STAPPA / ALAPCO

STATE AND TERRITORIAL
AIR POLLUTION PROGRAM
ADMINISTRATORS

ASSOCIATION OF
LOCAL AIR POLLUTION
CONTROL OFFICIALS

S. WILLIAM BECKER
EXECUTIVE DIRECTOR

December 22, 2003

Mr. William Kuykendal
Environmental Engineer
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
D205-01, USEPA Mailroom
109 T.W. Alexander Drive
Research Triangle Park, NC 27711

Dear Mr. Kuykendal:

On behalf of the State and Territorial Air Pollution Program Administrators (STAPPA) and the Association of Local Air Pollution Control Officials (ALAPCO), we would like to thank the U.S. Environmental Protection Agency (EPA) for extending the public comment period on AP-42 Section 11.19.2 for Crushed Stone Processing. In addition, we appreciate the background documents that EPA has supplied that were used by the National Stone, Sand, and Gravel Association (NSSGA) in developing this draft section. Section 11.19.2 addresses both crushed stone processing and pulverized mineral processing. Our comments relate only to crushed stone processing.

STAPPA and ALAPCO commend EPA's continuing commitment to keep the AP-42 for stone crushing current. We agree that EPA should periodically update all AP-42 sections. We note, however, that we share EPA's opinion that use of the most accurate data available is always preferred and that emission factors should only be used when more accurate data is unavailable. In fact, EPA states in its *Introduction to Emission Factors* that "data from source-specific emission tests or continuous emission monitors are usually preferred for estimating a source's emissions because those data provide the best representation of the tested source's emissions." In fact, *Figure 1* in the *Introduction* presents a hierarchical scheme from highest to lowest data quality in the following order: Continuous Emission Monitoring (CEM), Parametric Source Tests, Single Source Tests, Material Balance, AP-42 Emission Factors, and Engineering Judgment. EPA's *Introduction* concludes, "When such information [as source-specific data or data from equipment vendors] is not available, use of emission factors may be necessary as a last resort."

The revised AP-42 Emission Factors for Crushed Stone Processing should, therefore, be viewed in this context as a last resort method of estimating pollutants attributable to crushed stone processing. Many of the revisions to the PM10 and PM2.5 emission factors are generated from mathematical extrapolation methods. With one exception, there is no new test data. Utilization of the old Method 5 data or other EPA approved test methods that generated information for the

444 North Capitol St. N.W. Washington, D.C. 20001 Tel. (202) 624-7864 Fax (202) 624-7863

previous AP-42 versions in 1994 and 1995 are probably more acceptable in the EPA hierarchical scheme than the extrapolated information presented in certain sections of Section 11.19.2.

Figures 1-3 in this letter compare the emission factors for the last three versions of Section 11.19.2 for Crushed Stone Processing (July 1994, January 1995, August 2003) for Total Suspended Particulate, PM10, and PM2.5. The table demonstrates that Total Suspended Particulate and PM10 emission factors dropped significantly in value from July 1994 to August 2003. We are aware of no changes in the activity of crushed stone processing that would explain this decrease in emissions and it is the opinion of STAPPA and ALAPCO that an explanation should be required by EPA. We note that PM2.5 data was not available for July 1994 and January 1995 but was available for some nonmetallic mining processes in the August 2003 version. Although the data is therefore limited, it, too, dropped significantly for reasons that are unexplained in the AP-42.

EPA-Supplied Reference Information for AP-42 Section 11.19.2

EPA furnished 33 reference documents in "pdf" format to STAPPA and ALAPCO. These documents are listed in Table 1. Some of these references have been grayed out. Our comments only concern the references that remain in a white background. Of the 33 documents, 17 were not considered for review for the reasons given below:

- Seven documents focused on practices that have little or no relevance to usual industry practices. Three documents contained testing from baghouse stacks. Baghouses have never been common in the industry and most crushing spreads use a water suppression system to reduce dust emissions. We therefore viewed these tests as unrepresentative and did not consider them in the review. Four additional documents contained information regarding flash dryers, which are not present in nonmetallic mining pertaining to rock crushing.
- One document supplied information on stone crushing that utilizes a different process and different equipment from that generally used in stone crushing operations. The information in this report appeared to have no direct correlation to rock crushing.
- Nine documents were duplicates.

