DETERMINATION OF AIRBORNE CRYSTALLINE SILICA (QUARTZ) EXPOSURE
AT
Oceano Dunes State Vehicular Recreation Area and
CDF Air Monitoring Site, 2391 Willow Road, Arroyo Grande, California
San Luis Obispo County, California

Date: **March 16, 2018**

Report to: **Mat Fuzie, Deputy Director**
Off Highway Motor Vehicle Recreation Division
California Department of Parks and Recreation
1725 23rd Street, Suite 200
Sacramento, CA 95816

Prepared by: **John W. Kelse, Industrial Hygienist**
152 Pulaski Highway
Ansonia, CT 06401

Overview: On March 8, 2018, personal air samplers were deployed within the off-highway vehicle (OHV) riding area of Oceano Dunes State Vehicular Recreation Area (SVRA). Oceano Dunes SVRA is a state park located in south San Luis Obispo County, California and managed by the Off Highway Motor Vehicle Recreation Division (OHMVR Division) of the California Department of Parks and Recreation (DPR). This sampling follows prior air sampling in the same area conducted on November 15, 2017, the results of which were presented in my prior report to you, dated December 14, 2017.

Sampling was undertaken to determine total (all size) dust, respirable particulate (particulate 10 microns or smaller in size) and respirable crystalline silica (quartz). Sampling occurred on a dry, generally clear day in the low to mid 60's. There was a light to moderate westerly wind through the morning hours with a stronger northwesterly wind developing through the afternoon. White caps on the ocean surface and movement of dune sand was noted as winds increased.

The air samplers were affixed in the breathing zones of a maintenance worker deployed to the OHV riding area of the SVRA for close to 7 hours to construct and repair fences, and to a person simulating an OHV recreationist who traversed the dunes in an open-air recreational off-highway vehicle (ROV) for approximately 7 hours as well. Additionally, stationary respirable and total dust air samplers were affixed to the S1 meteorological tower (located in the west-central portion of the OHV riding area) at approximately adult breathing-zone height for a little over 7 hours.

An inland air quality monitoring station (referenced as CDF) was also equipped with ambient respirable and total dust air samplers for approximately 9 hours. The CDF monitoring site is located at 2391 Willow Road in Arroyo Grande. It is the location of a California Department of Forestry and Fire Prevention station.

At the CDF site, the air samplers were positioned on a meteorological instrument tower at approximately 14 feet above the ground, which is the approximate height of the CDF air quality sampling equipment positioned on the roof of a shed adjacent to the meteorological tower.

I coordinated the air sampling with Will Harris, a geologist with the California Geological Survey. Mr. Harris is experienced in the proper deployment of ambient and personal air sampling equipment.

Results: Analytical results for respirable crystalline silica (quartz) are below the detection limit for the analytical technique applied and volume of air filtered for each sample (see appended data sheet and Hartford Risk Engineering Laboratory Results Report). These results are similar to those previously reported although wind conditions during this monitoring period were greater.

Discussion: The United States Occupation Safety and Health Administration (OSHA) standard, known as the permissible exposure limit (PEL), for respirable crystalline silica dust in an industrial setting is a concentration of 50 micrograms per cubic meter of air averaged over an 8-hour work day. The PEL for respirable crystalline silica focuses on exposures that involve the mechanical breakdown of crystalline silica particulate to respirable size (10 microns or smaller). Such exposures are typically found in workplace settings involving grinding, abrasive blasting, sanding, drilling concrete, etc. Similar crystalline silica particle breakdown to respirable size in the natural environment rarely, if ever, occurs.

As mentioned, the OSHA PEL for respirable crystalline silica is based on exposure for an 8-hour workday, performed five days per week for 40 years. This standard is believed to be adequately protective for pneumoconiosis (silicosis in this instance) and cancer of the lung in an industrial workplace setting. It is an extremely conservative number (overly protective) if it is used for evaluation purposes to assess associated risk in a natural environment setting such as a beach and associated sand dunes.

As stated in my prior report, the respirable-size fraction of crystalline silica found in industrial environments is typically 100 times or more smaller (due to employed physical forces associated with processing) than that typically encountered in sand in beach and dune environments. For this reason, it is unsurprising that crystalline silica was not detected in the air filter samples collected last November and more recently on March 8, 2018, when the wind in the dunes was much more forceful.

