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Vapor Intrusion Assessment Report,

ML&P Transformer Shop Building
Anchorage, Alaska

SLR Ref: 105.00528.18001-331

December 27, 2018

Vapor Intrusion Assessment Report,

ML&P Transformer Shop Building
Anchorage, Alaska

Prepared for:
MUNICIPAL LIGHT AND POWER
821 E. First Avenue
Anchorage, Alaska 99501

This document has been prepared by SLR International Corp. The material and data in this report were prepared under the supervision and direction of the undersigned.

Bret Berglund, C.P.G.
Project Manager

CONTENTS

ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ALS	ALS Environmental
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COC	compound of concern
CoC	chain of custody
DRO	diesel range organics
ft	foot/feet
HVAC	heating, ventilation, and air conditioning
inHg	inches of mercury
µg/M^3	microgram per cubic meter
mg/Kg	milligrams per kilogram
mg/L	milligrams per liter
ML&P	Anchorage Municipal Light and Power
RRO	residual range organics
SLR	SLR International Corp
VOC	volatile organic compound
VI	vapor intrusion

1. INTRODUCTION

This report documents the methods and results of indoor air sampling for a vapor intrusion assessment conducted on November 11, 2018 at the Municipal Light and Power (ML&P) Transformer Shop Site at 1130 E. First Avenue (formerly 1201 E. Third Avenue), Anchorage, Alaska (Figure 1). The work was conducted in accordance with the project's Work Plan approved by the Alaska Department of Environmental Conservation (ADEC) (SLR 2018b).

The Transformer Shop site is listed in the ADEC Contaminated Site Database as File #2100.26.302, Record Key #90210001102, and Hazard ID 23842. The site's soil and groundwater is impacted with petroleum hydrocarbons attributed to leaking underground storage tanks (USTs). Five USTs storing gasoline, diesel, used oil, and heating oil and a fuel dispensing island were removed in the vicinity of the Transformer Shop in 1989 and 1990. At both the gasoline and used oil USTs, releases were evident. Contaminated soil was removed down to 8 feet below ground surface (bgs) and sent offsite for thermal treatment. The removal of contaminated soil was limited due to the shallow groundwater table and the building foundation to the north (HLA 1993). In 1994, a vapor extraction and air sparging system was installed to remediate contaminated soil remaining at the former gas and used oil UST excavation. During the installation, a previously unknown 3,000 gallon fuel oil UST was discovered approximately 30 feet south of the building and removed. Contaminated soil within the UST excavation was left in place. The air sparging/vapor extraction system operated from 1994 to about 2000 (S&W 2000). It was not considered effective after that time, and its use was discontinued. Historical site maps showing the location of the UST excavations and remediation system were included in Appendix C of the Work Plan (SLR 218b).

Groundwater monitoring has been conducted at the site since 1993. Four wells (MW-5, MW-6, MW-7 and MW-9) are currently monitored biannually, with samples analyzed for diesel range organics (DRO), gasoline range organics (GRO) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). The long term trend has been a gradual decline for the contaminants of concern in the groundwater. Since 2000, MW-9 has been the only monitoring well to contain contaminant concentrations above ADEC groundwater cleanup levels (18 AAC 75.345, Table C). MW-9 is located on the south side of the Transformer Shop building in the approximate location where the former gasoline and used oil USTs were reportedly located. MW-9 is hydrologically upgradient of the Transformer Shop building (Figure 2), and the general direction of groundwater flow is to the north.

During a file review the ADEC noted that the 2016 benzene concentration detected in MW-9 was above the ADEC vapor intrusion commercial target level of 69 micrograms per litter (ug/L), as listed in the vapor intrusion Guidance Document (ADEC 2017b). Consequently, in a letter to ML&P, ADEC requested an evaluation of the vapor intrusion pathway, along with sampling MW-9 groundwater for a full list volatile organic compounds (VOCs) by Method SW8260c and polycyclic aromatic hydrocarbons (PAHs) by SW8270d (ADEC 2017c).

The most recent groundwater sampling event was completed in August 2018. The results are summarized on Figure 2. Results were similar to past events, with only MW-9 exceeding ADEC groundwater cleanup levels. Analytes exceeding ADEC groundwater cleanup levels were GRO, DRO, benzene, ethylbenzene, xylenes 1,2,4-Trimethylbenzene, 1,2-Dichloroethane and

naphthalene In addition, benzene and 1,2,4-Trimethybenzene exceeded the ADEC vapor intrusion target levels for groundwater at a commercial site. The benzene concentration exceeded the target level (0.069 mg/L) by approximately two orders of magnitude, while the 1,2,4-Trimethybenzene concentration only slightly above the target level of 0.12 mg/L. All groundwater sample results for perchloroethylene (PCE) and related daughter products including trichloroethylene (TCE) and vinyl chloride were below detection limits.

1.1 PROJECT OBJECTIVES

The project objectives were to:

- Measure the concentrations of potential compounds of concern (COCs) in indoor air within the Transformer Shop, which is located hydrogeologically downgradient of the impacted soil and groundwater (approximate MW-9 location); and

- Determine whether measured concentrations of potential COCs in indoor air in the Transformer Shop represent an unacceptable risk for occupants, based on its current, commercial site use.

The direct measurement of vapor concentration within the building was considered to be the most practical method to initially evaluate the risk to building occupants. If the measured concentration of compounds in the indoor air did not exceed the ADEC target levels, the vapor intrusion pathway would be considered incomplete and not a concern. If the indoor air exceeded target levels, follow-up investigations or corrective actions would occur under an amended or new Work Plan.

1.2 SITE DESCRIPTION RELEVANT TO VAPOR INSTRUSION PATHWAY

The following site description is based on historical records including past reports, discussions with ML&P supervisors familiar with the facility, and SLR site visits to the facility on September 28, and November 11, 2018. Representative photographs taken of the building are contained in the photograph log (Appendix A).

The Transformer Shop is used by ML&P for offices, maintenance of transformers, vehicle storage and product storage, including new and used transformer fluids, spill cleanup materials, and wastes stored prior to offsite disposal. Figure 3 provides a floor plan illustrating the general layout. The building is one story, except for a mezzanine which runs along a portion of the north side of building. Offices are located on the eastern third of the building. They are separated from shop and garage area by a wall with a two doorways. The remainder of the building consists of a shop and garage. It is an open area, except for partial (pony) walls or partially enclosed work or storage areas. ML&P employees work in the building approximately 40 hours per week or less. The shop and garage area are generally occupied on an intermittent basis.

The building was built in the 1950s and likely has moderate air tightness. There are five large bay doors, which are used for moving equipment and vehicles in and out of the building. The building has a concrete slab floor (estimated to be about 10 inches thick) and concrete block walls. No obvious or extensive cracking of the slab was evident during the September 2018 site

visit. The building is heated with natural gas, using in wall heaters in the offices and wall or ceiling mounted space heaters in the shop and garage bays. The building has a heating, ventilation and air conditioning (HVAC) system with positive air flow. The domestic hot water system is fueled by gas. The building is connected to the public water and sanitary sewer system. The shop area has at least one floor drain in the slab connected to the sewer system. The exterior area around the building is covered with asphalt pavement.

Due to the nature of work conducted in the shop and garage area, there are variety of activities that could influence air quality within the building, including

- Storage and use paints, and cleaning products;
- Storage of fuels and lubricants;
- Storage of dielectric fluids (transformer oil); and
- Short term operation of vehicles (trucks and heavy equipment) in the garage.

Based on the site visits and discussions with ML&P personnel, most products stored or used in the building are unlikely to serve as significant emission sources for the contaminants of concern detected in groundwater. The primary fluid handed within the building is transformer oil, which does not contain BTEX compounds. ML&P has been using mineral oil based dialectic fluids, but is in the process of switching over to a FR3™ fluid, a natural ester fluid derived from vegetable oil.

The surface and near surface soil at the site consists of sandy gravels, with most of the material in the upper few feet consisting of imported gravel fill. Groundwater at the site is located approximately 5 feet below the ground surface and flows predominantly to the north based on water levels measurements in the monitoring wells surrounding the building (SLR 2018a).

Vapor intrusion is the migration of volatile chemicals from a subsurface vapor source into overlying buildings. The process is similar to that of radon gas seeping into homes. Vapor intrusion begins with a vapor source. Contaminants volatilize from the vapor source and move into the surrounding soil pore spaces as soil gas. Vapor sources may include contaminated soil in the vadose zone, free-phase or residual non-aqueous phase liquid (NAPL) above or near the top of the saturated zone, or shallow dissolved-phase contamination in groundwater. Underground tanks and piping that contain volatile chemicals can also release vapors into the surrounding soil.

