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SENT VIA E-MAIL AND FIRST CLASS MAIL

October 29, 2021

Richard Tallman, P.E.

Pottsville District Mining Office
Pennsylvania Department of Environmental Protection
5 West Laurel Boulevard
Pottsville, PA 17901

Re: Elevated Review Technical Deficiencies Application No. 7974SM1C10
Rock Hill Quarry
East Rockhill Township, Bucks County
Response to PADEP April 12, 2021 Technical Deficiency Letter

Dear Mr. Tallman:

Hanson Aggregates Pennsylvania LLC ("Hanson") provides this response to your letter dated April 12, 2021, requesting additional information in connection with Rock Hill Quarry ("Quarry").[1]

By letter dated June 21, 2021, PADEP granted Hanson an extension through October 29, 2021, for Items 10.e. through 12.c. of the Technical Deficiency Letter ("TDL") in recognition of the fact that these items require additional sampling and analysis. Hanson provided a timely response to Items 1 through 10.d of the Department's TDL on July 6, 2021. Accordingly, Hanson now provides this timely response to the remaining Items 10.e. through 12.c. Hanson is also attaching to this response a memorandum by the R.J. Lee Group ("RJLG") regarding its analysis of the single non-asbestiform structure (Attachment A) and a baseline assessment of risk posed by community exposure to background concentrations of asbestos at the Quarry perimeter (the "Risk Assessment") (Attachment B).

[1] Hanson is currently reviewing the Department's October 21, 2021 Letter. This submission shall not be construed as a response to the Department's October 21, 2021 Letter, and Hanson reserves the right to supplement or amend this submission, its prior submission, and related Asbestos Monitoring and Mitigation Plan and others plans in response to any issues raised or directives of the Department made therein. Hanson shall respond to the Department's October 21, 2021 Letter in a full and timely fashion on or before the required response date of December 6, 2021.

Hanson conducted five (5) rounds of sampling at the eight (8) locations along the perimeter of the Quarry to characterize background levels of naturally occurring asbestos ("NOA") at the Quarry. Hanson identified the eight locations in its July 6, 2021 submission. Of the forty (40) samples, Hanson identified only a single structure warranting additional analysis, which was subsequently determined not to possess asbestos morphology. Copies of the results of Hanson's perimeter sampling and analysis are attached hereto as Attachment C.

As discussed in the Risk Assessment, the results of Hanson's sampling in the air along the perimeter of the Quarry establish that no asbestos fibers were detected. These data provide a baseline against which any future detections of asbestos can be measured. The lack of background asbestos in the air at the Quarry perimeter indicates that further off-site analysis of asbestos, especially at locations outside the Quarry property, is unnecessary at this time. Because no asbestos fibers were detected in the air at the perimeter of the Quarry, any asbestos detected at locations outside the Quarry would be unrelated to Quarry operations.

Hanson Response to Comments from Rockhill Environmental Preservation Alliance ("REPA") and Dr. Bradley Erskine.

On October 4, 2021, the Rockhill Environmental Preservation Alliance, Inc. ("REPA") and Dr. Bradley Erskine of Erskine Environmental Consulting, Inc. ("EEC") submitted a response letter (the "EEC Response Letter") to the Department following Hanson's September 14, 2021, submission. Tellingly, REPA expressly stated that it "remains committed [sic] working with the Department to permanently cease operations at the Rock Hill Quarry." REPA's statement demonstrates its true intentions in this process. Apparently, REPA has absolutely no interest in credibly participating in this review. REPA's comment also unfairly mischaracterizes the Department's role, which is not to shut down the Quarry, but rather to make sure Hanson's Quarry operations comply with Pennsylvania environmental statutes and the Department's regulations.

The EEC Response Letter's criticism of the counting methodology should be rejected. Hanson stands by its statement in its September 14, 2021 submission that "[a]ll fibers, regardless of length, are counted by Hanson at the perimeter air monitors, and that "[t]here will not be a scenario where the Department is unaware of the presence of NOA at the perimeter based on any 'selective' or 'systematic' counting scheme."

EEC's criticism confuses the required counting methodology with RJLG analysis of particle morphology. In particular, EEC takes issue with RJLG's analysis of the asbestiform morphology of the single structure identified across five rounds of sampling. As a result, EEC concludes that "[a]sbestos may be present will be unreported, as it was during the initial investigation. An exposure assessment cannot be accurately conducted with a compromised or biased data set."

EEC's conclusion is confusing. On one hand, EEC warns that asbestos will be unreported. On the other, EEC would not be able to perform its evaluation of RJLG's analysis but for Hanson providing the final laboratory analysis reports for each of its five rounds of sampling and documentation as to the single structure identified, which, in addition to the final laboratory report, included a map identifying the location of the identified structure, electron micrograph imagery of the structure, an energy dispersive x-ray spectrum, and a selected area electron diffraction pattern, as well as a RJLG memorandum reviewing the data.

It is remarkable that EEC can review the data set provided by Hanson and then comment that asbestos will be unreported and that Hanson is not transparent. As indicated in its laboratory reports, RJLG counted all structure lengths that meet or exceed 0.5 um with a ≥ 3:1 aspect ratio and reported the total numbers of structures that met that length. There was only one such structure. RJLG's subsequent analysis of the particle morphology of that structure has no impact on whether RJLG included that structure in its initial count – which it did. Hanson did not exclude the structure based upon its determination that it did not have the characteristics of asbestiform morphology.

EEC's difference of opinion regarding RJLG's analysis of the particle morphology of a single structure does not change the fact that RJLG *did* count the structure and, importantly, provided the data for the Department's (and the public's) review. This is how Hanson will continue to operate in the future. Hanson (or its consultant) will count all fibers that meet or exceed 0.5 micrometers at the perimeter of the Quarry and will provide the Department with all laboratory analysis in accordance with the requirements of Hanson's Asbestos Monitoring and Mitigation Plan ("AMMP"). The Department will be able to review whether any structures were identified. Based on these data, the Department may determine, on its own, whether Hanson appropriately counted structures and performed any appropriate corrective actions.

Contrary to EEC's critique, RLJG's qualitative analysis of the structure and conclusion that it does not have characteristics of asbestiform morphology *is* supported by the method used. EEC's criticism seems to be that RLJG did not provide enough detail regarding its qualitative assessment of the structure and determination that it did not possess the characteristics of asbestiform morphology and that the ISO 10312 method does not "specif[y] any additional criteria where a fiber can be deemed non-asbestos using general characteristics." This is patently wrong. First, RJLG did report the structure in accordance with the method as an amphibole structure. See RJLG Final Laboratory Report, TEM ISO Analysis (July 20, 2021).

Though ISO 10312 does not necessarily discriminate between asbestiform fibers and elongated/cleavage fragments of other non-asbestiform structures, ISO 10312 *does not* remove or prohibit the exercise of professional judgement from the process following the initial classification. This is implied throughout the method.

ISO 10312 "Ambient Air – Determination of Asbestos Fibres – Direct Transfer Transmission Electron Microscopy Method" (hereinafter, "ISO 10312") provides relevant

definitions:

- Asbestiform: specific type of mineral fibrosity in which fibres and fibrils possess high tensile strength and flexibility.
- Asbestos: group of silicate minerals belonging to the serpentine and amphibole groups, which have crystallized in the asbestiform habit, causing them to be easily separated into long, thin, flexible, strong fibres when crushed or processed;
- Cleavage: breaking of a mineral along one of its crystallographic directions;
- Cleavage Fragment: fragment of a crystal that is bounded by cleavage faces:
    - **Note 1 to entry: crushing of non-asbestiform amphibole generally yields elongated fragments that conform to the definition of a fibre**.
- Fibre: elongated particle that has parallel or stepped sides
    - Note 1 to entry: For the purposes of this document, a fibre is defined to have an aspect ratio equal to or greater than 5:1 and a minimum length of 0.5 um.

See ISO 10312, Section 3 (Terms and Definitions), at p. 2-3 (emphasis added). Clearly, within its definition section, ISO 10312 expressly states that "non-asbestiform amphibole" can meet the definition of a fibre.

This concept of distinguishing between asbestiform and non-asbestiform is consistently reflected across the regulatory spectrum. As discussed by Hanson in its September 14, 2021 submission, OSHA removed non-asbestiform from its asbestos standards. See 55 Fed. Reg. 4938 (Feb. 12, 1990); 57 Fed. Reg. 24310 (June 8, 1992). Similarly, in EPA's "Method for the Determination of Asbestos in Bulk Building Materials" (EPA/600/R-93/116), EPA states:

> The major purpose of the quantitative preparation is to provide the analyst with a representative grain mount of the sample **in which the asbestos can be observed and distinguished from the nonasbestos matrix**.

See EPA/600/R-93/116, at p. 12 (emphasis added).

Thus, contrary to EEC's suggestion, laboratories are *required* to classify particles as asbestiform or non-asbestiform to meet applicable regulatory requirements. Consistent with its prior critique of Hanson's analysis, EEC's theme seems to be that Hanson and its consultants should not be permitted to exercise any professional judgment. This is not possible. In any event, Hanson personnel are well trained and more than capable of implementing Hanson's corrective action scheme to the satisfaction of the Department.

10. Please provide an up to date comprehensive NOA Monitoring and Risk Mitigation Plan for the Rock Hill Quarry.: §77.451, §77.105, §77.130.

e. **Please determine, quantify, and express the site-specific incremental risk of cancer above background risks that the proposed operations at the**

Rock Hill quarry will have on surrounding communities.

