



MEMORANDUM

DATE: August 11, 2011

TO: BAQ Engineering Services; BAQ Asbestos; BAQ Technical Management; BAQ Enforcement; RASMs; SBEAP; SC Asphalt Pavement Association

FROM: Christopher Hardee, P.E., BAQ Engineering Services
Robin Mack, Manager, BAQ Asbestos

SUBJECT: Tear-Off Asphalt Roofing Shingle Usage, Permitting/Asbestos Testing Protocol

Background

Tear-off asphalt roofing shingles are a waste stream generated from building demolition and roof shingle replacement. Asphalt roofing shingles last roughly 20 years and may be removed and replaced with new shingles or covered with a layer of new shingles. This practice generates a supply of 20 to 40+ year old shingles that contain between 19 and 36 percent asphalt binders by weight.¹ Instead of sending these tear-off shingles to a construction and demolition landfill for disposal, they may be used to replace a portion of expensive asphalt binder in the production of asphaltic concrete (asphalt). This makes the practice of using tear-off shingles in asphaltic concrete an economic method of recycling a waste stream that would otherwise go to a landfill².

The potential use of asbestos in the manufacturing of asphalt roofing shingles is concerning as the tear-off shingles are ground before using in production. Although wet suppression is used to minimize dust during grinding, asbestos contamination of the equipment and worker exposure may result if asbestos is present in the roofing shingles. Newer shingles are less likely to contain asbestos; however there is no regulatory requirement that domestically manufactured or imported shingles be asbestos free³. For these reasons, the S.C. Department of Health and Environmental Control, Bureau of Air Quality (Department), has developed an asbestos testing protocol for companies that would like to use tear-off shingles in asphalt production.

Pilot

In the spring of 2009, two asphalt plant owners and the SC Asphalt Pavement Association (SCAPA) approached the Department regarding tear-off shingle usage. One of the owners had previously been granted permission to use tear-off shingles and the other was seeking permission to start using tear-off shingles. At that time, the Department did not have a policy regarding tear-off shingle usage or a testing protocol. The owner that had previously been using tear-off shingles had implemented their own asbestos testing protocol and had tested 104 samples with only one determined to be asbestos containing material (ACM)⁴. The load determined to be ACM was disposed of properly.

The Department agreed to allow new facilities to utilize tear-off shingles as a pilot program, provided they follow a testing protocol of 1 sample per homogeneous load of tear-off shingles. The pilot program would continue until such time as enough tests had been performed to establish an adequate understanding of the potential presence of asbestos in the available tear-off shingles waste stream.

August 11, 2011

Tear-Off Asphalt Roofing Shingle Usage, Permitting/Asbestos Testing Protocol

Page 2 of 5

One company received tear-off shingles at its South Carolina plants and conducted approximately 735 asbestos tests. Another company had not received tear-off shingles at its South Carolina plants but submitted results of the approximately 300 asbestos tests conducted on tear-off shingles received at its North Carolina plants. Of the 1,035 samples tested, none were determined to be ACM.

Protocol

Permitting

A company must gain the Department's approval prior to utilizing tear-off shingles. The company must submit a written request to the Engineering Services Division, requesting permission to utilize tear-off shingles and list all plants at which they plan to use tear-off shingles. The company must submit an additional request for subsequent facilities.

Sample Gathering

Samples must be collected by licensed asbestos inspector.

The licensed asbestos inspector shall collect, in a statistically random manner, at least one bulk sample per homogenous load/pile to be tested. Tear-off shingle loads that are to be tested must be segregated from other shingles and not processed until testing results have been received.

Sample Testing

Per S.C. Regulation 61-86.1, "STANDARDS OF PERFORMANCE FOR ASBESTOS PROJECTS":

The owner/operator shall have all bulk samples analyzed for asbestos using laboratories accredited by the National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), or an equivalent standard as approved by the Department.

Bulk samples shall be analyzed for asbestos content by polarized light microscopy (PLM) using the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples" found in Appendix E to subpart E of 40 CFR 763, the "Method for the Determination of Asbestos in Bulk Building Materials" (EPA/600/R-93/116), ASTM E2356, or other method(s) deemed acceptable by the Department on a case-by-case basis.

A homogeneous area is not considered to contain ACM only if the results of all samples required to be collected from the area show asbestos in amounts of one percent (1%) or less.

A homogeneous area shall be determined to contain ACM based on a finding that the results of at least one sample collected from that area shows that asbestos is present in an amount greater than one percent (1%).

