



November 6, 2020

# Occupational Exposure Assessment Report: Respirable Crystalline Silica

**Pleasant Grove WWTP Energy  
Recovery Project  
5051 West Park Drive  
Roseville, CA 95747**

Prepared for:

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FACS Project #PJ60649

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## Executive Summary

Personal air monitoring for respirable dust and crystalline silica (quartz, cristobalite, and tridymite) was performed on Townsend & Schmidt Masonry employees at the Pleasant Grove Wastewater Treatment Plant Energy Recovery project site located at 5051 West Park Drive in Roseville, California while performing various masonry work. Monitoring was performed on October 7, 2020.

Results of personal breathing zone samples collected on October 7, 2020 indicate that full-shift worker exposures to respirable dust did not exceed the California Division of Occupational Safety and Health (Cal/OSHA) Permissible Exposure Limit (PEL) of 5 milligrams per cubic meter of air.

Results of personal breathing zone samples collected on October 7, 2020 indicate that full-shift worker exposures to respirable crystalline silica did not exceed the Cal/OSHA Action Level of 25 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) or PEL of 50  $\mu\text{g}/\text{m}^3$  during the masonry tasks monitored.

Based on the results of this survey, respiratory protection is not required at this time; however, those who are expected to be exposed to levels at or above the Action Level are required to follow requirements listed in the standard (Title 8 California Code of Regulations Section 1532.3). A more detailed discussion of assessment findings, conclusions, and recommendations is provided below.



## Introduction

Forensic Analytical Consulting Services, Inc. (FACS) was retained by Townsend & Schmidt Masonry to perform personal air monitoring for respirable dust and crystalline silica on Townsend & Schmidt Masonry employees at the Pleasant Grove Waste Water Treatment Plant (WWTP) Energy Recovery project site located at 5051 West Park Drive in Roseville, California while performing various masonry work. Occupational exposure to respirable crystalline silica was evaluated for:

- Mason 1; work shift was from 0700 hours to 1530 hours
- Mason 2; work shift was from 0700 hours to 1530 hours
- Mason 3; work shift was from 0700 hours to 1530 hours

The purpose of this investigation was to 1) characterize airborne dust concentrations by conducting sampling for respirable crystalline silica generated during masonry work tasks performed at the project site; 2) provide information for consideration in assessing risk to workers; and 3) provide recommendations for further assessment or controls, as necessary.

This report contains findings and recommendations from the assessment, as well as a description of methods used, and activities conducted during the exposure assessment process. The assessment was conducted by Ms. Alla Vyshnevskaya, Industrial Hygiene Technician from FACS on October 7, 2020.

The findings contained in this report are based solely on the results of sample analysis and on-site observations from the assessment date listed. Additional sites or agents not discussed in this report are not represented.

Sample results (summary tables, laboratory reports, and chain of custody forms) are presented in Appendix A. Data collection methodologies are described in Appendix B. A description of the applicable exposure limits is provided in Appendix C and representative photographs are provided in Appendix D.

## Scope of Work

At the request of the client, FACS conducted exposure monitoring for respirable crystalline silica for four (4) employees working at the Pleasant Grove WWTP Energy Recovery project site. The samples were collected during what was reported to be a typical workload.

In the course of this project, FACS conducted the following scope of work:

- Development of a site characterization (see section above).
- Evaluation of work tasks, including review of engineering controls, administrative controls, and personal protective equipment on site.
- Collection of personal air samples for respirable dust and crystalline silica.

Results of laboratory analysis of the samples were compared to occupational exposure limits established by the California Division of Occupational Safety and Health (Title 8 California Code of Regulations Section 1532.3). The results of the air monitoring and calculated time-weighted average (TWA) concentrations are provided in Table 1 and Table 2.

## Site and Process Characterization

The following information was gathered onsite and during conversations with the onsite staff.

### General Observations

Townsend & Schmidt Masonry is a masonry company specializing in brick, stone, block and thin brick veneer construction. The assessment was performed at the Pleasant Grove WWTP Energy Recovery project site in Roseville, California. The assessment was performed during construction of a concrete masonry unit (CMU) building at the project site. FACS evaluated the following tasks involved in the process:

- Saw cutting of CMU blocks
- Laying CMU blocks
- Drilling and core drilling of CMU blocks
- Mixing mortar
- Other general masonry tasks

All previously noted tasks were performed outdoors.