Of the 16 remaining documents, nine documents contained testing information (References 8, 17, 18, 19, 20, 21, 22, 23, 24) and seven documents were either EPA guidance or summary documents (References 10-16). Reference 16, *Fugitive Emissions from Integrated Iron and Steel Plants,* does not appear to pertain to nonmetallic mining and our comments do not address it.

Testing Information

STAPPA and ALAPCO's comments focus specifically on and give brief synopses of some of these test reports. We note at the outset that, of the nine documents containing testing information, only one supplied data from a test that was performed after publication of the last revision of AP-42 Section 11.19.2 in 1995 (Reference 8). We emphasize that the revisions to this AP-42 were apparently justified by one new test (the applicability of which we question below), the inclusion of extrapolated PM10 and PM2.5 data, and the addition of pulverized mineral processing to Section 11.19.2.

- Reference 8: *Measurement of PM10 and PM2.5 Emission Factors at a Stone Crushing Plant, Vulcan Materials Company, Pineville, North Carolina,* December 1996.

This test report supplied information for PM10 and PM2.5 for tertiary crushers, a fines crusher, a conveyor transfer point and a vibrating sizing screen for a granite crushing facility located in Pineville, North Carolina. This report contained emission rates in lbs/ton stone for the equipment studied:

Equipment	PM2.5 (lb/ton)	PM10 (lb/ton)
Tertiary Crusher	0.00019	0.00036
Fines Crusher	0.00007	0.00032
Conveyor Transfer Point	0.000013	0.000042
Vibratory Screen	0.00005	0.00028

STAPPA and ALAPCO have identified a number of possible misprints in the document comparing the schematic on page 4 to the stone throughput rates presented in Section 3.3 on page 16. The schematic drawing on page 4 shows maximum processed stone amounts of 700 tons per hour (TPH) for C-4, 1,325 TPH for C-3, and 175 TPH for C-20. The throughput numbers in Table 9 of page 16 exceed the maximum capacity figures presented on page 4 for C-4 and C-20. If the numbers presented in this report are accurate and not a misprint, then this may indicate that the crushing spread was operating in a "run-around" mode. "Run-around" means the rock is being recirculated around the system in a closed loop. The primary, secondary, or tertiary crushers, possibly due to an open setting on the crusher, are not actively crushing the rock down to a size that would allow the material to be screened out of the loop. If that is the case, we believe the numbers reported for emission factors in this report are not valid for a representative crushing operation because a representative crushing spread continuously produces rock of many different gradations.

Diversity of Data

With regard to References 17-24, STAPPA and ALAPCO conclude that the test data indicates that there are dramatic variations in results depending on the geographical features and climate in which the tests were performed. It is our opinion that the variability of the results set forth below demonstrates that emission factors for this industry can reflect actual emissions only when they are not "one-size-fits-all" figures, but are, rather, based on specific regional conditions. In a letter to EPA dated February 7, 1996, titled "Use of EPA Emission Factors for Crushed Stone and Sand and Gravel Processing," Terry McGuire, then Chief of the Technical Support Division of the California Air Resources Board, stated "The new AP-42 emission factors…represent only a generic value, and we strongly recommend the use of valid, local source test data whenever available. My staff also spoke to Ron Myers of the U.S. EPA's Emission Factor and Inventory Group in Research Triangle Park, North Carolina. He, too, believes that locally collected emission data are preferable when conditions are different from those used to develop the AP-42 factors." The following data underscore the continued need for locally collected data and correspondingly more accurate emission factors:

- Reference 17: *PM10 Emission Factors for a Stone Crushing Plant Deister Vibrating Screen at Martin Marietta in Raleigh-Durham, North Carolina,* June 1992