Vapors in the subsurface diffuse from areas of high concentration to areas of low concentration. When vapors reach a building, advective forces associated with the building may cause the vapors to flow through cracks in the foundation. The rate of vapor migration through soil and into a building is difficult to quantify and depends on soil types, chemical properties, building design and condition, and pressure differentials between the subsurface and the building. Intrusion into buildings happens by both diffusion and advection with advection generally being the dominant force, especially for smaller buildings without centralized HVAC systems.

In the case of the Transformer Shop, the potential COCs are vapors from the fuel remaining in the subsurface from the former leaking gasoline and used oil USTs located along the south side of the building. Based on the groundwater sampling results, the potential COCs with respect to vapor intrusion are benzene and 1,2,4-Trimethybenzene. Benzene is component of gasoline, and 1,2,4-Trimethybenzene is common gasoline additive. Potential receptors at risk are site workers who occupy the building approximately 40 hours per week or less. There is no residential or public site use within the building or immediate area. The surrounding area is fenced and is used for supporting ML&P operations.

1.3 REGULATORY FRAMEWORK

The ADEC regulates the release, characterization, and cleanup of hazardous substances under Article 3 of 18 AAC 75. Impacts to soil and groundwater from a release of a volatile hazardous substance can result in the formation of a subsurface vapor plume, which can intrude into overlying buildings (i.e., vapor intrusion). The ADEC has published a document entitled, Vapor Intrusion Guidance for Contaminated Sites to provide guidance on evaluating and responding potential risk posed by the vapor intrusion exposure pathway (ADEC 2017b).

As discussed above, the potential COCs at the Transformer Shop, with respect to vapor intrusion are benzene and 1,2,4-Trimethybenzene, due to their exceedances of ADEC vapor intrusion target levels for groundwater. As precaution for the purposes of the vapor intrusion assessment, toluene, ethylbenzene and xylene were considered secondary, potential COCs and included in the list of target analytes. Table 1 lists the ADEC target levels for indoor air for the potential COCs. Given the site use, commercial levels are considered most applicable to the Transformer Shop Building.

Table 1: Vapor Intrusion Potential Compounds of Concern at the Transformer Shop and ADEC Indoor Air Target Levels for Protection of Human Health

Compound	Indoor Air Target (µg/m^3)[1]	
	Residential	Commercial[2]
Benzene	3.1	**16**
Ethylebenzene[4]	11	**49**
Toluene	3,800	**7,500**
Xylenes (total)	100	**440**
1,2,4-Trimethybenzene	2.1	**8.8**

Table Key

µg/m^3 = micrograms per cubic meter

1) Source: Alaska Department of Environmental Conservation (ADEC), 2017. Vapor Intrusion Guidance for Contaminated Sites. November.
2) Primary standard to be used for risk screening purposes of the Transformer Shop Building indoor air.

2. METHODS AND ACTIVITIES

This section discusses the methods and procedures used for the air sampling and data assessment. Field sampling was conducted by Bret Berglund and Nick Wells of SLR in coordination with ML&P representatives (Lena Saville, ML&P Senior Environmental Engineer, and Steve Stangle, Operations and Transformer Shop Supervisor). The field team members met the definition of a "qualified environmental professional" and per 18 AAC 75.333(b). The sampling event occurred on November 11, 2011. It was conducted on a Sunday to minimize interference with facility operations, and the potential for background emissions.

The field sampling was conducted in accordance with Work plan (SLR 2018b), with the exception that one of the sample locations was adjusted slightly as discussed in Section 2.3.

2.1 PREPATORY ACTIVIES

Prior to conducting the air sampling event, products which had the potential to generate emissions of COCs (Table 1) were removed or sealed to the extent practical until the sampling was completed to eliminate internal (background) sources of VOCs. In addition, activities that could generate such VOC emissions such as vehicle operation, painting, or using cleaning agents ceased 24 hours prior to the start of sampling and did not resume until the sampling was complete. During the sampling event, the buildings HVAC system was operated as normal. Windows and doors remained closed except to allow personnel to enter or leave the building.

2.2 GENERAL PROCEDURES FOR AIR SAMPLING

Indoor air samples were collected in 6-liter, laboratory certified clean, stainless steel summa canisters. The canisters were fitted with certified flow controllers to regulate the flow of air into the canister during sample collection. The flow controllers for the air samples were set by the laboratory for an 8-hour sample period to provide a time-weighted average concentration.

Prior to sampling, two checks were performed to ensure that the canisters and regulators were acceptable for use. First, the initial canister vacuum was checked. According to the lab, any canister with a vacuum less than 25 inches of mercury (inHg) was to be rejected prior to sampling. The flow regulator equipped with an analog vacuum gauge was attached to the canister with the open end plugged. The canister was opened, and the vacuum reading was read. Each cannister had an initial vacuum of at least 29 inHg, as recorded on the field forms (Appendix B). They were considered acceptable for use.

Following the vacuum pressure check, a flow regulator Shut-In Test was completed. This test was done to ensure that all connections in the sampling devices were properly configured and that no leaking was occurring. The flow regulator was attached to the canister with the open end plugged. The canister was opened for about 15 seconds and then closed. The vacuum gauge was observed for about five minutes. If more than 1 inHg was lost per minute, the test was to be considered a failure. One system failed the test. The corrective action taken was to replace the regulator with a spare regulator. With the new regulator installed, the system passed the test, so

all deployed canisters and regulators were considered to be in good quality and satisfactory for sampling.

After testing was completed, air sampling was initiated. With the regulators already installed and confirmed to be tightly fitting, the sampling canisters were set up in their sampling locations, about 3-4 feet above the ground. The open end of the regulator was uncapped, and the canister was opened. The canisters collected air samples for eight hours. After sampling was completed, any canister with less than 0.5 inHg of vacuum remaining was to be rejected. Each of the samples had at least 2 inHg remaining after sampling was completed, as noted on the field forms (Appendix B). At the end of the sampling period, the canisters were closed, the regulators were removed, and the brass cap on the canisters were replaced. Sample labels were filled out and attached to the appropriate canister. Finally, the chain of custody (CoC) was filled out and all sampling materials were packed up for transportation to the laboratory.

2.3 SAMPLING LOCATIONS

The approximate sample locations are shown on Figure 3. The canisters were placed in open areas, away from air vents or air handling equipment. The primary sample location was in the shop area along the south side building in the vicinity of MW-9, which is the presumed source area. The sample point was located in the central portion of the shop, approximately 15 feet from the south wall, in the Control Pit. A primary and duplicate sample was collected at this location. If vapor intrusion from the subsurface source area was occurring, this interior location was considered the most likely to be impacted (worst case).

A second primary sample was collected in the office area, in the “Lunch (Break) Room.” This is a slightly different location than the main hallway that was originally planned (SLR, 2018a). The Break Room was a high use area, separate from the shop area. It was selected over the open hallway, because it had less potential foot traffic and risk the sample canister would be disturbed (e.g., bumped). During sampling period, only the SLR samplers and ML&P Transformer Shop Supervisor accessed the building.

2.4 SAMPLE DOCUMENTATION, HANDLING AND ANALYSIS

Field Forms were used to record pertinent sampling information (Appendix B). The location of sampling containers was documented on the floor plan (Figure 3). Photographs were taken, illustrating the sample locations (with canisters deployed). Photos were taken immediately after the sample canisters were set up and placed in their sampling locations. Photographs are provided in Appendix A (photos 7 and 8).

Samples were identified with a unique sample ID having this generic form: [Year][Site Name][sequential sample number]. The components of the naming scheme are described in more detail below:

- Sample year was represented by “18”
- Site Name was represented by “TS”, an acronym for the Transformer Shop

- Two-digit sequential sample numbers were “01” and “02.”

A 9 was be added to represent a sample duplicate. Samples 18TS01 and 18TS91 are the parent sample/duplicate pair.

Prior to shipping, the sample container valves were double-checked to ensure they were tight and secure. Air samples were not chilled

Samples were tracked using the CoC forms provided by the laboratory. Each sample was individually identified on a CoC form. The CoC included sample ID, sample date, sample time, requested analysis, requested analytes, type and number of sample containers, quality control information, and requested analytical turnaround time. Proper sample custody transfer, including signing, dating, and noting the time on the CoC, was completed by the individuals relinquishing and receiving the samples.

2.5 LABORATORY ANALYSIS, DATA QUALITY ASSESSMENT AND REPORTING

Samples were transported to the project's analytical laboratory, ALS Environmental, using commercial service. The contact information for the laboratory is:

- ALS Environmental, 2655 Park Center Drive, #A Simi Valley, CA 93065. Phone: 805-526-7161

ALS maintains a current ADEC and National Environmental Laboratory Accreditation Program (NELAP) accreditation (ADEC number 17-019 and NELAP number TNI01213), for analytical method of interest as applicable. Relevant information regarding the sample analysis and handling is summarized in Table 2.