RESPONSE: As indicated by Hanson's five (5) rounds of sampling at the perimeter of the Quarry, RJLG identified a single structure, which it determined did not have the characteristics of asbestiform morphology. RJLG also determined that the concentration from that analysis was 0.001 fibers/cc – 10 times lower than Hanson's proposed action limit in its AMMP. As a result of this baseline background analysis at the Quarry, asbestos fibers are not detected at the Quarry perimeter. Any future detections of asbestos at the Quarry perimeter during Quarry operations will represent the "incremental" risk of cancer above background risks. Further, any asbestos detected at the Quarry during Quarry operations will represent the highest concentrations to which community members may be exposed from operations. Finally, as indicated by the baseline background risk assessment, the current cancer risk posed by asbestos in the air at the Quarry is zero. Even conservatively assuming that the one non-asbestiform structure is a PCMe asbestiform structure, the risk level is well within EPA's acceptable risk range of 1x10E-4 to 1x10E-6.

11. **Please address suggestions provided by Secretary Dr. Rachel Levine the Pennsylvania Department of Health in the September 16, 2020 letter to Secretary McDonnell of the Pennsylvania Department of Environmental Protection including: §77.126, §77.104.**

Hanson is aware that the National Stone, Sand & Gravel Association ("NSSGA") previously provided a response to the Pennsylvania Department of Health's ("PADOH") September 16, 2020, letter to the Department.[2] Hanson concurs with NSSGA's responses provided therein and incorporates it here as if fully stated herein. Hanson further provides its response to the PADOH suggestions, below.

a. Conducting comprehensive health-based environmental sampling of air and soil for onsite, source, property/fence line and offsite locations.

RESPONSE: Hanson conducted five (5) rounds of sampling at eight (8) locations along the Quarry perimeter throughout the summer and fall of 2021. This sampling indicates that there is no asbestos detected in the ambient air at the Quarry perimeter. Moreover, this sampling indicates that any asbestos detected off-site, especially at locations attenuated and far removed from the Quarry, are unrelated to Quarry operations. This sampling indicates that off-site sampling at locations removed from the Quarry is unnecessary at this time. The sampling also provides an appropriate baseline from which Hanson and the Department can assess any future risks posed by future detections of asbestos detected in the air at the Quarry perimeter. Further, any asbestos detected at the Quarry during Quarry operations will represent the most conversative and protective figures against which community exposure can be measured.

[2] *Available at* https://files.dep.state.pa.us/RegionalResources/SERO/SEROPortalFiles/Community%20Info/RockHillQuarry/Naturally%20Occurring%20Asbestos%20Information%20-%20Timeline/NSSGA_EMP_Clarification_to_DOH.pdf

Hanson also included analysis of eight (8) bulk samples of overburden material collected at the Quarry, which were analyzed using polarized light microscopy ("PLM") in accordance with EPA/R-93/600/116 "Method for the Determination of Asbestos in Bulk Building Materials," and by transmission electron microscopy ("TEM") in accordance with ISO 22262-2.

b. Produce sample data applicable to human health, stationary breathing and on-person sampling over several weeks including summer and winter seasons covering various weather conditions.

RESPONSE: Hanson performed five (5) rounds of background analysis at eight (8) locations at the perimeter of the Quarry, for a total of forty (40) samples. The results of those analysis indicate that asbestos fibers were not detected in the air at the Quarry perimeter. This analysis serves as an adequate baseline against which any future detections of asbestos in the ambient air at the Quarry perimeter.

c. Conducting various activity-based personal sampling.

RESPONSE: In accordance with Section 4 of Hanson's AMMP, Hanson will perform activity-based sampling on a quarterly basis during the following operations:

1. Immediately downwind vicinity of blasting, if blasting is conducted during the quarter;
2. Near drilling machinery during operations, if drilling is conducted during the quarter;
3. Next to internal quarry roads on which haul trucks travel;
4. Near crushing/processing machinery during operations.

If TEM analysis confirms asbestos fiber concentrations in excess of the Mine Safety Health Administration ("MSHA") asbestos standard (0.1 f/cc) in any sample, Hanson will (1) notify DEP within 24 hours of receipt of the TEM analysis results, and (2) within three calendar days, conduct perimeter air monitoring in accordance with the AMMP. Hanson will maintain records associated with quarterly activity-based monitoring in accordance with the AMMP.

d. Determine the risk of exposure to vulnerable populations including schools, daycares, hospitals, etc.

RESPONSE: Based on five (5) rounds of background ambient air sampling collected at eight (8) locations along the perimeter of the Quarry, Hanson has not detected asbestos fibers in the air at the Quarry perimeter. Across forty (40) samples, RJLG identified a single structure, which RJLG determined did not possess asbestiform characteristics.

Even assuming that this structure was asbestiform, RJLG further calculated the concentration from that round of sampling to be 0.001 fibers/cc – 10 times lower than Hanson's proposed action limit in its AMMP.

This baseline background analysis demonstrates that the risk of exposure to asbestos from the Quarry to the surrounding community is effectively zero at this time. Finally, as indicated by the baseline background risk assessment, the current cancer risk posed by background levels of asbestos in the air at the Quarry is zero. Even conservatively assuming that the one non-asbestiform structure is a PCMe asbestiform structure, the risk level of asbestos based on the perimeter sampling is well within EPA's acceptable target cancer risk range of 1x10E-4 to 1x10E-6.

e. Conduct waterbody sampling.

RESPONSE: In addition, in its July 6, 2021 response to the Department, Hanson provided sampling analysis of surface water at the following seven locations at the Quarry:

1. NPDES Outfall
2. Sediment Trap 1
3. Sediment Trap 2
4. Sediment Trap 3
5. Sediment Basin 1
6. Sediment Basin 2
7. Quarry Pit

That sampling analysis did not identify any asbestos structures. As discussed by Hanson in its July 6, 2021 submission, this recent sampling supplements prior sampling reanalyzed in the August 14, 2020 submission. For that submission, Hanson analyzed water samples from each of the above listed sampling points in the spring of 2019. None of those samples were close to or exceeded EPA's recommended water quality criterion of 7 million fibers per liter ("MFL")[3] or the federal drinking water maximum contaminant level ("MCL") of 7 MFL that exceed 10 microns in length.[4]

Regarding ingestion via drinking water or other means, EPA has not established a reference dose level ("RfD") with respect to any increased risk of cancer associated with the ingestion of asbestos. See EPA IRIS Summary – Asbestos.[5] Further, according to the Agency for Toxic Substances and Disease Registry ("ATSDR"), "studies in humans and animals indicate that the ingestion of asbestos causes little or no risk of non-carcinogenic injury." See ATSDR Toxicological Profile for Asbestos (September 2001), at 3.2.2.[6]

[3] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table
[4] https://www.epa.gov/sites/production/files/2018-12/documents/hh-criteria-calculation-matrix-2002.pdf
[5] *Available at https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0371_summary.pdf.*
[6] *Available at* https://www.atsdr.cdc.gov/toxprofiles/tp61.pdf.

In that regard, the relevant water body - Tohickon Creek – was evaluated for use as a potable water supply. As discussed by Hanson in its July 19, 2018 submission[7], there are no known surface water intakes for a PWS within 10 miles downstream of the Quarry discharge. See Hanson Permit Update Submission (July 19, 2018), Module 8.5 (Public Water Supply Information).

f. Utilizing the EPA executed comprehensive NOA environmental sampling study protocols as guidelines.

RESPONSE: As discussed in section 3.4 of Hanson's AMMP (Analytical Methods), with respect to perimeter air analysis, Hanson employed the method identified by EPA in its Framework:

> The analytical methods and laboratory analysis for asbestos in air analysis to be utilized as part of this plan shall be those described in ISO 10312-2019-10 "Ambient Air – Determination of Asbestos Fibers – Direct Transfer Transmission Electron Microscopy Method", as modified by Page C-3 of EPA's "OSWER Directive #9200.0-68, September 2008, Framework For Investigating Asbestos-Contaminated Superfund Sites", which states that "Under the ISO method, two specific counting schemes are detailed. The first scheme is more general and allows for the counting of fibers that are 0.5 µm in length or greater, and have aspect ratios of 5:1 or greater. In routine practice, TEM is able to resolve fibers down to approximately 0.1 µm in width, as compared to the resolution for routine PCM (0.25 µm). Therefore, short thin fibers that would not be detected using PCM will be detected using TEM under the general counting scheme. EPA recommends modification of the aspect ratio to 3:1 for this counting scheme.

With respect to analysis of surface water, samples were analyzed in accordance with EPA Method 100.1 600/4-03-043 (Analytical Method For Determination Of Asbestos Fibers In Water).[8]

Finally, with respect to RJLG's analysis of bulk overburden materials at the Quarry, samples were analyzed by both polarized light microscopy ("PLM") in accordance with EPA/R-93/600/116 (Method for the Determination of Asbestos in Bulk Building Materials)[9] and by transmission electron microscopy (TEM) in accordance with ISO 22262-2 "Quantitative determination of asbestos by gravimetric and microscopical methods."

g. Please provide a complete all-encompassing Workplace Controls and

[7] *Available at https://files.dep.state.pa.us/RegionalResources/SERO/SEROPortalFiles/Community%20Info/RockHillQuarry/Non-Coal%20Surface%20Mining/July%2019%2c%202018%20Hanson%20Aggregates%20Permit%20Update.pdf.*
[8] https://semspub.epa.gov/work/08/1772054.pdf
[9] https://www.nist.gov/system/files/documents/nvlap/EPA-600-R-93-116.pdf

Practices Plan to Reduce NOA Exposure

RESPONSE: As part of its July 6, 2021 submission, Hanson developed and submitted an AMMP and Mineral Identification and Management Guide. These documents set forth comprehensive plans to safely identify, monitor, report to the Department, and mitigate (if necessary) NOA encountered during Quarry operations.