This plant, located in Raleigh-Durham, North Carolina, produces crushed granite for construction and road projects. The emission factors suggested in the report for a vibrating screen are:

% Stone Moisture	PM10 Emission Factor
< 1.5 %	0.00618 lb/ton rock
>1.5 %	0.00054 lb/ton rock

- Reference 18: *PM10 Emission Factors for a Stone Crushing Plant Tertiary Crusher at Martin Marietta in Garner, North Carolina*, February 17, 1992

This plant, located in Garner, North Carolina, produces crushed granite for construction and road projects.

The emission factors suggested in the report for a tertiary crusher are:

% Stone Moisture	PM10 Emission Factor
< 1.5 %	0.001717 lb/ton rock
> 1.5 %	0.000813 lb/ton rock

- Reference 19: *PM10 Emission Factors for a Stone Crushing Plant Deister Vibrating Screen and Crusher*, December 1992.

The test was conducted at the Vulcan Materials, Inc. plant in Skippers, Virginia, which produces crushed granite for construction and road projects.

The emission factors suggested in the report are:

Equipment	% Stone Moisture	PM10 Emission Factor
Cone crusher	< 1.5 %	0.00397 lb/ton rock
Cone crusher	> 1.5 %	0.00026 lb/ton rock
Deister vibrating screen	< 1.5 %	0.02701 lb/ton rock
Deister vibrating screen	> 1.5 %	0.00103 lb/ton rock

- Reference 20: *PM10 Emission Factors for a Stone Crushing Plant Tertiary Crusher and Vibrating Screen*, December 1992

The test was conducted at the Nolan L. Teer stone crushing facility located in Raleigh-Durham, North Carolina, which produces crushed granite for construction and road projects.

Equipment	% Stone Moisture	PM10 Emission Factor
Tertiary crusher	< 1.5 %	0.01395 lb/ton rock
Tertiary crusher	> 1.5 %	0.00195 lb/ton rock
Vibrating screen	< 1.5 %	0.07041 lb/ton rock
Vibrating screen	> 1.5 %	0.00184 lb/ton rock

- Reference 21*: PM10 Emission Factors for Two Transfer Points at a Granite Stone Crushing Plant*, January 1994

The test was conducted at the Wake Stone Corporation stone crushing facility located in Knightdale, North Carolina, which produces crushed granite for construction and road projects.

Equipment	% Stone Moisture	PM10 Emission Factor
Sizing Screen Conveyor Transfer Point	< 1.5 %	0.000282 lb/ton rock
Sizing Screen Conveyor Transfer Point	> 1.5 %	0.000092 lb/ton rock
Resize Screen Conveyor Transfer Point	< 1.5 %	0.001049 lb/ton rock
Resize Screen Conveyor Transfer Point	> 1.5 %	0.000030 lb/ton rock

- Reference 22: *PM10 Emission Factors for a Stone Crushing Plant Transfer Point*, April 1993

This test was conducted at the Martin Marietta plant located in Raleigh-Durham, North Carolina, which produces crushed granite for construction and road projects. The test results for the transfer point showed:

Pollutant	% Stone Moisture	Emission Factor
Total Particulate Emissions	< 1.5 %	0.05504 lb/ton rock
Total Particulate Emissions	> 1.5 %	0.000080 lb/ton rock
PM10	< 1.5 %	0.00289 lb/ton rock
PM10	> 1.5 %	0.000015 lb/ton rock

- Reference 23: *PM10 Emission Factors for a Limestone Crushing Plant Vibrating Screen and Crusher for Bristol, Tennessee*, July 1993

This test was conducted at the Vulcan Materials Company, Bristol, Tennessee plant, which produces crushed limestone.