Table 2: Summary of Sample Analysis and Handling

MEDIA	SAMPLE INTERVAL	PARAMATERS	METHOD	PLANNED NUMBER OF SAMPLES	SAMPLE CONTAINERS	PRESER-VATION	HOLD TIME
Air	8 Hours	BTEX and1,2,4-Trimethybenzene	TO-15	2 Primary & 1 duplicate	6-liter, 100%-certified stainless steel summa canister	None	30 days

Upon receipt of the laboratory data, a Quality Assurance (QA) Review was performed which included a QA summary and ADEC Data Review Checklists, as required by ADEC (ADEC 2017c). The laboratory data quality assurance (DQA) review and checklists are provided in Appendix C, with the laboratory reports provided in Appendix D. The laboratory reports met the requirements of the ADEC Technical Memorandum *Environmental Laboratory Data and Quality Assurance Requirements* (ADEC 2017c). As discussed in the DQA report the data were considered of good quality and acceptable for use with no qualifications. All data were considered usable.

3. AIR SAMPLING RESULTS

The indoor air sample results are provided Table 3. The data was compared against the ADEC vapor intrusion target levels for indoor air. The commercial standards were considered applicable based on the site use, but the data was also compared to residential levels as a conservative screening process.

The sample results were well below the target levels for both commercial and residential facilities. Most analytes were non-detectable. Toluene and m,p-xylenes were the only detected compounds in the air. The xylenes were only detected in the duplicate sample and at the limit of quantitation. The detected xylene and toluene concentrations were two to three orders of magnitude below their respective commercial target levels for vapor intrusion. The detected compounds are suspected to be emissions from within the building, and not the result of vapor intrusion from the soil or groundwater. As discussed in Section 1, benzene and 1,2,4-Trimethybenzene were the only detected analytes in the groundwater that exceeded ADEC vapor intrusion target levels for groundwater. Toluene and total xylene concentrations in the groundwater did not exceed the target levels for vapor intrusion.

Table 3 - Anchorage Municipal Light and Power Transformer Shop
2018 Indoor Air Sample Results

Compound in micrograms per cubic meter ($\mu g/m^3$)	ADEC Vapor Intrusion Target Levels for Indoor Air[1]		Sample Locations[2]		
			Primary: 18TS01 P1806251-001 11-Nov-2018	**Duplicate:** 18TS91 P1806251-002 11-Nov-2018	18TS02 P1806251-003 11-Nov-2018
			Conc.[3]	Conc.[3]	Conc.[3]
Volatiles in Air (Method EPA TO-15)	**Residential**	**Commercial**			
Benzene	3.1	**16**	U [0.69]	U [0.69]	U [0.66]
Toluene	3800	**7500**	2.8	2.9	1.6
Ethylbenzene	11	**49**	U [0.69]	U [0.69]	U [0.66]
m,p-Xylenes	--	**--**	U [1.5]	1.5	U [1.4]
o-Xylene	--	**--**	U [0.70]	U [0.70]	U [0.67]
Total Xylenes[4]	100	**440**	U [1.5]	1.5	U [1.4]
1,2,4-Trimethylbenzene	2.1	**8.8**	U [0.70]	U [0.70]	U [0.67]

Notes:

1. Vapor Intrusion Guidance for Contaminated Sites, Appendix D: DEC Indoor Air Target Levels, Commercial Indoor Air (ADEC, November 2017). The commercial levels are considered the applicable targets for the Transformer Shop Building.
2. The field sample identification number, laboratory sample identification number, and date collected are provided.
3. For detected results, the sample result is listed in $\mu g/m^3$. If an analyte was not detected, then the LOQ is shown [in brackets].
4. Total values were the summation of detected compounds only. If compounds were not detected, then the highest LOQ was listed.

Data Flags:

U	Undetectable, LOQ is listed in brackets to the right.

Abbreviations

--	Not applicable or screening criteria does not exist for this compound
ADEC	Alaska Department of Environmental Conservation
LOQ	limit of quantitation
$\mu g/m^3$	micrograms per cubic meter

4. SUMMARY AND CONCLUSIONS

The measured concentration of compounds in the indoor air in the Transformer Shop Building on November 11, 2018 did not exceed the ADEC vapor intrusion target levels for commercial or residential use. Based on the air sample results, the vapor intrusion pathway is considered to be incomplete and not a concern at the site.

5. REFERENCES

Alaska Department of Environmental Conservation (ADEC), 2009. *Environmental Laboratory Data and Quality Assurance Requirements.* Technical Memorandum. March.

ADEC. 2017a. *Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling. Technical Memorandum*. March.

ADEC. 2017b. *Vapor Intrusion Guidance for Contaminated Sites*. November.

ADEC. 2017c. Letter, *Re: Municipal Light & Power Transformer Shop*, from Grant Lidren (ADEC) to Yelena Saville (ML&P). November 28

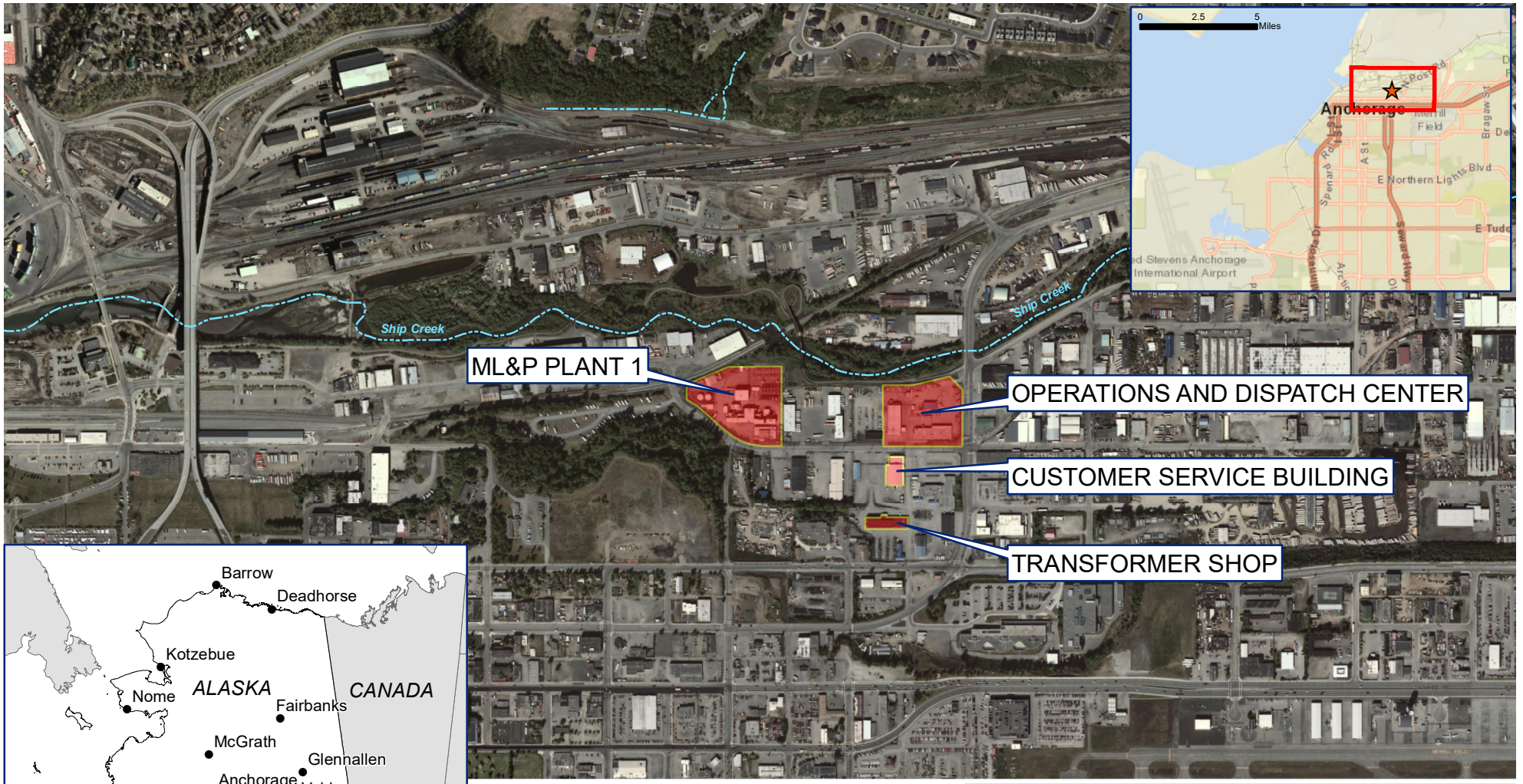
Harding Lawson Associates (HLA). 1993. *Phase II Remedial Investigation Municipal Light and Power Facilities, Anchorage, Alaska.* August 2.

