertising and/or reporting.

26.1.1 When the external licensing/accrediting bodies term is used to reference a laboratory's accredited status, it shall be accompanied by the external licensing/accrediting bodies lab code, where applicable.

26.1.2 The logos are on the Eurofins EMLab P&K website and some marketing material and not used on reports.

26.1.3 A test report bearing the term and/or symbol shall include a statement that the report must not be used by the client to claim product certification, approval, or endorsement by any external licensing/accrediting bodies or agency of the U.S. Government.

26.1.4 A laboratory shall not use the terms certified or registered when referencing its accreditations or conformance to current ISO/IEC 17025 requirements. The correct term is accredited.

26.1.5 When an accredited laboratory uses the term and/or symbol in a contract or proposal, the laboratory shall reference its current accreditation status and provide a copy of, or link to its scope of accreditation.

26.1.6 The external licensing/accrediting body's symbol shall stand by itself and shall not be combined with any other logo, symbol, or graphic.

26.1.7 All use of external licensing/accrediting body logos and accreditation information in advertising or otherwise distributed material must be pre-approved by the management

team (Cluster Leaders and Quality Assurance) to ensure adherence to the advertising and logo requirements of all external licensing/accrediting bodies, as noted in 26.1 above.

27.0 REVISION HISTORY

27.1 For access and review of previous Quality Assurance Manual revisions, contact Quality Assurance.

27.2 Revision 10, December 2015

27.2.1 Updated laboratory information for Chicago, Florida and South San Francisco, Added laboratory information for Atlanta (cover page).

27.2.2 Updated Technical Mangers for Irvine, South San Francisco, Sacramento, Seattle and Las Vegas. Added Technical Manager for Atlanta. (cover page).

27.2.3 Added responsibility for resumption of work for a stop work directive. (section 2.1.8 and 9.4).

27.2.4 Updated analytical method review frequency to biennially in the QA Manager job description (section 3.3.2)

27.2.5 Removed reference to “Lean Manager” in Project Manager job description (section 3.5.3).

27.2.6 Replaced term AIHA with AIHA-LAP, LLC throughout the document.

27.2.7 Corrected NVLAP acronym (section 3.6.4, 3.7.4 and 3.8.4).

27.2.8 Updated glassware washing requirements to “reusable” glassware (section 4.9)

27.2.9 Switched assigning the unique laboratory identification n umber from sample receipt procedure to login procedure (sections 5.3 and 5.4).

27.2.10 Removed records and control chats from controlled document section to records. (section 7.0 and 7.4)

27.2.11 Updated procedure for obsolete documents (section 7.15)

27.2.12 Added a monthly minimum requirement for QC blind recounts (section 8.2).

27.2.13 Added option for non-proficiency testing data for use in creating demonstrations of capability (section 12.4)

27.2.14 Updated requirements for PLM round robin analysis, (section 12.5.3).

27.2.15 Updated requirements for asbestos environmental monitoring (section 13.0)

27.2.16 Updated South San Francisco floor plan

27.2.17 Revised Organizational chart format to remove names (section 19.5).

27.3Revision 11, November 2016

27.3.1 Updated contact information for western region QA Manager on cover page.

27.3.2 Updated Las Vegas laboratory address on cover page.

27.3.3 Updated Technical Mangers for Irvine and, Sacramento on cover page.

27.3.4 Added Atlanta AIHA-LAP, LLC Laboratory ID number and removed "approved signatory" from Technical Managers signature on cover page

27.3.5 Moved statement marked in 1.1.1 to 1.1.2

27.3.6 Added statement that QA Manual confirms to CQMP in section 1.1.2.

27.3.7 Added reference to scopes of accreditation and added lead as an analytical technique in section 1.2.1

27.3.8 Added "NYS DOH" to sections 2.1.1 and 16.1

27.3.9 Added job description for ELLAP Technical Manager and updated job description for Analyst and Laboratory Technician in sections 3.7.2.g, 3.7.4.c.i, 3.8.2.j and 3.11.

27.3.10 Changed "calibration" to "verification" in section 4.4.2

27.3.11 Updated section 4.8.2 to reflect current annual schedule for non-BSC hood calibrations

27.3.12 Added suggested addition of COC under "contract review" in section 6.2.1

27.3.13 Added reference to EMLab P&K signature policy CA-I-P-002 in section 7.3.3

27.3.14 Updated record retention policy for all documents relating to AIHA_LAP, LLC ELLAP and NYS-DOH in section 7.4.2

27.3.15 Updated record retention policy for training documents relating to AIHA_LAP, LLC ELLAP and NYS-DOH in section 7.4.3

27.3.16 Updated computer back-up storage policy in section 7.5.6

27.3.17 Added requirement for client notification of where client data has been affected must be made within two weeks of completing investigation in section 9.4.1

27.3.18 Added requirement for environmental monitoring for lead to section 13.1.1

27.3.19 Updated the accreditation logo and name policy in section 16.0.

27.3.20 Replaced "QAzilla" with "corrective action request" in sections referencing work out of spec or corrective actions, etc.

27.4 Revision 12, March 2017

27.4.1 Updated Western and Central Regional Director name on cover page.

27.4.2 Updated EMLAP, IHLAP and ELLAP Technical Manager requirements.

27.4.3 Added that reporting limits are listed on final reports where applicable in section 5.11

27.4.4 Added if available to the requirement for NIST reference materials in section 12.8.2.c.

27.5 Revision 13, May 2018

27.5.1 QA Manual template conversion from EMLab P&K template to TestAmerica corporate template/structure.

27.5.2 Addition of lab manager role in personnel section

27.5.3 Addition of notification requirements for laboratory changes.

27.6 Revision 14, September 2018

27.6.1 Revision updates to address changes related to ISO 17025:2017 updates

27.6.2 Restoration of “Accreditation and Logo Advertising Policy”

27.7 Revision 15, September 2019

27.7.1 Revision updates to address rebranding to Eurofins TestAmerica and Eurofins EMLab P&K

27.7.2 Removal of Technical Manager approval requirements for annual QA Manual revision in Sec. 3.4.1.

27.7.3 Sec. 18.2 - Added paragraph 6 regarding the requirement concerning management of environmental conditions when work is being performed offsite.

27.7.4 Sec. 20.3.1, Correction to working weight verification schedule.

27.7.5 Updated Table 20-1 to reflect updated calibration frequency for biological safety cabinets.

27.7.6 Updated Org charts, Figure 4-1

27.7.7 Updated Revision History section to reflect and support technical record retention period.

27.8 Revision 16, October 2020

27.8.1 Revision updates to address continued rebranding, and updating references to ‘corporate’ as “NDSC’

27.8.2 Revisions to address changes to NDSC QAM template guidance, including section re-organization, table relocations to appendices.

27.8.3 Revisions to update Org Charts.

27.8.4 Removal of floor plans.

27.8.5 Added Section 4.1.1, Selection of Personnel

27.8.6 Addition of Section 4.3.10 for combined QA Assistant / EHSC role

27.8.7 Revisions to address deployment of personnel in additional network facilities, Sections 5.1, 5.3, and 17.1.5.

27.8.8 Revisions to address risks and opportunities in Section 14.3.2

27.8.9 Revisions to clarify processes for vendor/supplier evaluations, purchasing.

27.8.10 Revisions to include policy on deployment of analysts across network facilities, as well as related policies on PT participation.

27.8.11 Update to Client Confidentiality, Section 25.5 to include notification for information in public domains.

27.8.12 Reference QAzilla # 11048 for revision/approval process details.

Appendix 1.

List of Governing Documents applicable to the QA Manual

(NDSC, KDG and Laboratory SOPs and Policies)

NDSC Doc. No.	Title
CA-C-S-001	Work Sharing Process
CA-I-P-002	Electronic Reporting and Signature Policy
CA-L-P-002	Contract Compliance Policy
CA-Q-M-002	Corporate Quality Management Plan
CA-Q-S-001	Acid and Solvent Lot Testing and Approval Program
CA-Q-S-002	Manual Integrations-
CA-Q-S-006	Detection and Quantitation Limits
CA-Q-S-009	Root Cause Analysis
CA-T-P-001	Qualified Products List
CW-E-M-001	Corporate Environmental Health & Safety Manual
CW-F-P-002	Company-Wide Authorization Matrix
CW-F-P-004	Procurement and Contracts Policy
CW-F-S-007	Fixed Asset Acquisition, Retention and Safeguarding
CW-I-M-001	IT Change Control Procedure Manual
CW-L-P-001	Records Retention Policy
CW-L-P-004	Ethics Policy
CW-L-S-002	Internal Investigation
CW-Q-S-001	Corporate Document Control and Archiving
CW-Q-S-002	Writing a Standard Operating Procedure (SOPs)
CW-Q-S-003	Internal Auditing
CW-Q-S-004	Management Systems Review
CW-Q-S-005	Data Recall Process
CW-Q-S-001	Corporate Document Control and Archiving

Referenced Laboratory SOPs

Eurofins EMLab P&K Doc. No.	Title
EM-QA-S-2059	Document Control & Updating (Document Control and Control of Records, Sec. 3.4.1)
EM-CS-S-1709	Complaint Resolution (Resolving Client Concerns and Soliciting Client Feedback, Sec .10.1)
EM-QA-S-2059	Data Scanning (Document Control and Control of Records – Sec. 14.1.4)
EM-AD-S-1646 EM-AD-S-1261	Lab Training (General Training, Asbestos Analysis Training, Sec. 17.3)
EM-QA-S-2059	Writing SOPs (Document Control and Control of Records, Sec. 19.2)
EM-AD-S-1646 EM-AD-S-3548 EM-AD-S-1619	DOCs (General Training, Selection and Validation of Analytical Methods, Nonstandard Methods for Analysis Sec. 19.4.2)
EM-QA-S-1994 EM-QA-S-1259	MDLs (Quality Control for Sample Analysis, Quality Control for Asbestos Analysis, Sec. 19.7)
EM-AD-S-1601 EM-AD-S-1884	MI (Laboratory Service Management, QAzilla and LabServe Enhancement Procedure, Sec. 19.14.1)
EM-SM-S-1288 EM-SM-S-1993	Sample Receipt / Login, etc… (Sample Receiving, Sample Log In, Sec. 23.2.1.3)

Appendix 2.

Laboratory Certifications, Accreditations, Validations

Eurofins EMLab P&K maintains accreditations, certifications, and approvals with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, Standard Operating Procedures, Method Detection Limits, training records, etc. Details of accreditation/ certification/licensing, including accredited parameter lists are available for each program at www.emlab.com under "Accreditations".

Appendix 3.

References used to prepare the QA Manual

The QAM has been prepared to be consistent with the requirements of the following documents:

- ANSI/ASQC, E4-1994, "Specifications and Guidelines for Quality Management Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995, or most recent version)
- "EPA Requirements for Quality Management Programs" (QA/R-2) (EPA/240/B-01/002, May 31, 2006).
- EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories,* EPA, March 1979.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846), Third Edition, September 1986, Final Update I, July 1992, Final Update IIA, August 1993, Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IV, January 2008; Final Update V, August 2015.*
- Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261.
- *Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005) (DW labs only)*
- APHA, *Standard Methods for* the Examination of Water and Wastewater, 18th Edition, 19th, 20th, 21st, 22nd and on-line Editions.
- Marine Protection, Research, and Sanctuaries Act (MPRSA).
- Toxic Substances Control Act (TSCA).
- AIHA-LAP, LLC Accreditation Policy Modules,Rev 14
- NIST NVLAP Handbooks 150, Procedures and General Requirements (2020) and 150-3, Bulk Asbestos Analysis (2018-07)

Appendix 4.

Glossary/Acronyms (EL-V1M2 Sec. 3.1)

Glossary:

Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory.

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (QAMS)

Analyst: The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

Analytical Uncertainty: A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis. (TNI)

Anomaly: A condition or event, other than a non-conformance, that may affect the quality of the data, whether in the laboratory's control or not.

Asbestos Definitions

- Limit of Quantitation: The Limit of Quantitation is 1%.
- Less than One Percent (<1%): When the Laboratory reports a value of <1% using Calibrated Visual Area Estimation, this indicates that asbestos is present in an amount between trace and 0.99%, but cannot be accurately quantified at that level unless a 400 Point Count is performed.
- Non-Detected (ND): The Laboratory reports "Non-Detected" when the laboratory homogenizes the sample in some way or analyzes a sufficient number of sub-samples to obtain a representative analysis whereby no asbestos fibers have been detected in any sub-sample preparations
- Trace: When reporting the results of asbestos analyses using Calibrated Visual Area Estimation that are below the Laboratory's Limit of Quantitation, the Laboratory does not refer to or use the term "Trace"; the Laboratory reports the results as <1%. However, on occasion, samples can contain a "Trace" amount of asbestos. The term "Trace" means that asbestos was found to be present in the sample, but at a level below the minimum concentration needed to quantify at the reporting limit of 0.25% via a 400 Point Count (performed only by client request).

Assessment: The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of laboratory accreditation). (TNI)

Audit: A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. (TNI)

Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one (1) to twenty (20) environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be twenty-four (24) hours. An **analytical batch** is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include

prepared samples originating from various quality system matrices and can exceed twenty (20) samples. (TNI)

Bias: The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (TNI)

Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (ASQC)

Calibration: A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. (TNI)

1) In calibration of support equipment the values realized by standards are established through the use of reference standards that are traceable to the International System of Units (SI).

2) In calibration according to methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the laboratory with a certificate of analysis or purity, or prepared by the laboratory using support equipment that has been calibrated or verified to meet specifications.

Calibration Curve: The mathematical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (TNI)

Calibration Standard: A substance or reference material used to calibrate an instrument (QAMS)

Certified Reference Material (CRM): A reference material accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute. (TNI)

Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; the collector; time of collection; preservation; and requested analyses. (TNI)

Compromised Samples: Those samples which are improperly sampled, insufficiently documented (chain of custody and other sample records and/or labels), improperly preserved, collected in improper containers, or exceeding holding times when delivered to a laboratory. Under normal conditions, compromised samples are not analyzed. If emergency situation require analysis, the results must be appropriately qualified.

Confidential Business Information (CBI): Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products. TNI and its representatives agree to safeguard identified CBI and to maintain all information identified as such in full confidentiality.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to Second Column Confirmation; Alternate wavelength; Derivatization; Mass spectral interpretation; Alternative detectors or Additional Cleanup procedures. (TNI)

Conformance: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)

Correction: Actions necessary to correct or repair analysis specific non-conformances. The acceptance criteria for method specific QC and protocols as well as the associated corrective actions. The analyst will most frequently be the one to identify the need for this action as a result of calibration checks and QC sample analysis**.** No significant action is taken to change behavior, process or procedure.

Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)

Daily Reference: A reference sample with a known or accepted quantity of analyte(s) of interest used as a daily calibration standard to verify accuracy.

Data Audit: A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data re of acceptable quality (i.e., that they meet specified acceptance criteria).

Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collation into a more useable form. (TNI)

Deficiency/ Non-conformance: An unauthorized deviation from acceptable procedures or practices, or a defect in an item (ASQC), whether in the laboratory's control or not.

Demonstration of Capability: A procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision. (TNI)

Document Control: The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly, and controlled to ensure use of the correct version at the location where the prescribed activity if performed. (ASQC)

Duplicate Analyses: The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory. (EPA-QAD)

Equipment Blank: Sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

External Standard Calibration: Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.

Field Blank: Blank prepared in the field by filing a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken (EPA OSWER)

Field of Accreditation: Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation.

Holding Times: The maximum time that samples may be held prior to analyses and still be considered valid or not compromised. (40 CFR Part 136)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical test method. (TNI)

Internal Standard Calibration: Calibrations for methods that utilize internal standards to compensate for changes in instrument conditions.

Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)

Instrument Detection Limit (IDL): The minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in its derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is ± 100%. The IDL represents a range where qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes, taken through all preparation and analysis steps of the procedure unless otherwise noted in a reference method. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

An LCS shall be prepared at a minimum of 1 per batch of 20 or less samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The results of these samples shall be used to determine batch acceptance.

Least Squares Regression (1st Order Curve): The least squares regression is a mathematical calculation of a straight line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The regression calculation will generate a correlation coefficient (r) that is a measure of the "goodness of fit" of the regression line to the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r must be greater than or equal to 0.99 for organics and 0.995 for inorganics.

Limit(s) of Detection (LOD) [a.k.a., Method Detection Limit (MDL)]: The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017.

Limit(s) of Quantitation (LOQ) [a.k.a., Reporting Limit]: The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.

(QS) Matrix: The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions shall be used:

Aqueous: Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, groundwater effluents, and TCLP or other extracts.
Drinking Water: Any aqueous sample that has been designated as a potable or potential potable water source.
Saline/Estuarine: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.
Non-Aqueous Liquid: Any organic liquid with <15% settleable solids.
Biological Tissue: Any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.
Solids: Includes soils, sediments, sludges, and other matrices with >15% settleable solids.
Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Air & Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbant tube, impinger solution, filter, or other device. (TNI)

Matrix Spike (spiked sample or fortified sample): A sample prepared, taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a referenced method, by adding a known amount of target analyte to a specified amount of sample for which an independent test result of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (spiked sample or fortified sample duplicate): A replicate matrix spike prepared and analyzed to obtain a measure of the precision of the recovery for each analyte.

Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

Method Detection Limit: See Limit of Detection (LOD)-

Negative Control: Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.

Non-conformance: An indication, judgment, or state of not having met the requirements of the relevant specifications, contract, or regulation.

Observation: A record of phenomena that (1) may assist in evaluation of the sample data; (2) may be of importance to the project manager and/or the client, and yet not at the time of the observation have any known effect on quality.

Performance Audit: The routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory.

Positive Control: Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (TNI)

Preservation: Any conditions under which a sample must be kept in order to maintain chemical and/or biological integrity prior to analysis. (TNI)

Proficiency Testing: A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (TNI)

Proficiency Testing Program: The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (TNI)

Proficiency Test Sample (PT): A sample, the composition of which is unknown to the laboratory and is provided to test whether the laboratory can produce analytical results within specified acceptance criteria. (TNI)

Quality Assurance: An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item or service is of the type of quality needed and expected by the client. (TNI)

Quality Assurance [Project] Plan (QAPP): A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EAP-QAD)

Quality Control: The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against “out of control” conditions and ensuring that the results are of acceptable quality. (TNI)

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking, intended to demonstrate that a measurement system or activity is in control. (TNI)

Quality Manual: A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users. (TNI)

Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC activities. (TNI)

Raw Data: The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records. (TNI)

Record Retention: The systematic collection, indexing and storing of documented information under secure conditions.

Reference Material: Material or substance one or more properties of which are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (TNI)

Reference Standard: Standard used for the calibration of working measurement standards in a given organization or a given location. (TNI)

Sampling: Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure.

Second Order Polynomial Curve (Quadratic): The 2nd order curves are a mathematical calculation of a slightly curved line over two axis. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The 2nd order regression will generate a

coefficient of determination (COD or r^2) that is a measure of the "goodness of fit" of the quadratic curvature the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r^2 must be greater than or equal to 0.99.

Selectivity: The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent or that may behave similarly to the target analyte or parameter within the measurement system. (TNI)

Sensitivity: The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. (TNI)

Spike: A known mass of target analyte added to a blank, sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations procedures and policies. (TNI)

Standard Operating Procedures (SOPs): A written document which details the method for an operation, analysis, or action, with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks. (TNI)

Storage Blank: A blank matrix stored with field samples of a similar matrix (volatiles only) that measures storage contribution to any source of contamination.

Systems Audit (also Technical Systems Audit): A thorough, systematic, qualitative on-site assessment of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system. (EPA-QAD)

Technical Manager: A member of the staff of an environmental laboratory who exercises actual day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results

Technology: A specific arrangement of analytical instruments, detection systems, and/or preparation techniques.

Traceability: The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project. (TNI)

Trip Blank: A blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field, and returned to the laboratory in the shipping container with the field samples.

Uncertainty: A parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measured value.

Acronyms:

AIHA-LAP, LLC – AIHA Laboratory Accreditation Programs, LLC
CAR – Corrective Action Report
CCV – Continuing Calibration Verification
CF – Calibration Factor
CFR – Code of Federal Regulations

COC – Chain of Custody
DOC – Demonstration of Capability
DQO – Data Quality Objectives
DUP - Duplicate
EHS – Environment, Health and Safety
ELLAP (AIHA-LAP, LLC) - Environmental Lead Laboratory Accreditation Program
EMLAP (AIHA-LAP, LLC) – Environmental Microbiology Laboratory Accreditation Program
EPA – Environmental Protection Agency
GC - Gas Chromatography
GC/MS - Gas Chromatography/Mass Spectrometry
HPLC - High Performance Liquid Chromatography
ICP - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP/MS – ICP/Mass Spectrometry
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IHLAP (AIHA-LAP, LLC) – Industrial Hygiene Laboratory Accreditation Program
IS – Internal Standard
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LIMS – Laboratory Information Management System
LOD – Limit of Detection
LOQ – Limit of Quantitation
MDL – Method Detection Limit
MDLCK – MDL Check Standard
MDLV – MDL Verification Check Standard
MRL – Method Reporting Limit Check Standard
MS – Matrix Spike
MSD – Matrix Spike Duplicate
NYS DOH – New York State Department of Health
SDS - Safety Data Sheet
NELAP - National Environmental Laboratory Accreditation Program
NIST NVLAP – National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program
TCEQ – Texas Commission of Environmental Quality
TNI – The NELAC Institute
QAM – Quality Assurance Manual
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
REP – Replicate
RF – Response Factor
RPD – Relative Percent Difference
RSD – Relative Standard Deviation
SD – Standard Deviation
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

APPENDIX 9

Limited Asbestos Survey Report

Limited Asbestos Survey Report

Boys & Girls Club

525 W 9th Street
Hawthorne, Nevada 89415

Mineral County
Assessor's Parcel Number 001-061-04

Prepared For:
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Task: BC15-21
Category:54
Organizational Code: 5420
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BEC Project No. 018.17.001

Date June 30, 2021

bec environmental, inc.
Environmental Services

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STANDARD ABBREVIATIONS

ACBM	Asbestos-Containing Building Material
ACM	Asbestos-Containing Material
AHERA	Asbestos Hazards Emergency Response Act
APN	Assessor's Parcel Number
CFR	Code of Federal Regulations
COC	Chain of Custody
EPA	United States Environmental Protection Agency
HA	Homogeneous Area
ND	Non-Detect
NDEP	Nevada Division of Environmental Protection
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIST	National Institute for Standards and Technology
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PLM	Polarized Light Microscopy
RACM	Regulated Asbestos-Containing Material
TSI	Thermal System Insulation

COMMON UNITS OF MEASURE

ft^2	square feet

EXECUTIVE SUMMARY

The Nevada Division of Environmental Protection (NDEP) retained BEC Environmental, Inc. (BEC) to perform a limited asbestos survey of the of the Boys & Girls Club, at 525 West 9th Street, Hawthorne, Nevada 89415, located on Mineral Assessor's Parcel Number (APN) 001-061-04. The site consisted of a 2.58-acre parcel with an approximately 10,956-square-foot (ft^2) building listed by the County Assessor as "Detention Center" constructed in 1960 and one "outbuilding structure."

The limited asbestos survey was performed on June 8, 9, and 10, 2021, as part of a due diligence study of the property in preparation for potential renovations and transfer of the property from Mineral County to the Boys & Girls Club. The asbestos survey utilized the NDEP Brownfields Program Grant. The purpose of this investigation was to determine if any asbestos-containing materials (ACMs) existed in the accessible portions of the building at the time of the limited survey.

A total of 47 Homogeneous Areas (HAs) were identified during the visual assessment by a State of Nevada Licensed Asbestos Abatement Consultant and Building Inspector (Inspector). A total of 144 bulk ACM samples were collected and submitted to the Eurofins EMLab P&K (a TestAmerica Company) facility in Henderson, Nevada, under Chain of Custody (COC) protocol, for laboratory analysis of asbestos content. Based on a review of the laboratory analytical report, ACMs were identified in four HAs at the Boys & Girls Club building:

- EPA Category II Non-Friable ACM was identified in one HA:
    - BGA1: Rainbow Speckled Tile w/ Black Mastic
- EPA defined Friable ACM (Regulated ACM – RACM) was identified in three HAs:
    - BGA7: Yellow Air Unit Insulation
    - BGA16: White Fabric Pipe Insulation
    - BGA25: White Fabric Coated Pipe Insulation

1 INTRODUCTION

The Nevada Division of Environmental Protection (NDEP) retained BEC Environmental, Inc. (BEC) to perform a limited asbestos survey of the Boys & Girls Club, at 525 West 9th Street, Hawthorne, Nevada 89415, located on Mineral Assessor's Parcel Number (APN) 001-061-04. The site consisted of a 2.58-acre parcel with an approximately 10,956-square-foot (ft^2) building listed by the Mineral County Assessor as "Detention Center" constructed in 1960 and one "outbuilding structure."

The survey was performed by an Inspector accredited through the Nevada Department of Business and Industry, Division of Industrial Relations, Occupational Safety and Health Administration (OSHA). The purpose of this survey was to evaluate the location, condition, and quantity of asbestos-containing material (ACM) with an asbestos content greater than one percent (1%) which could present a workplace safety hazard and/or require special handling and waste disposal as part of potential renovation activities. The subject site is located adjacent to Hawthorne Elementary School and adjoining properties included vacant land, residential properties, and the Lions Park as shown in **Figure 1 – Site Location Map** located in **Attachment 1: Site Maps**.

2 SAMPLING METHODOLOGY

Prior to sampling, a preliminary visual survey of the interior and exterior areas of the building was performed to identify Homogeneous Areas (HAs) of building materials suspected to contain asbestos. HAs are defined as: "an area of surfacing material, thermal system insulation material (TSI), or miscellaneous material that is uniform in color and texture" (EPA, 1994). During the preliminary survey, assessments were made as to the relative condition of the building and to evaluate the presence of suspect friable materials. A friable material is defined under the Asbestos Hazards Emergency Response Act (AHERA) as "any asbestos-containing material applied on ceilings, walls, structural members, piping, duct work, or any other part of a building which when dry may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes nonfriable asbestos-containing material after such previously nonfriable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure" (AHERA, 2009). Friable asbestos material is defined under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) as "any material containing more than one percent (1%) asbestos as determined using the method specified in Appendix E, Subpart E, 40 Code of Federal Regulations (CFR) part 736, Section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure" (NESHAP, 1990).

The sampling strategy followed the sampling protocol consistent with AHERA (40 CFR 763.86), with primary emphasis on following the "3-5-7 Rule" for friable materials, which states:

> (1) At least three (3) bulk samples shall be collected from each homogeneous area that is 1,000 [square feet] sq. ft. or less, except as provided in 763.87(c)(2).
>
> (2) At least five (5) bulk samples shall be collected from each homogeneous area that is greater than 1,000 sq. ft. but less than or equal to 5,000 sq. ft., except as provided in 763.87(c)(2).
>
> (3) At least seven (7) bulk samples shall be collected from each homogenous area that is greater than 5,000 sq. ft., except as provided in 763.87(c)(2)" (EPA, 2012).

The accredited Inspector collected bulk samples from HAs in a manner sufficient to determine whether the material was ACM or not ACM, from all HAs assumed to contain asbestos. Once HAs were identified for each like material, a minimum of three representative samples of suspect ACM were collected from each area for analysis. Bulk samples of suspect ACM were collected by spraying the material with

amended water, where appropriate, removing a small portion of the material, and placing it into a labeled, resealable bag. All locations where suspect materials were sampled were identified on a building floor plan diagram with the identifying sample number, shown in **Figures 2, 3, and 4 – Samples**, located in **Attachment 1**.

Samples were handled with accepted procedures for the collection, packaging, COC documentation, and transport of bulk samples to a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory for analysis (EPA, 2012).

3 RESULTS

Kelly Sheehan, Inspector I-2166, performed the asbestos sampling survey on June 8, 9, and 10, 2021. Licensure certifications are included in **Attachment 2: Certifications**. All samples were submitted to Eurofins EMLab P&K (a TestAmerica Company), Henderson, Nevada, laboratory for analysis. Eurofins EMLab P&K Henderson was certified under the U.S. Department of Commerce National Institute of Standards and Technology (NIST) NVLAP. The lab certificate is included in **Attachment 2**. A total of 144 bulk samples of suspect ACM were collected and delivered to Eurofins EMLab P&K under COC protocol. A copy of the Eurofins EMLab P&K asbestos analytical laboratory report and COC forms are included in **Attachment 3: Laboratory Documentation**.

The HA samples, sample numbers, descriptions, and asbestos content are summarized in **Table 3-1**. Samples in **bold** were identified during laboratory analysis as asbestos-containing materials, i.e., contained more than 1% asbestos. **Figures 2, 3, and 4** in **Attachment 1** depict each sample location.

Note: It was determined HA BGA22 had already been collected under an earlier sample number (same HA), so this HA number was skipped in sample numbering.

Table 3-1: Polarized Light Microscopy (PLM) Analysis Results Summary

Description of HA Sampled	Sample Number	Layer Description	Asbestos Content (%)
Rainbow Speckled Tile w/ Black Mastic	BGA1-1	White Floor Tile	ND
		Yellow Mastic	ND
		Grey Leveling Compound	ND
	BGA1-2	White Floor Tile	ND
		Yellow Mastic	ND
	BGA1-3	White Floor Tile	ND
		Black Mastic	**5% Chrysotile**
Yellow Textured Pipe Insulation	BGA2-1	Yellow Insulation	ND
		White Paper w/ Silver Foil	ND
	BGA2-2	Yellow Insulation	ND
		White Paper w/ Silver Foil	ND
	BGA2-3	Yellow Insulation	ND
		White Paper w/ Silver Foil	ND
Red Rubber Wall Base w/ White Mastic	BGA3-1	Red Baseboard	ND
		Cream Mastic	ND
		White Mud	ND
	BGA3-2	Red Baseboard	ND
		White Mastic	ND
	BGA3-3	Red Baseboard	ND

		White Mastic	ND
Textured Wall Barrier	BGA4-1	White Semi-Fibrous Material	ND
		White Non-Fibrous Material	ND
	BGA4-2	White Semi-Fibrous Material	ND
		Off-White Mastic	ND
		White Mud	ND
	BGA4-3	White Semi-Fibrous Material	ND
		Off-White Mastic	ND
		White Mud	ND
White Drywall	BGA5-1	White Texture w/ Paint	ND
		White Fibrous Material	ND
		Brown Wood	ND
	BGA5-2	White Texture w/ Paint	ND
		White Drywall w/ Brown Paper	ND
	BGA5-3	White Texture w/ Paint	ND
		White Drywall w/ Brown Paper	ND
Brown Concrete	BGA6-1	Brown Concrete	ND
	BGA6-2	Brown Concrete	ND
	BGA6-3	Brown Concrete	ND
Yellow Air Unit Insulation	**BGA7-1**	Yellow Insulation	ND
		Black Tar w/ Paint	**3% Chrysotile**
	BGA7-2	Yellow Insulation	ND
		Black Tar w/ Paint	**3% Chrysotile**
	BGA7-3	Yellow Insulation	ND
		Black Tar w/ Paint	**3% Chrysotile**
Grey Cinder Block w/ Mortar	BGA8-1	Gray Block	ND
		Gray Mortar	ND
	BGA8-2	Gray Block	ND
		Gray Mortar	ND
	BGA8-3	Gray Block	ND
		Gray Mortar	ND
	BGA8-4	Gray Block	ND
		Gray Mortar	ND
	BGA8-5	Gray Block	ND
		Gray Mortar	ND
	BGA8-6	Gray Block	ND
		Gray Mortar	ND
Teal/White Painted Plaster	BGA9-1	White Texture w/ Paint	ND
	BGA9-2	White Texture w/ Paint	ND
	BGA9-3	White Texture w/ Paint	ND
Gray Carpet	BGA10-1	Gray Carpet	ND
		Cream Mastic	ND
	BGA10-2	Gray Carpet	ND
		Cream Mastic	ND
	BGA10-3	Gray Carpet	ND
		Cream Mastic	ND
Gray Rubber Wall Base w/ Yellow Mastic	BGA11-1	Gray baseboard	ND
		Yellow Mastic	ND
	BGA11-2	Gray Baseboard	ND

		Yellow Mastic	ND
	BGA11-3	Gray Baseboard	ND
		Yellow Mastic	ND
White Ceiling Tile	BGA12-1	White Ceiling Tile with White Surface	ND
	BGA12-2	White Ceiling Tile with White Surface	ND
	BGA12-3	White Ceiling Tile with White Surface	ND
Smooth Drywall	BGA13-1	White Drywall with Brown Paper	ND
	BGA13-2	White Drywall with Brown Paper and Paint	ND
	BGA13-3	White Drywall with Brown Paper and Paint	ND
Gray Concrete	BGA14-1	Gray Concrete	ND
	BGA14-2	Gray Concrete	ND
	BGA14-3	Gray Concrete	ND
Yellow Foam	BGA15-1	Yellow Foam	ND
	BGA15-2	Yellow Foam	ND
	BGA15-3	Yellow Foam	ND
White Fabric Pipe Insulation	BGA16-1	White Insulation	ND
	BGA16-2	White Insulation	ND
	BGA16-3	**White Insulation**	**3% Amosite 2% Crocidolite**
White/Black Pipe Fabric Pipe Insulation	BGA17-1	White Insulation	ND
		Brown Paper	ND
		Black Tar w/ Silver Foil	ND
	BGA17-2	White Insulation	ND
		Brown Paper	ND
		Black Tar w/ Silver Foil	ND
	BGA17-3	White Insulation	ND
		Brown Paper	ND
		Black Tar w/ Silver Foil	ND
Light Gray Cinder Block w/ Mortar	BGA18-1	Gray Block	ND
		Gray Mortar	ND
	BGA18-2	Gray Block	ND
		Gray Mortar	ND
	BGA18-3	Gray Block	ND
		Gray Mortar	ND
Light Gray Concrete	BGA19-1	Gray Concrete	ND
	BGA19-2	Gray Concrete	ND
	BGA19-3	Gray Concrete	ND
White Textured Drywall	BGA20-1	White Drywall w/ Brown Paper	ND
	BGA20-2	White Texture w/ Paint	ND
		White Drywall w/ Brown Paper	ND
	BGA20-3	White Texture w/ Paint	ND
		White Drywall w/ Brown Paper	ND
Light Blue Tile w/ Brown Mastic	BGA21-1	Blue Floor Tile	ND

		Yellow Mastic	ND
	BGA21-2	Blue Floor Tile	ND
		Yellow Mastic	ND
	BGA21-3	Blue Floor Tile	ND
		Yellow Mastic	ND
No sample BGA22			
Tan Sink Mastic	BGA23-1	Tan Mastic	ND
	BGA23-2	Tan Mastic	ND
	BGA23-3	Tan Mastic	ND
White Textured Ceiling	BGA24-1	White Texture w/ Paint	ND
		White Tape	ND
		White Joint Compound	ND
		White Drywall w/ Brown Paper	ND
	BGA24-2	White Texture w/ Paint	ND
		White Drywall w/ Brown Paper	ND
	BGA24-3	White Texture w/ Paint	ND
		White Drywall w/ Brown Paper	ND
White Fabric Coated Pipe Insulation	**BGA25-1**	**White Insulation**	**5% Amosite 2% Crocidolite**
	BGA25-2	**White Insulation**	**5% Amosite 2% Crocidolite**
	BGA25-3	**White Insulation**	**5% Amosite 2% Crocidolite**
Yellow Foam w/ Silver Lining	BGA26-1	Yellow Foam	ND
		Brown Paper w/ Silver Foil	ND
	BGA26-2	Yellow Foam	ND
		Brown Paper w/ Silver Foil	ND
	BGA26-3	Yellow Foam	ND
		Brown Paper w/ Silver Foil	ND
Red Shingles w/ Black Mastic	BGA27-1	Black Roofing Shingle w/ Red Pebbles	ND
		Black Mastic	ND
	BGA27-2	Black Roofing Shingle w/ Red Pebbles	ND
		Black Mastic	ND
	BGA27-3	Black Roofing Shingle w/ Red Pebbles	ND
		Black Mastic	ND
Drywall w/ Brown Paper	BGA28-1	White Drywall w/ Brown Paper	ND
	BGA28-2	White Drywall w/ Brown Paper	ND
	BGA28-3	White Drywall w/ Brown Paper	ND
Sidewalk Cement	BGA29-1	Gray Cementitious Material	ND
	BGA29-2	Gray Cementitious Material	ND
	BGA29-3	Gray Cementitious Material	ND
Asphalt	BGA30-1	Black Asphalt	ND
	BGA30-2	Black Asphalt	ND
	BGA30-3	Black Asphalt	ND
Smooth Ceiling	BGA31-1	White Drywall w/ Brown Paper & Paint	ND

	BGA31-2	White Drywall w/ Brown Paper & Paint	ND
	BGA31-3	White Drywall w/ Brown Paper & Paint	ND
Grey Patch Cement Material	BGA32-1	Gray Cementitious Material	ND
	BGA32-2	White Mud w/ Paint	ND
		Gray Cementitious Material	ND
	BGA32-3	White Mud w/ Paint	ND
		Gray Cementitious Material	ND
Grey Painted Concrete	BGA33-1	Gray Concrete	ND
	BGA33-2	Gray Concrete	ND
	BGA33-3	Gray Concrete	ND
Concrete Filler	BGA34-1	Gray Concrete Filler	ND
	BGA34-2	Gray Concrete Filler	ND
	BGA34-3	Gray Concrete Filler	ND
White Tile w/ Mortar and Grey Mastic	BGA35-1	White Tile	ND
		Gray Mortar	ND
		Gray Mastic	ND
	BGA35-2	White Tile	ND
		Gray Mortar	ND
		Gray Mastic	ND
	BGA35-3	White Tile	ND
		Gray Mortar	ND
		Gray Mastic	ND
Grey Tile w/ Mortar and Mastic	BGA36-1	Gray Tile	ND
		Gray Mortar	ND
		Cream Mastic	ND
	BGA36-2	Gray Tile	ND
		Gray Mortar	ND
		Cream Mastic	ND
	BGA36-3	Gray Tile	ND
		Gray Mortar	ND
		Cream Mastic	ND
Light Grey Tile w/ Mortar and Mastic	BGA37-1	Light Gray Tile	ND
		Gray Mortar	ND
		Cream Cementitious Material	ND
		White Mud	ND
	BGA37-2	Light Gray Tile	ND
		Gray Mortar	ND
		Cream Cementitious Material	ND
		White Mud	ND
	BGA37-3	Light Gray Tile	ND
		Cream Mastic	ND
Yellow Foam	BGA38-1	Yellow Foam	ND
	BGA38-2	Yellow Foam	ND
	BGA38-3	Yellow Foam	ND
White Mastic	BGA39-1	White Mastic	ND
	BGA39-2	White Mastic	ND
	BGA39-3	White Mastic	ND

White Window Sealant	BGA40-1	White Sealant	ND
	GBA40-2	White Sealant	ND
	BGA40-3	White Sealant	ND
White Styrofoam Insulation	BGA41-1	White Foam	ND
	GBA41-2	White Foam	ND
	BGA41-3	White Foam	ND
Cream Stucco and Cement	BGA42-1	Cream Stucco	ND
		Gray Cementitious Material	ND
	BGA42-2	Cream Stucco	ND
		Gray Cementitious Material	ND
	BGA42-3	Cream Stucco	ND
		Gray Cementitious Material	ND
Yellow Foam II	BGA43-1	Yellow Foam	ND
	BGA43-2	Yellow Foam	ND
	BGA43-3	Yellow Foam	ND
Yellow Rubber Mat w/ Yellow Mastic	BGA44-1	Yellow Flooring	ND
		Yellow Mastic	ND
	BGA44-2	Yellow Flooring	ND
		Yellow Mastic	ND
	BGA44-3	Yellow Flooring	ND
		Yellow Mastic	ND
Yellow/White Duct Insulation	BGA45-1	White Non-Fibrous Material	ND
		Yellow Insulation	ND
	BGA45-2	White Non-Fibrous Material	ND
		Yellow Insulation	ND
	BGA45-3	White Non-Fibrous Material	ND
		Yellow Insulation	ND
Black Rubber Material w/ Adhesive	BGA46-1	Black Non-Fibrous Material	ND
		White Adhesive	ND
	BGA46-2	Black Non-Fibrous Material	ND
		White Adhesive	ND
	BGA46-3	Black Non-Fibrous Material	ND
		White Adhesive	ND
Grey Adhesive	BGA47-1	Gray Adhesive	ND
	BGA47-2	Gray Adhesive	ND
	BGA47-3	Gray Adhesive	ND
White Tarp and Roofing Layers	BGA48-1	White Semi-Fibrous Material	ND
		Gray Fibrous Material	ND
		Yellow Foam	ND
	BGA48-2	White Semi-Fibrous Material	ND
		Gray Fibrous Material	ND
		Yellow Foam	ND
	BGA48-3	White Semi-Fibrous Material	ND
		Gray Fibrous Material	ND
		Yellow Foam	ND

Note: ND indicates asbestos was not detected in the sample layer.

4 CONCLUSIONS

BEC performed a limited asbestos survey of the Boys & Girls Club building, located on Mineral APN 001-061-04, at 525 West 9th Street, Hawthorne, Nevada 89415. A total of 144 bulk suspect ACM samples were collected from 47 HAs and submitted to Eurofins EMLab P&K (a TestAmerica Company) for laboratory analysis of asbestos content. Maps depicting each sample location are in **Attachment 1, Figure 2 – Main Building ACM Samples**, **Figure 3 – Gym ACM Samples**, and **Figure 4 – Outside and Roof ACM Samples**. Based on the preliminary site survey and a review of the laboratory analytical report, the following building materials were confirmed to contain asbestos greater than 1% of content:

Table 4-1: Asbestos-Containing Materials

Homogeneous Area	Sample IDs	Asbestos Content	EPA Category	OSHA Class[1]	Approximate Quantity[2]	Condition[3]
Rainbow Speckled Tile w/ Black Mastic	BGA1-3	5% Chrysotile	Category II	Class II	2,711ft^2	Occasional
	Layers of white, rainbow speckled tile, yellow mastic and black mastic floor system located in Hallway 1 and 2, the Entryway, A, B, C, and D Rooms, the Teen Room, the Kitchen, and Kitchen Storage. **Asbestos content found in the black mastic layer which was only observed in B Room but cannot be assumed to not be present under the Rainbow Speckled Tile in all other rooms.**					
Yellow Air Unit Insulation	BGA7-1 BGA7-2 BGA7-3	3% Chrysotile	Category II	Class II	36ft^2	Occasional
	Layers of yellow insulation and black tar with paint observed in the air units located in the northwest and southeast corners of the gym. **Asbestos content found in the black tar with paint layer.**					
White Fabric Pipe Insulation	BGA16-3	3% Amosite 2% Crocidolite	RACM Friable Asbestos Material	Friable Asbestos Material	40ft^2	Occasional
	White insulation coating pipes located in the Boiler Room. Only sample 3 from HA 16 was determined to contain asbestos, however, since all the White Fabric Pipe Insulation in the Boiler Room appears the same, all White Fabric Pipe Insulation in the Boiler Room should be assumed to contain asbestos.					
White Fabric Coated Pipe Insulation	BGA25-1 BGA25-2 BGA25-3	5% Amosite 2% Crocidolite	RACM Friable Asbestos Material	Friable Asbestos Material	300ft^2	Occasional
	White insulation coating pipes located in the Entryway, Hallway 1 and 2, the Kitchen, Kitchen Storage, the Boiler Room, Pat's Office, the Teen Room, the Janitor's Closet, and the B and D Rooms.					

[1]The most restrictive OSHA class is listed. OSHA classification is dependent on the management activity selected such that Class I is removal of TSI, Class II is removal of other ACM, Class III is repair and maintenance work, and Class IV is custodial activities related to ACM waste and debris.
[2]Areas provided are approximations based on observations during the site survey and should not be used for asbestos abatement bid specifications.

[3]The "Condition" of sample areas is determined by the certified assessment professional based on the AHERA terms for damage severity. A listing of "Major" damage indicates material damage greater than or equal to 160 ft^2 or 260 linear feet. A condition listed as "Severe" indicates material damage greater than 25 ft^2 or 10 linear feet, but less than 160 ft^2 or 260 linear. Material damage listed as "Occasional" occurs at irregular or infrequent intervals.

In accordance with Section 112 of the Clean Air Act, the EPA established the NESHAP. The National Emission Standard for Asbestos under NESHAP provides standards for demolition and renovation under 40 CFR Part 61 Subpart M Section 61.145 – Standard for Demolition and Renovation (NESHAP, 2011). EPA Category I nonfriable ACM includes asbestos-containing packages, gaskets, resilient floor coverings, and asphalt roofing products containing more than 1% asbestos as determined using the method specified in Appendix E, Subpart E, 40 CFR Part 763, Section 1, PLM. EPA Category II nonfriable ACM means any material, excluding Category I nonfriable ACM, containing more than 1% asbestos as determined using the methods specific in Appendix E, Subpart E, 40 CFR Part 763, Section 1, PLM that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

RACM is defined as (a) friable asbestos material, (b) EPA Category I nonfriable ACM that has become friable, (c) EPA Category I nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) standard Category II nonfriable 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 regulated by this subpart.

"Damaged friable miscellaneous ACM means friable miscellaneous ACM which has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or, if applicable, which has delaminated such that its bond to the substrate (adhesion) is inadequate or which for any other reason lacks fiber cohesion or adhesion qualities. Such damage or deterioration may be illustrated by the separation of ACM into layers; separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM surface; water damage; significant or repeated water stains, scrapes, gouges, mars or other signs of physical injury on the ACM. Asbestos debris originating from the [Asbestos-containing building material] ACBM in question may also indicate damage" (AHERA, 2009).

"Damaged friable surfacing ACM means friable surfacing ACM which has deteriorated or sustained physical injury such that the internal structure (cohesion) of the material is inadequate or which has delaminated such that its bond to the substrate (adhesion) is inadequate, or which, for any other reason, lacks fiber cohesion or adhesion qualities. Such damage or deterioration may be illustrated by the separation of ACM into layers; separation of ACM from the substrate; flaking, blistering, or crumbling of the ACM surface; water damage; significant or repeated water stains, scrapes, gouges, mars or other signs of physical injury on the ACM. Asbestos debris originating from the ACBM in question may also indicate damage" (AHERA, 2009).

