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November 17, 2017  
Project No. SCS539  
Geotracker Global ID T10000006756  
ACHCS Fuel Leak Case: RO0003170

1607 2nd Avenue, LLC  
Attn: Harry Tung

**RECEIVED**  
By Alameda County Environmental Health 1:37 pm, Nov 27, 2017

**Reference: Former Heating Oil Tank Site  
1607 2nd Avenue  
Oakland, Alameda County, California**

**Subject: Perjury Statement for Soil Vapor Investigation Report**

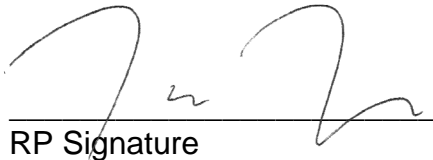
To Alameda County Environmental Health:

**PERJURY STATEMENT**

I declare, under penalty of perjury, that I have read the below-referenced document and the information and/or recommendations contained in this document is true and correct to the best of my knowledge.

- SCHUTZE & Associates, Inc. November 17, 2017, Soil Vapor Investigation, 1607 2nd Avenue, Oakland, CA 94606, Job #SCS539.3

Signed,



RP Signature

Harry T Tung  
RP Printed Name

11/17/2017  
Date



44358 S. GRIMMER BOULEVARD, FREMONT, CA 94538 ♦ TELEPHONE: (510) 226-9944 ♦ FAX: (510) 226-9948

November 17, 2017  
Project No. SCS539.3

GeoTracker Global ID T10000006756  
ACEH Fuel Leak Case No. RO0003170

**1607 2nd Avenue, LLC**  
**Attn: Mr. Harry T. Tung**  
4096 Piedmont Avenue, #150  
Oakland, CA 94611

**Alameda County Environmental Health**  
**Attn: Mr. Keith Nowell, PG, CHG**  
1131 Harbor Bay Parkway  
Alameda, CA 94502

**Reference: Former Heating Oil Tank Site**  
**1607 2nd Avenue**  
**Oakland, Alameda County, California**

**Subject: Soil Vapor Investigation**

Dear Mr. Tung and Mr. Nowell:

SCHUTZE & Associates, Inc. is pleased to present this Soil Vapor Investigation Report for the above-mentioned property (subject site) prepared in response to directives received from the Alameda County Department of Environmental Health (ACDEH) dated June 6, September 12 and December 16, 2016.<sup>123</sup>

The current Soil Vapor Investigation study was performed in accordance with SCHUTZE & Associates, Inc.'s *Work Plan for Vapor Intrusion to Indoor Air Evaluation* dated August 8, 2016 and approved by the ACDEH on September 12, 2016 with modifications, as follows:

- Depth of Foundation—Depth of the soil vapor collection to be five feet beneath the depth of the building foundation.

<sup>1</sup> ACDEH, *Work Plan Request, Fuel Leak Case No. RO0003170 and GeoTracker Global ID T10000006756, Second Avenue UST, 1607 2nd Avenue, Oakland, CA 94606*, June 6, 2016

<sup>2</sup> ACDEH, *Conditional Work Plan Approval, Fuel Leak Case No. RO0003170 and GeoTracker Global ID T10000006756, Second Avenue UST, 1607 2nd Avenue, Oakland, CA 94606*, September 12, 2016

<sup>3</sup> ACDEH, *Analytical Data Review, Fuel Leak Case No. RO0003170 and GeoTracker Global ID T10000006756, Second Avenue UST, 1607 2nd Avenue, Oakland, CA 94606*, December 16, 2016

- Interior Soil Vapor Sample Collection—Collection of the soil vapor sample within the interior of the utility room rather than at the exterior.
- Indoor Air Contingency Sampling—Provision of a copy of the soil vapor study results for agency approval prior to implementation of an indoor air study.
- Soil Vapor Analysis Scope—Analysis of helium, the tracer gas, and methane to ensure quality control.

The scope of work performed was supervised by a California Professional Geologist (P.G.) and conducted under ACDEH oversight. Documents pertaining to this work will be uploaded to the ACDEH ftp site and the SWRCB GeoTracker website.

## **A. BACKGROUND**

### **A.1 Site Description**

The subject site consists of an occupied apartment building on the northern corner of the intersection of 2nd Avenue and East 16th Street in Oakland, California. A Site Location map is presented as Figure 1. An underground storage tank (UST) containing heating oil was formerly located beneath the sidewalk approximately 3.5 ft southwest of the on-site apartment building. Additionally, the utility room in the apartment building, which is approximately 15 feet northeast of the former UST, was likely the location of an oil-fired boiler.

### **A.2 UST Removal (2014)**

An approximately 1,500-gallon UST was removed by Golden Gate Tank Removal, Inc. (GGTR) in 2014. The tank was found to be in poor condition with visible holes.

Nearly 22 tons of impacted soil was excavated and disposed of at the Keller Canyon Landfill Facility. According to the GGTR UST Closure Report, “The analytical results from the State Certified Laboratory following the tank removal and remedial activities were non-detect or insignificant, and deemed acceptable by the Oakland Fire Department (OFD); therefore, GGTR recommended no further action at the site.”<sup>4</sup>

An Underground Storage Tank Unauthorized Release Report was submitted on November 19, 2014, as required by the OFD due to the holes observed in the tank. The subject site property was designated as a LUST<sup>5</sup> Cleanup Site (GeoTracker Global ID T10000006756) with the ACDEH as the lead agency for the site (Fuel Leak Case No. RO0003170).

### **A.3 Soil and Groundwater Investigation (2016)**

SCHUTZE & Associates, Inc. completed a Soil and Groundwater Investigation at the subject site in February 2016. The purpose of the work was to further delineate the horizontal and vertical extent of potential hydrocarbon contamination in the soil and

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<sup>4</sup> Golden Gate Tank Removal, Inc., *Underground Storage Tank Closure Report, 1607 2nd Avenue, Oakland, CA 94606*, December 11, 2014

<sup>5</sup> Leaking underground storage tank

groundwater beneath the subject site, with the goal of achieving low-threat case closure for the site. The investigation was conducted according to SCHUTZE & Associates, Inc.'s *Work Plan for Subsurface Investigation, Apartment Building and Former Heating Oil Tank Site* dated August 27, 2015, which was approved by the ACDEH on September 25, 2015.

A narrow soil zone of TPH-ho<sup>6</sup> contamination was detected between the former UST pit and the foundation of the building. TPH-ho was detected in soil in boring B3 at 7.5 feet below ground surface (ft bgs) at a concentration of 1,500 milligrams per kilogram (mg/kg). TPH was not detected in any groundwater samples. Due to the limited extent of the TPH-ho contamination in soil at the site, SCHUTZE & Associates, Inc. recommended no further investigations at the subject site related to soil contamination.

#### Request for Vapor Intrusion to Indoor Air Work Plan

The ACDEH's letter dated June 6, 2016 reviewed SCHUTZE & Associates, Inc.'s March 9, 2016 *Soil and Groundwater Investigation Report and Evaluation for Low-Threat UST Case Closure*. The ACDEH recommended additional evaluation of the former waste oil tank area by performing a soil vapor study in order to: (1) collect soil gas samples at the subject site; (2) determine, based on the results, whether indoor air sampling is required; and (3) evaluate the sampling results to determine if the site satisfies the Low-Threat Closure Policy (LTCP) Media-Specific Criteria for Vapor Intrusion to Indoor Air.

#### Initial Soil Vapor Sampling Event (November 2016)

On November 7, 2016, SCHUTZE & Associates, Inc. advanced four (4) soil gas probes in the vicinity of the former waste oil UST and inside the on-site building's utility room and collected soil vapor samples; however, an ambient air leak greater than 5% was noted. The soil vapor samples from this sampling event were analyzed by EPA<sup>7</sup> Test Method TO-15; EPA Test Method TO-17 sample analysis was not performed. Due to these discrepancies, the ACDEH requested that the soil gas sampling event be repeated (ACDEH, December 16, 2016). The results from the November 2016 sampling event are therefore not included in this report.

## **B. SUBSURFACE CONDITIONS**

### **B.1 Geology / Soils**

The area of Oakland surrounding Lake Merritt is underlain by Pleistocene marine terrace deposits, dune sands (Merritt Sand) and artificial fill that have been laid down over estuarine mud (Bay Mud). The thickness of the Pleistocene sediments is estimated to be to approximately 50 ft bgs. During the February 2016 subsurface investigation, the majority of soils observed between 0.5 and 22 ft bgs (maximum boring depth) consisted of moist, stiff sands, silts and clays.

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<sup>6</sup> Total petroleum hydrocarbons as diesel and heating oil

<sup>7</sup> U.S. Environmental Protection Agency

## **B.2 Surface Waters / Groundwater**

Lake Merritt is located approximately 320 ft northwest and down-gradient from the former on-site UST location. Based on the location of Lake Merritt to the northwest and the general site topography, groundwater is expected to flow to the northwest.

During the February 2016 subsurface investigation, groundwater was encountered between 12 and 21 ft bgs. Groundwater likely occurs in gravelly and sandy horizons, sometimes in confined conditions. The potentiometric water level was approximately 11.5 ft bgs.

## **C. SOIL VAPOR INVESTIGATION**

SCHUTZE & Associates, Inc. conducted a Soil Vapor Investigation at the subject site on January 13, 2017. The work was performed in accordance with the scope and limitations of ASTM<sup>8</sup> Practice E1903-97 (re-approved 2002).

### **C.1 Pre-Field Activities**

Prior to the work, SCHUTZE & Associates, Inc. marked the proposed boring locations with white spray paint. Subsequently, Underground Services Alert (USA) was contacted to clear the marked areas for subsurface utilities. The ticket number provided by USA for this procedure is #W700300493.

A site-specific health and safety plan was prepared and a safety meeting was held before commencing fieldwork.

Prior to the soil vapor sampling, SCHUTZE & Associates, Inc. made the following observations regarding the building's foundation, crawl spaces and concrete slabs:

- The depths of the peripheral and internal footings for piers and load-bearing walls are approximately 3 ft bgs.
- The concrete floor beneath the utility room is approximately 3 to 4 inches thick. In accordance with the State Water Resources Control Board (SWRCB) LTCP guidance document<sup>9</sup>, Appendix 4, Scenario 4 (Pages 1 and 2), the soil vapor samples were collected sub-slab and 5 ft below the base of the concrete slab.
- The apartments in the on-site building are approximately one-half floor (approximately 4 feet) above ground level and a 4 foot tall, well ventilated crawl space exists between ground level and the apartment floors. Beneath the stairways and common-use hallways are ground level spaces such as the utility room (former boiler room), a long hallway and small storage units. The well ventilated crawl space likely creates an effective mitigating barrier between potentially upward migrating soil vapor and occupied residential indoor spaces.

