

Erskine Environmental Consulting

Geologic Investigations Hazardous Materials Naturally Occurring Asbestos

Technical Memorandum

February 16, 2020

Subject: EPA and USGS Position on RJLG Protocols

Introduction

This memorandum focuses attention on key documentation showing that the RJLG protocol to reduce or eliminate the reporting of asbestos has been deemed invalid by key regulatory agencies, and representations by RJLG that the methodology has been approved by EPA are not factually correct. The purpose is to provide PA DEP with information needed to draw its own conclusion regarding the validity of test data, and by extension, the validity of the sampling plan itself.

The data and information presented in this memorandum are drawn from Regulator source documents that include official opinions regarding the validity of the RJLG procedures. One additional document that has not been addressed in EEC's previous memoranda is an independent analysis of the RJLG procedures by the United States Geological Survey (USGS) at the El Dorado Hills study site.

Framework

The R.J. Lee Group (RJLG) has submitted to PA DEP definitions of asbestos to support the practice of particle differentiation that eliminates the reporting of particles as asbestos. These definitions of commercial asbestos are applied over and beyond the actual counting protocols in various methods to eliminate particles that are defined by RJLG as non-asbestos. Modification of the test methods through interpretation of these definitions and applying them out of context and in an arbitrary manner creates what are essentially new and unvalidated RJLG-specific test protocols that are not equivalent to the standard approved EPA protocols that laboratories are required to apply.

Representations in documents submitted to PA DEP, procedures published in documents cited by RJLG, and several published studies indicate that the RJLG protocol is applied to eliminate an entire population of fibers based on mean lengths, widths, and aspect ratios, and even go further to eliminate fibers on a particle by particle basis, using defects in fiber morphology such as rounded, pointed, and non-perpendicular tip ends, and fibers that have stepped margins or are not precisely similar to ideal perfect fibers. None of these criteria are included in the EPA test methods.

RJLG represented that its protocol has been approved by EPA at the El Dorado Hills EPA study site. To support this claim, RJLG stated that the non-responsiveness by EPA to a second round of arguments following EPA's determination constitutes a de facto approval. This representation is misleading and not factually correct.

RJLG represented that its protocol was approved at the Sparta Quarry EPA study site. To support this claim, RJLG argues that because the RJLG protocol was compared to the Berman and Crump method under EPA review and the standard EPA protocol, that somehow this constitutes a de facto approval. Previous memoranda by EEC showed that this representation is misleading and not factually correct. In fact, the RJLG protocol was invalidated in the study because it eliminated a significant population of fibers that contribute to cancer risk, and thereby underestimated the risk by a factor of six. The Sparta quarry site will not be discussed further in this memorandum.

EARTHRES, on behalf of RJLG, stated that particles with lengths that are $<5\mu\text{m}$ are eliminated from reporting in samples because health risk assessors generally do not use them in risk calculations. This approach applies procedures from one discipline (human health risk assessment using air data) to another independent discipline (reporting of asbestos by geologists in rock and soil). This cross-disciplinary application is contrary to sound scientific practice, and is contrary to Regulatory guidance (see discussion regarding the USGS evaluation of the RJLG protocol, below).

The links to relevant source documents are included in this memorandum to allow PA DEP and others to read and draw their own conclusions. All are readily available on EPA web sites, or may be found by a simple Google search.

EPA Study at the El Dorado Hills Site, California.

<https://archive.epa.gov/region9/toxic/web/pdf/asbestosreport0505.pdf>

In September 2003, the EPA received a petition under CERCLA¹, also known as Superfund, to assess asbestos exposure at public areas in the El Dorado Hills of California. The subsequent study in 2005 included a Multimedia Exposure Assessment where air and soil samples were analyzed to assist the U.S. EPA in identifying and estimating associated exposure levels for locations where there was a potential for exposure to asbestos from disturbed areas of Naturally Occurring Asbestos.