RACM must be properly removed by a trained professional prior to demolition or renovation activities. Anyone working on the project should be made aware concealed ACM may be found during cleanup or demolition. Workers should be advised not to disturb known or suspect ACM without approval by a competent person as defined under 29 CFR 1926.1101(b). Any concealed building materials discovered during demolition or renovation activities, which are suspected to contain asbestos, should be sampled and analyzed to confirm the presence or absence of asbestos prior to disturbance and/or disposal, or treated as ACM.

ACM is regulated by OSHA under 29 CFR 1926.1101, which regulates asbestos exposure for the following activities:

- Demolishing or salvaging structures where asbestos is present
- Removing or encapsulating ACM

- Constructing, altering, repairing, maintaining, or renovating asbestos-containing structures or substances
- Installing asbestos-containing products
- Cleaning up asbestos spills/emergencies
- Transporting, disposing, storing, containing, and housekeeping involving asbestos or asbestos-containing products on a construction site

The OSHA standard does not apply to asbestos-containing asphalt roof coatings, cements, and mastics (OSHA, 2002).

OSHA Class I asbestos work involves removal of asbestos-containing TSI and sprayed-on or troweled on surfacing materials. OSHA Class II asbestos work includes the removal of other types of ACM that are not TSI such as resilient floor covering and roofing materials. OSHA Class III asbestos work includes repair and maintenance operations where ACM or presumed ACM are disturbed. OSHA Class IV asbestos work includes custodial activities where employees clean up asbestos-containing waste and debris produced by construction, maintenance, or repair activities (OSHA, 2002). Determining the OSHA ACM Class depends on the redevelopment activities of the site.

If Class I asbestos activities involving the removal of ACM is selected, then it should be conducted within regulated areas, as defined in OSHA Safety and Health Regulations for Construction 1926.1101(e), with work done by a certified abatement professional. Control methods, safety regulation, and supervision by one qualified under OSHA General Safety and Health Provisions for Construction (29 CFR Part 1926.20) must be ensured by the employer. If Class II asbestos activities involving the removal of ACM is selected, the same work practices and requirements may apply as in Class I asbestos work. However, some Class II asbestos work has practices for specific jobs, such as removal of roofing materials. If Class III or IV asbestos work is selected, maintenance and/or repair of any ACM must be done by employees whose Class III or IV asbestos training is consistent with EPA's Model Accreditation Plan (40 CFR 763) (OSHA, 2002).

5 LIMITATIONS

The environmental services described in this report have been conducted in general accordance with current regulatory guidelines and the standard of care exercised by environmental consultants performing similar work in the State of Nevada. No other warranty, expressed or implied, is made regarding the professional opinions presented in this report. This document is intended to be used in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. NDEP or BEC should be contacted if the reader requires any additional information or has questions regarding the content, interpretations presented, or completeness of this document. The survey was limited to the areas sampled and the number of samples collected. Findings are limited to the conditions and results reported for the time the limited survey was completed. The conclusions and recommendations regarding environmental conditions presented in this report are based on a scope of work authorized by the Client. Note, however, virtually no scope of work, no matter how exhaustive, can identify all site contaminants or conditions.

It should be understood the conditions of a site can change with time as a result of natural processes or human activities at the subject site. Additionally, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which neither NDEP nor BEC has any control. Neither NDEP nor BEC can warrant or guarantee that the absence of additional indicators of hazardous materials definitively means that other hazardous materials do not exist on the site.

Sincerely,

Kelly Sheehan 6/30/2021

Kelly Sheehan — Date
Environmental Scientist
Nevada Asbestos Inspector I-2166, expires 10/22/2021

Erika Balderson 6/30/2021

Erika Balderson — Date
Senior Environmental Scientist
Nevada Asbestos Inspector I-1991, expires 03/05/2022

6 REFERENCES

AHERA. (2009). *Subchapter II - Asbetsos Hazard Emergency Response Act.* Retrieved 2021, from Government Publishing Office: https://www.gpo.gov/fdsys/pkg/USCODE-2009-title15/html/USCODE-2009-title15-chap53-subchapII.htm

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EPA. (2012, July). *Section 763.86 - Sampling.* Retrieved 2021, from Title 40 Chapter I Subchapter R Part 763 - Asbestos Subpart E Asbestos in Schools: https://www.govinfo.gov/app/details/CFR-2012-title40-vol32/CFR-2012-title40-vol32-sec763-86

NESHAP. (1990). *Subpart M - Naitonal Emission Standard for Asbestos.* Retrieved 2021, from US Government Publishing Office: https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=5682f19deb490dddbf305a72120607c8&mc=true&n=sp40.10.61.m&r=SUBPART&ty=HTML

NESHAP. (2011, July 1). *40 CFR 61.145 - Standard for Demolition and Renovation.* Retrieved 2021, from U.S. Government Publishing Office: https://www.gpo.gov/fdsys/granule/CFR-2011-title40-vol8/CFR-2011-title40-vol8-sec61-145

OSHA. (2002). *Asbestos Standard for the Construction Industry.* Retrieved 2021, from Occupational Safety and Health Administration: https://www.osha.gov/Publications/osha3096.pdf

ATTACHMENT 1

Site Maps

Figure **1** - **Site Location Map**

Boys & Girls Club
525 W 9th Street
Hawthorne, NV 89415

bec environmental, inc.
Environmental Services

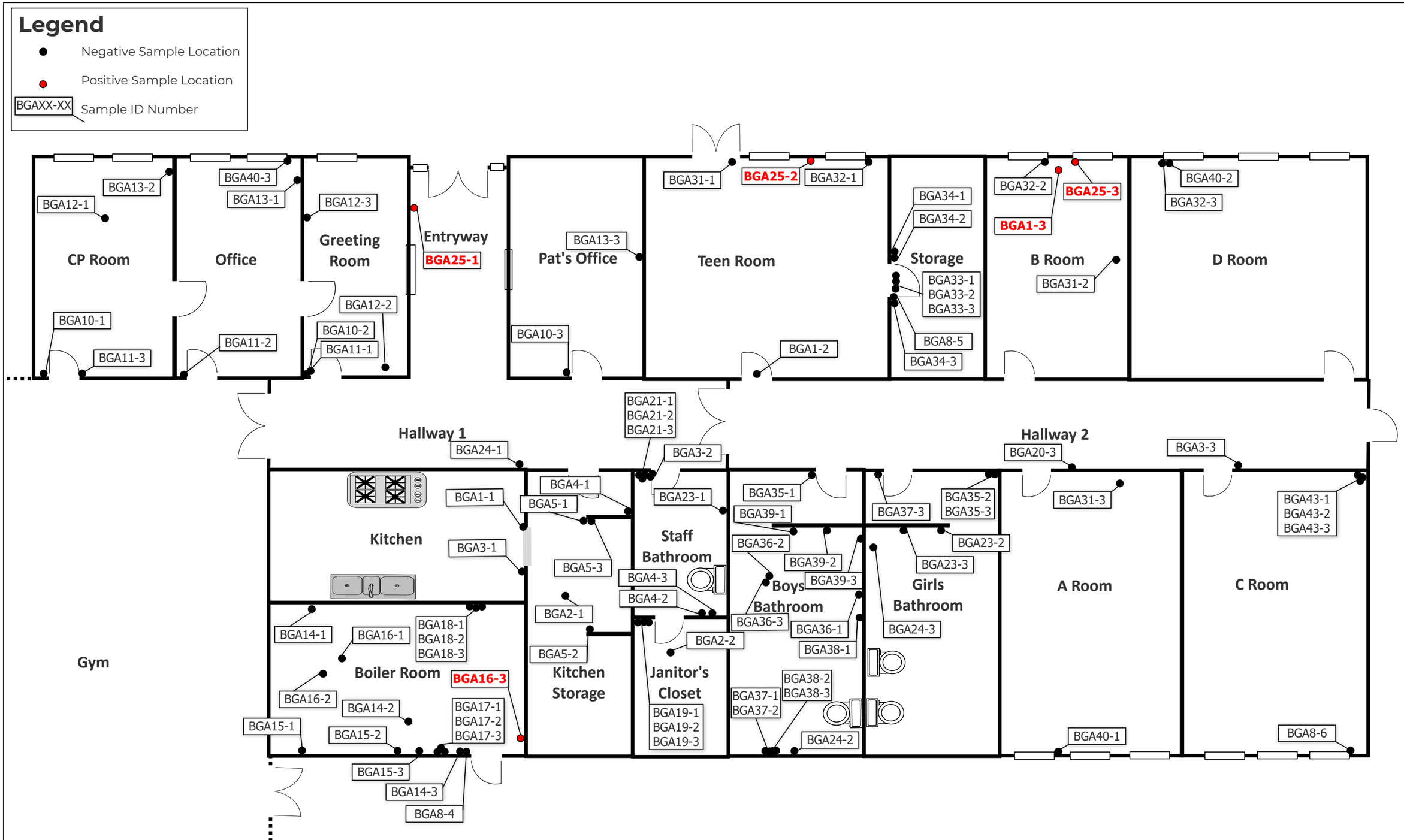

Figure 2 - Main Building ACM Samples

Boys & Girls Club
525 West 9th Street
Hawthorne, Nevada 89415

NOT TO SCALE

N

bec environmental, inc.
Environmental Services

Legend

- Negative Sample Location
- Positive Sample Location
- BGAXX-XX — Sample ID Number

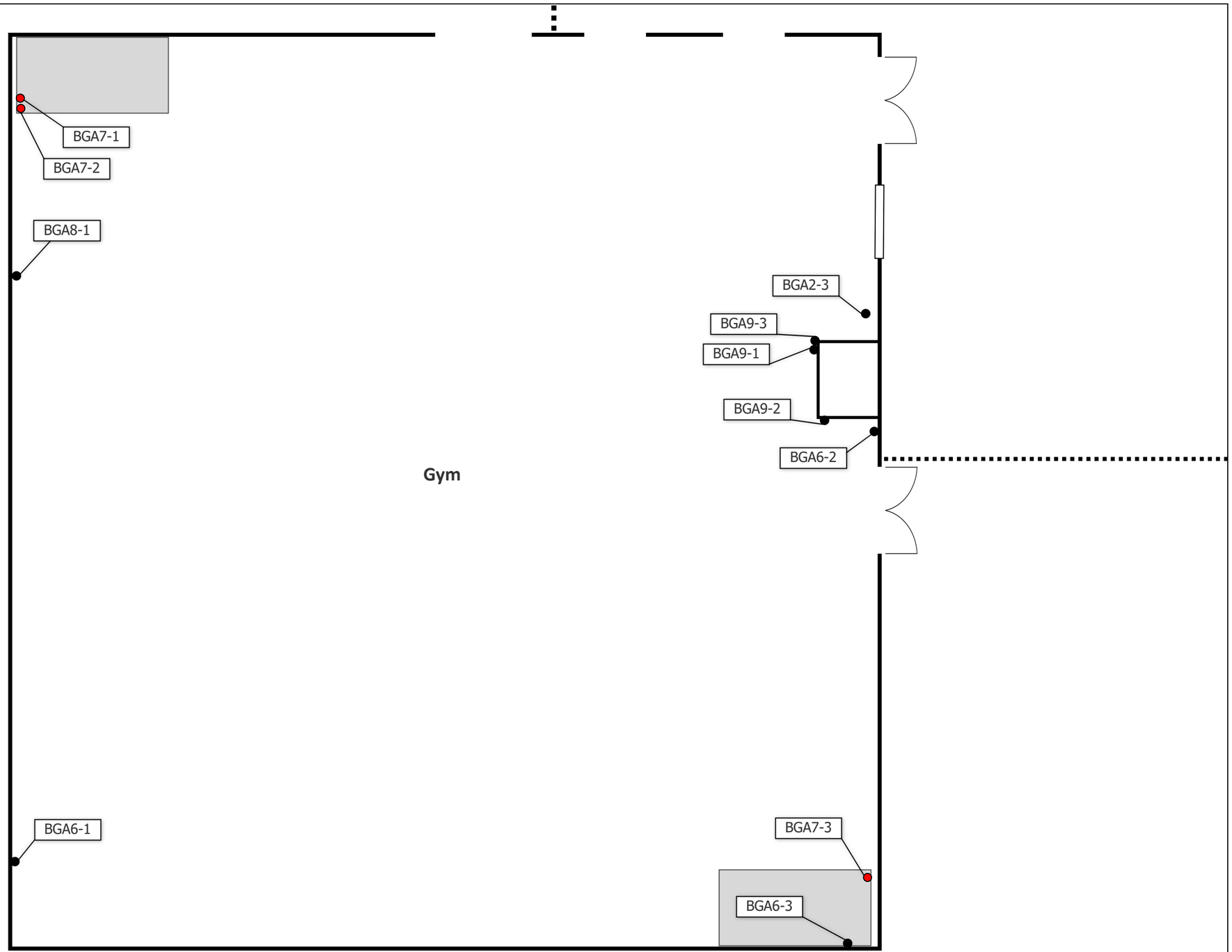

Figure 3 - Gym ACM Samples
Boys & Girls Club
525 West 9th Street
Hawthorne, Nevada 89415

NOT TO SCALE

bec environmental, inc.
Environmental Services

N

Figure 4 - Outside / Roof ACM Samples

Boys & Girls Club
525 West 9th Street
Hawthorne, Nevada 89415

NOT TO SCALE

bec environmental, inc.
Environmental Services

N

ATTACHMENT 2

Certifications

STATE OF NEVADA
DEPARTMENT OF BUSINESS AND INDUSTRY
DIVISION OF INDUSTRIAL RELATIONS
Occupational Safety and Health Administration
Asbestos Control Program

Certifies That Kelly Sheehan

is Licensed As Asbestos Abatement Consultant

License No. I-2166 Expiration Date 10/22/2021

Signature Of Licensee

THE ASBESTOS INSTITUTE

Certifies that

Kelly Sheehan

has attended and received instruction in the EPA approved course

AHERA Building Inspector Refresher

on

October 22, 2020

and successfully completed and passed the competency exam.

Certificate:
ON-4644-8888-102220

Date of Examination:
22-Oct-2020

Date of Expiration:
22-Oct-2021

William T. Cavness
Director

Approved Instructor

THE ASBESTOS INSTITUTE
20033 N. 19th Ave, Building 6, Phoenix, AZ 85027
602-864-6564 – www.theasbestosinstitute.com

This training meets all requirements for asbestos certification under Toxic Substance Control Act Title II.

KS

STATE OF NEVADA
DEPARTMENT OF BUSINESS AND INDUSTR
DIVISION OF INDUSTRIAL RELATIONS
Occupational Safety and Health Administration
Asbestos Control Program

Certifies That Erika Balderson

is Licensed As Asbestos Abatement Consultant

License No. I-1991 Expiration Date 03/20/2021

Signature Of Licensee

THE ASBESTOS INSTITUTE

Certifies that

Erika Balderson

has attended and received instruction in the EPA approved course

AHERA Building Inspector Refresher

Approval Code: CA-089-06

on

March 20, 2020

and successfully completed and passed the competency exam.

Certificate:
ON-53933-9528-032020

Date of Examination:
20-Mar-2020

Date of Expiration:
20-Mar-2021

William T. Cavness
Director

Approved Instructor

THE ASBESTOS INSTITUTE
20033 N. 19th Ave, Building 6, Phoenix, AZ 85027
602-864-6564 – www.theasbestosinstitute.com

This training meets all requirements for asbestos certification under Toxic Substance Control Act Title II.

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 500031-0

Eurofins EMLab P&K

Phoenix, AZ

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 dated January 2009).

2021-01-01 through 2021-12-31

Effective Dates

For the National Voluntary Laboratory Accreditation Program

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Eurofins EMLab P&K
1501 W. Knudsen Dr.
Phoenix, AZ 85027-1307
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Email: dshelby@emlabpk.com
http://www.emlab.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 500031-0

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

For the National Voluntary Laboratory Accreditation Program

ATTACHMENT 3

Laboratory Documentation

CHAIN OF CUSTODY

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SSF, CA: 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080 * (866) 888-6653

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions: x
Phone:	702-304-9830	

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
ND – Next Business Day	
SD – Same Business Day Rush*	
*Please call Client Services for locations with Rush services	

ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air		PLM Bulk						PLM Rock & Soil		Other Requests		
						Fiber Count (NIOSH 7400)	OSHA with TWA	Asbestos Bulk PLM	EPA Point Count (200 Point Count)	EPA Point Count (400 Point Count)	EPA Point Count (1000 Point Count)	Gravimetric Point Count (400 Pt Count)	Gravimetric Point Count (1000 Pt Count)	CARB 435 Method (400 Point Count)	CARB 435 Method (1000 Point Count)	Lead Analysis – Flame AA		
BGA1-1	Rainbow Speckled Tile w/ Black Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA1-2	Rainbow Speckled Tile w/ Black Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA1-3	Rainbow Speckled Tile w/ Black Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA2-1	Yellow Textured Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA2-2	Yellow Textured Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA2-3	Yellow Textured Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA3-1	Red Rubber Wall Base w/ White Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA3-2	Red Rubber Wall Base w/ White Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA3-3	Red Rubber Wall Base w/ White Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA4-1	Textured Wall Barrier	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA4-2	Textured Wall Barrier	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

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Phone:	702-304-9830		

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Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)
ND – Next Business Day
SD – Same Business Day Rush*
*Please call Client Services for locations with Rush services

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes
BGA4-3	Textured Wall Barrier	B	STD		
BGA5-1	White Drywall	B	STD		
BGA5-2	White Drywall	B	STD		
BGA5-3	White Drywall	B	STD		
BGA6-1	Brown Concrete	B	STD		
BGA6-2	Brown Concrete	B	STD		
BGA6-3	Brown Concrete	B	STD		
BGA7-1	Yellow Air Unit Insultation	B	STD		
BGA7-2	Yellow Air Unit Insultation	B	STD		
BGA7-3	Yellow Air Unit Insultation	B	STD		
BGA8-1	Grey Cinder Block w/ Mortar	B	STD		

ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

	PCM Air		PLM								Other Requests		
			Bulk						Rock & Soil				
Sample ID	Fiber Count (NIOSH 7400)	OSHA with TWA	Asbestos Bulk PLM	EPA Point Count (200 Point Count)	EPA Point Count (400 Point Count)	EPA Point Count (1000 Point Count)	Gravimetric Point Count (400 Pt Count)	Gravimetric Point Count (1000 Pt Count)	CARB 435 Method (400 Point Count)	CARB 435 Method (1000 Point Count)	Lead Analysis – Flame AA		
BGA4-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA5-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA5-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA5-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA6-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA6-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA6-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA7-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA7-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA7-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA8-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

By submitting this Chain of Custody, you agree to be bound by the terms and conditions set forth at http://www.emlab.com/terms-of-service

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Phoenix, AZ: 1501 West Knudsen Drive, Phoenix, AZ 85027 * (800) 651-4802
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ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

CONTACT INFORMATION

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Contact:	Kelly Sheehan	Special Instructions:	x
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*Please call Client Services for locations with Rush services	

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA8-2	Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA8-3	Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA8-4	Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA8-5	Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA8-6	Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA9-1	Teal/White Painted Plaster	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA9-2	Teal/White Painted Plaster	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA9-3	Teal/White Painted Plaster	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA10-1	Grey Carpet	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA10-2	Grey Carpet	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA10-3	Grey Carpet	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

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SSF, CA: 6000 Shoreline Court, Suite 205, South San Francisco, CA 94080 * (866) 888-6653

ASBESTOS ANALYSIS

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
ND – Next Business Day	
SD – Same Business Day Rush*	
*Please call Client Services for locations with Rush services	

REQUESTED SERVICES (Check boxes below)

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA11-1	Grey Rubber Wall Base w/ Yellow Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA11-2	Grey Rubber Wall Base w/ Yellow Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA11-3	Grey Rubber Wall Base w/ Yellow Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA12-1	White Ceiling Tile	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA12-2	White Ceiling Tile	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA12-3	White Ceiling Tile	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA13-1	Smooth Drywall	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA13-2	Smooth Drywall	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA13-3	Smooth Drywall	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA14-1	Grey Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA14-2	Grey Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES		RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A – Air	W – Wipe	Kelly Sheehan	6/11/2021 430p		6/11/21
B – Bulk	T – Tape				
D – Dust	R – Rock				
SO – Soil	O – Other:				

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ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

CONTACT INFORMATION

Company: BEC Environmental, Inc.
Contact: Kelly Sheehan
Phone: 702-304-9830
Address: 7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Special Instructions: x

PROJECT INFORMATION

Project ID: 018.17.001
Project Description: Boys & Girls Club - Phase I / Asbestos and Lead Survey
Project Zip Code: 89415
Sampling Date & Time: 6/9/21 & 6/10/21
PO Number:
Sampled By: Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)
ND – Next Business Day
SD – Same Business Day Rush*
*Please call Client Services for locations with Rush services

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA14-3	Grey Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA15-1	Yellow Foam Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA15-2	Yellow Foam Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA15-3	Yellow Foam Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA16-1	White Fabric Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA16-2	White Fabric Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA16-3	White Fabric Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA17-1	White/Black Pipe Fabric Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA17-2	White/Black Pipe Fabric Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA17-3	White/Black Pipe Fabric Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA18-1	Light Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES		RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A – Air	W – Wipe	Kelly Sheehan	6/11/2021 430p		6/11/21
B – Bulk	T – Tape				
D – Dust	R – Rock				
SO – Soil	O – Other:				

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CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)

ND – Next Business Day

SD – Same Business Day Rush*

*Please call Client Services for locations with Rush services

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA18-2	Light Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA18-3	Light Grey Cinder Block w/ Mortar	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA19-1	Light Grey Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA19-2	Light Grey Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA19-3	Light Grey Concrete	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA20-1	White Textured Drywall	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA20-2	White Textured Drywall	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA20-3	White Textured Drywall	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA21-1	Light Blue Tile w/ Brown Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA21-2	Light Blue Tile w/ Brown Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA21-3	Light Blue Tile w/ Brown Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES		RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A – Air	W – Wipe	Kelly Sheehan	6/11/2021 430p		6/11/21
B – Bulk	T – Tape				
D – Dust	R – Rock				
SO – Soil	O – Other:				

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ASBESTOS ANALYSIS

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
ND – Next Business Day	
SD – Same Business Day Rush*	
*Please call Client Services for locations with Rush services	

REQUESTED SERVICES (Check boxes below)

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air		PLM Bulk						Rock & Soil		Other Requests		
						Fiber Count (NIOSH 7400)	OSHA with TWA	Asbestos Bulk PLM	EPA Point Count (200 Point Count)	EPA Point Count (400 Point Count)	EPA Point Count (1000 Point Count)	Gravimetric Point Count (400 Pt Count)	Gravimetric Point Count (1000 Pt Count)	CARB 435 Method (400 Point Count)	CARB 435 Method (1000 Point Count)	Lead Analysis – Flame AA		
No Sample 22	XXXX	XXXX	XXXX			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
No Sample 22	XXXX	XXXX	XXXX			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
No Sample 22	XXXX	XXXX	XXXX			☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA23-1	Tan Sink Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA23-2	Tan Sink Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA23-3	Tan Sink Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA24-1	White Textured Ceiling	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA24-2	White Textured Ceiling	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA24-3	White Textured Ceiling	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA25-1	White Fabric Coated Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA25-2	White Fabric Coated Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES		RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
A – Air	W – Wipe	Kelly Sheehan	6/11/2021 430p		6/11/21
B – Bulk	T – Tape				
D – Dust	R – Rock				
SO – Soil	O – Other:				

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ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)	Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.
ND – Next Business Day	
SD – Same Business Day Rush*	
*Please call Client Services for locations with Rush services	

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA25-3	White Fabric Coated Pipe Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA26-1	Yellow Foam w/ Silver Lining	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA26-2	Yellow Foam w/ Silver Lining	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA26-3	Yellow Foam w/ Silver Lining	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA27-1	Red Shingles w/ Black Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA27-2	Red Shingles w/ Black Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA27-3	Red Shingles w/ Black Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA28-1	Drywall w/ Brown Paper	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA28-2	Drywall w/ Brown Paper	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA28-3	Drywall w/ Brown Paper	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA29-1	Sidewalk Cement	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 420p		

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ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)
ND – Next Business Day
SD – Same Business Day Rush*
*Please call Client Services for locations with Rush services

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

						PCM Air		PLM								Other Requests		
								Bulk						Rock & Soil				
Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	Fiber Count (NIOSH 7400)	OSHA with TWA	Asbestos Bulk PLM	EPA Point Count (200 Point Count)	EPA Point Count (400 Point Count)	EPA Point Count (1000 Point Count)	Gravimetric Point Count (400 Pt Count)	Gravimetric Point Count (1000 Pt Count)	CARB 435 Method (400 Point Count)	CARB 435 Method (1000 Point Count)	Lead Analysis – Flame AA		
BGA29-2	Sidewalk Cement	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA29-3	Sidewalk Cement	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA30-1	Asphalt	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA30-2	Asphalt	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA30-3	Asphalt	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA31-1	Smooth Ceiling	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA31-2	Smooth Ceiling	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA31-3	Smooth Ceiling	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA32-1	Grey Patch Cement Layer	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA32-2	Grey Patch Cement Layer	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA32-3	Grey Patch Cement Layer	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

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CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

- **STD** – Standard (DEFAULT)
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*Please call Client Services for locations with Rush services

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ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA36-3	Grey Tile w/ Mortar & Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA37-1	Light Grey Tile w/ Mortar & Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA37-2	Light Grey Tile w/ Mortar & Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA37-3	Light Grey Tile w/ Mortar & Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA38-1	Yellow Foam	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA38-2	Yellow Foam	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA38-3	Yellow Foam	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA39-1	White Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA39-2	White Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA39-3	White Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA40-1	White Window Sealant	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

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CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

- **STD** – Standard (DEFAULT)
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- **SD** – Same Business Day Rush*

*Please call Client Services for locations with Rush services

Rushes received after 2pm or on weekends, will be considered received the next business day. Please alert us in advance of weekend analysis needs.

Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes
BGA40-2	White Window Sealant	B	STD		
BGA40-3	White Window Sealant	B	STD		
BGA41-1	White Styrofoam Insulation	B	STD		
BGA41-2	White Styrofoam Insulation	B	STD		
BGA41-3	White Styrofoam Insulation	B	STD		
BGA42-1	Cream Stucco & Cement	B	STD		
BGA42-2	Cream Stucco & Cement	B	STD		
BGA42-3	Cream Stucco & Cement	B	STD		
BGA43-1	Yellow Foam II	B	STD		
BGA43-2	Yellow Foam II	B	STD		
BGA43-3	Yellow Foam II	B	STD		

ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

Sample ID	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA40-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA40-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA41-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA41-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA41-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA42-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA42-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA42-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA43-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA43-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA43-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

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ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

- **STD** – Standard (DEFAULT)
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Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes	PCM Air: Fiber Count (NIOSH 7400)	PCM Air: OSHA with TWA	PLM Bulk: Asbestos Bulk PLM	PLM Bulk: EPA Point Count (200 Point Count)	PLM Bulk: EPA Point Count (400 Point Count)	PLM Bulk: EPA Point Count (1000 Point Count)	PLM Bulk: Gravimetric Point Count (400 Pt Count)	PLM Bulk: Gravimetric Point Count (1000 Pt Count)	PLM Rock & Soil: CARB 435 Method (400 Point Count)	PLM Rock & Soil: CARB 435 Method (1000 Point Count)	Other Requests: Lead Analysis – Flame AA	Other Requests	Other Requests
BGA44-1	Yellow Rubber Mat w/ Yellow Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA44-2	Yellow Rubber Mat w/ Yellow Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA44-3	Yellow Rubber Mat w/ Yellow Mastic	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA45-1	Yellow/White Duct Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA45-2	Yellow/White Duct Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA45-3	Yellow/White Duct Insulation	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA46-1	Black Rubber Material w/ Adhesive	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA46-2	Black Rubber Material w/ Adhesive	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA46-3	Black Rubber Material w/ Adhesive	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA47-1	Grey Adhesive	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA47-2	Grey Adhesive	B	STD			☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan	6/11/2021 430p		6/11/21

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CONTACT INFORMATION

Company:	BEC Environmental, Inc.	Address:	7241 W. Sahara Ave., Ste 120, Las Vegas, NV 89117
Contact:	Kelly Sheehan	Special Instructions:	x
Phone:	702-304-9830		

PROJECT INFORMATION

Project ID:	018.17.001		
Project Description:	Boys & Girls Club - Phase I / Asbestos and Lead Survey		
Project Zip Code:	89415	Sampling Date & Time:	6/9/21 & 6/10/21
PO Number:		Sampled By:	Kelly Sheehan

TURN AROUND TIME CODES (TAT)

STD – Standard (DEFAULT)
ND – Next Business Day
SD – Same Business Day Rush*
*Please call Client Services for locations with Rush services

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Sample ID	Description	Sample Type (Below)	TAT (Above)	Total Volume (Air Samples only)	Notes
BGA47-3	Grey Adhesive	B	STD		
BGA48-1	White Tarp & Roofing Layers	B	STD		
BGA48-2	White Tarp & Roofing Layers	B	STD		
BGA48-3	White Tarp & Roofing Layers	B	STD		

ASBESTOS ANALYSIS

REQUESTED SERVICES (Check boxes below)

Sample ID	PCM Air		PLM Bulk						PLM Rock & Soil		Other Requests		
	Fiber Count (NIOSH 7400)	OSHA with TWA	Asbestos Bulk PLM	EPA Point Count (200 Point Count)	EPA Point Count (400 Point Count)	EPA Point Count (1000 Point Count)	Gravimetric Point Count (400 Pt Count)	Gravimetric Point Count (1000 Pt Count)	CARB 435 Method (400 Point Count)	CARB 435 Method (1000 Point Count)	Lead Analysis – Flame AA		
BGA47-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA48-1	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA48-2	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
BGA48-3	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

SAMPLE TYPE CODES	
A – Air	W – Wipe
B – Bulk	T – Tape
D – Dust	R – Rock
SO – Soil	O – Other:

RELINQUISHED BY	DATE & TIME	RECEIVED BY	DATE & TIME
Kelly Sheehan KS	6/11/2021 4:31p		6/11/21

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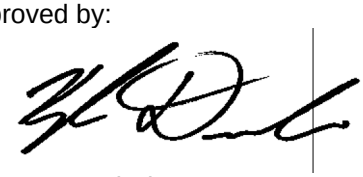
Report for:

Kelly Sheehan
BEC Environmental Inc.
7660 W. Sahara Ave.
Ste. 150
Las Vegas, NV 89117

Regarding: Project: 018.17.001; Boys and Girls Club - Phase 1 / Asbestos and Lead Survey
EML ID: 2661860

Approved by:



Approved Signatory
Kyle Demsko

Dates of Analysis:
Asbestos PLM: 06-16-2021

Service SOPs: Asbestos PLM (EPA 40CFR App E to Sub E of Part 763 & EPA METHOD 600/R-93-116, SOP EM-AS-S-1267)
NVLAP Lab Code 500056-0

All samples were received in acceptable condition unless noted in the Report Comments portion in the body of the report. The results relate only to the samples as received and tested. The results include an inherent uncertainty of measurement associated with estimating percentages by polarized light microscopy. Measurement uncertainty data for sample results with >1% asbestos concentration can be provided when requested.

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Eurofins EMLab P&K
6100 Mountain Vista St, Ste #160, Henderson, NV 89014
(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Kelly Sheehan
Re: 018.17.001; Boys and Girls Club - Phase 1 / Asbestos and Lead Survey

Date of Receipt: 06-11-2021
Date of Report: 06-16-2021

ASBESTOS PLM REPORT

Total Samples Submitted:	144
Total Samples Analyzed:	144
Total Samples with Layer Asbestos Content > 1%:	8

Location: BGA1-1, Rainbow Speckled Tile w/ Black Mastic Lab ID-Version‡: 12721827-1

Sample Layers	Asbestos Content
White Floor Tile	ND
Yellow Mastic	ND
Gray Leveling Compound	ND
Sample Composite Homogeneity:	Moderate

Location: BGA1-2, Rainbow Speckled Tile w/ Black Mastic Lab ID-Version‡: 12721828-1

Sample Layers	Asbestos Content
White Floor Tile	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA1-3, Rainbow Speckled Tile w/ Black Mastic Lab ID-Version‡: 12721829-1

Sample Layers	Asbestos Content
White Floor Tile	ND
Black Mastic	5% Chrysotile
Sample Composite Homogeneity:	Moderate

Location: BGA2-1, Yellow Textured Pipe Insulation Lab ID-Version‡: 12721830-1

Sample Layers	Asbestos Content
Yellow Insulation	ND
White Paper with Silver Foil	ND
Composite Non-Asbestos Content:	90% Glass Fibers 5% Cellulose
Sample Composite Homogeneity:	Good

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Inhomogeneous samples are separated into homogeneous subsamples and analyzed individually. ND means no fibers were detected. When detected, the minimum detection and reporting limit is less than 1% unless point counting is performed. Floor tile samples may contain large amounts of interference material and it is recommended that the sample be analyzed by gravimetric point count analysis to lower the detection limit and to aid in asbestos identification.
‡ A "Version" indicated by -"x" after the Lab ID# with a value greater than 1 indicates a sample with amended data. The revision number is reflected by the value of "x".

Eurofins EMLab P&K
6100 Mountain Vista St, Ste #160, Henderson, NV 89014
(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Kelly Sheehan
Re: 018.17.001; Boys and Girls Club - Phase 1 / Asbestos and Lead Survey

Date of Receipt: 06-11-2021
Date of Report: 06-16-2021

ASBESTOS PLM REPORT

Location: BGA2-2, Yellow Textured Pipe Insulation Lab ID-Version‡: 12721831-1

Sample Layers	Asbestos Content
Yellow Insulation	ND
White Paper with Silver Foil	ND
Composite Non-Asbestos Content:	90% Glass Fibers 5% Cellulose
Sample Composite Homogeneity:	Good

Location: BGA2-3, Yellow Textured Pipe Insulation Lab ID-Version‡: 12721832-1

Sample Layers	Asbestos Content
Yellow Insulation	ND
White Paper with Silver Foil	ND
Composite Non-Asbestos Content:	90% Glass Fibers 5% Cellulose
Sample Composite Homogeneity:	Good

Location: BGA3-1, Red Rubber Wall Base w/ White Mastic Lab ID-Version‡: 12721833-1

Sample Layers	Asbestos Content
Red Baseboard	ND
Cream Mastic	ND
White Mud	ND
Sample Composite Homogeneity:	Good

Location: BGA3-2, Red Rubber Wall Base w/ White Mastic Lab ID-Version‡: 12721834-1

Sample Layers	Asbestos Content
Red Baseboard	ND
White Mastic	ND
Sample Composite Homogeneity:	Good

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Date of Receipt: 06-11-2021
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ASBESTOS PLM REPORT

Location: BGA3-3, Red Rubber Wall Base w/ White Mastic Lab ID-Version‡: 12721835-1

Sample Layers	Asbestos Content
Red Baseboard	ND
White Mastic	ND
Sample Composite Homogeneity:	Good

Location: BGA4-1, Textured Wall Barrier Lab ID-Version‡: 12721836-1

Sample Layers	Asbestos Content
White Semi-Fibrous Material	ND
White Non-Fibrous Material	ND
Composite Non-Asbestos Content:	15% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA4-2, Textured Wall Barrier Lab ID-Version‡: 12721837-1

Sample Layers	Asbestos Content
White Semi-Fibrous Material	ND
Off-White Mastic	ND
White Mud	ND
Composite Non-Asbestos Content:	15% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA4-3, Textured Wall Barrier Lab ID-Version‡: 12721838-1

Sample Layers	Asbestos Content
White Semi-Fibrous Material	ND
Off-White Mastic	ND
White Mud	ND
Composite Non-Asbestos Content:	15% Glass Fibers
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA5-1, White Drywall Lab ID-Version‡: 12721839-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Fibrous Material	ND
Brown Wood	ND
Composite Non-Asbestos Content:	10% Cellulose
Sample Composite Homogeneity:	Moderate

Location: BGA5-2, White Drywall Lab ID-Version‡: 12721840-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA5-3, White Drywall Lab ID-Version‡: 12721841-1

Sample Layers	Asbestos Content
White Texture	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA6-1, Brown Concrete Lab ID-Version‡: 12721842-1

Sample Layers	Asbestos Content
Brown Concrete	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA6-2, Brown Concrete Lab ID-Version‡: 12721843-1

Sample Layers	Asbestos Content
Brown Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA6-3, Brown Concrete Lab ID-Version‡: 12721844-1

Sample Layers	Asbestos Content
Brown Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA7-1, Yellow Air Unit Insulation Lab ID-Version‡: 12721845-1

Sample Layers	Asbestos Content
Yellow Insulation	ND
Black Tar with Paint	3% Chrysotile
Composite Non-Asbestos Content:	90% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA7-2, Yellow Air Unit Insulation Lab ID-Version‡: 12721846-1

Sample Layers	Asbestos Content
Yellow Insulation	ND
Black Tar with Paint	3% Chrysotile
Composite Non-Asbestos Content:	90% Glass Fibers
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA7-3, Yellow Air Unit Insulation Lab ID-Version‡: 12721847-1

Sample Layers	Asbestos Content
Yellow Insulation	ND
Black Tar with Paint	3% Chrysotile
Composite Non-Asbestos Content:	90% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA8-1, Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721848-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA8-2, Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721849-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA8-3, Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721850-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA8-4, Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721851-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA8-5, Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721852-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA8-6, Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721853-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA9-1, Teal / White Painted Plaster Lab ID-Version‡: 12721854-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA9-2, Teal / White Painted Plaster Lab ID-Version‡: 12721855-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
Sample Composite Homogeneity:	Good

Location: BGA9-3, Teal / White Painted Plaster Lab ID-Version‡: 12721856-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
Sample Composite Homogeneity:	Good

Location: BGA10-1, Grey Carpet Lab ID-Version‡: 12721857-1

Sample Layers	Asbestos Content
Gray Carpet	ND
Cream Mastic	ND
Composite Non-Asbestos Content:	85% Synthetic Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA10-2, Grey Carpet Lab ID-Version‡: 12721858-1

Sample Layers	Asbestos Content
Gray Carpet	ND
Cream Mastic	ND
Composite Non-Asbestos Content:	85% Synthetic Fibers
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA10-3, Grey Carpet Lab ID-Version‡: 12721859-1

Sample Layers	Asbestos Content
Gray Carpet	ND
Cream Mastic	ND
Composite Non-Asbestos Content:	85% Synthetic Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA11-1, Grey Rubber Wall Base w/ Yellow Mastic Lab ID-Version‡: 12721860-1

Sample Layers	Asbestos Content
Gray Baseboard	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA11-2, Grey Rubber Wall Base w/ Yellow Mastic Lab ID-Version‡: 12721861-1

Sample Layers	Asbestos Content
Gray Baseboard	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA11-3, Grey Rubber Wall Base w/ Yellow Mastic Lab ID-Version‡: 12721862-1

Sample Layers	Asbestos Content
Gray Baseboard	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA12-1, White Ceiling Tile Lab ID-Version‡: 12721863-1

Sample Layers	Asbestos Content
White Ceiling Tile with White Surface	ND
Composite Non-Asbestos Content:	35% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA12-2, White Ceiling Tile Lab ID-Version‡: 12721864-1

Sample Layers	Asbestos Content
White Ceiling Tile with White Surface	ND
Composite Non-Asbestos Content:	35% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA12-3, White Ceiling Tile Lab ID-Version‡: 12721865-1

Sample Layers	Asbestos Content
White Ceiling Tile with White Surface	ND
Composite Non-Asbestos Content:	35% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA13-1, Smooth Drywall Lab ID-Version‡: 12721866-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper and Paint	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA13-2, Smooth Drywall Lab ID-Version‡: 12721867-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper	ND
Sample Composite Homogeneity:	Good

Location: BGA13-3, Smooth Drywall Lab ID-Version‡: 12721868-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper and Paint	ND
Sample Composite Homogeneity:	Good

Location: BGA14-1, Grey Concrete Lab ID-Version‡: 12721869-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA14-2, Grey Concrete Lab ID-Version‡: 12721870-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA14-3, Grey Concrete Lab ID-Version‡: 12721871-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA15-1, Yellow Foam Concrete Lab ID-Version‡: 12721872-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA15-2, Yellow Foam Concrete Lab ID-Version‡: 12721873-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA15-3, Yellow Foam Concrete Lab ID-Version‡: 12721874-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA16-1, White Fabric Pipe Insulation Lab ID-Version‡: 12721875-1

Sample Layers	Asbestos Content
White Insulation	ND
Composite Non-Asbestos Content:	5% Glass Fibers < 1% Cellulose < 1% Synthetic Fibers
Sample Composite Homogeneity:	Good

Location: BGA16-2, White Fabric Pipe Insulation Lab ID-Version‡: 12721876-1

Sample Layers	Asbestos Content
White Insulation	ND
Composite Non-Asbestos Content:	5% Glass Fibers < 1% Cellulose < 1% Synthetic Fibers
Sample Composite Homogeneity:	Good

Location: BGA16-3, White Fabric Pipe Insulation Lab ID-Version‡: 12721877-1

Sample Layers	Asbestos Content
White Insulation	3% Amosite 2% Crocidolite
Sample Composite Homogeneity:	Good

Location: BGA17-1, White/Black Pipe Fabric Pipe Insulation Lab ID-Version‡: 12721878-1

Sample Layers	Asbestos Content
White Insulation	ND
Brown Paper	ND
Black Tar with Silver Foil	ND
Composite Non-Asbestos Content:	5% Cellulose
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA17-2, White/Black Pipe Fabric Pipe Insulation Lab ID-Version‡: 12721879-1

Sample Layers	Asbestos Content
White Insulation	ND
Brown Paper	ND
Black Tar with Silver Foil	ND
Composite Non-Asbestos Content:	5% Cellulose
Sample Composite Homogeneity:	Good

Location: BGA17-3, White/Black Pipe Fabric Pipe Insulation Lab ID-Version‡: 12721880-1

Sample Layers	Asbestos Content
White Insulation	ND
Brown Paper	ND
Black Tar with Silver Foil	ND
Composite Non-Asbestos Content:	5% Cellulose
Sample Composite Homogeneity:	Good

Location: BGA18-1, Light Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721881-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA18-2, Light Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721882-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA18-3, Light Grey Cinder Block w/ Mortar Lab ID-Version‡: 12721883-1

Sample Layers	Asbestos Content
Gray Block	ND
Gray Mortar	ND
Sample Composite Homogeneity:	Good

Location: BGA19-1, Light Grey Concrete Lab ID-Version‡: 12721884-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA19-2, Light Grey Concrete Lab ID-Version‡: 12721885-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA19-3, Light Grey Concrete Lab ID-Version‡: 12721886-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

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(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Kelly Sheehan
Re: 018.17.001; Boys and Girls Club - Phase 1 / Asbestos and Lead Survey

Date of Receipt: 06-11-2021
Date of Report: 06-16-2021

ASBESTOS PLM REPORT

Location: BGA20-1, White Textured Drywall

Lab ID-Version‡: 12721887-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA20-2, White Textured Drywall

Lab ID-Version‡: 12721888-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA20-3, White Textured Drywall

Lab ID-Version‡: 12721889-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA21-1, Light Blue Tile w/ Brown Mastic

Lab ID-Version‡: 12721890-1

Sample Layers	Asbestos Content
Blue Floor Tile	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA21-2, Light Blue Tile w/ Brown Mastic Lab ID-Version‡: 12721891-1

Sample Layers	Asbestos Content
Blue Floor Tile	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA21-3, Light Blue Tile w/ Brown Mastic Lab ID-Version‡: 12721892-1

Sample Layers	Asbestos Content
Blue Floor Tile	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA23-1, Tan Sink Mastic Lab ID-Version‡: 12721893-1

Sample Layers	Asbestos Content
Tan Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA23-2, Tan Sink Mastic Lab ID-Version‡: 12721894-1

Sample Layers	Asbestos Content
Tan Mastic	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA23-3, Tan Sink Mastic

Lab ID-Version‡: 12721895-1

Sample Layers	Asbestos Content
Tan Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA24-1, White Textured Ceiling

Lab ID-Version‡: 12721896-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Tape	ND
White Joint Compound	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA24-2, White Textured Ceiling

Lab ID-Version‡: 12721897-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA24-3, White Textured Ceiling

Lab ID-Version‡: 12721898-1

Sample Layers	Asbestos Content
White Texture with Paint	ND
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA25-1, White Fabric Coated Pipe Insulation Lab ID-Version‡: 12721899-1

Sample Layers	Asbestos Content
White Insulation	5% Amosite 2% Crocidolite
Sample Composite Homogeneity:	Good

Location: BGA25-2, White Fabric Coated Pipe Insulation Lab ID-Version‡: 12721900-1

Sample Layers	Asbestos Content
White Insulation	5% Amosite 2% Crocidolite
Sample Composite Homogeneity:	Good

Location: BGA25-3, White Fabric Coated Pipe Insulation Lab ID-Version‡: 12721901-1

Sample Layers	Asbestos Content
White Insulation	5% Amosite 2% Crocidolite
Sample Composite Homogeneity:	Good

Location: BGA26-1, Yellow Foam w/ Silver Lining Lab ID-Version‡: 12721902-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Brown Paper with Silver Foil	ND
Composite Non-Asbestos Content:	5% Cellulose
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA26-2, Yellow Foam w/ Silver Lining Lab ID-Version‡: 12721903-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Brown Paper with Silver Foil	ND
Composite Non-Asbestos Content:	5% Cellulose
Sample Composite Homogeneity:	Moderate

Location: BGA26-3, Yellow Foam w/ Silver Lining Lab ID-Version‡: 12721904-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Brown Paper with Silver Foil	ND
Composite Non-Asbestos Content:	5% Cellulose
Sample Composite Homogeneity:	Moderate

Location: BGA27-1, Red Shingles w/ Black Mastic Lab ID-Version‡: 12721905-1

Sample Layers	Asbestos Content
Black Roofing Shingle with Red Pebbles	ND
Black Mastic	ND
Composite Non-Asbestos Content:	10% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA27-2, Red Shingles w/ Black Mastic Lab ID-Version‡: 12721906-1