Conclusion: Results for all air filter samples collected on March 8, 2018 and analyzed for respirable crystalline silica (quartz) are below the detection limit of the analysis applied. These results are consistent with those presented in my prior report dated December 14, 2018. As such, the presented and reviewed data provide no evidence of a realistic pulmonary (inhalation) risk with respect to respirable crystalline silica.

Attachments: Results report to John Kelse from the Hartford Risk Engineering Laboratory
Dated March 16, 2017
Sampling data sheet prepared by John Kelse
Sampling pump calibration record
Field Sampling Data Recording Sheet

THE HARTFORD - RISK ENGINEERING LABORATORY
ONE HARTFORD PLAZA
HARTFORD, CT 06155
TOLL FREE 1-800-986-3509

AIHA-LAP, LLC ACCREDITED LABORATORY #100124

RESULTS REPORT :

JOHN KELSE
152 PULASKI HWY
ANSONIA, CT 06401
JKELZ45@GMAIL.COM

LABORATORY NUMBER: 33404
ACCOUNT: CALIFORNIA DEPT OF PARKS AND RECREATION
ACCOUNT ADDRESS: SACRAMENTO, CA

DATE COLLECTED :
DATE RECEIVED : 3/14/18
REPORT DATE : 3/16/18

LABORATORY NUMBER: 33404

FIELD ID		VOL (LITERS)	TIME (MINS)	ANALYTE	MG	MG/M3	PPM	MRL (MG)	REFERENCED METHOD:	ANALYSIS DATE
AA73294	54400	908								
				RESPIRABLE DUST	< 0.025	< 0.028		0.025	GRAV/NIOSH 0600M	3/14/18
				QUARTZ	< 0.010	< 0.012		0.010	XRD/NIOSH 7500 M	3/16/18
AA73295	54399	756								
				RESPIRABLE DUST	< 0.025	< 0.033		0.025	GRAV/NIOSH 0600M	3/14/18
				QUARTZ	< 0.010	< 0.014		0.010	XRD/NIOSH 7500 M	3/16/18
AA73296	54396	759								
				RESPIRABLE DUST	0.061	0.080		0.025	GRAV/NIOSH 0600M	3/14/18
				QUARTZ	< 0.010	< 0.014		0.010	XRD/NIOSH 7500 M	3/16/18
AA73297	54395	688								
				RESPIRABLE DUST	< 0.025	< 0.036		0.025	GRAV/NIOSH 0600M	3/14/18
				QUARTZ	< 0.010	< 0.015		0.010	XRD/NIOSH 7500 M	3/16/18
AA73298	54398	1181								
				RESPIRABLE DUST	0.045	0.038		0.025	GRAV/NIOSH 0600M	3/14/18
AA73299	54401	961								
				RESPIRABLE DUST	0.12	0.12		0.025	GRAV/NIOSH 0600M	3/14/18
AA73300	54397	0								
				RESPIRABLE DUST	< 0.025	---		0.025	GRAV/NIOSH 0600M	3/14/18
				QUARTZ	< 0.010	---		0.010	XRD/NIOSH 7500 M	3/16/18

LABORATORY NUMBER: 33404

FIELD ID	VOL (LITERS)	TIME (MINS)	ANALYTE	MG	MG/M3	PPM	MRL (MG)	REFERENCED METHOD:	ANALYSIS DATE

NOTE: The concentration values (e.g. MG/M3, PPM) were calculated at the laboratory using data and information (times and/or flow rates) supplied to the laboratory by the submittor.

NOTE: If applicable, organic sampling tubes are analyzed separately. "<" means not measured at the method reporting limit (the amount of this material that can reliably be reported based on analytical conditions).

NOTE: Sample results have not been corrected for the amount of contamination found on the field blank sample, unless otherwise noted.

NOTE: Reported values have been rounded. However, calculations were performed using intermediate unrounded results.

NOTE: The reported results relate only to the items tested. Unless otherwise noted, all samples were received at the laboratory in satisfactory condition.