Desk Statement December 13, 2005 Regarding the RJLG Report

<http://basslakeaction.org/misc-html-pgs/EPA-RJLee-20060111.html>

In December 2005 EPA received a report by RJLG that criticized EPA's results, stating that it substantially overstated asbestos concentrations by including fibers that were not asbestiform or

¹ CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act

were cleavage fragments and non-toxic. EPA quickly issued a Desk Statement in response. According to EPA, the RJLG report “*makes several sweeping and unsupported statements regarding the El Dorado Hills exposure assessment*”, and “*There is little or no medical evidence suggesting that “cleavage fragments” of similar dimensions to asbestos fibers do not pose a potentially serious health risk*”. In addition, EPA stated that it would conduct a thorough review of the RJLG report and also would be seeking some additional assistance from experts from the U.S. Geological Survey in Denver, Colorado. Both the EPA review and USGS study are discussed below.

Response to the November 2005 National Stone, Sand & Gravel Association Report Prepared by the R.J. Lee Group, Inc “Evaluation of EPA’s Analytical Data from the El Dorado Hills Asbestos Evaluation Project”

<https://archive.epa.gov/region9/toxic/web/pdf/rjlee-response4-20final.pdf>

EPA conducted a thorough review of RJLG’s assertions and refuted each argument point by point. EPA stated that “*the RJLG Report draws conclusions that are contradicted by the El Dorado Hills data and by generally accepted scientific principles for measuring asbestos exposure*”, and concluded “*EPA Region 9 has carefully reviewed the R. J. Lee Report and believes that it makes largely unsupported and incorrect conclusions about the EPA Region 9 El Dorado Hills Naturally Occurring Asbestos Exposure Assessment*”. EPA also stated that the “*USGS was conducting an independent study of the El Dorado County area to address several mineralogical questions raised by the R. J. Lee Report*”. EPA did not approve nor validate RJLG’s methodology, rather, it refuted RJLG’s assertions.

USGS Report: Mineralogy and Morphology of Amphiboles Observed in Soils and Rocks in El Dorado Hills, California.

https://pubs.usgs.gov/of/2006/1362/downloads/pdf/OF06-1362_508.pdf

At the request of EPA, the USGS conducted an independent study of amphiboles in rocks and soils in the El Dorado Hills, California, area. The purpose of this study was to investigate specific issues regarding the presence of “naturally occurring asbestos” raised by an USEPA activity-based sampling study and subsequent criticisms of that study outlined in a review prepared by the RJLG.

The USGS study refuted RJLG’s representations subject by subject, as summarized below.

The Use of Aluminum Content to Eliminate Fibers

Using Transmission Electron Microscopy (TEM), RJLG uses the aluminum content of an amphibole fiber as a method to declare it as “non-asbestos”. It is based on observations that commercial asbestos that was applied to building materials generally contain low concentrations of aluminum. This criterion is not included in standard EPA test methods. The USGS’s conclusion is as follows:

“In the first argument, The RJLG Review stated that any amphibole containing more than 0.3 cation aluminum per formula unit cannot be asbestos and therefore should not have been counted as asbestos in the USEPA analyses. We disagree with this blanket assertion regarding aluminum content presented by the RJLG Review”.

The Use of Extinction Angle to Eliminate Fibers

During analysis by Polarized Light Microscopy (PLM), the extinction refers to the angle between the fiber axis with respect to the light optical axes. RJLG represents that asbestos will always have a near-zero extinction angle, and fibers with extinction angles of greater than perhaps 1-2 degrees should be excluded from reporting. The USGS's conclusion is as follows:

“The second mineralogical objection raised in the RJLG Review was that “true asbestos” has an apparent 0-degree extinction angle when viewed in a polarizing microscope. We also do not agree with this assertion in the RJLG Review, particularly when applied to the mineral types identified in the USEPA Study”.