Sample Layers	Asbestos Content
Black Roofing Shingle with Red Pebbles	ND
Black Mastic	ND
Composite Non-Asbestos Content:	10% Glass Fibers
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA27-3, Red Shingles w/ Black Mastic Lab ID-Version‡: 12721907-1

Sample Layers	Asbestos Content
Black Roofing Shingle with Red Pebbles	ND
Black Mastic	ND
Composite Non-Asbestos Content:	10% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA28-1, Drywall w/ Brown Paper Lab ID-Version‡: 12721908-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose
Sample Composite Homogeneity:	Good

Location: BGA28-2, Drywall w/ Brown Paper Lab ID-Version‡: 12721909-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose
Sample Composite Homogeneity:	Good

Location: BGA28-3, Drywall w/ Brown Paper Lab ID-Version‡: 12721910-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper	ND
Composite Non-Asbestos Content:	10% Cellulose
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA29-1, Sidewalk Cement Lab ID-Version‡: 12721911-1

Sample Layers	Asbestos Content
Gray Cementitious Material	ND
Sample Composite Homogeneity:	Good

Location: BGA29-2, Sidewalk Cement Lab ID-Version‡: 12721912-1

Sample Layers	Asbestos Content
Gray Cementitious Material	ND
Sample Composite Homogeneity:	Good

Location: BGA29-3, Sidewalk Cement Lab ID-Version‡: 12721913-1

Sample Layers	Asbestos Content
Gray Cementitious Material	ND
Sample Composite Homogeneity:	Good

Location: BGA30-1, Asphalt Lab ID-Version‡: 12721914-1

Sample Layers	Asbestos Content
Black Asphalt	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA30-2, Asphalt

Lab ID-Version‡: 12721915-1

Sample Layers	Asbestos Content
Black Asphalt	ND
Sample Composite Homogeneity:	Good

Location: BGA30-3, Asphalt

Lab ID-Version‡: 12721916-1

Sample Layers	Asbestos Content
Black Asphalt	ND
Sample Composite Homogeneity:	Good

Location: BGA31-1, Smooth Ceiling

Lab ID-Version‡: 12721917-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper and Paint	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA31-2, Smooth Ceiling

Lab ID-Version‡: 12721918-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper and Paint	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA31-3, Smooth Ceiling

Lab ID-Version‡: 12721919-1

Sample Layers	Asbestos Content
White Drywall with Brown Paper and Paint	ND
Composite Non-Asbestos Content:	10% Cellulose < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA32-1, Grey Patch Cement Layer

Lab ID-Version‡: 12721920-1

Sample Layers	Asbestos Content
Gray Cementitious Material	ND
Sample Composite Homogeneity:	Good

Location: BGA32-2, Grey Patch Cement Layer

Lab ID-Version‡: 12721921-1

Sample Layers	Asbestos Content
White Mud with Paint	ND
Gray Cementitious Material	ND
Sample Composite Homogeneity:	Good

Location: BGA32-3, Grey Patch Cement Layer

Lab ID-Version‡: 12721922-1

Sample Layers	Asbestos Content
White Mud with Paint	ND
Gray Cementitious Material	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA33-1, Grey Painted Concrete Lab ID-Version‡: 12721923-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA33-2, Grey Painted Concrete Lab ID-Version‡: 12721924-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA33-3, Grey Painted Concrete Lab ID-Version‡: 12721925-1

Sample Layers	Asbestos Content
Gray Concrete	ND
Sample Composite Homogeneity:	Good

Location: BGA34-1, Concrete Filler Lab ID-Version‡: 12721926-1

Sample Layers	Asbestos Content
Gray Concrete Filler	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA34-2, Concrete Filler Lab ID-Version‡: 12721927-1

Sample Layers	Asbestos Content
Gray Concrete Filler	ND
Sample Composite Homogeneity:	Good

Location: BGA34-3, Concrete Filler Lab ID-Version‡: 12721928-1

Sample Layers	Asbestos Content
Gray Concrete Filler	ND
Sample Composite Homogeneity:	Good

Location: BGA35-1, White Tile w/ Mortar and Grey Mastic Lab ID-Version‡: 12721929-1

Sample Layers	Asbestos Content
White Tile	ND
Gray Mortar	ND
Gray Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA35-2, White Tile w/ Mortar and Grey Mastic Lab ID-Version‡: 12721930-1

Sample Layers	Asbestos Content
White Tile	ND
Gray Mortar	ND
Gray Mastic	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA35-3, White Tile w/ Mortar and Grey Mastic Lab ID-Version‡: 12721931-1

Sample Layers	Asbestos Content
White Tile	ND
Gray Mortar	ND
Gray Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA36-1, Grey Tile w/ Mortar and Mastic Lab ID-Version‡: 12721932-1

Sample Layers	Asbestos Content
Gray Tile	ND
Gray Mortar	ND
Cream Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA36-2, Grey Tile w/ Mortar and Mastic Lab ID-Version‡: 12721933-1

Sample Layers	Asbestos Content
Gray Tile	ND
Gray Mortar	ND
Cream Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA36-3, Grey Tile w/ Mortar and Mastic Lab ID-Version‡: 12721934-1

Sample Layers	Asbestos Content
Gray Tile	ND
Gray Mortar	ND
Cream Mastic	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA37-1, Light Grey Tile w/ Mortar and Mastic Lab ID-Version‡: 12721935-1

Sample Layers	Asbestos Content
Light Gray Tile	ND
Gray Mortar	ND
Cream Cementitious Material	ND
White Mud	ND
Sample Composite Homogeneity:	Moderate

Location: BGA37-2, Light Grey Tile w/ Mortar and Mastic Lab ID-Version‡: 12721936-1

Sample Layers	Asbestos Content
Light Gray Tile	ND
Gray Mortar	ND
Cream Cementitious Material	ND
White Mud	ND
Sample Composite Homogeneity:	Moderate

Location: BGA37-3, Light Grey Tile w/ Mortar and Mastic Lab ID-Version‡: 12721937-1

Sample Layers	Asbestos Content
Light Gray Tile	ND
Cream Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA38-1, Yellow Foam Lab ID-Version‡: 12721938-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA38-2, Yellow Foam Lab ID-Version‡: 12721939-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA38-3, Yellow Foam Lab ID-Version‡: 12721940-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA39-1, White Mastic Lab ID-Version‡: 12721941-1

Sample Layers	Asbestos Content
White Mastic	ND
Sample Composite Homogeneity:	Good

Location: BGA39-2, White Mastic Lab ID-Version‡: 12721942-1

Sample Layers	Asbestos Content
White Mastic	ND
Sample Composite Homogeneity:	Good

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(866) 888-6653 Fax (623) 780-7695 www.emlab.com

Client: BEC Environmental Inc.
C/O: Kelly Sheehan
Re: 018.17.001; Boys and Girls Club - Phase 1 / Asbestos and Lead Survey

Date of Receipt: 06-11-2021
Date of Report: 06-16-2021

ASBESTOS PLM REPORT

Location: BGA39-3, White Mastic Lab ID-Version‡: 12721943-1

Sample Layers	Asbestos Content
White Mastic	ND
Sample Composite Homogeneity:	Good

Location: BGA40-1, White Window Sealant Lab ID-Version‡: 12721944-1

Sample Layers	Asbestos Content
White Sealant	ND
Sample Composite Homogeneity:	Good

Location: BGA40-2, White Window Sealant Lab ID-Version‡: 12721945-1

Sample Layers	Asbestos Content
White Sealant	ND
Sample Composite Homogeneity:	Good

Location: BGA40-3, White Window Sealant Lab ID-Version‡: 12721946-1

Sample Layers	Asbestos Content
White Sealant	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA41-1, White Styrofoam Insulation Lab ID-Version‡: 12721947-1

Sample Layers	Asbestos Content
White Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA41-2, White Styrofoam Insulation Lab ID-Version‡: 12721948-1

Sample Layers	Asbestos Content
White Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA41-3, White Styrofoam Insulation Lab ID-Version‡: 12721949-1

Sample Layers	Asbestos Content
White Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA42-1, Cream Stucco and Cement Lab ID-Version‡: 12721950-1

Sample Layers	Asbestos Content
Cream Stucco	ND
Gray Cementitious Material	ND
Composite Non-Asbestos Content:	< 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA42-2, Cream Stucco and Cement Lab ID-Version‡: 12721951-1

Sample Layers	Asbestos Content
Cream Stucco	ND
Gray Cementitious Material	ND
Composite Non-Asbestos Content:	< 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA42-3, Cream Stucco and Cement Lab ID-Version‡: 12721952-1

Sample Layers	Asbestos Content
Cream Stucco	ND
Gray Cementitious Material	ND
Composite Non-Asbestos Content:	< 1% Glass Fibers
Sample Composite Homogeneity:	Moderate

Location: BGA43-1, Yellow Foam II Lab ID-Version‡: 12721953-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA43-2, Yellow Foam II Lab ID-Version‡: 12721954-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA43-3, Yellow Foam II Lab ID-Version‡: 12721955-1

Sample Layers	Asbestos Content
Yellow Foam	ND
Sample Composite Homogeneity:	Good

Location: BGA44-1, Yellow Rubber Mat w/ Yellow Mastic Lab ID-Version‡: 12721956-1

Sample Layers	Asbestos Content
Yellow Flooring	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA44-2, Yellow Rubber Mat w/ Yellow Mastic Lab ID-Version‡: 12721957-1

Sample Layers	Asbestos Content
Yellow Flooring	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

Location: BGA44-3, Yellow Rubber Mat w/ Yellow Mastic Lab ID-Version‡: 12721958-1

Sample Layers	Asbestos Content
Yellow Flooring	ND
Yellow Mastic	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA45-1, Yellow/White Duct Insulation Lab ID-Version‡: 12721959-1

Sample Layers	Asbestos Content
White Non-Fibrous Material	ND
Yellow Insulation	ND
Composite Non-Asbestos Content:	90% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA45-2, Yellow/White Duct Insulation Lab ID-Version‡: 12721960-1

Sample Layers	Asbestos Content
White Non-Fibrous Material	ND
Yellow Insulation	ND
Composite Non-Asbestos Content:	90% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA45-3, Yellow/White Duct Insulation Lab ID-Version‡: 12721961-1

Sample Layers	Asbestos Content
White Non-Fibrous Material	ND
Yellow Insulation	ND
Composite Non-Asbestos Content:	90% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA46-1, Black Rubber Material w/ Adhesive Lab ID-Version‡: 12721962-1

Sample Layers	Asbestos Content
Black Non-Fibrous Material	ND
White Adhesive	ND
Sample Composite Homogeneity:	Moderate

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ASBESTOS PLM REPORT

Location: BGA46-2, Black Rubber Material w/ Adhesive Lab ID-Version‡: 12721963-1

Sample Layers	Asbestos Content
Black Non-Fibrous Material	ND
White Adhesive	ND
Sample Composite Homogeneity:	Moderate

Location: BGA46-3, Black Rubber Material w/ Adhesive Lab ID-Version‡: 12721964-1

Sample Layers	Asbestos Content
Black Non-Fibrous Material	ND
White Adhesive	ND
Sample Composite Homogeneity:	Moderate

Location: BGA47-1, Grey Adhesive Lab ID-Version‡: 12721965-1

Sample Layers	Asbestos Content
Gray Adhesive	ND
Sample Composite Homogeneity:	Good

Location: BGA47-2, Grey Adhesive Lab ID-Version‡: 12721966-1

Sample Layers	Asbestos Content
Gray Adhesive	ND
Sample Composite Homogeneity:	Good

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ASBESTOS PLM REPORT

Location: BGA47-3, Grey Adhesive

Lab ID-Version‡: 12721967-1

Sample Layers	Asbestos Content
Gray Adhesive	ND
Sample Composite Homogeneity:	Good

Location: BGA48-1, White Tarp and Roofing Layers

Lab ID-Version‡: 12721968-1

Sample Layers	Asbestos Content
White Semi-Fibrous Material	ND
Gray Fibrous Material	ND
Yellow Foam	ND
Composite Non-Asbestos Content:	10% Cellulose 2% Synthetic Fibers < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA48-2, White Tarp and Roofing Layers

Lab ID-Version‡: 12721969-1

Sample Layers	Asbestos Content
White Semi-Fibrous Material	ND
Gray Fibrous Material	ND
Yellow Foam	ND
Composite Non-Asbestos Content:	10% Cellulose 2% Synthetic Fibers < 1% Glass Fibers
Sample Composite Homogeneity:	Good

Location: BGA48-3, White Tarp and Roofing Layers

Lab ID-Version‡: 12721970-1

Sample Layers	Asbestos Content
White Semi-Fibrous Material	ND
Gray Fibrous Material	ND
Yellow Foam	ND
Composite Non-Asbestos Content:	10% Cellulose 2% Synthetic Fibers < 1% Glass Fibers
Sample Composite Homogeneity:	Good

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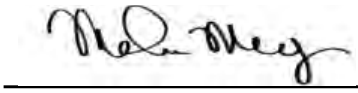

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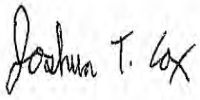
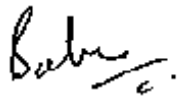
Central Cluster Leader – Kamash Pillai — 10/1/2020 Date



Aerotech Cluster Leader – Joshua Cox — 10/2/2020 Date

Technical Director – Michael Berg (Deputy for East Cluster Leader) — 10/2/2020 Date



South Cluster Leader – Balu Krishnan — 10/2/2020 Date

Quality Assurance Manager - Urooj Sagheer — 10/1/2020 Date

Quality Assurance Manager - Dan Shelby — 10/1/2020 Date

Senior Quality Assurance Manager - Claudia Palermo — 10/2/2020 Date

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3.0 INTRODUCTION, SCOPE AND APPLICABILITY

3.1 Introduction and Compliance References

Eurofins EMLab P&K's Quality Assurance (QA) Manual is a document prepared to define the overall policies, organization objectives and functional responsibilities for achieving Eurofins EMLab P&K's data quality goals. Governing SOPs are in place within the organization to ensure the proper execution of this QA Manual (refer to Appendix 1). This manual and referenced documents are required reading for all personnel within the Eurofins EMLab P&K network, which is comprised of two legal entities, EMLab P&K, LLC and Aerotech Laboratories, Inc.

The laboratory is a team of people who work together to serve the health and environmental needs of society through science and technology. The Eurofins EMLab P&K network of laboratories maintains a local perspective in its scope of services and client relations and maintains a national perspective in terms of quality.

The QA Manual has been prepared to assure compliance with The NELAC Institute (TNI) Standard, dated 2009 and 2016; ISO/IEC Guide 17025:2005 and 2017. Policies and procedures listed in Appendix 1 are compliant with the National Divisional Support Center (NDSC) Quality Management Plan (QMP) for Eurofins TestAmerica; Eurofins EMLab P&K and the various accreditation and certification programs which are held by the laboratory to support environmental work (Appendix 2).
Refer to Appendix 3 for a list of additional references for which this QA Manual is compliant.

3.2 Terms and Definitions

A Quality Assurance Program is a company-wide system designed to ensure that data produced by the laboratory conforms to the standards set by state and/or federal regulations (i.e. CA-ELAP, TCEQ, NYS DOH, etc.), as well as applicable accrediting bodies. The program functions at the local management level through company goals, from guidance at the executive management level, and at the analytical level through Standard Operating Procedures (SOPs) and quality control. Our program is designed to minimize systematic error, encourage constructive, documented problem solving, and provide a framework for continuous improvement within the organization.

Refer to Appendix 4 for the Glossary/Acronyms.

3.3 Scope / Fields of Testing

The laboratory analyzes a broad range of environmental and industrial samples. Sample matrices vary, but are not limited to, air, potable and non-potable waters, bulks, wipes, swabs, dust, soils, etc. The Quality Assurance Program contains specific procedures and methods to test samples of differing matrices for chemical, physical and biological parameters. The Program also contains guidelines on maintaining documentation of analytical processes, reviewing results, servicing clients and tracking samples through the laboratory. The technical and service requirements of all analytical requests are thoroughly evaluated before commitments are made to accept the work. Measurements are made using published reference methods or methods developed and validated by the laboratory.

The methods covered by this manual include the most frequently requested methodologies needed to provide analytical services in the United States and its territories. The specific list of test methods used by the laboratory can be found in LabServe, under the services list. Additional information, such as facility specific scopes of accreditation, may be found on the Eurofins EMLab P&K, LLC website.

The approach of this manual is to define the minimum level of quality assurance and quality control necessary to meet these requirements. All methods performed by the laboratory shall meet these criteria as appropriate. In some instances, quality assurance project plans (QAPPs), project specific data quality objectives (DQOs) or local regulations may require criteria other than those contained in this manual. In these cases, the laboratory will abide by the requested criteria following review and acceptance of the requirements by the Cluster Leader and the Quality Assurance (QA) Manager. In some cases, QAPPs and DQOs may specify less stringent requirements. The Cluster Leader and the QA Manager must determine if it is in the lab's best interest to follow the less stringent requirements.

3.4 Management of the Manual

3.4.1 Review Process

Eurofins National Divisional Support Center (NDSC) which houses the Quality Assurance leadership team for Eurofins Environment Testing America. NDSC QA will assure that the template remains in compliance with Section 3.1. This manual itself is reviewed annually by Cluster Leaders and Quality Assurance Managers, to assure that it reflects current practices and meets the requirements of the laboratory's clients and regulators as well as the QMP. Occasionally, the manual may need changes in order to meet new or changing regulations and operations. The QA Manager will review the changes in the normal course of business and incorporate changes into revised sections of the document. All updates will be reviewed by the Cluster Leaders and Quality Assurance Managers. The laboratory updates and approves such changes according to our Document Control & Updating procedures (refer to SOP No. EM-QA-S-2059).

4.0 MANAGEMENT REQUIREMENTS

4.1 Overview

Eurofins EMLab P&K, LLC is a is a business unit of Eurofins Environment Testing America Built Environment The laboratory's operational and support staff have the day-to-day independent operational authority under the direction of the Eurofins Built Environment Laboratory President, Business Unit Manager, and Cluster Leaders and is supported by the NDSC QA team. The laboratory operational and support staff work under the direction of the Cluster Leaders. The organizational chart of the management staff are presented in Figure 4-1. Individual departmental staff lists are maintained in the laboratory's internal intranet.

4.2 Selection of Personnel

Where individual facility updates, changes or goals necessitate, hiring or transfer of personnel either into new or existing roles is driven by cluster leaders. Once defined as a need, all aspects of the hiring process at Eurofins EMLab P&K are managed via the Eurofins US Recruitment

team. All position requests are submitted to the Eurofins US Recruitment team for coordination and planning of position details (requirements, location, salary, etc.). The process includes the review and setting of timelines, selection of posting sites, and defining recruitment team and hiring manager responsibilities associated with the available position.

4.3 Roles and Responsibilities

In order for the Quality Assurance Program to function properly, all members of the staff must clearly understand and meet their individual responsibilities as they relate to the quality program. The responsibility for quality resides with every employee of the laboratory. All employees have access to the QA Manual, are trained to this manual, and are responsible for upholding the standards therein. Each person carries out his/her daily tasks impartially and in a manner consistent with the goals and in accordance with the procedures in this manual and the laboratory's SOPs. The following descriptions briefly define each role in its relationship to the Quality Assurance Program.

4.3.1 Vice President of Quality and Environmental Health and Safety (VP-QA/EHS)

The Vice President (VP) of QA/EHS reports directly to Eurofins Environment Testing America Chief Operating Officer (COO). With the aid of the NDSC Quality Team Members, Business Unit Managers, Laboratory Directors, the VP-QA/EHS has the responsibility for the establishment, general overview and maintenance of the Quality Assurance and EH&S Programs within Eurofins Environment Testing America. Additional responsibilities include:

- Review of QA/QC and EHS aspects of NDSC Official Document, national projects and expansions or changes in services.
- Work with various organizations outside of the laboratory to further the development of quality standards and represent the laboratory at various trade meetings.
- Prepare monthly reports for quality and EH&S metrics across the environmental testing laboratories and a summary of any quality and EH&S related initiatives and issues.
- With the assistance of the Executive Management, and the EHS Managers, maintenance and implementation of the Eurofins Environment Testing America Environmental, Health and Safety Program.

4.3.2 Quality Directors

There are four (4) Quality Directors within NDSC that report directly to the VP-QA/EHS. These Quality Directors have oversight of the general overview and maintenance of the QA Program within the Eurofins Environment Testing America laboratories. Supported tasks include:

- Monitors laboratory internal audit findings;
- Identifies common laboratory weaknesses and monitors corrective action closures.
- Develops NDSC quality guidance documents and management tools for ensuring and improving compliance;
- Monitors and communicates DoD/DoE requirements;
- Monitors and communicates regulatory and certification requirements;
- Training and OnBoarding
- Laboratory assessments, mentoring, and interventions

- Track/drive root cause investigations and corrective action plans
- Builds knowledge base for preventive actions

4.3.3 Quality Information Manager

The Quality Information works directly with the NDSC Quality Directors and EHS Managers; and reports directly to the VP-QA/EHS. The Quality Information Manager is responsible for the management of:

- NDSC Official Documents
- TALS/LIMS Certification Module Data
- Company's Intranet website
- Company's Regulatory Limits Database
- Subcontract laboratory and approved vendor information
- Internal and External client support for various company groups (e.g., Client Services, EH&S, Legal, IT, Sales) for both quality and operational functions
- Communicate regulatory information and lists

4.3.4 Environmental Health and Safety (EH&S) Managers

There are 3 EH&S Managers within NDSC that report directly to the VP-QA/EHS. These EH&S Managers have oversight of the general overview and maintenance of the EH&S Program within the Eurofins Environment Testing America laboratories. Supported tasks include:

- Consolidation and tracking all safety and health-related information and reports for the company, and managing compliance activities for Eurofins Environment Testing America locations.
- Coordination/preparation of the Environmental, Health and Safety Manual Template that is used by each laboratory to prepare its own laboratory-specific Safety Manual/ CHP.
- Preparation of information and training materials for laboratory EHS Coordinators.
- Assistance in the coordination of employee exposure and medical monitoring programs to insure compliance with applicable safety and health regulations.
- Serving as Department of Transportation (D.O.T.) focal point and providing technical assistance to location management.
- Serving as Hazardous Waste Management main contact and providing technical assistance to location management.

4.3.5 Ethics and Compliance Officers (ECOs)

The NDSC VP-QA/EHS and Corporate Counsel are designated Each ECO acts as a back-up to the other ECO and both are involved when data investigations occur. Each ECO has a direct line of communication to the entire executive management personnel and lab management staff.
The ECOs monitor and audit procedures to determine compliance with policies and to make recommendations for policy enhancements to the President, COO, Laboratory Director or other appropriate individuals within the laboratory. The ECO will assist the laboratory QA Manager in the coordination of internal auditing of ethical policy related activities and processes within the laboratory, in conjunction with the laboratory's regular internal auditing function.

The ECOs will also participate in investigations of alleged violations of policies and work with the appropriate internal departments to investigate misconduct, remedy the situation, and prevent recurrence of any such activity.

4.3.6 Business Unit Manager

The Business Unit Manager is responsible for the overall quality, safety, financial, technical, human resource and service performance of the network of Eurofins EMLab P&K laboratories and reports to their business unit President. The Business Unit Manager provides the resources necessary to implement and maintain an effective and comprehensive Quality Assurance and Data Integrity Program. Provides support to the laboratory management of all clusters and is responsible for the overall performance and viability of the lab's profitability. The GM is also responsible for generating positive operating margin and growing revenues for the company at the business unit level by supporting business and market strategy plans. Responsibilities include, but are not limited to:

- Manages labs in accordance with business plan and analyzes financial performance to meet the business objectives.
- Monitors progress of business units toward objectives and key performance indicators (KPI's) to improve financial performance, customer service and revenue growth daily. Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Provides weekly and monthly reports to management to ensure that goals and objectives are being achieved and to recognize opportunities for development.
- Conducts supervisory responsibilities with direct reports to foster and maintain strong staff performance.
- Prepares annual capital and operating budgets for business units yearly to meet financial goals and objectives.
- Responsible for establishing new business developments and additive growth to meet financial objectives.
- Facilitates local and company-wide initiatives and activities weekly to promote cooperation and consistency across their group and the company.
- Communicates with employees daily concerning objectives, company direction and expectations to create a positive work environment and improve staff performance.
- Supports all company policies and procedures daily to ensure compliance with standard operating procedures (SOP's).
- Meets with clients on a regular basis to evaluate lab performance and respond to changing customer requirements
- Reviews audit findings and ensures corrective actions are taken as needed to maintain compliance.
- Assists laboratory management personnel with operational issues including contract negotiations, sales and service issues, customer relations, and key proposals in order to ensure smooth operating systems and meet customer needs.
- Participates in corporate and group lab meetings to support key Eurofins TestAmerica initiatives and provide supervision at remote facilities.

4.3.7 Cluster Leader

The Cluster Leaders are responsible for maintaining positive operating margin to the company at the laboratory level and for meeting and exceeding the annual budget. The Cluster Leaders are responsible for overseeing operations personnel of the Eurofins EMLab P&K, LLC laboratories in their individual cluster, and providing guidance and direction as needed. Eurofins EMLab P&K, LLC's laboratories are grouped in clusters, as defined in organization charts, Figure 4-1. These positions represent the analytical departments in corporate planning and implementation of policies. This includes assuring the quality of all processes through training and placement of departmental personnel in key roles and coordination of department activities with other corporate departments and assuring the smooth flow of work on a daily basis. The Cluster Leader directly or indirectly manages their client service personnel who are the contacts for clients regarding analytical services and advice. The Cluster Leader will work closely with the Business Unit Manager in monitoring, reviewing and directing laboratory personnel, including through the individual Laboratory Managers and Supervisors. The Cluster Leaders are also responsible for implementing the safety policies for their facilities. Responsibilities include but are not limited to:

- Overall responsibility for the operation of the analytical laboratories in their cluster
- Coordinates and supervises all activities related to Eurofins EMLab P&K, LLC analytical processes Manages the laboratory to provide positive operating margin for the company and meet annual budgetary goals.
- Approves of all laboratory purchases including capital spending approvals to support the business plan and maintain profitability.
- Ensures that all analysts and supervisors have the appropriate education and training to properly carry out the duties assigned to them and ensures that this training has been documented. Works with Eurofins Environment Testing Human Resources for hiring of new personnel.
- Ensures that personnel are free from any commercial, financial and other undue pressures which might adversely affect the quality of their work.
- Ensures company human resource policies are adhered to and maintained.
- Ensures that sufficient numbers of qualified personnel are employed to supervise and perform the work of the laboratory. Assesses laboratory capacity and workload.
- Ensures that appropriate corrective actions are taken to address analyses identified as requiring such actions by internal and external performance or procedural audits.
- Communicates facility specific goals and objectives to employees.
- Reviews and approves all SOPs prior to their implementation and ensures all approved SOPs are implemented and adhered to.
- Pursues and maintains appropriate laboratory certification and contract approvals. Supports ISO 17025 requirements.
- Maintains positive customer relationships through direct interaction with customers, as needed.
- Ensures client specific reporting and quality control requirements are met.
- Contributes to the continuous improvement of the laboratory operations.
- Maintains an awareness of technical developments and regulatory requirements.
- Represents analytical services in corporate planning and vision
- Develops new and alternate analytical services
- Performs periodic reviews of their direct staff and oversees evaluation of analyst and/or laboratory technician performance and provides written feedback regarding performance

- Reviews analytical methods on an biennial basis
- Ensures that the EHS program is enforced and the EHS Manual is implemented in the facilities under their control
- Can act as a Technical Manager or NVLAP Approved Signatory if approved by respective regulatory agency.
- This individual may serve as report signatory.

Departmental Relations

- Reports directly to the Business Unit Manager.
- Works directly with the Quality Assurance Manager to ensure accuracy and precision of all analytical results
- Works with Facility Managers and personnel to coordinate implementation of company policies

Qualifications (Minimum)

- An earned life science degree, minimally at the baccalaureate level and a minimum of two years of full time equivalent documented relevant environmental microbiological work experience (mycological and/or bacteriological) and/or an earned physical or biological science degree, minimally at the baccalaureate level.
- The individual must be familiar with indoor air quality, bacteriological sampling and analytical methodology.

4.3.8 Senior Quality Assurance (QA) Manager

The Senior Quality Assurance (QA) Manager, in addition to all the responsibilities of a QA Manager (Section 4.2.4), is also responsible for managing the QA Managers or Quality Coordinators of assigned laboratories. The Senior QA Manager oversees the assigned laboratories to ensure that these labs have implemented an effective quality management system and that the labs drive continuous improvement. This includes identifying or developing quality management tools and training quality staff in the implementation of quality management systems, techniques and tools. The Senior QA Manager reports directly to the General Manager. In addition to those responsibilities listed in Section 4.2.4, responsibilities of the Senior QA Manager include, but are not limited to:

- Act as the QA representative and a representative of senior management in client meetings, regulatory meetings, open forums for discussing regulation changes, etc.
- Generate and submit monthly QA reports for the Management team to keep the team informed of the QA activities
- Provide the necessary support to drive and lead the initiative in making improvements to different processes/functions/procedures within the Quality Assurance program by closely working with other QA Managers, Operations, IT and the Management team
- Assist Business Unit Manager in QA personnel decisions including: staffing, hiring, evaluations, and disciplinary actions as requested.
- Supervise and coordinate the activities of the QA staff at assigned laboratories. Serve as a resource to all laboratory personnel on QA issues.
- Captains the QA team to enable communication and to distribute duties and responsibilities.

4.3.9 Quality Assurance (QA) Manager

The QA Manager has responsibility and authority to ensure the continuous implementation of the quality system. The QA Manager reports directly to the Senior Quality Assurance Manager. This position is able to evaluate data objectively and perform assessments without outside (e.g., managerial) influence. The NDSC Team may be used as a resource in dealing with regulatory requirements, certifications and other quality assurance related items. The Senior QA Manager directs the activities of the QA Managers to accomplish specific responsibilities, which include, but are not limited to:

- Serves as the focal point for QA/QC in the laboratory.
- Have functions independent from laboratory operations for which he/she has quality assurance oversight.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Arrange for or conducting internal audits on quality systems and the technical operation
- Implements and oversees the Eurofins EMLab P&K, LLC Quality Assurance program for the main laboratories and satellite laboratories (microlabs).
- Maintains and updates the Quality Assurance Manual.
- Maintains all quality control statistical data and other quality control documentation.
- Annually audits the Quality Assurance program, reporting procedures, and other documentation for each assigned facility.
- Works with supervisors to review, develop, and implement appropriate QA steps throughout process flow to ensure high quality of work and reasonable documentation.
- Assesses and implements requirements for current ISO/IEC 17025:2017, AIHA-LAP, LLC EMLAP, IHLAP, and NVLAP accreditation, along with any other accreditations, such as state specific accreditations/certifications (i.e. CA-ELAP, NY-ELAP, etc.).
- Responsible for ensuring that the laboratory is compliant to the current ISO/IEC 17025 standard, the AIHA-LAP, LLC, the NVLAP accreditation policies, and additional accreditations as they apply.
- Produces the monthly quality assurance report
- Responsible for training in Quality Assurance department.
- Maintains and controls all Quality Assurance documents and records.
- Researches and obtains new accreditations/licensing as required.
- Maintains regional facility accreditations/licensing and proficiency testing programs.
- Notifying laboratory management of non-conformances in the quality system and ensuring corrective action is taken. Procedures that do not meet the standards set forth in the QAM or laboratory SOPs shall be investigated following procedures outlined in Section 12 and if deemed necessary may be temporarily suspended during the investigation.
- Communication to the relevant regulatory authorities when there are management or facility changes that impact the laboratory.
- Monitoring and evaluating laboratory accreditations, certifications, and licenses; scheduling proficiency testing samples, where applicable.
- Monitoring and communicating regulatory changes that may affect the laboratory to management.
- Training and advising the laboratory staff on quality assurance/quality control procedures that are pertinent to their daily activities.

- The laboratory QA Manager will maintain records of all ethics-related training, including the type and proof of attendance.
- Maintain, improve, and evaluate the corrective action database and the corrective and preventive action systems.
- Objectively monitor standards of performance in quality control and quality assurance without outside (e.g., managerial) influence.
- Ensuring Communication & monitoring standards of performance to ensure that systems are in place to produce the level of quality as defined in this document.
- Evaluation of the thoroughness and effectiveness of training.

Qualifications (Minimum)

- A baccalaureate degree in an applicable basic or applied science and have at least one year of non-academic analytical experience.
- Quality Assurance Manager shall have documented training in statistics or laboratory quality assurance/quality control.
- Have documented training and/or experience in QA/QC procedures and the laboratory's Quality System.
- Have a general knowledge of the analytical test methods for which data audit/review is performed (and/or having the means of getting this information when needed).

4.3.10 Quality Assurance (QA) Assistant / Environmental Health and Safety Coordinator

The combined role of Quality Assurance Assistant / Environmental Health and Safety Coordinator holds dual responsibilities within the Quality Assurance team and the EH&S program for Eurofins EMLab P&K and reports directly to the Senior Quality Assurance Manager. The role of Quality Assurance Assistant includes assisting Quality Assurance Managers in the maintenance and continual improvement of the Quality Management System for the environmental microbiology, asbestos, lead, and radon programs. The role of Environmental Health and Safety Coordinator (EHSC) is responsible for administering the EH&S program across all Eurofins EMLab P&K locations, and working with facility management and local safety committee teams to provide a safe, healthy working environment and maintain regulatory compliance with local, state, and federal laws. The EH&S Coordinator role enforces environmental, health, and safety policies and procedures. Responsibilities include, but are not limited to:

QA Assistant Role:

- Assist QA Managers with data entry and QC reporting
- Assisting QA Managers with document control, including tracking and assignment of reviews
- Assisting QA Managers in maintaining the laboratory's reference data, preparation of certification applications
- Assisting with maintenance of training records for all employees
- Assist with maintenance of technical records including SOPs, QC records, laboratory data, etc.
- Performs additional tasks as needed and directed by Quality Assurance Manager.
- May perform customer service requests for Project Management staff, supply SOP's, certification information, etc.

EHS Coordinator Role:

- Works with facility management and local safety committee members to ensure facility compliance with the EH&S Manual and applicable policies/procedures.
- Works with laboratory management and corporate EH&S to ensure all Eurofins EMLab P&K facilities are monitored for unsafe conditions, acts, and potential hazards, proper personal protective equipment is available and used, and personnel are properly trained in its use.
- Completes monthly and annual EH&S reports, both internal and external.
- Investigates accidents, incidents, and near misses and identifies root causes, and works with management to eliminate those root causes. Completes accident investigation and reporting in reporting suite.
- Works with facility management to ensure that routine facility inspections for compliance with health, safety and environmental regulations and procedures are completed at each facility.
- Works with facility management to ensure that safety equipment checks are completed at each location to ensure proper working order and sufficient inventory.
- Plans, delivers and tracks completion of monthly refresher and general awareness training sessions and compliance training, including new employee EH&S orientation.
- Participates in and conducts routine EH&S committee meetings.
- Conducts annual EH&S audits for Eurofins EMLab P&K

Qualifications (Minimum)

- A high school diploma or GED and documented on-the-job experience training and experience in general laboratory quality assurance/quality control.

4.3.11 Laboratory Manager

The Laboratory Manager, where applicable, is responsible for overseeing facility specific analytical operations. The Facility Manager will work closely with the Cluster Leader in monitoring, reviewing and directing laboratory work, analytical quality, and overall capacity evaluations. Responsibilities include, but are not limited to:

- Overall responsibility for the operation of the analytical laboratory
- Coordinates and supervises all activities related to Eurofins EMLab P&K, LLC analytical processes
- Implements any Corrective Actions in the laboratory regarding analytical procedures or processes.
- Oversees training programs, if applicable
- Provides assistance with Quality Assurance SOPs for the facility – through the Cluster Leader – and ensures their implementation so that the facility is operated in a compliant manner that allows it to produce defensible data.
- Responsible for ensuring that the laboratory is compliant to the current ISO/IEC 17025 standard, the AIHA-LAP, LLC accreditation policies, the NVLAP accreditation policies, and additional accreditations as they apply.
- Interfaces with analysts to assure that quality analytical data is provided to clients and on – time delivery dates are met.
- Ensures that the employee health and safety procedures are implemented and followed to maintain facility operations that are compliant with appropriate policies and regulations.
- Maintains positive customer relationships through direct interaction with customers, as needed.

- Ensures client specific reporting and quality control requirements are met.
- Can act as the Technical Manager or NVLAP Approved Signatory if approved by respective regulatory agency.
- This individual may serve as report signatory.

Departmental Relations

- Reports directly to the Cluster Leader.
- Works directly with the Quality Assurance Manager to ensure accuracy and precision of all analytical results.
- Works with Cluster Leaders to coordinate implementation of company policies.
- Works with facility personnel staff to implement company policies.

Qualifications (Minimum)

- An earned life science degree, minimally at the baccalaureate level and a minimum of two years of full time equivalent documented relevant environmental microbiological work experience (mycological and/or bacteriological) and/or an earned physical or biological science degree, minimally at the baccalaureate level.
- The individual must be familiar with indoor air quality, bacteriological sampling and analytical methodology.

4.3.12 Technical Manager or Designee

Technical Manager Qualifications

- An earned science degree, minimally at the baccalaureate level, with a minimum of one year of relevant laboratory experience, three months of which must be full time equivalent documented environmental work experience applicable to analyses performed (i.e. mycological and/or bacteriological microbiology, asbestos fibers by PCM, lead analyses).
- The individual must be experienced in the selection and use of bioaerosol, surface, fluid and raw material sampling methods and in sample processing for the quantification and identification of mesophilic and thermophilic bacteria, and mesophilic, xerophilic, hydrophilic and thermotolerant fungi (molds and yeasts) isolated by those methods, as applicable.
- The individual must be experienced in the sampling methods and sample processing for the quantification of asbestos and other fibers by PCM analysis, as applicable.
- The individual must be experienced in the sampling methods and sample processing for the quantification of lead, as applicable to AIHA-LAP, LLC ELLAP.
- The technical manager or their designee shall be responsible for all technical operations and shall be available to address technical issues for laboratory staff and customers concerning analyses, as applicable.
- This individual may serve as report signatory.
- The individual must be present on-site at least 20 hours per week, or 50% of the laboratory working hours (whichever is greater) to address technical issues for laboratory staff and clients.

4.3.13 Senior Analyst

Senior analysts may oversee other departmental analyses, such as mycology and/or bacteriology. Senior Analysts will provide leadership to analytical and support staff. A Senior Analyst is responsible for providing high quality analyses and excellent client service. Senior analysts may also oversee asbestos, allergen and other analytical testing done in the laboratory. Responsibilities may include, but are not limited to:

- May supervise and coordinate laboratory work flow and analyses

- Performs analysis
- May train new analysts
- Maintains client relations and technical support when applicable
- Assists in research and development of new analytical services as required
- Assists the QA manager in development, implementation and data collection of QA processes for analytical services
- Performs independent data reviews for other analyst's work

Departmental Relations

- Reports to the Cluster Leader or Facility Manager.
- Implements and performs mycological, bacteriological, asbestos and other analytical training as required by the Cluster Leader
- Supports other Supervisors, Facility Managers or Cluster Leader when necessary
- Can act as the facility Technical Manager or NVLAP Approved Signatory if approved by respective regulatory agency.

Qualifications (Minimum)

Environmental Microbiology Laboratory Program (Fungi and Bacteria)

- An earned science degree, minimally at the baccalaureate level and a minimum of three years of full time equivalent documented environmental microbiological work experience (mycological and/or bacteriological).

Industrial Hygiene Laboratory Accreditation Program (PCM Asbestos)

- An earned physical or biological science degree, minimally at the baccalaureate level and a minimum of three years relevant nonacademic analytical chemistry experience. A minimum of two years' experience must be in asbestos analyses. The remaining one year can be substituted for work experience.
- Completion of NIOSH 582 (or equivalent) training course for PCM analyses.

National Voluntary Laboratory Accreditation Program (PLM Asbestos)

- Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index) Analysts are competent with the polarized light microscope, Can properly align the microscope and identify all of the crucial parts.
- Completion of McCrone (or equivalent) training course for PLM analyses if deemed necessary.

4.3.14 Analyst

Analysts perform a range of analyses based upon specific area of responsibility, including but not limited to, aerobiological, environmental, asbestos and drinking water samples. Analysts are responsible for high quality analyses and excellent client service. Responsibilities may include, but are not limited to:

- Analyzes samples for fungal and/or bacterial parameters
- Identify macrofungi and microfungi
- Analyzes samples for bacterial parameters, including drinking waters for coliforms and *E. coli*
- Process and prepare samples for analysis Analyze samples for asbestos
- Analyze samples for allergens

- Digest and analyze samples for lead analysis.
- Accurately records and reports analytical data
- Performs specific tasks related to Quality Control
- Maintains analytical quality control records
- Performs regular analysis of reference materials and other quality control samples
- Performs independent data reviews for other analysts' work

Departmental Relations

- Reports to Cluster Leader, or Facility Manager.
- Works with management and support staff for optimal teamwork
- Works with project management staff to clarify technical matters.
- Can act as the facility Technical Manager and NVLAP Approved Signatory if approved by respective regulatory agency

Qualifications (Minimum)

- Environmental Microbiology Laboratory Program (Fungi and Bacteria)
- A bachelor's degree in physical or biological science and documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.
- Industrial Hygiene Laboratory Accreditation Program (Asbestos)
- A bachelor's degree in a physical or biological science, and a minimum of one year relevant nonacademic analytical chemistry experience.
- Completion of training courses for PCM analyses.

Environmental Lead Laboratory Accreditation Program (ELLAP)

- A bachelor's degree in physical or biological science and one month of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.
- National Voluntary Laboratory Accreditation Program (PLM Asbestos)
- Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index). Analysts are competent with the polarized light microscope, and can properly align the microscope and identify all of the crucial parts.
- Completion of McCrone (or equivalent) training course for PLM analyses if deemed necessary.

4.3.15 Laboratory Technician/Assistant

Laboratory technicians and assistants prepare bioaerosol and microbial samples for fungal and bacteriological analysis. Receive samples and complete required paperwork for processing and analysis of samples, where applicable. Responsibilities may include, but are not limited to:

- Prepares bioaerosol and microbial samples for fungal and bacterial analysis
- Cultures fungi and bacteria from environmental samples for analysis
- Works with a variety of sampling media for optimal results
- Analyzes samples for fungal parameters
- Identify macrofungi and microfungi
- Analyzes samples for bacterial parameters, including drinking waters for coliforms and *E. coli*
- Analyze water samples for analysis

- Analyze samples for asbestos
- Analyze samples for allergens
- Digest and analyze samples for lead analysis.
- Accurately enters and reports analytical data
- Performs specific tasks related to Quality Control
- Performs required Quality Control procedures
- Maintenance of laboratory supplies, equipment, and routine lab reagents
- Prepare samples for ELISA analysis and perform ELISA analysis

Departmental Relations

- Reports to Cluster Leader or Facility manager
- Work with analysts to complete samples by required deadlines
- Work with log-in and receiving supervisors to control flow of work through the laboratory.
- Can act as the NVLAP Approved Signatory if approved by respective regulatory agency.

Qualifications (Minimum)

Environmental Microbiology Laboratory Program (Fungi and Bacteria)

- A high school diploma or GED and documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.

Environmental Lead Laboratory Accreditation Program (ELLAP)

- A high school diploma or GED and documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.

National Voluntary Laboratory Accreditation Program (PLM Asbestos)

- Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index); b) analysts are competent with the polarized light microscope, Can properly align the microscope and identify all of the crucial parts.
- Completion of McCrone (or equivalent) training course for PLM analyses if deemed necessary.

4.3.16 Project Manager (PM)

Members of the laboratory Client Services/Project Management Group are responsible for organizing and managing client projects. Clients are assigned a project manager who serves as their primary contact at the laboratory. It is the PM's responsibility to act as the client advocate by communicating client requirements to laboratory personnel and ensuring that clients provide complete information needed by the laboratory to meet those requirements – including all verbal communications. The PM reports to the Cluster Leader and serves as the interface between the laboratory's technical departments and the laboratory's clients. With the overall goal of total client satisfaction, the functions of this position are outlined below:

- Scheduling sample submissions, sample container orders and sample pick-up via the laboratory courier service.
- Confirming certification status
- Coordinating and communicating turnaround time (TAT) requirements for high priority samples/projects.
- Answering common technical questions, facilitating problem resolution and coordinating technical details with the laboratory staff.