Equipment	% Stone Moisture	PM10 Emission Factor
Cone crusher	< 1.0 %	0.002917 lb/ton rock
Cone crusher	> 1.0 %	0.001055 lb/ton rock
Vibrating screen	< 1.0 %	0.018393 lb/ton rock
Vibrating screen	> 1.0 %	0.001222 lb/ton rock

- Reference 24: *PM10 Emission Factors for a Limestone Crushing Plant Vibrating Screen and Crusher for Maryville, Tennessee*, July 1993

This test was conducted at the Vulcan Materials Company, Maryville, Tennessee plant, which produces crushed limestone.

Equipment	% Stone Moisture	PM10 Emission Factor
Cone crusher	< 1.0 %	0.001041 lb/ton rock
Cone crusher	> 1.0 %	0.000147 lb/ton rock
Vibrating screen	< 1.0 %	0.006920 lb/ton rock
Vibrating screen	> 1.0 %	0.000549 lb/ton rock

The test information contained in References 8 and 17-24, as presented in the preceding pages, is test information from granite and limestone crushing operations located in Tennessee and North Carolina. Nonmetallic mining is, however, far more diverse across the United States than is reflected by testing done on these two kinds of rock. In the words of one authority, "The construction aggregates category generally includes the sub-categories of crushed stone, sand and gravel, and lightweight aggregates such as pumice. The crushed stone sub-category, in descending order of production, covers limestone and dolomite, granite, traprock, sandstone, quartz, and quartzite." *Review Emissions Data Base and Develop Emission Factors for the Construction Aggregate Industry*, September 1984, Engineering Science Consultants, pp 2-1 [from EPA-supplied cd-rom data, ref 06c11s1902/1995.pdf]

STAPPA and ALAPCO represent states with different geography and different climatology. Granite rock may be plentiful in one state and not available in another state. The climatology in one state may be responsible for mined stone that is already wet before being crushed and therefore large fugitive dust emissions are not possible. In another state, with sparse rainfall, the mined rock can remain dry during the crushing process, which would enhance fugitive dust emissions during the rock crushing process. Other parameters affecting the amount of dust generated from rock crushing facilities are wind speed, time of year, and time of day.

Because of the diversity of the nonmetallic industry, we believe EPA should reconsider its approach to AP-42 Section 11.19.2. We believe the approach discussed in *Review Emissions Data Base and Develop Emission Factors for the Construction Aggregate Industry*, September 1984, makes the most sense in determining nonmetallic mining emissions throughout the United States. The document breaks out emission tests by nonmetallic mineral category. In so doing, it allows a state the flexibility to assign an emission factor based on its unique geological and/or climatological characteristic. Table 5 on page 5-7 of that document would be a good template to use in modifying the proposed AP-42 Section 11.19.2

As stated earlier, EPA places testing information above derived information in evaluating the accuracy of emission factors. If EPA would take this regional approach and use most of the information in the above-referenced *Review Emissions Data Base and Develop Emission Factors for the Construction Aggregate Industry* document, the agency would then be basing its emission factors on actual testing information rather than generating emission factors through an extrapolation scheme that predicts results rather than using results generated from EPA-approved testing methods. EPA's approach would, if this were to occur, be consonant with the provisions of the proposed AP-42 itself, as discussed starting on page 11-10.2-10 of the proposed AP-42 11.19.2 section: "A variety of material, equipment, and operating factors can influence emissions from crushing. These factors include (1) stone type, (2) feed size and distribution, (3) moisture content, (4) throughput rate, (5) crusher type, (6) size reduction ratio, and (7) fines content."

Additional Information

STAPPA and ALAPCO have received nonmetallic mining testing information from the state of Arizona, which is attached here.

Summary

STAPPA and ALAPCO appreciate EPA's extension of the public comment period on AP-42 Section 11.19.2. Since the last AP-42 Section 11.19.2 revision in 1995, EPA has received only one piece of testing information that may or may not be relevant depending on the operational parameters which occurred during the testing. STAPPA and ALAPCO would like

EPA to refocus this AP-42 section to address differences in climatology and geology in the United States and request that the AP-42 Section 11.19.2 be based on actual test data.