As indicated in Section 3.3 its AMMP:

> During periods of full quarry operation, perimeter monitoring samples will be collected on a bimonthly basis. Bi-monthly samples will be collected for an initial 6-month period of full quarry operations. Although daily hours of operation may vary, sampling events will coincide with times the aggregate processing equipment is operating and will not be conducted on closed days except to perform ambient or low activity sampling as described below. Samples will also be collected during blasting activities.

Further, per Section 4, Hanson will perform activity-based monitoring:

> On a quarterly basis, unless otherwise approved in writing by PADEP, Hanson will collect and analyze air samples during each of the following operations using the same collection and analysis methods described above in Sections 3.2 and 3.4:
>
> - Immediately downwind vicinity of blasting, if blasting is conducted during the quarter.
> - Near drilling machinery during operations, if drilling is conducted during the quarter.
> - Next to internal quarry roads on which haul trucks travel.
> - Near crushing/processing machinery during operations.
>
> If TEM analysis confirms asbestos fiber concentrations in excess of MSHA asbestos standard (0.1 f/cc) in any sample[10], Hanson will (1) notify PADEP within 24 hours of receipt of the TEM analysis results, and (2) within three calendar days, conduct perimeter air monitoring in accordance with Section 3 above. Hanson will maintain records associated with quarterly activity-based monitoring in accordance with Section 3.5.

Finally, in accordance with section 6.2 of its AMMP, to minimize dust at the Quarry, Hanson will apply several measures with respect to vehicle traffic, stockpiling and material handling, crushing and sizing equipment, drill rigs, and blasting, including the following:

> <u>Vehicle Traffic</u>
> - Hanson will utilize a dedicated street sweeper to clean paved plant roads

[10] Note, the MSHA PEL is an 8-hour time-weighted average exposure.

and public roadways near site entrances as needed. Hanson's [or a subcontractor's] street sweeper is a state-of-the-art sweeper utilizing a broom system and water sprays to collect debris while minimizing dust generation. Hanson will maintain a log of the time and day when the street sweeper is used.

- When operating, Hanson will conduct a daily visual inspection for material tracked onto public roads. If material has accumulated on a public road, Hanson will clean the road promptly or, at minimum, by the end of the workday. During full quarry operations, one camera will be installed to monitor the entrance of the quarry to allow the operator to observe any accumulated material.
- Posted vehicle speed limits on haul roads in quarry and stockpile areas to no more than 15 miles per hour

Haul Roads:

- Application of water or commercial dust suppressing liquids during extremely dry or windy conditions and in winter months as needed.
- Roads are resurfaced/regraded as needed to maintain a clear and safe working surface and thereby reducing dust generation.

Stockpiles and Material Handling:

- Storage piles will be wetted using water sprays as necessary to control emissions. Stock and working piles will be adequately wetted or controlled using dust palliatives or suppressants, wind berms, or breaks during the addition and removal of material.
- Hanson may wet materials to be handled prior to loading tucks. The drop height will be minimized as safety permits. Trucks will be loaded on the leeward side of the storage pile. The facility will install a wind sock to easily identify wind direction.
- Dust will be controlled with wet sprays and/or dust collection systems in accordance with best available technology requirements on all conveyors/transfer points.
- Overburden will be wetted (if necessary) prior to movement or handling to minimize dust generation.

Crushing and Sizing Equipment:

- Shot rock and processed aggregate spillage will be cleaned up as needed to minimize creation of excessive amounts of dust and to maintain general housekeeping in the quarry. The frequency of cleaning up spillage will vary depending upon how much material is running through the plant and how much product is being produced, loaded, and sold on a given day

Blasting:

- Prior to blasting, all drill cuttings will be removed from around the drill holes. The use of dust or screenings as stemming for blast holes will not be permitted. Coarse aggregate will be used for stemming.

- To minimize the offsite migration of dust, the blast area will be pre-wetted to minimize the release of surface dust and fines, scheduling blasts only under favorable meteorological conditions. In addition, smaller blasts can be employed when possible.

h. Please provide a complete all-encompassing plan to prevent NOA exposure to the surrounding community.

RESPONSE: As discussed above, Hanson's AMMP provides that during full Quarry operations, Hanson will perform perimeter monitoring analysis on a bi-monthly basis. During more limited 500-ton removal operations, Hanson will collect samples during the entirety of the removal event. In accordance with ISO 10312-2019-10, as modified by EPA's Framework, Hanson analytical laboratory will count all asbestos fibers that are 0.5 um in length or greater. Analytical reports provided to Hanson by the analytical laboratory will be sent to PADEP promptly in accordance with Hanson's AMMP.

From that count, Hanson will determine if the identified asbestos fibers exceed Hanson's proposed corrective action threshold level in its AMMP. If TEM analysis confirms asbestos fiber concentrations in excess of the proposed corrective action level in any sample, Hanson will undertake the following corrective measures to abate any potential migration of asbestos fibers:

1. Report the results immediately to the Hanson site manager and Operations Manager. Hanson will also notify the PADEP within 24 hours of receipt of the TEM analysis results.

2. Daily air sampling of that location will commence for 7 days.

3. Investigate the potential cause of the results. The investigation will include at least the following elements:
    a. Review of operational activities that were occurring during sampling,
    b. Confirmation that dust suppression systems are fully operational, and
    c. Quality Assurance and Quality Control review of all sampling and laboratory equipment and procedures.

4. Hanson will take immediate corrective measures. These corrective measures may vary based on the location of the sample, and findings of the investigation. The investigation will begin as soon as the result is confirmed and will be completed in an expedited manner. The corrective actions may include investigation of the source of any airborne asbestos, extra dust suppression measures, cleanup, repairs or modifications to systems and controls, or temporary cessation of operations.

5. Within seven calendar days of receipt of the TEM analysis results from the 7-day daily air sampling in 2) above, submit to PADEP a written report of the sampling

results, and a plan and schedule of steps that have been or will be taken to identify and mitigate the source of the airborne asbestos, and to re-monitor ambient air at the facility perimeter. This written report should also include the results of the most recent EPA Method 100.1 water sampling described in Section 5.

6. Hanson will record the results and all corrective measures taken at the site in a permanent written log.

In the event that asbestos is detected at the perimeter, Hanson will notify the Department quickly upon receipt of laboratory analysis. If that asbestos exceeds Hanson's proposed corrective action level threshold in its AMMP, Hanson is obligated to perform corrective actions, which may include temporary cessation of Quarry operations. Hanson must submit a written report of the sampling results, and a plan and schedule of steps that have or will be taken to identify and mitigate the source of airborne asbestos. In this way, the exposure to the community of asbestos generated by Quarry operations will be consistently monitored and addressed, as necessary. Data collected at the perimeter of the quarry also represents the most conservative exposure scenario against which community exposure can be measured, and will be more protective of the community than data collected off-site.

12. Testing provided by Hanson Aggregates has shown that NOA and Elongate Mineral Particles are present at the Rock Hill Quarry Site. § 77.451, § 77 .104.

a. Please quantify the background levels of airborne NOA and EMPs in the vicinity of the Rock Hill Quarry site by performing a background level assessment utilizing the structure counting criteria as described in ISO 10312-2019-10 "Ambient Air - Determination of Asbestos Fibers - Direct Transfer Transmission Electron Microscopy Method", as modified in Appendix C, Page C-3: Fiber Measurement and Identification detailed in EPA's "OSWER Directive #9200.0-68, September 2008, Framework For Investigating Asbestos-Contaminated Superfund Sites".

RESPONSE: Hanson collected five (5) rounds of ambient air samples at eight (8) monitoring locations at the quarry perimeter in accordance with ISO 10312-2019-10, as modified by EPA's Framework. Across five rounds of sampling, RJLG identified a single structure, which it determined did not possess the characteristics of asbestiform morphology. As such, no asbestos fibers were detected in the air at the perimeter of the Quarry.

b. Utilizing the background levels of NOA and EMPs, specify the corrective action levels to be used to maintain NOA and EMPs transmission and/or migration below levels known to be associated

with asbestos related diseases with the assumption that EMPs may pose the same health risks as NOA.

RESPONSE: As discussed in Hanson's July 6, 2021, submission and Section 3.6 Hanson's AMMP (Corrective Actions), Hanson has proposed a corrective action level consistent with EPA's Framework, as well as EPA's superfund responses at, for example, the Ambler and Borit Asbestos Superfund Sites.

c. Please provide a detailed all-encompassing site-specific NOA and EMP guidance document for the Rock Hill Quarry addressing sampling, analysis, monitoring, and controlling NOA & EMP transmission resulting from any operation at the Rock Hill Quarry via air, water or aggregate production and transportation.

RESPONSE: Hanson developed and provided its AMMP as part of its July 6, 2021 submission to the Department. Hanson's AMMP provides a comprehensive guide as to how Hanson will collect, analyze, and monitor airborne asbestos data at the Quarry during both full and limited Quarry operations, record and report that data to the Department, perform corrective actions, perform activity based monitoring, and mitigate dust and emissions during operations. The perimeter analysis and activity based analysis will identify asbestos generated during all quarrying activities, including the processing of current aggregate stockpiles. Hanson has also developed a Mineral Identification and Management Guide to assist its quarry personnel in inspecting the Quarry, identifying protocol asbestos fibers, and properly dispose of identified asbestos material.