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<sup>8</sup> American Society for Testing and Materials

<sup>9</sup> SWRCB, *Low-Threat Underground Storage Tank Case Closure Policy*, August 28, 2012

## **C.2 Drilling Methodology**

On January 13, 2017, two (2) two-inch soil borings (SV-1-5 and SV-2-5) were advanced to 5 ft below the depth of the apartment building's concrete slab using hand drilling methods. One additional boring was drilled using a coring drill bit to collect a sub-slab sample (SV-1-3). SV-1-3 and SV-1-5 were located within the interior of the utility room of the apartment building and SV-2-5 was located adjacent to the exterior of the building. The boring locations are depicted on the attached Figure 2.

## **C.3 Soil Vapor Sampling Methodology**

Three (3) soil vapor samples were collected from beneath the subject site; two samples at five ft bgs (SV-1-5' and SV-2-5') and one sample (SV-1-3") just below the slab foundation of the on-site structure. Groundwater was not encountered during the drilling activities.

To collect the sample, a porous tip was attached to a rigid tube, which was then inserted into the boring at the desired sampling depth. Coarse sand was then poured into the boring to surround the tip with a porous media. Subsequently, bentonite clay was placed in layers into the boring and water was poured onto each bentonite layer to seal the drill hole and prevent vapor intrusion from above. Teflon<sup>®</sup> tubing was used for soil vapor sampling to decrease contaminant recovery (reactivity) and to prevent reduced recovery of naphthalene.

The SUMMA canisters were supplied with a negative pressure, meaning the pressure inside the canister was less than the atmospheric pressure outside the canister. When the regulators were opened, soil vapor was drawn into the canister. The regulators were closed on the SUMMAs subsequent to collecting each sample and the brass caps replaced on the intakes of the canisters.

The tube was connected to a stainless steel sample train, with a purge canister at the distant connection and the sample canister on the closer connection. Five-micron in-line filters were used to prevent particulate matter from entering the canisters and to increase canister fill times. Vacuum gauges were used to measure the initial vacuum of the canister before sampling and the final vacuum upon completion. A second in-line vacuum gauge was used to measure the pressure differential. Helium was used as a tracer and a helium shroud provided by McCampbell Analytical, Inc. (CDPH ELAP<sup>10</sup> #1644) was utilized.

The samples were collected in 1-liter, evacuated, stainless steel canisters provided by McCampbell Analytical, Inc. in accordance with the July 2015 *Advisory – ActiveSoil Gas Investigations* (California Environmental Protection Agency [Cal/EPA], Department of Toxic Substances Control [DTSC] and Regional Water Quality Control Boards of Los Angeles [LARWQCB] and San Francisco [SFRWQCB]).

The canisters were placed into the original shipping containers and delivered to McCampbell Analytical, Inc. using chain-of-custody procedures. Soil vapor samples were analyzed for volatile organic compounds (VOCs) by EPA Test Method TO-15, with

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<sup>10</sup> California Department of Public Health Environmental Laboratory Accreditation Program

naphthalene confirmation by Test Method TO-17, which assists in indicating aerobic/anaerobic conditions.

#### D. ANALYTICAL RESULTS FOR SOIL VAPOR

Selected analytical results for the soil vapor samples are shown in Table 1 and depicted on Figure 2. The complete laboratory report is attached as Appendix A. The soil vapor analytical results were compared to the San Francisco Bay Regional Water Quality Control Board (Water Board) Tier 1 Environmental Screening Levels (ESLs), February 2016 (Rev. 3).

**TABLE 1**  
**Selected Analytical Results for Soil Vapor**  
**1607 2nd Avenue, Oakland, California**

Sample				Units in %			Units in $\mu\text{g}/\text{m}^3$					
Sample ID	Depth (feet below slab)	Date Collected	Sample Location	Methane	Oxygen	Carbon Dioxide	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Naphthalene
SV-1-3	Sub-slab	1/13/2017	Utility Room	0.00028	17	0.015	ND<1.8	5.0	120	4.8	23	ND<3.0
SV-1-5	5.0			0.00068	17	0.067	ND<1.8	<b>73</b>	71	18	36	ND<2.7
SV-2-5	5.0		Sidewalk	0.00069	16	0.033	ND<1.8	17	96	6.0	28	ND<2.7
<b>Residential (Table SG-1) ESLs</b>				<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>5,400</b>	<b>48</b>	<b>160,000</b>	<b>560</b>	<b>52,000</b>	<b>41</b>
<b>Commercial (Table SG-1) ESLs</b>				<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>47,000</b>	<b>420</b>	<b>1,300,000</b>	<b>4,900</b>	<b>440,000</b>	<b>360</b>

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter; MTBE = methyl tert-butyl ether; ND<1.0 = not detected with a reporting limit of 1.0; N/A = not available.  
 ESLs = San Francisco Bay Regional Water Quality Control Board environmental screening levels (February 2016, Revision 3; Table SG-1, Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels). **Bold** indicates results that exceed or are equal to ESLs.  
 Volatile organic compounds, methane, oxygen and carbon dioxide were analyzed by EPA Method TO15; naphthalene was analyzed by EPA Method TO17.

SCHUTZE & Associates, Inc.

#### D.1 VOCs

- MTBE was not detected above the laboratory reporting limit (RL) in the soil vapor samples.
- Benzene was detected in soil vapor above the residential Tier 1 ESL of  $48 \mu\text{g}/\text{m}^3$  with a concentration of  $73 \mu\text{g}/\text{m}^3$  at SV-1-5. Benzene was also detected at concentrations below the residential Tier 1 ESL at SV-1-3 ( $5.0 \mu\text{g}/\text{m}^3$ ) and SV-2-5 ( $17 \mu\text{g}/\text{m}^3$ ).
- Toluene was detected in soil vapor below the residential Tier 1 ESL of  $160,000 \mu\text{g}/\text{m}^3$  with a maximum concentration of  $120 \mu\text{g}/\text{m}^3$  at SV-1-3.
- Ethylbenzene was detected in soil vapor below the residential Tier 1 ESL of  $560 \mu\text{g}/\text{m}^3$  with a maximum concentration of  $18 \mu\text{g}/\text{m}^3$  at SV-1-5.
- Xylenes was detected in soil vapor below the residential Tier 1 ESL of  $52,000 \mu\text{g}/\text{m}^3$  with a maximum concentration of  $36 \mu\text{g}/\text{m}^3$  at SV-1-5.

- Naphthalene was not detected above the laboratory RL in the soil vapor samples. Teflon<sup>®</sup> tubing was used for soil vapor sampling to decrease contaminant recovery (reactivity), and to prevent reduced recovery of naphthalene.

## D.2 Discussion of Results / LTCP Considerations

### Attenuation Evaluation

Attenuation is a measure of the decrease in concentration that occurs during vapor migration and may vary with space and time. The soils observed between 0.5 and 22 ft bgs (maximum boring depth) consisted of moist, stiff sands, silts and clays. The presence of clay suggest effective bioattenuation beneath the subject site.

Oxygen concentrations in the Attenuation Zone play a significant role in the evaluation of the effectiveness of an attenuation zone. The LTCP Appendix 4, Scenario 4 requirements for effective attenuation need to equal or exceed 4%. The oxygen concentrations beneath the utility room were 17%. Therefore, an effective Bioattenuation Zone appears to be present beneath the subject site.

### Benzene Analyzes

Based on the 2016 soil and groundwater investigation by SCHUTZE & Associates, Inc., the chemicals of concern at the subject site are TPH-ho and TPH-d<sup>11</sup>, which were apparently used in an interior boiler for heating in the past. Soil contamination appeared to be limited to and associated with a product line between the former tank and the former boiler at 7.5 ft bgs (SCHUTZE, March 2016).

*Soil:* VOCs, including MTBE, benzene, toluene, ethylbenzene, and xylenes, were below the laboratory RLs in the analyzed soil samples; however, the RLs for MTBE and benzene for sample B-3-7.5 were slightly above the respective ESLs of 0.023 and 0.044 mg/kg.

*Groundwater:* TPH, PAHs<sup>12</sup> and VOCs (with the exception of chloroform) were not detected in any of the groundwater samples above the RLs.

*Soil Vapor:* Benzene was detected in soil vapor above the residential Tier 1 ESL of 48  $\mu\text{g}/\text{m}^3$  with a concentration of 73  $\mu\text{g}/\text{m}^3$  at SV-1-5. Benzene was also detected at concentrations below the residential Tier 1 ESL at SV-1-3 (5.0  $\mu\text{g}/\text{m}^3$ ) and SV-2-5 (17  $\mu\text{g}/\text{m}^3$ ). The decrease of benzene in soil vapor from 73  $\mu\text{g}/\text{m}^3$  at 5 ft below the slab to 5.0  $\mu\text{g}/\text{m}^3$  at just below the slab (sub-slab) suggests effective attenuation between those depths.

Based on the historical use of the site as a residence, the historical use of non-benzene-containing heating oil and non-detections of contaminants in soil and groundwater, it is unlikely that the benzene detected in soil vapor is associated with the former on-site heating oil UST. Leaks from equipment stored in the building's utility room that used benzene-containing gasoline and/or off-site gas stations are more likely the cause of the benzene detected in soil vapor.

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<sup>11</sup> Total petroleum hydrocarbons as diesel

<sup>12</sup> Polynuclear aromatic hydrocarbons



## **Methane Analyses**

Methane may be formed as a result of anaerobic degradation of petroleum hydrocarbons. It occurs more often at high volume concentrated (LNAPL) releases or where ethanol-blended gasoline has been released where the O<sub>2</sub> is exhausted. It may cause increases in the gas volume and gas pressure and move the petroleum hydrocarbon vapors towards the surface. It is degraded in aerobic conditions, thus additionally decreasing the available O<sub>2</sub>. Methane may cause an explosion in confined spaces.

Methane was detected in the samples collected at 5 ft below the slab at 0.00068 and 0.00069 µg/m<sup>3</sup> and at a lower concentration of 0.00028 µg/m<sup>3</sup> in the sub-slab sample. Ethanol-blended gasoline was not released at the subject site. The O<sub>2</sub> is not exhausted. Based on the analytical results, methane concentrations are not a concern.

## **Applicability to LTCP Criteria**

The LTCP guidance documents of the SWRCB and ACDEH offer Scenarios for case closure. Appendix 4, Scenario 4 (Pages 1 and 2) is applicable if direct measurements of soil gas concentrations have been made, as was done in the current investigation. The Page 1 Scenario is for a case where the beneficial effects of a Bioattenuation Zone are not taken into consideration. In regards to Page 2, the Bioattenuation Zone beneath the subject site appears to be present and acceptable; however additional TPH samples would be required to qualify for the Page 2 Scenario.