Sincerely,

Roger Westman
ALAPCO Chair
Emissions and Modeling Committee

Herb Williams
STAPPA Chair
Emissions and Modeling Committee

Table 1-List of EPA Documents

This letter reference number	EPA Electronic Document	EPA Document Name	Date	Author	Applicable to Nonmetallic Mining?
1	c11s1902 draft_#1.pdf	A Report of Particulate Source Sampling Performed for Franklin Industrial Minerals in Sherwood, Tennessee	August 9, 1994	Frank Ward and Company	No. Test report for a baghouse system.
2	c11s1902 draft_#2.pdf	Performance Test Report Baghouse BH-570 Limestone System at Franklin Industrial Minerals at Alabaster, Alabama	May 2000	Advanced Industrial Resources, LLC	No. Test report for a baghouse system
3	c11s1902 draft_#3.pdf	Performance Test Report of Baghouse No. 37 at Franklin Industrial Minerals at Dalton, Georgia	November 1999	Advanced Industrial Resources, LLC	No. Test report for a baghouse system.
4	c11s1902 draft_#4.pdf	Compliance Test Programs for Particulate Emissions from Flash Dryer #3 for Omya, Inc., Proctor, Vermont	October 27, 2000	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities.
5	c11s1902 draft_#5.pdf	Compliance Test Programs for Particulate Emissions from Flash Dryer #3 for Omya, Inc., Proctor, Vermont	January 24, 2001	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities.
6	c11s1902 draft_#6.pdf	Source Emission Compliance Test for Non-metallic Mineral Processing Plant for Omya, Inc., Proctor, Vermont	April 17, 1998	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities.
7	c11s1902 draft_#7.pdf	Source Emission Compliance Test for Non-metallic Mineral Processing Plant for Omya, Inc., Proctor, Vermont	July 14, 1997	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities.
8	c11s1902 draft_#8.pdf	Measurement of PM10 and PM2.5 Emission Factors at a Stone Crushing Plant, Vulcan Materials Company, Pineville, North Carolina	December 1996	Air Control Techniques, P.C.	Yes. Tests sponsored by National Stone Association.
9	c11s1902 draft_#9.pdf	PM10/PM2.5 Emission Factor Testing for the Pulverized Mineral Division of the National Stone Sand and Gravel Association	October 2001	Air Control Techniques, P.C.	No. Tests conducted for pulverized stone and not stone crushing. The equipment for pulverized stone is much different than the equipment used for stone crushing.
10	ref_01c11s1902_1995.pdf	Air Pollution Control Techniques for Non-metallic Minerals Industry	August 1981	US EPA Emissions and Standards Division	Yes.