In addition to perimeter air analysis, Hanson will collect a sample from dust suppression water sources for asbestos analysis, which will be analyzed in accordance with EPA Method 100.1 (Analytical Method For Determination Of Asbestos Fibers In Water).

With respect to the transportation of rock determined to contain NOA at and from the Quarry, Hanson's AMMP implements several emissions mitigation measures with respect to truck traffic and the local haul road. These include the following measures:

1. posted vehicle speed limit of 15 miles per hour,
2. paving the site entrance,
3. truck washing equipment,
4. street sweepers to clean public roadways,
5. requirements that all trucks transporting materials off-site be covered.

Further, the OSHA and MSHA Hazard Communication Standards require product warnings that meet their specifications. This is normally conveyed in Safety Data Sheets and weigh ticket warnings. The Quarry will comply with all OSHA and MSHA warning regulations.

Hanson remains committed to continuing to work with PADEP to allow the removal of the Cessation Order so that quarrying activities can safely resume at the Rock Hill Quarry.

Regards,

Andrew J. Gutshall, P.G.
Area Environmental Manager

Catherine Stehlin
Associate General Counsel – NE Region

encl:

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Robert, J. Schena, Esq., Fox Rothschild LLP
Environmental File

ATTACHMENT A

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

October 29, 2021

Mr. Robert Schena
Fox Rothschild, LLP
747 Constitution Dr
Suite 100
Exton, PA 19341

RE: Hanson Aggregates Rock Hill Quarry
RJ Lee Group Project Number LLH901997

Dear Mr. Schena,

This letter is to present a technical response to the letter dated September 28, 2021 from Erskine Environmental Consulting (EEC) to REPA. The EEC letter contains several statements as to the nature of the testing and results provided by RJ Lee Group.

REPA criticism #1

> Hanson submitted a number of test results where asbestos was detected in one sample during a time frame when activity at the site was minimal or absent. The test results and interpretations were provided by their consulting laboratory, R.J. Lee Group (RJLG). For the sample where an actinolite fiber was observed, RJLG, within the body of the text, classified the fiber as not having the characteristics of asbestos, and included a TEM photograph and EDX chemical spectra in support of this assertion. The final laboratory report omitted reference to the determination that the fiber was actinolite, a regulated form of asbestos.

A particle of actinolite was observed during the analysis and was accurately and completely reported. Contrary to EEC's assertion, the observed actinolite fiber was reported, but was correctly classified as having a non-asbestiform habit.

The definition of asbestos, from ISO 10312-2019 is:

> **3.6**
> **asbestos**
> group of silicate minerals belonging to the serpentine and *amphibole* (3.2) groups, which have crystallized in the asbestiform habit, causing them to be easily separated into long, thin, flexible, strong *fibres* (3.22) when crushed or processed
>
> Note 1 to entry: The Chemical Abstracts Service Registry Numbers of the most common asbestos varieties are: chrysotile (12001-29-5), crocidolite (12001-28-4), grunerite asbestos (Amosite) (12172-73-5), anthophyllite asbestos (77536-67-5), tremolite asbestos (77536-68-6) and actinolite asbestos (77536-66-4). Other varieties of asbestiform amphibole, such as richterite asbestos and winchite asbestos[19] may also be found in some products such as vermiculite and talc.

This is expanded by the definition of amphibole:

3.2
amphibole
group of rock-forming ferromagnesium silicate minerals, closely related in crystal form and composition, and having the nominal formula:

$$A_{0-1}B_2C_5T_8O_{22}(OH,F,Cl)_2$$

where

A = K, Na;

B = Fe^{2+}, Mn, Mg, Ca, Na;

C = Al, Cr, Ti, Fe^{3+}, Mg, Fe^{2+};

T = Si, Al, Cr, Fe^{3+}, Ti.

Further, the definition for amphibole asbestos:

3.3
amphibole asbestos
amphibole (3.2) in an *asbestiform* (3.5) habit

For completeness, the definition of asbestiform:

3.5
asbestiform
specific type of mineral fibrosity in which the *fibres* (3.22) and fibrils possess high tensile strength and flexibility

And fibre:

3.22
fibre
elongated particle that has parallel or stepped sides

Note 1 to entry: For the purposes of this document, a fibre is defined to have an aspect ratio equal to or greater than 5:1 and a minimum length of 0,5 µm.

Note: this definition has been modified per USEPA OSWER Directive 9200.0-68 as specified by PADEP to include particles with aspect ratio equal to or greater than 3:1.

A further clarifying definition is also provided in the method:

3.13
cleavage fragment
fragment of a crystal that is bounded by *cleavage* (3.12) faces

Note 1 to entry: Crushing of non-asbestiform amphibole generally yields elongated fragments that conform to the definition of a fibre.

In the above definition for cleavage fragment, it is important to note that elongated non-asbestiform fragments can conform to the definition of a fiber, and would be included in the overall structure count. However, ISO's specific definition for "cleavage fragment" clearly acknowledges that not all elongated fibers can or should be considered to be asbestos. This is critical in that the known facts are the rocks at Rock Hill have indicated the presence of both asbestiform (and thus amphibole asbestos) and non-

asbestiform amphiboles (not amphibole asbestos). Thus, it is improper to presume all amphibole fibers would be asbestos, as not all of the fibers can be assumed to be asbestiform. The importance of this fact has been codified by USOSHA in 1992[1] to exclude non-asbestiform varieties of the amphibole minerals from the regulation of asbestos. Further, USMSHA came to a similar conclusion in 2008[2] and did not include non-asbestiform amphiboles in the definition of asbestos.

REPA criticism #2

> The fiber in question, does, in fact, possess the characteristics of asbestos as defined by the procedures of the test method, and the method includes no criteria allowing the classification of a fiber as non-asbestos using general descriptive criteria. ISO 10312 defines a fiber as:
>
> > *Any particle with parallel or stepped sides, of minimum length 0.5 µm, and with an aspect ratio of 5:1 or greater, shall be defined as a fiber.*
>
> The fiber in question meets this definition.

Here EEC mixes definitions. It is clear that EEC is using only the definition of "fiber" as provided in ISO 10312 to mean "asbestos". EEC believes that any and all amphibole fibers be counted as asbestos even if they are not. RJLG clearly reported the fiber as amphibole and did nothing to exclude it from the analysis or hide it from critical review. Reporting the fiber as non-asbestiform is consistent with the facts presented by observation of the fiber and comparison to characteristics of asbestiform material presented in peer-reviewed literature cited in ISO 10312 (Campbell W.J, Blake R.L., Brown L.L., Cather E.E., Sjoberg J.J. Selected silicate minerals and their asbestiform varieties. Mineralogical definitions and identification-characterization. Information circular 8751. United States Department of the Interior, Bureau of Mines, Washington, D.C., 1977).

REPA criticism #3

> **The RJLG report (dated July 30, 2021) identified the fiber as actinolite, an amphibole regulated as asbestos.**

Actinolite is regulated as asbestos only when it occurs in the asbestiform habit. RJLG is following current US regulations on the nature of what is and is not asbestos.

> It is not clear why RJLG did not report the fiber as asbestos when, by their own report, meets the criteria specified in ISO 10312:
>
> 1. The particle meets the definition of a fiber,
> 2. The particle was identified as an amphibole, and
> 3. The amphibole was identified as actinolite.
>
> Thus, the fiber should have been reported on the report as actinolite asbestos, and not non-asbestiform amphibole.

[1] 57 FR 24310, June 8, 1992
[2] 73 FR 11284, February 29, 2008

RJLG did not report the fiber as asbestos because it does not possess the characteristics of being asbestiform. The fiber in question does in fact meet all of the three criteria listed, and was accurately reported as an amphibole fiber. RJLG will only report as asbestos those fibers that possess asbestiform characteristics. We have been clear and transparent in presenting this finding.

The ISO 10312 method acknowledges the interference that non-asbestiform fibers (i.e. cleavage fragments) present. However, it in no way requires that all amphibole fibers be reported as asbestos. At Appendix D, Section D.4.1:

> It is not always possible to proceed to a definitive identification of a fibre; this may be due to instrumental limitations or to the actual nature of the fibre.

This statement acknowledges the inherent interferences using the ISO10312 method by fibers of non-asbestiform morphology (i.e. actual nature of the fibre).

Also at Appendix D, Section D.4.3:

> Every particle without tubular morphology and which is not obviously of biological origin, with an aspect ratio of 5:1 or greater, and having parallel or stepped sides, shall be considered as a suspected amphibole fibre.

This phrasing clearly describes the fiber at issue. RJLG followed the appropriate steps of zone axis ED and quantitative EDS analysis to arrive at the correct identification of the fiber being of unequivocal amphibole composition as outlined in Figure D.4 and identified the fiber as amphibole.

All particles observed to have the morphology of a fiber have been counted. This fiber has also been accurately identified as being amphibole. RJLG has not evaded any portion of the ISO 10312 method.

The continued criticism by REPA and its consultant on the RJLG results is refuted by the method itself. The argument hinges on this single sentence in the Scope section of ISO 10312:

> The method cannot discriminate between individual fibres of asbestos and elongate fragments (cleavage fragments and acicular particles) from non-asbestos analogues of the same amphibole mineral[13].