*Scenario 4 (Page 1):* The soil gas sample has to be taken beneath the foundation (the 3 to 4 inches thick concrete slab at the subject site; sample SV-1-3) and at least 5 ft below the concrete slab (samples SV-1-5 and SV-2-5). The guidance document requires benzene at <85 µg/m<sup>3</sup> at 5 ft below the foundation as an acceptable LTCP concentration. The 73 µg/m<sup>3</sup> concentration beneath the subject site meets this criterion. Therefore, the Petroleum Vapor Intrusion Criteria of the LTCP are met and no follow-up indoor air testing is required.

## **E. FIELD QUALITY CONTROL AND CHAIN-OF-CUSTODY**

The drilling and sampling equipment was appropriately decontaminated between borings and all field procedures were appropriate to minimize external sample contamination. Nitrile gloves were worn during all field activities.

McC Campbell Analytical Inc. provided sample containers in good condition and the samples were delivered to McC Campbell Analytical, Inc. in accordance with standard chain-of-custody procedures.

“Level II” Quality Control (QC) Data Reporting was performed by McC Campbell Analytical, Inc. According to the laboratory report (Appendix A), all analyses were completed satisfactorily and all QC samples were found to be within the proper control limits.

Helium was not detected in the soil vapor samples, indicating that leakage did not occur and that the samples were acceptable.

Based on the data validation review, all data are considered usable for the intended purpose.

## F. CONCLUSIONS

SCHUTZE & Associates, Inc. has completed a Soil Vapor Investigation at the property located at the former heating oil tank site at 1607 2nd Avenue, Oakland, Alameda County, California.

The tank was removed in 2014 and associated soil contamination was indicated. Based on the soil and groundwater investigation completed in 2016, there appears to be no impact to groundwater. However, soil contamination by TPH-ho was discovered associated with a product pipe between the former tank and the likely former boiler location. Due to the limited extent of the contamination, SCHUTZE & Associates, Inc. recommended no further action. ACDEH requested an investigation of potential soil vapor intrusion into the residential spaces in the on-site apartment building. The requested soil vapor investigation is the subject of this report.

In total, three soil vapor samples were collected: one at the exterior former tank area and two in the interior former boiler room. The interior samples consisted of one sub-slab sample and one sample collected at 5 ft below the slab.

Based on the analytical results, only one detected contaminant in soil vapor exceeded the residential Tier 1 ESLs, which was the benzene concentration in sample SV-1-5'. The benzene level was  $73 \mu\text{g}/\text{m}^3$  which exceeds the residential ESL of  $48 \mu\text{g}/\text{m}^3$ . However, the benzene concentration is below the maximum concentration of  $84 \mu\text{g}/\text{m}^3$  for benzene presented in the LTCP Guidance Document, Appendix 4, Scenario 4 (Page 1).

## G. RECOMMENDATIONS

SCHUTZE & Associates, Inc. recommends no follow-up indoor air investigation or other environmental investigations at the subject site.

We have enjoyed working on this project and appreciate the opportunity to be of service. Please call SCHUTZE & Associates, Inc. at (510) 226-9944 with any questions or comments about this report.

Cordially,

**SCHUTZE & ASSOCIATES, INC.**



Jan H. Schutze, P.G., M.Sc.  
President

Attachments

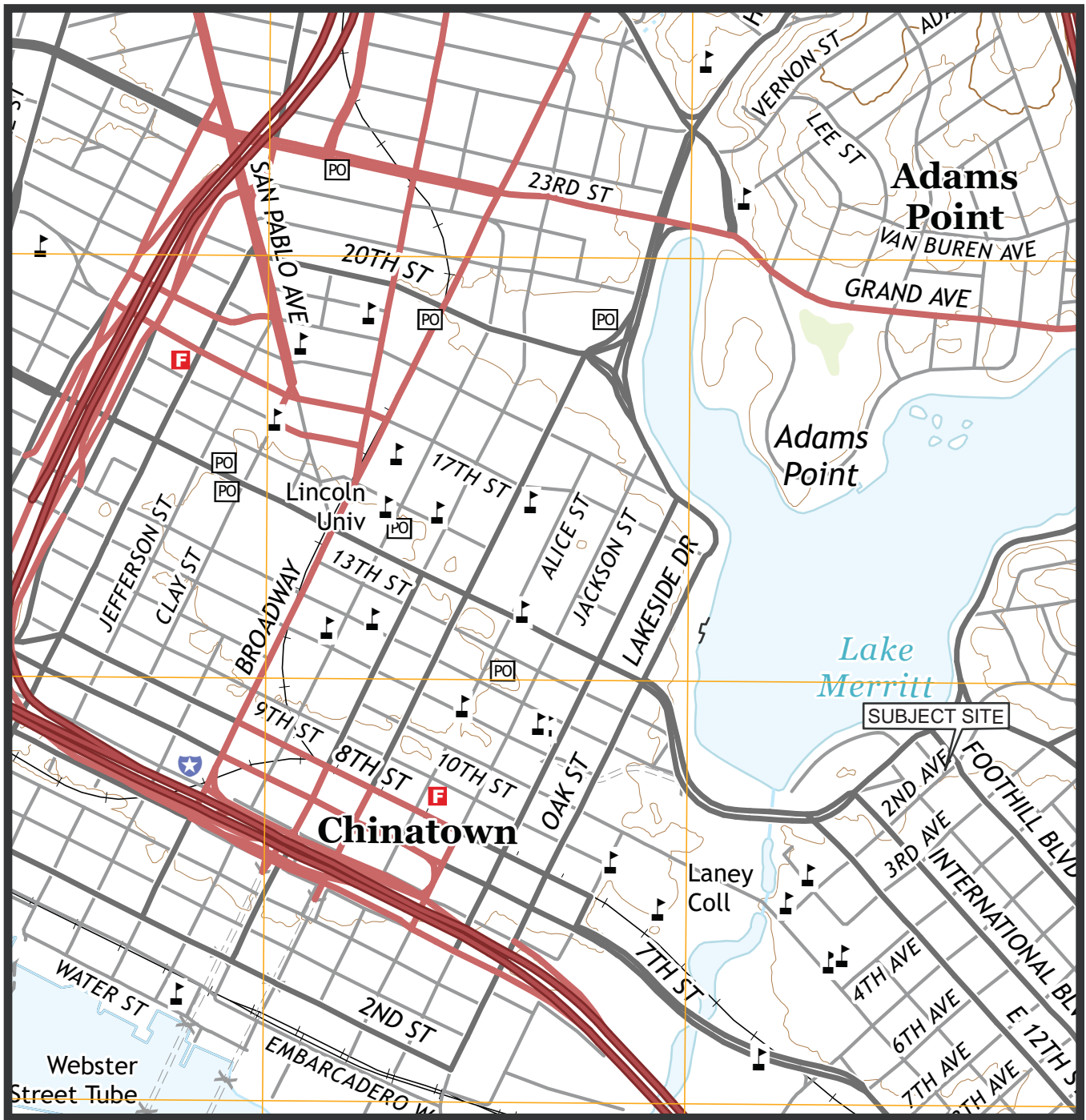
Figure 1 – Site Vicinity Map

Figure 2 – Soil Vapor Sampling Results

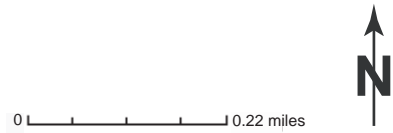
Site Photographs

Appendix A – Laboratory Report and Chain-of-Custody Form

# FIGURES



**SITE VICINITY MAP**  
 1607 2nd Avenue  
 Oakland, California



SCHUTZE & Associates, Inc.  
 Project No. SCS539.3  
 November 2016

Source: USGS  
 Oakland West 7.5 Quad  
 2015 (scale 1:24,000)

Figure 1

Approximate distance from former UST to Lake Merritt: 320 ft.

1607 2nd Avenue Apartment Building (Subject Site)

SV-1-5	
Depth (ft)	5.0
MTBE	ND<1.8
Benzene	73
Toluene	71
Ethylbenzene	18
Xylenes (total)	36
Naphthalene	ND<2.7

SV-1-5 Ft (below concrete slab)

SV-1-3 inches (below slab)

SV-1-3	
Depth (ft)	0.25
MTBE	ND<1.8
Benzene	5.0
Toluene	120
Ethylbenzene	4.8
Xylenes (total)	23
Naphthalene	ND<3.0

Utility Room is approx. 1 ft below sidewalk grade

Interior Passage

Former Heating Oil UST

SV-2-5 ft (below concrete sidewalk)

SV-2-5	
Depth (ft)	5.0
MTBE	ND<1.8
Benzene	17
Toluene	96
Ethylbenzene	6.0
Xylenes (total)	28
Naphthalene	ND<2.7

Tier 1 ESLs ( $\mu\text{g}/\text{m}^3$ )	
TPH-d	68,000
TPH-mo	N/A
TPH-ho	N/A
Benzene	48
Toluene	160,000
Ethylbenzene	560
Xylenes	52,000
MTBE	5,400
Naphthalene	41

East 16th Street

Sidewalk

Sidewalk

150 E. 16th St. Apartments

Sidewalk

Assumed Groundwater Flow Direction

Bx Approximate Boring Location with Boring Number

● Soil Vapor Sampling Locations

Approximate Scale (Feet)