**Mason 1 (M1)** conducted saw cutting activities, as well as other general masonry tasks on the day of the exposure assessment. Saw cutting activities were performed for approximately two (2) hours of the employees eight-hour work shift. Saw cutting activities were performed using a concrete masonry saw with a 20" blade and custom-built rack, equipped with an iQ PowerTools iQ2000 Dust Collector. Moderate airborne dust was observed to be generated during saw cutting. Dust created by saw cutting appeared to be captured at the source and drawn away from the employee's breathing zone and into the dust collector filter. Periodically, the saw was powered off and M1 manually cleaned the filters by shaking the filter bank while the doors were closed. This shaking operation deposited dust into the dust tray below the filter.

Other general masonry tasks performed by M1 included operating a Grendall Pneumatic Telehandler machine to deliver rebar and other supplies to the new building construction site. Additionally, M1 was observed inputting and aligning the rebar inside the CMU block wall.

Personal protective equipment used by M1 on the day of FACS' assessment included work boots, hard hat, safety vest, safety glasses, work gloves, and a disposable N-95 facepiece respirator.

**Mason 2 (M2) and Mason 3 (M3)** performed CMU block laying activities along with other general masonry tasks for the majority of their shift. CMU block laying was performed by pushing the blocks into the mortar bed applied to the previous course of CMU blocks using a masonry brick trowel, ensuring that the block was level and properly aligned. The masons then trimmed and removed the excess mortar. Mason line was used as a guide for the remaining CMU blocks in each course. Minimal airborne dust was observed to be generated during the block laying activities.

Personal protective equipment used by M2 and M3 on the day of FACS' assessment included work boots, safety vest, hard hat, and safety glasses.

**Mason 4 (M4)** performed the following activities on the day of FACS' exposure assessment:

- Bending of rebar
- Mixing mortar

- Drilling / core drilling
- Saw cutting

Bending of rebars was performed utilizing a portable Diamond Rebar Bender, manufactured by Benner Nawman, and was observed performed intermittently throughout the day.

Mortar mixing was performed at a mixer. Approximately three (3) bags of AMERIMIX Preblended Water Repellent Mortar (AMX 410 WRM / AMX510 WRM, Type S) were used during the mortar mixing event. Heavy airborne dust was observed to be generated during the mixing of mortar. Water was not observed to be used for dust control during the mortar mixing activities. Per the product safety data sheet (SDS) retrieved by FACS from the AMERIMIX website, this mortar contains between 60-100% of quartz.

CMU block drilling and core drilling tasks were performed by M4 for 15-20 minutes approximately three times throughout the shift, for a combined total of approximately 50 minutes. Drilling was performed at ground level. Drilling and core drilling activities were performed using a HILTI TE70-ATC corded rotary hammer drill with a long masonry drill bit and a Makita core drill with a four-inch drill bit, respectively, with a BOSCH High Efficiency Particulate Air (HEPA) vacuum attached to both drills to capture generated dust. Moderate airborne dust was observed to be generated during these work tasks. The generated dust did not visually reach the employee's breathing zone during the CMU block drilling task as the drilling was performed by M4 at or near the ground level while using a rotary hammer drill with a long masonry drill bit. Furthermore, the attached HEPA vacuum was observed to capture the generated dust at or near the drilling source.

Saw cutting activities were performed by M4 for approximately one (1) hour of the employees eight-hour work shift. Saw cutting activities were performed using a concrete masonry saw with a 20" blade and custom-built rack, equipped with an iQ PowerTools iQ2000 Dust Collector. Moderate airborne dust was observed to be generated during saw cutting. Dust created by saw cutting appeared to be captured at the source and drawn away from the employee's breathing zone and into the dust collector filter.

Personal protective equipment used by M4 on the day of FACS' assessment included work boots, safety vest, hard hat, and safety glasses. M4 was observed wearing a disposable N-95 facepiece respirator in addition to the previously described personal protective equipment during the drilling and core drilling tasks.

See Appendix D for photographs of tasks noted above.

## Data Summary and Analysis

### Time Weighted Average (TWA) Exposure Calculation

Occupational exposures are generally represented as a time weighted average (TWA), which is the average exposure concentration across the time period evaluated. Occupational exposure limits (OELs) are typically given as an 8-hour TWA, which represents the maximum average concentration a worker should be exposed to over an 8-hour workday.