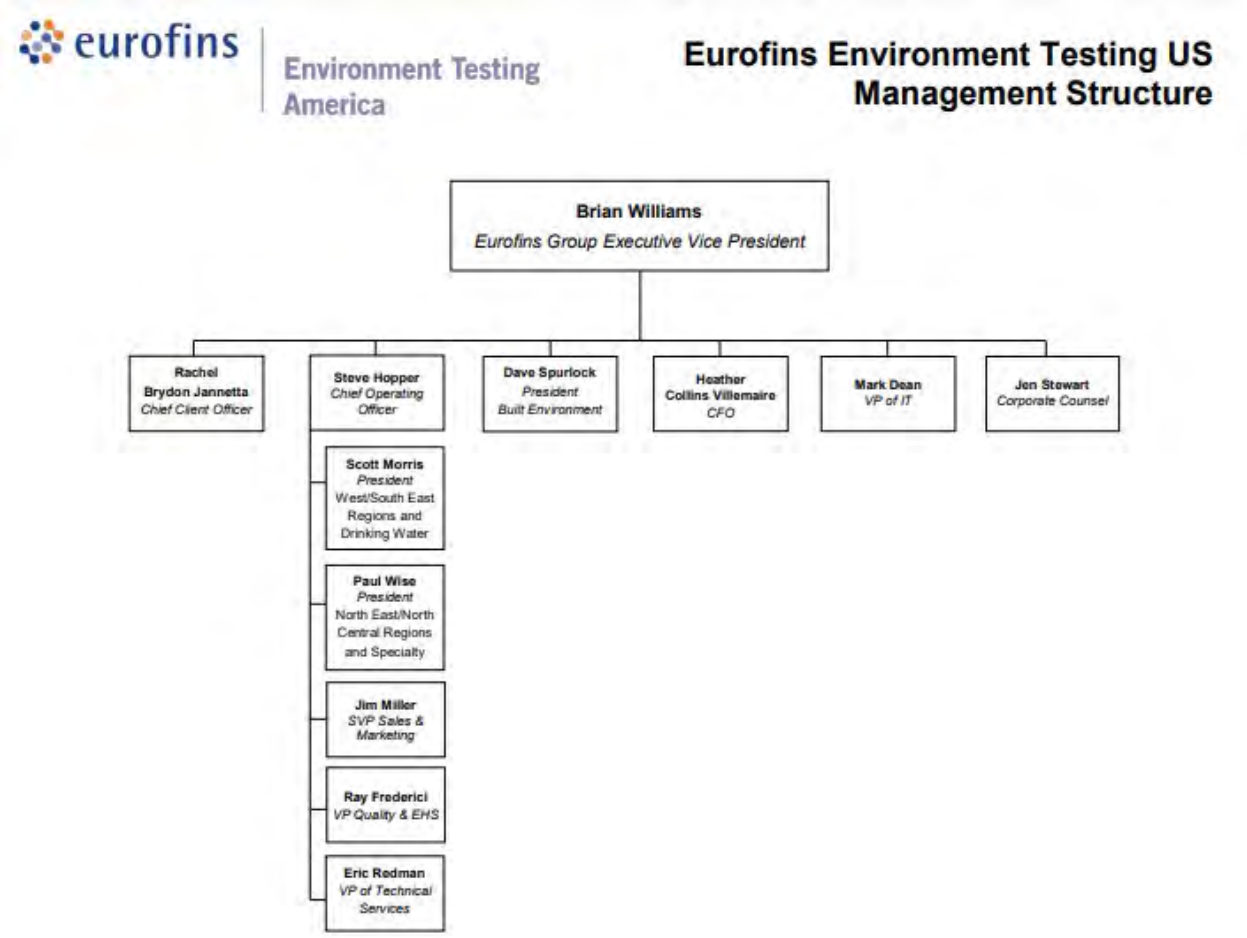
- Responsible to ensure that clients receive the proper sampling supplies.
- Accountable for response to client inquiries concerning sample status.
- Responsible for assistance to clients regarding the resolution of problems concerning COC.
- Ensuring that client specifications, when known, are met by communicating project and quality assurance requirements to the laboratory.
- Notifying the supervisors of incoming projects and sample delivery schedules.
- Responsible for discussing with client any project-related problems, resolving service issues, and coordinating technical details with the laboratory staff.
- Responsible for staff familiarization with specific quotes, sample log-in review, and final report completeness.
- Monitor the status of all data projects in-house to ensure timely and accurate delivery of reports.
- Inform clients of data project-related problems and resolve service issues.
- Coordinate requests for sample containers and other services (data packages).

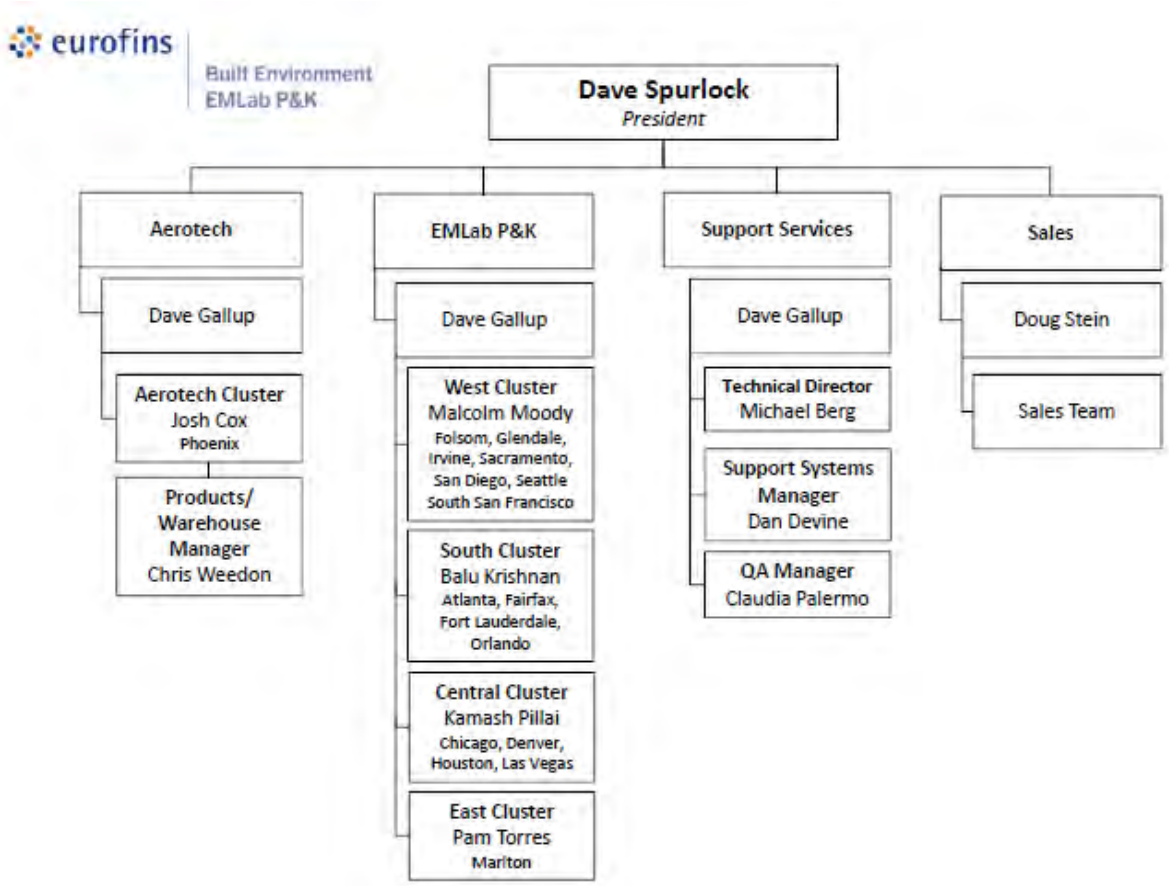
4.4 Business Continuity and Contingency Plans

Various policies and practices are in place to address continuity of business and contingency plans to ensure continued operations or minimal disruption in operations should unplanned events (natural disasters, unexpected management changes, etc.) occur. Deputies are identified for all key management personnel. Deputies would temporarily fill a role if the primary is absent for more than 15 consecutive calendar days. The deputies must meet the same qualifications as the primary person should they be required to take on the responsibilities. The QA Manager communicates to the relevant regulatory authorities when there are management or facility changes that impact the laboratory. Changes in the technical director must be communicated within a period of time and in the manner dictated by each regulatory authority.

The Eurofins EMLab P&K Deputy List, document EM-QA-R-7794, defines who assumes the responsibilities of key personnel in their absence for the western region and the eastern region respectively.

Figure 4-1. Corporate and Laboratory Organization Charts




eurofins
Built Environment
EMLab P&K
Dave Spurlock
President
Aerotech
Dave Gallup
Aerotech Cluster
Josh Cox
Phoenix
Products/
Warehouse
Manager
Chris Weedon
EMLab P&K
Dave Gallup
West Cluster
Malcolm Moody
Folsom, Glendale,
Irvine, Sacramento,
San Diego, Seattle
South San Francisco
South Cluster
Balu Krishnan
Atlanta, Fairfax,
Fort Lauderdale,
Orlando
Central Cluster
Kamash Pillai
Chicago, Denver,
Houston, Las Vegas
East Cluster
Pam Torres
Marlton
Support Services
Dave Gallup
Technical Director
Michael Berg
Support Systems
Manager
Dan Devine
QA Manager
Claudia Palermo
Sales
Doug Stein
Sales Team

5.0 PERSONNEL

5.1 Overview

The laboratory's management believes that its highly qualified and professional staff is the single most important aspect in assuring a high level of data quality and service. The staff consists of professionals and support personnel.

All personnel must demonstrate competence in the areas where they have responsibility. Any staff that is undergoing training shall have appropriate supervision until they have demonstrated their ability to perform their job function on their own. Staff shall be qualified for their tasks based on appropriate education, training, experience and/or demonstrated skills as required.

The laboratory employs sufficient personnel with the necessary education, training, technical knowledge and experience for their assigned responsibilities. Personnel may perform laboratory activities in more than one facility as directed by Cluster Leaders. Authorized analysts may be employed across more than one facility as needed to meet operational and personnel needs, Where personnel are deployed to a secondary facility, records are to be maintained detailing the dual facility assignments, anticipated timeframe of assignment, and organizational charts must reflect the use of dual location analysts where long term arrangements are in place (greater than 15 business days).

All personnel are responsible for complying with all QA/QC requirements that pertain to the laboratory and their area of responsibility. Each staff member must have a combination of experience and education to adequately demonstrate a specific knowledge of their particular area of responsibility. Technical staff must also have a general knowledge of lab operations, test methods, QA/QC procedures and records management.

Laboratory management is responsible for formulating goals for lab staff with respect to education, training and skills and ensuring that the laboratory has a policy and procedures for identifying training needs and providing training of personnel. The training shall be relevant to the present and anticipated responsibilities of the lab staff.

The laboratory only uses personnel that are employed by or under contract to, the laboratory. Contracted personnel, when used, must meet competency standards of the laboratory and work in accordance to the laboratory's quality system.

5.2 Education and Experience Requirements for Technical Personnel

The laboratory makes every effort to hire analytical staffs that possess a college degree (AA, BA, BS) in an applied science with some biology in the curriculum. Exceptions can be made based upon the individual's experience and ability to learn. Selection of qualified candidates for laboratory employment begins with documentation of minimum education, training, and experience prerequisites needed to perform the prescribed task. Minimum education and training requirements for laboratory employees are outlined in job descriptions maintained by Eurofins Environment Testing America Human Resources.

Experience and specialized training are occasionally accepted in lieu of a college degree (basic lab skills such as using a balance, colony counting, aseptic or quantitation techniques, etc., are also considered).

As a general rule for analytical staff, refer to Table 5-1:

Table 5-1. Analytical Staff Education and Experience Requirements

Specialty	Education	Experience
Sample Processing	H.S. Diploma or GED	On the job training (OJT)
Laboratory Technician / Assistant	H.S. Diploma or GED	One year of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst. For fungal air direct exam (spore trap) and/or lead, analysts are required to undergo six months of documented on-the-job training as a spore trap analyst trainee under the supervision of a Senior Analyst.
Laboratory Technician / Assistant (PLM Asbestos)	H.S. Diploma or GED Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.	Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index). Analysts are competent with the polarized light microscope, and can properly align the microscope and identify all of the crucial parts. Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.

Specialty	Education	Experience
Senior Analyst – Mycology/Bacteriology	An earned science degree, minimally at the baccalaureate level.	Minimum of three years of full time equivalent documented environmental microbiological work experience (mycological or bacteriological)
Senior Analyst – PCM Asbestos	An earned physical or biological science degree, minimally at the baccalaureate. Level. Completion of NIOSH 582 (or equivalent) training course for PCM analyses.	A minimum of three years relevant nonacademic analytical chemistry experience. A minimum of two years' experience must be in asbestos analyses. The remaining one year can be substituted for work experience.
Senior Analyst – PLM Asbestos	A bachelor's degree in physical or biological science. Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.	Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index) Analysts are competent with the polarized light microscope. Can properly align the microscope and identify all crucial parts.
Analyst (Fungi/Bacteria)	A bachelor's degree in physical or biological science.	Six months of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst (For fungal air direct exam (spore trap), analysts are required to undergo three months of documented on-the-job training as a spore trap analyst trainee under the supervision of a Senior Analyst.)
Analyst (PCM Asbestos)	A bachelor's degree in a physical or biological science. Completion of training course for PCM analysis.	A minimum of one year relevant nonacademic analytical chemistry experience.

Specialty	Education	Experience
Analyst (PLM Asbestos)	A bachelor's degree in physical or biological science. Completion of McCrone (or equivalent) training course for PLM analysis if deemed necessary.	Understand polarized light microscopy and its application to crystalline materials sufficiently to conduct analyses. That they understand what the various optical properties are, how they are measured or observed in the microscope, and how the data are used to form a conclusion about the identity of the component, (e.g., an analyst using central and/or annular focal screening (dispersion staining) to measure refractive index must be able to explain what produces the observed color and how that color is used to determine refractive index). Analysts are competent with the polarized light microscope, and can properly align the microscope and identify all of the crucial parts.
Analyst (Lead)	A bachelor's degree in physical or biological science.	One month of documented on-the-job training as an analyst trainee under the supervision of a Senior Analyst.
Technical Managers	An earned science degree, minimally at the baccalaureate level. (For bacteria/fungi: The individual must be experienced in the selection and use of bioaerosol, surface, fluid and raw material sampling methods and in sample processing for the quantification and identification of mesophilic and thermophilic bacteria, and mesophilic, xerophilic, hydrophilic and thermotolerant fungi (molds and yeasts) isolated by those methods.)	A minimum of one year of relevant laboratory experience, three months of which must be full time equivalent documented environmental microbiological work experience (mycological and/or bacteriological).

When an analyst does not meet these requirements, they can perform a task under the direct supervision of a qualified analyst, peer reviewer or Technical Manager, and are considered an analyst in training. The person supervising an analyst in training is accountable for the quality of the analytical data and must review and approve data and associated corrective actions.

5.3 Training

The laboratory is committed to furthering the professional and technical development of employees at all levels.

Orientation to the laboratory's policies and procedures, in-house method training, and employee attendance at outside training courses and conferences all contribute toward employee proficiency. Below are examples of various areas of required employee training:

Table 5-2. Examples of Required Training

Required Training	Time Frame	Employee Type
Environmental Health & Safety	Prior to lab work	All
Ethics – New Hires	1 week of hire	All
Ethics – Comprehensive	60 days of hire	All
Data Integrity	60 days of hire	Technical and PMs
Quality Assurance	90 days of hire	All
Ethics – Comprehensive Refresher	Annually	All
Initial Demonstration of Capability (DOC)	Prior to unsupervised method performance	Technical

The laboratory maintains records of relevant authorization/competence, education, professional qualifications, training, skills and experience of technical personnel (including contracted personnel) as well as the date that approval/authorization was given. These records are kept on file at the laboratory. Authorizations are applicable across the Eurofins EMLab P&K network of laboratories for shared procedures. Also refer to "Demonstration of Capability" in Section 19.

The training of technical staff is kept up to date by:

- Each employee must have documentation in their training file that they have read, understood and agreed to follow the most recent version of the laboratory QA Manual and SOPs in their area of responsibility. This documentation is updated as SOPs are updated.
- Documentation from any training courses or workshops on specific equipment, analytical techniques or other relevant topics.
- Documentation of proficiency (refer to Section 19).
- An Ethics Agreement signed by each staff member (renewed each year) and evidence of annual ethics training.
- A Confidentiality Agreement signed by each staff member signed at the time of employment.
- Human Resources maintains documentation and attestation forms on employment status and records; benefit programs; timekeeping/payroll; and employee conduct (e.g., ethics violations). This information is maintained in the employee's secured personnel file.

Evidence of successful training could include such items as:

- Adequate documentation of training within operational areas, including one-on-one technical training for individual technologies, and particularly for people cross-trained.
- Analysts knowledge to refer to QA Manual for quality issues.
- Analysts following SOPs, i.e., practice matches SOPs.

- Analysts regularly communicate to supervisors and QA if SOPs need revision, rather than waiting for auditors to find problems.

Further details of the, laboratory's training program are described in the Laboratory Training SOP (EM-AD-S-1646, General Training).

5.4 Data Integrity and Ethics Training Program

The laboratory's Ethics and Data Integrity Program is discussed in Section 7.2. Employees are trained as to the legal and environmental repercussions that result from data misrepresentation. Key topics covered in the presentation include:

- Organizational mission and its relationship to the critical need for honesty and full disclosure in all analytical reporting.
- Ethics Policy
- How and when to report ethical/data integrity issues. Confidential reporting.
- Record keeping.
- Discussion regarding data integrity procedures.
- Specific examples of breaches of ethical behavior (e.g. peak shaving, altering data or computer clocks, improper macros, etc., accepting/offering kickbacks, illegal accounting practices, unfair competition/collusion)
- Internal monitoring. Investigations and data recalls.
- Consequences for infractions including potential for immediate termination, debarment, or criminal prosecution.
- Importance of proper written narration / data qualification by the analyst and project manager with respect to those cases where the data may still be usable but are in one sense or another partially deficient.

Additionally, a data integrity hotline (1-800-736-9407) is maintained by The NDSC.

6.0 ACCOMMODATIONS AND ENVIRONMENTAL CONDITIONS

6.1 Overview

Each Eurofins EMLab P&K laboratory is a secure laboratory facility with controlled access and designed to accommodate an efficient workflow and to provide a safe and comfortable work environment for employees. All visitors sign in and are escorted by laboratory personnel. Access is controlled by various measures.

Each laboratory is equipped with structural safety features. Each employee is familiar with the location, use, and capabilities of general and specialized safety features associated with their workplace. The laboratory provides and requires the use of protective equipment including safety glasses, protective clothing, gloves, etc., OSHA and other regulatory agency guidelines regarding required amounts of bench and fume hood space, lighting, ventilation (temperature and humidity controlled), access, and safety equipment are met or exceeded.

Traffic flow through sample preparation and analysis areas is minimized to reduce the likelihood of contamination. Adequate floor space and bench top area is provided to allow unencumbered sample preparation and analysis space. Sufficient space is also provided for storage of reagents and media, glassware, and portable equipment. Ample space is also provided for refrigerated sample storage before analysis and archival storage of samples after analysis. Laboratory HVAC and deionized water systems are designed to minimize potential trace contaminants.

The laboratory is separated into specific areas for sample receiving, sample preparation, microbiological sample analysis, asbestos sample analysis, lead sample analysis, and administrative functions.

6.2 Environment

Laboratory accommodation, test areas, energy sources, and lighting are adequate to facilitate proper performance of tests. Each facility is equipped with heating, ventilation, and air conditioning (HVAC) systems appropriate to the needs of environmental testing performed at this laboratory. The environment in which these activities are undertaken does not invalidate the results or adversely affect the required accuracy of any measurements.

Each laboratory provides for the effective monitoring, control and recording of environmental conditions that may affect the results of environmental tests as required by the relevant specifications, methods, and procedures. Such environmental conditions include temperature of in use equipment and within the laboratory, where applicable. Monitoring also includes environmental monitoring for airborne molds, bacterial contaminants, surface lead and total airborne fibers, including asbestos, which is performed on a predetermined schedule per facility.

When any of the method or regulatory required environmental conditions change to a point where they may adversely affect test results, analytical testing will be discontinued until the environmental conditions are returned to the required levels.

Environmental conditions of the facility housing the computer network and Labserve are regulated to protect against raw data loss.

When the laboratory performs laboratory activities at sites or facilities outside its permanent control, it shall ensure that the requirements related to facilities and environmental conditions of this document are met.

Specific requirements for facility and environmental conditions, as well as periodic monitoring of conditions, are given in the Environmental Health & Safety Manual plus each laboratory's Facility Addendum. Procedures and requirements for routine environmental monitoring are found in EM-HS-S-1585.

6.3 Work Areas

There is effective separation between neighboring areas when the activities therein are incompatible with each other. Examples include:

- Microbiological culture handling and sample incubation areas.
- Asbestos sample handling and preparation of reagents.
- Chemical handling areas, including reagent preparation and waste disposal areas.

Access to and use of all areas affecting the quality of analytical testing is defined and controlled by secure access to the laboratory building as described below in the Building Security section.

Adequate measures are taken to ensure good housekeeping in each laboratory and to ensure that any contamination does not adversely affect data quality. These measures include regular cleaning to control dirt and dust within the laboratory. Work areas are available to ensure an unencumbered work area. Work areas include:

- Access and entryways to the laboratory.
- Sample receipt areas.
- Sample storage areas.
- Chemical and waste storage areas.
- Data handling and storage areas.
- Sample processing areas.
- Sample analysis areas.

Refer to the following documents and procedures for specific requirements for microbiological laboratory facility requirements.

- Standard Methods, 20th Ed., 9020B, Sec. 2
- TNI V1M5, 1.7.3.7.a
- CW-E-M-001, Eurofins TestAmerica Environmental Health and Safety Manual, Section 16
- EM-HS-S-1639, Housekeeping and Decontamination
- EM-HS-S-1286, Procedure for the Retention and Disposal of Samples

6.4 Responding to Emergencies

Employees must be aware of procedures to respond to all emergencies that might occur in the workplace. Employees must be familiar with the location and proper operation of all emergency equipment, evacuation routes and designated assembly areas for all areas where they work. Refer to the NDSC EH&S Manual Document No. CW-E-M-001. Sec. 7 and the laboratory's local EH&S addendum for complete details. These documents provide direction for situations where normal operations of the laboratory are not possible (e.g., electrical failures, heating/air conditioning failures, fire/building evacuation, computer failures, hazardous material spills, injury to employees, pandemic flu, disruption of phone service, etc.)

In the event that the building or information technology (IT) systems would be severely challenged, a designated disaster recovery team, which includes Facility Management, Maintenance, Safety, Laboratory/Executive Management, Public Relations, IT, QA and other applicable personnel depending on the scope of the disaster, would assemble at a designated area to assess the situation and formulate a plan.

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6.5 Building Security

Building keys and/or key fobs are distributed to employees as necessary.

Visitors to the laboratory sign in and out in a visitor's logbook. A visitor is defined as any person who visits the laboratory who is not an employee of the laboratory. In addition to signing into the laboratory, the Environmental Health and Safety policies require the completion of specific EH &S forms by all visitors and vendors. Visitors (with the exception of company employees) are escorted by laboratory personnel at all times, or the location of the visitor is noted in the visitor's logbook.

7.0 QUALITY SYSTEM

7.1 Quality Policy Statement

The Quality Policy statement gives employees clear requirements for the production of analytical data. As an organization, all personnel are committed to high quality professional practice, testing and data, and service to our clients.

We strive to provide the highest quality data achievable by:

- Reading and understanding all of the quality documents applicable to each position and implementing the process in our work.
- Following all recordkeeping requirements; describing clearly and accurately all activities performed; recording "real time" as the task is carried out; understanding that it is never acceptable to "back date" entries and should additional information be required at a later date, the actual date and by whom the notation is made must be documented.
- Ensuring data integrity through the completeness, consistency, impartiality and accuracy of the data generated. Data is attributable, legible, contemporaneously recorded, original or a true copy, and accurate (ALCOA). This applies to manual paper documentation and electronic records.
- Providing accountability and traceability for each sample analyzed through proper sample handling, labeling, preparation, instrument calibration/qualification/validation, analysis, and reporting; establishing an audit trail (the who, what, when, and why) that identifies date, time, analyst, instrument used, instrument conditions, quality control samples (where appropriate and/or required by the method), and associated standard material.
- Emphasizing a total quality management process which provides impartiality, accuracy, and strict compliance with agency regulations and client requirements, giving the highest degree of confidence; understanding that meeting the requirements of the next employee in the work flow process is just as important as meeting the needs of the external client.
- Providing thorough documentation and explanation to qualify reported data that may not meet all requirements and specifications, but is still of use to the client; understanding this occurs only after discussion with the client on the data limitations and acceptability of this approach.
- Responding immediately to indications of questionable data, out-of-specification occurrences, equipment malfunctions, and other types of laboratory problems, with investigation and applicable corrective action; documenting these activities completely, including the reasons for the decisions made.

- ❖ Providing a work environment that ensures accessibility to all levels of management and encourages questions and expression of concerns on quality issues to management. Eurofins recognizes that the implementation of a quality assurance program requires management's commitment and support as well as the involvement of the entire staff
- ❖ Continually improve systems and manage risk to support quality improvement efforts in laboratory, administrative and managerial activities

7.2 Ethics and Data Integrity

Eurofins Environment Testing America is committed to ensuring the integrity of its data and meeting the quality needs of its clients. The laboratory operates our Ethics and Data Integrity program under the guidance of Eurofin's Key Guidance Document (KGD). The elements of our Ethics and Data Integrity Program include:

- An Ethics Policy (NDS Document No. CW-L-P-004) and Employee Ethics Statements.
- Ethics and Compliance Officer/s (ECOs).
- A Training Program.
- Self-governance through disciplinary action for violations.
- A confidential mechanism for anonymously reporting alleged misconduct and a means for conducting internal investigations of all alleged misconduct. (NDSC Document No. CW-L-S-002).
- Procedures and guidance for recalling data if necessary (NDSC Document No. CW-Q-S-005).
- Effective external and internal monitoring system that includes procedures for internal audits (Section 17).
- Produce results, which are accurate and include QA/QC information that meets client pre-defined Data Quality Objectives (DQOs).
- Present services in a confidential, honest and forthright manner.
- Provide employees with guidelines and an understanding of the Ethical and Quality Standards of our Industry.
- Provide procedures and guidance to ensure the impartiality and confidentiality of all data and customer information.
- Operate our facilities in a manner that protects the environment and the health and safety of employees and the public.
- Obey all pertinent federal, state and local laws and regulations and encourage other members of our industry to do the same.
- Educate clients as to the extent and kinds of services available.
- Assert competency only for work for which adequate personnel and equipment are available and for which adequate preparation has been made.
- Promote the status of environmental laboratories, their employees, and the value of services rendered by them.

7.3 Quality System Documentation

The laboratory's Quality System is communicated through a variety of documents.

- Quality Assurance Manual – Eurofins EMLab P&K has one quality assurance manual to address the quality management system applicable to all Eurofins EMLab P&K facilities.NDSC Official Documents – Each laboratory may use the Guidance (instructional use) documents at their discretion. Template documents are process documents that the laboratory's need to implement locally by using the document as is or as an outline to define their internal practices that meet the minimum requirements of the template. Required documents need to be implemented as is and listed in the laboratory's document control list.
- Key Guidance Documents (KGDs) - Documents compiled at the Group Service Centre (GSC) level by Functional Leaders (document owners) aimed at providing specific Eurofins groups of employees with guidelines necessary for the good conduct of their respective work.
- Laboratory SOPs and Policies– General and Technical
- Laboratory QA/QC Policy Memorandums

7.3.1 Order of Precedence

In the event of a conflict or discrepancy between policies, the order of precedence is as follows:

- Quality Management Plan (QMP)
- NDSC Guidance Documents
- KGDs
- Laboratory Quality Assurance Manual (QAM)
- Laboratory SOPs and Policies
- Other (Work Instructions (WI), memos, flow charts, etc.)

NOTE: The laboratory has the responsibility and authority to operate in compliance with regulatory requirements of the jurisdiction in which the work is performed. Where the QMP conflicts with those regulatory requirements, the regulatory requirements of the jurisdiction shall hold primacy. The laboratory's QA Manual shall take precedence over the QMP in those cases.

7.4 QA/QC Objectives for the Measurement of Data

Quality Assurance (QA) is responsible for developing planned activities whose purpose is to provide assurance to all levels of management that a quality program is in place within the laboratory, and that it is functioning in an effective manner that is consistent with the requirements of NELAP, ISO 17025, and any other regulatory agencies (i.e., states) in which the laboratory maintains accreditation.
Quality Control (QC) is generally understood to be limited to the analyses of samples and to be synonymous with the term *"analytical quality control"*. QC refers to the routine application of statistically based procedures to evaluate and control the accuracy of results from analytical measurements. The QC program includes procedures for estimating and controlling precision and bias and for determining reporting limits.

Request for Proposals (RFPs) and Quality Assurance Project Plans (QAPP) provide a mechanism for the client and the laboratory to discuss the data quality objectives in order to ensure that analytical services closely correspond to client needs. In order to ensure the ability

of the laboratory to meet the Data Quality Objectives (DQOs) specified in the QAPP, clients are advised to allow time for the laboratory to review the QAPP before being finalized. The client is responsible for developing the QAPP; however, the laboratory will provide support to the client for developing the sections of the QAPP that concern laboratory activities.

Historically, laboratories have described their QC objectives in terms of precision, accuracy, representativeness, comparability, completeness, selectivity and sensitivity (PARCCSS).

7.4.1 Precision

The objective is to meet the performance for precision demonstrated for the methods on similar samples and to meet data quality objectives (DQOs) of the EPA and/or other regulatory programs. Precision is defined as the degree of reproducibility of measurements under a given set of analytical conditions (exclusive of field sampling variability). Precision is documented on the basis of replicate analysis, usually duplicate or matrix spike (MS) duplicate samples.

7.4.2 Accuracy

The objective is to meet the performance for accuracy demonstrated for the methods on similar samples and to meet data quality objectives (DQOs) of the EPA and/or other regulatory programs. Accuracy is defined as the degree of bias in a measurement system. Accuracy may be documented through the use of laboratory control samples (LCS) and/or MS. A statement of accuracy is expressed as an interval of acceptance recovery about the mean recovery.

7.4.3 Representativeness

The objective is to provide data which is representative of the sampled medium. Representativeness is defined as the degree to which data represent a characteristic of a population or set of samples and is a measurement of both analytical and field sampling precision. The representativeness of the analytical data is a function of the procedures used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical samples or sample aliquots.

The representativeness of the data from the sampling sites depends on both the sampling procedures and the analytical procedures. Refer to laboratory SOPs for subsampling and homogenization techniques appropriate to the analytical method.

7.4.4 Comparability

The objective is to provide analytical data for which the accuracy, precision, representativeness, and reporting limit statistics are similar to these quality indicators generated by other laboratories for similar samples, and data generated by the laboratory over time.

Comparability objective is documented by inter-laboratory studies carried out by regulatory agencies or carried out for specific projects or contracts, by comparison of periodically generated statements of accuracy, precision, and reporting limits with those of other laboratories.

7.4.5 Completeness

The completeness objective for data is 90% (or as specified by a particular project), expressed as the ratio of the valid data to the total data over the course of the project. Data will be

considered valid if they are adequate for their intended use. Data usability will be defined in a QAPP, project scope, or regulatory requirement. Data validation is the process for reviewing data to determine its usability and completeness. If the completeness objective is not met, actions will be taken internally and with the data user to improve performance. This may take the form of an audit to evaluate the methodology and procedures as possible sources for the difficulty or may result in a recommendation to use a different method.

7.4.6 Selectivity

Selectivity is defined as the capability of a test method or instrument to respond to a target substance or constituent in the presence of non-target substances. Target analytes are separated from non-target constituents and subsequently identified/detected through one or more of the following, depending on the analytical method: extractions (separation), digestions (separation), interelement corrections (separation), use of matrix modifiers (separation), specific retention times (separation and identification), confirmations with different columns or detectors (separation and identification), specific wavelengths (identification), specific mass spectra (identification), and specific electrodes (separation and identification).

7.4.7 Sensitivity

Sensitivity refers to the amount of analyte necessary to produce a detector response that can be reliably detected (above the Method Detection Limit) or quantified (above the Reporting Limit).

7.5 Criteria for Quality Indicators

The laboratory maintains a *Quality Control Criteria Summary that contains tables* that summarize the precision and accuracy acceptability limits for performed analyses (EM-QA-R-5730). This summary includes an effective date, is updated each time new limits are generated, and are managed by the laboratory's QA department. Unless otherwise noted, limits within these tables are laboratory generated. Some acceptability limits are derived from US EPA methods when they are required. Where US EPA method limits are not required, the laboratory has developed limits from evaluation of data from similar matrices. Criteria for development of control limits is contained in EM-AD-S-3548, Selection and Validation of Analytical Methods.

7.6 Statistical Quality Control

Statistically-derived precision and accuracy limits are required by selected methods (such as NIOSH 7400) and programs (such as the AIHA-LAP, LLC Laboratory Accreditation Program). The laboratory routinely utilizes statistically-derived limits to evaluate method performance and determine when corrective action is appropriate. The current limits in the laboratory are entered into the Laboratory Information Management System (LIMS), also referenced as LabServe. An archive of all limits used within the laboratory is maintained within the LIMS/LabServe and Bugzilla records. If a method defines the QC limits, the method limits are used.

If a method requires the generation of historical limits, the lab develops such limits from recent data in the QC database of LIMS/LabServe following the guidelines described in Section 24. All calculations and limits are documented and dated when approved and effective. On occasion, a client requests contract-specified limits for a specific project.

Current QC limits are entered and maintained in the LIMS/LabServe analyte database. As sample results and the related QC are entered into LIMS/LabServe, the sample QC values are compared with the limits in LIMS/LabServe to determine if they are within the acceptable range. The analyst then evaluates if the sample needs to be re-analyzed.

7.6.1 QC Charts

All QC analyses (duplicates, replicates, daily references) including data reviews, must be completed prior to release of results to clients**.** When QC analysis cannot be completed on the same day, the results must be qualified with a report comment.

Proficiency Testing results, and data from additional QC analyses may be used in determining analyst accuracy and precision, where applicable, for demonstration of continuing capability. If proficiency testing problems arise, the analysts will be asked to review the samples again to determine the source of error. If necessary, corrective actions will be implemented as determined by Quality Assurance, the facility manager and/or the Cluster Leader based on the nature of the problems.

Asbestos-PLM (Document EM-AS-S-1267)
Quality Control Requirements include duplicate analysis, Monthly Reference Sample, and Proficiency testing.

- Replicate and duplicate analyses are performed to evaluate the precision of a particular analysis. The routine analysis portion is processed through the laboratory in a normal manner. After the analysis has been completed, LabServe automated programming triggers the selection of 5% of the completed bulk samples for replicate analysis and 5% for duplicate analysis, based upon service, analyst and batch. The primary data along with the replicate and duplicate data will be statistically analyzed and control limits will be determined for the analyses (also automated by Labserve).
- Proficiency Testing results and data from additional QC analyses may be used in determining analyst accuracy and precision, where applicable, for demonstration of continuing capability. If proficiency testing problems arise, the analysts will be asked to review the samples again to determine the source of error. If necessary, corrective actions will be implemented as determined by Quality Assurance, the facility manager and/or the Cluster Leader based on the nature of the problems.

Asbestos - PCM (Document EM-AS-S-1260)

- Microscopes must be adjusted at least once a day, per analyst. Also, the phase-shift detection limit of the microscope must be checked weekly using the HSE/NPL phase-contrast test slide.
- Quality Control Requirements include duplicate analysis at the rate of 10%, Daily Reference Sample, Round Robin and Proficiency testing.
- The Reference Sample Quality Control Analysis (PCM) is performed by each analyst per day of analysis to evaluate the precision and accuracy of each analyst for fiber identification. The goal of performing Daily Reference Sample Quality Control Analysis is for continuous improvement. The samples for the Daily Reference Sample Quality Control Analysis consist of reference permanent slides, each of which contains varying asbestos or non-asbestos fiber. Each analyst will analyze a randomly selected slide for each day, recording their

results for the fiber counts. The identification by each analyst will be compared with the known standard through LabServe QC criteria automation. Any discrepancies in data comparison trigger an automated failure task for the analyst, who will be required to review the slide again to determine the source of error, and document any associated corrective actions.

- Biannual ongoing demonstration of analyst proficiency using Proficiency Analytical Testing (PAT) samples is required.

Training of Analysts (Document EM-AD-S-1646 and EM-AS-S-1261)

- All new analysts will receive documented training on Eurofins EMLab P&K, LLC analysis and sample preparation procedures as it relates to their individual job functions. The extent and duration of the training will depend on the level of education and experience of the trainee as outlined in Documents EM-AD-S-1646 and EM-AS-S-1261.
- All analytical training will include, but not be limited to, maintaining documentation of the training procedures and duration, a list of criteria documenting that the required steps involved have been addressed during the training, testing using reference materials where available, comparison of trainee results against analyst results, and providing the trainee with training documents and reference texts.
- Analysts and technicians will be authorized to perform a specific task and operate specific instruments once the applicable Training Acknowledgment and Authorization forms have been completed and signed by the trainee and trainer and all related data, reviews, and records have been submitted to Quality Assurance for final review and inclusion in analyst training records.

Analysis of Unknown Samples and Reference Materials

- Where applicable to job responsibilities, analysts will analyze unknown bacterial and/or fungal organisms at least monthly to ensure the consistency of identification. Selection of organisms will be made randomly from laboratory stock cultures.
- Where applicable to job responsibilities, analysts will analyze unknown samples for asbestos identification and quantitation.
- Documentation of the analyses will be maintained by the Quality Assurance department.
- Reference Materials
- Eurofins EMLab P&K, LLC maintains a library of reference materials that are accessible to all analysts. Each facility is responsible for maintaining an individual list of reference texts which are maintained in LabServe.
- Eurofins EMLab P&K, LLC maintains a library of cultures and reference slides. EMPAT and other microbiological reference materials are grown and analyzed by the laboratory on a routine basis.
- Asbestos reference samples such as NIST SRM #1866 and SRM #1867, or equivalent, are also maintained in applicable laboratories, if available.
- The laboratory retains and utilizes proficiency testing materials for use as in-house instructional materials. The proficiency test results are used to verify accuracy and precision for each analyst and to judge the analysts' overall performance. Proficiency test results are used for inter-analyst comparisons and entered into the laboratory’s management system

records. The laboratory determines precision on the qualitative and quantitative analyses of samples by: repeatability - repeat analyses by the same analyst; -comparison of results from multiple slide mounts of the same material; reproducibility - analysis of samples by multiple analysts if possible (single analyst laboratories require more interlaboratory data); and interlaboratory analysis - analysis of samples by other laboratories. The laboratory also determines the accuracy of the qualitative and quantitative analyses of samples by: analysis of proficiency testing materials; analysis of standards either prepared in-house or purchased; and analysis of samples using independent methods (e.g., XRD, gravimetric, etc.).

- When analyzing QC samples (duplicates, replicates) or reference samples, analysts must complete the analysis and enter the results into Labserve or record them on appropriate data sheets, without any assistance from or discussions with other analysts.
- Analysts should not edit the result they reported in Labserve or recorded on appropriate data sheets.

Demonstration of Capability: (Document EM-AD-S-1646)

Semi-annual demonstrations of capability may be accomplished by successful completion of:

- duplicate analyses;
- replicate analyses;
- daily reference analyses and
- proficiency testing samples.
- Acceptable performance criteria for Ongoing Demonstrations of competency are based on the performance characteristics for the method, established either from the data collected from the analysis of QC check samples, those already promulgated by the method, those set by an outside provider or an error rate of ≤1% for Asbestos PLM, and ≤5% for other analyses over a six month period.
- For example, if an analyst is qualified to perform bacterial analyses and is required to participate in the AIHA EMPAT Bacterial Culturable Proficiency Testing program, the acceptable performance for their Ongoing Demonstration of Competency would be a score of ≥85%, which is set by the provider

7.7 Quality System Metrics

In addition to the QC parameters discussed above, the entire Quality System is evaluated on a monthly basis through the use of specific metrics (refer to Section 18). These metrics are used to drive continuous improvement in the laboratory's Quality System.

8.0 DOCUMENT CONTROL

8.1 Overview

The QA Department is responsible for the control of documents used in the laboratory to ensure that approved, up-to-date documents are in circulation and out-of-date (obsolete) documents are archived or destroyed. The following documents, at a minimum, must be controlled:

- Laboratory Quality Assurance Manual
- Laboratory Standard Operating Procedures (SOP)
- Laboratory Policies
- Work Instructions and Forms
- NDSC Documents[1]
- KGDs[1]

[1]Includes locally implemented documents that are document controlled within the laboratory's document control system. The NDSC and/or KGD documents are only considered controlled when they are read on the intranet site. Printed copies are considered uncontrolled unless the laboratory physically distributes them as controlled documents. A detailed description of the procedure for issuing, authorizing, controlling, distributing, and archiving NDSC Official Documents is found in Document CW-Q-S-001, NDSC Document Control and Archiving. The laboratory's internal document control procedure is defined in SOP No. EM-QA-S-2059. All documents that are part of the Eurofins EMLab P&K quality assurance system, either internally generated or external are controlled through the Eurofins EMLab P&K LabServe Document Control system. The formal distribution of documents to Eurofins EMLab P&K employees is conducted through a companywide electronic release of revisions in LabServe. All users with log in credentials are afforded access to current revisions of released documents through the LabServe Document control module.

The laboratory QA Department also maintains access to various references and document sources integral to the operation of the laboratory. This includes reference methods and regulations. Instrument manuals (hard or electronic copies) are also maintained by the laboratory.

The laboratory maintains control of records for raw analytical data and supporting records such as audit reports and responses, logbooks, standard logs, training files, MDL studies, Proficiency Testing (PT) studies, certifications and related correspondence, and corrective action reports *(however named)*. Raw analytical data consists of bound logbooks, instrument printouts, any other notes, magnetic media, electronic data, and final reports.

8.2 Document Approval and Issue

The pertinent elements of the document control system include a unique document title and number, pagination, the total number of pages of the item or an 'end of document' page, the effective date, revision number, and the laboratory's name. The QA personnel are responsible for the maintenance of this system.

Controlled documents are authorized by the QA Department and Regional Laboratory Directors. In some cases, the document owner and/or facility technical managers/approved signatories, may be asked to review controlled documents prior to release. In order to develop a new document, a document owner/author submits an electronic draft to the QA Department for

suggestions, review, and approval before use. Upon approval, QA personnel add the identifying version information to the document and retain that document as the official document on file. That document is then electronically registered and distributed to applicable facilities via LabServe Document Control. Changes to documents stored electronically will be strictly controlled by the LabServe document control system. Handwritten changes to SOPs are not allowed.

The QA Department maintains a list of the official versions of controlled documents. A Master List of Eurofins EMLab P&K Controlled Documents is maintained in LabServe and can be accessed by all employees using the “My Docs" tab on the LabServe home page.

Quality System Policies and Procedures will be reviewed at a minimum of every two years and revised as appropriate. Changes to documents occur when a procedural change warrants.

8.3 Procedures for Document Control Policy

For changes to the QA Manual, and all other quality documents, refer to SOP No. EM-QA-S-2059. Uncontrolled copies must not be used within the laboratory. Printing of Eurofins EMLab P&K SOPs is not permissible unless strictly and exclusively used for review or training purposes. Any document printed for this purpose must be labeled as “UNCONTROLLED” or “OBSOLETE” to indicate it is not a controlled copy. Any official document printed for these purposes must be discarded/shredded immediately following completion of review or training. Previous revisions are removed from general access points and stored within the LabServe Document Control module, and are not accessible to lab personnel. Current electronic copies are stored within LabServe Document Control and are accessible to personnel via the “MyDocs” link after logging in with individual system credentials.

For changes to SOPs, refer to SOP No. EM-QA-S-2059, Document Control and Control of Records.

Forms, worksheets, work instructions and information are organized by department in the LabServe Document Control module. The procedure for the care of these documents is in SOP EM-QA-S-2059.

8.4 Obsolete Documents

All invalid or obsolete documents are removed, or otherwise prevented from unintended use. The laboratory has specific procedures as described above to accomplish this. In general, obsolete documents are removed from general access points in LabServe Document Control. A copy of the obsolete document is archived within LabServe Document Control according to SOP No. EM-QA-S-2059.

9.0 SERVICE TO THE CLIENT

9.1 Overview

The laboratory has established procedures for the review of work requests and contracts, oral or written. The procedures include evaluation of the laboratory's capability and resources to meet the contract's requirements within the requested time period. All requirements, including the methods to be used, must be adequately defined, documented and understood. For many environmental sampling and analysis programs, testing design is site or program specific and does not necessarily fit into a standard laboratory service or product. It is the laboratory's intent to provide both standard and customized environmental laboratory services to our clients.

A thorough review of technical and QC requirements contained in contracts is performed to ensure project success. The appropriateness of requested methods, and the lab's capability to perform them must be established. Projects, proposals, and contracts are reviewed for adequately defined requirements and the laboratory's capability to meet those requirements. Alternate test methods that are capable of meeting the clients' requirements may be proposed by the lab. A review of the lab's capability to analyze non-routine analytes is also part of this review process.

All projects, proposals and contracts are reviewed for the client's requirements in terms of compound lists, test methodology requested, sensitivity (detection and reporting levels), accuracy, and precision requirements (% Recovery and RPD). The reviewer ensures that the laboratory's test methods are suitable to achieve these requirements and that the laboratory holds the appropriate certifications and approvals to perform the work. The laboratory and any potential subcontract laboratories must be certified, as required, for all proposed tests.

Electronic or hard copy deliverable requirements are evaluated against the laboratory's capacity for production of the documentation.

If the laboratory cannot provide all services but intends to subcontract such services, whether to another Eurofins facility on the same LIMS or to an outside firm, this will be documented and discussed with the client prior to contract approval. (Refer to Section 10 for Subcontracting Procedures.)

The laboratory informs the client of the results of the review if it indicates any potential conflict, non-conformance, lack of accreditation, or inability of the lab to complete the work satisfactorily. Any discrepancy between the client's requirements and the laboratory's capability to meet those requirements is resolved in writing before acceptance of the contract. It is necessary that the contract be acceptable to both the laboratory and the client. Amendments initiated by the client and/or Eurofins EMLab P&K are documented in writing.

All contracts, QAPPs, Sampling and Analysis Plans (SAPs), contract amendments, and documented communications become part of the project record.

The same contract review process used for the initial review is repeated when there are amendments to the original contract by the client, and the participating personnel are informed of the changes.

9.2 Review Sequence and Key Personnel

Appropriate personnel will review the work request at each stage of evaluation.

For routine projects and other simple tasks, a review of standard COC submissions by the receiving and log in staff is considered adequate. The receiving and log in staff confirm that the laboratory has any required certifications, that it can meet the clients' data quality and reporting requirements and that the lab has the capacity to meet the clients turn around needs. Routine project submission reviews are performed according to SOP No. EM-SM-S-1288, Sample Receiving, and EM-SM-S-1993, Sample Log-In.

For new, complex or large projects, the proposed contract is given to the Regional Account Manager or Project Manager, who will decide which lab will receive the work based on the scope of work and other requirements, including certification, testing methodology, and available capacity to perform the work. The contract review process is outlined in NDSC Document No. CA-L-P-002**,** Contract Compliance Policy.