This statement is at odds with the entire foundation of the EEC criticisms of the results provided by RJLG and is ignored by REPA. By their reasoning all observed fibers of amphibole should be asbestos. Since the counting criteria cannot differentiate between the two forms, and we know that the two forms exist at this site, it cannot be used to differentiate one form from the other. By utilizing and continually misinterpreting this method it is clear that one of the aims of REPA through their consultant is to consistently inflate (in this instance by 100%) the concentration of any “asbestos” that might be measured. By equating the definition of “fiber” to mean “asbestos” REPA is ignoring the facts of the geology at this site as has been consistently done in repeated reviews of RJLG analyses. RJLG does not deny that an amphibole fiber was found during the analysis (we reported it). By referring to the publication cited at 13 in the bibliography of ISO 10312 it is possible to understand the differences in the nature of asbestos and non-asbestos varieties of amphibole. While there is no quantitative means to make this distinction for a single fiber, that does not preclude making the best effort to accurately

describe the nature of the material being examined. When dealing with non-commercial amphibole types (e.g., actinolite), if the dimensions and characteristics of the observed fiber were consistent with amphibole asbestos it would have been reported as such. Additionally, ISO 22262-1 describes a means of differentiating asbestiform amphiboles states:

> In general, for this part of ISO 22262, the presence of either the asbestiform or the non-asbestiform analogues of tremolite, actinolite, anthophyllite or richterite/winchite can usually be specified. If the majority of the amphibole fibres longer than 5 µm have aspect ratios equal to or lower than 5:1, and if the fibres do not exhibit any of the characteristics in c), it can be concluded that the amphibole is probably non-asbestiform, with the degree of certainty increasing with decreasing maximum aspect ratio. If any amphibole fibres longer than 5 µm with aspect ratios in the range of 20:1 or higher are observed, then it can be concluded that amphibole asbestos is probably present, with the degree of certainty increasing with increasing aspect ratio.

REPA criticism #4

Finally, EEC continues to make the same criticism of RJLG:

> This subject has been addressed in several memoranda by EEC, and it is a very important issue in evaluating whether or not the project should be allowed to move forward. If the RJLG reports are an indication of what may be expected in the future, then it seems asbestos in processed material and air samples will be reported as non-asbestos based on "characteristics of asbestiform morphology" rather than as reported by the test methodology. Asbestos that may be present will be unreported, as it was during the initial investigation. An exposure assessment cannot be accurately conducted with a compromised or biased data set.

Reporting on this site over the past two years by RJLG has been consistent with the prescribed generally accepted methods: the amphibole present in the quarry is actinolite and represents a range of morphologies from asbestiform to prismatic. When asbestiform actinolite has been observed, it has been accurately reported as actinolite asbestos. Likewise, when non-asbestiform actinolite has been observed, it has been accurately reported as such following generally accepted analytical methodologies. No serpentine or amphibole type fibers have been excluded from the analyses and RJLG will continue to accurately follow the counting protocols of any prescribed methods. The fact that amphibole occurs in a range of morphologies confounds any interpretation of the data collected on the nature of any airborne fibers by any laboratory that thoroughly understands the issues at hand (refer to EMSL letter to PADEP dated October 30, 2019). Just because the prescribed analytical method does not provide a quantitative means to distinguish asbestiform from non-asbestiform fibers does not abolish the fact that they may exist together in a sample and in this quarry.

For the purpose of regulating this site, the distinction between asbestiform and non-asbestiform materials is crucial. For the purpose of monitoring the concentration of airborne fibers to assess any hazard presented, that distinction is also crucial.

If PADEP personnel have any concerns over the scientific credentials and integrity of the RJ Lee Group's laboratory and staff based on the continued assertions of REPA and their paid contractor(s), we welcome PADEP to visit our laboratory and speak with our personnel. It should be noted that RJLG is a PADEP approved laboratory for asbestos analysis.

RJLG strives for accuracy in all analyses performed, and to over-report the asbestos content measured by deviation from standard methods is inaccurate and unacceptable. How the PADEP or our client Hanson uses or interprets our data is beyond our control.

Sincerely,

Bryan Bandli, Ph.D.
Principal Investigator

ATTACHMENT B

Memorandum

To: Robert Schena, Fox Rothschild LLP **Date:** October 28, 2021

From: Julie Goodman, Ph.D., DABT, FACE, ATS

Subject: 2021 Rock Hill Quarry Perimeter Sampling

On five occasions in 2021 (June 23, July 6, July 28, August 27, and September 10), Hanson Aggregates PA LLC (Hanson) performed perimeter ambient air sampling at the Rock Hill Quarry (Gutshall, 2021; RJLG, 2021a,b). In the five rounds of sampling, only one structure was detected among the 40 samples that were collected, and this structure was not a phase-contrast microscopy equivalent (PCMe) structure. This is, it was not an asbestiform elongate mineral particle (EMP), according to the United States Environmental Protection Agency's (US EPA) "Framework for Investigating Asbestos-Contaminated Superfund Sites" (Framework) (US EPA, 2008). These results do not provide evidence for any background asbestos concentrations at the perimeter of the quarry.

Based on the sampling at the perimeter of the quarry, it is my professional opinion that the current background concentrations of EMPs in the air do not present a risk to the community. This single structure, even assuming it was a PCMe structure, is 10 times lower than Hanson's proposed screening level of 0.01 PCMe fibers per cubic centimeter (f/cc) and, if it were a PCMe structure, would be associated with a cancer risk within US EPA's acceptable range of 10^{-4} to 10^{-6}.

Because the highest possible concentrations of asbestos from the quarry to which the community could be exposed is at the perimeter of the quarry, the assessment of background off-site asbestos is unnecessary. It is my professional opinion that this sampling serves as an acceptable baseline assessment against which future measurements of asbestos at the perimeter can be compared, and that using data collected at the perimeter of the quarry will be protective of the community because it will represent the maximum potential asbestos exposure from quarry operations.

1 Sampling and Analysis Methods

Air monitoring samples were collected from eight locations (M1 to M8) on the perimeter of the Rock Hill Quarry site, as shown in Figure 1, below, on June 23, July 6, July 28, August 27, and September 10, 2021. One of the sampling locations (M2) is located in an area described as "aggregate stockpiles," which had overburden material that was quarried and stockpiled at some point in the past.

RJ Lee Group (RJLG) analyzed all of the air samples using International Organization for Standardization (ISO) Method 10312 (modified per Office of Solid Waste and Emergency Response [OSWER] Directive #9200.0-68), which describes the preparation and analysis of ambient air samples using transmission electron microscopy (TEM) and electron diffraction and energy dispersive X-ray analyses (Bandli, 2021; US EPA, 2008). TEM analysis identifies and records asbestos fibers and asbestos structures, which include "bundles, clusters, and matrices" (US EPA, 2008, p. C-3). According to US EPA's Framework, this "method is used for the determination of the concentration of asbestos structures in air samples, and includes measurements of lengths, widths, and aspect ratio… of the asbestos structures. The method allows

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determination of the type of asbestos fibers present in a sample, but cannot discriminate between individual structures of asbestos and non-asbestos forms of amphibole minerals" (US EPA, 2008, pp. C-1-C-2). When "a TEM analyst visually detects a structure that morphologically resembles an asbestos mineral," additional tests are performed using electron diffraction and X-ray analysis to examine the crystal structure of the fiber (US EPA, 2008, p. C-4). US EPA's Framework specifically defines PCMe structures as the following:

> [C]hrysotile and amphibole structures identified through transmission electron microscopy (TEM) analysis that are equivalent to those that would be identified in the same sample through phase contrast microscopy analysis, with the main difference being that TEM additionally permits the specific identification of asbestos fibers. PCMe structures are **asbestiform** structures greater than 5 microns in length having at least a 3 to 1 length to width (aspect) ratio. (US EPA, 2008, p. A-3) (emphasis added)

As such, even if a structure exceeds 5 μm, it is not a PCMe structure if it does not have an asbestiform morphology.

Hanson stated in its September 14, 2021, letter to the Pennsylvania Department of Environmental Protection (PADEP) that "[a]ll fibers, regardless of length, are counted by Hanson at the perimeter air monitors. All perimeter air monitoring sampling results are shared with the Pennsylvania Department of Environmental Protection… within twenty-four (24) hours of receipt by Hanson" (Hanson, 2021). This sampling procedure is consistent with the US EPA's Framework, which outlined two steps: (1) a general counting scheme in which all asbestos fibers ≥0.5 μm in length are identified, and (2) for the purposes of determining risk, all fibers >5 μm with an aspect ratio of ≥3:1 and a width ≥0.25 μm and ≤3 μm are counted (US EPA, 2008). Hanson also collected water samples on June 23, 2021 (Hanson Aggregates PA, LLC, 2020).

Water samples were analyzed by RJLG using US EPA method 100.1 600/4-03-043, which also employs TEM analysis (Hanson Aggregates PA, LLC, 2020; Chatfield and Dillon, 1983). In this method, all asbestos fibers with a length >0.5 μm and an aspect ratio ≥3:1 are counted. Determining the number of fibers with lengths >5 μm can be useful for determining the quantity of asbestos fibers present in water that, if the water were to evaporate, could become airborne.

2 Sampling Results

RJLG counted all structures ≥0.5 μm long with aspect ratios ≥3:1 from the air samples collected on June 23, July 6, July 28, August 27, and September 10 (Gutshall, 2021; RJLG, 2021b,c). No asbestos fibers or asbestos structures were detected in the air samples that were collected on June 23, July 28, August 27, or September 10 (RJLG, 2021a-d).