11	ref_03c11s1902_1995.pdf	Emissions from the Crushed Granite Industry: State of the Art	February 1978	USEPA Office of Research and Development, EPA-600/2-78-021	Yes
12	ref_04c11s1902_1995.pdf	Source Assessment: Crushed Stone	May 1978	USEPA Office of Research and Development, EPA-600/2-78-004L	Yes
13	ref_05c11s1902_1995.pdf	Particulate Emission Factors for the Construction Aggregate Industry	January 1983	GCA Corporation subcontracted by USEPA-Air Management Technology Branch	Yes
14	ref_06c11s1902_1995.pdf	Review Emissions Data Base and Develop Emission Factors for the Construction Aggregate Industry	September 1984	Engineering Science prepared for the Construction Aggregate Industries Steering Committee	Yes
15	ref_07c11s1902_1995.pdf	Development of Emission Factors for Fugitive Dust Sources	June 1974	Midwest Research Institute for USEPA, EPA-450/3-74-037	Yes
16	ref_08c11s1902_1995.pdf	Fugitive Emissions from Integrated Iron and Steel Plants	March 1978	Midwest Research Institute for USEPA, EPA-600/2-78-050	Yes. Parking lots from paved and unpaved roads.
17	ref_09c11s1902_1995.pdf	PM10 Emission Factors for a Stone Crushing Plant Deister Vibrating Screen at Martin Marietta in Raleigh-Durham, North Carolina	June 1992	Entropy Environmentalists, Inc. for USEPA-Emission Measurement Branch	Yes
18	ref_10c11s1902_1995.pdf	PM10 Emission Factors for a Stone Crushing Plant Tertiary Crusher at Martin Marietta in Garner, North Carolina	February 17, 1992	Entropy Environmentalists, Inc. for USEPA-Emission Measurement Branch	Yes
19	ref_11c11s1902_1995.pdf	PM10 Emission Factors for a Stone Crushing Plant Deister Vibrating Screen and Crusher	December 1992	Entropy Environmentalists, Inc. for National Stone Association	Yes
20	ref_12c11s1902_1995.pdf	PM10 Emission Factors for a Stone Crushing Plant Tertiary Crusher and Vibrating Screen	December 1992	Entropy Environmentalists, Inc. for Science Applications International Corporation	Yes
21	ref_13c11s1902_1995.pdf	PM10 Emission Factors for Two Transfer Points at a Granite Stone Crushing Plant	January 1994	Entropy Inc. for USEPA-Emission Measurement Branch	Yes
22	ref_14c11s1902_1995.pdf	PM10 Emission Factors for a Stone Crushing Plant Transfer Point	April 1993	Entropy Environmentalists, Inc. for National Stone Association	Yes
23	ref_15c11s1902_1995.pdf	PM10 Emission Factors for a Limestone Crushing Plant Vibrating Screen and Crusher for Bristol, Tennessee	July 19, 1993	Entropy Environmentalists, Inc. for USEPA-Emission Measurement Branch	Yes

24	ref_16c11s1902_1995.pdf	PM10 Emission Factors for a Limestone Crushing Plant Vibrating Screen and Crusher for Maryville, Tennessee	July 19, 1993	Entropy Environmentalists, Inc. for USEPA-Emission Measurement Branch	Yes
25	ref_15db11s1902_june 2003.pdf	Measurement of PM10 and PM2.5 Emission Factors at a Stone Crushing Plant, Vulcan Materials Company, Pineville, North Carolina	December 1996	Air Control Techniques, P.C for National Stone Association	Yes. Duplicate with Reference 8
26	ref_16db11s1902_june 2003.pdf	PM10/PM2.5 Emission Factor Testing for the Pulverized Mineral Division of the National Stone Sand and Gravel Association	October 2001	Air Control Techniques, P.C.	No. Tests conducted for pulverized stone and not stone crushing. The equipment for pulverized stone is much different than the equipment used for stone crushing.
27	ref_17db11s1902_june 2003.pdf	A Report of Particulate Source Sampling Performed for Franklin Industrial Minerals Located in Sherwood, Tennessee	August 9, 1994	Frank Ward and Company	See Reference 1.
28	ref_18db11s1902_june 2003.pdf	Performance Test Report of Baghouse No. 37 at Franklin Industrial Minerals at Dalton, Georgia	November 1999	Advanced Industrial Resources, LLC	No. Test report for a baghouse system. See Reference 3.
29	ref_19db11s1902_june 2003.pdf	Performance Test Report Baghouse BH-570 Limestone System at Franklin Industrial Minerals at Alabaster, Alabama	May 2000	Advanced Industrial Resources, LLC	No. Test report for a baghouse system. See Reference 2.
30	ref_20db11s1902_june 2003.pdf	Source Emission Compliance Test for Non-metallic Mineral Processing Plant for Omya, Inc., Proctor, Vermont	July 14, 1997	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities See Reference 7.
31	ref_21db11s1902_june 2003.pdf	Source Emission Compliance Test for Non-metallic Mineral Processing Plant for Omya, Inc., Proctor, Vermont	April 17, 1998	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities See Reference 6.
32	ref_22db11s1902_june 2003.pdf	Compliance Test Programs for Particulate Emissions from Flash Dryer #3 for Omya, Inc., Proctor, Vermont	January 24, 2001	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities. See Reference 5.
33	ref_23db11s1902_june 2003.pdf	Compliance Test Programs for Particulate Emissions from Flash Dryer #3 for Omya, Inc., Proctor, Vermont	October 27, 2000	Air Quality Technical Services, Inc.	No. Flash dryers not applicable / typical to aggregate crushing facilities. See Reference 4.

