**OHMVR COMMISSION MEETING**
**Folsom, CA 95630**

**October 28, 2015**

**STAFF REPORT:** International Environmental Research Foundation (IERF) Report Update

**STAFF:** Rick LeFlore, Environmental Program Manager

**SUBJECT:** Clear Creek Management Area (CCMA): Update of Asbestos Exposures Associated with Motorcycle Riding and Hiking on Asbestos Containing Soils: Risk of Asbestos-Related Cancer

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## Summary

In May 2013, the OHMVR Division entered into agreement with the IERF to determine adequate and accurate health-based risk analysis of asbestos present in serpentinite rock and soil at the CCMA in San Benito and Fresno Counties, California. This work is additional and complementary to work previously performed by IERF at CCMA in 2010. At that time, ambient and activity-based (motorcycle trail riding) air samples were collected and later analyzed to determine if particles collected on membrane filters were asbestos related and what the airborne concentrations of this mineral may be. A risk assessment analysis was performed based on the data generated, and IERF issued a report of its findings on March 8, 2011. In general, based on the findings, it was determined that there are times and conditions during which motorcycle trail recreation can be performed at CCMA when off-highway vehicle (OHV) enthusiasts would not be exposed to unacceptable high levels of airborne asbestos.

The purpose of the subsequent study report is for IERF to analyze additional air samples collected during other months than previously studied, when OHV recreation is traditionally popular at CCMA. An additional risk assessment has been performed using a larger number of air samples collected over the months that IERF did not previously sample. A final risk analysis and report was to be delivered by September 2014. After the September 25, 2015, OHMVR Commission meeting, OHMVR Division staff requested an update from IERF on the status of its efforts. The update, dated October 15, 2015, is attached as part of this staff report and is incorporated as reference.

## Discussion

The October 15, 2015, update is not to be inferred as a conclusionary risk analysis and assessment, as IERF has additional research and write-up work yet to be performed in order to fulfill terms and conditions of the existing agreement. As stated in the attached update, IERF collected 34 additional motorcycle air samples over 2-day periods in November and December 2013 and January and March 2014 (results for 31 of these samples are listed on Table 1 in the attached report). Sample strategies were identical to those performed in the earlier IERF study as follows: each motorcycle ride was about 20 miles, one in the morning and another in the afternoon over two days. Air samples were collected on the first two motorcycle riders, while additional riders followed, taking videos of the two lead riders using helmet mounted GoPro cameras. Two additional air samples were collected on the last motorcycle rider on the final day of air sampling in March 2014.

Preliminary review of the Table 1 fiber exposure data shows mean exposure of the lead rider in this study is about two times higher than what was found in the previous study. The mean of 13 air samples collected on the lead rider was similar to that found in the previous study; however, one sample was markedly higher. The rider trailing the lead rider had a 10-fold high fiber exposure than found in the earlier study, wherein the two riders had about the same exposure to airborne fibers. The update notes that the trailing rider's increased exposure was not a consistent finding, as on some rides the lead and trailing rider had similar exposures.

Distinction is made in the update that not all the airborne fibers are "chrysotile" asbestos. The Table 1 fibers are airborne mineral fibers five microns or greater in length, with length to width ratios of 3:1 or greater.

At this point, the IERF study shows exposure to airborne mineral fibers at CCMA "could be a factor of 10-fold higher than the earlier estimates … or about two asbestos-related cancers per million lifetimes."

## Commission Action

For information only

## Attachments

Attachment 1: Update: Asbestos Exposures Associated with Motorcycle Riding and Hiking on Asbestos Containing Soils: A Risk of Asbestos-Related Cancer, October 15, 2015

# Update: Asbestos Exposures Associated with Motorcycle Riding and Hiking on Asbestos Containing Soils: Risk of Asbestos-Related Cancer

Prepared for

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By

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October 15, 2015

**Background:**

The International Environmental Research Foundation (IERF) study started with the collection of activity-based air samples in the Clear Creek Management Area (CCMA) over two days in April, 2010. The air samples were collected from two activities (motorcycle riding and hiking) and the ambient air to determine the background concentration of airborne asbestos in CCMA. Eight air samples were collected on two motorcycle riders during four rides. Each ride was about 20 miles and consisted of two riders, the trailing rider was instructed to follow at a distance sufficient to avoid any visible dust generated by the lead rider. The asbestos exposure of the two riders was statically identical and their exposure was 0.013 fibers per milliliter (f/mL). Half the fibers were chrysotile asbestos and the others had elemental compositions consistent with tremolite (another mineral that can occur as asbestos). Assuming the asbestos exposure measured and riding at Clear Creek 5-days per year; Wilson *et al.*, 2011 calculated the risk of asbestos-related cancers using two current models of the United State Environmental Protection Agency (EPA 1986, IRIS). The maximum lifetime excess risk from 5-days of motorcycle over a year at CCMA is approximately 0.18 asbestos-related cancers risk per million people exposed (Wilson *et al.*, 2011).