Regarding its analysis of eight air samples collected on July 6, 2021, RJLG reported that there were "no countable structures (≥0.5 μm long, ≥3:1 aspect ratio)" in seven of the samples (Bandli, 2021). One amphibole structure was detected in Sample 0706-4, which was collected at location M5. RJLG reported that the structure was 5.5 μm long and 0.7 μm wide, yielding an aspect ratio of 7.86, but indicated that, based on electron diffraction and energy dispersive X-ray analyses, the structure "does not have characteristics of asbestiform morphology" (Bandli, 2021). That is, the detected amphibole fiber was a cleavage fragment.

Cleavage fragments are formed by the fragmentation of a non-fibrous mineral (*e.g.*, when a rock is crushed). The distinction between naturally occurring asbestos (NOA) fibers and cleavage fragments, even of the same mineral, is important, because they have different physical and toxicological characteristics (*i.e.*, their ability, or lack thereof, to cause health effects in humans) and different surface properties, such as roughness

(NRC, 1984), as a result of the way in which they are formed. Cleavage fragments are always non-asbestiform particles (Campbell *et al*., 1977). Exposure to cleavage fragments has not been shown to present similar health risks as exposure to asbestiform fibers (Gamble and Gibbs, 2008; Addison and McConnell, 2008; Mossman, 2008; Williams *et al*., 2013).

No asbestos structures were detected in the seven water samples collected on June 23, 2021 (Hanson Aggregates PA, LLC. 2020).

These analyses demonstrate that there is no measurable asbestos at the perimeter of the Rock Hill Quarry when there is no activity occurring at the site.

3 Risk Assessment

I analyzed the results of five rounds of sampling to determine potential baseline exposures to asbestos in the air at the perimeter of the site and evaluate any potential human health risks at baseline. The primary pathway through which the community around the Rock Hill Quarry might be exposed to asbestos in the air from the site at baseline is *via* inhalation.

Out of 40 samples, 39 had no detectable EMPs and 1 sample had 0.001 s/cc. According to US EPA guidance, "[w]hen computing the mean of a set of asbestos measurements, samples that are 'non-detect' should be evaluated using a value of zero" (US EPA, 2008, p. 19).[1] Thus, I calculated a mean of 0.000025 s/cc among these samples.

Because the only structure detected was not a PCMe structure, these data do not indicate there is any inhalation risk from current background asbestos exposures at the quarry perimeter. However, assuming it was an asbestos fiber, and assuming a person would be exposed continuously (*i.e*., 24 hours per day, 365 days per year) over a lifetime starting at birth, and using the inhalation unit risk (IUR) of 0.23 calculated by US EPA (2008, Table 2), I calculated a lifetime cancer risk of 5.8 in 1,000,000, which is well within US EPA's acceptable range of 10^{-4} to 10^{-6}. This is also well below Hanson's proposed action level of 0.01 f/cc, which is consistent with US EPA's Framework. This lifetime exposure scenario is a worst-case exposure scenario and assumes that the structure was asbestos and not, as determined by RJLG, a cleavage fragment. Because the structure was a cleavage fragment and not asbestos, the true risk of exposure to current background conditions is zero.

Based on the risk calculations discussed above, and consistent with risk assessment guidance in US EPA's Framework, no further action is necessary at this time to evaluate the potential for off-site asbestos because no PCMe structures were detected at the quarry perimeter during the background sampling events (US EPA, 2008, p. 9). Further, the one cleavage fragment structure, even assuming it qualified as asbestiform, did not exceed Hanson's proposed screening level or US EPA's acceptable risk level. For the same reason, no mitigation of asbestos generated at the quarry is necessary at this time.

With respect to water, based on a hydrogeological survey performed in 2017, there were no known surface water intakes for a public water supply within 10 miles downstream from the quarry, and there were only two wells within a half-mile of the quarry (EarthRes, 2018). Even if it were drinking water, considering the limit of detection, the lack of asbestos structures detected in water samples indicate that if there is any asbestos present, it would be in concentrations well below US EPA's recommended ambient surface water criterion of 7 million fibers per liter (MFL) and the federal drinking water maximum contaminant level of 7 MFL that exceed 10 μm in length (US EPA, 2020). I also note that inhalation is the primary route of

[1] According to US EPA (2008, p. 19) using half of the limit of detection for non-detects (*i.e*., rather than zero) "may lead to a substantial overestimate of the true mean of a group of samples."

exposure for asbestos and, as stated by the Agency for Toxic Substances and Disease Registry, "[s]tudies in humans and animals indicate that ingestion of asbestos causes little or no risk of noncarcinogenic injury" (ATSDR, 2001).

4 Risk Management

Asbestos risks to receptors occur primarily through inhalation. The potential risk of exposure to the community from asbestos generated during quarry operations could occur through two primary pathways: quarry operations that result in asbestos emissions into the ambient air that migrate, off-site and transport of mined aggregate that potential contains asbestos material.

4.1 Quarry Operations

Hanson will conduct air monitoring at the perimeter during quarry operations; these data will also be provided to PADEP.

If asbestos is measured off-site, it may not be possible to determine from where it originated. In contrast, perimeter sampling can be assumed to represent the worst-case scenario with respect to asbestos exposure from the quarry for people in the community, especially sensitive receptors. This is because asbestos does not significantly migrate from its source. Several studies have shown that asbestos concentrations in air decrease with increasing distance from a specific source, because fibers mix with ambient and outdoor air (Kuryvial *et al*., 1974; Donovan *et al*., 2011; Ilgren *et al*., 2015).

As stated by Hanson in its September 14, 2021, letter:

> Perimeter data provides the most accurate data as it relates to NOA from the Rock Hill Quarry, offers the most conservative background assessment scenario as it relates to offsite receptors, and provides readily comparable data against which Hanson can assess any incremental risk posed by future detections of NOA. Hanson's determination to extrapolate risk based on detections (if any) of NOA at the quarry perimeter also accounts for the impracticality of tracing asbestos encountered far offsite back to an original generator. (Hanson, 2021)

If asbestos structures detected during perimeter monitoring exceed Hanson's proposed screening level, Hanson has indicated in its Asbestos Monitoring and Mitigation Plan (AMMP) that it will take appropriate measures to mitigate exposures.

4.2 Transport of Product Off-site

Regarding potential exposures to asbestos through the transportation of aggregate product off-site, Hanson stated in its AMMP that it will employ several mitigation measures with respect to truck traffic to limit the potential for asbestos to leave the quarry, including:

- Dedicated street-sweepers to clean paved roads and public roadways near site entrances;
- A truck wash with spray nozzles to remove loose and dusty material from loaded trucks leaving the site through the main gate;
- A requirement that all trucks transporting materials off-site will be covered with tarps or other devices; and

- A posted vehicle speed limit of 15 miles per hour on haul roads in quarry and stockpile areas.

5 Conclusions

The results of five rounds of perimeter sampling, including the area with rock piles, have indicated that no background levels of asbestos are detected in the air at the Rock Hill Quarry. Only one fiber was detected, and it was a cleavage fragment. Going forward, perimeter sampling during quarry operations will represent worst-case scenarios regarding potential exposures to the community, because concentrations of asbestos decrease with increasing distance from its source.

Therefore, as a result of the background analysis, I conclude the following:

- Asbestos fibers were not detected in the air at the perimeter of the quarry;
- The lack of asbestos in the air at the perimeter of the quarry indicates that background concentrations of asbestos do not currently pose a health risk to the community;
- Assessing community exposure to asbestos generated during quarry operations based on perimeter sampling assumes the "worst-case" exposure scenario and will be most protective of the community; and
- Because perimeter sampling is so conservative, no further off-site sampling is necessary at this time to evaluate exposure to asbestos generated at the quarry.