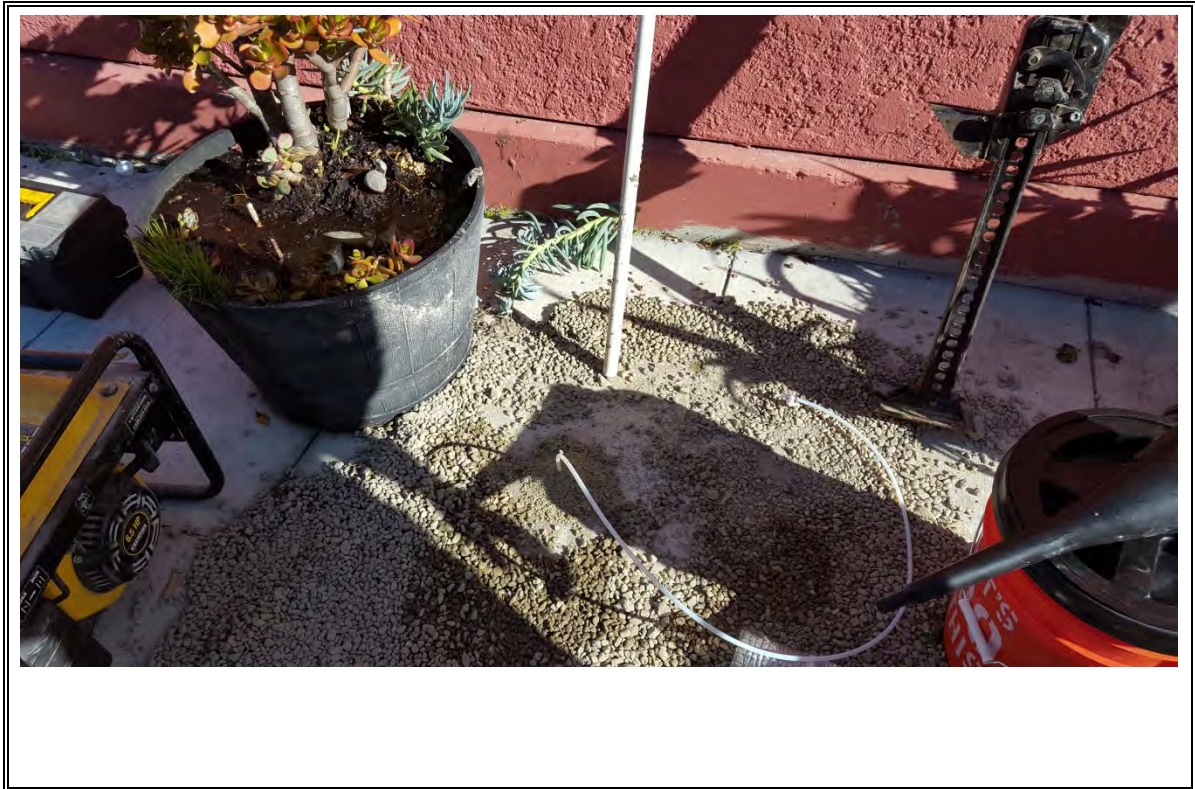
2nd Avenue

### Soil Vapor Sampling Results 1607 2nd Avenue Oakland, Alameda County, California

# **SITE PHOTOGRAPHS**

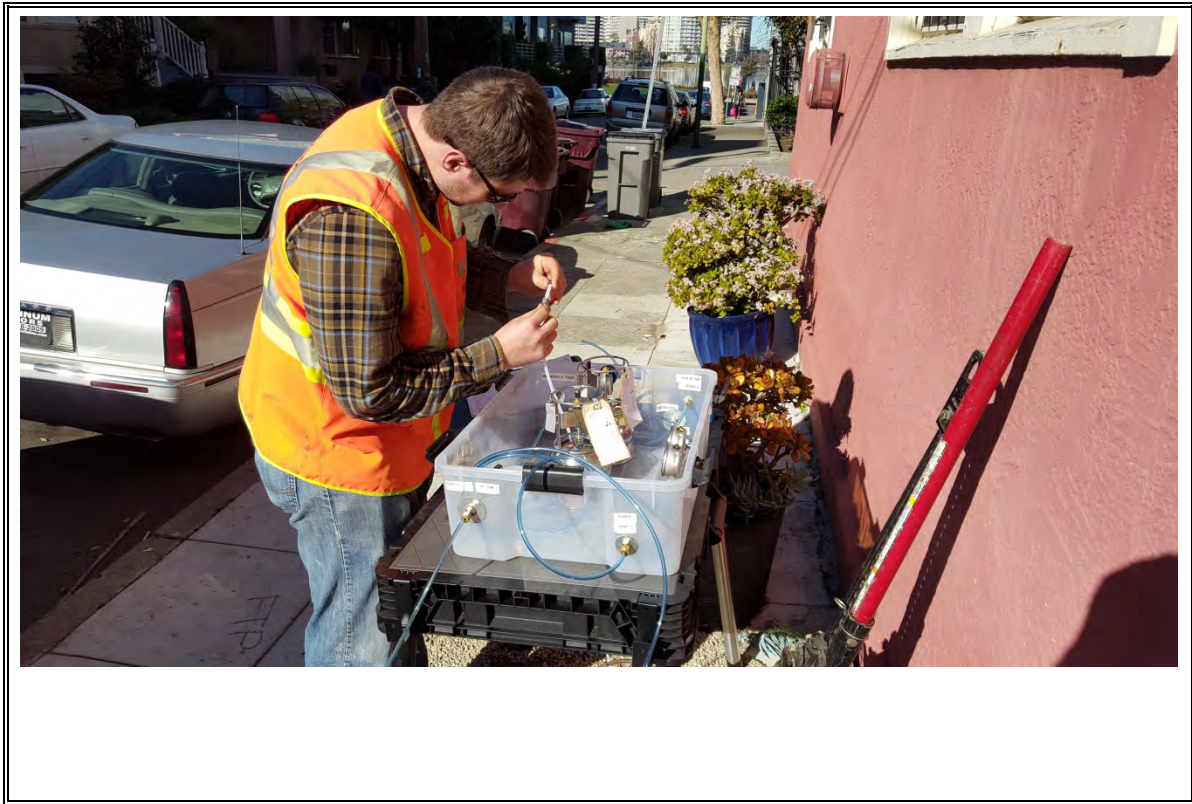


1. Concrete slab drilling for boring SV-1-3.



2. Installation of soil vapor probe SV-2-5 with bentonite.





3. Helium shroud for SV-2-5.



4. Sidewalk slab cutting for SV-2-5.



5. SV-1-3 and SV-1-5 in the utility room.



6. Sidewalk after grouting and patching.

**APPENDIX A**

**LABORATORY REPORT**



# McC Campbell Analytical, Inc.

"When Quality Counts"

## Analytical Report

**WorkOrder:** 1701626

**Report Created for:** Schutze & Associates, Inc.  
44358 South Grimmer Blvd  
Fremont, CA 94538

**Project Contact:** Kevin Loeb  
**Project P.O.:**  
**Project Name:** Tung/SCS539

**Project Received:** 01/17/2017

Analytical Report reviewed & approved for release on 01/24/2017 by:

Angela Rydelius,  
Laboratory Manager

*The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.*





## Glossary of Terms & Qualifier Definitions

**Client:** Schutze & Associates, Inc.  
**Project:** Tung/SCS539  
**WorkOrder:** 1701626

### Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

### Analytical Qualifiers

a10 reporting limit changed due to variable volume of air that pumped through each filter / sorbent tube.  
j1 see attached narrative



## **Glossary of Terms & Qualifier Definitions**

**Client:** Schutze & Associates, Inc.  
**Project:** Tung/SCS539  
**WorkOrder:** 1701626

### **Quality Control Qualifiers**

F2 LCS/LCSD recovery and/or RPD is out of acceptance criteria.



## Case Narrative

**Client:** Schutze & Associates, Inc.  
**Project:** Tung/SCS539

**Work Order:** 1701626  
January 25, 2017

1/23/17 TO-17 GC-37

Sample: SV-2-5 (1701626-003C)

The total volume collected onto the sorbent tube was calculated using observed initial and final pressures on a 1 L summa can. The final pressure of the summa can associated with the sample was measured in the lab at McC Campbell Analytical on 1/18/17.

The Nitrogen concentration cannot be reported due to a miscommunication in the lab. The sample canisters were inadvertently pressurized with N<sub>2</sub> for analysis by GC-FID.

### TO-15 ANALYSIS

All summa canisters are EVACUATED 5 days after the reporting of the results. Please call or email if a longer retention time is required.

In an effort to attain the lowest reporting limits possible for the majority of the TO-15 target list, high level compounds may be analyzed using EPA Method 8260B.

Polymer (Tedlar) bags are not recommended for TO15 samples. The disadvantages are listed in Appendix B of the DTSC Active Soil Gas Advisory of July 2015.



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/20/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %

### Atmospheric Gases

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5	1701626-001A	SoilGas	01/13/2017 12:00	GC26	132974

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.11	24.13	AK

Analytes	Result	RL	DF	Date Analyzed
Oxygen	17	0.40	1	01/20/2017 16:37

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5 TO-17 Summa	1701626-001B	SoilGas	01/13/2017 12:00	GC26	132974

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.40	24.77	AK

Analytes	Result	RL	DF	Date Analyzed
Oxygen	16	0.40	1	01/20/2017 17:40

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3	1701626-002A	SoilGas	01/13/2017 12:00	GC26	132974

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.73	25.40	AK

Analytes	Result	RL	DF	Date Analyzed
Oxygen	17	0.40	1	01/20/2017 16:58

(Cont.)

 Angela Rydelius, Lab Manager





# Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/20/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %

## Atmospheric Gases

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3 TO-17 Summa	1701626-002B	SoilGas	01/13/2017 12:00	GC26	132974

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.07	24.12	AK

Analytes	Result	RL	DF	Date Analyzed
Oxygen	16	0.40	1	01/20/2017 18:01

SV-2-5	1701626-003A	SoilGas	01/13/2017 12:00	GC26	132974
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Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.13	24.22	AK

Analytes	Result	RL	DF	Date Analyzed
Oxygen	16	0.40	1	01/20/2017 17:19

SV-2-5 TO-17 Summa	1701626-003B	SoilGas	01/13/2017 12:00	GC26	132974
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Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
11.98	23.87	AK

Analytes	Result	RL	DF	Date Analyzed
Oxygen	17	0.40	1	01/20/2017 18:22

 Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/19/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %

### Helium

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5	1701626-001A	SoilGas	01/13/2017 12:00	GC26	132841

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.11	24.13	AK

Analytes	Result	RL	DF	Date Analyzed
Helium	ND	0.050	1	01/19/2017 11:17

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3	1701626-002A	SoilGas	01/13/2017 12:00	GC26	132841

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.73	25.40	AK

Analytes	Result	RL	DF	Date Analyzed
Helium	ND	0.050	1	01/19/2017 11:29

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-2-5	1701626-003A	SoilGas	01/13/2017 12:00	GC26	132841

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.13	24.22	AK

Analytes	Result	RL	DF	Date Analyzed
Helium	ND	0.050	1	01/19/2017 11:42

 Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/20/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %

### Light Gases

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5	1701626-001A	SoilGas	01/13/2017 12:00	GC26	132973

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.11	24.13	AK

Analytes	Result	RL	DF	Date Analyzed
Carbon Dioxide	0.067	0.0040	1	01/20/2017 10:50
Methane	0.00068	0.00020	1	01/20/2017 10:50

SV-1-5 TO-17 Summa	1701626-001B	SoilGas	01/13/2017 12:00	GC26	132973
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Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.40	24.77	AK

Analytes	Result	RL	DF	Date Analyzed
Carbon Dioxide	0.066	0.0040	1	01/20/2017 14:01
Methane	0.00069	0.00020	1	01/20/2017 14:01

SV-1-3	1701626-002A	SoilGas	01/13/2017 12:00	GC26	132973
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Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.73	25.40	AK

Analytes	Result	RL	DF	Date Analyzed
Carbon Dioxide	0.015	0.0040	1	01/20/2017 11:11
Methane	0.00028	0.00020	1	01/20/2017 11:11

(Cont.)

Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/20/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %

### Light Gases

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3 TO-17 Summa	1701626-002B	SoilGas	01/13/2017 12:00	GC26	132973

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.07	24.12	AK

Analytes	Result	RL	DF	Date Analyzed
Carbon Dioxide	0.0094	0.0040	1	01/20/2017 14:22
Methane	0.00026	0.00020	1	01/20/2017 14:22

SV-2-5	1701626-003A	SoilGas	01/13/2017 12:00	GC26	132973
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Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.13	24.22	AK

Analytes	Result	RL	DF	Date Analyzed
Carbon Dioxide	0.033	0.0040	1	01/20/2017 11:33
Methane	0.00069	0.00020	1	01/20/2017 11:33

SV-2-5 TO-17 Summa	1701626-003B	SoilGas	01/13/2017 12:00	GC26	132973
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Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
11.98	23.87	AK

Analytes	Result	RL	DF	Date Analyzed
Carbon Dioxide	0.037	0.0040	1	01/20/2017 14:44
Methane	0.00022	0.00020	1	01/20/2017 14:44

 Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5	1701626-001A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.11	24.13	AK

Analytes	Result	RL	DF	Date Analyzed
Acetone	180	60	1	01/24/2017 00:11
Acrolein	ND	5.8	1	01/24/2017 00:11
Acrylonitrile	ND	1.1	1	01/24/2017 00:11
tert-Amyl methyl ether (TAME)	ND	2.1	1	01/24/2017 00:11
Benzene	73	1.6	1	01/24/2017 00:11
Benzyl chloride	ND	2.6	1	01/24/2017 00:11
Bromodichloromethane	ND	3.5	1	01/24/2017 00:11
Bromoform	ND	5.2	1	01/24/2017 00:11
Bromomethane	ND	2.0	1	01/24/2017 00:11
1,3-Butadiene	ND	1.1	1	01/24/2017 00:11
2-Butanone (MEK)	120	75	1	01/24/2017 00:11
t-Butyl alcohol (TBA)	ND	31	1	01/24/2017 00:11
Carbon Disulfide	15	1.6	1	01/24/2017 00:11
Carbon Tetrachloride	ND	3.2	1	01/24/2017 00:11
Chlorobenzene	ND	2.4	1	01/24/2017 00:11
Chloroethane	ND	1.3	1	01/24/2017 00:11
Chloroform	ND	2.4	1	01/24/2017 00:11
Chloromethane	ND	1.0	1	01/24/2017 00:11
Cyclohexane	30	18	1	01/24/2017 00:11
Dibromochloromethane	ND	4.4	1	01/24/2017 00:11
1,2-Dibromo-3-chloropropane	ND	0.12	1	01/24/2017 00:11
1,2-Dibromoethane (EDB)	ND	3.9	1	01/24/2017 00:11
1,2-Dichlorobenzene	ND	3.0	1	01/24/2017 00:11
1,3-Dichlorobenzene	ND	3.0	1	01/24/2017 00:11
1,4-Dichlorobenzene	ND	3.0	1	01/24/2017 00:11
Dichlorodifluoromethane	2.7	2.5	1	01/24/2017 00:11
1,1-Dichloroethane	ND	2.0	1	01/24/2017 00:11
1,2-Dichloroethane (1,2-DCA)	ND	2.0	1	01/24/2017 00:11
1,1-Dichloroethene	ND	2.0	1	01/24/2017 00:11
cis-1,2-Dichloroethene	ND	2.0	1	01/24/2017 00:11
trans-1,2-Dichloroethene	ND	2.0	1	01/24/2017 00:11
1,2-Dichloropropane	ND	2.4	1	01/24/2017 00:11
cis-1,3-Dichloropropene	ND	2.3	1	01/24/2017 00:11
trans-1,3-Dichloropropene	ND	2.3	1	01/24/2017 00:11

(Cont.)

 Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5	1701626-001A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.11	24.13	AK

Analytes	Result	RL	DF	Date Analyzed
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	3.6	1	01/24/2017 00:11
Diisopropyl ether (DIPE)	ND	2.1	1	01/24/2017 00:11
1,4-Dioxane	ND	1.8	1	01/24/2017 00:11
Ethanol	ND	96	1	01/24/2017 00:11
Ethyl acetate	ND	1.8	1	01/24/2017 00:11
Ethyl tert-butyl ether (ETBE)	ND	2.1	1	01/24/2017 00:11
Ethylbenzene	<b>18</b>	2.2	1	01/24/2017 00:11
4-Ethyltoluene	<b>4.8</b>	2.5	1	01/24/2017 00:11
Freon 113	ND	3.9	1	01/24/2017 00:11
Heptane	<b>34</b>	21	1	01/24/2017 00:11
Hexachlorobutadiene	ND	5.4	1	01/24/2017 00:11
Hexane	<b>57</b>	18	1	01/24/2017 00:11
2-Hexanone	<b>11</b>	2.1	1	01/24/2017 00:11
4-Methyl-2-pentanone (MIBK)	<b>10</b>	2.1	1	01/24/2017 00:11
Methyl-t-butyl ether (MTBE)	ND	1.8	1	01/24/2017 00:11
Methylene chloride	ND	8.8	1	01/24/2017 00:11
Methyl methacrylate	ND	2.1	1	01/24/2017 00:11
Naphthalene	ND	5.3	1	01/24/2017 00:11
Propene	ND	880	10	01/23/2017 18:58
Styrene	<b>14</b>	2.2	1	01/24/2017 00:11
1,1,1,2-Tetrachloroethane	ND	3.5	1	01/24/2017 00:11
1,1,2,2-Tetrachloroethane	ND	3.5	1	01/24/2017 00:11
Tetrachloroethene	ND	3.4	1	01/24/2017 00:11
Tetrahydrofuran	ND	3.0	1	01/24/2017 00:11
Toluene	<b>71</b>	1.9	1	01/24/2017 00:11
1,2,4-Trichlorobenzene	ND	3.8	1	01/24/2017 00:11
1,1,1-Trichloroethane	ND	2.8	1	01/24/2017 00:11
1,1,2-Trichloroethane	ND	2.8	1	01/24/2017 00:11
Trichloroethene	ND	2.8	1	01/24/2017 00:11
Trichlorofluoromethane	ND	2.8	1	01/24/2017 00:11
1,2,4-Trimethylbenzene	<b>7.1</b>	2.5	1	01/24/2017 00:11
1,3,5-Trimethylbenzene	ND	2.5	1	01/24/2017 00:11
Vinyl Acetate	ND	18	1	01/24/2017 00:11
Vinyl Chloride	ND	1.3	1	01/24/2017 00:11

(Cont.)

 Angela Rydelius, Lab Manager



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5	1701626-001A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.11	24.13	AK

Analytes	Result	RL	DF	Date Analyzed
Xylenes, Total	36	6.6	1	01/24/2017 00:11

Surrogates	REC (%)	Limits	Date Analyzed
1,2-DCA-d4	106	70-130	01/24/2017 00:11
Toluene-d8	107	70-130	01/24/2017 00:11
4-BFB	101	70-130	01/24/2017 00:11



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3	1701626-002A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.73	25.40	AK

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	60	1	01/24/2017 00:57
Acrolein	ND	5.8	1	01/24/2017 00:57
Acrylonitrile	ND	1.1	1	01/24/2017 00:57
tert-Amyl methyl ether (TAME)	ND	2.1	1	01/24/2017 00:57
Benzene	5.0	1.6	1	01/24/2017 00:57
Benzyl chloride	ND	2.6	1	01/24/2017 00:57
Bromodichloromethane	19	3.5	1	01/24/2017 00:57
Bromoform	ND	5.2	1	01/24/2017 00:57
Bromomethane	ND	2.0	1	01/24/2017 00:57
1,3-Butadiene	ND	1.1	1	01/24/2017 00:57
2-Butanone (MEK)	ND	75	1	01/24/2017 00:57
t-Butyl alcohol (TBA)	ND	31	1	01/24/2017 00:57
Carbon Disulfide	10	1.6	1	01/24/2017 00:57
Carbon Tetrachloride	ND	3.2	1	01/24/2017 00:57
Chlorobenzene	ND	2.4	1	01/24/2017 00:57
Chloroethane	ND	1.3	1	01/24/2017 00:57
Chloroform	150	2.4	1	01/24/2017 00:57
Chloromethane	ND	1.0	1	01/24/2017 00:57
Cyclohexane	ND	18	1	01/24/2017 00:57
Dibromochloromethane	ND	4.4	1	01/24/2017 00:57
1,2-Dibromo-3-chloropropane	ND	0.12	1	01/24/2017 00:57
1,2-Dibromoethane (EDB)	ND	3.9	1	01/24/2017 00:57
1,2-Dichlorobenzene	ND	3.0	1	01/24/2017 00:57
1,3-Dichlorobenzene	ND	3.0	1	01/24/2017 00:57
1,4-Dichlorobenzene	ND	3.0	1	01/24/2017 00:57
Dichlorodifluoromethane	2.6	2.5	1	01/24/2017 00:57
1,1-Dichloroethane	ND	2.0	1	01/24/2017 00:57
1,2-Dichloroethane (1,2-DCA)	ND	2.0	1	01/24/2017 00:57
1,1-Dichloroethene	ND	2.0	1	01/24/2017 00:57
cis-1,2-Dichloroethene	ND	2.0	1	01/24/2017 00:57
trans-1,2-Dichloroethene	ND	2.0	1	01/24/2017 00:57
1,2-Dichloropropane	ND	2.4	1	01/24/2017 00:57
cis-1,3-Dichloropropene	ND	2.3	1	01/24/2017 00:57
trans-1,3-Dichloropropene	ND	2.3	1	01/24/2017 00:57

(Cont.)

 Angela Rydelius, Lab Manager





## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3	1701626-002A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.73	25.40	AK

Analytes	Result	RL	DF	Date Analyzed
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	3.6	1	01/24/2017 00:57
Diisopropyl ether (DIPE)	ND	2.1	1	01/24/2017 00:57
1,4-Dioxane	ND	1.8	1	01/24/2017 00:57
Ethanol	ND	96	1	01/24/2017 00:57
Ethyl acetate	ND	1.8	1	01/24/2017 00:57
Ethyl tert-butyl ether (ETBE)	ND	2.1	1	01/24/2017 00:57
Ethylbenzene	<b>4.8</b>	2.2	1	01/24/2017 00:57
4-Ethyltoluene	ND	2.5	1	01/24/2017 00:57
Freon 113	ND	3.9	1	01/24/2017 00:57
Heptane	<b>25</b>	21	1	01/24/2017 00:57
Hexachlorobutadiene	ND	5.4	1	01/24/2017 00:57
Hexane	<b>33</b>	18	1	01/24/2017 00:57
2-Hexanone	ND	2.1	1	01/24/2017 00:57
4-Methyl-2-pentanone (MIBK)	ND	2.1	1	01/24/2017 00:57
Methyl-t-butyl ether (MTBE)	ND	1.8	1	01/24/2017 00:57
Methylene chloride	ND	8.8	1	01/24/2017 00:57
Methyl methacrylate	ND	2.1	1	01/24/2017 00:57
Naphthalene	ND	5.3	1	01/24/2017 00:57
Propene	ND	88	1	01/24/2017 00:57
Styrene	<b>2.7</b>	2.2	1	01/24/2017 00:57
1,1,1,2-Tetrachloroethane	ND	3.5	1	01/24/2017 00:57
1,1,2,2-Tetrachloroethane	ND	3.5	1	01/24/2017 00:57
Tetrachloroethene	ND	3.4	1	01/24/2017 00:57
Tetrahydrofuran	ND	3.0	1	01/24/2017 00:57
Toluene	<b>120</b>	1.9	1	01/24/2017 00:57
1,2,4-Trichlorobenzene	ND	3.8	1	01/24/2017 00:57
1,1,1-Trichloroethane	ND	2.8	1	01/24/2017 00:57
1,1,2-Trichloroethane	ND	2.8	1	01/24/2017 00:57
Trichloroethene	ND	2.8	1	01/24/2017 00:57
Trichlorofluoromethane	ND	2.8	1	01/24/2017 00:57
1,2,4-Trimethylbenzene	<b>3.6</b>	2.5	1	01/24/2017 00:57
1,3,5-Trimethylbenzene	ND	2.5	1	01/24/2017 00:57
Vinyl Acetate	ND	18	1	01/24/2017 00:57
Vinyl Chloride	ND	1.3	1	01/24/2017 00:57

(Cont.)