Full-task sampling was performed during this assessment to determine exposures to respirable crystalline silica during the tasks involved in CMU core drilling, saw cutting, mixing of mortar, CMU block laying, and other general masonry task performance. The TWA concentration for a full shift was calculated assuming there was no additional exposure to respirable crystalline silica during the part of the shift that was not monitored.

## General Dust

Respirable dust samples were initially analyzed gravimetrically for general dust by National Institute of Occupational Safety and Health (NIOSH) Method 0600. The PELs for “Particulates Not Otherwise Regulated” are only applicable if crystalline silica is not detected in the samples. Based on the sample results, crystalline silica is an ingredient in the materials worked on during the day of the assessment, and therefore the crystalline silica standards would apply to all samples collected; even those identified as below the laboratory’s limit of detection.

## Crystalline Silica

Following the gravimetric analysis, the air samples were further analyzed for crystalline silica by NIOSH Method 7500.

The Cal/OSHA standard for crystalline silica (Title 8 CCR 1532.3) regulates the maximum permitted 8-hour time-weighted-average concentration of airborne respirable quartz, cristobalite, and tridymite. When exposures are found or are expected to exceed allowable levels, additional measures, to control such harmful exposures (e.g. respiratory protection) shall be instituted.

## Direct Comparison to Cal/OSHA PELs

Measured exposure levels were compared to the regulatory OELs established by Cal/OSHA. Sample results for 8-hour TWA respirable dust and crystalline silica are provided in Tables 1 and 2 in Appendix A, respectively. A summary of regulatory OELs established by Cal/OSHA is provided in Appendix C.

## Findings and Conclusions

Based on this assessment, the following conclusions were reached regarding the Townsend & Schmidt Masonry employee exposures to respirable crystalline silica at the Pleasant Grove WWTP Energy Recovery Project

1. The calculated 8hr TWA results of personal air samples collected for crystalline silica indicate that employee exposures were below the regulatory exposure limits (Cal/OSHA PEL and Action Level).
2. The employees monitored were observed wearing the following PPE:
  - M1 – work boots, safety vest, hard hat, safety glasses, work gloves, and a disposable N-95 respirator.
  - M2 and M3 – work boots, hard hat, safety vest, and safety glasses.
  - M4 – work boots, hard hat, safety vest, safety glasses, and a disposable N-95 respirator.

## Requirements and Recommendations

Based on this assessment, the following recommendations are provided:

1. Continue the use of exposure controls already in place during all dust generating activities known or suspected to contain crystalline silica. Such controls include the use of a dust collector on the saw and a HEPA vacuum attachment on the rotary hammer drill and core drill.
2. Consider additional dust control methods during the mortar mixing operation to reduce visible dust and further reduce employee exposures to respirable crystalline silica.
3. Consider positioning the mortar mixer so that the employee performing the mortar mixing task is standing upwind in order to further reduce their exposure to respirable crystalline silica.
4. Notify all affected employees of the monitoring results within 15 days of receiving this report either individually in writing or by posting the results in an appropriate location that is accessible to employees.
5. Make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in Title 8 CCR Section 1532.3.
6. Retain a copy of this report for 30 years.

## Limitations

This investigation is limited to the conditions and practices observed and information made available to FACS. The methods, conclusions and recommendations provided are based on FACS' judgment, expertise and the standard of practice for professional service. They are subject to the limitations and variability inherent in the methodology employed. As with all environmental investigations, this investigation is limited to the defined scope and does not purport to set forth all hazards, nor indicate that other hazards do not exist.

Please do not hesitate to contact our offices at 916-726-1303 with any questions or concerns. Thank you for the opportunity to assist Townsend & Schmidt Masonry in promoting a more healthful environment.