This review encompasses all facets of the operation. The scope of work is distributed to the appropriate personnel, as needed based on scope of contract, to evaluate all of the requirements shown above (not necessarily in the order below)**:**

- Contract Administrator
- Laboratory Project Manager
- Laboratory Cluster Leaders and/or Technical Managers
- Account Executives
- Quality Managers
- Laboratory Environmental Health and Safety Managers/Directors
- The Laboratory Director reviews the formal laboratory quote and makes final acceptance for their facility.

The Sales Director, Contract Administrator, Account Executive or Proposal Coordinator then submits the final proposal to the client.

In the event that one of the above personnel is not available to review the contract, his or her back-up will fulfill the review requirements.

9.3 Balancing Laboratory Capacity and Workload

Evaluating laboratory capacity to perform specific projects is the responsibility of the Business Unit Manager, Cluster Leaders, Facility Managers, and Client Services. Many analysts are cross-trained to perform a variety of tests, and there is redundant equipment available in case of malfunctions. This minimizes the need to evaluate small and medium size projects against capacity available to complete them. Large and complex projects are reviewed against capacity estimates before bids are submitted to ensure that the client's analysis schedule is met. Regularly scheduled meetings are held between laboratory management, PMs, Client Services and QA personnel to review progress with current projects, as well as special requirements of new work scheduled for the laboratory. Laboratory capacity and backlog is tracked on a continuous basis using information from the Laboratory Sample Information System (LIMS) including turnaround time, and work in-house.

9.4 Documentation

Copies of all signed and/approved contracts are maintained within LabServe account records.

Appropriate records are maintained for every contract or work request. All stages of the contract review process are documented and include records of any significant changes.

The contract will be distributed to and maintained by the appropriate sales/marketing personnel and the Account Executive. A copy of the contract and formal quote will be filed with the laboratory PM and the Laboratory Director.

Records are maintained of pertinent discussions with a client relating to the client's requirements or the results of the work during the period of execution of the contract. The PM keeps a phone log of conversations with the client.

9.4.1 Project-Specific Quality Planning

Communication of contract specific technical and QC criteria is an essential activity in ensuring the success of site specific testing programs. To achieve this goal, a PM is assigned to each client. It is the PM's responsibility to ensure that project-specific technical and QC requirements are effectively evaluated and communicated to the laboratory personnel before and during the project. QA department involvement may be needed to assist in the evaluation of custom QC requirements.

PM's are the primary client contact and they ensure resources are available to meet project requirements, they coordinate opportunities and work with laboratory management and supervisory staff to ensure available resources are sufficient to perform work for the client's project.

Prior to work on a new project, the dissemination of project information and/or project opening meetings may occur to discuss schedules and unique aspects of the project. Items to be discussed may include the project technical profile, turnaround times, holding times, methods, analyte lists, reporting limits, deliverables, sample hazards, or other special requirements. The PM introduces new project information to maximize production and client satisfaction, while maintaining quality.Project notes may be associated with each sample batch as a reminder upon sample receipt and analytical processing.

Any change that may occur within an active project is agreed upon between the client/regulatory agency and the PM/laboratory. These changes (e.g., use of a non-standard method or modification of a method) and approvals must be documented prior to implementation. Documentation pertains to any document (e.g., letter, e-mail, variance, contract addendum), which has been signed by both parties.

Such changes are also communicated to the laboratory either during operations meetings or via LabServe project tasks. Such changes are updated to the project notes and are introduced to the managers at these meetings. The laboratory staff is then introduced to the modified requirements via the PM or the individual laboratory Technical Manager. After the modification is implemented into the laboratory process, documentation of the modification is made in the case narrative of the data report(s), where applicable.

The laboratory strongly encourages client visits to the laboratory and for formal/informal information sharing session with employees in order to effectively communicate ongoing client needs as well as project specific details for customized testing programs.

9.5 Special Services

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. It is the laboratory's goal to meet all client requirements in addition to statutory and regulatory requirements. The laboratory has procedures to ensure confidentiality to clients (Section 15 and 25).

The laboratory's standard procedures for reporting data are described in Section 25. Special services are also available and provided upon request. These services include:

- Reasonable access for our clients or their representatives to the relevant areas of the laboratory for the witnessing of tests performed for the client.
- Assisting client-specified third party data validators as specified in the client's contract.
- Supplemental information pertaining to the analysis of their samples. Note: An additional charge may apply for additional data/information that was not requested prior to the time of sample analysis or previously agreed upon.

When the client requests a statement of conformity to a specification or standard based on the analysis performed by the laboratory (e.g., pass/fail, in-tolerance/out-of-tolerance), the decision rule shall be clearly defined. Unless inherent in the requested specification or standard, the decision rule selected shall be communicated to the client. Associated reporting requirements are addressed in Section 25.2.18.

9.6 Client Communication

PMs are the primary communication link to the clients. They shall inform their clients of any delays in project completion as well as any non-conformances in either sample receipt or sample analysis. Project management will maintain ongoing client communication throughout the entire client project.

Technical Managers and/or Regional Laboratory Directors are available to discuss any technical questions or concerns that the client may have.

9.7 Reporting

The laboratory works with our clients to produce any special communication reports required by the contract.

9.8 Client Surveys

The laboratory assesses both positive and negative client feedback. The results are used to improve overall laboratory quality and client service. Eurofins Sales and Marketing teams periodically develop lab and client specific surveys to assess client satisfaction.

When a complaint is received, we determine, to the best of our ability, the extent of the issue and what data is in question. The person receiving the complaint documents this information

and promptly forwards it to the appropriate management personnel where the work in question was performed. If a data reporting error is discovered, the final report and/or data must be regenerated with the correct value(s).

The person receiving the complaint is responsible for entering client concerns into Labserve via the task system, ensuring that concerns selections are marked. In some cases, an ICAT is initiated to address and document the situation. While an individual issue may not warrant a formal investigation, QA monitors these issues for potential trends and will issue an ICAT if a trend is evident.

10.0 SUBCONTRACTING OF TESTS

10.1 Overview

For the purpose of this quality manual, the phrase subcontract laboratory refers to a laboratory external to the Eurofins EMLab P&K. The phrase “work sharing” refers to internal transfers of samples between the Eurofins EMLab P&K laboratories. The term outsourcing refers to the act of subcontracting tests.

When contracting with our clients, the laboratory makes commitments regarding the services to be performed and the data quality for the results to be generated. When the need arises to outsource testing for our clients because project scope, changes in laboratory capabilities, capacity, or unforeseen circumstances, we must be assured that the subcontractors or work sharing laboratories understand the requirements and will meet the same commitments we have made to the client. Refer to Eurofins EMLab P&K’s Sample Receiving SOP (EM-SM-S-1288) for Subcontracting Procedures and the Work Sharing Process.

When outsourcing analytical services, the laboratory will assure, to the extent necessary, that the subcontract or work sharing laboratory maintains a program consistent with the requirements of this document, the requirements specified in the current ISO/IEC 17025 and/or the client’s Quality Assurance Project Plan (QAPP). All QC guidelines specific to the client’s analytical program are transmitted to the subcontractor and agreed upon before sending the samples to the subcontract facility. Additionally, work requiring accreditation will be placed with an appropriately accredited laboratory. The laboratory performing the subcontracted work will be identified in the final report, as will non-TNI accredited work where required.

Project Managers (PMs) or other responsible Client Service members, for the Export Lab (i.e., the Eurofins EMLab P&K laboratory that transfers samples to another laboratory) are responsible for obtaining client approval prior to subcontracting any samples. The laboratory will advise the client of a subcontract arrangement in writing and when possible approval from the client shall be obtained and retained in the project folder. Standard Eurofins EMLab P&K Terms & Conditions include the flexibility to work-share samples within the Eurofins EMLab P&K laboratories. Therefore, additional advance notification to clients for intra-laboratory work-shares is not necessary unless specifically required by a client contract. Unless the client has specified a particular location where Eurofins EMLab P&K, LLC is to perform its services, Eurofins EMLab P&K, LLC may perform services for the client at any laboratory in its network provided that for the samples being work-shared, the receiving lab has the same requested services on its Scope of Accreditation as the lab to which the samples were originally sent. Before samples are work-shared, Eurofins EMLab P&K, LLC will advise the client of the arrangement in writing by

requesting a Transfer Approval/Disapproval Agreement to be completed by the client. These agreements will be kept on file for future use. Every attempt will be made to gain the client's approval in writing using the Transfer Approval/Disapproval Agreement. If the client does not respond to the approval request, Eurofins EMLab P&K, LLC retains the right, at its discretion, to work-share services ordered by the client to another Eurofins EMLab P&K, LLC laboratory or other laboratories.

Note: In addition to the client, some regulating agencies (e.g., USDA) or contracts require notification prior to placing such work**.**

10.2 Qualifying and Monitoring Subcontractors

Whenever a PM or Regional Account Manager becomes aware of a client requirement or laboratory need where samples must be outsourced to another laboratory, the other laboratory(s) shall be selected based on the following:

- Subcontractors specified by the client - In these circumstances, the client assumes responsibility for the quality of the data generated from the use of a subcontractor.
- Subcontractors reviewed by Eurofins EMLab P&K – Firms which have been reviewed by the company and are known to meet standards for accreditations (e.g., AIHA-LAP, LLC, NVLAP, State specific accreditations, TNI, etc.); technical specifications; legal and financial information.

A listing of vendors is available on the Eurofins Environment Testing TestAmerica intranet site.

All Eurofins EMLab P&K laboratories are pre-qualified for work sharing provided they hold the appropriate accreditations and can adhere to the project/program requirements. Client approval is not necessary unless specifically required by the contract. In these cases, the client must provide acknowledgement that the samples can be sent to that facility (an e-mail is sufficient documentation or if acknowledgement is verbal, the date, time, and name of person providing acknowledgement must be documented). The originating laboratory is responsible for communicating all technical, quality, and deliverable requirements as well as other contract needs. (NDSC Document No. CA-C-S-001, Work Sharing Process).

Eurofins EMLab P&K, LLC will be held responsible for data produced as a result of subcontracting of work, except in the case where the client or a regulatory authority specifies which subcontractor is to be used.

Prior to submitting samples to subcontractors the samples may be logged into the LIMS/LabServe and assigned a Eurofins EMLab Project ID number. A Chain of Custody (COC) must be signed to document transfer to the subcontracting laboratory. All data reported from a subcontractor shall list the name of the laboratory performing the analysis. A copy of the COC must be part of the report sent to Eurofins EMLab P&K, LLC after completion of the analysis by the subcontractor.

10.2.1 When the potential sub-contract laboratory has not been previously approved, RAMs or PMs may nominate a laboratory as a subcontractor based on need. The decision to nominate a laboratory must be approved by the Business Unit Manager or Cluster Leader. The Business Unit Manager or Cluster Leader requests that the QA Manager or PM begin the process of

approving the subcontract laboratory as outlined in NDSC Document No. CW-L-S-004, Subcontracting Procedures.

Once the appropriate accreditation and legal information is received by the laboratory, it is evaluated for acceptability and forwarded to the NDSC Quality Information Manager (QIM) for review. After the NDSC QIM reviews the documents for completeness, the information is forwarded to the Finance Department for formal signature and contracting with the laboratory. The approved vendor will be added to the approved subcontractor list on the intranet site, and the finance group is concurrently notified.

The client will assume responsibility for the quality of the data generated from the use of a subcontractor they have requested the lab to use. The qualified subcontractors on the intranet site are known to meet minimal standards. Eurofins EMLab P&K does not certify laboratories. The subcontractors on our approved list can only be recommended to the extent that we would use them.

10.3 Oversight and Reporting

The status and performance of qualified subcontractors will be monitored by NDSC, and includes an annual review process (see NDSC Document No. CW-L-S-004). Any problems identified will be brought to the attention of NDSC and/or Procurement personnel.

- Complaints shall be investigated. Documentation of the complaint, investigation, and corrective action will be maintained in the subcontractor's file on the intranet site. Complaints are posted using the Vendor Performance Report.
- Information shall be updated on the intranet when new information is received from the subcontracted laboratories.
- Subcontractors in good standing will be retained on the intranet listing. Client Services personnel will notify all Eurofins EMLab P&K laboratories, NDSC, and Corporate Contracts if any laboratory requires removal from the intranet site. This notification will be posted on the intranet site and e-mailed to all Client Services Personnel, Cluster Leaders, QA Managers, and Sales Personnel.

Prior to initially sending samples to the subcontracted laboratory, the PM confirms their certification status to determine if it's current and scope-inclusive. The information is documented within the project records.

10.3.1 All subcontracted samples must be accompanied by a Eurofins EMLab P&K Chain of Custody (COC). A copy of the original COC sent by the client must be available in LIMS for all samples workshared within Eurofins EMLab P&K. Client COCs are only forwarded to external subcontractors when samples are shipped directly from the project site to the subcontractor lab. Under routine circumstances, client COCs are not provided to external subcontractors.

Through communication with the subcontracted laboratory, the PM monitors the status of the subcontracted analyses, facilitates successful execution of the work, and ensures the timeliness and completeness of the analytical report.

Non-TNI accredited work must be identified in the subcontractor's report as appropriate. If TNI accreditation is not required, the report does not need to include this information.

Reports submitted from subcontractor laboratories are not altered and are included in their original form in the final project report. This clearly identifies the data as being produced by a subcontractor facility. If subcontract laboratory data is incorporated into the laboratory's EDD (i.e., imported), the report must explicitly indicate which lab produced the data for which methods and samples.

Note: The results submitted by a Eurofins EMLab P&K work sharing laboratory may be transferred electronically and the results reported by the Eurofins EMLab P&K work sharing lab are identified on the final report. The report must explicitly indicate which lab produced the data for which methods and samples. The final report must include a copy of the completed COC for all work sharing reports.

10.4 Contingency Planning

The full qualification of a subcontractor may be waived to meet emergency needs. This decision and justification must be documented in the project files, and the 'Purchase Order Terms And Conditions For Subcontracted Laboratory Services' must be sent with the samples and COC.

In the event this provision is utilized, the laboratory (e.g., PM) will be required to verify and document the applicable accreditations of the subcontractor. All other quality and accreditation requirements will still be applicable, but the subcontractor need not have signed a subcontract agreement with Eurofins EMLab P&K at this time.

The use of any emergency subcontractor will require the PM to complete a ~~JDE~~ New Vendor Add Form in order to process payment to the vendor and add them to LIMS/LabServe. This form requires the user to define the subcontractor's category/s of testing and the reason for testing.

10.4 Use of NELAP and A2LA Logo

It is not laboratory policy to use these logos on any company letterhead, including analytical reports.

11.0 PURCHASING SERVICES AND SUPPLIES

11.1 Overview

Evaluation and selection of suppliers and vendors is performed, in part, on the basis of the quality of their products, their ability to meet the demand for their products on a continuous and short term basis, the overall quality of their services, their past history, and competitive pricing. This is achieved through evaluation of objective evidence of quality furnished by the supplier, which can include certificates of analysis, recommendations, and proof of historical compliance with similar programs for other clients. To ensure that quality critical consumables and equipment conform to specified requirements, which may affect quality, all purchases from

specific vendors are approved by a member of the supervisory or management staff. Capital expenditures are made in accordance with Eurofins TestAmerica's Fixed Asset Acquisition, Retention and Safeguarding SOP No. CW-F-S-007.

Contracts will be signed in accordance with the laboratory's authorization matrix, or refer to NDSC Document No. CW-F-P-002. Request for Proposals (RFP's) will be issued where more information is required from the potential vendors than just price. Process details are available in NDSC Document No. CW-F-P-004, Guidance on Procurement and Contracts Policy. RFP's allow the laboratory to determine if a vendor is capable of meeting requirements such as supplying all of the Eurofins TestAmerica facilities, meeting required quality standards and adhering to necessary ethical and environmental standards. The RFP process also allows potential vendors to outline any additional capabilities they may offer.

11.2 Glassware

Glassware used for volumetric measurements must be Class A or verified for accuracy according to laboratory procedure. Pyrex (or equivalent) glass should be used where possible. For safety purposes, thick-wall glassware should be used where available.

11.3 Reagents, Standards & Supplies

Purchasing guidelines for equipment, consumables, and reagents must meet the requirements of the specific method and testing procedures for which they are being purchased.

11.3.1 Purchasing

Chemical reagents, solvents, glassware, and general supplies are ordered as needed to maintain sufficient quantities on hand. Materials used in the analytical process must be of a known quality. The wide variety of materials and reagents available makes it advisable to specify recommendations for the name, brand, and grade of materials to be used in any determination. This information is contained in the method SOP. Requests for reagents, standards, or supplies are directed to facility managers, Cluster Leaders, or designee. For labs using on-site consignment, analyst may check the item out of the on-site consignment system that contains items approved for laboratory use.

11.3.2 Receiving

It is the responsibility of the facility manager, or designee, to receive the shipment. It is the responsibility of the receiving personnel to document the date materials were received. Once the ordered reagents or materials are received, the receiver compares the information on the label or packaging to the original order to ensure that the purchase meets the quality level specified. This is documented through the addition of the received date and initials to the information present on the packing slip. All reagents and media received by the laboratory for internal use must be dated and initialed upon receipt, and assigned an expiration date if one is not assigned by the manufacturer. All items are to be stored according to manufacturer's instructions and SDS requirements. The Certification of Analysis and other Quality Control records for specific medium and reagent lots supplied by the vendors are maintained at each facility. (Supply Receiving and Distribution East, Document EM-MR-S-1209, and Supply Receiving and Distribution West, Document EM-MR-S-7350)

Materials may not be released for use in the laboratory until they have been inspected, verified as suitable for use, and the inspection/verification has been documented. Materials which are found to not meet expected requirements and level of quality either at receiving or upon initial use, are to be set aside for return to the vendor. Facility managers, or designees, are to be notified of any negative trend noted in quality of vendor materials for further evaluation and vendor replacement as needed. Trends are reported immediately by the laboratory staff to the Purchasing Group.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.

Any media or reagents generated by the laboratory must follow the prescribed procedure for quality control checking prior to use in analysis. **I**n-house generated standards or reagents must complete quality control checks, before being used in the processing of samples. All standards and reagents produced by the laboratory are produced with a description of content, preparer's initials, manufacturer and lot number of parent material, pH (if applicable), assigned lot numbers and expiration dates.

All standards used to calibrate instruments or measuring devices must be traceable to the NIST, or equivalent national or international standard.

Safety Data Sheets (SDSs) are available online through the Company's intranet website. Anyone may review these for relevant information on the safe handling and emergency precautions of on-site chemicals.

11.3.3 Specifications

Methods used in the laboratory specify the grade of reagent that must be used in the procedure. If the quality of the reagent is not specified, analytical reagent grade will be used. It is the responsibility of the analyst to check the procedure carefully for the suitability of grade of reagent.

Reagents, media, and chemicals must not be used past the manufacturer's expiration date and must not be used past the expiration time noted in a method SOP. If expiration dates or recommended retest dates are not provided, the laboratory may contact the manufacturer to determine an expiration date. If no recommended expiration is available, the laboratory will assume a 5 year expiration from date of manufacture.

Wherever possible, standards must be traceable to national or international standards of measurement or to national or international reference materials. Records to that effect are available to the user.

Where applicable, compressed gases in use are checked for pressure and secure positioning daily. To prevent a tank from going to dryness, or introducing potential impurities, the pressure should be closely watched as it decreases to approximately 15% of the original reading, at which point it should be replaced. For example, a standard sized laboratory gas cylinder containing 3,000 psig of gas should be replaced when it drops to approximately 500 psig. The

quality of the gases must meet method or manufacturer specification or be of a grade that does not cause any analytical interference.

Water used in the preparation of samples, standards or reagents must meet the applicable water quality requirements noted in individual method SOPs.

The laboratory may purchase reagent grade (or other similar quality) water for use in the laboratory. This water must be certified clean by the supplier for all target analytes or otherwise verified by the laboratory prior to use. This verification is documented.

Purchased bottleware used for sampling must be certified clean and the certificates must be maintained. If uncertified sampling bottleware is purchased, all lots must be verified clean prior to use. This verification must be maintained. (Reference SOPs EM-MR-S-1209 and EM-MR-S-7350.)

11.3.4 Storage

Reagent and chemical storage is important from the aspects of both integrity and safety. Light-sensitive reagents may be stored in brown-glass containers. Storage conditions are per the NDSC Environmental Health & Safety Manual Document No. CW-E-M-001, the local laboratory EH&S manual addendum and method SOPs or manufacturer instructions.

11.4 Purchase of Equipment / Instruments / Software

When a new piece of equipment is needed, either for additional capacity or for replacing inoperable equipment, the analyst or supervisor makes a supply request to the Facility Manager, Cluster Leader, or the Business Unit Manager. If they agree with the request, the procedures outlined in NDSC Document No. CA-T-P-001, Qualified Products List, are followed. A decision is made as to which piece of equipment can best satisfy the requirements. The appropriate written requests are completed and purchasing places the order.

Upon receipt of a new or used piece of equipment, an identification name is assigned and added to the equipment list. Its capability is assessed to determine if it is adequate or not for the specific application. For instruments, a calibration curve is generated, followed by MDLs, Demonstration of Capabilities (DOCs), and other relevant criteria (refer to Section 19). For software, its operation must be deemed reliable and evidence of instrument verification must be retained by the QA Department. Software certificates supplied by the vendors are filed with the QA Department. The manufacturer's operation manual is retained locally at each facility.

11.5 Services

Service to analytical instruments (except analytical balances) is performed on an as needed basis. Routine preventative maintenance is discussed in Section 20. The need for service is determined by analysts and/or Technical Managers. The service providers that perform the services are approved by the Facility Manager.

Analytical balances are serviced and calibrated annually in accordance with SOP EM-EQ-S-1584. The calibration and maintenance services are performed on-site, and the balances are returned to use immediately following successful calibration. Calibration certificates are filed for reference. If the calibration was unsuccessful, the balance is immediately removed from service and segregated pending either further maintenance or disposal.

Calibration services for support equipment such as thermometers, weight sets, autopipettors, etc., are obtained from vendors with current and valid ISO/IEC 17025 accreditation for calibration of the specific piece of equipment. Prior to utilizing the vendor's services, the vendor's accreditation status is verified. Once the equipment has been calibrated, the calibration certificates are reviewed by the QA department, and documentation of the review is filed with the calibration certificates. The equipment is then returned to service within the laboratory.

11.6 Suppliers

The laboratory selects vendors through a competitive proposal / bid process, strategic business alliances or negotiated vendor partnerships (contracts). This process is defined in the NDSC Procurement & Contracts Policy (Document No. CW-F-P-004). The level of control used in the selection process is dependent on the anticipated spending amount and the potential impact on the laboratory's business. Vendors that provide test and measuring equipment, solvents, standards, certified containers, instrument related service contracts or subcontract laboratory services shall be subject to more rigorous controls than vendors that provide off-the-shelf items of defined quality that meet the end use requirements. The purchasing system includes all suppliers/vendors that have been approved for use.

Evaluation of suppliers is accomplished by ensuring the supplier ships the product or material ordered and that the material is of the appropriate quality. This is documented by signing off on packing slips or other supply receipt documents. The purchasing documents contain the data that adequately describe the services and supplies ordered.

Any issues of vendor performance are to be reported immediately by the laboratory staff to thePurchasing Group by completing a Vendor Performance Report.

The Purchasing Group will work through the appropriate channels to gather the information required to clearly identify the problem and will contact the vendor to report the problem and to make any necessary arrangements for exchange, return authorization, credit, etc.

Suppliers are subject to re-evaluation, as deemed appropriate, through the use of Vendor Performance Reports used to summarize and review to determine corrective action necessary, or service improvements required by vendors

The laboratory has access to a listing of all approved suppliers of critical consumables, supplies and services. This information is provided through the purchasing system.

11.6.1 New Vendor Procedure

Laboratory employees who wish to request the addition of a new vendor must complete a Vendor Add Request Form.

New vendors are evaluated based upon criteria appropriate to the products or services provided as well as their ability to provide those products and services at a competitive cost. Vendors are also evaluated to determine if there are ethical reasons or potential conflicts of interest with laboratory employees that would make it prohibitive to do business with them as well as their

financial stability. The QA Department and/or the Cluster Leaders and Business Unit Manager are consulted with vendor and product selection that have an impact on quality.

12.0 COMPLAINTS

12.1 Overview

The laboratory considers an effective client complaint handling processes to be of significant business and strategic value. Listening to and documenting client concerns captures client knowledge that enables our operations to continually improve processes and client satisfaction. An effective client complaint handling process also provides assurance to the data user that the laboratory will stand behind its data, service obligations and products.

A client complaint is any expression of dissatisfaction with any aspect of our business services (e.g., communications, responsiveness, data, reports, invoicing and other functions) expressed by any party, whether received verbally or in written form. Client inquiries, complaints or noted discrepancies are documented, communicated to management, and addressed promptly and thoroughly.

The laboratory has procedures for addressing both external and internal complaints with the goal of providing satisfactory resolution to complaints in a timely and professional manner.

The nature of the complaint is identified, documented and investigated, and an appropriate action is determined and taken. In cases where a client complaint indicates that an established policy or procedure was not followed, the QA Department must evaluate whether a special audit must be conducted to assist in resolving the issue. A written confirmation or letter to the client, outlining the issue and response taken is recommended as part of the overall action taken.

The process of complaint resolution and documentation utilizes the procedures outlined in Section 12 (Corrective Actions) and is documented following EM-CS-S-1709, Resolving Client Concerns and Soliciting Client Feedback, and/or EM-QA-S-3553, Root Cause and Corrective Actions, as applicable.

12.2 External Complaints

An employee that receives a complaint initiates the complaint resolution process by first documenting the complaint according to (EM-CS-S-1709).

Complaints fall into two categories: correctable and non-correctable. An example of a correctable complaint would be one where a report re-issue would resolve the complaint. An example of a non-correctable complaint would be one where a client complains that their data was repeatedly late. Non-correctable complaints should be reviewed for preventive action measures to reduce the likelihood of future occurrence and mitigation of client impact.

The general steps in the complaint handling process are:

- Receiving and documenting complaints
- Acknowledging receipt of complaint, whenever possible

- Complaint investigation and service recovery
- Process improvement

The laboratory shall inform the initiator of the complaint of the results of the investigation and the corrective action taken, if any.

12.3Internal Complaints

Internal complaints include, but are not limited to: errors and non-conformances, training issues, internal audit findings, and deviations from methods. Corrective actions may be initiated by any staff member who observes a nonconformance and shall follow the procedures outlined in Section 12. In addition, Executive Management, Sales and Marketing and IT may initiate a complaint by contacting the laboratory or through the corrective action system described in Section 14.

12.4Management Review

The number and nature of client complaints is reported by the QA Manager to the Laboratory Director and Quality Director in the QA Monthly report. Monitoring and addressing the overall level and nature of client complaints and the effectiveness of the solutions is part of the Annual Management Systems Review (Section 18).

13.0 CONTROL OF NON-CONFORMING WORK

13.1Overview

When data discrepancies are discovered or deviations and departures from laboratory SOPs, policies and/or client requests have occurred, corrective action is taken immediately. First, the laboratory evaluates the significance of the nonconforming work. Then, a corrective action plan is initiated based on the outcome of the evaluation. If it is determined that the nonconforming work is an isolated incident, the plan could be as simple as adding a qualifier / report comment to the final results and/or making a notation in the project log. If it is determined that the nonconforming work is a systematic or improper practices issue, the corrective action plan could include a more in depth investigation and a possible suspension of an analytical method. In all cases, the actions taken are documented using the laboratory's corrective action system (refer to Section 12).

Due to the frequently unique nature of environmental samples, sometimes departures from documented policies and procedures are needed. When an analyst encounters such a situation, the problem is presented to the supervisor for resolution. (this may be done via LabServe task system.) The supervisor may elect to discuss it with the Technical Manager or have a representative contact the client to decide on a logical course of action. Once an approach is agreed upon, it must be documented via the LabServe project task system. This information can then be supplied to the client in the form of a report comment, where applicable.

Project Management may encounter situations where a client may request that a special procedure be applied to a sample that is not standard lab practice. Based on a technical evaluation, the lab may accept or opt to reject the request based on technical or ethical merit. An example might be the need to report an analyte that the lab does not normally report. The

lab would not have validated the method for this compound following the procedures in Section 19. The client may request that the compound be reported based only on the calibration. Such a request would need to be approved by the QA Manager and the Cluster Leader, documented and included in the project record. Deviations **must** also be noted on the final report with a statement that the analyte is not reported in compliance with the analytical method requirements and the reason. Data being reported to a non-TNI state would need to note the change made to how the method is normally run.

13.2Responsibilities and Authorities

Under certain circumstances, the Cluster Leader, a Technical Manager, or a member of the QA team may authorize departures from documented procedures or policies. The departures may be a result of procedural changes due to the nature of the sample; a one-time procedure for a client; QC failures with insufficient sample to reanalyze, etc. In most cases, the client will be informed of the departure prior to the reporting of the data. Any departures must be well documented using the laboratory's corrective action procedures. This information may also be documented in logbooks and/or data review checklists as appropriate**.** Any impacted data must be referenced in a case narrative and/or flagged with an appropriate data qualifier.

Any misrepresentation or possible misrepresentation of analytical data discovered by any laboratory staff member must be reported to facility Senior Management within 24-hours. The Senior Management staff is comprised of the Business Unit Manager,Cluster Leader, the QA Manager, and the Facility/Technical Managers. The reporting of issues involving alleged violations of the company's Data Integrity or Manual Integration procedures must be conveyed to an ECO (e.g., the VP-QA/EHS) and the laboratory's Quality Manager within 24 hours of discovery.

Whether an inaccurate result was reported due to calculation or quantitation errors, data entry errors, improper practices, or failure to follow SOPs, the data must be evaluated to determine the possible effect.

The Business Unit Manager, Cluster Leader, QA Manager, ECOs, VP of Operations and the Quality Directors have the authority and responsibility to halt work, withhold final reports, or suspend an analysis for due cause as well as authorize the resumption of work.

13.3Evaluation of Significance and Actions Taken

For each nonconforming issue reported, an evaluation of its significance and the level of management involvement needed is made. This includes reviewing its impact on the final data, whether or not it is an isolated or systematic issue, and how it relates to any special client requirements.

The NDSC Document entitled Data Recalls (CW-Q-S-005) is the procedure to be followed when it is discovered that erroneous or biased data may have been reported to clients or regulatory agencies.

The NDSC Document entitled Internal Investigations (CW-L-S-002) is the procedure to be followed for investigation and correction of situations involved alleged incidents of misconduct or violation of the company's ethics policy.

Laboratory level decisions are documented and approved using the laboratory's standard nonconformance/corrective action reporting in lieu of the data recall determination form contained in NDSC Document No. CW-Q-S-005.

13.4 Prevention of Nonconforming Work

If it is determined that the nonconforming work could recur, further corrective actions must be made following the laboratory's corrective action system. Periodically as defined by the laboratory's preventive action schedule, the QA Department evaluates non-conformances to determine if any nonconforming work has been repeated multiple times. If so, the laboratory's corrective action process may be followed.

13.5 Method Suspension / Restriction (Stop Work Procedures)

In some cases, it may be necessary to suspend/restrict the use of a method or target analyte which constitutes significant risk and/or liability to the laboratory. Suspension/restriction procedures can be initiated by any of the persons noted in Section 13.2, Paragraph 5.

Prior to suspension/restriction, confidentiality will be respected, and the problem with the required corrective and preventive action will be stated in writing and presented to the Cluster Leader.

The Cluster Leader shall arrange for the appropriate personnel to meet with the QA Manager as needed. This meeting shall be held to confirm that there is a problem, that suspension/restriction of the method is required and will be concluded with a discussion of the steps necessary to bring the method/target or test fully back on line. In some cases, that may not be necessary if all appropriate personnel have already agreed there is a problem and there is agreement on the steps needed to bring the method, target or test fully back on line. The QA Manager will also initiate a corrective action report as described in Section 12 if one has not already been started. A copy of any meeting notes and agreed upon steps should be e-mailed by the laboratory to their Business Unit President, Business Unit Manager, and VP-QA & EHS . This e-mail acts as notification of the incident.

After suspension/restriction, the lab will hold all reports to clients pending review. No faxing, mailing or distributing through electronic means may occur. The report must not be posted for viewing on the internet. It is the responsibility of the Laboratory Director to hold all reporting and to notify all relevant laboratory personnel regarding the suspension/restriction (e.g., Project Management, Log-in, etc.). Clients will NOT generally be notified at this time. Analysis may proceed in some instances depending on the non-conformance issue.

Within 72 hours, the QA Manager will determine if compliance is now met and reports can be released, OR determine the plan of action to bring work into compliance, and release work. A team, with all principals involved (e.g., Cluster Leader, Facility/Technical Manager, QA Manager) can devise a start-up plan to cover all steps from client notification through compliance and release of reports. Project Management and the Directors of Client Services and Sales and Marketing must be notified if clients must be notified or if the suspension/restriction affects the laboratory's ability to accept work. The QA Manager must approve start-up or elimination of any restrictions after all corrective action is complete.

14.0 CORRECTIVE ACTION

14.1Overview

A major component of the laboratory's Quality Assurance (QA) Program is the problem investigation and feedback mechanism designed to keep the laboratory staff informed on quality related issues and to provide insight to problem resolution. When nonconforming work or departures from policies and procedures in the quality system or technical operations are identified, the corrective action procedure provides a systematic approach to assess the issues, restore the laboratory's system integrity, and prevent reoccurrence. Eurofins EMLab P&K employs two systems to manage non-conformances. Issues suspected of being systematic in nature and for which root cause analysis and a formal Corrective Action Report (CAR) are documented in the Incident Corrective Action Tracking (ICAT) database. Routine batch non-conformances, events that are understood to be isolated in nature, are documented in the LabServe task system.

14.2General

Problems within the quality system or within analytical operations may be discovered in a variety of ways, such as QC sample failures, internal or external audits, proficiency testing (PT) performance, client complaints, staff observation, etc.

The purpose of a corrective action system is to:

- Identify non-conformance events and assign responsibility for investigating.
- Resolve non-conformance events and assign responsibility for any required corrective action.
- Identify systematic problems before they become serious.
- Identify and track client complaints and provide resolution.

14.2.1 LabServe Task System - is used to document the following types of corrective actions:

- Deviations from an established procedure or SOP
- QC outside of limits
- Isolated reporting / calculation errors
- Client complaints

14.2.2 Corrective Actions Documented In the ICAT Database

- Internal and external audit findings
- Failed or unacceptable PT results
- Identified poor process or method performance trends
- Issues found while reviewing tasks that warrant further investigation
- Systematic reporting / calculation errors
- Data recall investigations
- Questionable trends that are found in the review of NCMs.
- Client complaints

- Excessive revised reports
- Health and Safety violations

The ICAT database is used to document background information, track the results of corrective action investigations and root cause analysis, and to provide reports of corrective action plans.

14.3Closed Loop Corrective Action Process

Any employee in the company can initiate a corrective action. There are four main components to a closed-loop corrective action process once an issue has been identified: Cause Analysis, Selection and Implementation of Corrective Actions (both short and long term), Monitoring of the Corrective Actions, and Follow-up.

14.3.1 Cause Analysis

- Upon discovery of a non-conformance event, the event must be defined and documented. A LabServe task or entry into the ICAT system must be initiated, someone is assigned to investigate the issue and the event is investigated for cause. Table 12-1 provides some general guidelines on determining responsibility for assessment.
- The cause analysis step is the key to the process as a long term corrective action cannot be determined until the cause is determined.
- If the cause is not readily obvious, the Technical Manager, Laboratory Director, or QA Manager (or QA designee) is consulted.

14.3.2 Selection and Implementation of Corrective Actions

- Where corrective action is needed, the laboratory shall identify potential corrective actions. The action(s) most likely to eliminate the problem and prevent recurrence are selected and implemented. Responsibility for implementation is assigned.
- The laboratory must additionally consider potential risks and opportunities in the development and implementation of corrective actions. Where any identified risk and/or opportunity needs to be updated as a result of a nonconformity, this shall be performed and documented during the planning of the corrective action.
- Corrective actions shall be to a degree appropriate to the magnitude of the problem identified through the cause analysis.
- Whatever corrective action is determined to be appropriate, the laboratory shall document and implement the changes. This documentation may be recorded within the context of the originating nonconformity and using the applicable tool (QA-zilla, iCat, LabServe task, etc.)

14.3.3 Root Cause Analysis

Root Cause Analysis is a class of problem solving (investigative) methods aimed at identifying the basic or causal factor(s) that underlie variation in performance or the occurrence of a significant failure. The root cause may be buried under seemingly innocuous events, many steps preceding the perceived failure. At first glance, the immediate response is typically directed at a symptom and not the cause. Typically, root cause analysis would be best with three or more incidents to triangulate a weakness. NDSC Document Root Cause Analysis (No. CA-Q-S-009) provides guidance on this, as well as Eurofins EMLab P&K SOP, Conducting

Root Cause Investigations and Implementing Corrective Actions,(Document EM-QA-S-3553)describe the procedure.

Systematically analyze and document the root causes of the more significant problems that are reported. Identify, track, and implement the corrective actions required to reduce the likelihood of recurrence of significant incidents. Trend the root cause data from these incidents to identify root causes that, when corrected, can lead to dramatic improvements in performance by eliminating entire classes of problems.

Identify the one event associated with problem and ask why this event occurred. Brainstorm the root causes of failures; for example, by asking why events occurred or conditions existed; and then why the cause occurred consecutive times until you get to the root cause. For each of these sub events or causes, ask why it occurred. Repeat the process for the other events associated with the incident.

Root cause analysis does not mean the investigation is over. Look at technique or other systems outside the normal indicators. Often creative thinking will find root causes that ordinarily would be missed and continue to plague the laboratory or operation.

14.3.4 Monitoring of the Corrective Actions

- The Cluster Leader, Facility Manager and/or Technical Manager and QA Manager are responsible to ensure that the corrective action taken was effective.
- Ineffective actions are documented and re-evaluated until acceptable resolution is achieved. Technical Managers are accountable to the Laboratory Director to ensure final acceptable resolution is achieved and documented appropriately.
- The QA Manager reviews monthly ICAT records for trends. Highlights are included in the QA monthly report (refer to Section 18). If a significant trend develops that adversely affects quality, an audit of the area is performed and corrective action implemented.
- Any out-of-control situations that are not addressed acceptably at the laboratory level may be reported to the NDSC Quality Director by the QA Manager, indicating the nature of the out-of-control situation and problems encountered in solving the situation.

14.3.5 Follow-up Audits

- Follow-up audits may be initiated by the QA Manager and shall be performed as soon as possible when the identification of a nonconformance casts doubt on the laboratory's compliance with its own policies and procedures, or on its compliance with state or federal requirements.
- These audits often follow the implementation of the corrective actions to verify effectiveness. An additional audit would only be necessary when a critical issue or risk to business is discovered.

(Also refer to Section 17.1.4, Special Audits.)

14.4Technical Corrective Actions

In addition to providing acceptance criteria and specific protocols for technical corrective actions in the method SOPs, the laboratory has general procedures to be followed to determine when

departures from the documented policies and procedures and quality control have occurred (refer to Section 13). The documentation of these procedures is through the use of a LabServe task or record in the ICAT system.

Table 14-1 includes examples of general technical corrective actions. For specific criteria and corrective actions, refer to the analytical methods or specific method SOPs. The laboratory may also maintain Work Instructions on these items that are available upon request.

Table 14-1 provides some general guidelines for identifying the individual(s) responsible for assessing each QC type and initiating corrective action. The table also provides general guidance on how a data set should be treated if associated QC measurements are unacceptable. Specific procedures are included in Method SOPs, Work Instructions, QAM Sections 19 and 20. All corrective actions are reviewed monthly, at a minimum, by the QA Manager and highlights are included in the QA monthly report.

To the extent possible, samples shall be reported only if all quality control measures are acceptable. If the non-conformance does not impair the usability of the results, data will be reported with an appropriate data qualifier. Where sample results may be impaired, the Project Manager is notified by a LabServe task and appropriate corrective action (e.g., reanalysis) is taken and documented**.**

14.5Basic Corrections

When mistakes occur in records, each mistake shall be crossed-out, [not obliterated (e.g. no white-out)], and the correct value entered alongside. All such corrections shall be initialed (or signed) and dated by the person making the correction. In the case of records stored electronically, the original uncorrected file must be maintained intact and a second corrected file is created. This same process applies to adding additional information to a record. All additions made later than the initial must also be initialed (or signed) and dated. When corrections are due to reasons other than obvious transcription errors, the reason for the corrections (or additions) shall also be documented.

Table 14-1. Example – General Corrective Action Procedures

QC Activity *(Individual Responsible for Initiation/Assessment)*	**Acceptance Criteria**	**Recommended Corrective Action**
Initial Instrument Blank *(Analyst)*	- Instrument response < MDL.	- Prepare another blank. - If same response, determine cause of contamination: reagents, environment, instrument equipment failure, etc..

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Initial Calibration Standards *(Analyst, Technical Manager(s))*	- Correlation coefficient > 0.99 or standard concentration value. - % Recovery within acceptance range. - See details in Method SOP.	- Reanalyze standards. - If still unacceptable, remake standards and recalibrate instrument.
Independent Calibration Verification (Second Source) *(Analyst, Technical Manager(s))*	- % Recovery within control limits.	- Remake and reanalyze standard. - If still unacceptable, then remake calibration standards or use new primary standards and recalibrate instrument.
Continuing Calibration Standards *(Analyst, Data Reviewer)*	% Recovery within control limits.	- Reanalyze standard. - If still unacceptable, then recalibrate and rerun affected samples.
Matrix Spike / Matrix Spike Duplicate (MS/MSD) *(Analyst, Data Reviewer)*	- % Recovery within limits documented in ***(state where limits are maintained)***.	- If the acceptance criteria for duplicates or matrix spikes are not met because of matrix interferences, the acceptance of the analytical batch is determined by the validity of the LCS. - If the LCS is within acceptable limits the batch is acceptable. - The results of the duplicates, matrix spikes and the LCS are reported with the data set. - For matrix spike or duplicate results outside criteria the data for that sample shall be reported with qualifiers.
Laboratory Control Sample (LCS) *(Analyst, Data Reviewer)*	- % Recovery within limits specified in ***(state where limits are maintained).***	- Batch must be re-prepared and re-analyzed. This includes any allowable marginal exceedance. When not using marginal exceedances, the following exceptions apply: 1) when the acceptance criteria for the positive control are exceeded high (i.e., high bias) and there are associated samples that are non-detects, then those non-detects may be reported with data qualifying codes; 2) when the acceptance criteria for the positive control are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level with data qualifying codes. **Note:** If there is insufficient sample or the holding time cannot be met, contact client and report with flags.

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Method Blank (MB) *(Analyst, Data Reviewer)*	< Reporting Limit	- Reanalyze blank. - If still positive, determine source of contamination. If necessary, reprocess (i.e. digest or extract) entire sample batch. Report blank results. - Qualify the result(s) if the concentration of a targeted analyte in the MB is at or above the reporting limit AND is > 1/10 of the amount measured in the sample.
Proficiency Testing (PT) Samples *(QA Manager, Technical Manager(s))*	- Criteria supplied by PT Supplier.	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat a PT sample to show the problem is corrected.
Daily References *(QA Manager(s), Analysts)*	SOP EM-QA-S-1194, Quality Control for Sample Analysis SOP EM-QA-S-1259, Quality Control for Asbestos Analysis Reference EM-QA-R-5730, Quality Control Criteria Summary	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat sample analysis to show the problem is corrected.
Duplicate Samples *(QA Manager(s), Analysts)*	SOP EM-QA-S-1194, Quality Control for Sample Analysis SOP EM-QA-S-1259, Quality Control for Asbestos Analysis Reference EM-QA-R-5730, Quality Control Criteria Summary	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat sample analysis to show the problem is corrected.
Replicate Samples *(QA Manager(s), Analysts)*	SOP EM-QA-S-1194, Quality Control for Sample Analysis SOP EM-QA-S-1259, Quality Control for Asbestos Analysis Reference EM-QA-R-5730, Quality Control Criteria Summary	- Any failures or warnings must be investigated for cause. Failures may result in the need to repeat sample analysis to show the problem is corrected.
Internal / External Audits *(QA Manager, Technical Manager(s), Laboratory Director)*	- Defined in Quality System documentation such as SOPs, QAM, etc..	- Non-conformances must be investigated through CAR system and necessary corrections must be made.

QC Activity *(Individual Responsible for Initiation/Assessment)*	Acceptance Criteria	Recommended Corrective Action
Reporting / Calculation Errors (Depends on issue – possible individuals include: Analysts, Data Reviewers, Project Managers, Technical Managers, QA Manager, Corporate QA, Corporate Management)	- NDSC Document No. CW-Q-S-005, Data Recall	- Corrective action is determined by type of error. Follow the procedures in NDSC Document No. CW-L-S-002 or EM-QA-S-3533.
Client Complaints *(Project Managers, Lab Director/Manager, Sales and Marketing)*	-	- Corrective action is determined by the type of complaint. For example, a complaint regarding an incorrect address on a report will result in the report being corrected and then follow-up must be performed on the reasons the address was incorrect (e.g., database needs to be updated).
QA Monthly Report (Refer to Section 16 for an example) (QA Manager, Lab Director/Manager, *Technical Manager(s)*)	- QAM, SOPs.	- Corrective action is determined by the type of issue. For example, CARs for the month are reviewed and possible trends are investigated.
Health and Safety Violation (Safety Officer, Lab Director/Manager, *Technical Manager(s)*)	- Environmental Health and Safety (EHS) Manual.	- Non-conformance is investigated and corrected through CAR system.

15.0 PREVENTIVE ACTION / IMPROVEMENT

15.1 Overview

The laboratory's preventive action programs improve or eliminate potential causes of nonconforming product and/or nonconformance to the quality system. This preventive action process is a proactive and continuous process of improvement activities that can be initiated through feedback from clients, employees, business providers, and affiliates. The QA Department has the overall responsibility to ensure that the preventive action process is in place, and that relevant information on actions is submitted for management review. (EM-QA-S-7577, Continuous Improvement and Preventive Actions.)

Dedicating resources to an effective preventive action system emphasizes the laboratory's commitment to its QA Program. It is beneficial to identify and address negative trends before they develop into complaints, problems and corrective actions. Additionally, the laboratory continually strives to improve customer service and client satisfaction through continuous improvements to laboratory systems.