Shannon and Wilson, Inc. (S&W). 2000. August 200 Site Activities at 1201 East Third Avenue, Municipal Light and Power Site 3. *Anchorage, Alaska.* October.

SLR International Corporation (SLR). 2018a. *August 2018 Groundwater Monitoring at the ML&P Transformer Shop; 1130 E. First Ave., Anchorage, Alaska (Hazard ID: 23842).* October 8.

SLR. 2018b. Vapor Intrusion Assessment Work Plan, *ML&P Transformer Shop Building, Anchorage, Alaska.* October 17.

FIGURES



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0 275 550 1,100 1,650 2,200 Feet

WHEN PLOTTED AT 8.5 x 11 PAGE SIZE

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

SLR

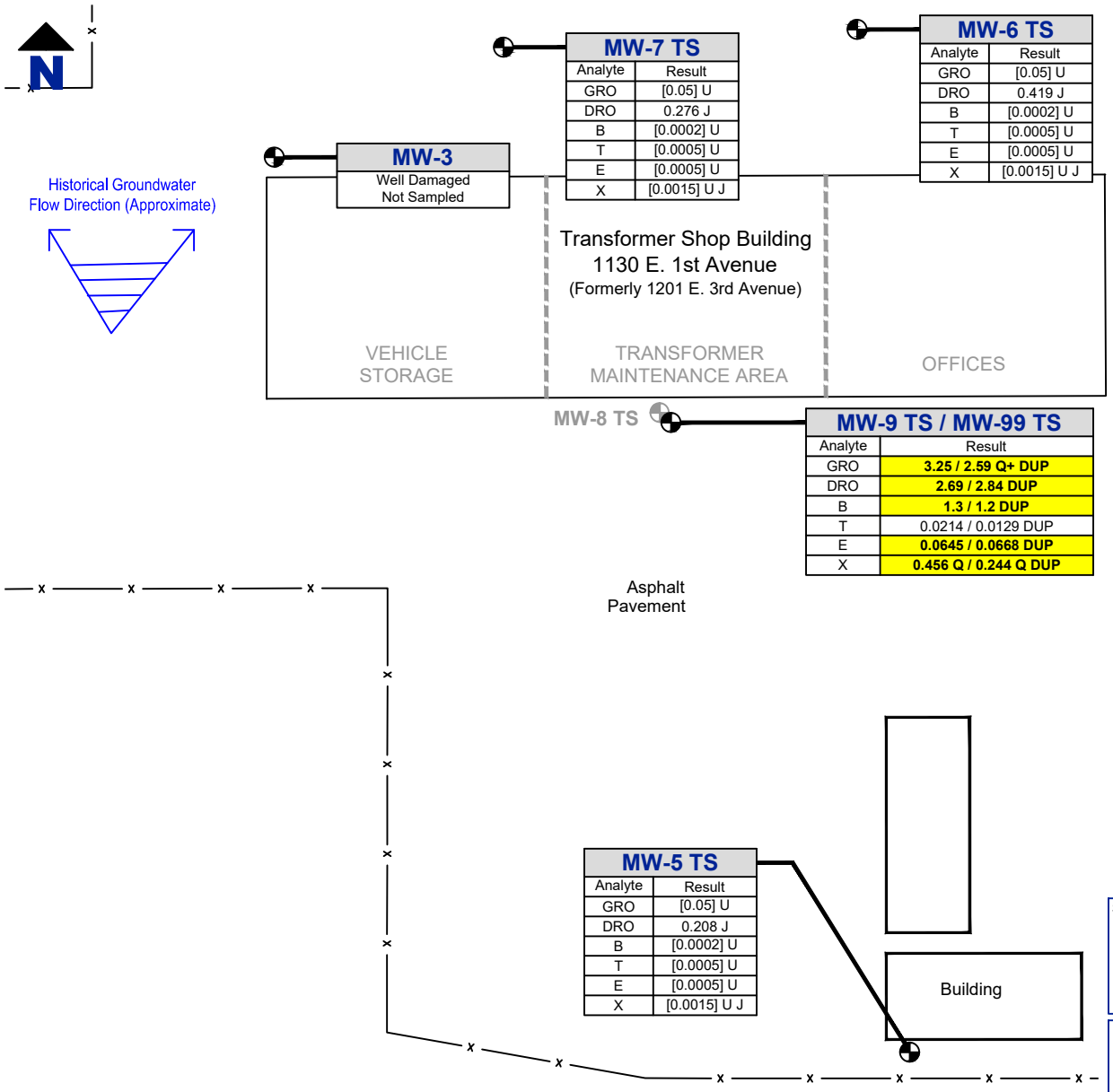
Site
TRANSFORMER SHOP
MUNICIPAL LIGHT AND POWER
1130 EAST 1ST AVENUE
ANCHORAGE, ALASKA

Plan
VAPOR INTRUSION ASSESSMENT

Drawing
SITE VICINITY MAP

Drawing	October 2018	Scale	1 in = 880 feet
File Name	F1 Transformer Shop Bldg_18.mxd	Project No.	105.00528.18001

Fig. No. 1



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THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Legend

- GROUNDWATER MONITORING WELL
- GROUNDWATER MONITORING WELL - SAMPLING DISCONTINUED IN 2003
- CHAIN-LINK FENCE

Sampling Results Guidelines

AAC	ALASKA ADMINISTRATIVE CODE
ADEC	ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DRO	DIESEL RANGE ORGANICS
GRO	GASOLINE RANGE ORGANICS
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	TOTAL XYLENES
DUP	DUPLICATE SAMPLE
J	ESTIMATED CONCENTRATION BETWEEN THE LOQ AND DL.
Q	THE RESULT IS ESTIMATED, DUE TO A LABORATORY QUALITY CONTROL FAILURE OR A MATRIX EFFECT. WHERE APPLICABLE, A "+" OR "-" WAS APPENDED TO INDICATE A HIGH OR LOW BIAS.
U	NONDETECT, LOD IS SHOWN IN BRACKETS
UJ	THE ANALYTE WAS NOT DETECTED. THE REPORTED QUANTITATION LIMIT IS APPROXIMATE AND MAY BE INACCURATE OR IMPRECISE.
LOD	LIMIT OF DETECTION
LOQ	LIMIT OF QUANTITATION
DL	DETECTION LIMIT
0.00249	SAMPLE HAS **EXCEEDED** ADEC CLEANUP LEVEL LISTED IN 18 AAC 75.345 TABLE C [NOVEMBER 2017]
0.005	SAMPLE **DOES NOT EXCEED** ADEC CLEANUP LEVEL LISTED IN 18 AAC 75.345 TABLE C [NOVEMBER 2017]

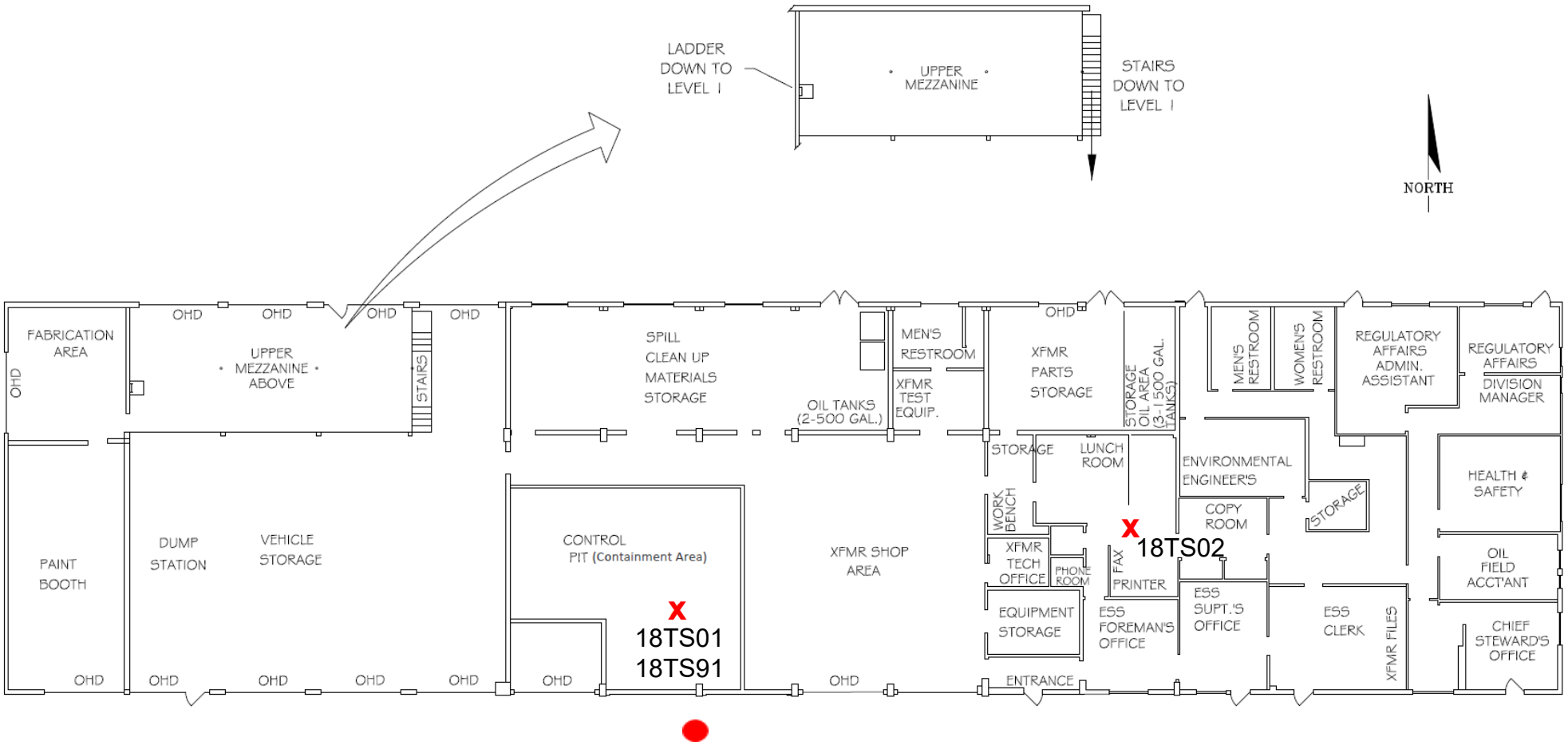
Site: TRANSFORMER SHOP
ML&P 1130 E. 1ST AVENUE
(FORMERLY 1201 E. 3RD AVENUE)
ANCHORAGE, ALASKA