Respectfully,

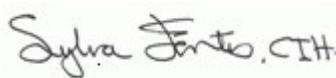
FORENSIC ANALYTICAL



Diana Lutsik  
Project Manager

Reviewed by:

FORENSIC ANALYTICAL



Sylvia Fontes, MS, CIH  
Director, Sacramento



## Appendix A

# Sampling Results Summary and Laboratory Report

**Table 1: Sampling Results Summary for Respirable Dust**

Townsend & Schmidt Masonry – Pleasant Grove WWTP Energy Recovery Project Assessment Date: October 7, 2020					
Sample ID	Employee	Work Task Description	Sample Duration (min.)	Respirable Dust (mg/m <sup>3</sup> )	TWA <sup>1</sup> Respirable Dust (mg/m <sup>3</sup> )
1127632-01	Robert Sullivan / Mason 1	Saw cutting of CMU blocks	497	0.10	0.10
1127966-02	Saul Alvarez / Mason 2	Laying CMU block	498	0.25	0.26
0130364-03	David Trask / Mason 3	Laying CMU block	498	0.17	0.18
1131355-04	Jonas Littleton / Hodd Carrier	Mixing mortar, drilling/core drilling, saw cutting	498	0.16	0.17
<b>Cal/OSHA Permissible Exposure Limit (PEL) – 8-hour TWA</b>				<b>5</b>	<b>5</b>
<b>Notes:</b> <sup>1</sup> Exposure assuming there was no exposure to the agent during the non-sampled portions of the day. Results are given in mg/m <sup>3</sup> (milligrams per cubic meter of air). PEL – permissible exposure limit TWA – time-weighted average PELs for Particulates Not Otherwise Regulated – for information only. Because the dust contained crystalline silica, the PELs for crystalline silica apply.					



**Table 2: Sampling Results Summary for Crystalline Silica**

Townsend & Schmidt Masonry – Pleasant Grove WWTP Energy Recovery Project Assessment Date: October 7, 2020										
Sample ID	Employee (Work Task)	Sample Duration (min)	Result (µg/m <sup>3</sup> )				TWA <sup>1</sup> (µg/m <sup>3</sup> )			
			Respirable Quartz	Respirable Cristobalite	Respirable Tridymite	Respirable Crystalline Silica (RCS)	Respirable Quartz	Respirable Cristobalite	Respirable Tridymite	Respirable Crystalline Silica (RCS)
1127632-01	Robert Sullivan / M1 (Saw cutting of CMU blocks)	497	5.0	<4.9	<20	5.0	5.2	<5.1	<21	5.2
1127966-02	Saul Alvarez / M2 (Laying CMU block)	498	10	<5.0	<20	10	10	<5.2	<21	10
0130364-03	David Trask / M3 (Laying CMU block)	498	8.1	<5.0	<20	8.1	8.4	<5.2	<21	8.4
1131355-04	Jonas Littleton / HC (Mixing mortar, core drilling, saw cutting)	498	13	<5.0	<20	13	13	<5.2	<21	13
<b>Cal/OSHA Permissible Exposure Limit (PEL) - 8-hour TWA</b>							<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>Cal/OSHA Action Level</b>							<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>
<b>Notes:</b> <sup>1</sup> Exposure assuming there was no exposure to the agent during the non-sampled portions of the day. Results are given in "µg/m <sup>3</sup> " (micrograms per cubic meter of air). The symbol "<" means "less than" and the value following indicates the laboratory reporting limit for the analytical method and sample volume. PEL – permissible exposure limit TWA – time-weighted average										





**GALSON**

**Ms. Diana Lutsik  
Forensic Analytical Consulting Services  
7625 Sunrise Blvd  
Suite 104  
Citrus Heights, CA 95610**

**October 16, 2020**

**Account# 23802**

**Login# L520972**

**Dear Diana Lutsik:**

**Enclosed are the analytical results for the samples received by our laboratory on October 09, 2020. All samples on the chain of custody were received in good condition unless otherwise noted. Any additional observations will be noted on the chain of custody.**

**Please contact client services at (888) 432-5227 if you would like any additional information regarding this report. Thank you for using SGS Galson.**

**Sincerely,**

**SGS Galson**

A handwritten signature in black ink that reads 'Lisa Swab'. The signature is written in a cursive, flowing style.

**Lisa Swab  
Laboratory Director**

**Enclosure(s)**

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- Unless otherwise noted within the report, all quality control results associated with the samples were within established control limits or did not impact reported results.
- Note: The findings recorded within this report were drawn from analysis of the sample(s) provided to the laboratory by the Client (or a third party acting at the Client’s direction). The laboratory does not have control over the sampling process, including but not limited to the use of field equipment and collection media, as well as the sampling duration, collection volume or any other collection parameter used by the Client. The findings herein constitute no warranty of the sample’s representativeness of any sampled environment, and strictly relate to the samples as they were presented to the laboratory. For recommended sampling collection parameters, please refer to the Sampling and Analysis Guide at [www.sgs.com](http://www.sgs.com).
- Unrounded results are carried through the calculations that yield the final result and the final result is rounded to the number of significant figures appropriate to the accuracy of the analytical method. Please note that results appearing in the columns preceding the final result column may have been rounded and therefore, if carried through the calculations, may not yield an identical final result to the one reported.
- The stated LOQs for each analyte represent the demonstrated LOQ concentrations prior to correction for desorption efficiency (if applicable).
- Unless otherwise noted within the report, results have not been blank corrected for any field blank or method blank data.