Opportunities for improvement may be discovered through any of the following:

- review of the monthly QA Metrics Report,
- trending Labserve tasks or iCAT corrective actions,
- review of control charts and QC results,
- trending proficiency testing (PT) results,
- performance of management system reviews,
- trending client complaints,
- review of processing operations, or
- staff observations.

The monthly Management Systems Metrics Report shows performance indicators in all areas of the laboratory and quality system. These areas include revised reports, corrective actions, audit findings, internal auditing and data authenticity audits, client complaints, PT samples, holding time violations, SOPs, ethics training, etc. The metrics report is reviewed monthly by the laboratory management, NDSC QA Team, Local and Executive Management. These metrics are used in evaluating the management and quality system performance on an ongoing basis and provide a tool for identifying areas for improvement.

Items identified as continuous improvement opportunities to the management system may be issued as goals from the annual management systems review, recommendations from internal audits, white papers, Lessons Learned, Technical Services audit report, Technical Best Practices, or as Executive or management initiatives.

The laboratory's corrective action process is integral to implementation of preventive actions. A critical piece of the corrective action process is the implementation of actions to prevent further occurrence of a non-compliance event. Historical review of corrective action and non-conformances provides a valuable mechanism for identifying preventive action opportunities.

15.1.1 The following elements are part of a preventive action/process improvement system:

- Identification of an opportunity for preventive action or process improvement.
- Process for the preventive action or improvement.
- Define the measurements of the effectiveness of the process once undertaken.
- Execution of the preventive action or improvement.
- Evaluation of the plan using the defined measurements.

- Verification of the effectiveness of the preventive action or improvement.
- Close-Out by documenting any permanent changes to the Quality System as a result of the Preventive Action or Process Improvement. Documentation of Preventive Action/process Improvement is incorporated into the monthly QA reports, corrective action process and management review.

15.1.2 Any preventive actions/process improvement undertaken or attempted shall be taken into account during the annual Management Systems Review (Section 16). A highly detailed report is not required; however, a summary of successes and failures within the preventive action program is sufficient to provide management with a measurement for evaluation.

16.0 CONTROL OF RECORDS

The laboratory maintains a records management system appropriate to its needs and that complies with applicable standards or regulations as required. The system produces unequivocal, accurate records that document all laboratory activities. The laboratory retains all original observations, calculations and derived data, calibration records and a copy of the analytical report for a minimum of five years after it has been issued. Exceptions for programs with longer retention requirements are discussed in Section 14.1.2.

16.1 Overview

The laboratory has established procedures for identification, collection, indexing, access, filing, storage, maintenance and disposal of quality and technical records. A record index is listed in Table 16-1. More detailed information on retention of specific records is provided in EM-QA-S-2059, Document Control and Control of Records. Quality records are maintained by the QA department in a database, which is backed up as part of the regular laboratory backup. Records are of two types; either electronic or hard copy paper formats depending on whether the record is computer or hand generated (some records may be in both formats). Technical records are maintained by local facility management. Laboratory technical records are maintained by IT.

Table 16-1. Record Index[1]

	Record Types [1]:	**Retention Time:**
Technical Records	- Raw Data - Logbooks[2] - Standards - Certificates - Analytical Records - MDLs/IDLs/DOCs - Lab Reports	5 Years from analytical report issue*

	Record Types [1]:	**Retention Time:**
Official Documents	- Quality Assurance Manual (QAM) - Work Instructions - Policies - SOPs - Policy Memorandums - Manuals - Published Methods	Indefinitely
QA Records	- Certifications - Method and Software Validation / Verification Data	Indefinitely
QA Records	- Internal & External Audits/Responses - Corrective/Preventive Actions - Management Reviews - Data Investigation	5 Years from archival* **Data Investigation:** 5 years or the life of the affected raw data storage whichever is greater (beyond 5 years if ongoing project or pending investigation)
Project Records	- Sample Receipt & COC Documents - Contracts and Amendments - Correspondence - QAPP - SAP - Telephone Logbooks - Lab Reports	5 Years from analytical report issue*
Administrative Records	Financial and Business Operations	Refer to NDSC Document No. CW-L-WI-001
	EH&S Manual, Permits	Indefinitely
	Disposal Records	Indefinitely
	Employee Handbook	Indefinitely
	Personnel files, Employee Signature & Initials, Administrative Training Records (e.g., Ethics)	Refer to HR Manual
	Administrative Policies	Indefinitely
	Technical Training Records	7 years
	Legal Records	Indefinitely
	HR Records	Refer to NDSC Document No. CW-L-WI-001
	IT Records	Refer to NDSC Document No. CW-L-WI-001
	Corporate Governance Records	Refer to NDSC Document No. CW-L-WI-001
	Sales & Marketing	5 years
	Real Estate	Indefinitely

[1] Record Types encompass hardcopy and electronic records.
[2] Examples of Logbook types: Maintenance, Instrument Run, Preparation (standard and samples), Standard and Reagent Receipt, Archiving, Balance Calibration, Temperature (hardcopy or electronic records).
* Exceptions listed in Table 14-2.

16.1.1 All records are stored and retained in such a way that they are secure and readily retrievable at the laboratory facility or main regional facility that provides a suitable environment to prevent damage or deterioration and to prevent loss. All records shall be protected against fire, theft, loss, environmental deterioration, and vermin. In the case of electronic records, electronic or magnetic sources, storage media are protected from deterioration caused by magnetic fields and/or electronic deterioration.

Access to the data is limited to laboratory and company employees and shall be documented with an access log**.** Records archived off-site are stored in a secure location where a record is maintained of any entry into the storage facility. Whether on-site or off-site storage is used, logs are maintained in each storage box to note removal and return of records. Retention of records are maintained on-site at the laboratory for at least 1 month after their generation and moved offsite for the remainder of the required storage time. Records are maintained for a minimum of five years unless otherwise specified by a client or regulatory requirement.

For raw data and project records, record retention shall be calculated from the date the project report is issued. For other records, such as NDSC and or KGD, Controlled Documents, QA, or Administrative Records, the retention time is calculated from the date the record is formally retired. Records related to the programs listed in Table 16-2 have lengthier retention requirements and are subject to the requirements in Section 16.1.3.

16.2 Programs with Longer Retention Requirements

Some regulatory programs have longer record retention requirements than the standard record retention time. These are detailed in Table 16-2 with their retention requirements. In these cases, the longer retention requirement is enacted. If special instructions exist such that client data cannot be destroyed prior to notification of the client, the container or box containing that data is marked as to who to contact for authorization prior to destroying the data.

Table 16-2. Example: Special Record Retention Requirements

Program	**[1]Retention Requirement**
Drinking Water – All States	10 years (lab reports and raw data)
AIHA-LAP ELLAP (Lead)	5 years (project records) (quality control laboratory records required to support retained data and associated reporting for AIHA-LAP ELLAP (lead) will be maintained for a minimum of 6 years)
NYS DOH	5 years (quality control laboratory records required to support retained data and associated reporting for NYS DOH will be maintained for a minimum of 6 years)
OSHA	30 years

[1]Note: Extended retention requirements must be noted with the archive documents or addressed in facility-specific records retention procedures.

16.2.1 The laboratory has procedures to protect and back-up records stored electronically and to prevent unauthorized access to or amendment of these records. All analytical data is maintained as hard copy or in a secure readable electronic format. For analytical reports that are maintained as copies in PDF format, refer to Section 19.13.1 for more information.

16.2.2 The record keeping system allows for historical reconstruction of all laboratory activities that produced the analytical data, as well as rapid recovery of historical data (Records stored off

site should be accessible within 2 days of a request for such records). The history of the sample from when the laboratory took possession of the samples must be readily understood through the documentation. This shall include inter-laboratory transfers of samples.

- The records include the identity of personnel involved in sampling, sample receipt, preparation, or testing. All analytical work contains the initials (at least) of the personnel involved. The laboratory's copy of the COC is stored in chronological order. The chain of custody would indicate the name of the sampler. If any sampling notes are provided with a work order, they are kept with this package.

- All information relating to the laboratory facilities' equipment, analytical test methods, and related laboratory activities, such as sample receipt, sample preparation, or data verification are documented.

- The record keeping system facilitates the retrieval of all working files and archived records for inspection and verification purposes (e.g., set format for naming electronic files, set format for what is included with a given analytical data set. Instrument data is stored sequentially by instrument. A given day's analyses are maintained in the order of the analysis. Run logs are maintained for each instrument or method; a copy of each day's run log or instrument sequence is stored with the data to aid in re-constructing an analytical sequence. Where an analysis is performed without an instrument, bound logbooks or bench sheets are used to record and file data, where applicable and not part of LabServe direct entry. Standard and reagent information is recorded in logbooks or entered into LabServe for each method as required.

- Changes to hardcopy records shall follow the procedures outlined in Section 12 and 19. Changes to electronic records in LabServe or instrument data are recorded in audit trails.

- The reason for a signature or initials on a document is clearly indicated in the records such as "sampled by," "prepared by," "reviewed by", or "analyzed by".

- All generated data except those that are generated by automated data collection systems, are recorded directly, promptly and legibly in permanent dark ink.

- Hard copy data may be scanned into PDF format for record storage as long as the scanning process can be verified in order to ensure that no data is lost and the data files and storage media must be tested to verify the laboratory's ability to retrieve the information prior to the destruction of the hard copy that was scanned.

- Also refer to Section 19.13.1 'Computer and Electronic Data Related Requirements'**.**

16.3Technical and Analytical Records

16.3.1 The laboratory retains records of original observations, derived data and sufficient information to establish an audit trail, calibration records, staff records and a copy of each analytical report issued, for a minimum of five years unless otherwise specified by a client or regulatory requirement. The records for each analysis shall contain sufficient information to enable the analysis to be repeated under conditions as close as possible to the original. The records shall include the identity of laboratory personnel responsible for the subsampling,

performance of each analysis and reviewing results.

16.3.2 Observations, data and calculations are recorded real-time and are identifiable to the specific task.

16.3.3 Changes to hardcopy records shall follow the procedures outlined in Section 12 and 19. Changes to electronic records in LabServe or instrument data are recorded in audit trails.

The essential information to be associated with analysis, such as strip charts, tabular printouts, computer data files, analytical notebooks, and run logs, include:

- laboratory sample ID code**;**
- Date of analysis; time of analysis is also required if the holding time is seventy-two (72) hours or less, or when time critical steps are included in the analysis (e.g., drying times, incubations, etc.); instrumental analyses have the date and time of analysis recorded as part of their general operations. Where a time critical step exists in an analysis, location for such a time is included as part of the documentation in a specific logbook or on a benchsheet.
- Instrumentation identification and instrument operating conditions/parameters. Operating conditions/parameters are typically recorded in instrument maintenance logs where available.
- analysis type**;**
- all manual calculations and manual integrations**;**
- analyst's or operator's initials/signature**;**
- sample preparation including cleanup, sample processing/dilution/plating, incubation periods or subculture, ID codes, volumes, weights, instrument printouts, meter readings, calculations, reagents**;**
- test results**;**
- standard and reagent origin, receipt, preparation, and use**;**
- calibration criteria, frequency and acceptance criteria**;**
- data and statistical calculations, review, confirmation, interpretation, assessment and reporting conventions**;**
- quality control protocols and assessment**;**
- electronic data security, software documentation and verification, software and hardware audits, backups, and records of any changes to automated data entries; and
- Method performance criteria including expected quality control requirements. These are indicated both in LabServe and on specific analytical report formats**.**

16.3.4 All logbooks used during receipt, preparation, storage, analysis, and reporting of samples or monitoring of support equipment shall undergo a periodic, documented supervisory or peer review.

16.4Laboratory Support Activities

In addition to documenting all the above-mentioned activities, the following are retained QA records and project records (previous discussions in this section relate where and how these data are stored):

- all original raw data, whether hard copy or electronic, for calibrations, samples and quality control measures, including analysts' work sheets and data output records (chromatograms, strip charts, and other instrument response readout records)**;**
- a written description or reference to the specific test method used which includes a description of the specific computational steps used to translate parametric observations into a reportable analytical value**;**
- copies of final reports**;**
- archived SOPs**;**
- correspondence relating to laboratory activities for a specific project**;**
- all corrective action reports, audits and audit responses**;**
- proficiency test results and raw data; and
- results of data review, verification, and crosschecking procedures

16.4.1 Sample Handling Records

Records of all procedures to which a sample is subjected while in the possession of the laboratory are maintained. These include but are not limited to records pertaining to:

- sample preservation including appropriateness of sample container and compliance with holding time requirement;
- sample identification, receipt, acceptance or rejection and login;
- sample storage and tracking including shipping receipts, sample transmittal / COC forms; and
- procedures for the receipt and retention of samples, including all provisions necessary to protect the integrity of samples.

16.5Administrative Records

The laboratory also maintains the administrative records in either electronic or hard copy form. Refer to Table 14-1.

16.6Records Management, Storage and Disposal

All records (including those pertaining to test equipment), certificates and reports are safely stored, held secure and in confidence to the client. Certification related records are available upon request.

All information necessary for the historical reconstruction of data is maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval.

Records that are stored or generated by computers or personal computers have hard copy, write-protected backup copies, or an electronic audit trail controlling access**.**

The laboratory has a record management system (a.k.a., document control) for control of laboratory notebooks, instrument logbooks, standards logbooks, and records for data reduction, validation, storage and reporting. Records are considered archived when noted as such in the records management system (a.k.a., document control.)

16.6.1 Transfer of Ownership

In the event that the laboratory transfers ownership or goes out of business, the laboratory shall ensure that the records are maintained or transferred according to client's instructions. Upon ownership transfer, record retention requirements shall be addressed in the ownership transfer agreement and the responsibility for maintaining archives is clearly established. In addition, in cases of bankruptcy, appropriate regulatory and state legal requirements concerning laboratory records must be followed. In the event of the closure of the laboratory, all records will revert to the control of the NDSC. Should the entire company cease to exist, as much notice as possible will be given to clients and the accrediting bodies who have worked with the laboratory during the previous 5 years of such action.

16.6.2 Records Disposal

Records are removed from the archive and destroyed after 5 years unless otherwise specified by a client or regulatory requirement. On a project specific or program basis, clients may need to be notified prior to record destruction. Records are destroyed in a manner that ensures their confidentiality such as shredding, mutilation or incineration. (Refer to Tables 16-1 and 16-2).

Electronic copies of records must be destroyed by erasure or physically damaging off-line storage media so no records can be read.

If a third party records management company is hired to dispose of records, a "Certificate of Destruction" is required.

17.0 AUDITS

17.1Internal Audits

Internal audits are performed to verify that laboratory operations comply with the requirements of the lab's quality system and with the external quality programs under which the laboratory operates. Audits are planned and organized by the QA staff. Personnel conducting the audits should be independent of the area being evaluated. Auditors will have sufficient authority, access to work areas, and organizational freedom necessary to observe all activities affecting quality and to report the assessments to laboratory management and**,** when requested**,** to Executive management.

Audits are conducted and documented as described in the NDSC Document on performing Internal Auditing, No. CW-Q-S-003. The types and frequency of routine internal audits are

described in Table 15-1. Special or ad hoc assessments may be conducted as needed under the direction of the QA staff.

Table 17-1. Types of Internal Audits and Frequency

Description	Performed by	Frequency
Quality Systems Audits	QA Department, QA approved designee, or NDSC QA	All areas of the laboratory annually
Method Audits QA Technical Audits	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to NDSC Document No. CW-Q-S-003)	QA Technical Audits Frequency: 50% of methods annually
SOP Method Compliance	Joint responsibility: a) QA Manager or designee b) Technical Manager or Designee (Refer to CW-Q-S-003)	SOP Compliance Review Frequency: • Every 2 years • 100% of SOPs annually (DoD/DOE Labs)
Special	QA Department or Designee	Surveillance or spot checks performed as needed, e.g., to confirm corrective actions from other audits.
Performance Testing	Analysts with QA oversight	Two successful per year for each TNI-field of testing or as dictated by regulatory requirements

17.1.1 Annual Quality Systems Audit

An annual quality systems audit is required to ensure compliance to analytical methods and SOPs, Eurofins Data Integrity and Ethics Policies (See Section 7.2), TNI quality systems, AIHA-LA LLC quality systems, NIST NVLAP quality systems, client and state requirements, and the effectiveness of the internal controls of the analytical process, including but not limited to data review, quality controls, preventive action and corrective action. The completeness of earlier corrective actions is assessed for effectiveness & sustainability. The audit is divided into sections for each operating or support area of the lab, and each section is comprehensive for a given area. The area audits may be performed on a rotating schedule throughout the year to ensure adequate coverage of all areas. This schedule may change as situations in the laboratory warrant.

17.1.2 QA Technical Audits

QA technical audits assess data authenticity and analyst integrity. These audits are based on client projects, associated sample delivery groups, and the methods performed. Reported results are compared to raw data to verify the authenticity of results. The validity of calibrations and QC results are compared to data qualifiers, footnotes, and report comments. Manual calculations are checked. QA technical audits will include all methods within a two-year period.

17.1.3 SOP Method Compliance

Compliance of all SOPs with the source methods and compliance of the operational groups with the SOPs will be assessed by the Technical Manager or qualified designee at least every two years.

17.1.4 Special Audits

Special audits are conducted on an as needed basis, generally as a follow up to specific issues such as client complaints, corrective actions, PT results, data audits, system audits, validation comments, regulatory audits or suspected ethical improprieties. Special audits are focused on a specific issue, and report format, distribution, and timeframes are designed to address the nature of the issue.

17.1.5 Performance Testing

Eurofins EMLab P&K, LLC participates in external proficiency testing programs consistent with the requirements outlined by the Laboratory's accreditation, licensing, or registration bodies, and at the frequency required to remain compliant with such programs. The laboratory generally participates in the following types of PT studies, where applicable and/or required by external accreditation, licensing, or registration bodies: AIHA-PAT LLC (EMLAP, IHLAP), NIST NVLAP Bulk Asbestos, Legionella proficiency testing, potable and non-potable water, etc.

It is Eurofins policy that PT samples be treated as typical samples in the production process. Furthermore, where PT samples present special or unique problems, in the regular production process they may need to be treated differently, as would any special or unique request submitted by any client. The QA Manager must be consulted and in agreement with any decisions made to treat a PT sample differently due to some special circumstance.

When the analysis includes subjective analyst evaluation (e.g., microscopic identification and/or quantitation), all analysts, including those in sub-facilities, are required to participate in proficiency testing, with each analyst separately analyzing, recording, and reporting test results. All proficiency testing samples are to be analyzed by the receiving facility. Transfer to alternate laboratory is prohibited, as is discussion of proficiency round details with other facilities prior to completion of a round. Where a facility employs analysts who perform analyses across more than one facility, these analysts are restricted to participation in one facility's proficiency testing, and any discussion of details with personnel outside of the analyst's participation location is strictly prohibited.

Written investigations for unacceptable PT results are required. In some cases it may be necessary for blind QC samples to be submitted to the laboratory to show a return to control.

17.2External Audits

External audits are performed when accrediting and/or certifying agencies or clients conduct on-site inspections or submit performance testing samples for analysis. It is Eurofins policy to cooperate fully with regulatory authorities and clients. The laboratory makes every effort to provide the auditors with access to personnel, documentation, and assistance. Laboratory supervisors are responsible for providing corrective actions to the QA Manager who coordinates

the response. Audit responses are due in the time allotted by the client or agency performing the audit.

The laboratory cooperates with clients and their representatives to monitor the laboratory's performance in relation to work performed for the client. The client may only view data and systems related directly to the client's work. All efforts are made to keep other client information confidential.

17.2.1 Confidential Business Information (CBI) Considerations

During on-site audits, auditors may come into possession of information claimed as business confidential. A business confidentiality claim is defined as "a claim or allegation that business information is entitled to confidential treatment for reasons of business confidentiality or a request for a determination that such information is entitled to such treatment." When information is claimed as business confidential, the laboratory must place on (or attach to) the information at the time it is submitted to the auditor, a cover sheet, stamped or typed legend or other suitable form of notice, employing language such as "trade secret", "proprietary" or "company confidential". Confidential portions of documents otherwise non-confidential must be clearly identified. CBI may be purged of references to client identity by the responsible laboratory official at the time of removal from the laboratory. However, sample identifiers may not be obscured from the information. Additional information regarding CBI can be found in within the 2009 TNI standards.

17.3 Audit Findings

Audit findings are documented using the corrective action process and database (see Section 12). The laboratory's corrective action responses may include action plans that could not be completed within a predefined timeframe. In these instances, a completion date must be set and agreed to by operations management and the QA Manager.

Developing and implementing corrective actions to findings is the responsibility of the Cluster Leader and/or Facility Manager where the finding originated. Findings that are not corrected by specified due dates are reported monthly to management in the QA monthly report.

If any audit finding casts doubt on the effectiveness of the operations or on the correctness or validity of the laboratory's test results, the laboratory shall take timely corrective action, and shall notify clients in writing if the investigations show that the laboratory results have been affected. Once corrective action is implemented, a follow-up audit is scheduled to ensure that the problem has been corrected.

Clients must be notified promptly in writing of any event such as the identification of defective measuring or test equipment that casts doubt on the validity of results given in any test report or amendment to a test report. The investigation must begin within 24 hours of discovery of the problem and all efforts are made to notify the client within two weeks after the completion of the investigation.

18.0 MANAGEMENT REVIEWS

18.1 Quality Assurance Report

The QA Department is responsible for preparing a comprehensive monthly metrics report to Management to keep them apprised of current quality issues. This report fosters communication, review, and refinement of the QA system to evaluate the suitability of policies and procedures to meet both regulatory and laboratory quality objectives.

The NDSC QA team compiles information from all of the Environment Testing laboratories monthly metrics reports for the Executive Management team. This report includes notable information and concerns regarding the laboratories QA program and a listing of new regulations that may potentially impact the laboratories.

18.2 Annual Management Review

The Laboratory Management team (Cluster Leader, Facility Managers/Technical Manager, QA Manager) conducts a review annually of its quality systems to ensure its continuing suitability and effectiveness in meeting client and regulatory requirements and to introduce any necessary changes or improvements. It will also provide a platform for defining goals, objectives and action items that feed into the laboratory planning system. The LabServe review consists of examining any audits, complaints or concerns that have been raised through the year that are related to LabServe. The laboratory will summarize any critical findings that cannot be solved by the lab and report them to Corporate IT.

This management systems review (NDSC Document No. CW-Q-S-004 and Work Instruction No. CW-Q-WI-003) uses information generated during the preceding year to assess the “big picture” by ensuring that routine actions taken and reviewed on a monthly basis are not components of larger systematic concerns. The monthly review should keep the quality systems current and effective, therefore, the annual review is a formal senior management process to review specific existing documentation. Significant issues from the following documentation are compiled or summarized by the QA Manager prior to the review meeting:

- Matters arising from the previous annual review.
- Prior Monthly QA Reports issues.
- Laboratory QA Metrics.
- Review of report reissue requests.
- Review of client feedback and complaints.
- Issues arising from any prior management or staff meetings.
- Minutes from prior senior lab management meetings. Issues that may be raised from these meetings include:
    - Adequacy of staff, equipment and facility resources.
    - Adequacy of policies and procedures.
    - Future plans for resources and testing capability and capacity.
- The annual internal double blind PT program sample performance (if performed),
- Compliance to the Ethics Policy and Data Integrity Plan. Including any evidence/incidents of inappropriate actions or vulnerabilities related to data Integrity.

- Evaluation of overall risk, including risks to impartiality, confidentiality, reporting statements of conformity, and nonconforming work.

A report is generated by the QA Manager and management. The report is distributed to the Business Unit Manager, Cluster Leader, Facility/Technical Manager, and QA Manager. The report includes, but is not limited to:

- The date of the review and the names and titles of participants.
- A reference to the existing data quality related documents and topics that were reviewed.
- Quality system or operational changes or improvements that will be made as a result of the review [e.g., an implementation schedule including assigned responsibilities for the changes (Action Table)].

Changes to the quality systems requiring update to the laboratory QA Manual shall be included in the next revision of the QA Manual.

18.3 Potential Integrity Related Managerial Reviews

Potential integrity issues (data or business related) must be handled and reviewed in a confidential manner until such time as a follow-up evaluation, full investigation, or other appropriate actions have been completed and issues clarified. NDSC Internal Investigations Document shall be followed (NDSC Document No. CW-L-S-002). All investigations that result in finding of inappropriate activity are documented and include any disciplinary actions involved, corrective actions taken, and all appropriate notifications of clients.

Eurofins Built Testing President, Business Unit Manager, Cluster Leader, and NDSC Team are informed of any current data integrity or data recall investigations via the monthly metrics report.

19.0 **TEST METHODS AND METHOD VALIDATION**

19.1 Overview

The laboratory uses methods that are appropriate to meet our clients' requirements and that are within the scope of the laboratory's capabilities. These include sampling, handling, transport, storage and preparation of samples, and, where appropriate, an estimation of the measurement of uncertainty as well as statistical techniques for analysis of environmental data.

Instructions are available in the laboratory for the operation of equipment as well as for the handling and preparation of samples. All instructions, Standard Operating Procedures (SOPs), reference methods and manuals relevant to the working of the laboratory are readily available to all staff. Deviations from published methods are documented (with justification) in the laboratory's approved SOPs. SOPs are submitted to clients for review at their request. Significant deviations from published methods require client approval and regulatory approval where applicable.

19.2 Standard Operating Procedures (SOPS)

The laboratory maintains SOPs that accurately reflect all phases of the laboratory such as assessing data integrity, corrective actions, handling customer complaints as well as all analytical methods and sampling procedures. Where method SOPs are derived from the most recently promulgated/approved, published methods and are specifically adapted to the laboratory facility. Modifications or clarifications to published methods are clearly noted in the SOPs. All SOPs are controlled in the laboratory.

- All SOPs contain a revision number, effective date, and appropriate approval signatures. Controlled copies are available to all staff.
- Procedures for writing an SOP are incorporated by reference to SOP EM-QA-S-2059, Document Control and Control of Records.
- SOPs are reviewed at a minimum of every 2 years (annually for Drinking Water and DoD/DOE SOPs), and where necessary, revised to ensure continuing suitability and compliance with applicable requirements.

19.3 Laboratory Methods Manual

For each test method, the laboratory shall have available the published referenced method as well as the laboratory developed SOP.

Note: If more stringent standards or requirements are included in a mandated test method or regulation than those specified in this manual, the laboratory shall demonstrate that such requirements are met. If it is not clear which requirements are more stringent, the standard from the method or regulation is to be followed. Any exceptions or deviations from the referenced methods or regulations are noted in the specific analytical SOP.

The laboratory maintains an SOP Index for both technical and non-technical SOPs. Technical SOPs are maintained to describe a specific test method. Non-technical SOPs are maintained to describe functions and processes not related to a specific test method.

19.4 Selection of Methods

Since numerous methods and analytical techniques are available, continued communication between the client and laboratory is imperative to assure the correct methods are utilized. Once client methodology requirements are established, this and other pertinent information is summarized by the Project Manager. These mechanisms ensure that the proper analytical methods are applied when the samples arrive for log-in. For non-routine analytical services (e.g., special matrices, non-routine compound lists), the method of choice is selected based on client needs and available technology. The methods selected should be capable of measuring the specific parameter of interest, in the concentration range of interest, and with the required precision and accuracy.

19.4.1 Sources of Methods

Routine analytical services are performed using both in-house developed methodology and standard EPA-approved methodology. In some cases, modification of standard approved

methods may be necessary to provide accurate analyses of particularly complex matrices. When the use of specific methods for sample analysis is mandated through project or regulatory requirements, only those methods shall be used.

When clients do not specify the method to be used or methods are not required, the methods used will be clearly validated and documented in an SOP and available to clients and/or the end user of the data. Refer to Appendix 3 for a list of the currently accepted U.S. EPA analytical method references used by the laboratory.

The laboratory reviews updated versions to all the aforementioned references for adaptation based upon capabilities, instrumentation, etc., and implements them as appropriate. As such, the laboratory strives to perform only the latest versions of each approved method as regulations allow or require.

Other reference procedures for non-routine analyses may include methods established by specific states (e.g., Underground Storage Tank methods), ASTM or equipment manufacturers. Sample type, source, and the governing regulatory agency requiring the analysis will determine the method utilized.

The laboratory shall inform the client when a method proposed by the client may be inappropriate or out of date. After the client has been informed, and they wish to proceed contrary to the laboratory's recommendation, it will be documented.

19.4.1.1 Client Supplied Methods

Most of the client-supplied method requirements presented to us involve achieving specific quality control criteria, limits of quantitation (LOQ), and/or method detection limits (MDL) using standard EPA methods. These requirements are communicated to the appropriate technical groups prior to the project start up. Each technical group evaluates the scope of work and the requirements to ensure the criteria can be met using the standard EPA method. The data is monitored to ensure the criteria are met throughout the project. The PM notifies the client if there is a more appropriate method available or if the client's criteria cannot be achieved on a certain sample matrix (i.e., due to matrix or dilutions).

Occasionally, we are asked to transfer a non-standardized method from a client into our lab or to develop a new method, when one is not available. In the case of a method transfer, we set up the client's method and perform some initial evaluation. After the initial evaluation, we may make recommendations on how to improve method performance. If the method appears to be adequate, we determine linearity, specificity, precision, accuracy, MDL, and LOQ by performing calibrations, analyzing method blanks, and carrying out method detection limit and IDOC studies.

In the case of method development, we work with the client and/or data user to determine the level of validation required ensuring that the method meets its intended purpose. In addition to the elements above, we also determine standard and sample stability and robustness depending on the scope of the project. Typically, a standard operating procedure is written and submitted to the client with the results of the validation. These steps are completed prior to analysis of field samples. Data related to the setup of the method are archived.

19.4.1.2 Procedural Deviations

Analysts are required to follow a documented method for all tests performed; and any deviations from analytical methods must be documented, approved, and justified in an appropriate and consistent manner. We classify method deviations as either being a planned deviation or an unplanned deviation. In general, the following information is captured to document both types of situations:

- Description of the situation
- Reason or justification for the deviation
- Impact the deviation had on the testing
- Signature/date of analyst performing the test (may also be LabServe user identification and timestamp)
- Signature/date of QA and Laboratory management approving the deviation (may also be LabServe user identification and timestamp)
- Signature/date of client approval, if necessary (may also be electronic communication from client)

Deviations to written procedures are documented in raw data records, LabServe Task System, or through ICAT. All types of documentation require management and QA review and approval.

19.4.2 Demonstration of Capability

Before the laboratory may institute a new method and begin reporting results, the laboratory shall confirm that it can properly operate the method. In general, this demonstration does not test the performance of the method in real world samples, but in an applicable and available clean matrix sample. If the method is for the testing of analytes that are not conducive to spiking, demonstration of capability may be performed on quality control samples.

A demonstration of capability (DOC, Lab SOP # EM-AD-S-1646) is performed whenever there is a change in instrument type (e.g., new instrumentation), matrix, method or personnel (e.g., analyst has not performed the test within the last 12 months).

Note: The laboratory shall have a DOC for all analytes included in the methods that the laboratory performs, and proficiency DOCs for each analyst shall include all analytes that the laboratory routinely performs. Addition of non-routine analytes does not require new DOCs for all analysts if those analysts are already qualified for routine analytes tested using identical chemistry and instrument conditions.

The initial demonstration of capability must be thoroughly documented and approved by the Facility Manager, Technical Manager (where appropriate), and QA Manager prior to independently analyzing client samples. All associated documentation must be retained in accordance with the laboratory's archiving procedures.

The laboratory must have an approved SOP, demonstrate satisfactory performance, and conduct an MDL study (when applicable). There may be other requirements as stated within the published method or regulations (e.g., retention time window study).

Note: In some instances, a situation may arise where a client requests that an unusual analyte be reported using a method where this analyte is not normally reported. If the analyte is being reported for regulatory purposes, the method must meet all procedures outlined within this QA Manual (SOP, MDL, and Demonstration of Capability). If the client states that the information is not for regulatory purposes, the result may be reported as long as the following criteria are met:

- The client request is documented and the lab informs the client of its procedure for working with unusual compounds. The final report must be footnoted: *Reporting Limit based on the low standard of the calibration curve.*

19.4.3 Initial Demonstration of Capability (IDOC) Procedures

19.1.1.1 All analysts and technicians are required to demonstrate their ability to produce reliable results before they perform analysis without direct supervision and document on an Initial Demonstration of Capability (IDOC) form. This form is to be completed by the QA Manager and maintained as part of the employee's training record. (SOP EM-AD-S-1646). The Initial Demonstration of Capability (IDOC) form is to be completed per procedure/analysis prep.

19.1.1.2 Training timeframes and minimum sample counts are defined by analysis type and are applicable to initial training. A list of training requirements may be found in the General Training SOP, EM-AD-S-1646. Where training requirements are undefined, a detailed training plan is required.

19.1.1.3 Where an analyst has previous documented training, and has met the required timeframe and minimum sample count for same/like analytical methods, the timeframe and noted sample count will not be required. Sample training in these situations require development of a training plan with an appropriate timeframe and appropriate number of minimum samples.

19.1.1.4 An authorization statement (refer to Figure 19-1 as an example shall be used to document the completion of each initial demonstration of capability.) A copy of the authorization is archived in the analyst's training folder.

19.5 Laboratory Developed Methods and Non-Standard Methods

Eurofins EMLab P&K employs the use of in-house developed methods as well as published reference methods. Any new method developed by the laboratory must be fully defined in an SOP and validated by qualified personnel with adequate resources to perform the method. Method specifications and the relation to client requirements must be clearly conveyed to the client if the method is a non-standard method (not a published or routinely accepted method). The client must also be in agreement to the use of the non-standard method.

19.6 Validation of Methods

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

All non-standard methods, laboratory designed/developed methods, standard methods used outside of their scope, and major modifications to published methods must be validated to confirm they are fit for their intended use. The validation will be as extensive as necessary to meet the needs of the given application. The results are documented with the validation procedure used and contain a statement as to the fitness for use.

19.6.1 Method Validation and Verification Activities for All New Methods

While method validation can take various courses, the following activities can be required as part of method validation. Method validation records are designated QC records and are archived accordingly.

When changes are made to any validated methods, the influence of such changes shall be documented and, if appropriate, a new validation shall be performed.

19.6.1.1 Determination of Method Selectivity – Method selectivity is the demonstrated ability to discriminate the analyte(s) of interest from other compounds in the specific matrix or matrices from other analytes or interference. In some cases to achieve the required selectivity for an analyte, a confirmation analysis is required as part of the method.

19.6.1.2 Determination of Method Sensitivity – Sensitivity can be both estimated and demonstrated. Whether a study is required to estimate sensitivity depends on the level of method development required when applying a particular measurement system to a specific set of samples. Detection limit studies are conducted as described in Section 19.7 below. Where other protocols for estimations and/or demonstrations of sensitivity are required by regulation or client agreement, these shall be followed.

19.6.1.3 Relationship of Limit of Detection (LOD) to the Limit of Quantitation (LOQ) – An important characteristic of expression of sensitivity is the distinction between the LOD and the LOQ. The LOD is the minimum level at which the presence of an analyte can be reliably concluded. The LOQ is the minimum concentration of analyte that can be quantitatively determined with acceptable precision and bias, equivalent to the laboratory's routine reporting limit (RL). For most instrumental measurement systems, there is a region where semi-quantitative data is generated around the LOD (both above and below the estimated MDL or LOD) and below the LOQ. In this region, detection of an analyte may be confirmed but quantification of the analyte is unreliable within the accuracy and precision guidelines of the measurement system. When an analyte is detected below the LOQ, and the presence of the analyte is confirmed by meeting the qualitative identification criteria for the analyte, the analyte can be reliably reported, but the amount of the analyte can only be estimated. If data is to be reported in this region, it must be done so with a qualification that denotes the semi-quantitative nature of the result.

19.6.1.4 Determination of Interferences – A determination that the method is free from interferences in a blank matrix is performed.

19.6.1.5 Determination of Range – Where appropriate to the method, the quantitation range is determined by comparison of the response of an analyte in a curve to established or targeted criteria. Generally the upper quantitation limit is defined by highest acceptable calibration concentration. The lower quantitation limit or QL cannot be lower than the lowest non-zero calibration level, and can be constrained by required levels of bias and precision.

19.6.1.6 Determination of Accuracy and Precision – Accuracy and precision studies are generally performed using replicate analyses, with a resulting percent recovery and measure of reproducibility (standard deviation, relative standard deviation) calculated and measured against a set of target criteria.

19.6.1.7 Documentation of Method – The method is formally documented in an SOP. If the method is a minor modification of a standard laboratory method that is already documented in an SOP, an SOP Attachment describing the specific differences in the new method is acceptable in place of a separate SOP.

19.6.1.8 Continued Demonstration of Method Performance – Continued demonstration of method performance is addressed in the SOP. Continued demonstration of method performance is generally accomplished by batch specific QC samples such as LCS, method blanks or PT samples.

19.7 Method Detection Limits (MDL) / Limits of Detection (LOD)

The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017. The MDL is equivalent to the TNI LOD, and is also equivalent to the DoD/DOE Quality Systems Manual (QSM) DL. The working or final MDL is the higher of the MDL value determined from spikes (MDLs) and the MDL value determined from blanks (MDLb). An initial MDL study shall be performed during the method validation process and when the method is altered in a way that can reasonably be expected to change its sensitivity. On-going data are collected during each quarter in which samples are being analyzed. At least once every 13 months the MDLs and MDLb are re-calculated and re-evaluated using data collected during the preceding period. Refer to the laboratory's SOP No. EM-AD-S-3548 for details on the laboratory's method validation process.

19.8 Verification of Detection Limits

If it is found during the re-evaluation of detection limit results that more than 5% of the spiked samples do not return positive numeric results that meet all method qualitative identification criteria, then then spiking level shall be increased and the initial MDL study pre-performed at the new spiking concentration.

19.9 Instrument Detection Limits (IDL)

The IDL is sometimes used to assess the reasonableness of the MDL or in some cases required by the analytical method or program requirements. IDLs are most commonly used in metals analyses but may be useful in demonstration of instrument performance in other areas.

IDLs are calculated to determine an instrument's sensitivity independent of any preparation method. IDLs are calculated either using 7 replicate spike analyses, like MDL but without sample preparation, or by the analysis of 10 instrument blanks and calculating 3 x the absolute value of the standard deviation.

19.10 Limit of Quantitation

The LOQ shall be at a concentration equivalent to the lowest calibration standard concentration, with the exception of methods using a single-point calibration, and shall be greater than the

MDL. The LOQ is verified by preparing and analyzing spikes at concentrations 1-2 times the selected LOQ, employing the complete analytical process.

When the laboratory establishes a quantitation limit, it must be initially verified by the analysis of a low level standard or QC sample at 1-2 times the reporting limit and annually thereafter. The annual requirement is waived for methods that have an annually verified MDL. The laboratory will comply with any regulatory requirements.

19.11 Estimation of Uncertainty of Measurement

19.11.1 Uncertainty is "a parameter associated with the result of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand" (as defined by the International Vocabulary of Basic and General Terms in Metrology, ISO Geneva, 1993, ISBN 92-67-10175-1). Knowledge of the uncertainty of a measurement provides additional confidence in a result's validity. Its value accounts for all the factors which could possibly affect the result, such as adequacy of analyte definition, sampling, matrix effects and interferences, climatic conditions, variances in weights, volumes, and standards, analytical procedure, and random variation. Some national accreditation organizations require the use of an "expanded uncertainty" defined as the range within which the value of the measurand is believed to lie within at least a 95% confidence level with the coverage factor k=2.

19.11.2 Uncertainty is not error. Error is a single value (i.e., the difference between the true result and the measured result). On environmental samples, the true result is never known. The measurement is the sum of the unknown true value and the unknown error. Unknown error is a combination of systematic error, or bias, and random error. Bias varies predictably, constantly, and independently from the number of measurements. Random error is unpredictable, assumed to be Gaussian in distribution, and reducible by increasing the number of measurements.

19.11.3 The minimum uncertainty associated with results generated by the laboratory can be determined by using the Laboratory Control Sample (LCS) accuracy range for a given analyte. The LCS limits are used to assess the performance of the measurement system since they take into consideration all of the laboratory variables associated with a given test over time (except for variability associated with the sampling and the variability due to matrix effects). The percent recovery of the LCS is compared either to the method-required LCS accuracy limits or to the statistical, historical, in-house LCS accuracy limits.

19.11.4 To calculate the uncertainty for the specific result reported, refer to SOP EM-QA-S-1960.

19.11.5 In the case where a well-recognized test method specifies limits to the values of major sources of uncertainty of measurement (e.g., 524.2, 525, etc.) and specifies the form of presentation of calculated results, no further discussion of uncertainty is required.

19.12 Sample Reanalysis Guidelines

Because there is a certain level of uncertainty with any analytical measurement, a sample re-preparation (where appropriate) and subsequent analysis (hereafter referred to as 'reanalysis') may result in either a higher or lower value from an initial sample analysis. There are also

variables that may be present (e.g., sample homogeneity, analyte precipitation over time, etc.) that may affect the results of a reanalysis. Based on the above comments, the laboratory will reanalyze samples at a client's request with the following caveats. Client specific Contractual Terms & Conditions for reanalysis protocols may supersede the following items.

- If the reanalysis does not agree (as defined above) with the original result, then the laboratory will investigate the discrepancy and reanalyze the sample a third time for confirmation if sufficient sample is available.

- Any potential charges related to reanalysis are discussed in the contract terms and conditions or discussed at the time of the request. The client will typically be charged for reanalysis unless it is determined that the lab was in error.

- Due to the potential for increased variability, reanalysis may not be applicable to Non-homogenous, Encore, and Sodium Bisulfate preserved samples. See the Area Supervisor or Laboratory Director if unsure.

19.13 Control of Data

The laboratory has policies and procedures in place to ensure the authenticity, integrity, and accuracy of the analytical data generated by the laboratory.

19.13.1 Computer and Electronic Data Related Requirements

The three basic objectives of our computer security procedures and policies are shown below.
The laboratory is currently using the Eurofins EMLab P&K LabServe system, a proprietary in-house developed LIMS system. It is referred to as LabServe for the remainder of this section. Labserve utilizes a Microsoft SQL database which is an industry standard relational database platform.

19.13.1.1 Maintain the Database Integrity – Assurance that data is reliable and accurate through data verification (review) procedures, password-protecting access, anti-virus protection, data change requirements, as well as an internal LIMS permissions procedure.

- LIMS Database Integrity is achieved through data input validation, internal user controls, documentation of system failures and corrective actions taken, and data change requirements.
- Spreadsheets and other software developed in-house must be verified with documentation through hand calculations prior to use. Cells containing calculations must be lock-protected and controlled.
- Instrument hardware and software adjustments are safeguarded through maintenance logs, audit trails and controlled access.
- Custom built software applications, as well as significantly modified off the shelf software, are validated for performing accurate mathematical calculations and transposition of non-numerical information. Whenever the computer software is edited or changed, the computation and transposition processes are revalidated using a computerized test suite in the potentially affected areas prior to the software being used to gather or report data. Data are checked for the following processes:

  - Data accuracy during data collection and storage
  - Data integrity and confidentiality during data storage
  - Integrity of data following electronic transmission to clients
- All software validations and associated process checks are to be fully documented within the Bugzilla system. All supporting spreadsheets, documents, etc. are to be attached to the validation record within Bugzilla.

19.13.1.2 Ensure Information Availability – Protection against loss of information or service is ensured through scheduled back-ups, stable file server network architecture, secure storage of media, line filter, Uninterruptible Power Supply (UPS), and maintaining older versions of software as revisions are implemented.

19.13.1.3 Maintain Confidentiality – Ensure data confidentiality through physical access controls such as password protection or website access approval when electronically transmitting data.

19.13.2 Data Reduction

The complexity of the data reduction depends on the analytical method and the number of discrete operations involved (e.g., extractions, dilutions, instrument readings and concentrations). The analyst calculates the final results from the raw data or uses appropriate computer programs to assist in the calculation of final reportable values.

Analytical results are reduced to appropriate concentration units specified by the analytical method, taking into account factors such as dilution, sample weight or volume, etc. Blank correction will be applied only when required by the method or per manufacturer's indication; otherwise, it should not be performed. Calculations are independently verified by appropriate laboratory staff. Calculations and data reduction steps for various methods are summarized in the respective analytical SOPs or program requirements.

19.13.2.1 All raw data must be retained with the project folder, computer file (if appropriate), and/or appropriate log. All criteria pertinent to the method must be recorded. The documentation is recorded at the time observations or calculations are made and must be signed or initialed/dated (month/day/year). It must be easily identifiable who performed which tasks if multiple people were involved.

19.13.2.2 Detection and reporting limits for analyses are unique to the method being performed. Detection and reporting limits are defined within the respective analytical procedures, where applicable. They are also listed on final reports, where applicable.

19.13.2.3 Due to the nature of biological data the number of significant figures that are used for interpretation should generally be one or two. Therefore data generated by the laboratory is reported with a maximum of two significant figures, unless the use of additional significant figures is warranted by specific analytical reporting requirements.

19.13.2.4 For those methods that do not have an instrument printout or an instrumental output compatible with the LabServe System, the raw results and dilution factors are entered directly into LabServe by the analyst, and the software calculates the final result for the analytical report. LabServe has a defined significant figure criterion for each analyte.

19.13.2.5 The laboratory strives to import data directly from instruments or calculation spreadsheets to ensure that the reported data are free from transcription and calculation errors. For those analyses with an instrumental output compatible with LabServe, the raw results and dilution factors are transferred into LabServe electronically after reviewing the quantitation report, and removing unrequested or poor spectrally-matched compounds. The analyst prints a copy of what has been entered to check for errors. This printout and the instrument's printout of calibrations, concentrations, retention times, chromatograms, and mass spectra, if applicable, are retained with the data file. The data file is stored in a monthly folder on the instrument computer; periodically, this file is transferred to the server and, eventually, to a tape file.

19.13.3 Logbook / Worksheet Use Guidelines

Logbooks and worksheets are filled out 'real time' and have enough information on them to trace the events of the applicable analysis/task. (e.g. calibrations, standards, analyst, sample ID, date, time on short holding time tests, temperatures when applicable, calculations are traceable, etc.)