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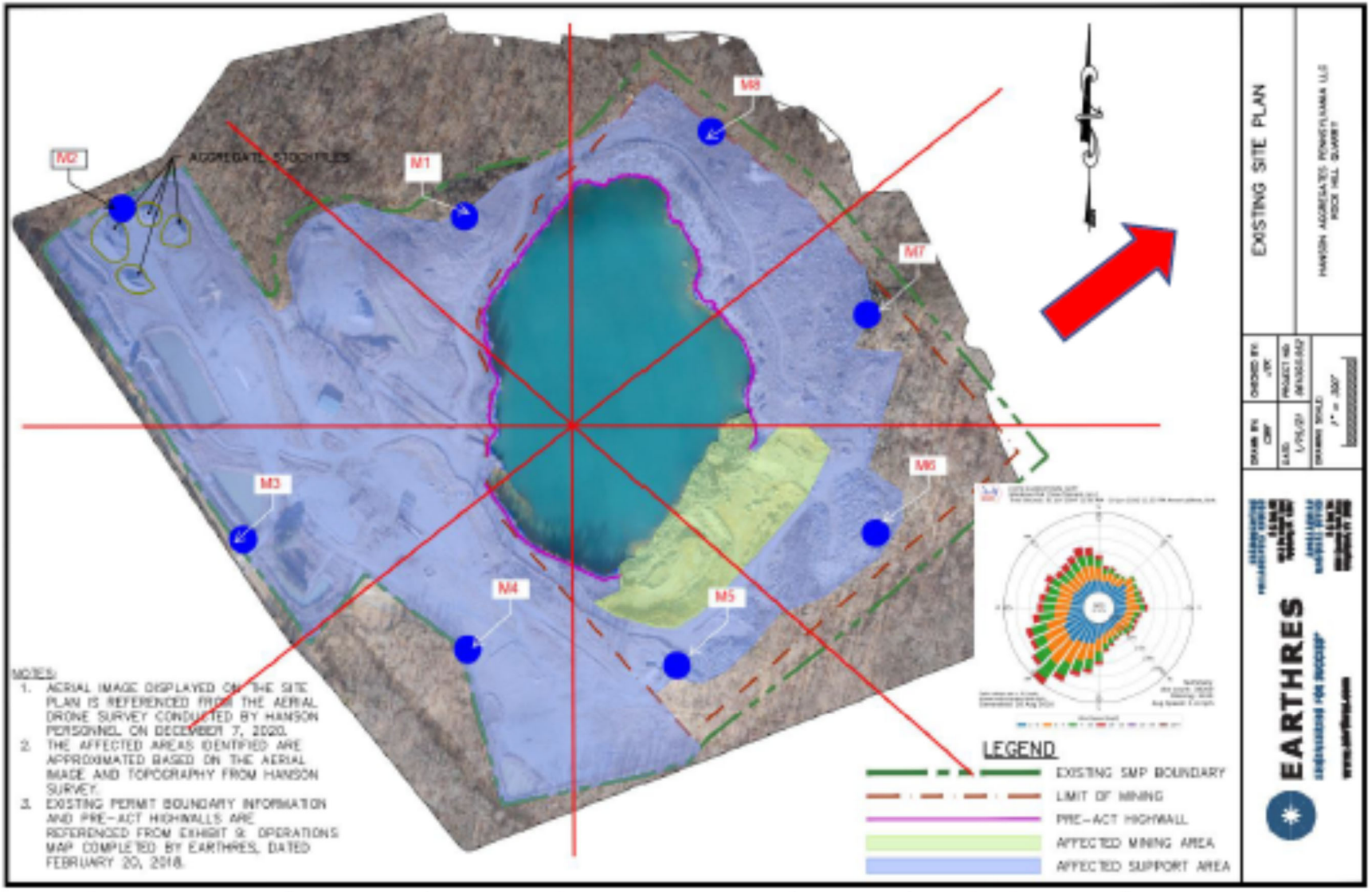

Figure 1 Rock Hill Quarry Site Map with Sample Collection Locations. Source: Bandli (2021).

ATTACHMENT C

RJ Lee Group, Inc
350 Hochberg Road
Monroeville, PA 15146
Tel: (724) 325-1776 | Fax (724) 733-1799

Final Laboratory Report

TEM ISO Analysis

Ms. Clair Wischusen
Fox Rothschild LLP
2700 Kelly Road
Suite 300
Warrington, PA 18976
US

Report Date: 06/28/2021
Sample Receipt Date: 06/24/2021
RJ Lee Group Job No.: LLH901997-29
Authorization/P.O. No.:
Samples Received: 10
Client Job No.:

Method: ISO 10312, 1st Edition 1995-05-01

TABLE 1 -- Total Asbestos Structures Concentration

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Dilution Factor	Volume (liter)	Area Analyzed (mm^2)	Total Asbestos Chry	Total Asbestos Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Asbestos Concentration (S/cc) Chry	Total Asbestos Concentration (S/cc) Amph
0623-1	3174413.HT	M7	385	1	1120	0.07061	0	0	0 - 3	0 - 3	0.0049	< 0.0049	< 0.0049
0623-2	3174414.HT	M8	385	1	965	0.08826	0	0	0 - 3	0 - 3	0.0045	< 0.0045	< 0.0045
0623-3	3174415.HT	M1	385	1	887	0.08826	0	0	0 - 3	0 - 3	0.0049	< 0.0049	< 0.0049
0623-4	3174416.HT	M2	385	1	1045	0.07944	0	0	0 - 3	0 - 3	0.0046	< 0.0046	< 0.0046

NOTES
1. Volumes provided by the client listed above were used to calculate analytical results and sensitivities.
2. "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
3. If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
4. Abbreviations: N/A-Not Applicable, O/L-Overloaded, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, NAS-Non-Asbestos Structures, f-Asbestos Fibers, F-Total Fibers.
5. Samples will be held for 90 days and then disposed of per Federal regulations.
6. Sample(s) for this project were analyzed at our Monroeville, PA (NVLAP Lab Code 101208-0, NY ELAP #10884) facility.
7. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.

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Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Dilution Factor	Volume (liter)	Area Analyzed (mm^2)	Total Asbestos Chry	Total Asbestos Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Asbestos Concentration (S/cc) Chry	Total Asbestos Concentration (S/cc) Amph
0623-5	3174417.HT	M3	385	1	1040	0.07944	0	0	0 - 3	0 - 3	0.0047	< 0.0047	< 0.0047
0623-6	3174418.HT	M4	385	1	1050	0.07944	0	0	0 - 3	0 - 3	0.0046	< 0.0046	< 0.0046
0623-7	3174419.HT	M5	385	1	1000	0.07944	0	0	0 - 3	0 - 3	0.0048	< 0.0048	< 0.0048
0623-8	3174420.HT	M6	385	1	970	0.07944	0	0	0 - 3	0 - 3	0.0050	< 0.0050	< 0.0050
0623-9	3174421.HT	field blank	385	1	0	0.08826	0	0	0 - 3	0 - 3	N/A	N/A	N/A
0623-10	3174422.HT	field blank	385	1	0	0.08826	0	0	0 - 3	0 - 3	N/A	N/A	N/A

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DISCLAIMER

TABLE 2 -- Asbestos Structures >= 5 µm Length

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Dilution Factor	Volume (liter)	Area Analyzed (mm^2)	Total Asbestos Chry	Total Asbestos Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Asbestos Concentration (S/cc) Chry	Total Asbestos Concentration (S/cc) Amph
0623-1	3174413.HT	M7	385	1	1120	0.07061	0	0	0 - 3	0 - 3	0.0049	< 0.0049	< 0.0049
0623-2	3174414.HT	M8	385	1	965	0.08826	0	0	0 - 3	0 - 3	0.0045	< 0.0045	< 0.0045
0623-3	3174415.HT	M1	385	1	887	0.08826	0	0	0 - 3	0 - 3	0.0049	< 0.0049	< 0.0049
0623-4	3174416.HT	M2	385	1	1045	0.07944	0	0	0 - 3	0 - 3	0.0046	< 0.0046	< 0.0046
0623-5	3174417.HT	M3	385	1	1040	0.07944	0	0	0 - 3	0 - 3	0.0047	< 0.0047	< 0.0047
0623-6	3174418.HT	M4	385	1	1050	0.07944	0	0	0 - 3	0 - 3	0.0046	< 0.0046	< 0.0046
0623-7	3174419.HT	M5	385	1	1000	0.07944	0	0	0 - 3	0 - 3	0.0048	< 0.0048	< 0.0048
0623-8	3174420.HT	M6	385	1	970	0.07944	0	0	0 - 3	0 - 3	0.0050	< 0.0050	< 0.0050

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0623-9	3174421.HT	field blank	385	1	0	0.08826	0	0	0 - 3	0 - 3	N/A	N/A	N/A
0623-10	3174422.HT	field blank	385	1	0	0.08826	0	0	0 - 3	0 - 3	N/A	N/A	N/A

Authorized Signature:

Ashleigh Sload, Scientist

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DISCLAIMER

RJ LEE GROUP
DELIVERING SCIENTIFIC RESOLUTION

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Report Date: 07/20/2021
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RJ Lee Group Job No.: LLH901997-33
Authorization/P.O. No.:
Samples Received: 10
Client Job No.:

Method: ISO 10312, 1st Edition 1995-05-01

TABLE 1 – Structures Length ≥0.5µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm²)	Volume (liter)	Area Analyzed (mm²)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0706-1	3174475.HT	M7	385	1067	0.36000	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0706-2	3174476.HT	M8	385	767	0.36000	0	0	0 - 3	0 - 3	0.0014	< 0.0014	< 0.0010	0	< 0.0014
0706-3	3174477.HT	M1	385	1029	0.36000	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0706-4	3174478.HT	M5	385	1037	0.36000	0	1	0 - 3	0 - 5	0.0010	< 0.0010	0.0010	0	< 0.0010

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8. "Asbestiform Amphibole" section represents number and concentration of asbestiform amphibole structures included in "Total Structures" count and concentration.