 Angela Rydelius, Lab Manager



# Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m³

## Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3	1701626-002A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.73	25.40	AK

Analytes	Result	RL	DF	Date Analyzed
Xylenes, Total	23	6.6	1	01/24/2017 00:57

Surrogates	REC (%)	Limits	Date Analyzed
1,2-DCA-d4	95	70-130	01/24/2017 00:57
Toluene-d8	103	70-130	01/24/2017 00:57
4-BFB	99	70-130	01/24/2017 00:57



## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-2-5	1701626-003A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.13	24.22	AK

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	60	1	01/24/2017 01:43
Acrolein	ND	5.8	1	01/24/2017 01:43
Acrylonitrile	ND	1.1	1	01/24/2017 01:43
tert-Amyl methyl ether (TAME)	ND	2.1	1	01/24/2017 01:43
Benzene	17	1.6	1	01/24/2017 01:43
Benzyl chloride	ND	2.6	1	01/24/2017 01:43
Bromodichloromethane	ND	3.5	1	01/24/2017 01:43
Bromoform	ND	5.2	1	01/24/2017 01:43
Bromomethane	ND	2.0	1	01/24/2017 01:43
1,3-Butadiene	ND	1.1	1	01/24/2017 01:43
2-Butanone (MEK)	ND	75	1	01/24/2017 01:43
t-Butyl alcohol (TBA)	ND	31	1	01/24/2017 01:43
Carbon Disulfide	200	1.6	1	01/24/2017 01:43
Carbon Tetrachloride	ND	3.2	1	01/24/2017 01:43
Chlorobenzene	ND	2.4	1	01/24/2017 01:43
Chloroethane	ND	1.3	1	01/24/2017 01:43
Chloroform	31	2.4	1	01/24/2017 01:43
Chloromethane	ND	1.0	1	01/24/2017 01:43
Cyclohexane	35	18	1	01/24/2017 01:43
Dibromochloromethane	ND	4.4	1	01/24/2017 01:43
1,2-Dibromo-3-chloropropane	ND	0.12	1	01/24/2017 01:43
1,2-Dibromoethane (EDB)	ND	3.9	1	01/24/2017 01:43
1,2-Dichlorobenzene	ND	3.0	1	01/24/2017 01:43
1,3-Dichlorobenzene	ND	3.0	1	01/24/2017 01:43
1,4-Dichlorobenzene	ND	3.0	1	01/24/2017 01:43
Dichlorodifluoromethane	2.9	2.5	1	01/24/2017 01:43
1,1-Dichloroethane	ND	2.0	1	01/24/2017 01:43
1,2-Dichloroethane (1,2-DCA)	ND	2.0	1	01/24/2017 01:43
1,1-Dichloroethene	ND	2.0	1	01/24/2017 01:43
cis-1,2-Dichloroethene	ND	2.0	1	01/24/2017 01:43
trans-1,2-Dichloroethene	ND	2.0	1	01/24/2017 01:43
1,2-Dichloropropane	ND	2.4	1	01/24/2017 01:43
cis-1,3-Dichloropropene	ND	2.3	1	01/24/2017 01:43
trans-1,3-Dichloropropene	ND	2.3	1	01/24/2017 01:43

(Cont.)

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## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-2-5	1701626-003A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.13	24.22	AK

Analytes	Result	RL	DF	Date Analyzed
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	3.6	1	01/24/2017 01:43
Diisopropyl ether (DIPE)	ND	2.1	1	01/24/2017 01:43
1,4-Dioxane	ND	1.8	1	01/24/2017 01:43
Ethanol	ND	96	1	01/24/2017 01:43
Ethyl acetate	ND	1.8	1	01/24/2017 01:43
Ethyl tert-butyl ether (ETBE)	ND	2.1	1	01/24/2017 01:43
Ethylbenzene	6.0	2.2	1	01/24/2017 01:43
4-Ethyltoluene	3.0	2.5	1	01/24/2017 01:43
Freon 113	ND	3.9	1	01/24/2017 01:43
Heptane	45	21	1	01/24/2017 01:43
Hexachlorobutadiene	ND	5.4	1	01/24/2017 01:43
Hexane	430	18	1	01/24/2017 01:43
2-Hexanone	ND	2.1	1	01/24/2017 01:43
4-Methyl-2-pentanone (MIBK)	24	2.1	1	01/24/2017 01:43
Methyl-t-butyl ether (MTBE)	ND	1.8	1	01/24/2017 01:43
Methylene chloride	ND	8.8	1	01/24/2017 01:43
Methyl methacrylate	ND	2.1	1	01/24/2017 01:43
Naphthalene	ND	5.3	1	01/24/2017 01:43
Propene	210	88	1	01/24/2017 01:43
Styrene	3.4	2.2	1	01/24/2017 01:43
1,1,1,2-Tetrachloroethane	ND	3.5	1	01/24/2017 01:43
1,1,2,2-Tetrachloroethane	ND	3.5	1	01/24/2017 01:43
Tetrachloroethene	ND	3.4	1	01/24/2017 01:43
Tetrahydrofuran	4.8	3.0	1	01/24/2017 01:43
Toluene	96	1.9	1	01/24/2017 01:43
1,2,4-Trichlorobenzene	ND	3.8	1	01/24/2017 01:43
1,1,1-Trichloroethane	ND	2.8	1	01/24/2017 01:43
1,1,2-Trichloroethane	ND	2.8	1	01/24/2017 01:43
Trichloroethene	ND	2.8	1	01/24/2017 01:43
Trichlorofluoromethane	ND	2.8	1	01/24/2017 01:43
1,2,4-Trimethylbenzene	7.7	2.5	1	01/24/2017 01:43
1,3,5-Trimethylbenzene	2.6	2.5	1	01/24/2017 01:43
Vinyl Acetate	ND	18	1	01/24/2017 01:43
Vinyl Chloride	ND	1.3	1	01/24/2017 01:43

(Cont.)

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## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/23/17-1/24/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-2-5	1701626-003A	SoilGas	01/13/2017 12:00	GC29	133045

Initial Pressure (psia)	Final Pressure (psia)	Analyst(s)
12.13	24.22	AK

Analytes	Result	RL	DF	Date Analyzed
Xylenes, Total	28	6.6	1	01/24/2017 01:43
Surrogates	REC (%)	Limits		
1,2-DCA-d4	99	70-130		01/24/2017 01:43
Toluene-d8	101	70-130		01/24/2017 01:43
4-BFB	99	70-130		01/24/2017 01:43

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## Analytical Report

**Client:** Schutze & Associates, Inc.  
**Date Received:** 1/17/17 15:30  
**Date Prepared:** 1/19/17-1/23/17  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**Extraction Method:** TO17  
**Analytical Method:** TO17  
**Unit:** µg/m<sup>3</sup>

### Volatile Organic Compounds in µg/m<sup>3</sup>

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-5 Sorbent Tube	1701626-001C	SoilGas	01/13/2017 12:00	GC37	132978

Analytes	Result	RL	DF	Date Analyzed
Naphthalene	ND	2.7	1	01/19/2017 15:26

Surrogates	REC (%)	Limits	Date Analyzed
4-BFB	90	70-130	01/19/2017 15:26

**Analyst(s):** KBO **Analytical Comments:** a10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-1-3 Sorbent Tube	1701626-002C	SoilGas	01/13/2017 12:00	GC37	132978

Analytes	Result	RL	DF	Date Analyzed
Naphthalene	ND	3.0	1	01/19/2017 17:44

Surrogates	REC (%)	Limits	Date Analyzed
4-BFB	94	70-130	01/19/2017 17:44

**Analyst(s):** KBO **Analytical Comments:** a10

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
SV-2-5 Sorbent Tube	1701626-003C	SoilGas	01/13/2017 12:00	GC37	132978

Analytes	Result	RL	DF	Date Analyzed
Naphthalene	ND	2.7	1	01/23/2017 16:35

Surrogates	REC (%)	Limits	Date Analyzed
4-BFB	90	70-130	01/23/2017 16:35

**Analyst(s):** KBO **Analytical Comments:** a10,j1

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## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/20/17  
**Date Analyzed:** 1/20/17  
**Instrument:** GC26  
**Matrix:** SoilGas  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 132974  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %  
**Sample ID:** MB/LCS-132974

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### QC Summary Report for ASTM D1946-90

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Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Oxygen	ND	0.781	0.20	0.70	-	112	70-130

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QA/QC Officer



## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/19/17  
**Date Analyzed:** 1/19/17  
**Instrument:** GC26  
**Matrix:** Soilgas  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 132841  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %  
**Sample ID:** MB/LCS-132841

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### QC Summary Report for ASTM D1946-90

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Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Helium	ND	0.0836	0.025	0.10	-	84	60-140

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QA/QC Officer





## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/20/17  
**Date Analyzed:** 1/20/17  
**Instrument:** GC26  
**Matrix:** SoilGas  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 132973  
**Extraction Method:** ASTM D 1946-90  
**Analytical Method:** ASTM D 1946-90  
**Unit:** %  
**Sample ID:** MB/LCS-132973

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### QC Summary Report for ASTM D1946-90

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Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Carbon Dioxide	ND	0.00889	0.0020	0.010	-	89	70-130
Methane	ND	0.00820	0.00010	0.010	-	82	70-130

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QA/QC Officer



## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/23/17  
**Date Analyzed:** 1/23/17  
**Instrument:** GC29  
**Matrix:** SoilGas  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 133045  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>  
**Sample ID:** MB/LCS-133045