- Corrections are made following the procedures outlined in Section 12.
- Logbooks are controlled by the QA department. A record is maintained of all logbooks in the lab.
- Unused portions of pages must be "Z"'d out, signed and dated.
- Worksheets are created with the approval of the Regional Manager and QA Manager at the facility. The QA Manager controls all worksheets following the procedures in Section 6.

19.13.4 Review / Verification Procedures

Review procedures are outlined in several SOPs (e.g. Sample Receiving (EM-SM-S-1288), Sample Log In (EM-SM-S-1993), Technical Report Review and Release Procedures (EM-SM-S-1637) to ensure that reported data are free from calculation and transcription errors, that QC parameters have been reviewed and evaluated before data is reported. The general review concepts are discussed below, more specific information can be found in the SOPs.

19.13.4.1 Log-In Review - The data review process starts at the sample receipt stage. Sample control personnel review chain-of-custody forms and project instructions from the project management group. This is the basis of the sample information and analytical instructions entered into LabServe. The log-in instructions are reviewed by the personnel entering the information, and a second level review is conducted by the project management staff.

19.13.4.2 First Level Data Review - The next level of data review occurs with the analysts. As data are generated, analysts review their work to ensure that the results meet project and SOP requirements. First level reviews include inspection of all raw data (e.g., raw data sheets, logs, etc.), evaluation of calibration/calibration verification data in the day's analytical run, evaluation of QC data, and reliability of sample results. The analyst transfers data not already directly entered into LabServe, data qualifiers are added as needed. All first level reviews are documented.

19.13.4.3 Second Level Data Review – All analytical data are subject to review by a second qualified analyst or supervisor. Second level reviews include inspection of all raw data including 100% of data associated with any changes made by the primary analyst. The second review also includes evaluation of QC data, reliability of sample results, qualifiers, and project tasks. Manual calculations are checked in second level review. All second level reviews are documented.

Issues that deem further review include the following:

- QC data are outside the specified control limits for accuracy and precision
- Reviewed sample data does not match with reported results
- Unusual detection limit changes are observed
- Samples having unusually high results
- Samples exceeding a known regulatory limit
- Raw data indicating some type of contamination or poor technique
- Transcription errors
- Results outside of calibration range

19.13.4.4 Unacceptable analytical results may require reanalysis of the samples. Any problems are brought to the attention of the Laboratory Director, Project Manager, Quality Manager, Technical Manager, or Supervisor for further investigation. Corrective action is initiated whenever necessary.

19.13.4.5 The review process includes, but is not limited to, verifying that the COC is followed, report comments are present where necessary, comments are appropriate, and project specific requirements are met.

20.0 EQUIPMENT and CALIBRATIONS

20.1 Overview

The laboratory purchases the most technically advanced analytical instrumentation for sample analyses. Instrumentation is purchased on the basis of accuracy, dependability, efficiency and sensitivity. Each laboratory is furnished with all items of sampling, preparation, analytical testing and measurement equipment necessary to correctly perform the tests for which the laboratory has capabilities. Each piece of equipment is capable of achieving the required accuracy and complies with specifications relevant to the method being performed. Before being placed into use, the equipment (including sampling equipment) is calibrated and checked to establish that it meets its intended specification. The calibration routines for analytical instruments establish the range of quantitation. Calibration procedures are specified in SOP EM-EQ-S-1584. A list of available laboratory instrumentation, per facility, is maintained by Quality Assurance in QA server folders.

Equipment is only operated by authorized and trained personnel. Manufacturer's instructions for equipment use are readily accessible to all appropriate laboratory personnel.

20.2 Preventive Maintenance

The laboratory follows a well-defined maintenance program to ensure proper equipment operation and to prevent the failure of laboratory equipment or instrumentation during use. This program of preventive maintenance helps to avoid delays due to instrument failure.

Routine preventive maintenance procedures and frequency, such as cleaning and replacements, should be performed according to the procedures outlined in the manufacturer's manual. Qualified personnel must also perform maintenance when there is evidence of degradation of peak resolution, a shift in the calibration curve, loss of sensitivity, or failure to continually meet one of the quality control criteria.

Scheduled routine maintenance is defined in SOP EM-EQ-S-1584. It is the responsibility of each Facility Manager and/or designee to ensure that instrument maintenance logs are kept for all equipment in his/her facility. Preventative maintenance procedures are outlined in EM-EQ-S-1584 and may also be outlined in analytical SOPs or instrument manuals. (Note: for some equipment, the log used to monitor performance is also the maintenance log. Multiple pieces of equipment may share the same log as long as it is clear as to which instrument is associated with an entry.)

Instrument maintenance logs are controlled and are used to document instrument problems, instrument repair and maintenance activities. Maintenance logs shall be kept for all major pieces of equipment. Instrument maintenance logs may also be used to specify instrument parameters.

- Documentation must include all major maintenance activities such as contracted preventive maintenance and service and in-house activities such as the replacement of electrical components, lamps, tubing, valves, columns, detectors, cleaning and adjustments.
- Each entry in the instrument log includes the analyst's initials, the date, a detailed description of the problem (or maintenance needed/scheduled), a detailed explanation of the solution or maintenance performed, and a verification that the equipment is functioning properly (state what was used to determine a return to control. e.g. instrument recalibrated on ‘date’ with acceptable verification, etc.) must also be documented in the instrument records.
- When maintenance or repair is performed by an outside agency, service receipts detailing the service performed are to be maintained as part of facility equipment records.

If an instrument requires repair (subjected to overloading or mishandling), gives suspect results, or otherwise has shown to be defective or outside of specified limits it shall be taken out of operation and tagged as out-of-service or otherwise isolated until such a time as the repairs have been made and the instrument can be demonstrated as operational by calibration and/or verification or other test to demonstrate acceptable performance. The laboratory shall examine the effect of this defect on previous analyses.

In the event of equipment malfunction that cannot be resolved, service shall be obtained from the instrument vendor manufacturer, or qualified service technician, if such a service can be tendered. If on-site service is unavailable, arrangements shall be made to have the instrument shipped back to the manufacturer for repair. Back up instruments, which have been approved, for the analysis shall perform the analysis normally carried out by the malfunctioning instrument. If the back-up is not available and the analysis cannot be carried out within the needed timeframe, the samples shall be subcontracted.

At a minimum, if an instrument is sent out for service or transferred to another facility, it must be verified as functional upon return or repair prior to return to lab operations.

20.3 Support Equipment

This section applies to all devices that may not be the actual test instrument, but are necessary to support laboratory operations. These include but are not limited to: balances, ovens, refrigerators, freezers, incubators, water baths, temperature measuring devices, and volumetric dispensing devices if quantitative results are dependent on their accuracy, as in standard preparation and dispensing or dilution into a specified volume. All raw data records associated with the support equipment are retained to document instrument performance. Additional information and requirements may be found in SOP EM-EQ-S-1584.

20.3.1 Weights and Balances

The accuracy of the balances used in the laboratory is checked every working day, before use. All balances are placed on stable counter tops.

Each balance is checked prior to initial serviceable use with at least two certified ASTM type 1 weights spanning its range of use (weights that have been calibrated to ASTM type 1 weights may also be used for daily verification). ASTM type 1 weights used only for calibration of other weights (and no other purpose) are inspected for corrosion, damage or nicks at least annually and if no damage is observed, they are calibrated at least every 5 years by an outside calibration laboratory. Any weights (including ASTM Type 1) used for daily balance checks or other purposes are recalibrated/recertified every two years to NIST standards (this may be done internally if laboratory maintains “calibration only” ASTM type 1 weights).
All balances are serviced annually by a qualified service representative, who supplies the laboratory with a certificate that identifies traceability of the calibration to the NIST standards.

All of this information is recorded in logs, and the recalibration/recertification certificates are kept on file.

20.3.2 pH, Conductivity, and Turbidity Meters

The pH meters used in the laboratory are accurate to $\pm$ 0.1 pH units, and have a scale readability of at least 0.05 pH units. The meters automatically compensate for the temperature, and are calibrated with at least two working range buffer solutions before each use.

Conductivity meters are also calibrated before each use with a known standard to demonstrate the meters do not exceed an error of 1% or one umhos/cm.

Turbidity meters are also calibrated before each use. All of this information is documented in logs.

Consult pH, Conductivity, and Turbidity SOPs for further information.

20.3.3 Thermometers

All thermometers are calibrated on an annual basis with a NIST-traceable thermometer.

- If the temperature measuring device is used over a range of 10°C or less, then a single point verification within the range of use is acceptable;
- If the temperature measuring device is used over a range of greater than 10°C, then the verification must bracket the range of use.

IR thermometers and digital thermometers are calibrated every 6 months, (or quarterly where required by external accrediting bodies).

The NIST reference thermometer is recalibrated every five years (unless thermometer has been exposed to temperature extremes or apparent separation of internal liquid) by an approved outside service and the provided certificate of traceability is kept on file. The NIST thermometer(s) have increments of 1 degree (0.5 degree or less increments are required for drinking water microbiological laboratories), and have ranges applicable to method and certification requirements. The NIST traceable thermometer is used for no other purpose than to calibrate other thermometers.

All of this information is documented in logs. Monitoring method-specific temperatures, including incubators, heating blocks, water baths, and ovens, is documented in equipment-specific logs. More information on this subject can be found in the *Calibration and Maintenance of Lab Equipment* SOP, EM-EQ-S-1584.

20.3.4 Refrigerators/Freezer Units, Water baths, Ovens and Incubators

The temperatures of all refrigerator units and freezers used for sample and standard storage are monitored each working day, at minimum. Temperatures are recorded twice daily, with a minimum 4 hours between readings for days in use.

Ovens, water baths and incubators are monitored on days of use.

All of this equipment has a unique identification number, and is assigned a thermometer for monitoring.

Sample storage refrigerator temperatures are kept between 2ºC and 8 ºC.

Specific temperature settings/ranges for other refrigerators, ovens, water baths, and incubators can be found in method specific SOPs.

All of this information is documented in Daily Temperature Logs and/or electronic data logger records.

20.3.5 Autopipettors, Dilutors, and Syringes

Mechanical volumetric dispensing devices are given unique identification numbers and the delivery volumes are verified, at a minimum, on a monthly basis. Monthly pipette verification and annual calibration procedures are found in SOP EM-EQ-S-1584.

For those dispensers that are not used for analytical measurements, a label can be applied to the device stating that it is not calibrated and not for use in analysis. Any device not regularly verified cannot be used for any quantitative measurements.

20.3.6 Autoclaves

Each autoclave requires routine maintenance and cleaning to ensure functionality of the unit. Process controls are in place daily, weekly, and quarterly to ensure that the unit is performing as required with respect to time, temperature and sterilization requirements. Details of required maintenance can be found in manufacturer manuals as well as SOP Autoclave Operation and Maintenance SOP, EM-EQ-S-1198.

20.3.7 Microscopes

The routine maintenance of microscopes is outlined in Document EM-EQ-S-1586 "Routine Maintenance of Microscopes". Microscope Ocular Micrometers are calibrated annually with an NIST traceable micrometer per Document EM-EQ-S-1588 "Ocular Micrometer Calibration". Records of the maintenance and ocular micrometer calibrations are maintained as part of the Quality System documentation.

For those microscopes used in PCM analysis, routine maintenance and alignment requirements are outlined with the analytical Document EM-AS-S-1260 "PCM Analysis for Asbestos and Other Fibers".

For those microscopes used in Asbestos PLM analysis, routine maintenance and alignment requirements are outlined with the analytical Document EM-AS-S-1267 "Sample Preparation and Analysis for Asbestos Fibers by Polarized Light Microscopy (PLM)".

20.3.8 Ventilation and Decontamination

Class II Biosafety hoods are certified on an annual basis by a NSF accredited field certifier to ensure that the hoods are functioning according to the specifications outlined in NSF Standard 49 and the Chapter 13 of the ASHRAE Applications Notebook (1999). The records for the hood calibration are maintained at each facility.

All other Biohazard hoods, including Class I with HEPA filter used for asbestos, are certified on an annual basis by an ISO/IEC 17025:2017 accredited vendor.

Hoods used for asbestos analyses must operate at a minimum 75 fpm or they shall not be used for asbestos work.

20.4 Instrument Calibrations

Calibration of analytical instrumentation is essential to the production of quality data. Strict calibration procedures are followed for each method. These procedures are designed to determine and document the method detection limits, the working range of the analytical instrumentation and any fluctuations that may occur from day to day.

Sufficient raw data records are retained to allow an outside party to reconstruct all facets of the initial calibration. Records contain, but are not limited to, the following: calibration date, method, instrument, analyst(s) initials or signatures, analysis date, analytes, concentration, response,

and type of calibration (Avg RF, curve, or other calculations that may be used to reduce instrument responses to concentration.)

Sample results must be quantitated from the initial calibration and may not be quantitated from any continuing instrument calibration verification unless otherwise required by regulation, method or program.

If the initial calibration results are outside of the acceptance criteria, corrective action is performed and any affected samples are reanalyzed if possible. If the reanalysis is not possible, any data associated with an unacceptable initial calibration will be reported with appropriate data qualifiers (refer to Section 12).

Note: Instruments are calibrated initially and as needed after that and at least annually.

20.4.1 Calibration Standards

Calibration standards are prepared using the procedures indicated in the Reagents and Standards section of the determinative method SOP. If a reference method does not specify the number of calibration standards, a minimum of 3 calibration points will be used.

Standards for instrument calibration are obtained from a variety of sources. All standards are traceable to national or international standards of measurement, or to national or international standard reference materials.

The lowest concentration calibration standard that is analyzed during an initial calibration must be at or below the stated reporting limit for the method based on the final volume of extract (or sample).
The other concentrations define the working range of the instrument/method or correspond to the expected range of concentrations found in actual samples that are also within the working range of the instrument/method. Results of samples not bracketed by initial instrument calibration standards (within calibration range to at least the same number of significant figures used to report the data) must be reported as having less certainty, e.g., defined qualifiers or flags (additional information may be included in the case narrative).

All initial calibrations are verified with a standard obtained from a second source and traceable to a national standard, when available (or vendor certified different lot if a second source is not available). For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst at a different time or a different preparation would be considered a second source. This verification occurs immediately after the calibration curve has been analyzed, and before the analysis of any samples.

20.4.1.1 Calibration Verification

The calibration relationship established during the initial calibration must be verified initially and at least daily as specified in the laboratory method SOPs in accordance with the referenced analytical methods and in the 2009 and 2016 TNI Standard. The process of calibration verification applies to both external standard and internal standard calibration techniques, as well as to linear and non-linear calibration models. Initial calibration verification (ICV) is with a standard source secondary (second source standard) to the calibration standards, but

continuing calibration verifications (CCV) may use the same source standards as the calibration curve.

Note: The process of calibration verification referred to here is fundamentally different from the approach called "calibration" in some methods. As described in those methods, the calibration factors or response factors calculated during calibration are used to update the calibration factors or response factors used for sample quantitation. This approach, while employed in other EPA programs, amounts to a daily single-point calibration.

All target analytes and surrogates, including those reported as non-detects, must be included in periodic calibration verifications for purposes of retention time confirmation and to demonstrate that calibration verification criteria are being met, i.e., RPD, per 2009 and 2016 TNI Std. EL-V1M4 Sec. 1.7.2.

All samples must be bracketed by periodic analyses of standards that meet the QC acceptance criteria (e.g., calibration and retention time). The frequency is found in the determinative methods or SOPs.

Note: If an internal standard calibration is being used then bracketing calibration verification standards are not required, only daily verifications are needed. The results from these verification standards must meet the calibration verification criteria and the retention time criteria (if applicable).

Generally, the calibrations must be verified by an ICV analyzed immediately following initial calibration and before sample analysis. The ICV may be used as the first bracketing CCV, if criteria for both are met.

A continuing instrument calibration verification (CCV) is generally analyzed at the beginning of each 12-hour analytical shift during which samples are analyzed. The 12-hour analytical shift begins with the injection of the calibration verification standard (or the MS tuning standard in MS methods). The shift ends after the completion of the analysis of the last sample, QC, or standard that can be injected within 12-hours of the beginning of the shift. For methods that have quantitation by external calibration models, a CCV is analyzed at the end of each analytical sequence. Some methods have more frequent CCV requirements. See specific SOPs. Most inorganic methods require the CCV to be analyzed after ever 10 samples or injections, including matrix or batch QC samples.

Note: If an internal standard calibration is being used (e.g., GCMS) then bracketing standards are not required, only daily verifications are needed, except as specified by program or method requirements.

If the results of a CCV are outside the established acceptance criteria and analysis of a second consecutive (and immediate) CCV fails to produce results within acceptance criteria, corrective action shall be performed. Once corrective actions have been completed and documented, the laboratory shall demonstrate acceptable instrument / method performance by analyzing two consecutive CCVs, or a new initial instrument calibration shall be performed.

Sample analyses and reporting of data may not occur or continue until the analytical system is calibrated or calibration verified. However, data associated with an unacceptable calibration

verification may be fully useable reported based upon discussion and approval of the client under the following special conditions:

a). when the acceptance criteria for the CCV are exceeded high (i.e., high bias) and the associated samples within the batch are non-detects, then those non-detects may be reported case narrative comment explaining the high bias. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted; or

b). when the acceptance criteria for the CCV are exceeded low (i.e., low bias), those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise the samples affected by the unacceptable CCV shall be re-analyzed after a new calibration curve has been established, evaluated and accepted.

Samples reported by the 2 conditions identified above will be appropriately flagged.

20.4.1.2 Verification of Linear and Non-Linear Calibrations

Calibration verification for calibrations involves the calculation of the percent drift or the percent difference of the instrument response between the initial calibration and each subsequent analysis of the verification standard. (These calculations are available in the laboratory method SOPs.) Verification standards are evaluated based on the % Difference from the average CF or RF of the initial calibration or based on % Drift or % Recovery if a linear or quadratic curve is used.

Regardless of whether a linear or non-linear calibration model is used, if initial verification criterion is not met, then no sample analyses may take place until the calibration has been verified or a new initial calibration is performed that meets the specifications listed in the method SOPs. If the calibration cannot be verified after the analysis of a single verification standard, then adjust the instrument operating conditions and/or perform instrument maintenance, and analyze another aliquot of the verification standard. If the calibration cannot be verified with the second standard, then a new initial calibration is performed.

- When the acceptance criteria for the calibration verification are exceeded high, i.e., high bias, and there are associated samples that are non-detects, then those non-detects may be reported. Otherwise, the samples affected by the unacceptable calibration verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted.

- When the acceptance criteria for the calibration verification are exceeded low, i.e., low bias, those sample results may be reported if they exceed a maximum regulatory limit/decision level. Otherwise, the samples affected by the unacceptable verification shall be reanalyzed after a new calibration curve has been established, evaluated and accepted. Alternatively, a reporting limit standard may be analyzed to demonstrate that the laboratory can still support non-detects at their reporting limit.

21.0 MEASUREMENT TRACEABILITY

21.1 Overview

Traceability of measurements shall be assured using a system of documentation, calibration, and analysis of reference standards. Laboratory equipment that are peripheral to analysis and whose calibration is not necessarily documented in a test method analysis or by analysis of a reference standard shall be subject to ongoing certifications of accuracy. At a minimum, these must include procedures for checking specifications of ancillary equipment: balances, thermometers, temperature, Deionized (DI) and Reverse Osmosis (RO) water systems, automatic pipettes and other volumetric measuring devices. (Refer to Section 20.3). With the exception of Class A Glassware and glass microliter syringes, quarterly accuracy checks (at minimum) are performed for all mechanical volumetric devices. Wherever possible, subsidiary or peripheral equipment is checked against standard equipment or standards that are traceable to national or international standards. Class A Glassware and glass microliter syringes should be routinely inspected for chips, acid etching or deformity (e.g., bent needle). If the Class A glassware or syringe is suspect, the accuracy of the glassware will be assessed prior to use.

All reusable glassware and plasticware that is used in the analysis of samples must be cleaned, and where appropriate, sterilized according to Document EM-EQ-S-5810 "Glassware Cleaning". All glassware shall be inspected for cracks and chips before each time it is used. If cracks or chips are found, the glassware shall not be used and shall be repaired or discarded.

21.2 NIST-Traceable Weights and Thermometers

Reference standards of measurement shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated.

For NIST-traceable weights and thermometers, the laboratory requires that all calibrations be conducted by a calibration laboratory accredited by A2LA, NVLAP (National Voluntary Laboratory Accreditation Program), or another accreditation organization that is a signatory to a MRA (Mutual Recognition Arrangement) of one or more of the following cooperations – ILAC (International Laboratory Accreditation Cooperation) or APLAC (Asia–Pacific Laboratory Accreditation Cooperation). A calibration certificate and scope of accreditation is kept on file at the laboratory.

21.3 Reference Standards / Materials

Reference standards/materials, where commercially available, are traceable to certified reference materials. Commercially prepared reference standards, to the extent available, are purchased from vendors that are accredited to ISO Guide 34 and ISO/IEC Guide 17025:2017. All reference standards from commercial vendors shall be accompanied with a certificate that includes at least the following information:

- Manufacturer
- Analytes or parameters calibrated
- Identification or lot number
- Calibration method
- Concentration with associated uncertainties

- Purity

If a standard cannot be purchased from a vendor that supplies a Certificate of Analysis, the purity of the standard is documented by analysis. The receipt of all reference standards must be documented. Reference standards are labeled with a unique ID and expiration date. All documentation received with the reference standard is retained as a QC record and references the unique ID.

All reference, primary and working standards/materials, whether commercially purchased or laboratory prepared, must be checked regularly to ensure that the variability of the standard or material from the true value does not exceed method requirements. The accuracy of calibration standards is checked by comparison with a standard from a second source. In cases where a second standard manufacturer is not available, a vendor certified different lot is acceptable for use as a second source. For unique situations, such as air analysis where no other source or lot is available, a standard made by a different analyst would be considered a second source. The appropriate Quality Control (QC) criteria for specific standards are defined in laboratory SOPs. In most cases, the analysis of an Initial Calibration Verification (ICV) or LCS (where there is no sample preparation) is used as the second source confirmation. These checks are generally performed as an integral part of the analysis method (e.g. calibration checks, laboratory control samples).

All standards and materials must be stored and handled according to method or manufacturer's requirements in order to prevent contamination or deterioration. Refer to the Environmental Health & Safety Manual or laboratory SOPs. For safety requirements, please refer to method SOPs and the laboratory's Environmental Health and Safety Manual.

Standards and reference materials shall not be used after their expiration dates unless their reliability is verified by the laboratory and their use is approved by the Quality Assurance Manager. The laboratory must have documented contingency procedures for re-verifying expired standards.

21.4 Documentation and Labeling of Standards, Reagents, and Reference Materials

Reagents must be at a minimum the purity required in the test method. The date of reagent receipt and the expiration date are documented.

All manufacturer or vendor supplied Certificate of Analysis or Purity must be retained, stored appropriately, and readily available for use and inspection. These records are maintained on-site with each facility's current QA/QC records. Records must be kept of the date of receipt and date of expiration of standards, reagents and reference materials. In addition, records of preparation of laboratory standards, reagents, and reference materials must be retained, stored appropriately, and be readily available for use and inspection. For detailed information on documentation and labeling, please refer to facility Supply Receiving and Distribution SOPs.

Wherever possible, cultures purchased for use as control or reference cultures and inclusion in laboratory stock must be obtained from external sources traceable to Guide 34 such as, but not limited to, American Type Culture Collection (ATCC), Hardy Diagnostics and other commercially available traceable culture catalogs. It is not permissible to retain AIHA-EMPAT proficiency

testing rounds for inclusion in stock culture collections due to licensing agreements in place with AIHA-PAT, LLC.
All standards, reagents, and reference materials must be labeled in an unambiguous manner.
Records are maintained for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

Commercial materials purchased for preparation of calibration solutions, spike solutions, etc.., are usually accompanied with an assay certificate or the purity is noted on the label. If the assay purity is 96% or better, the weight provided by the vendor may be used without correction. If the assay purity is less than 96% a correction will be made to concentrations applied to solutions prepared from the stock commercial material. Blended gas standard cylinders use a nominal concentration if the certified value is within +/-15%, otherwise the certified values is used for the canister concentration.

21.4.1 All standards, reagents, and reference materials must be labeled in an unambiguous manner.

Records are maintained for standard and reference material preparation. These records show the traceability to purchased stocks or neat compounds. These records also include method of preparation, date of preparation, expiration date and preparer's name or initials. Preparation procedures are provided in the Method SOPs.

21.4.2 All standards, reagents, and reference materials must be clearly labeled with a minimum of the following information:

- Lot number
- Expiration Date (include prep date for reagents)
- Standard ID
- Special Health/Safety warnings if applicable

Records must also be maintained of the date of receipt for commercially purchased items or date of preparation for laboratory prepared items. Special Health/Safety warnings must also be available to the analyst. This information is maintained on-site with each facility's current QA/QC records.

21.4.3 In addition, the following information may be helpful:

- Date opened (for multi-use containers, if applicable)
- Description of standard (if different from manufacturer's label or if standard was prepared in the laboratory)
- Recommended Storage Conditions
- Concentration (if applicable)
- Initials of analyst preparing standard or opening container

All containers of prepared reagents must include an expiration date and an ID number to trace back to preparation.

Procedures for preparation of reagents can be found in the Method SOPs.

Standard ID numbers must be traceable through associated logbooks, worksheets and preparation/analytical batch records.

All reagents and standards must be stored in accordance to the following priority: 1) with the manufacturer's recommendations; 2) with requirements in the specific analytical methods as specified in the laboratory SOP.

22.0 SAMPLING

22.1 Overview

Eurofins EMLab P&K, LLC does not offer sampling services. Rare exceptions have been made upon high profile client request. Such requests are to include client specified sampling plans and are reviewed and approved on a case by case basis by the General Manager and Cluster Leader. Such requests and dictated protocols are documented as part of the client account records. Clients of the laboratory are supplied, upon request, with Eurofins EMLab P&K, LLC Chain of Custody (COC) forms, and written information regarding the use of sampling devices and sampling procedures. Clients may also obtain these materials and a detailed list of sampling procedures from the Eurofins EMLab P&K, LLC internet site.

22.2 Sampling Containers

The laboratory offers clean sampling containers for use by clients. These containers are obtained from reputable container manufacturers. Certificates of cleanliness for bottles and preservatives are provided by the supplier and are maintained at the laboratory. Alternatively, the certificates may be maintained by the supplier and available to the laboratory on-line. Internally, a representative sample from new lots of sample containers are checked for sterility and records maintained per lot.

22.2.1 Preservatives

Upon request, preservatives are provided to the client in pre-cleaned sampling containers. In some cases containers may be purchased pre-preserved from the container supplier. Whether prepared by the laboratory or bought pre-preserved, the grades of the preservatives are at a minimum:

- Sodium Thiosulfate – ACS Grade or equivalent

22.3 Definition of Holding Time

The date and time of sampling documented on the COC form establishes the day and time zero. As a general rule, when the maximum allowable holding time is expressed in days (e.g., 14 days, 28 days), the holding time is based on calendar day measured. Holding times expressed in hours (e.g., 6 hours, 24 hours, etc.) are measured from date and time zero. Holding times for analysis include any necessary reanalysis. However, there are some programs that determine

holding time compliance based on the date and specific time of analysis compared to the time of sampling regardless of how long the holding time is.

22.4 Sampling Containers, Preservation Requirements, Holding Times

The preservation and holding time criteria specified in the laboratory SOPs are derived from the source documents for the methods. If method required holding times or preservation requirements are not met, the reports will be qualified using a report comment. As soon as possible or “ASAP” is an EPA designation for tests for which rapid analysis is advised, but for which neither EPA nor the laboratory have a basis for a holding time.

22.5 Sample Aliquots / Subsampling

Taking a representative sub-sample from a container is necessary to ensure that the analytical results are representative of the sample collected in the field. The size of the sample container, the quantity of sample fitted within the container, and the homogeneity of the sample need consideration when sub-sampling for sample preparation. It is the laboratory’s responsibility to take a representative subsample or aliquot of the sample provided for analysis.

Analysts should handle each sample as if it is potentially dangerous. At a minimum, safety glasses (where applicable), gloves, and lab coats must be worn when preparing aliquots for analysis.

Only open asbestos samples in appropriate HEPA filtered hoods with a minimum flow rate of 75 fpm.

Guidelines on taking sample aliquots & subsampling are located in individual method SOPs.

23.0 HANDLING OF SAMPLES

Sample management procedures at the laboratory ensure that sample integrity and custody are maintained and documented from sampling/receipt through disposal.

Consider every sample as potentially dangerous. Handle samples in manner that reduces the potential of contamination to others and the laboratory environment.

Wipe every surface involved in the processing of samples with disinfectant after working with the samples.

Do not leave the lids off of plates at any time, and if necessary reseal plates with parafilm after analysis.

It is every employee's responsibility to report any safety concerns or incidence of non-compliance to supervisors, quality assurance officer, safety coordinator, or corporate management.

23.1 Chain of Custody (COC)

The COC form is the written documented history of any sample and is initiated when bottles are sent to the field, or at the time of sampling. This form is completed by the sampling personnel

and accompanies the samples to the laboratory where it is received and stored under the laboratory's custody. The purpose of the COC form is to provide a legal written record of the handling of samples from the time of collection until they are received at the laboratory. It also serves as the primary written request for analyses from the client to the laboratory. The COC form acts as a purchase order for analytical services when no other contractual agreement is in effect. An example of a COC form may be found in Figure 23-1.

23.1.1 Field Documentation

When the sampling personnel deliver the samples directly to Eurofins EMLab P&K personnel, the samples are stored in a cooler with ice, as applicable, and remain solely in the possession of the client's field technician until the samples are delivered to the laboratory personnel. The sample collector must assure that each container is in his/her physical possession or in his/her view at all times, or stored in such a place and manner to preclude tampering. The field technician relinquishes the samples in writing on the COC form to the sample control personnel at the laboratory or to a Eurofins courier. When sampling personnel deliver the samples through a common carrier (Fed-Ex, UPS), the CoC relinquished date/time is completed by the field personnel and samples are released to the carrier. Samples are only considered to be received by the laboratory when personnel at the fixed laboratory facility have physical contact with the samples.

Note: Independent couriers are not required to sign the COC form. The COC is usually kept in the sealed sample cooler. The receipt from the courier is stored in log-in by date; it lists all receipts each date.

23.1.2 Legal / Evidentiary Chain-of-Custody

If samples are identified for legal/evidentiary purposes on the COC, standard COC and sample handling procedures apply. Eurofins EMLab P&K does not provide internal chain of custody.

23.2 Sample Receipt

Samples are received at the laboratory by designated sample receiving personnel and a unique laboratory project identification number is assigned. Each sample container shall be assigned a unique sample identification number that is cross-referenced to the client identification number such that traceability of test samples is unambiguous and documented. Each sample container is affixed with a durable sample identification label. Sample acceptance, receipt, tracking and storage procedures are detailed in SOP EM-SM-S-1288, and summarized in the following sections.

23.2.1 Laboratory Receipt

The integrity of all samples received is checked during the Sample Receipt process outlined in Document EM-SM-S-1288 "Sample Receipt" prior to sample Log-in. It is the duty of the individual receiving the samples to ensure that the samples received are intact and not compromised in any fashion. The sample acceptance policy to be used as a guideline for assessing the integrity of received samples is contained within Document EM-SM-S-1288 "Sample Receiving".

During sample receipt and log in, the receiving staff separates the individual analysis types into bins and makes copies of the original COC for each bin as needed. The types of analyses, the number of samples received for each analysis, the type of sample and the requested turnaround time are recorded into the database. Any missing or extra samples received are recorded on the original COC and into the database. If any of the previous information is missing or incomplete, the information is documented into the database and the client is contacted. Samples are categorized by projects and analysis types into individual bins and queued for the Log-in process. The laboratory maintains a sample storage area that protects the samples from deterioration, loss, damage or from unauthorized access.

Whenever a compromised sample is encountered, the information is documented in LabServe (Report Comments, Project Log, Project Tasks, Log-in Field or Account Details). The client must be contacted and at the very least, if possible, a message left to inform the client of the situation. If, at the client's request, a compromised sample is analyzed, a qualifying statement must be submitted with the written report describing that the integrity of the results are potentially compromised and that the interpretation of the data is left to the client. Clients are informed on the condition of the sample in the final report. A record of pertinent discussions with clients must be maintained in LabServe (for example in the account details, project logs, tasks, etc.).

23.2.1.1 Unique Sample Identification

All samples that are processed through the laboratory receive a unique sample identification to ensure that there can be no confusion regarding the identity of such samples at any time. This system includes identification for all samples.

The laboratory assigns a unique identification (e.g., Sample ID) code to each sample container received at the laboratory.

23.3 Sample Acceptance Policy

The laboratory has a written sample acceptance policy noted in Document EM-SM-S-1288 "Sample Receipt" (Example in Figure 23-2) that clearly outlines the circumstances under which samples shall be accepted or rejected. These include, but are not limited to:

- sample holding times must be adhered to (Sampling Guide);
- all samples submitted must have a Chain of Custody (COC), or an equivalent sample request, to be received by the laboratory;
- samples are checked for unique identifiers on each sample and that the number of samples matches the information on the COC;
- proper sample containers with adequate volume for the analysis (Sampling Guide) and necessary QC;
- samples must be preserved according to the requirements of the requested analytical method (Sampling Guide);
- the project manager will be notified if any sample is received in damaged condition.

Data from samples which do not meet these criteria are flagged and the nature of the variation from policy is defined.

23.3.1 After inspecting the samples, the sample receiving personnel sign and date the COC form, make any necessary notes of the samples' conditions and store them in appropriate refrigerators or storage locations, as needed.

23.3.2 Any deviations from these checks that question the suitability of the sample for analysis, or incomplete documentation as to the tests required will be resolved by consultation with the client. If the sample acceptance policy criteria are not met, the laboratory shall either:

- Retain all correspondence and/or records of communications with the client regarding the disposition of rejected samples, or
- Fully document any decision to proceed with sample analysis that does not meet sample acceptance criteria.

Once sample acceptance is verified, the samples are logged into the LIMS/LabServe according SOP No. EM-SM-S-1993. and assigned an Eurofins EMLab P&K, LLC Project Number and unique laboratory identifiers for each sample in the project.

All client information, project information, analysis requests, sample identifier information, sample descriptions and miscellaneous notes are entered into the database. The information logged into the database is checked against the information on the original COC and Project Log before the samples are sent to a Receiving and Log- in Quality Control check.

In an effort to meet the needs of the client, Eurofins EMLab P&K, LLC offers the client the ability to log samples in via the internet. Clients enter Chain of Custody (COC) information into the internet log-in screen and then print a COC form which is sent with the samples to the laboratory.
Upon receipt of the samples at the laboratory the COCs are signed by the receiving laboratory staff and the information logged in by the clients is compared with the samples received and the information on the printed client produced COC. Additional information regarding Sample Log In via the internet can be found in SOP EM-SM-S-1993.

23.4 Sample Storage

In order to avoid deterioration, contamination or damage to a sample during storage and handling, from the time of receipt until all analyses are complete, samples are stored in refrigerators, freezers or protected locations suitable for the sample matrix. Samples are never to be stored with reagents, standards or materials that may create contamination.

Access to the laboratory is controlled such that sample storage need not be locked at all times unless a project specifically demands it. Samples are accessible to laboratory personnel only. Visitors to the laboratory are prohibited from entering the refrigerator and laboratory areas unless accompanied by an employee of Eurofins.

23.5 Hazardous Samples and Foreign Soils

To minimize exposure to personnel and to avoid potential accidents, hazardous and foreign soil samples are stored in an isolated area designated for hazardous waste only. For any sample that is known to be hazardous at the time of receipt or, if after completion of analysis the result exceeds the acceptable regulatory levels, a Hazardous Sample Notice must be completed by the analyst. This form may be completed by Sample Control, Project Managers, or analysts and must be attached to the report. The sample itself is clearly marked with a red stamp, stamped on the sample label reading “HAZARDOUS” or “FOREIGN SOIL” and placed in a colored and/or marked bag to easily identify the sample. The date, log number, lab sample number, and the result or brief description of the hazard are all written on the Hazardous & Foreign Soil Sample Notice. A copy of the form must be included with the original COC and Work Order and the original must be given to the Sample Control Custodian. Analysts will notify Sample Control of any sample determined to be hazardous after completion of analysis by completing a Hazardous Sample Notice. All hazardous samples are either returned to the client or disposed of appropriately through a hazardous waste disposal firm that lab-packs all hazardous samples and removes them from the laboratory. Foreign soil samples are sent out for incineration by a USDA-approved waste disposal facility.

23.6 Sample Shipping

In the event that the laboratory needs to ship samples, the samples are placed in a cooler with enough ice where necessary to ensure the samples remain within required temperature range for desired analysis during transit. The samples are carefully surrounded by packing material to avoid breakage (yet maintain appropriate temperature where necessary). The chain-of-custody form is signed by the sample control technician and included in the shipment. Samples are generally shipped overnight express or hand-delivered by a Eurofins TestAmerica courier to maintain sample integrity. All personnel involved with shipping and receiving samples must be trained to maintain the proper chain-of-custody documentation and to keep the samples intact and on ice, where necessary. The Environmental, Health and Safety Manual contains additional shipping requirements.

23.7 Sample Disposal

Samples should be retained for a minimum of 30 days after the project report is sent, however, provisions may be made for earlier disposal of samples once the holding time is exceeded. Some samples are required to be held for longer periods based on regulatory or client requirements (e.g., 60 days after project report is sent). The laboratory must follow the longer sample retention requirements where required by regulation or client agreement. Several possibilities for sample disposal exist: the sample may be consumed completely during analysis, the sample may be returned to the customer or location of sampling for disposal, or the sample may be disposed of in accordance with the laboratory’s waste disposal procedures (SOP EM-HS-S-1286). All procedures in the laboratory’s Environmental Health and Safety Manual are followed during disposal. Samples are normally maintained in the laboratory no longer than one month from receipt unless otherwise requested. Unused portions of samples found or suspected to be hazardous according to state or federal guidelines may be returned to the client upon completion of the analytical work.

Figure 23-1 . Example: Sample Acceptance Policy

All incoming work will be evaluated against the criteria listed below and found with SOP EM-SM-S-1288. Where applicable, data from any samples that do not meet the criteria listed below will be noted on the laboratory report defining the nature and substance of the variation. In addition the client will be notified ASAP after the receipt of the samples.

Per State and/or Federal Regulation, the client is responsible to ensure that samples are shipped in accordance with DOT/IATA requirements, and that radioactive materials may only be delivered to licensed facilities. Any samples containing (or suspected to contain) Source, Byproduct, or Special Nuclear Material as defined by 10 CFR should be delivered directly to facilities licensed to handle such radioactive material. Natural material or ores containing naturally occurring radionuclides may be delivered to any Eurofins facility or courier as long as the activity concentration of the material does not exceed 270 pCi/g alpha or 2700 pCi/g beta (49 CFR Part 173).

Samples received are expected to display the following features:

- Sealed correctly to eliminate cross contamination.
- Clearly discernible markings and identifications.
- Packing materials sufficient to appropriate to eliminate the risk of damage during delivery.
- Sample volume/amount must meet minimum and maximum amount requirements for each analysis, if applicable.
- Lead wipes must meet ASTM E1792 criteria.
- Culture media within expiration dates and lot numbers clearly identified on the plate.
- Asbestos PCM cassettes should not be packaged in Styrofoam and should be separated from PLM samples.
- Bacteriology samples, where a state certification is applicable, should only be shipped to labs holding that certification and should meet the analysis' temperature and holding time requirements.

Samples will be placed on the Project Manager will contact the client if any of the following are observed:

- Leakage from a sample.
- Water intrusion into a sample.
- Physical damage to a sample due to improper packaging during transport.
- Breaking or otherwise discernible compromise to the integrity of the sample.
- Illegible, ambiguous, or missing sample identification information.
- Sample volume/amount does not meet minimum and maximum amount requirements for each analysis, if applicable.
- Lead wipes do not meet the ASTM E1792 criteria.
- Culture media that is expired, dried, or detached from the culture plate.
- Asbestos PCM cassettes packaged in Styrofoam or with asbestos bulk samples.
- Bacteriology samples submitted for an analysis for which state certification is not held at the laboratory of receipt, and/or not adhering to the temperature and hold time requirements

Sample and hold time requirements vary per method. These can be found in SOP EM-SM-S-1288.

Eurofins EMLab P&K will make every effort to analyze samples within the regulatory holding time. Samples must be received in the laboratory with enough time to perform the sample analysis. Except for short holding time samples (< 48hr HT) sample must be received with at least 48 hrs (2 working days) remaining on the holding time for us to ensure analysis.

24.0 ASSURING THE QUALITY OF TEST RESULTS

24.1 Overview

In order to assure our clients of the validity of their data, the laboratory continuously evaluates the quality of the analytical process. The analytical process is controlled not only by instrument calibration as discussed in Section 20, but also by routine process quality control measurements (e.g. Blanks, Laboratory Control Samples (LCS), Matrix Spikes (MS), duplicates (DUP), replicates (REP), daily reference slides, and routine quality control checks). These quality control checks are performed as required by the method or regulations to assess precision and accuracy. Quality control samples are to be treated in the exact same manner as the associated field samples being tested. In addition to the routine process quality control samples, Proficiency Testing (PT) Samples (concentrations unknown to laboratory) are analyzed to help ensure laboratory performance.

24.2 Controls

Sample preparation or pre-treatment is commonly required before analysis. Typical preparation steps vary per method and may include homogenization, drying, acid digestion filter concentration, heat treatment, acid treatment, dilution, centrifugation, etc.. During these pre-treatment steps, samples are arranged into discreet manageable groups referred to as preparation (prep) batches, where applicable. Prep batches provide a means to control variability in sample treatment. Control samples are added to each prep batch to monitor method performance and are processed through the entire analytical procedure with investigative/field samples.

Quality Control Requirements include, but are not limited to, duplicate analysis, replicate analysis, daily reference analysis, round robin and proficiency testing as applicable to the method being performed. Quality control requirements, acceptance criteria, frequency and required trending practices are outlined in Document EM-QA-S-1994, Quality Control for Sample Analysis, Document EM-QA-S-1259, Quality Control for Asbestos Analysis, or within method specific documents.

A Quality Control and Acceptance Criteria Summary is available as Document EM-QA-R-5730.

24.3 Negative Controls

Table 24-1. Example – Negative Controls

Control Type	Details
Negative Control (NC)	are used to assess preparation and analysis for possible contamination during the preparation and processing steps.
	The specific frequency of use for method blanks during the analytical sequence is defined in the specific standard operating procedure for each analysis. Generally it is 1 per day of analysis.
	The method blank is prepared from a clean matrix similar to that of the associated samples that is free from target analytes (e.g., Reagent water, Ottawa sand, glass beads, etc.) and is processed along with and under the same conditions as the associated samples. The method blank goes through all of the steps of the process (including as necessary: filtration, clean-ups, etc.).
	Reanalyze or qualify associated sample results when the concentration of a targeted analyte in the blank is at or above the reporting limit as established by the method or by regulation, AND is greater than 1/10 of the amount measured in the sample.

Table 24-1. Example – Negative Controls

Control Type	Details
Calibration Blanks	are prepared and analyzed along with calibration standards where applicable. They are prepared using the same reagents that are used to prepare the standards. In some analyses the calibration blank may be included in the calibration curve.
Instrument Blanks	are blank reagents or reagent water that may be processed during an analytical sequence in order to assess contamination in the analytical system. In general, instrument blanks are used to differentiate between contamination caused by the analytical system and that caused by the sample handling or sample prep process. Instrument blanks may also be inserted throughout the analytical sequence to minimize the effect of carryover from samples with high analyte content.
Field Blanks [1]	are sometimes used for specific projects by the field samplers.

[1] When known, these field QC samples should not be selected for matrix QC as it does not provide information on the behavior of the target compounds in the field samples. Usually, the client sample ID will provide information to identify the field blanks with labels such as "FB", "EB", or "TB."

Evaluation criteria and corrective action for these controls are defined in the specific standard operating procedure for each analysis.

24.3.1 Negative Controls for Microbiological Methods – Microbiological Methods utilize a variety of negative controls throughout the process to ensure that false positive results are not obtained. These controls are critical to the validity of the microbiological analyses. Details of required negative controls are located within in each method SOP.

Table 24-2. Examples of Negative Controls for Microbiology

Control Type	Details
Sterility Checks (Media)	are analyzed for each lot of pre-prepared media, ready-to-use media and for each batch of medium prepared by the laboratory.
Sterility checks (Sample Containers)	are performed on at least one container per lot of purchased, pre-sterilized containers. If containers are prepared and sterilized by the laboratory, one container per sterilization batch is checked. Container sterility checks are performed using non-selective growth media.
Sterility Checks (Dilution Water)	are performed on each batch of dilution water prepared by the laboratory and on each batch of pre-prepared dilution water.
Sterility Checks (Filters)	are also performed on at least one filter from each new lot of membrane filters using non-selective growth media.

Negative culture controls demonstrate that a media does not support the growth of non-target organisms and ensures that there is not an atypical positive reaction from the target organisms. Prior to the first use of the media, each lot of pre-prepared selective media or batch of laboratory prepared selective media is analyzed with at least one known negative culture control as appropriate to the method.

24.4Positive Controls

Each regulatory program and each method within those programs specify the control samples that are prepared and/or analyzed with a specific batch

Note that frequency of control samples vary with specific regulatory, methodology and project specific criteria. Complete details on method control samples are as listed in each analytical SOP.

Cultures for quality control testing of media and for use as reference organisms are stored appropriately based on procedural requirements. Details can be found in EM-AD-S-5745.

24.4.1 Controls for Microbiological Methods

Laboratory produced media and reagents are checked against quality control organisms, where applicable, and for sterility according to media type recipes/instructions prior to use in analytical procedures. Documentation for the quality control of media and reagents are kept on file. Quality Control records for media produced by outside vendors are kept on file.