VAPOR INTRUSION ASSESSMENT

Drawing: 2018 GROUNDWATER SAMPLING RESULTS FOR GRO, DRO, AND BTEX

Date	October 2018	Scale	1" = 50 Feet
File Name	F2 Trans Shop GW Results_18	Project No.	105.00528.18001

Fig. No. 2



X = Air Sample Location (Approximate)
● = MW-9 Location (Approximate)

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THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Site	TRANSFORMER SHOP MUNICIPAL LIGHT AND POWER 1130 EAST 1ST AVENUE ANCHORAGE, ALASKA
Plan	VAPOR INTRUSION ASSESSMENT
Drawing	TRANSFORMER SHOP FLOOR PLAN AND NOVEMBER 2018 AIR SAMPLE LOCATIONS

Drawing	November 2018	Scale	
File Name	F3 Transformer Shop Bldg_18.mxd	Project No.	105.00528.18001
Fig. No.	3		

Appendix A Photograph Log (Preliminary Site Inspection and November 2018 Sampling Event)

Photo 1: Transformer Shop building from the southeast. Approximate location of monitoring well MW-9 is shown.

Photo 2: Inside of the Transformer Shop looking northeast. Offices are behind the eastern wall.

SLR	Transformer Shop Vapor Intrusion Assessment Anchorage, Alaska
SITE PHOTOGRAPHS September 26, 2018	Job No: 105.00528.18001

Photo 3: Inside of the Transformer Shop looking southwest. MW-9 is located just outside of the window on the left.

Photo 4: Inside of the Transformer Shop looking south. MW-9 is located outside of the window.

Photo 5: Inside of the Transformer Shop looking west into the Control Pit (Containment Area). MW-9 is located outside of the building, near the window on the left.

Photo 6: Inside of the Control Pit (Containment Area) looking east into the Transformer Shop. Offices are behind the wall in the background (east).

Photo 7: Location of samples 18TS01 and 18TS91 in the Control Pit.

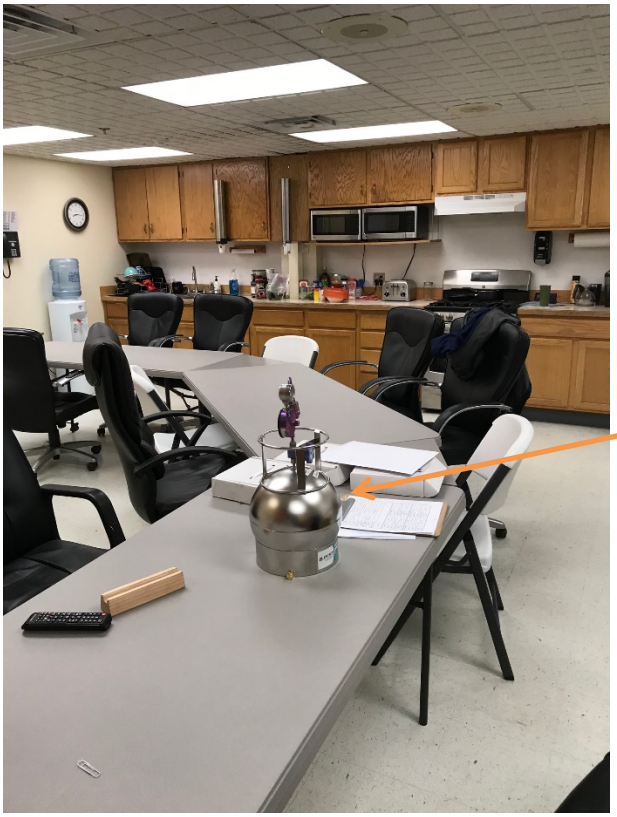


Photo 8: Location of sample 18TS02 in the Lunch (Break) Room.