### QC Summary Report for TO15

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	66.4	30	60	-	111	60-140
Acrolein	ND	66.8	2.9	58.25	-	115	60-140
Acrylonitrile	ND	71.1	0.55	55	-	129	60-140
tert-Amyl methyl ether (TAME)	ND	131	1.0	105	-	125	60-140
Benzene	ND	97.2	0.80	80	-	122	60-140
Benzyl chloride	ND	175	1.3	132.5	-	132	60-140
Bromodichloromethane	ND	202	1.8	175	-	115	60-140
Bromoform	ND	348	2.6	262.5	-	133	60-140
Bromomethane	ND	79.7	1.0	97.5	-	82	60-140
1,3-Butadiene	ND	67.4	0.55	55	-	122	60-140
2-Butanone (MEK)	ND	90.8	38	75	-	121	60-140
t-Butyl alcohol (TBA)	ND	96.4	16	77.5	-	124	60-140
Carbon Disulfide	ND	88.1	0.80	80	-	110	60-140
Carbon Tetrachloride	ND	204	1.6	160	-	127	60-140
Chlorobenzene	ND	140	1.2	117.5	-	119	60-140
Chloroethane	ND	68.4	0.65	67.5	-	101	60-140
Chloroform	ND	135	1.2	122.5	-	110	60-140
Chloromethane	ND	59.0	0.50	52.5	-	112	60-140
Cyclohexane	ND	94.0	9.0	87.5	-	107	60-140
Dibromochloromethane	ND	284	2.2	217.5	-	130	60-140
1,2-Dibromo-3-chloropropane	ND	315	0.060	245	-	129	60-140
1,2-Dibromoethane (EDB)	ND	222	2.0	195	-	114	60-140
1,2-Dichlorobenzene	ND	185	1.5	152.5	-	121	60-140
1,3-Dichlorobenzene	ND	184	1.5	152.5	-	120	60-140
1,4-Dichlorobenzene	ND	184	1.5	152.5	-	121	60-140
Dichlorodifluoromethane	ND	148	1.2	125	-	118	60-140
1,1-Dichloroethane	ND	116	1.0	102.5	-	113	60-140
1,2-Dichloroethane (1,2-DCA)	ND	111	1.0	102.5	-	108	60-140
1,1-Dichloroethene	ND	106	1.0	100	-	106	60-140
cis-1,2-Dichloroethene	ND	114	1.0	100	-	115	60-140
trans-1,2-Dichloroethene	ND	114	1.0	100	-	114	60-140
1,2-Dichloropropane	ND	124	1.2	117.5	-	106	60-140
cis-1,3-Dichloropropene	ND	138	1.2	115	-	120	60-140
trans-1,3-Dichloropropene	ND	144	1.2	115	-	125	60-140
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	217	1.8	177.5	-	122	60-140
Diisopropyl ether (DIPE)	ND	122	1.0	105	-	116	60-140
1,4-Dioxane	ND	134	0.90	92.5	-	144, F2	60-140

(Cont.)

QA/QC Officer



## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/23/17  
**Date Analyzed:** 1/23/17  
**Instrument:** GC29  
**Matrix:** SoilGas  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 133045  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>  
**Sample ID:** MB/LCS-133045

### QC Summary Report for TO15

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Ethanol	ND	56.7	48	47.5	-	119	60-140
Ethyl acetate	ND	106	0.90	92.5	-	114	60-140
Ethyl tert-butyl ether (ETBE)	ND	127	1.0	105	-	121	60-140
Ethylbenzene	ND	128	1.1	110	-	116	60-140
4-Ethyltoluene	ND	154	1.2	125	-	123	60-140
Freon 113	ND	222	2.0	195	-	114	60-140
Heptane	ND	116	10	105	-	110	60-140
Hexachlorobutadiene	ND	355	2.7	270	-	132	60-140
Hexane	ND	101	9.0	90	-	112	60-140
2-Hexanone	ND	122	1.0	105	-	116	60-140
Isopropyl Alcohol	ND	73.4	25	62.5	-	117	60-140
4-Methyl-2-pentanone (MIBK)	ND	124	1.0	105	-	119	60-140
Methyl-t-butyl ether (MTBE)	ND	107	0.90	92.5	-	116	60-140
Methylene chloride	ND	96.5	4.4	87.5	-	110	60-140
Methyl methacrylate	ND	125	1.0	104	-	120	60-140
Naphthalene	ND	333	2.6	265	-	126	60-140
Propene	ND	41.2	44	42.5	-	97	60-140
Styrene	ND	130	1.1	107.5	-	120	60-140
1,1,1,2-Tetrachloroethane	ND	224	1.8	175	-	128	60-140
1,1,2,2-Tetrachloroethane	ND	203	1.8	175	-	116	60-140
Tetrachloroethene	ND	220	1.7	172	-	128	60-140
Tetrahydrofuran	ND	70.5	1.5	75	-	94	60-140
Toluene	ND	110	0.95	95	-	116	60-140
1,2,4-Trichlorobenzene	ND	249	1.9	187.5	-	133	60-140
1,1,1-Trichloroethane	ND	168	1.4	137.5	-	122	60-140
1,1,2-Trichloroethane	ND	159	1.4	137.5	-	116	60-140
Trichloroethene	ND	157	1.4	137.5	-	114	60-140
Trichlorofluoromethane	ND	172	1.4	142.5	-	121	60-140
1,2,4-Trimethylbenzene	ND	155	1.2	125	-	124	60-140
1,3,5-Trimethylbenzene	ND	150	1.2	125	-	120	60-140
Vinyl Acetate	ND	105	9.0	90	-	117	60-140
Vinyl Chloride	ND	75.3	0.65	65	-	116	60-140
Xylenes, Total	ND	396	3.3	330	-	120	60-140

(Cont.)

QA/QC Officer



## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/23/17  
**Date Analyzed:** 1/23/17  
**Instrument:** GC29  
**Matrix:** SoilGas  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 133045  
**Extraction Method:** TO15  
**Analytical Method:** TO15  
**Unit:** µg/m<sup>3</sup>  
**Sample ID:** MB/LCS-133045

### QC Summary Report for TO15

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
<b>Surrogate Recovery</b>							
1,2-DCA-d4	493.9	507		500	99	101	70-130
Toluene-d8	520.1	503		500	104	101	70-130
4-BFB	482.7	488		500	97	98	70-130

QA/QC Officer



## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/19/17  
**Date Analyzed:** 1/19/17  
**Instrument:** GC37  
**Matrix:** Sorbent Tube  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 132978  
**Extraction Method:** TO17  
**Analytical Method:** TO17  
**Unit:** µg/m<sup>3</sup>  
**Sample ID:** MB/LCS-132978

### QC Summary Report for TO17

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1,1-Trichloroethane	ND	55.8	2.0	50	-	112	60-140
1,1-Dichloroethane	ND	56.6	2.0	50	-	113	60-140
1,1-Dichloroethene	ND	55.1	2.0	50	-	110	60-140
1,1-Dichloropropene	ND	59.5	2.0	50	-	119	60-140
2,2-Dichloropropane	ND	57.5	2.0	50	-	115	60-140
2-Butanone (MEK)	ND	227	8.0	200	-	114	60-140
2-Hexanone	ND	56.4	2.0	50	-	113	60-140
4-Methyl-2-pentanone (MIBK)	ND	49.9	2.0	50	-	100	60-140
Acetone	ND	873	20	1000	-	87	60-140
Bromochloromethane	ND	57.8	2.0	50	-	116	60-140
Carbon Disulfide	ND	49.5	2.0	50	-	99	60-140
Carbon Tetrachloride	ND	57.6	2.0	50	-	115	60-140
Chloroform	ND	57.2	2.0	50	-	114	60-140
cis-1,2-Dichloroethene	ND	57.4	2.0	50	-	115	60-140
Dibromomethane	ND	57.3	2.0	50	-	115	60-140
Dichlorodifluoromethane	ND	50.5	2.0	50	-	101	60-140
Diisopropyl ether (DIPE)	ND	53.4	2.0	50	-	107	60-140
Ethyl tert-butyl ether (ETBE)	ND	59.3	2.0	50	-	119	60-140
Methylene chloride	ND	45.2	2.0	50	-	90	60-140
n-Butyl benzene	ND	54.6	2.0	50	-	109	60-140
t-Butyl alcohol (TBA)	ND	235	8.0	200	-	117	60-140
tert-Amyl methyl ether (TAME)	ND	56.8	2.0	50	-	114	60-140
Tetrahydrofuran	ND	403	2.0	500	-	81	60-140
trans-1,2-Dichloroethene	ND	51.5	2.0	50	-	103	60-140
Trichlorofluoromethane	ND	41.9	2.0	50	-	84	60-140
Benzene	ND	55.2	2.0	50	-	110	60-140
Bromobenzene	ND	55.6	2.0	50	-	111	60-140
Bromodichloromethane	ND	56.6	2.0	50	-	113	60-140
Bromoform	ND	61.0	2.0	50	-	122	60-140
sec-Butyl benzene	ND	56.8	2.0	50	-	114	60-140
tert-Butyl benzene	ND	55.7	2.0	50	-	111	60-140
Chlorobenzene	ND	55.8	2.0	50	-	112	60-140
2-Chlorotoluene	ND	53.9	2.0	50	-	108	60-140
4-Chlorotoluene	ND	56.2	2.0	50	-	112	60-140
Dibromochloromethane	ND	59.3	2.0	50	-	119	60-140
1,2-Dibromo-3-chloropropane	ND	24.7	2.0	20	-	124	60-140
1,2-Dibromoethane (EDB)	ND	56.0	2.0	50	-	112	60-140

(Cont.)