Positive Result Procedures/Reporting

Tear-off shingle loads that are determined to be ACM shall be properly disposed of in accordance with S.C. Regulation 61-86.1.

Any company that finds a tear-off shingle load to be ACM during periodic testing must revert to continuous testing and provide timely notice of the change.

Shingles that have tested positive for asbestos may not be mixed with other shingles. Any attempt to dilute shingles that have been determined to contain ACM to less than 1% will be considered circumvention of air quality regulations.

Sampling Schedule/Model

For companies that utilize tear-off shingles at multiple plants, the aggregate test results from all plants are used for testing thresholds. See aggregation and rotation schedule below.

Continuous Testing

A company that receives Department approval to utilize tear-off shingles must initially test each homogeneous LOAD of tear-off shingles. A company that was conducting periodic testing and finds a load to be ACM must revert to continuous testing. Once one-hundred continuous tests have been conducted with no loads found to be ACM, a company may switch to periodic testing.

Periodic Testing

A company whose last one-hundred continuous tests have found no loads to be ACM, may start testing tear-off shingles on a periodic basis. During periodic testing, a company will test every two-hundred fiftieth TON of tear-off shingles received.

Testing/Rotation Schedule

A company that utilizes tear-off shingles at multiple plants and that are conducting periodic testing must establish a testing rotation schedule. On or around the two-hundred fiftieth ton marks (250, 500, 750, 1,000, etc.), the company must test a homogenous load of tear-off shingles received at a plant based on the rotation schedule.

If the first plant on the rotation has not received tear-off shingles within 15 tons of the two-hundred fiftieth mark, the company shall skip the plant and test the next load of tear-off shingles received at any plant. Skipped plants shall be given priority in the rotation for the next scheduled test.

Volumetric Factor

A company that utilizes tear-off shingles at a facility without vehicle scales and desires to use periodic testing, must develop a volumetric conversion factor from loads of known weight and use this factor to install a storage bin with graduated marks. Load volumes between marks will be rounded up to the next highest mark.

Aggregation

A company that utilizes tear-off shingles at multiple plants must total the number of tear-off shingles received across all plants on a daily basis.

Records

A company must maintain records of the date and amount of tear-off shingles received (in appropriate units, homogenous loads/tons), the date the sample was collected, the name of the individual that collected the sample and their asbestos inspector license number, and copies of the lab reports.

For companies with multiple plants that utilize tear-off shingles, a company must maintain records of the daily totals and the testing rotation schedule. Large numbers of consecutive days without tear-off shingles received may be indicated as a single entry in the log.

All records required to demonstrate compliance shall be maintained on site for a period of at least five (5) years from the date of the sample, measurement, report, or application, and shall be made available to a Department representative upon request to verify a source's compliance.

Reports

Summaries of test results must be submitted annually to the BAQ Asbestos Section.

¹ California Integrated Waste Management Board (CIWMB), 2001, Publication #431-97-031, "Asphalt Roofing Shingles Recycling: Introduction",

<http://www.calrecycle.ca.gov/condemo/shingles/default.htm>

² "Evaluation of Use of Manufactured Waste Asphalt Shingles in Hot Mix Asphalt", R.B. Mallick and M.R. Teto, Worcester Polytechnic Institute and W.S. Mogawer, UMass Dartmouth, Chelsea Center for Recycling and Economic Development, Technical Report #26, July 2000,

<http://www.chelseacenter.org/pdfs/TechReport26.pdf>

³ "EPA Asbestos Materials Bans: Clarification", May 18, 1999,

<http://www.epa.gov/asbestos/pubs/asbbans2.pdf>

⁴ Per S.C. Regulation 61-86.1, "Asbestos containing material (ACM)" - Material containing asbestos of any type, either alone or mixed with other materials, in an amount greater than one percent (1%) as determined by using the method specified in 40 CFR Part 763, Appendix A, Subpart F, Section 1, as amended, or an accepted equivalent. (NOTE: "Appendix A to Subpart F" has been redesignated as, and shall hereinafter be referred to as, "Appendix E to Subpart E" - 60 FR 31917, June 19, 1995.)

August 11, 2011

Tear-Off Asphalt Roofing Shingle Usage, Permitting/Asbestos Testing Protocol

Page 5 of 5

Record of Revisions	
DATE	Description of Change
August 11, 2011	Initial Document