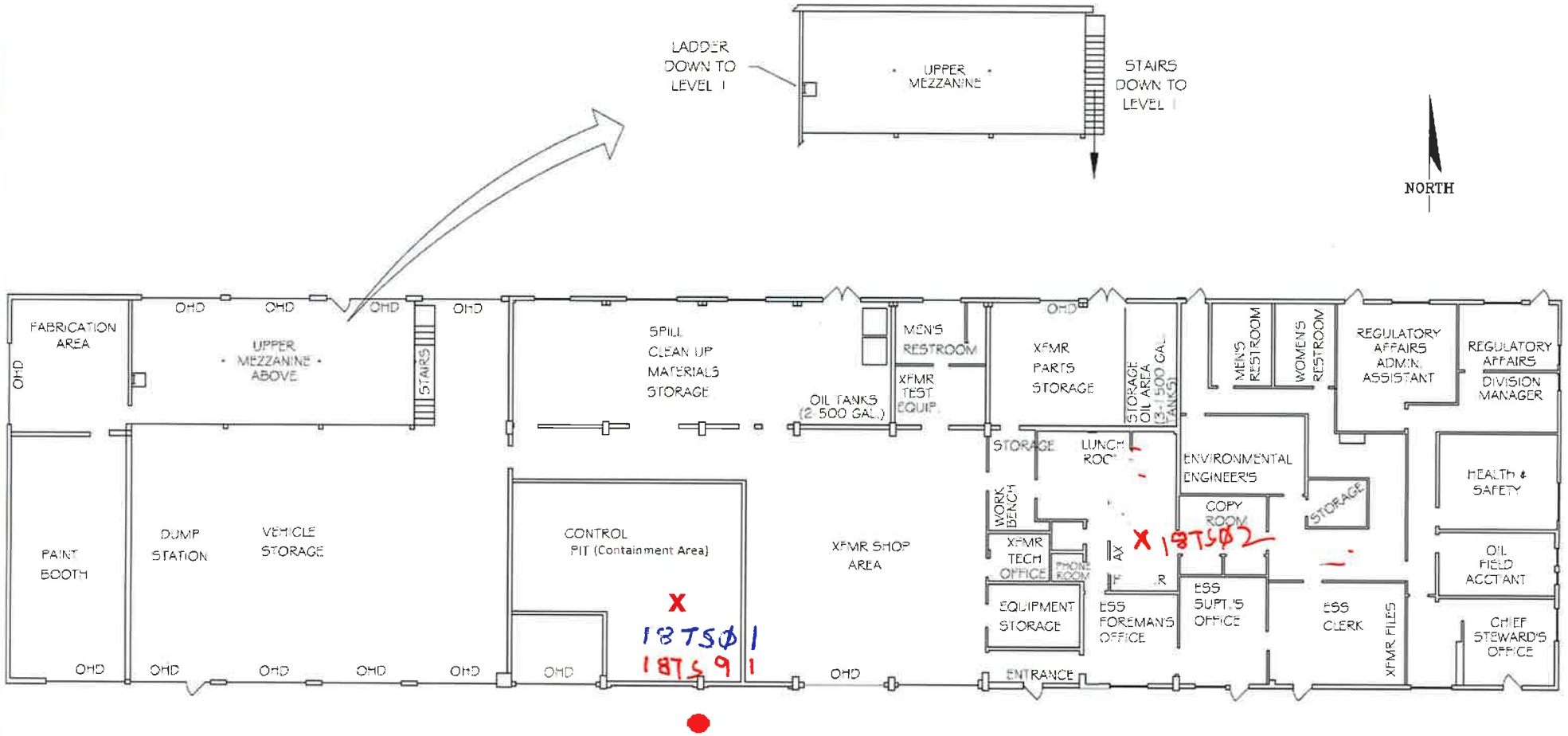
Appendix B Field Forms

Indoor Air Sampling Form

Site Name	ML&P Transformer Shop		
Project ID	105.00528.18001-331	**Sampler Name**	B. Berglund, N. Wells
Property	Transformer Shop Building, 1130 E. Frist Ave, Anchorage, Ak		
Sample Location	Containment Area of Shop		
Sample Matrix	Indoor Air	**Floor**	First Floor
Room Temperature (deg F)	68	**Room**	Containment Area
PID (ppm)	NA	**Relative Humidity (%)**	NA
Weather Conditions	Out door temp. = 36°F. Rain and sleet. Temperatures rising.		
Comments	ML&P trucks parked out doors. Bay doors, other doors and windows closed. Canisters about 4 ft above ground.		
Sample ID:	18TS01	**Shut In Test Passed?**	Yes
Sample Type	6-Liter Summa Canister	**Sample Duration**	8-hour
Canister ID	AS01177	**Regulator ID**	SFC00284
Start Vacuum (in Hg)	29.5	**End Vacuum (in Hg)**	3
Start Date	11/11/2018	**End Date**	11/11/2018
Start Time	08:12	**End Time**	16:12
Duplicate Sample ID:	18TS91	**Shut In Test Passed?**	Yes
Sample Type	6-Liter Summa Canister	**Sample Duration**	8-hour
Canister ID	AS00749	**Regulator ID**	SFC00223
Start Vacuum (in Hg)		**End Vacuum (in Hg)**	3
Start Date	11/11/2018	**End Date**	11/11/2018
Start Time	08:12	**End Time**	16:12

Indoor Air Sampling Form

Site Name	ML&P Transformer Shop		
Project ID	105.00528.18001-331	**Sampler Name**	B. Berglund, N. Wells
Property	Transformer Shop Building, 1130 E. Frist Ave, Anchorage, Ak		
Sample Location	Break room area of offices.		
Sample Matrix	Indoor Air	**Floor**	First Floor
Room Temperature (deg F)	72	**Room**	Break room
PID (ppm)	NA	**Relative Humidity (%)**	NA
Weather Conditions	outdoor temp ≈ 36°F. Rain & sleet.		
Comments	ML&P trucks parked outdoors. Doorways closed. Door to shop from offices closed except to enter. Canister about ~~3.5~~ BP 3.5 Ft above ground.		
Sample ID:	18TS02	**Shut In Test Passed (Y/N)?**	Yes
Sample Type	6-Liter Summa Canister	**Sample Duration**	8-hour
Canister ID	AS01374	**Regulator ID**	SFC00312
Start Vacuum (in Hg)	29	**End Vacuum (in Hg)**	2
Start Date	11/11/2018	**End Date**	11/11/2018
Start Time	08:10	**End Time**	16:10



X = Air Sample Location (Approximate)
● = MW-9 Location (Approximate)

Sample Date: 11-11-2018

Site	TRANSFORMER SHOP MUNICIPAL LIGHT AND POWER 1130 EAST 1ST AVENUE ANCHORAGE, ALASKA
Plan	VAPOR INTRUSION ASSESSMENT
Drawing	TRANSFORMER SHOP FLOOR PLAN AND PROPOSED AIR SAMPLE LOCATIONS

Drawing	October 2018	Scale	Fig. No. 3
File Name	F3 Transformer Shop Bldg_18.mxd	Project No.	105.00528.18001

N

SLR

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY.
ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

Appendix C Laboratory Data Quality Assessment, and ADEC Data Review Checklist

LABORATORY DATA
QUALITY ASSURANCE REVIEW
ML&P

2018 VAPOR INTRUSION ASSESSMENT
AT THE ML&P TRANSFORMER SHOP
(1130 EAST 1ST AVE., ANCHORAGE, AK)

DECEMBER 2018

Prepared by: Jennifer McLean
Reviewed by: Bret Berglund

SLR Project Number: 105.00528.18001
ADEC Number: 2100.26.302
ADEC Hazard ID: 23842

SLR International Corporation
2700 Gambell Street, Suite 200
Anchorage, AK 99503

ACRONYMS AND ABBREVIATIONS

ALS	ALS Environmental, Simi Valley, California
ADEC	Alaska Department of Environmental Conservation
BTEX	benzene, toluene, ethylbenzene, xylenes
CCV	continuing calibration verification
COC	chain of custody
DL	detection limit
EPA	United States Environmental Protection Agency
LCL	lower control limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOQ	limit of quantitation
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NELAP	National Environmental Laboratory Accreditation Program
QA	quality assurance
QAR	quality assurance review
QC	quality control
RPD	relative percent difference
SLR	SLR International Corporation
$\mu g/m^3$	micrograms per cubic meter

This report summarizes a review of the analytical data for indoor air samples collected on November 11, 2018 in support of the ML&P Transformer Shop Area Vapor Intrusion Assessment. Samples were collected by SLR International Corporation (SLR). ALS Environmental (ALS) in Simi Valley, California provided analytical support to the project. ALS maintains a current Alaska Department of Environmental Conservation (ADEC) and National Environmental Laboratory Accreditation Program (NELAP) accreditation (ADEC number 17-019 and NELAP number TNI01213), for analytical method of interest as applicable. Table 1 provides a summary of the work order, sample receipt, analytical method, and analytes.

Table 1 Sample Summary

SDG	Date Collected	Date Received by Laboratory	Temp. Blank	Matrix	Analytical Method	Analyte
P1806251	11/11/2018	11/13/2018	ambient	air	EPA TO-15	BTEX 1,2,4-Trimethylbenzene

Acronyms:
BTEX – benzene, toluene, ethylbenzene, and total xylenes SDG – sample delivery group

The laboratory final report was presented as a Level II deliverable and included documentation of the delivery group chain-of-custody (COC) and sample receipt condition. The PDF laboratory report is provided electronically as Appendix D.

Quality Assurance Program

A quality assurance (QA) program was followed for this project that addressed project administration, sampling, quality control (QC), and data review. SLR adhered to required and established sampling and COC protocols. The selected laboratory maintains an internal quality assurance program and standard operating procedures.

The analytical data was reviewed for consistency with any project-specific requirements noted in the Vapor Intrusion Assessment Work Plan (SLR, 2018), ADEC Technical Memorandum *Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling* (ADEC 2017a), analytical method criteria, and laboratory criteria. An ADEC Laboratory Data Review Checklist was completed for the SDG, and is included at the end of this report A review for any anomalies to the project requirements for precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) are noted in this Quality Assurance Review (QAR), and any data qualifications discussed.

The data review included the following, as applicable:

- Reviewing COC records for completeness, signatures, and dates;
- Identifying any sample receipt or preservation anomalies that could impact data quality;
- Verifying that QC blanks (e.g., field blanks, equipment blanks, trip blanks, etc.) were properly prepared, identified, and analyzed;
- Evaluating whether laboratory reporting limits met project goals;

- Reviewing the case narrative for any discussion of any Continuing Calibration Verification (CCV) recoveries or other calibration related criteria as being outside applicable acceptance limits;

- Verifying that surrogate analyses were within recovery acceptance limits;

- Verifying that the Laboratory Control Samples (LCS) was within recovery acceptance limits;

- Evaluating the result relative percent difference (RPD) between primary and duplicate field samples; and

- Providing an overall assessment of laboratory data quality and qualifying sample results if necessary.

Data Qualifications

As part of this QAR, qualifiers were applied to datum as determined necessary based on specified criteria or professional judgement. In all cases, the basis for qualification and the applied data flag are discussed in this QAR. Table 2 provides a list of potential qualifiers (i.e., flags). These data flags were appended to the data as appropriate.