ABBREVIATIONS: MG = Milligrams MG/M3 = Milligrams per Cubic Meter of Air PPM = Parts Per Million MRL = Method Reporting Limit Referenced Method "M" = Modified

Laboratory Analysts :
D. White
A. Neiman
R. Ross
A. van der Swaagh
R. Coma
L. Schoeplein

INDUSTRIAL HYGIENE ISO/IEC 17025:2005 Accredited Laboratory AIHAACCREDITEDLABS.ORG Lab ID # 100124

ROBERT ROSS
LABORATORY TECHNICAL MANAGER

DUST SAMPLING DATA SHEET:

Sampling Date: March 8, 2018 Seaside Recreational Area San Louis Obispo County, California
LAB REF# 33104: The Hartford – Risk Engineering Laboratory
AIHA-LAP, LLC Accredited Laboratory #100124
Analysis – Total dust by gravimetric (NIOSH method 0600M)
Quartz (free silica) by XRD (NIOSH method7500)

OSHA Workplace Regulatory Standards Applied:
Total Dust (includes inhalable): 10 mg/m³ 8 hr. (TWA)
Respirable Dust: 3 mg/ m³ 8 hr. TWA
Quartz* (free silica): 0.05 mg/ m³ 8 hr. TWA (Respirable fraction).

Sample #	Sample Time	Liter Vol.	Location	Contaminant	Mg/m³ Found 8 Hr equiv.
54395	6 hr 46 min.	688	Per. Marko Morales, Maint. of fences in dunes	Respirable Dust Quartz	<0.036 <0.015
54396	7 hr 20 min.	759	Per. Will Harris, General area, dunes/rec. area	Respirable Dust Quartz	0.080 <0.014
54401 54399	7 hr 15 min.	961 756	Fixed Sampling at S1 Tower	Total Dust Respirable Dust Quartz	0.12 <0.033 <0.014
54398 54400	9 hrs	1181	Fixed Sampling at CDF site	Total Dust Respirable Dust Quartz	0.038 <0.028 <0.012

CALIBRATION RECORD: March 10, 2018

Pump #	Filter #	Start L/ min.	End L/min.	L/min Difference	Final L/min.	Min. Time Sampled	**LITER VOLUME**
12	54400	1.716	1.675	- .04	1.69	537	**908**
10	54399	1.726	1.735	+ .01	1.73	437	**756**
13	54396	1.707	1.763	+ .05	1.72	439	**759**
3	54395	1.717	1.683	- .024	1.7	405	**688**
1	54398	2.17	2.23	+ .06	2.2	537	**1181**
6	54401	2.01	2.42	+ .41	2.2	437	**961**

SAMPLING DATA RECORDING SHEET: 3/8/18 WJH

Filter #	Pump #	TIME ON	TIME OFF	TYPE OF SAMPLE (PERSONAL OR FIXED) NAME & ACTIVITY
54395 Pvc	23195	0800	~~1546~~ 1446 (2:46) ~~1546 (3:~~	Personal - Marco Morales - Field Maintenance
54398 PVC	~~82886~~ 82862	0915	1812 (6:12)	Ambient @ CDF - no cyclone
54400 Pvc	80186	0915	18:12 (6:12)	Ambient @ CDF - w/ cyclone
54399 PVC	80058	1005	1721 (5:21)	Ambient @ S1 w/ cyclone
54401 PVC	M3	1005	1721 (5:21)	Ambient @ S1 no cyclone
54396	Pump #13	1015	1726 (5:26)	Personal - Will Harris - the Bugsaet Dunes on side by side recreation sim.

Control Filter # 54397 PVC

Date of Survey: March 8, 2018

Weather @ 530 PM moderate WNW wind 63°, sunny mostly

Available Info on conditions: (temps, wind aspects, rain, etc.)

0900 - Lt. Winds, Partly sunny, 62°
1015 - Lt. West Wind, Mostly sunny
1205: West Wind, moderate, 63°, Sunny
1300: WNW wind, still, 64°, sunny
1445: Stiff/strong WNW wind, saltation occurring, sunny 63°

Describe dust exposure – what the mineral composition of this exposure is likely to be – particularly for possible interferences.

Samples collected w/in and downwind of coastal dune environment. CDF locations also influenced by Hwy 1 approx. 150 to the north, an oil refinery to the south-southwest, and agricultural operations to the west.