24.5Acceptance Criteria (Control Limits)

As mandated by the test method and regulation, each individual QC sample (daily reference, duplicate, replicate, positive control, negative control, etc.) is evaluated against the control limits published in the test method. Where there are no established acceptance criteria, the laboratory calculates in-house control limits with the use of control charts or, in some cases, utilizes client project specific control limits. When this occurs, the regulatory or project limits will supersede the laboratory's in-house limits.

Note: For methods, analytes and matrices with very limited data (e.g., unusual matrices not analyzed often), interim limits are established using available data or by analogy to similar methods or matrices.

Once control limits have been established, they are verified, reviewed, and updated if necessary on a biennial basis unless the method requires more frequent updating. Control limits are established per method (as opposed to per instrument) regardless of the number of instruments utilized.

Laboratory generated % Recovery acceptance (control) limits are generally established by taking $\pm$ 3 Standard Deviations (99% confidence level) from the average recovery of a minimum of 20-30 data points (more points are preferred).

- Regardless of the calculated limit, the limit should be no tighter than the Calibration Verification (ICV/CCV) where applicable. (Unless the analytical method specifies a tighter limit).

- In-house limits cannot be any wider than those mandated in a regulated analytical method. Client or contract required control limits are evaluated against the laboratory's statistically derived control limits to determine if the data quality objectives (DQOs) can be achieved. If

laboratory control limits are not consistent with DQOs, then alternatives must be considered, such as method improvements or use of an alternate analytical method.

24.5.1 The lab must be able to generate a current listing of their control limits and track when the updates are performed. In addition, the laboratory must be able to recreate historical control limits.

24.5.2 A LCS that is within the acceptance criteria establishes that the analytical system is in control and is used to validate the process. Samples that are analyzed with an LCS with recoveries outside of the acceptance limits may be determined as out of control and should be reanalyzed if possible. If reanalysis is not possible, then the results for all affected analytes for samples within the same batch must be qualified when reported. The internal corrective action process (see Section 12) is also initiated if an LCS exceeds the acceptance limits. Sample results may be qualified and reported without reanalysis if:

- The analyte results are below the reporting limit and the LCS is above the upper control limit.

- If the analytical results are above the relevant regulatory limit and the LCS is below the lower control limit.

24.5.3 If the MS/MSDs do not meet acceptance limits, the MS/MSD and the associated spiked sample is reported with a qualifier for those analytes that do not meet limits. If obvious preparation errors are suspected, or if requested by the client, unacceptable MS/MSDs are reprocessed and reanalyzed to prove matrix interference. A more detailed discussion of acceptance criteria and corrective action can be found in the lab's method SOPs and in Section 12.

24.6 Additional Procedures to Assure Quality Control

The laboratory has written and approved method SOPs to assure the accuracy of the test method including calibration (see Section 20), use of certified reference materials (see Section 21) and use of PT samples (see Section 15).

A discussion regarding MDLs, Limit of Detection (LOD) and Limit of Quantitation (LOQ) can be found in Section 19.

- Use of formulae to reduce data is discussed in the method SOPs and in Section 20.
- Selection of appropriate reagents and standards is included in Section 9 and 21.
- A discussion on selectivity of the test is included in Section 5.
- Constant and consistent test conditions are discussed in Section 18.
- The laboratories sample acceptance policy is included in Section 23.

25.0 REPORTING RESULTS

25.1 Overview

The results of each test are reported accurately, clearly, unambiguously, and objectively in accordance with State and Federal regulations as well as client requirements. Analytical results are issued in a format that is intended to satisfy customer and laboratory accreditation requirements as well as provide the end user with the information needed to properly evaluate the results. Where there is conflict between client requests and laboratory ethics or regulatory requirements, the laboratory's ethical and legal requirements are paramount, and the laboratory will work with the client during project set up to develop an acceptable solution. Refer to Section 9.

A variety of report formats are available to meet specific needs.

In cases where a client asks for simplified reports, there must be a written request from the client. There still must be enough information that would show any analyses that were out of conformance (QC out of limits) and there should be a reference to a full report that is made available to the client. Review of reported data is included in Section 19.

25.2 Test Reports

Analytical results are reported in a format that is satisfactory to the client and meets all requirements of applicable accrediting authorities and agencies. A variety of report formats are available to meet specific needs. Data results are predominantly made available to clients directly through electronic means. Eurofins EMLab P&K, LLC additionally offers hard copy reporting by special client request only. At a minimum, the standard laboratory report shall contain the following information:

25.2.1 A report title (e.g., Analytical Report)

25.2.2 The cover page shall include the laboratory name, address and telephone number.

25.2.3 A unique identification of the report (e.g., Eurofins EMLab P&K Project #) and on each page an identification in order to ensure the page is recognized as part of the report and a clear identification of the end.

Note: Page numbers of report are represented as page # of ##. Where the first number is the page number and the second is the total number of pages.

25.2.4 A copy of the chain of custody (COC).

- Any COCs involved with Subcontracting are included.

25.2.5 The name and address of client and a project name/number, if applicable.

25.2.6 Description and unambiguous identification of the tested sample(s) including the client identification code.

25.2.7 Date of receipt of sample, date and time of collection, and date(s) of test preparation and performance, and time of preparation or analysis if the required holding time for either activity is less than or equal to 72 hours.

25.2.8 Date reported or date of revision, if applicable.

25.2.9 Method of analysis including method code (EPA, Standard Methods, etc.).

25.2.10 Reporting limits, where applicable

25.2.11 Method detection limits (if requested)

25.2.12 Definition of Data qualifiers and reporting acronyms (e.g. ND).

25.2.13 Sample results.

25.2.14 Condition of samples at receipt.

25.2.15 A statement to the effect that the results relate only to the items tested and the sample as received by the laboratory, except when information is provided by the client. When data is provided by the client there shall be a clear identification of it, and a disclaimer shall be put in the report when the client supplied data can affect the validity of the test.

25.2.16 A statement that the report shall not be reproduced except in full, without prior express written approval by the laboratory.

25.2.17 A signature and title of the person(s) accepting responsibility for the content of the report and date of issue.

25.2.18 When TNI accreditation is required, the lab shall certify that the test results meet all requirements of TNI or provide reasons and/or justification if they do not.

25.2.19 Appropriate laboratory certification number for the state of origin of the sample, if applicable.

25.2.20 If only part of the report is provided to the client (client requests some results before all of it is complete), it must be clearly indicated on the report (e.g., preliminary report). A complete report must be sent once all of the work has been completed.

25.2.21 Any non- Eurofins EMLab P&K subcontracted analysis results are provided as a separate report on the official letterhead of the subcontractor. All Eurofins TestAmerica subcontracting is clearly identified on the report as to which laboratory performed a specific analysis.

Note: Refer to Eurofins EMLab P&K SOP EM-QA-2059 for details on internally applying electronic signatures of approval.

25.2.22 Electronic Data Deliverables (EDDs)

EDDs are routinely offered as part of Eurofins Eurofins EMLab P&K's services in addition to the test report as described in Section 25.2. When NELAP accreditation is required and both a test report and EDD are provided to the client, the official version of the test report will be the combined information of the report and the EDD. Eurofins EMLab P&K offers a variety of EDD formats including Excel and custom files.

EDD specifications are submitted to the IT department by the PM for review and undergo the contract review process. Once the facility has committed to providing data in a specific electronic format, the coding of the format may need to be performed. This coding is documented and validated. The validation of the code is retained by the IT staff coding the EDD.

EDDs shall be subject to a review to ensure their accuracy and completeness. If EDD generation is automated, review may be reduced to periodic screening if the laboratory can demonstrate that it can routinely generate that EDD without errors. Any revisions to the EDD format must be reviewed until it is demonstrated that it can routinely be generated without errors. If the EDD can be reproduced accurately and if all subsequent EDDs can be produced error-free, each EDD does not necessarily require a review.

25.3 Supplemental Information for Test

The lab identifies any unacceptable QC analyses or any other unusual circumstances or observations such as environmental conditions and any non-standard conditions that may have affected the quality of a result. This is typically in the form of a footnote or a qualifier and/or a report comment explaining the discrepancy in the front of the report.

Numeric results with values outside of the calibration range, either high or low are qualified as estimated.

Where quality system requirements are not met, a statement of compliance/non-compliance with requirements and/or specifications is required, including identification of test results derived from any sample that did not meet TNI sample acceptance requirements such as improper container, holding time, or temperature.

Where applicable, a statement on the estimated uncertainty of measurements; information on uncertainty is needed when a client's instructions so require.

When, as requested by the client and agreed to by Eurofins EMLab P&K, the report includes a statement of conformity to specification or standard (see Special Services, Section 7.4), the report shall clearly identify:

- to which results the statement applies,
- which specifications, standard or parts thereof are met or not, and
- the decision rule that was applied (unless the decision rule is inherent in the requested specification or standard, taking into account the level of risk (such as false accept and false reject and statistical assumptions) associated with the decision rule.

Opinions and Interpretations - The test report contains objective information, and generally does not contain subjective information such as opinions and interpretations. If such information is required by the client, the Laboratory Director will determine if a response can be prepared. If so, the Laboratory Director will designate the appropriate member of the management team to prepare a response. The response will be fully documented, and reviewed by the Laboratory Director, before release to the client. There may be additional fees charged to the client at this time, as this is a non-routine function of the laboratory.

Note: Review of data deliverable packages for submittal to regulatory authorities requires responses to non-conforming data concerning potential impact on data quality. This necessitates a limited scope of interpretation, and this work is performed by the QA Department. This is the only form of “interpretation” of data that is routinely performed by the laboratory.

When opinions or interpretations are included in the report, the laboratory provides an explanation as to the basis upon which the opinions and interpretations have been made. Opinions and interpretations are clearly noted as such and where applicable, a comment should be added suggesting that the client verify the opinion or interpretation with their regulator.

25.4 Environmental Testing Obtained From Subcontractors

If the laboratory is not able to provide the client the requested analysis, the samples would be subcontracted following the procedures outlined in the Eurofins EMLab P&K SOP on Subcontracting (SOP No. EM-SM-S-1288).

Data reported from analyses performed by a subcontractor laboratory are clearly identified as such on the analytical report provided to the client. Results from a subcontract laboratory outside of Eurofins EMLab P&K are reported to the client on the subcontract laboratory’s original report stationary and the report includes any accompanying documentation.

25.5 Client Confidentiality

The laboratory will ensure the highest standards of quality and integrity of the data and services provided to our clients.

The laboratory is responsible for maintaining in confidence all client information obtained or created. In situations involving the transmission of environmental test results by telephone, facsimile or other electronic means, client confidentiality must be maintained.

The laboratory will not intentionally divulge to any person (other than the client or any other person designated by the client in writing) any information regarding the services provided by the laboratory or any information disclosed to the laboratory by the client. Furthermore, information known to be potentially endangering to national security or an entity’s proprietary rights will not be released.

Should it be necessary to place any client information in a public domain, the customer shall be informed in advance, unless the client already provides the same information publically and/or has agreed to the release by the laboratory.

Information about the client obtained from sources other than the client (e.g., complainant, regulators) shall be confidential between client and the laboratory. The source of this

information shall be confidential to the laboratory and shall not be shared with the client, unless agreed by the source.

Note: This shall not apply to the extent that the information is required to be disclosed by the laboratory under the compulsion of legal process. The laboratory will, to the extent feasible, provide reasonable notice to the client before disclosing the information.

Note: Authorized representatives of an accrediting authority are permitted to make copies of any analyses or records relevant to the accreditation process, and copies may be removed from the laboratory for purposes of assessment.

25.5.1 Report deliverable formats are discussed with each new client. If a client requests that reports be faxed or e-mailed, the reports are to meet all requirements of this document, including cover letter.

25.6 Format of Reports

The format of reports is designed to accommodate each type of environmental test carried out and to minimize the possibility of misunderstanding or misuse.

25.7 Amendments to Test Reports

Corrections, additions, or deletions to reports are only made when justification arises through supplemental documentation. Justification is documented using the laboratory's corrective action system (refer to Section 12).

The revised report is retained in the LIMS/LabServe, under the "Deliverables" section of the project details page. The original report is maintained in the LIMS/LabServe, under the "Reports" section of the project details page. The revised report will have the word "revised" or "amended" on the report cover page and a unique report ID in LabServe. The "Delivery" section of the project details page in the LIMS/LabServe provides a delivery record of reports and packages.

When the report is re-issued, a notation of "revised report" is placed on the cover/signature page of the report with a brief explanation of reason for the re-issue._

25.8 Policies on Client Requests for Amendments

25.8.1 Policy on Data Omissions or Reporting Limit Increases

Fundamentally, our policy is simply to not omit previously reported results (including data qualifiers) or to not raise reporting limits and report sample results as ND. This policy has few exceptions. Exceptions are:

- Laboratory error.
- Sample identification is indeterminate (confusion between COC and sample labels).

- An incorrect analysis (not analyte) was requested (e.g., COC lists 8315 but client wanted 8310). A written request for the change is required.
- Incorrect limits reported based on regulatory requirements.
- The requested change has absolutely *no possible* impact on the interpretation of the analytical results and there is *no possibility* of the change being interpreted as misrepresentation by anyone inside or outside of our company.

25.8.2 Multiple Reports

Eurofins EMLab P&K does not issue multiple reports for the same work order where there is different information on each report (this does not refer to copies of the same report) unless required to meet regulatory needs and approved by QA.

26.0 ACCREDITATION AND LOGO ADVERTISING POLICY

26.1 Eurofins EMLab P&K, LLC strives to comply with the advertising and logo requirements of all external licensing/accrediting bodies. As such, the accreditation and logo advertising polices of all external licensing/accrediting bodies (i.e. NIST NVLAP, AIHA-LAP, LLC EMLAP and ELLAP, IHLAP, TCEQ, and NYS DOH programs etc.) must be reviewed and all conditions adhered to prior to use in advertising and/or reporting.

26.1.1 When the external licensing/accrediting bodies term is used to reference a laboratory's accredited status, it shall be accompanied by the external licensing/accrediting bodies lab code, where applicable.

26.1.2 The logos are on the Eurofins EMLab P&K website and some marketing material and not used on reports.

26.1.3 A test report bearing the term and/or symbol shall include a statement that the report must not be used by the client to claim product certification, approval, or endorsement by any external licensing/accrediting bodies or agency of the U.S. Government.

26.1.4 A laboratory shall not use the terms certified or registered when referencing its accreditations or conformance to current ISO/IEC 17025 requirements. The correct term is accredited.

26.1.5 When an accredited laboratory uses the term and/or symbol in a contract or proposal, the laboratory shall reference its current accreditation status and provide a copy of, or link to its scope of accreditation.

26.1.6 The external licensing/accrediting body's symbol shall stand by itself and shall not be combined with any other logo, symbol, or graphic.

26.1.7 All use of external licensing/accrediting body logos and accreditation information in advertising or otherwise distributed material must be pre-approved by the management

team (Cluster Leaders and Quality Assurance) to ensure adherence to the advertising and logo requirements of all external licensing/accrediting bodies, as noted in 26.1 above.

27.0 REVISION HISTORY

27.1 For access and review of previous Quality Assurance Manual revisions, contact Quality Assurance.

27.2 Revision 10, December 2015

27.2.1 Updated laboratory information for Chicago, Florida and South San Francisco, Added laboratory information for Atlanta (cover page).

27.2.2 Updated Technical Mangers for Irvine, South San Francisco, Sacramento, Seattle and Las Vegas. Added Technical Manager for Atlanta. (cover page).

27.2.3 Added responsibility for resumption of work for a stop work directive. (section 2.1.8 and 9.4).

27.2.4 Updated analytical method review frequency to biennially in the QA Manager job description (section 3.3.2)

27.2.5 Removed reference to “Lean Manager” in Project Manager job description (section 3.5.3).

27.2.6 Replaced term AIHA with AIHA-LAP, LLC throughout the document.

27.2.7 Corrected NVLAP acronym (section 3.6.4, 3.7.4 and 3.8.4).

27.2.8 Updated glassware washing requirements to “reusable” glassware (section 4.9)

27.2.9 Switched assigning the unique laboratory identification n umber from sample receipt procedure to login procedure (sections 5.3 and 5.4).

27.2.10 Removed records and control chats from controlled document section to records. (section 7.0 and 7.4)

27.2.11 Updated procedure for obsolete documents (section 7.15)

27.2.12 Added a monthly minimum requirement for QC blind recounts (section 8.2).

27.2.13 Added option for non-proficiency testing data for use in creating demonstrations of capability (section 12.4)

27.2.14 Updated requirements for PLM round robin analysis, (section 12.5.3).

27.2.15 Updated requirements for asbestos environmental monitoring (section 13.0)

27.2.16 Updated South San Francisco floor plan

27.2.17 Revised Organizational chart format to remove names (section 19.5).

27.3Revision 11, November 2016

27.3.1 Updated contact information for western region QA Manager on cover page.

27.3.2 Updated Las Vegas laboratory address on cover page.

27.3.3 Updated Technical Mangers for Irvine and, Sacramento on cover page.

27.3.4 Added Atlanta AIHA-LAP, LLC Laboratory ID number and removed "approved signatory" from Technical Managers signature on cover page

27.3.5 Moved statement marked in 1.1.1 to 1.1.2

27.3.6 Added statement that QA Manual confirms to CQMP in section 1.1.2.

27.3.7 Added reference to scopes of accreditation and added lead as an analytical technique in section 1.2.1

27.3.8 Added "NYS DOH" to sections 2.1.1 and 16.1

27.3.9 Added job description for ELLAP Technical Manager and updated job description for Analyst and Laboratory Technician in sections 3.7.2.g, 3.7.4.c.i, 3.8.2.j and 3.11.

27.3.10 Changed "calibration" to "verification" in section 4.4.2

27.3.11 Updated section 4.8.2 to reflect current annual schedule for non-BSC hood calibrations

27.3.12 Added suggested addition of COC under "contract review" in section 6.2.1

27.3.13 Added reference to EMLab P&K signature policy CA-I-P-002 in section 7.3.3

27.3.14 Updated record retention policy for all documents relating to AIHA_LAP, LLC ELLAP and NYS-DOH in section 7.4.2

27.3.15 Updated record retention policy for training documents relating to AIHA_LAP, LLC ELLAP and NYS-DOH in section 7.4.3

27.3.16 Updated computer back-up storage policy in section 7.5.6

27.3.17 Added requirement for client notification of where client data has been affected must be made within two weeks of completing investigation in section 9.4.1

27.3.18 Added requirement for environmental monitoring for lead to section 13.1.1

27.3.19 Updated the accreditation logo and name policy in section 16.0.

27.3.20 Replaced "QAzilla" with "corrective action request" in sections referencing work out of spec or corrective actions, etc.

27.4 Revision 12, March 2017

27.4.1 Updated Western and Central Regional Director name on cover page.

27.4.2 Updated EMLAP, IHLAP and ELLAP Technical Manager requirements.

27.4.3 Added that reporting limits are listed on final reports where applicable in section 5.11

27.4.4 Added if available to the requirement for NIST reference materials in section 12.8.2.c.

27.5 Revision 13, May 2018

27.5.1 QA Manual template conversion from EMLab P&K template to TestAmerica corporate template/structure.

27.5.2 Addition of lab manager role in personnel section

27.5.3 Addition of notification requirements for laboratory changes.

27.6 Revision 14, September 2018

27.6.1 Revision updates to address changes related to ISO 17025:2017 updates

27.6.2 Restoration of “Accreditation and Logo Advertising Policy”

27.7 Revision 15, September 2019

27.7.1 Revision updates to address rebranding to Eurofins TestAmerica and Eurofins EMLab P&K

27.7.2 Removal of Technical Manager approval requirements for annual QA Manual revision in Sec. 3.4.1.

27.7.3 Sec. 18.2 - Added paragraph 6 regarding the requirement concerning management of environmental conditions when work is being performed offsite.

27.7.4 Sec. 20.3.1, Correction to working weight verification schedule.

27.7.5 Updated Table 20-1 to reflect updated calibration frequency for biological safety cabinets.

27.7.6 Updated Org charts, Figure 4-1

27.7.7 Updated Revision History section to reflect and support technical record retention period.

27.8 Revision 16, October 2020

27.8.1 Revision updates to address continued rebranding, and updating references to ‘corporate’ as “NDSC’

27.8.2 Revisions to address changes to NDSC QAM template guidance, including section re-organization, table relocations to appendices.

27.8.3 Revisions to update Org Charts.

27.8.4 Removal of floor plans.

27.8.5 Added Section 4.1.1, Selection of Personnel

27.8.6 Addition of Section 4.3.10 for combined QA Assistant / EHSC role

27.8.7 Revisions to address deployment of personnel in additional network facilities, Sections 5.1, 5.3, and 17.1.5.

27.8.8 Revisions to address risks and opportunities in Section 14.3.2

27.8.9 Revisions to clarify processes for vendor/supplier evaluations, purchasing.

27.8.10 Revisions to include policy on deployment of analysts across network facilities, as well as related policies on PT participation.

27.8.11 Update to Client Confidentiality, Section 25.5 to include notification for information in public domains.

27.8.12 Reference QAzilla # 11048 for revision/approval process details.

Appendix 1.

List of Governing Documents applicable to the QA Manual

(NDSC, KDG and Laboratory SOPs and Policies)

NDSC Doc. No.	Title
CA-C-S-001	Work Sharing Process
CA-I-P-002	Electronic Reporting and Signature Policy
CA-L-P-002	Contract Compliance Policy
CA-Q-M-002	Corporate Quality Management Plan
CA-Q-S-001	Acid and Solvent Lot Testing and Approval Program
CA-Q-S-002	Manual Integrations-
CA-Q-S-006	Detection and Quantitation Limits
CA-Q-S-009	Root Cause Analysis
CA-T-P-001	Qualified Products List
CW-E-M-001	Corporate Environmental Health & Safety Manual
CW-F-P-002	Company-Wide Authorization Matrix
CW-F-P-004	Procurement and Contracts Policy
CW-F-S-007	Fixed Asset Acquisition, Retention and Safeguarding
CW-I-M-001	IT Change Control Procedure Manual
CW-L-P-001	Records Retention Policy
CW-L-P-004	Ethics Policy
CW-L-S-002	Internal Investigation
CW-Q-S-001	Corporate Document Control and Archiving
CW-Q-S-002	Writing a Standard Operating Procedure (SOPs)
CW-Q-S-003	Internal Auditing
CW-Q-S-004	Management Systems Review
CW-Q-S-005	Data Recall Process
CW-Q-S-001	Corporate Document Control and Archiving

Referenced Laboratory SOPs

Eurofins EMLab P&K Doc. No.	Title
EM-QA-S-2059	Document Control & Updating (Document Control and Control of Records, Sec. 3.4.1)
EM-CS-S-1709	Complaint Resolution (Resolving Client Concerns and Soliciting Client Feedback, Sec .10.1)
EM-QA-S-2059	Data Scanning (Document Control and Control of Records – Sec. 14.1.4)
EM-AD-S-1646 EM-AD-S-1261	Lab Training (General Training, Asbestos Analysis Training, Sec. 17.3)
EM-QA-S-2059	Writing SOPs (Document Control and Control of Records, Sec. 19.2)
EM-AD-S-1646 EM-AD-S-3548 EM-AD-S-1619	DOCs (General Training, Selection and Validation of Analytical Methods, Nonstandard Methods for Analysis Sec. 19.4.2)
EM-QA-S-1994 EM-QA-S-1259	MDLs (Quality Control for Sample Analysis, Quality Control for Asbestos Analysis, Sec. 19.7)
EM-AD-S-1601 EM-AD-S-1884	MI (Laboratory Service Management, QAzilla and LabServe Enhancement Procedure, Sec. 19.14.1)
EM-SM-S-1288 EM-SM-S-1993	Sample Receipt / Login, etc… (Sample Receiving, Sample Log In, Sec. 23.2.1.3)

Appendix 2.

Laboratory Certifications, Accreditations, Validations

Eurofins EMLab P&K maintains accreditations, certifications, and approvals with numerous state and national entities. Programs vary but may include on-site audits, reciprocal agreements with another entity, performance testing evaluations, review of the QA Manual, Standard Operating Procedures, Method Detection Limits, training records, etc. Details of accreditation/ certification/licensing, including accredited parameter lists are available for each program at www.emlab.com under "Accreditations".

Appendix 3.

References used to prepare the QA Manual

The QAM has been prepared to be consistent with the requirements of the following documents:

- ANSI/ASQC, E4-1994, "Specifications and Guidelines for Quality Management Systems for Environmental Data Collection and Environmental Technology Programs" (American National Standard, January 5, 1995, or most recent version)
- "EPA Requirements for Quality Management Programs" (QA/R-2) (EPA/240/B-01/002, May 31, 2006).
- EPA 600/4-79-019, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories,* EPA, March 1979.
- *Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW846), Third Edition, September 1986, Final Update I, July 1992, Final Update IIA, August 1993, Final Update II, September 1994; Final Update IIB, January 1995; Final Update III, December 1996; Final Update IV, January 2008; Final Update V, August 2015.*
- Federal Register, 40 CFR Parts 136, 141, 172, 173, 178, 179 and 261.
- *Manual for the Certification of Laboratories Analyzing Drinking Water (EPA 815-R-05-004, January 2005) (DW labs only)*
- APHA, *Standard Methods for* the Examination of Water and Wastewater, 18th Edition, 19th, 20th, 21st, 22nd and on-line Editions.
- Marine Protection, Research, and Sanctuaries Act (MPRSA).
- Toxic Substances Control Act (TSCA).
- AIHA-LAP, LLC Accreditation Policy Modules,Rev 14
- NIST NVLAP Handbooks 150, Procedures and General Requirements (2020) and 150-3, Bulk Asbestos Analysis (2018-07)

Appendix 4.

Glossary/Acronyms (EL-V1M2 Sec. 3.1)

Glossary:

Acceptance Criteria: Specified limits placed on characteristics of an item, process, or service defined in requirement documents. (ASQC)

Accreditation: The process by which an agency or organization evaluates and recognizes a laboratory as meeting certain predetermined qualifications or standards, thereby accrediting the laboratory.

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components which are due to sampling and analytical operations; a data quality indicator. (QAMS)

Analyst: The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

Analytical Uncertainty: A subset of Measurement Uncertainty that includes all laboratory activities performed as part of the analysis. (TNI)

Anomaly: A condition or event, other than a non-conformance, that may affect the quality of the data, whether in the laboratory's control or not.

Asbestos Definitions

- Limit of Quantitation: The Limit of Quantitation is 1%.
- Less than One Percent (<1%): When the Laboratory reports a value of <1% using Calibrated Visual Area Estimation, this indicates that asbestos is present in an amount between trace and 0.99%, but cannot be accurately quantified at that level unless a 400 Point Count is performed.
- Non-Detected (ND): The Laboratory reports "Non-Detected" when the laboratory homogenizes the sample in some way or analyzes a sufficient number of sub-samples to obtain a representative analysis whereby no asbestos fibers have been detected in any sub-sample preparations
- Trace: When reporting the results of asbestos analyses using Calibrated Visual Area Estimation that are below the Laboratory's Limit of Quantitation, the Laboratory does not refer to or use the term "Trace"; the Laboratory reports the results as <1%. However, on occasion, samples can contain a "Trace" amount of asbestos. The term "Trace" means that asbestos was found to be present in the sample, but at a level below the minimum concentration needed to quantify at the reporting limit of 0.25% via a 400 Point Count (performed only by client request).

Assessment: The evaluation process used to measure or establish the performance, effectiveness, and conformance of an organization and/or its systems to defined criteria (to the standards and requirements of laboratory accreditation). (TNI)

Audit: A systematic and independent examination of facilities, equipment, personnel, training, procedures, record-keeping, data validation, data management, and reporting aspects of a system to determine whether QA/QC and technical activities are being conducted as planned and whether these activities will effectively achieve quality objectives. (TNI)

Batch: Environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A **preparation batch** is composed of one (1) to twenty (20) environmental samples of the same quality systems matrix, meeting the above mentioned criteria and with a maximum time between the start of processing of the first and last sample in the batch to be twenty-four (24) hours. An **analytical batch** is composed of prepared environmental samples (extracts, digestates or concentrates) which are analyzed together as a group. An analytical batch can include

prepared samples originating from various quality system matrices and can exceed twenty (20) samples. (TNI)

Bias: The systematic or persistent distortion of a measurement process, which causes errors in one direction (i.e., the expected sample measurement is different from the sample's true value). (TNI)

Blank: A sample that has not been exposed to the analyzed sample stream in order to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value and is sometimes used to adjust or correct routine analytical results. (ASQC)

Calibration: A set of operations that establish, under specified conditions, the relationship between values of quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realized by standards. (TNI)

1) In calibration of support equipment the values realized by standards are established through the use of reference standards that are traceable to the International System of Units (SI).

2) In calibration according to methods, the values realized by standards are typically established through the use of Reference Materials that are either purchased by the laboratory with a certificate of analysis or purity, or prepared by the laboratory using support equipment that has been calibrated or verified to meet specifications.

Calibration Curve: The mathematical relationship between the known values, such as concentrations, of a series of calibration standards and their instrument response. (TNI)

Calibration Standard: A substance or reference material used to calibrate an instrument (QAMS)

Certified Reference Material (CRM): A reference material accompanied by a certificate, having a value, measurement uncertainty, and stated metrological traceability chain to a national metrology institute. (TNI)

Chain of Custody (COC) Form: Record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; the collector; time of collection; preservation; and requested analyses. (TNI)

Compromised Samples: Those samples which are improperly sampled, insufficiently documented (chain of custody and other sample records and/or labels), improperly preserved, collected in improper containers, or exceeding holding times when delivered to a laboratory. Under normal conditions, compromised samples are not analyzed. If emergency situation require analysis, the results must be appropriately qualified.

Confidential Business Information (CBI): Information that an organization designates as having the potential of providing a competitor with inappropriate insight into its management, operation or products. TNI and its representatives agree to safeguard identified CBI and to maintain all information identified as such in full confidentiality.

Confirmation: Verification of the identity of a component through the use of an approach with a different scientific principle from the original method. These may include, but are not limited to Second Column Confirmation; Alternate wavelength; Derivatization; Mass spectral interpretation; Alternative detectors or Additional Cleanup procedures. (TNI)

Conformance: An affirmative indication or judgment that a product or service has met the requirements of the relevant specifications, contract, or regulation; also the state of meeting the requirements. (ANSI/ASQC E4-1994)

Correction: Actions necessary to correct or repair analysis specific non-conformances. The acceptance criteria for method specific QC and protocols as well as the associated corrective actions. The analyst will most frequently be the one to identify the need for this action as a result of calibration checks and QC sample analysis**.** No significant action is taken to change behavior, process or procedure.

Corrective Action: The action taken to eliminate the causes of an existing nonconformity, defect or other undesirable situation in order to prevent recurrence. (ISO 8402)

Daily Reference: A reference sample with a known or accepted quantity of analyte(s) of interest used as a daily calibration standard to verify accuracy.

Data Audit: A qualitative and quantitative evaluation of the documentation and procedures associated with environmental measurements to verify that the resulting data re of acceptable quality (i.e., that they meet specified acceptance criteria).

Data Reduction: The process of transforming the number of data items by arithmetic or statistical calculations, standard curves, and concentration factors, and collation into a more useable form. (TNI)

Deficiency/ Non-conformance: An unauthorized deviation from acceptable procedures or practices, or a defect in an item (ASQC), whether in the laboratory's control or not.

Demonstration of Capability: A procedure to establish the ability of the analyst to generate analytical results of acceptable accuracy and precision. (TNI)

Document Control: The act of ensuring that documents (and revisions thereto) are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly, and controlled to ensure use of the correct version at the location where the prescribed activity if performed. (ASQC)

Duplicate Analyses: The analyses or measurements of the variable of interest performed identically on two subsamples of the same sample. The results from duplicate analyses are used to evaluate analytical or measurement precision but not the precision of sampling, preservation or storage internal to the laboratory. (EPA-QAD)

Equipment Blank: Sample of analyte-free media which has been used to rinse common sampling equipment to check effectiveness of decontamination procedures.

External Standard Calibration: Calibrations for methods that do not utilize internal standards to compensate for changes in instrument conditions.

Field Blank: Blank prepared in the field by filing a clean container with pure de-ionized water and appropriate preservative, if any, for the specific sampling activity being undertaken (EPA OSWER)

Field of Accreditation: Those matrix, technology/method, and analyte combinations for which the accreditation body offers accreditation.

Holding Times: The maximum time that samples may be held prior to analyses and still be considered valid or not compromised. (40 CFR Part 136)

Internal Standard: A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical test method. (TNI)

Internal Standard Calibration: Calibrations for methods that utilize internal standards to compensate for changes in instrument conditions.

Instrument Blank: A clean sample (e.g., distilled water) processed through the instrumental steps of the measurement process; used to determine instrument contamination. (EPA-QAD)

Instrument Detection Limit (IDL): The minimum amount of a substance that can be measured with a specified degree of confidence that the amount is greater than zero using a specific instrument. The IDL is associated with the instrumental portion of a specific method only, and sample preparation steps are not considered in its derivation. The IDL is a statistical estimation at a specified confidence interval of the concentration at which the relative uncertainty is ± 100%. The IDL represents a range where qualitative detection occurs on a specific instrument. Quantitative results are not produced in this range.

Laboratory Control Sample (however named, such as laboratory fortified blank, spiked blank, or QC check sample): A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes, taken through all preparation and analysis steps of the procedure unless otherwise noted in a reference method. It is generally used to establish intra-laboratory or analyst specific precision and bias or to assess the performance of all or a portion of the measurement system.

An LCS shall be prepared at a minimum of 1 per batch of 20 or less samples per matrix type per sample extraction or preparation method except for analytes for which spiking solutions are not available such as total suspended solids, total dissolved solids, total volatile solids, total solids, pH, color, odor, temperature, dissolved oxygen or turbidity. The results of these samples shall be used to determine batch acceptance.

Least Squares Regression (1st Order Curve): The least squares regression is a mathematical calculation of a straight line over two axes. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The regression calculation will generate a correlation coefficient (r) that is a measure of the "goodness of fit" of the regression line to the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r must be greater than or equal to 0.99 for organics and 0.995 for inorganics.

Limit(s) of Detection (LOD) [a.k.a., Method Detection Limit (MDL)]: The MDL is the minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results, consistent with 40CFR Part 136 Appendix B, August, 2017.

Limit(s) of Quantitation (LOQ) [a.k.a., Reporting Limit]: The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence.

(QS) Matrix: The component or substrate that contains the analyte of interest. For purposes of batch and QC requirement determinations, the following matrix distinctions shall be used:

Aqueous: Any aqueous sample excluded from the definition of Drinking Water or Saline/Estuarine. Includes surface water, groundwater effluents, and TCLP or other extracts.
Drinking Water: Any aqueous sample that has been designated as a potable or potential potable water source.
Saline/Estuarine: Any aqueous sample from an ocean or estuary, or other salt water source such as the Great Salt Lake.
Non-Aqueous Liquid: Any organic liquid with <15% settleable solids.
Biological Tissue: Any sample of a biological origin such as fish tissue, shellfish, or plant material. Such samples shall be grouped according to origin.
Solids: Includes soils, sediments, sludges, and other matrices with >15% settleable solids.
Chemical Waste: A product or by-product of an industrial process that results in a matrix not previously defined.

Air & Emissions: Whole gas or vapor samples including those contained in flexible or rigid wall containers and the extracted concentrated analytes of interest from a gas or vapor that are collected with a sorbant tube, impinger solution, filter, or other device. (TNI)

Matrix Spike (spiked sample or fortified sample): A sample prepared, taken through all sample preparation and analytical steps of the procedure unless otherwise noted in a referenced method, by adding a known amount of target analyte to a specified amount of sample for which an independent test result of target analyte concentration is available. Matrix spikes are used, for example, to determine the effect of the matrix on a method's recovery efficiency.

Matrix Spike Duplicate (spiked sample or fortified sample duplicate): A replicate matrix spike prepared and analyzed to obtain a measure of the precision of the recovery for each analyte.

Method Blank: A sample of a matrix similar to the batch of associated samples (when available) that is free from the analytes of interest and is processed simultaneously with and under the same conditions as samples through all steps of the analytical procedures, and in which no target analytes or interferences are present at concentrations that impact the analytical results for sample analyses.

Method Detection Limit: See Limit of Detection (LOD)-

Negative Control: Measures taken to ensure that a test, its components, or the environment do not cause undesired effects, or produce incorrect test results.

Non-conformance: An indication, judgment, or state of not having met the requirements of the relevant specifications, contract, or regulation.

Observation: A record of phenomena that (1) may assist in evaluation of the sample data; (2) may be of importance to the project manager and/or the client, and yet not at the time of the observation have any known effect on quality.

Performance Audit: The routine comparison of independently obtained qualitative and quantitative measurement system data with routinely obtained data in order to evaluate the proficiency of an analyst or laboratory.

Positive Control: Measures taken to ensure that a test and/or its components are working properly and producing correct or expected results from positive test subjects.

Precision: The degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves; a data quality indicator. Precision is usually expressed as standard deviation, variance or range, in either absolute or relative terms. (TNI)

Preservation: Any conditions under which a sample must be kept in order to maintain chemical and/or biological integrity prior to analysis. (TNI)

Proficiency Testing: A means of evaluating a laboratory's performance under controlled conditions relative to a given set of criteria through analysis of unknown samples provided by an external source. (TNI)

Proficiency Testing Program: The aggregate of providing rigorously controlled and standardized environmental samples to a laboratory for analysis, reporting of results, statistical evaluation of the results and the collective demographics and results summary of all participating laboratories. (TNI)

Proficiency Test Sample (PT): A sample, the composition of which is unknown to the laboratory and is provided to test whether the laboratory can produce analytical results within specified acceptance criteria. (TNI)

Quality Assurance: An integrated system of management activities involving planning, implementation, assessment, reporting and quality improvement to ensure that a process, item or service is of the type of quality needed and expected by the client. (TNI)

Quality Assurance [Project] Plan (QAPP): A formal document describing the detailed quality control procedures by which the quality requirements defined for the data and decisions pertaining to a specific project are to be achieved. (EAP-QAD)

Quality Control: The overall system of technical activities that measures the attributes and performance of a process, item, or service against defined standards to verify that they meet the stated requirements established by the customer; operational techniques and activities that are used to fulfill requirements for quality; also the system of activities and checks used to ensure that measurement systems are maintained within prescribed limits, providing protection against “out of control” conditions and ensuring that the results are of acceptable quality. (TNI)

Quality Control Sample: A sample used to assess the performance of all or a portion of the measurement system. One of any number of samples, such as Certified Reference Materials, a quality system matrix fortified by spiking, or actual samples fortified by spiking, intended to demonstrate that a measurement system or activity is in control. (TNI)

Quality Manual: A document stating the management policies, objectives, principles, organizational structure and authority, responsibilities, accountability, and implementation of an agency, organization, or laboratory, to ensure the quality of its product and the utility of its product to its users. (TNI)

Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and QC activities. (TNI)

Raw Data: The documentation generated during sampling and analysis. This documentation includes, but is not limited to, field notes, electronic data, magnetic tapes, untabulated sample results, QC sample results, print outs of chromatograms, instrument outputs, and handwritten records. (TNI)

Record Retention: The systematic collection, indexing and storing of documented information under secure conditions.

Reference Material: Material or substance one or more properties of which are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. (TNI)

Reference Standard: Standard used for the calibration of working measurement standards in a given organization or a given location. (TNI)

Sampling: Activity related to obtaining a representative sample of the object of conformity assessment, according to a procedure.

Second Order Polynomial Curve (Quadratic): The 2nd order curves are a mathematical calculation of a slightly curved line over two axis. The y axis represents the instrument response (or Response ratio) of a standard or sample and the x axis represents the concentration. The 2nd order regression will generate a

coefficient of determination (COD or r^2) that is a measure of the "goodness of fit" of the quadratic curvature the data. A value of 1.00 indicates a perfect fit. In order to be used for quantitative purposes, r^2 must be greater than or equal to 0.99.

Selectivity: The ability to analyze, distinguish, and determine a specific analyte or parameter from another component that may be a potential interferent or that may behave similarly to the target analyte or parameter within the measurement system. (TNI)

Sensitivity: The capability of a method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. (TNI)

Spike: A known mass of target analyte added to a blank, sample or sub-sample; used to determine recovery efficiency or for other quality control purposes.

Standard: The document describing the elements of laboratory accreditation that has been developed and established within the consensus principles of standard setting and meets the approval requirements of standard adoption organizations procedures and policies. (TNI)

Standard Operating Procedures (SOPs): A written document which details the method for an operation, analysis, or action, with thoroughly prescribed techniques and steps. SOPs are officially approved as the methods for performing certain routine or repetitive tasks. (TNI)

Storage Blank: A blank matrix stored with field samples of a similar matrix (volatiles only) that measures storage contribution to any source of contamination.

Systems Audit (also Technical Systems Audit): A thorough, systematic, qualitative on-site assessment of the facilities, equipment, personnel, training, procedures, record keeping, data validation, data management, and reporting aspects of a total measurement system. (EPA-QAD)

Technical Manager: A member of the staff of an environmental laboratory who exercises actual day-to-day supervision of laboratory operations for the appropriate fields of accreditation and reporting of results

Technology: A specific arrangement of analytical instruments, detection systems, and/or preparation techniques.

Traceability: The ability to trace the history, application, or location of an entity by means of recorded identifications. In a calibration sense, traceability relates measuring equipment to national or international standards, primary standards, basic physical constants or properties, or reference materials. In a data collection sense, it relates calculations and data generated throughout the project back to the requirements for the quality of the project. (TNI)

Trip Blank: A blank matrix placed in a sealed container at the laboratory that is shipped, held unopened in the field, and returned to the laboratory in the shipping container with the field samples.

Uncertainty: A parameter associated with the result of a measurement that characterizes the dispersion of the value that could reasonably be attributed to the measured value.

Acronyms:

AIHA-LAP, LLC – AIHA Laboratory Accreditation Programs, LLC
CAR – Corrective Action Report
CCV – Continuing Calibration Verification
CF – Calibration Factor
CFR – Code of Federal Regulations

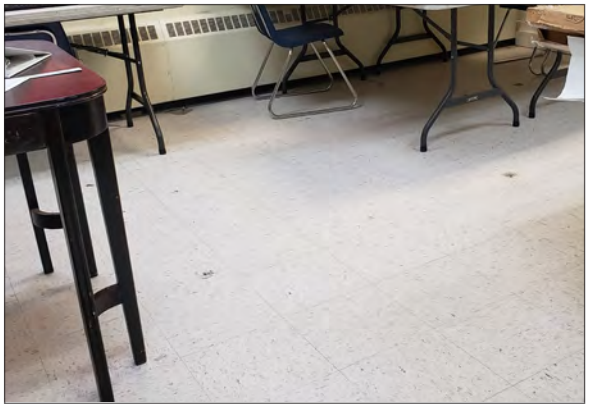
COC – Chain of Custody
DOC – Demonstration of Capability
DQO – Data Quality Objectives
DUP - Duplicate
EHS – Environment, Health and Safety
ELLAP (AIHA-LAP, LLC) - Environmental Lead Laboratory Accreditation Program
EMLAP (AIHA-LAP, LLC) – Environmental Microbiology Laboratory Accreditation Program
EPA – Environmental Protection Agency
GC - Gas Chromatography
GC/MS - Gas Chromatography/Mass Spectrometry
HPLC - High Performance Liquid Chromatography
ICP - Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP/MS – ICP/Mass Spectrometry
ICV – Initial Calibration Verification
IDL – Instrument Detection Limit
IH – Industrial Hygiene
IHLAP (AIHA-LAP, LLC) – Industrial Hygiene Laboratory Accreditation Program
IS – Internal Standard
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
LIMS – Laboratory Information Management System
LOD – Limit of Detection
LOQ – Limit of Quantitation
MDL – Method Detection Limit
MDLCK – MDL Check Standard
MDLV – MDL Verification Check Standard
MRL – Method Reporting Limit Check Standard
MS – Matrix Spike
MSD – Matrix Spike Duplicate
NYS DOH – New York State Department of Health
SDS - Safety Data Sheet
NELAP - National Environmental Laboratory Accreditation Program
NIST NVLAP – National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program
TCEQ – Texas Commission of Environmental Quality
TNI – The NELAC Institute
QAM – Quality Assurance Manual
QA/QC – Quality Assurance / Quality Control
QAPP – Quality Assurance Project Plan
REP – Replicate
RF – Response Factor
RPD – Relative Percent Difference
RSD – Relative Standard Deviation
SD – Standard Deviation
SOP – Standard Operating Procedure
TAT – Turn-Around-Time
VOA – Volatiles
VOC – Volatile Organic Compound

ATTACHMENT 4

Asbestos-Containing Material Photos

bec environmental, inc.
Environmental Services

Photo 1



BGA1: White Rainbow Speckled Tile.

Photo 2

ACM was found in black mastic sample layer of HA BGA1.

Photo 3

BGA7: Yellow Air Unit Insulation.

Photo 4

ACM was found in the black tar with paint layer of sample HA BGA7.

Photo 5

BGA16: White Fabric Pipe Insulation consisted of the pipe insulation that surrounded the boiler, and the pipe near the entrance of the Boiler Room.

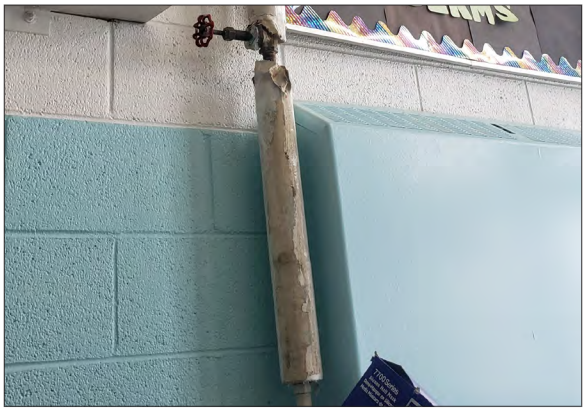
Photo 6

ACM was found in the white insulation layer of sample HA BGA16.

Photo 7

BGA25: White Fabric Coated Pipe Insulation.

Photo 8



ACM was found in the insulation of HA BGA25.

Photo 9

These pipes were considered “Occasionally” damaged according to AHERA terms for damage severity.