Table 2 Data Qualifiers

Lab Qualifier (Flag)	NFG Qualifier (Flag)	Equivalent Project Qualifier (Flag)[1,2]	Definition
U	U	**U**	The analyte was analyzed for, but was not detected above the limit of quantitation (LOQ). This qualifier is appended by the laboratory.
J	NJ	J	The analyte has been "tentatively" or "presumptively" identified as present and the associated numerical value is the estimated concentration in the sample between the limit of quantitation (LOQ) and the Detection Limit (DL). This qualifier is appended by the laboratory.
--	J	Q	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample, due to one or more laboratory quality control criteria failures (e.g., LCS recovery, surrogate spike recovery) or a matrix effect. Where applicable, a "+" or "-" was appended to indicate a high or low bias, respectively.
--	UJ	UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
--	R	R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
--	--	B	Blank contamination: The analyte was positively identified in the blank (e.g., trip blank and/or method blank) associated with the sample and the concentration reported for the sample was less than five times that of the blank (ten times for metals and common laboratory contaminants methylene chloride and acetone). Where applicable, "U" was appended prior to the "B" to indicate the blank detection is greater than the sample detection and the result is likely a false positive.

Notes:
1 - Flags were appended to the data where applicable. The table presents laboratory, U.S. Environmental Protection Agency (EPA) National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2017), and project equivalent qualifiers.
2 - Only flags in **bold** were applicable and appended to data for this project.

A discussion of the project data quality relative to PARCCS goals and summary of any anomalies or failures requiring data qualifiers follows.

Data Validation

Data Packages
The data package was checked for transcription errors, omissions, or other anomalies. No issues were noted with regards to the data package.

Sample Receipt
The sample receipt documentation was checked for anomalies. No issues were noted with regards to the receipt of samples.

Holding Times and Preservation
Samples were appropriately preserved and were submitted to SGS. Sample analyses were conducted within holding time criteria. No issues were noted with regards to sample preservation.

Laboratory Method Blanks
Laboratory method blanks were analyzed at the appropriate frequencies. Analytes were not detected at or above the LOQ in the method blank. (The laboratory report uses the term method reporting limit (MRL) in place of LOQ).

Trip Blanks
Trip blanks were not required for indoor air samples.

Reporting Limits
For non-detectable results MRLs were compared to applicable target levels. MRLs were compared ADEC Vapor Intrusion Guidance for Contaminated Sites, Appendix D: DEC Indoor Air Target Levels for Commercial Indoor Air (ADEC, 2017b.) All analytes with results of non-detect had LODs below applicable target levels.

Calibration Verifications
No CCVs were noted in the case narrative as being outside of acceptance limits. CCV recoveries were not otherwise presented in the report. All CCV criteria were considered met.

Internal Standards
No internal standards were noted in the case narrative as being outside of acceptance limits. Internal standard performance was not otherwise presented in the report. Internal standards criteria were considered met.

Surrogate Recovery Results
Surrogate analysis was performed at the required frequencies. All surrogate recoveries were within analytical method and ALS percent recovery acceptance limits.

Laboratory Control Samples and Laboratory Control Sample Duplicates
An LCS was analyzed in association with these samples. All LCS recoveries were within acceptable limits. No Laboratory Control Sample Duplicates (LCSD) was analyzed.

Matrix Spike and Matrix Spike Duplicate Samples
No matrix spike (MS) or matrix spike duplicates (MSDs) were analyzed in association with these samples.

Field Duplicates
One field duplicate was analyzed for the two primary samples collected. For all methods and analytes, the duplicate frequency requirement of one per 10 samples or less per matrix and analyte was satisfied. The field duplicate was submitted blind to the laboratory. Sample 18TS91 was a duplicate of 18TS01.

All parent sample/field duplicate RPDs were within the ADEC required 25% for air samples. For m,p-xylene, parent sample 18TS01 result was undetectable with an MRL of 1.5 µg/m^3 , while the duplicate sample result was a detected value of 1.5 µg/m^3 , exactly at the MRL. As the MRL is used to calculate RPDs for undetectable results, these samples are considered within the required 25% RPD limit.

Parent sample/field duplicate pairs with both results below the MRL were considered acceptable without qualification.

Laboratory Duplicate Samples
Laboratory duplicates were analyzed at the appropriate frequency. No duplicate RPDs were noted in the case narrative as outside of acceptance limits. Duplicate performance criteria were considered met

Overall Assessment

This data were considered of good quality and acceptable for use with no qualifications. All data were considered usable.

Precision, Accuracy, Representativeness, Comparability, Completeness, and Sensitivity Summary

- Precision: Precision goals were met.
- Accuracy: Accuracy goals were met.
- Representativeness: Representativeness goals were met. The samples were collected from planned locations per the Workplan (SLR, 2018).
- Comparability: Comparability goals were met. The same laboratory and method was used.
- Completeness: Completeness goals were met. The data were 100% complete with respect to analysis.
- Sensitivity: Sensitivity goals were met

References

Alaska Department of Environmental Conservation (ADEC), 2017a. Memorandum *Data Quality Objectives, Checklists, Quality Assurance Requirements for Laboratory Data, and Sample Handling.* March.

ADEC, 2017b.Technical *Vapor Intrusion Guidance for Contaminated Sites*. November.

SLR International Corporation (SLR). 2018. *Vapor Intrusion Assessment Work Plan, ML&P Transformer Shop Building, Anchorage, Alaska.* October 17.

United States Environmental Protection Agency (EPA), 2014. *National Functional Guidelines for Superfund Organic Methods Data Review.* August.

Attachments

Attachment 1 – ADEC Data Review Checklist

Contaminated Sites Program
Spill Prevention and Response Division
Alaska Department of Environmental Conservation

Laboratory Data Review Checklist for Air Samples

Completed by:	Jennifer McLean		
Title:	Associate Scientist	Date:	December 13, 2018
CS Report Name:	2018 Vapor Intrusion Assessment at the ML&P Transformer Shop	Report Date:	December 3, 2018
Consultant Firm:	SLR International Corporation		
Laboratory Name:	ALS Simi Valley, California	Laboratory Report Number:	P1806251
DEC File Number:	2100.26.302	DEC Haz ID:	23842

1. Laboratory
   a. Did a NELAP-certified laboratory receive and perform all of the submitted sample analyses?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes, ADEC number 17-019 and NELAP number TNI01213

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP-approved?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Not applicable. Not transferred.

2. Chain of Custody (COC)
   a. Was the COC information completed, signed and dated (including released/received by)?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes.

   b. Was the correct analyses requested?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes.

3. Laboratory Sample Receipt Documentation
   a. Was the sample condition documented? Were samples collected in gas-tight, opaque/dark Summa canisters or other DEC-approved containers? Was the canister vacuum/pressure checked, recorded upon receipt and were there no open valves?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes to all questions.

   b. If there were any discrepancies, were they documented? Examples include incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   No discrepancies were noted.

   c. Was the data quality or usability affected? (Please explain.)

   Comments:

   No impact.

4. Case Narrative
   a. Is there a case narrative and is it understandable?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes

   b. Were there any discrepancies, errors or QC failures identified by the lab?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   No discrepancies.

   c. Were all corrective actions documented?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   No corrective actions were necessary.

   d. What is the effect on data quality/usability according to the case narrative?

   Comments:

   No impact.

5. Samples Results
   a. Was the correct analyses performed/reported as requested on COC?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes

   b. Were the samples analyzed within 30 days of collection or within the time required by the method?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes.

   c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes. Cleanup levels used were Vapor Intrusion Guidance, Appendix D, Indoor commercial Air (Nov. 2017).

   d. Was the data quality or usability affected?

   Comments:

   No impact.

6. QC Samples
   a. Method Blank
      i. Was one method blank reported per analysis and 20 samples?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes

      ii. Were all method blank results less than PQL?
      ☐ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Yes.

      iii. If above PQL, what samples are affected?

   Comments:

   Not applicable.

iv. Do the affected sample(s) have data flags and, if so, are the data flags clearly defined?

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Not applicable. No impact.

v. Was the data quality or usability affected? (Please explain.)

Comments:

No impact.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Was there one LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

An LCS and laboratory duplicate were analyzed.

ii. Accuracy – Were all percent recoveries (%R) reported and within method or laboratory limits? What were the project specified DQOs, if applicable?

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Yes.

iii. Precision – Were all relative percent differences (RPD) reported and were they less than method or laboratory limits? What were the project-specified DQOs, if applicable.

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

The parent sample/laboratory duplicate were within limits, but were not a project samples thus were not shown in the laboratory report

iv. If the %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Not applicable. All recoveries and RPDs were acceptable.

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Not applicable.

vi. Is the data quality or usability affected? (Please explain.)

Comments:

No impact.

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?
☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Yes.

ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits? What were the project-specified DQOs, if applicable?
☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Yes

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

All surrogate recoveries were acceptable.

iv. Was the data quality or usability affected? (Please explain.)