**Accreditations** SGS Galson holds a variety of accreditations and recognitions. Our quality management system conforms with the requirements of ISO/IEC 17025. Where applicable, samples may also be analyzed in accordance with the requirements of ELAP, NELAC, or LELAP under one of the state accrediting bodies listed below. Current Scopes of Accreditation can be viewed at <http://www.sgs.com> in the accreditations section of the "About" page. To determine if the analyte tested falls under our scope of accreditation, please visit our website or call Client Services at (888) 432-5227.

National/International	Accreditation/Recognition	Lab ID#	Program/Sector
AIHA-LAP, LLC - IHLAP, ELLAP, EMLAP	ISO/IEC 17025 and USEPA NLLAP	Lab ID 100324	Industrial Hygiene, Environmental Lead, Environmental Microbiology

State	Accreditation/Recognition	Lab ID#	Program/Sector
New York (NYSDOH)	ELAP and NELAC (TNI)	Lab ID: 11626	Air Analysis, Solid and Hazardous Waste
New Jersey (NJDEP)	NELAC (TNI)	Lab ID: NY024	Air Analysis
Louisiana (LDEQ)	LELAP	Lab ID: 04083	Air Analysis, Solid Chemical Materials
Texas	Texas Dept. of Licensing and Regulation	Lab ID: 1042	Mold Analysis Laboratory license

**Legend**

< - Less than	mg - Milligrams	MDL - Method Detection Limit	ppb - Parts per Billion
> - Greater than	ug - Micrograms	NA - Not Applicable	ppm - Parts per Million
l - Liters	m3 - Cubic Meters	NS - Not Specified	ppbv - ppb Volume
LOQ - Limit of Quantitation	kg - Kilograms	ND - Not Detected	ppmv - ppm Volume
ft2 - Square Feet	cm2 - Square Centimeters	in2 - Square Inches	ng - Nanograms



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## LABORATORY ANALYSIS REPORT

6601 Kirkville Road  
 East Syracuse, NY 13057  
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 www.sgsgalson.com

Client : Forensic Analytical Consulting Account No.: 23802  
 Site : PLEASANT GROVE WWTP RECOVERY P Login No. : L520972  
 Project No. : PJ60649 TOWNSEND & SCHMIDT  
 Date Sampled : 07-OCT-20 Date Analyzed : 13-OCT-20  
 Date Received : 09-OCT-20 Report ID : 1214244

### Respirable Dust

<u>Sample ID</u>	<u>Lab ID</u>	<u>Air Vol</u> <u>liter</u>	<u>Total</u> <u>mg</u>	<u>Conc</u> <u>mg/m3</u>
1127632-01	L520972-1	1023	0.11	0.10
1127966-02	L520972-2	999	0.25	0.25
0130364-03	L520972-3	1007	0.17	0.17
1131355-04	L520972-4	1009	0.16	0.16
BLANK-1130363	L520972-5	NA	<0.050	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of Quantitation: 0.050 mg  
 Analytical Method : mod. NIOSH 0600; Gravimetric  
 Collection Media : PVC PW 37mm

Submitted by: ALK  
 Date : 13-OCT-20  
 Supervisor : KEG

Approved by: CMP



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## LABORATORY ANALYSIS REPORT

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Client : Forensic Analytical Consulting Account No.: 23802  
 Site : PLEASANT GROVE WWTP RECOVERY P Login No. : L520972  
 Project No. : PJ60649 TOWNSEND & SCHMIDT  
 Date Sampled : 07-OCT-20 Date Analyzed : 13-OCT-20 - 15-OCT-20  
 Date Received : 09-OCT-20 Report ID : 1214694