Figure 1-Total Particulate Matter AP 42 Emission Factor Version Comparison

Emission Factor Comparison
Section 11.19.2-Pounds per ton

		Total Particulate Matter						Percent	Percent
		AP-42	EMF	AP-42	EMF	AP-42	EMF	Change	Change
Process	*SCC*	Jul-94	Rating	Jan-95	Rating	Aug-03	Rating	Aug -03 to Jul -94	Aug -03 to Jan-95
Screening (uncontrolled)	3-05-020-02,(	0.15	E	ND	N/A	0.025	E	-83%	100%
Screening (controlled)	3-05-020-02,(	0.0085	E	ND	N/A	0.0021	E	-75%	100%
Primary crushing	3-05-020-01	0.0007	E	0.0007	E	ND	N/A	-100%	-100%
Secondary crushing	3-05-020-02	ND	N/A	ND	N/A	ND	N/A	ND	ND
Tertiary crushing	3-05-020-03	0.036	E	ND	N/A	0.0054	E	-85%	100%
Primary crushing (controlled)	3-05-020-01	ND	N/A	ND	N/A	ND	N/A	ND	ND
Secondary crushing (controlled)	3-05-020-02	ND	N/A	ND	N/A	ND	N/A	ND	ND
Tertiary crushing (controlled)	3-05-020-03	0.0016	E	ND	N/A	0.0012	E	-25%	100%
Fines crushing	3-05-020-05	0.72	E	ND	N/A	0.039	E	-95%	100%
Fines crushing (controlled)	3-05-020-05	0.13	E	ND	N/A	0.0036	E	-97%	100%
Fines screening	3-05-020-21	0.3	E	ND	N/A	0.3	E	0%	100%
Fines screening (controlled)	3-05-020-21	0.0036	E	ND	N/A	0.0036	E	0%	100%
Conveyor transfer point	3-05-020-06	0.026	E	ND	N/A	0.0029	E	-89%	100%
Conveyor transfer point (controlled)	3-05-020-06	0.00014	E	ND	N/A	0.00013	E	-7%	100%
Wet drilling: unfragmented stone	3-05-020-10	ND	N/A	ND	N/A	ND	N/A	ND	ND
Truck unloading: fragmented stone	3-05-020-31	ND	N/A	ND	N/A	ND	N/A	ND	ND
Truck loading conveyor-crushed stone	3-05-020-32	ND	N/A	ND	N/A	ND	N/A	ND	ND