Comments:

No impact.

d. Field Duplicate

i. Was one field duplicate submitted per analysis and 10 type (soil gas, indoor air, etc.) samples?
☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Yes

ii. Were they or was it submitted blind to the lab?
☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Yes. 18TS91 was a duplicate of 18TS01.

iii. Precision – Were all relative percent differences (RPD) less than the specified DQOs? (Recommended: 25 %)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Yes. 18TS01 m,p-xylene result was undetectable with a LOQ (MRL) of 1.5 ug/m3, and the duplicate result (18TS91) was a detection of 1.5 ug/m3.

iv. Was the data quality or usability affected? (Please explain.)

Comments:

As the LOQ is used to calculate the RPD for the undetectable result, and the detection was exactly at the LOQ, The RPD is considered acceptable.

e. Field Blank (If not used, explain why.)

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

A field blank was not practicable nor required by the workplan.

i. Were all results less than the PQL?

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

Not applicable.

ii. If above PQL, what samples are affected?

Comments:

Not applicable.

iii. Was the data quality or usability affected? (Please explain.)

Comments:

No impact.

7. Other Data Flags/Qualifiers

a. Were other data flags/qualifiers defined and appropriate?

☐ Yes ☐ No ☐ N/A (Please explain.)

Comments:

No qualifiers were necessary.

Appendix D Laboratory Data

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

LABORATORY REPORT

December 3, 2018

Bret Berglund
SLR International
2700 Gambell Street, Suite 200
Anchorage, AK 99503

RE: ML&P Transformer Shop / 105.00528.18001-331

Dear Bret:

Enclosed are the results of the samples submitted to our laboratory on November 13, 2018. For your reference, these analyses have been assigned our service request number P1806251.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 5:17 pm, 12/03/18

Kate Kaneko
Laboratory Director

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

Client: SLR International Service Request No: P1806251
Project: ML&P Transformer Shop / 105.00528.18001-331

CASE NARRATIVE

The samples were received intact under chain of custody on November 13, 2018 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. For projects requiring DoD QSM 5.1 compliance canisters were cleaned to <1/2 the MRL. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	http://dec.alaska.gov/eh/lab.aspx	17-019
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/page/la-lab-accreditation	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml	2018027
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1347317
New Jersey DEP (NELAP)	http://www.nj.gov/dep/enforcement/oqa.html	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-005
Pennsylvania DEP	http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html	T104704413-18-9
Utah DOH (NELAP)	http://health.utah.gov/lab/lab_cert_env	CA016272018-9
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: SLR International Service Request: P1806251

Project ID: ML&P Transformer Shop / 105.00528.18001-331

Date Received: 11/13/2018

Time Received: 10:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
18TS01	P1806251-001	Air	11/11/2018	16:12	AS01177	-0.89	3.52	X
18TS91	P1806251-002	Air	11/11/2018	16:12	AS00749	-1.01	3.56	X
18TS02	P1806251-003	Air	11/11/2018	16:10	AS01374	-0.20	3.61	X

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No 1180625 1

Company Name & Address (Reporting Information)
SLR International
2700 Gambell St, Suite 200
Anchorage, AK 99503

Project Name MLTP Transformer Shop

Project Number 105.00528.18001-331

Project Manager Bret Berglund

P.O. # / Billing Information
105.00528.18001-331

Phone 907-222-1112 Fax 907-563-2164

Email Address for Result Reporting
jmclean@slrconsulting.com, bberglund@slrconsulting.com

Sampler (Print & Sign) Nicholas Wells

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15 BTEX & 1,2,4-Trimethyl benzene		Comments e.g. Actual Preservative or specific instructions
18TS01		11/11/18	16:12	AS01177	SFC00284	29.5	3	6L	X		8 hr Sample
18TS91		11/11/18	16:12	AS00749	SFC00223	29	3	6L	X		↓
18TS02		11/11/18	16:10	AS01374	SFC00312	29	2	6L	X		↓

Report Tier Levels - please select
Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ✓
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
	11/12/18	09:10		11/13/18	7:00
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: SLR International Work order: P1806251

Project: ML&P Transformer Shop / 105.00528.18001-331

Sample(s) received on: 11/13/18 Date opened: 11/13/18 by: AARON GONZALEZ

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Box Sealing Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1806251-001.01	6.0 L Silonite Can					
P1806251-002.01	6.0 L Silonite Can					
P1806251-003.01	6.0 L Silonite Can					
P1806251-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **SLR International**
Client Sample ID: **18TS01** ALS Project ID: P1806251
Client Project ID: **ML&P Transformer Shop / 105.00528.18001-331** ALS Sample ID: P1806251-001

Test Code: EPA TO-15 Date Collected: 11/11/18
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 11/13/18
Analyst: Raneem Sahtah Date Analyzed: 12/1/18
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01177

Initial Pressure (psig): -0.89 Final Pressure (psig): 3.52

Container Dilution Factor: 1.32

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	0.69	ND	0.21	
108-88-3	Toluene	**2.8**	0.70	**0.75**	0.19	
100-41-4	Ethylbenzene	ND	0.69	ND	0.16	
179601-23-1	m,p-Xylenes	ND	1.5	ND	0.33	
95-47-6	o-Xylene	ND	0.70	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	ND	0.70	ND	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **SLR International**
Client Sample ID: **18TS91** ALS Project ID: P1806251
Client Project ID: **ML&P Transformer Shop / 105.00528.18001-331** ALS Sample ID: P1806251-002

Test Code: EPA TO-15 Date Collected: 11/11/18
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 11/13/18
Analyst: Raneem Sahtah Date Analyzed: 12/1/18
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00749

Initial Pressure (psig): -1.01 Final Pressure (psig): 3.56

Container Dilution Factor: 1.33

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	0.69	ND	0.22	
108-88-3	Toluene	**2.9**	0.70	**0.77**	0.19	
100-41-4	Ethylbenzene	ND	0.69	ND	0.16	
179601-23-1	m,p-Xylenes	**1.5**	1.5	**0.35**	0.34	
95-47-6	o-Xylene	ND	0.70	ND	0.16	
95-63-6	1,2,4-Trimethylbenzene	ND	0.70	ND	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **SLR International**
Client Sample ID: **18TS02** ALS Project ID: P1806251
Client Project ID: **ML&P Transformer Shop / 105.00528.18001-331** ALS Sample ID: P1806251-003

Test Code: EPA TO-15 Date Collected: 11/11/18
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 11/13/18
Analyst: Raneem Sahtah Date Analyzed: 12/1/18
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS01374

Initial Pressure (psig): -0.20 Final Pressure (psig): 3.61

Container Dilution Factor: 1.26

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	0.66	ND	0.21	
108-88-3	Toluene	**1.6**	0.67	**0.42**	0.18	
100-41-4	Ethylbenzene	ND	0.66	ND	0.15	
179601-23-1	m,p-Xylenes	ND	1.4	ND	0.32	
95-47-6	o-Xylene	ND	0.67	ND	0.15	
95-63-6	1,2,4-Trimethylbenzene	ND	0.67	ND	0.14	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **SLR International**
Client Sample ID: **Method Blank** ALS Project ID: P1806251
Client Project ID: **ML&P Transformer Shop / 105.00528.18001-331** ALS Sample ID: P181201-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Raneem Sahtah Date Analyzed: 12/1/18
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Container Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	0.52	ND	0.16	
108-88-3	Toluene	ND	0.53	ND	0.14	
100-41-4	Ethylbenzene	ND	0.52	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.1	ND	0.25	
95-47-6	o-Xylene	ND	0.53	ND	0.12	
95-63-6	1,2,4-Trimethylbenzene	ND	0.53	ND	0.11	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **SLR International**
Client Project ID: **ML&P Transformer Shop / 105.00528.18001-331** ALS Project ID: P1806251

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date(s) Collected: 11/11/18
Analyst: Raneem Sahtah Date(s) Received: 11/13/18
Sample Type: 6.0 L Silonite Canister(s) Date(s) Analyzed: 12/1/18
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P181201-MB	**100**	**106**	**91**	70-130	
Lab Control Sample	P181201-LCS	**97**	**102**	**93**	70-130	
18TS01	P1806251-001	**100**	**103**	**95**	70-130	
18TS91	P1806251-002	**100**	**102**	**98**	70-130	
18TS02	P1806251-003	**102**	**102**	**99**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **SLR International**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1806251
Client Project ID: **ML&P Transformer Shop / 105.00528.18001-331** ALS Sample ID: P181201-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Raneem Sahtah Date Analyzed: 12/1/18
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
71-43-2	Benzene	211	**163**	**77**	66-111	
108-88-3	Toluene	212	**175**	**83**	66-114	
100-41-4	Ethylbenzene	212	**180**	**85**	69-117	
179601-23-1	m,p-Xylenes	426	**385**	**90**	67-117	
95-47-6	o-Xylene	214	**192**	**90**	67-118	
95-63-6	1,2,4-Trimethylbenzene	215	**220**	**102**	67-124	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.