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TABLE 1 – Structures Length ≥0.5µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0706-5	3174479.HT	M6	385	905	0.36000	0	0	0 - 3	0 - 3	0.0012	< 0.0012	< 0.0012	0	< 0.0012
0706-6	3174480.HT	M2	385	945	0.36000	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0706-7	3174481.HT	M4	385	960	0.36000	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0706-8	3174482.HT	M3	385	1054	0.36000	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0706-9	3174483.HT	Field blank	385	0	0.36000	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0706-10	3174484.HT	Field blank	385	0	0.36000	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

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TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm²)	Volume (liter)	Area Analyzed (mm²)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0706-1	3174475.HT	M7	385	1067	0.36000	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0706-2	3174476.HT	M8	385	767	0.36000	0	0	0 - 3	0 - 3	0.0014	< 0.0014	< 0.0014	0	< 0.0014
0706-3	3174477.HT	M1	385	1029	0.36000	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0706-4	3174478.HT	M5	385	1037	0.36000	0	1	0 - 3	0 - 5	0.0010	< 0.0010	0.0010	0	< 0.0010
0706-5	3174479.HT	M6	385	905	0.36000	0	0	0 - 3	0 - 3	0.0012	< 0.0012	< 0.0012	0	< 0.0012
0706-6	3174480.HT	M2	385	945	0.36000	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0706-7	3174481.HT	M4	385	960	0.36000	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0706-8	3174482.HT	M3	385	1054	0.36000	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010

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TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0706-9	3174483.HT	Field blank	385	0	0.36000	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0706-10	3174484.HT	Field blank	385	0	0.36000	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

Authorized Signature:

Ashleigh Sload, Scientist

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Final Laboratory Report

TEM ISO Analysis

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Fox Rothschild LLP
2700 Kelly Road
Suite 300
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US

Report Date: 08/11/2021
Sample Receipt Date: 07/30/2021
RJ Lee Group Job No.: LLH901997-34
Authorization/P.O. No.:
Samples Received: 10
Client Job No.:

Method: ISO 10312

TABLE 1 – Structures Length ≥0.5µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Asbestos		95% Confidence Interval		Analytical Sensitivity (S/cc)	Total Asbestos Concentration (S/cc)		Asbestiform Amphibole	
						Chry	Amph	Chry	Amph		Chry	Amph	No.	S/cc
0728-1	3174953.HT	M7	385	1025	0.35555	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0728-2	3174954.HT	M8	385	1033	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-3	3174955.HT	M1	385	1055	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-4	3174956.HT	M5	385	685	0.35555	0	0	0 - 3	0 - 3	0.0016	< 0.0016	< 0.0016	0	< 0.0016

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						Chry	Amph	Chry	Amph		Chry	Amph	No.	S/cc
0728-5	3174957.HT	M6	385	782	0.35555	0	0	0 - 3	0 - 3	0.0014	< 0.0014	< 0.0014	0	< 0.0014
0728-6	3174958.HT	M2	385	1036	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0014	< 0.0010	0	< 0.0010
0728-7	3174959.HT	M4	385	1035	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-8	3174960.HT	M3	385	1035	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-9	3174961.HT	Field blank	385	0	0.35555	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0728-10	3174962.HT	Field blank	385	0	0.35555	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

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TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Asbestos		95% Confidence Interval		Analytical Sensitivity (S/cc)	Total Asbestos Concentration (S/cc)		Asbestiform Amphibole	
						Chry	Amph	Chry	Amph		Chry	Amph	No.	S/cc
0728-1	3174953.HT	M7	385	1025	0.35555	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0728-2	3174954.HT	M8	385	1033	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-3	3174955.HT	M1	385	1055	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-4	3174956.HT	M5	385	685	0.35555	0	0	0 - 3	0 - 3	0.0016	< 0.0016	< 0.0016	0	< 0.0016
0728-5	3174957.HT	M6	385	782	0.35555	0	0	0 - 3	0 - 3	0.0014	< 0.0014	< 0.0014	0	< 0.0014
0728-6	3174958.HT	M2	385	1036	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-7	3174959.HT	M4	385	1035	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0728-8	3174960.HT	M3	385	1035	0.35555	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010

NOTES

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TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Asbestos Chry	Total Asbestos Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Asbestos Concentration (S/cc) Chry	Total Asbestos Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0728-9	3174961.HT	Field blank	385	0	0.35555	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0728-10	3174962.HT	Field blank	385	0	0.35555	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

Authorized Signature: _____

Monica McGrath-Koerner, Scientist

NOTES

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RJ Lee Group, Inc
350 Hochberg Road
Monroeville, PA 15146
Tel: (724) 325-1776 | Fax (724) 733-1799

Final Laboratory Report

TEM ISO Analysis

Ms. Clair Wischusen
Fox Rothschild LLP
2700 Kelly Road
Suite 300
Warrington, PA 18976
US

Report Date: 09/14/2021
Sample Receipt Date: 09/01/2021
RJ Lee Group Job No.: LLH901997-35
Authorization/P.O. No.:
Samples Received: 10
Client Job No.:

Method: ISO 10312

TABLE 1 – Structures Length ≥0.5µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm²)	Volume (liter)	Area Analyzed (mm²)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0827-1	3175282.HT	M7	385	1010	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-2	3175283.HT	M8	385	1003	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-3	3175284.HT	M1	385	1006	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-4	3175285.HT	M5	385	997	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011

NOTES
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TABLE 1 – Structures Length ≥0.5µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures		95% Confidence Interval		Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc)		Asbestiform Amphibole	
						Chry	Amph	Chry	Amph		Chry	Amph	No.	S/cc
0827-5	3175286.HT	M6	385	1088	0.35091	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0827-6	3175287.HT	M2	385	1120	0.35091	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0827-7	3175288.HT	M4	385	1074	0.35091	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0827-8	3175289.HT	M3	385	941	0.35091	0	0	0 - 3	0 - 5	0.0012	< 0.0012	< 0.0012	0	< 0.0012
0827-9	3175290.HT	Field blank	385	0	0.35091	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0827-10	3175291.HT	Field blank	385	0	0.35091	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

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DISCLAIMER

TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0827-1	3175282.HT	M7	385	1010	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-2	3175283.HT	M8	385	1003	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-3	3175284.HT	M1	385	1006	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-4	3175285.HT	M5	385	997	0.35091	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0827-5	3175286.HT	M6	385	1088	0.35091	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0827-6	3175287.HT	M2	385	1120	0.35091	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0827-7	3175288.HT	M4	385	1074	0.35091	0	0	0 - 3	0 - 3	0.0010	< 0.0010	< 0.0010	0	< 0.0010
0827-8	3175289.HT	M3	385	941	0.35091	0	0	0 - 3	0 - 3	0.0012	< 0.0012	< 0.0012	0	< 0.0012

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TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0827-9	3175290.HT	Field blank	385	0	0.35091	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0827-10	3175291.HT	Field blank	385	0	0.35091	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

Authorized Signature:

Ashleigh Sload, Scientist

NOTES

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Monroeville, PA 15146
Tel: (724) 325-1776 | Fax (724) 733-1799

Final Laboratory Report

TEM ISO Analysis

Ms. Clair Wischusen
Fox Rothschild LLP
2700 Kelly Road
Suite 300
Warrington, PA 18976
US

Report Date: 09/29/2021
Sample Receipt Date: 09/14/2021
RJ Lee Group Job No.: LLH901997-36
Authorization/P.O. No.:
Samples Received: 10
Client Job No.:

Method: ISO 10312

TABLE 1 – Structures Length ≥0.5µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm²)	Volume (liter)	Area Analyzed (mm²)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0910-1	3175449.HT	M7	385	1005	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-2	3175450.HT	M8	385	998	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-3	3175451.HT	M1	385	1003	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-4	3175452.HT	M5	385	1012	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011

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Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures		95% Confidence Interval		Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc)		Asbestiform Amphibole	
						Chry	Amph	Chry	Amph		Chry	Amph	No.	S/cc
0910-5	3175453.HT	M6	385	992	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-6	3175454.HT	M2	385	1034	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-7	3175455.HT	M4	385	1025	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-8	3175456.HT	M3	385	1037	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-9	3175457.HT	field blank	385	0	0.34983	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0910-10	3175458.HT	field blank	385	0	0.34983	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

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0910-1	3175449.HT	M7	385	1005	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
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0910-3	3175451.HT	M1	385	1003	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
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0910-5	3175453.HT	M6	385	992	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-6	3175454.HT	M2	385	1034	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
0910-7	3175455.HT	M4	385	1025	0.34983	0	0	0 - 3	0 - 3	0.0011	< 0.0011	< 0.0011	0	< 0.0011
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TABLE 2 – Structures Length ≥5.0µm, Length:Width Aspect Ratio ≥3:1

Client Sample Number	RJLG Sample Number	Sample Description	Filter Area (mm^2)	Volume (liter)	Area Analyzed (mm^2)	Total Structures Chry	Total Structures Amph	95% Confidence Interval Chry	95% Confidence Interval Amph	Analytical Sensitivity (S/cc)	Total Structures Concentration (S/cc) Chry	Total Structures Concentration (S/cc) Amph	Asbestiform Amphibole No.	Asbestiform Amphibole S/cc
0910-9	3175457.HT	field blank	385	0	0.34983	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A
0910-10	3175458.HT	field blank	385	0	0.34983	0	0	0 - 3	0 - 3	N/A	N/A	N/A	0	N/A

Authorized Signature:

Ashleigh Sload, Scientist

NOTES

1. Volumes provided by the client listed above were used to calculate analytical results and sensitivities.
2. "<" indicates results less than analytical sensitivity. "---" indicates that sample was not analyzed.
3. If RJ Lee Group, Inc. did not collect the samples analyzed, the verifiability of the laboratory's results are limited to the reported values.
4. Abbreviations: N/A-Not Applicable, O/L-Overloaded, Chry-Chrysotile Asbestos, Amph-Amphibole Asbestos, NAS-Non-Asbestos Structures, f-Asbestos Fibers, F-Total Fibers.
5. Samples will be held for 90 days and then disposed of per Federal regulations.
6. Sample(s) for this project were analyzed at our Monroeville, PA (NVLAP Lab Code 101208-0, NY ELAP #10884) facility.
7. These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which these results are used or interpreted.
8. "Asbestiform Amphibole" section represents number and concentration of asbestiform amphibole structures included in "Total Structures" count and concentration.

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