ND=No Data, N/A=Not Applicable

Figure 2-PM10 Emission Factor AP-42 Version Comparison

Emission Factor Comparison
Section 11.19.2-Pounds per ton

		PM10						Percent	Percent
		AP-42	EMF	AP-42	EMF	AP-42	EMF	Change	Change
Process	*SCC*	Jul-94	Rating	Jan-95	Rating	Aug-03	Rating	Aug -03 to Jul -94	Aug -03 to Jan-95
Screening (uncontrolled)	3-05-020-02,03	0.015	C	0.015	C	0.0087	C	-42%	-42%
Screening (controlled)	3-05-020-02,03	0.00084	C	0.00084	C	0.00073	C	-13%	-13%
Primary crushing	3-05-020-01	ND	N/A	ND	N/A	ND	N/A	ND	N/A
Secondary crushing	3-05-020-02	ND	N/A	ND	N/A	ND	N/A	ND	ND
Tertiary crushing	3-05-020-03	0.0024	C	0.0024	C	0.0024	C	0%	0%
Primary crushing (controlled)	3-05-020-01	ND	N/A	ND	N/A	ND	N/A	ND	ND
Secondary crushing (controlled)	3-05-020-02	ND	N/A	ND	N/A	ND	N/A	ND	ND
Tertiary crushing (controlled)	3-05-020-03	0.00059	C	0.00059	C	0.00054	C	-8%	-8%
Fines crushing	3-05-020-05	0.015	E	0.015	E	0.015	E	0%	0%
Fines crushing (controlled)	3-05-020-05	0.002	E	0.0021	E	0.0021	E	5%	0%
Fines screening	3-05-020-21	0.071	E	0.071	E	0.071	E	0%	0%
Fines screening (controlled)	3-05-020-21	0.0021	E	0.0021	E	0.0021	E	0%	0%
Conveyor transfer point	3-05-020-06	0.0014	D	0.0014	D	0.0011	D	-21%	-21%
Conveyor transfer point (controlled)	3-05-020-06	0.000048	D	0.000048	D	4.50E-05	D	-6%	-6%
Wet drilling: unfragmented stone	3-05-020-10	0.00008	E	0.00008	E	8.00E-05	E	0%	0%
Truck unloading: fragmented stone	3-05-020-31	0.000016	E	0.000016	E	1.60E-06	E	-90%	-90%
Truck loading conveyor-crushed stone	3-05-020-32	0.0001	E	0.0001	E	0.0001	E	0%	0%

ND=No Data, N/A=Not Applicable

Figure 3-PM2.5 Emission Factor AP-42 Version Comparison

Emission Factor Comparison
Section 11.19.2-Pounds per ton

		PM 2.5						Percent Change	Percent Change
		AP-42	EMF	AP-42	EMF	AP-42	EMF		
Process	*SCC*	Jul-94	Rating	Jan-95	Rating	Aug-03	Rating	Aug -03 to Jul -94	Aug -03 to Jan-95
Screening (uncontrolled)	3-05-020-02,03	ND	N/A	ND	N/A	ND	N/A	ND	ND
Screening (controlled)	3-05-020-02,03	ND	N/A	ND	N/A	0.00005	E	100%	100%
Primary crushing	3-05-020-01	ND	N/A	ND	N/A	ND	N/A	ND	ND
Secondary crushing	3-05-020-02	ND	N/A	ND	N/A	ND	N/A	ND	ND
Tertiary crushing	3-05-020-03	ND	N/A	ND	N/A	ND	N/A	ND	ND
Primary crushing (controlled)	3-05-020-01	ND	N/A	ND	N/A	ND	N/A	ND	ND
Secondary crushing (controlled)	3-05-020-02	ND	N/A	ND	N/A	ND	N/A	ND	ND
Tertiary crushing (controlled)	3-05-020-03	ND	N/A	ND	N/A	0.0001	E	100%	100%
Fines crushing	3-05-020-05	ND	N/A	ND	N/A	ND	N/A	ND	ND
Fines crushing (controlled)	3-05-020-05	ND	N/A	ND	N/A	ND	N/A	ND	ND
Fines screening	3-05-020-21	ND	N/A	ND	N/A	ND	N/A	ND	ND
Fines screening (controlled)	3-05-020-21	ND	N/A	ND	N/A	ND	N/A	ND	ND
Conveyor transfer point	3-05-020-06	ND	N/A	ND	N/A	ND	N/A	ND	ND
Conveyor transfer point (controlled)	3-05-020-06	ND	N/A	ND	N/A	1.50E-05	E	100%	100%
Wet drilling: unfragmented stone	3-05-020-10	ND	N/A	ND	N/A	ND	N/A	ND	ND
Truck unloading: fragmented stone	3-05-020-31	ND	N/A	ND	N/A	ND	N/A	ND	ND
Truck loading conveyor-crushed stone	3-05-020-32	ND	N/A	ND	N/A	ND	N/A	ND	ND

ND=No Data, N/A=Not Applicable