### Respirable Crystalline Silica (RCS): Quartz, Cristobalite, Tridymite

Sample ID	Lab ID	Analyte	Air Vol		
			l	ug	ug/m3
1127632-01	L520972-1	Quartz	1023	5.1	5.0
		Cristobalite	1023	<5.0	<4.9
		Tridymite	1023	<20	<20
		RCS	1023	5.1	5.0
1127966-02	L520972-2	Quartz	999	10	10
		Cristobalite	999	<5.0	<5.0
		Tridymite	999	<20	<20
		RCS	999	10	10
0130364-03	L520972-3	Quartz	1007	8.2	8.1
		Cristobalite	1007	<5.0	<5.0
		Tridymite	1007	<20	<20
		RCS	1007	8.2	8.1

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug C:5.0ug T:20.ug  
 Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD  
 Collection Media : PVC PW 37mm

Submitted by: AFB  
 Date : 16-OCT-20  
 Supervisor : KRK

Approved by: NLO



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## LABORATORY ANALYSIS REPORT

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 Project No. : PJ60649 TOWNSEND & SCHMIDT  
 Date Sampled : 07-OCT-20 Date Analyzed : 13-OCT-20 - 15-OCT-20  
 Date Received : 09-OCT-20 Report ID : 1214694

### Respirable Crystalline Silica (RCS): Quartz, Cristobalite, Tridymite

Sample ID	Lab ID	Analyte	Air Vol		
			l	ug	ug/m3
1131355-04	L520972-4	Quartz	1009	13	13
		Cristobalite	1009	<5.0	<5.0
		Tridymite	1009	<20	<20
		RCS	1009	13	13
BLANK-1130363	L520972-5	Quartz	NA	<5.0	NA
		Cristobalite	NA	<5.0	NA
		Tridymite	NA	<20	NA
		RCS	NA	<5.0	NA

COMMENTS: Please see attached lab footnote report for any applicable footnotes.

Level of quantitation: Q:5.0ug C:5.0ug T:20.ug  
 Analytical Method : mod. NIOSH 7500/mod. OSHA ID-142; XRD  
 Collection Media : PVC PW 37mm

Submitted by: AFB  
 Date : 16-OCT-20  
 Supervisor : KRK  
 Approved by: NLO



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## LABORATORY FOOTNOTE REPORT

Client Name : Forensic Analytical Consulting Services  
 Site : PLEASANT GROVE WWTP RECOVERY P  
 Project No. : PJ60649 TOWNSEND & SCHMIDT

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Date Sampled : 07-OCT-20 Account No.: 23802  
 Date Received: 09-OCT-20 Login No. : L520972  
 Date Analyzed: 13-OCT-20 - 15-OCT-20

L520972 (Report ID: 1214244):  
 SOPs: GRAV-SOP-5(29), GRAV-SOP-6(25)

L520972 (Report ID: 1214244):  
 Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Respirable Dust	+/-6.3%	101%

L520972 (Report ID: 1214694):  
 The reported RCS value is based on recoveries of silica polymorphs (Quartz, Cristobalite, and/or Tridymite) greater than the reporting level. The presence of silica below the reporting level cannot be ruled out. When all polymorph results are below the reporting level, RCS defaults to the lowest polymorph concentration. The calibration standard used for Tridymite analysis is not NIST traceable; however, when Tridymite is detected above the reporting level, it is included in the RCS calculation.  
 SOPs: ix-xrdreview(15), ix-xrdashprep(36), ix-calibrate(13), ix-xrdstdprep(30)  
 We perform a quantitative secondary angle confirmation on all Quartz results greater than 0.025 mg. Secondary angle quantitative confirmation is not possible below 0.025 mg.

L520972 (Report ID: 1214694):  
 Accuracy and mean recovery data presented below is based on a 95% confidence interval (k=2). The estimated accuracy applies to the media, technology, and SOP referenced in this report and does not account for the uncertainty associated with the sampling process. The accuracy is based solely on spike recovery data from internal quality control samples. Where N/A appears below, insufficient data is available to provide statistical accuracy and mean recovery values for the associated analyte.