The air samples collected in April, 2010 were collected over two consecutive days and rain had occurred just prior to our arriving (Wilson *et al.*, 2011).

**Update:**

In Phase II of the IERF study thirty-four additional motorcycle air samples were collected at CCMA over 2-day periods in November & December 2013 and January & March of 2014. Of the 34 air samples collected on the motorcycle riders during the second phase of this study, the results for 31 of these air samples are shown in Table 1. The sampling strategy was identical to the samples collected in April of 2010 (Wilson *et al.*, 2011). Each motorcycle ride was approximately 20 miles, one in the morning and another in the afternoon over two days. Although air samples were collected on the first two motor cycle riders, additional riders were following, taking videos of the two lead riders using helmet mounted cameras. In addition, on the final day of air sampling in March 2014, two additional air samples were collected on the last motorcycle rider (Table 1).

A preliminary review of the currently available fiber exposure data shown in Table 1, indicates the mean exposure of the lead rider in the second phase of this study is approximately 2-fold higher than in the earlier study. Among the fourteen air samples collected on the lead rider, one was markedly higher - 0.16f/mL - without this air sample, the mean of the other thirteen was 0.015f/mL similar to the earlier study in April 2010 (Table 1). The rider trailing the lead rider had a 10-fold high fiber exposure than in the earlier study where the two riders had about the same exposure to airborne fibers (Wilson *et al.*, 2011). The increased exposure to the trailing rider was not a consistent finding as on some rides the lead and trailing rider had very similar exposures.

As in the earlier study not all the airborne fibers are chrysotile asbestos. The fibers counted in Table 1 are airborne mineral fibers five microns or greater in length with length to width ratios of 3:1 or greater. From the information currently available at this point in the IERF study the exposure to airborne mineral fibers at CCMA could be a factor of 10-fold higher than the earlier estimates in Wilson *et al.*, 2011 or about 2 asbestos-related cancers per million lifetimes.

## References

Environmental Protection Agency. Airborne Asbestos Health Assessment Update. EPA-600-8-84/003F; 1986.

Integrated Risk Information System (IRIS). Asbestos. Retrieved from http://www.epa.gov/iris/subst/0371.htm/

Nolan RP, Langer AM: Concentration and Type of Asbestos Fibers in Air Inside Buildings In: The Health Effects of Chrysotile-Asbestos: Contribution of Science to Risk-Management Decisions, Canadian Mineralogist, Special Publication 5, pp. 39-51, 2001.

Wilson R, Kelse J, Nord GL, Nolan RP, Langer AM. Preliminary Analysis of the Asbestos Exposure Associated with Motorcycle Riding and Hiking in The Clear Creek Management Area (CCMA) San Benito County, California, International Environmental Research Foundation, New York, NY, March 8, 2011.

Table 1. Summary of the air samples collected and analyzed to date for Phase 2 of the Clear Creek Management Area Asbestos Risk Assessment by the IERF. The air samples were prepared by direct-transfer and analyzed by analytical transmission electron microscopy (ATEM).

| **Air Sample Type** | **№ of Air Samples Analyzed** | **№ of Air Sample Where no Fibers were Detect** | **Concentration of Airborne (Fiber/Milliliter)** |
|---|---|---|---|
| Lead Motorcycle Rider | 14 | 8 | 0.026 |
| Second Motorcycle Rider | 15 | 1 | 0.12 |
| Last Motorcycle Rider | 2 | 1 | 0.012 |
| Hiker | 5 | 3 | 0.046 |
| Ambient Air | 7 | 5 | 0.0060 |
| Motorcycle Riders, April, 2010 | 8 | 4 | 0.013 |
| Control | | | No Fibers Detected |
| **Background of Asbestos in the Ambient Air in US (Nolan and Langer, 2001)** | | | **<0.0012** |
| **Background of Asbestos in Ambient Air Worldwide (see WHO, 1986)** | | | **<0.001 and 0.01** |
| **United States Occupational Safety and Health Administration (OSHA) Asbestos Permissible Exposure Limit (PEL)** | | | **0.1** |

World Health Organization (1986) *Asbestos and Other Natural Minerals, Environmental Health Criteria* 53, International Programme on Chemical Safety, Geneva, page 12.