Amphibole Asbestos Particle Populations Based on Morphology

RJLG represents that morphological criteria such as average length, width and aspect ratio (length divided by width) can be applied and eliminate entire populations of fibers from reporting as asbestos. Eliminating individual or populations of fibers based on these criteria is not prescribed in EPA methods. The USGS's conclusion is as follows:

“The RJLG Review proposed that the particles identified in The USEPA Study contained a population of cleavage fragments rather than a population of asbestiform particles. Therefore, the assertion by the RJLG Review that the majority of the El Dorado Hill amphiboles are cleavage fragments is not consistent with our data”.

Modifying Test Methods by Applying Health-Risk Criteria

The RJLG protocol eliminates fiber in rock and soil samples that it feels may not be considered a significant contributor to cancer by health-risk experts, and therefore, may eliminate fibers with certain lengths and widths from reporting. In particular, RJLG eliminated fibers that were $\geq 5\mu\text{m}$ in length, and cited this as a reason. EPA counting rules do not allow for criteria that are not included in specific test methods to be replaced by another arbitrary criteria. The USGS's conclusion is as follows:

“Finally, it seems appropriate in light of the issues addressed in this report, to stress that it is absolutely not the role of the analytical or mineralogical communities to make health-based decisions or to make independent analytical assessments that directly or indirectly influence health-based outcomes. It is the obligation of the analytical and mineralogical communities to provide accurate, unbiased, and scientifically sound information to the health and regulatory

communities so that appropriate and informed, health-related policy and regulatory decisions can be made”.

Applying General Definitions of Asbestos to Modify a Test Method

The RJLG provided to PA DEP a list of general definitions of asbestos, and applied them to their own methodology in an arbitrary manner. EPA test methods specify the counting rules in the body of the methods, and do not allow them to be overridden using a subjective application and arbitrary interpretation of definitions of commercial asbestos. The USGS’s comments on this practice is as follows:

“We also find that the types of amphiboles that occur naturally in the El Dorado Hills study area are not easily categorized using criteria sometimes employed for identification and characterization of commercial-grade asbestos. Such criteria include aluminum content (or other trace to minor chemistry) and optical properties such as extinction angle. These and other properties of commercial-grade asbestos such as flexibility and tensile strength have not been shown to directly contribute to health effects and should not be the sole basis for exclusion of materials that may otherwise meet demonstrated health-related criteria such as length, width, bulk chemistry, and perhaps surface chemistry. We should also point out that the counting criteria developed for analysis of asbestos in the workplace or in commercial products may not be appropriate for direct application to what is currently referred to as naturally occurring asbestos”.

Conclusions

The documentation provided above indicates that the RJLG methods and procedures have been refuted by the key regulatory agencies, and their application eliminates asbestos fibers that would be reported if the EPA test methodologies were applied correctly. It also shows that representations that EPA has approved the methods is factually false. According to the Qualitative Survey and Sampling Plan (QSSP), alternative and arbitrary methods were also applied during the field investigation such as pre-determining whether asbestos is likely to be present in a rock unit (based on lithology) and sampling avoidance based on visual but not microscopic determinations. As a result, it is EEC’s opinion that both the field investigation and testing program have been fatally compromised. EEC continues to recommend that the PA DEP conduct an unbiased NOA investigation by retaining an independent geologist and laboratory that is not tied to the mining industry. Data provided by an accurate and unbiased investigation will provide PA DEP with the information needed to make an informed decision regarding, and in support of, the next course of action.

The conclusions provided in this document are the opinion of the author, based on more than 33 years' experience in the field of NOA geologic investigations and testing methodology. EEC encourages EARTHRES, RJLG or any other entity to review this document, comment, and provide a rebuttal. EEC will be happy to review any comment and respond as appropriate.

A handwritten signature in blue ink that reads "Bradley G. Erskine". The signature is written in a cursive style and is positioned above a solid horizontal line.

Bradley G. Erskine, Ph.D., PG, CEG, CAC
Erskine Environmental Consulting, Inc.