Parameter	Accuracy	Mean Recovery
Cristobalite	+/-12.2%	95%
Quartz	+/-12.1%	92.1%
Tridymite	+/-15.5%	97.6%

771726242838  
 Date: 10/09/20  
 Shipper: FEDEX  
 Initials: BGF

Prep: UNKNOWN

75

**GALSON**

**CHAIN OF CUSTODY**

1520972

Turn Around Time (TAT): (surcharge)	You may edit and complete this COC electronically by logging in to your Client Portal account at <a href="https://portal.galsonlabs.com/">https://portal.galsonlabs.com/</a>		
<input checked="" type="checkbox"/> Standard 0%	Client Acct No.: 23802	Report To: Ms. Diana Lutsik	Invoice To: Accounts Payable
<input type="checkbox"/> 4 Business Days 35%	Company Name: Forensic Analytical Consulting Services	Company Name: Forensic Analytical Consulting Services	Address 1: 21228 Cabot Blvd
<input type="checkbox"/> 3 Business Days 50%	Original Prep No.: PCA588070	Address 1: 7625 Sunrise Blvd	Address 2:
<input type="checkbox"/> 2 Business Days 75%	CS Rep: NTORMBY	Address 2: Suite 104	City, State Zip: Hayward, CA 94545
<input type="checkbox"/> Next Day by 6pm 100%	Online COC No.: 213858	City, State Zip: Citrus Heights, CA 95610	Phone No.: 510 - 266 - 4600
<input type="checkbox"/> Next Day by Noon 150%		Phone No.: 916 - 633 - 1105	Email Address: ap@forensicanalytical.com
<input type="checkbox"/> Same Day 200%		Cell No.: 916 - 300 - 4972	Comments:
<input type="checkbox"/> Samples submitted using the FreePumpLoan™ Program		Email reports to: dlutsik@forensicanalytical.com, sacdata@forensicanalytical.com	P.O. No.:
<input type="checkbox"/> Samples submitted using the FreeSamplingBadges™ Program		Email EDD to: dlutsik@forensicanalytical.com, sacdata@forensicanalytical.com	Payment info.: <input type="checkbox"/> I will call SGS Galson to provide credit card info <input type="checkbox"/> Card on File (enter the last five digits on the line below)
		Comments:	

Comments:	State Sampled: CA	Please indicate which OEL(s) this data will be used for: <input type="checkbox"/> OSHA PEL <input type="checkbox"/> ACGIH TLV <input type="checkbox"/> MSHA <input checked="" type="checkbox"/> Cal OSHA <input type="checkbox"/> IAQ: _____ <input type="checkbox"/> Other: _____ <small>Specify Limit(s) Specify Other</small>
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Site Name: Pleasant Grove WWTPL Recovery Project	Project: PJ60649 Townsend & Schmidt	Sampled By: Alla Vishnevsk	List description of industry or Process/interferences present in sampling area:
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Sample ID * (Maximum of 20 Characters)	Date Sampled *	Collection Medium	Sample Volume Sample Time Sample Area *	Liters Minutes in <sup>3</sup> , cm <sup>3</sup> , ft <sup>3</sup> *	Analysis Requested	Method Reference ^	Hexavalent Chromium Process (e.g., welding, plating, painting, etc.)
1127632-01	10-07-2020	PW 37mm PVC for PPI	1,023	L	Silica, crystalline quartz, cristobalite, & tridymite (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	

^ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature	Date	Time	Print Name / Signature	Date	Time
Relinquished By:				Brett Grenert-Fischer	10/9/20	1102
Relinquished By:					10/9/20	

\* You must fill in these columns for any samples which you are submitting.  
 Samples received after 3pm will be considered as next day's business.

Online COC No.: 213858  
 Prep No.: PCA588070  
 Account No.: 23802  
 Draft: 10/5/2020 7:06:37 PM

All services are rendered in accordance with the applicable SGS General Conditions of Service accessible via: <http://www.sgs.com/en/Terms-and-Conditions.aspx>



GALSON

CHAIN OF CUSTODY

Comments :

Sample ID * (Maximum of 20 Characters)	Date Sampled *	Collection Medium	Sample Volume Sample Time Sample Area *	Liters Minutes in <sup>2</sup> , cm <sup>2</sup> , ft <sup>2</sup> *	Analysis Requested	Method Reference ^	Hexavalent Chromium Process (e.g., welding, plating, painting, etc.)
1127966-02	10-07-2020	PW 37mm PVC for PPI	999	L	Silica, crystalline quartz, cristobalite, & tridymite (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
0130364-03	10-07-2020	PW 37mm PVC for PPI	1,007	L	Silica, crystalline quartz, cristobalite, & tridymite (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
0 1131355-04	10-07-2020	PW 37mm PVC for PPI	1,009	L	Silica, crystalline quartz, cristobalite, & tridymite (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	
Blank-1130363	10-07-2020	PW 37mm PVC for PPI	0	L	Silica, crystalline quartz, cristobalite, & tridymite (with respirable dust)	mod. NIOSH 0600/7500/mod. OSHA ID-142; Grav./XRD	

^ If the method(s) indicated on the COC are not our routine/preferred method(s), we will substitute our routine/preferred methods. If this is not acceptable, check here to have us contact you.