QA/QC Officer



## Quality Control Report

**Client:** Schutze & Associates, Inc.  
**Date Prepared:** 1/19/17  
**Date Analyzed:** 1/19/17  
**Instrument:** GC37  
**Matrix:** Sorbent Tube  
**Project:** Tung/SCS539

**WorkOrder:** 1701626  
**BatchID:** 132978  
**Extraction Method:** TO17  
**Analytical Method:** TO17  
**Unit:** µg/m<sup>3</sup>  
**Sample ID:** MB/LCS-132978

### QC Summary Report for TO17

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,2-Dichlorobenzene	ND	54.3	2.0	50	-	109	60-140
1,3-Dichlorobenzene	ND	56.2	2.0	50	-	112	60-140
1,4-Dichlorobenzene	ND	55.4	2.0	50	-	111	60-140
1,2-Dichloroethane (1,2-DCA)	ND	57.1	2.0	50	-	114	60-140
1,2-Dichloropropane	ND	56.1	2.0	50	-	112	60-140
1,3-Dichloropropane	ND	56.9	2.0	50	-	114	60-140
cis-1,3-Dichloropropene	ND	58.5	2.0	50	-	117	60-140
trans-1,3-Dichloropropene	ND	61.3	2.0	50	-	123	60-140
Ethylbenzene	ND	56.0	2.0	50	-	112	60-140
Hexachlorobutadiene	ND	54.0	2.0	50	-	108	60-140
Isopropylbenzene	ND	49.9	2.0	50	-	100	60-140
4-Isopropyl toluene	ND	56.4	2.0	50	-	113	60-140
Methyl-t-butyl ether (MTBE)	ND	53.4	2.0	50	-	107	60-140
Naphthalene	ND	56.6	2.0	50	-	113	60-140
n-Propyl benzene	ND	56.7	2.0	50	-	113	60-140
Styrene	ND	56.8	2.0	50	-	114	60-140
1,1,1,2-Tetrachloroethane	ND	56.8	2.0	50	-	114	60-140
1,1,2,2-Tetrachloroethane	ND	55.1	2.0	50	-	110	60-140
Tetrachloroethene	ND	56.6	2.0	50	-	113	60-140
Toluene	ND	56.2	2.0	50	-	112	60-140
1,2,3-Trichlorobenzene	ND	54.0	2.0	50	-	108	60-140
1,2,4-Trichlorobenzene	ND	54.6	2.0	50	-	109	60-140
1,1,2-Trichloroethane	ND	53.7	2.0	50	-	107	60-140
Trichloroethene	ND	51.9	2.0	50	-	104	60-140
1,2,3-Trichloropropane	ND	56.7	2.0	50	-	113	60-140
1,2,4-Trimethylbenzene	ND	56.1	2.0	50	-	112	60-140
1,3,5-Trimethylbenzene	ND	57.3	2.0	50	-	115	60-140
Xylenes, Total	ND	167	6.0	150	-	112	60-140
<b>Surrogate Recovery</b>							
toluene-d8	100.1	97.4		100	100	97	70-130
4-BFB	104.7	100		100	105	100	70-130

1534 Willow Pass Rd  
Pittsburg, CA 94565-1701  
(925) 252-9262

# CHAIN-OF-CUSTODY RECORD

WorkOrder: 1701626

ClientCode: SCO

WaterTrax    WriteOn    EDF    Excel    EQulS    Email    HardCopy    ThirdParty    J-flag

**Report to:**

Kevin Loeb  
Schutze & Associates, Inc.  
44358 South Grimmer Blvd  
Fremont, CA 94538  
(510) 226-9944   FAX: (510) 625-8176

Email: kevin@schutze-inc.com; js@schutze-inc.co  
cc/3rd Party:  
PO:  
ProjectNo: Tung/SCS539

**Bill to:**

Accounts Payable  
Schutze & Associates, Inc.  
44358 South Grimmer Blvd  
Fremont, CA 94538  
priscillajazz@yahoo.com

**Requested TAT: 5 days;**

**Date Received: 01/17/2017**

**Date Logged: 01/17/2017**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1701626-001	SV-1-5	SoilGas	1/13/2017 12:00	<input type="checkbox"/>	A	A	A	A	A	A						
1701626-001	SV-1-5 Sorbent Tube	SoilGas	1/13/2017 12:00	<input type="checkbox"/>								C				
1701626-001	SV-1-5 TO-17 Summa	SoilGas	1/13/2017 12:00	<input type="checkbox"/>		B		B								
1701626-002	SV-1-3	SoilGas	1/13/2017 12:00	<input type="checkbox"/>	A	A	A	A	A	A						
1701626-002	SV-1-3 Sorbent Tube	SoilGas	1/13/2017 12:00	<input type="checkbox"/>								C				
1701626-002	SV-1-3 TO-17 Summa	SoilGas	1/13/2017 12:00	<input type="checkbox"/>		B		B								
1701626-003	SV-2-5	SoilGas	1/13/2017 12:00	<input type="checkbox"/>	A	A	A	A	A	A						
1701626-003	SV-2-5 Sorbent Tube	SoilGas	1/13/2017 12:00	<input type="checkbox"/>								C				
1701626-003	SV-2-5 TO-17 Summa	SoilGas	1/13/2017 12:00	<input type="checkbox"/>		B		B								

**Test Legend:**

1	ATMOSPHERICGAS_SG(%)	2	HELIUM_LC_SOILGAS(%)	3	LG_SUMMA_SOILGAS(%)	4	PRHELIUM SHROUD
5	TO15_Scan-SIM_SOIL(UG/M3)	6	TO15-8260_SOIL(UG/M3)	7	TO17VOC_ST(UGM3)	8	
9		10		11		12	

**Prepared by: Jena Alfaro**

The following SamplIDs: 001A, 002A, 003A contain testgroup TO15He\_O2\_CO2\_Ch4\_SG.

**Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days). Hazardous samples will be returned to client or disposed of at client expense.



### WORK ORDER SUMMARY

**Client Name:** SCHUTZE & ASSOCIATES, INC.

**Project:** Tung/SCS539

**Work Order:** 1701626

**Client Contact:** Kevin Loeb

**QC Level:** LEVEL 2

**Contact's Email:** kevin@schutze-inc.com; js@schutze-inc.com; Mari@schutze-inc.com;

**Comments:**

**Date Logged:** 1/17/2017

WaterTrax     WriteOn     EDF     Excel     Fax     Email     HardCopy     ThirdParty     J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1701626-001A	SV-1-5	SoilGas	TO15 w/ Helium, O2, CO2 and Methane	1	1L Summa	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-001B	SV-1-5 TO-17 Summa	SoilGas	ASTM D1946-90 (Helium)	1	1L Summa	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-001C	SV-1-5 Sorbent Tube	SoilGas	TO17 (VOCs) (µg/m³) <Naphthalene>	1	Sorbent Tube	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-002A	SV-1-3	SoilGas	TO15 w/ Helium, O2, CO2 and Methane	1	1L Summa	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-002B	SV-1-3 TO-17 Summa	SoilGas	ASTM D1946-90 (Helium)	1	1L Summa	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-002C	SV-1-3 Sorbent Tube	SoilGas	TO17 (VOCs) (µg/m³) <Naphthalene>	1	Sorbent Tube	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-003A	SV-2-5	SoilGas	TO15 w/ Helium, O2, CO2 and Methane	1	1L Summa	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-003B	SV-2-5 TO-17 Summa	SoilGas	ASTM D1946-90 (Helium)	1	1L Summa	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	
1701626-003C	SV-2-5 Sorbent Tube	SoilGas	TO17 (VOCs) (µg/m³) <Naphthalene>	1	Sorbent Tube	<input type="checkbox"/>	1/13/2017 12:00	5 days		<input type="checkbox"/>	

**NOTES:** - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.





### McCAMPBELL ANALYTICAL, INC.

1534 Willow Pass Rd. Pittsburg, Ca. 94565-1701  
 Telephone: (877) 252-9262 / Fax: (925) 252-9269

[www.mcccampbell.com](http://www.mcccampbell.com) [main@mcccampbell.com](mailto:main@mcccampbell.com)

### CHAIN OF CUSTODY RECORD

Turn Around Time: 1 Day Rush	2 Day Rush	3 Day Rush	STD	<input checked="" type="checkbox"/>	Quote #
J-Flag / MDL	ESL	Cleanup Approved	Bottle Order #		
Delivery Format: GeoTracker EDF	PDF	EDD	Write On (DW)	EQuIS	

Report To: Kevin Loeb Bill To:

Company: Schutze & Assoc.

Email:

Email: Tele: 510-226-9944

Project Name/ #: Tung/SC5539

Project Location: 1607 2nd Ave, Oakland PO #

Sampler Signature: [Signature]

#### Analysis Requested

SAMPLE ID Location / Field Point	Sampling Start		End	Canister SN#	Sample Kit / Manifold # ST=Seibert Tube	VOCs TO-15 (µg/m³) - See Notes	8010 by TO-15 (µg/m³)	TPH(g) (µg/m³)	LEED: (inc. 4PCH, Formaldehyde, CO, Total VOCs)	Fixed Gas (CO₂, Methane, Ethane, Ethylene, Acetylene, Propane, CO) %	Fixed Gas: (O₂, N₂) %	API: Aliphatic and/or Aromatic (circle one) µg/m³	Helium Leak Check %	Leak Check (IPA, Norflorane, 1,1-difluoroethane) µg/m³	TO17 (Naphthalene)	Matrix		Canister Pressure / Vacuum		
	Date	Time	Time													Soilgas	Indoor Air	Initial	Final	
SU-1-5	1/13	12:00		7521-869	316T-1315	X					X	X	X	X		X			-27	-4
				7525-873	ST= G0148983						X		X	X		X			-25	-3
SU-1-3"				0885-2513	316-1338	X					X		X	X		X			-29	-3
				6171-757	ST= G0149907						X		X	X		X			-25	-5
SU-2-5				1990-1938	316T-1309	X					X		X	X		X			-30	-4
				7508-856	ST= G0148929						X		X	X		X			-25	-
No Nitrogen analysis due to He leak check																				

Helium Shroud SN#

Leak Check Default is IPA

Notes: Please specify units if different than default: VOCs is reported in µg/m³, fixed is reported in %.

\*\*MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate \$250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time	Comments / Instructions
<u>Mari Chirri</u>	1-17-17	955	<u>[Signature]</u>	1-17-17	955	X No Samples Labeled. Confirmed via canister IDs
<u>[Signature]</u>	1-17-17	1530	<u>[Signature]</u>	1-17-17	1530	



### Sample Receipt Checklist

Client Name: **Schutze & Associates, Inc.**  
 Project Name: **Tung/SCS539**

Date and Time Received: **1/17/2017 15:30**  
 Date Logged: **1/17/2017**  
 Received by: **Jena Alfaro**  
 Logged by: **Jena Alfaro**

WorkOrder No: **1701626** Matrix: SoilGas  
 Carrier: David Shaver (MAI Courier)

#### Chain of Custody (COC) Information

Chain of custody present? Yes  No   
 Chain of custody signed when relinquished and received? Yes  No   
 Chain of custody agrees with sample labels? Yes  No   
 Sample IDs noted by Client on COC? Yes  No   
 Date and Time of collection noted by Client on COC? Yes  No   
 Sampler's name noted on COC? Yes  No

#### Sample Receipt Information

Custody seals intact on shipping container/cooler? Yes  No  NA   
 Shipping container/cooler in good condition? Yes  No   
 Samples in proper containers/bottles? Yes  No   
 Sample containers intact? Yes  No   
 Sufficient sample volume for indicated test? Yes  No

#### Sample Preservation and Hold Time (HT) Information

All samples received within holding time? Yes  No  NA   
 Sample/Temp Blank temperature Temp: NA   
 Water - VOA vials have zero headspace / no bubbles? Yes  No  NA   
 Sample labels checked for correct preservation? Yes  No   
 pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)? Yes  No  NA   
 Samples Received on Ice? Yes  No

#### UCMR3 Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522? Yes  No  NA   
 Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539? Yes  No  NA

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 Comments: