



## Asphalt Binder Crumb Rubber Verification Subtask Group Meeting Minutes - Corrected

Monday, August 25, 2014 10:00am – 2:00pm	Vulcan Materials Company Office Conference Room 16013 E. Foothill Blvd. Irwindale, CA 91702
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1. The meeting was called to order at 10:00am. Don Goss and Kee Foo (co-chairs) welcomed the participants, and participants made self introductions. An attendance roster is included with these minutes.
2. Don covered housekeeping items and asked if any changes or additions to the agenda were necessary. None were suggested.
3. The minutes from the July 30 meeting were reviewed. Don asked if any corrections to the minutes were needed, and none were suggested, so the minutes were approved as submitted.
4. The group reviewed the assignments from the July 30 meeting, as follows.

Edgard Hitti had contacted Terry Arnold of the FHWA, and correspondence from Terry was distributed to the group prior to the meeting. Further discussion about analytical procedures was postponed to a later point in the agenda.

Kee Foo surveyed other state DOTs regarding their use of a verification system for CRM in asphalt binders. Most states do not specify CRM in asphalt. Of those that do, most do not have a rigorous verification system as to the source and content of the CRM. These states rely upon a supplier's certification, records of weights and measures or a chain-of-custody to verify the source of the CRM. No other state appears to have a verification system as rigorous as that being considered by this subtask group.

Caltrans and the group at large had previously committed to "brainstorm" about any additional approaches that would constitute an "independent verification" part of the entire verification process. Further discussion on this topic was also postponed to a later point in the agenda.

5. The group discussed the content of the correspondence from Terry Arnold (FHWA) and his work with X-Ray Fluorescence (XRF) as an analytical procedure for determining CRM content in asphalt. It was noted that the procedure requires job specific materials for calibration and the development of calibration curves, and it measures zinc in parts per million as a surrogate "marker" for CRM content. XRF analysis in general is described in ASTM D4927, but its applicability to asphalt binders was

questioned. In a discussion with Kee Foo and Sri, Terry described his procedure as a “research method,” and said he was not yet confident about its use to determine CRM content in asphalt without further development in his research. Terry’s work will be published with the Transportation Research Board (TRB), but not until February of 2015.

The group also discussed the AASHTO T44 Solubility Test as a potential method to measure the CRM content in asphalt. However, it was noted that the method lacked the degree of accuracy necessary for the purpose of this subtask group, so it was considered unacceptable at the current time as an analytical method to measure CRM content in asphalt.

Due to the short time-frame of the subtask group and the current lack of a standard analytical procedure for testing CRM in asphalt, the consensus of the group was that an analytical test method approach to verifying CRM content in asphalt is currently not feasible. Paramount Petroleum and Valero have submitted samples – and Vulcan Materials also agreed to submit samples – to Terry for his use in continuing his work. The group agreed to remain open to the possibility of using an analytical approach sometime in the future; but for the present, the group agreed that a different approach – such as the use of weights and measures – is needed for verification of CRM content.

- Pascal Mascarenhas agreed to provide to Terry Arnold small samples of base asphalt, CRM, and an asphalt rubber sample at a known CRM content.

The group then began to discuss what would constitute the basic elements of the verification process.

6. The group took a break for lunch at 11:30am and reconvened at approximately 12:10pm.

7. The group continued its discussion about the basic elements of a CRM verification system. As noted in the minutes from the July 30 meeting (item #8), Caltrans had suggested that verification might be viewed in terms of three elements: 1) a chain of custody with respect to source and ownership of the CRM, 2) a protocol for weights and measures, and 3) an independent verification of the process. It was further noted that “independent verification” of the process (element 3) might be satisfied by either a) an eyewitness verification, such as by a Caltrans representative, b) a third-party verification, such as by a consulting Professional Engineer, or c) verification by a Weighmaster licensed by the State of California. There was general consensus among the group that the three elements numbered above (chain of custody, weights and measures, independent verification) would constitute a good system of verification for the source and amount of CRM in asphalt.

8. The group then began to discuss how to best address each element of the verification system, and it was agreed to simply discuss each element one at a time.

Regarding the verification of the source of the CRM with a chain of custody system, it was noted that the California Tire Management Program, administered under California's Department of Resources Recycling and Recovery (CalRecycle), already employs a manifest system for tracking waste tires from the generator to the collector/processor via registered haulers. Each participant in the waste tire stream is registered with the State and is subject to regular inspections. It was also stated that the waste tire processors who sell recycled tire rubber into commerce already make certifications with respect to the source of the material. After much discussion about the details of the CalRecycle waste tire management system, it was agreed that this system might suffice for element #1 of the verification system – the verification of the source of the CRM. The group decided to ask waste tire processors to provide examples of the manifests employed in the CalRecycle system and to provide examples of the certifications provided by the waste tire processors, in order to determine further if the current CalRecycle system would suffice for element #1 of the verification system.

- Waste tire processors CRM and BAS agreed to provide the requested documents to Don Goss for distribution to the group at large.
- Don agreed to query Golden By-Products and Liberty Tire Recycling (who were not present) and request that they also provide such documents for the deliberations of the group.

Being hopeful that the current CalRecycle system might suffice for element #1 of the verification system, the group turned its attention to element #2 – a protocol for weights and measures. Suppliers of asphalt rubber described for the group the general process and equipment that they employ for weighing and measuring CRM into that product. Then suppliers of PG-M (aka terminal blend rubberized asphalt) described for the group the general process and equipment that is employed in the production of PG-M binders with tire rubber. Much discussion followed about how a process might be developed that would be applicable to both types of products, but the group was not able to come to a general agreement. It was suggested that simple process flow diagrams of each type of process might help the group in its deliberations.

- Mark Belshe agreed to provide a process flow diagram for asphalt rubber to Don for distribution to the group.
- Edgard Hitti agreed to provide a process flow diagram for PG-M (with tire rubber) to Don for distribution to the group.

9. Individual tasks were assigned as noted by the bullet points (•) above. Participants were asked to complete their tasks by September 15 and submit the results to Don for distribution to the group prior to the next meeting.

10. The next meeting was scheduled for Monday, September 22 in Northern California, at either Caltrans (Translab) Conference Room or the Granite Construction Company's Bradshaw location.

11. The meeting was adjourned at approximately 2:10pm.

Respectfully submitted,

Kee Foo

Don Goss