Chain of Custody	Print Name / Signature	Date	Time	Print Name / Signature	Date	Time
Relinquished By :	Alla Vishnevskia	10-7-20		Received By : Brett Grenert-Fischer	10/9/20	1102
Relinquished By :				Received By :		

\* You must fill in these columns for any samples which you are submitting.  
 Samples received after 3pm will be considered as next day's business.

Online COC No. : 213858  
 Prep No. : PCA588070  
 Account No. : 23802  
 Draft : 10/5/2020 7:06:37 PM

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## Appendix B

### FACS Data Collection Methods

#### Respirable Dust and Crystalline Silica

Samples were collected in accordance with NIOSH Method 0600, using a low-volume air sampling pump affixed to a disposable, preloaded Parallel Particle Impactor (PPI) sampler containing four small impactors in the inlet section of the device, operating at a flow rate of 2 liters per minute (lpm). Flow rates were calibrated pre and post sampling, in line using a primary standard calibrator (Bios Defender 510). Samples were labeled using a unique identification number and shipped under Chain of Custody to an American Industrial Hygiene Association (AIHA) accredited analytical laboratory (SGS Galson in East Syracuse, NY).

Samples and blanks were analyzed in a two-step process. Initially, the particulate concentrations are measured by the laboratory using gravimetric analysis (NIOSH 0600). In the second process, the amount of crystalline silica in each sample is measured by the laboratory using x-ray power diffraction (XRD) in accordance with NIOSH Method 7500. Crystalline silica normally has three silica polymorphs: quartz, cristobalite, and tridymite. Results are expressed in milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ) for Respirable Dust and micrograms per cubic meter ( $\text{ug}/\text{m}^3$ ) for Respirable Crystalline Silica.

## Appendix C

### Description of Occupational Exposure Limits

California Division of Occupational Safety and Health (Cal/OSHA) Permissible Exposure Limits (PELs)

- Definition: The Cal/OSHA PELs are regulated by the California Code of Regulations §5155 and represent the maximum permitted 8-hour time-weighted average concentration of an airborne contaminant. Employee exposure to an airborne contaminant during the workday shall not exceed the PEL specified for that substance. Table AC-1 of CCR §5155 presents concentration limits for airborne contaminants to which nearly all workers may be exposed daily during a 40-hour workweek for a working lifetime without adverse effect.
- The Action Level is an exposure concentration that if exceeded, triggers additional sampling and medical surveillance requirements.
- Source: California Code of Regulations § 5155, Table AC-1  
[http://www.dir.ca.gov/title8/5155table\\_ac1.html](http://www.dir.ca.gov/title8/5155table_ac1.html)
- Source: California Code of Regulations § 1532.3, Occupational Exposures to Respirable Crystalline Silica  
[https://www.dir.ca.gov/title8/1532\\_3.html](https://www.dir.ca.gov/title8/1532_3.html)

## Appendix D

### Photographs



Photo #1: Project site entry sign



Photo #2: Overview of project area



Photo #3: Mortar mixing work area



Photo #4: Mortar mixer



Photo #5: Water repellent mortar (manufactured by Amerimix)



Photo #6: Concrete masonry saw with a 20" blade and custom-built rack, equipped with an iQ PowerTools iQ2000 Dust Collector



Photo #7: Masons laying CMU brick



Photo #8: Water truck spraying the dirt



Photo #9: Mason 1 performing saw cutting activities



Photo #10: Mason 1 cutting the CMU block



Photo #11: Mason 4 mixing mortar



Photo #12: Moderate airborne dust generation observed during mixing of mortar



Photo #13: Mason 4 performing drilling tasks



Photo #14: HILTI TE70-ATC corded rotary hammer drill with pointed chisel used for drilling activities



Photo #15: Makita drill with a 4" drill bit used for core drilling



Photo #16: BOSCH HEPA vacuum used during drilling and core drilling

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Right Perspective  
Right Now**

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