LEHIGH
HEIDELBERGCEMENTGroup

Lehigh Southwest Cement Company

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February 18, 2011

Scott Lutz
Air Quality Engineering Manager - Toxic Evaluation Section
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, CA 94109

Subject: Revised AB2588 Health Risk Assessment Protocol - Permanente Plant

Dear Mr. Lutz,

As requested by the Bay Area Air Quality Management District (BAAQMD) to complete and provide several different emissions scenarios to an AB 2588 Health Risk Assessment (HRA) for its Permanente facility in Cupertino, California, please find enclosed Lehigh Southwest Cement Company's revised HRA protocol developed by AMEC Geomatrix. I would like to draw your attention to and clarify some points regarding these different emissions scenarios:

1. Lehigh has always followed the Federal and State environmental agencies' guidelines when estimating our facility emissions. Prior to 2009, this facility has always estimated its gaseous emissions by the approved Federal EPA's Toxic Release Inventory approach of utilizing stack test data, deriving a factor from that data and applying it towards the facility's annual production. This approved EPA emissions calculation approach is a reason that all facilities have emissions fluctuations from one year to another.

   For years 2009 and on, this plant started using a Mass Balanced Approach (MBA) to calculate mercury emissions. EPA now considers this MBA to be the most accurate and conservative approach for estimating mercury emissions. This new approach used 30 consecutive days of sampling of all the raw materials and fuels for their mercury content and assumes that all the mercury will be vaporized and exits the stacks to the atmosphere. The MBA is also tied to the plants annual production and therefore, fluctuations from year to year will continue.

2. The mercury emissions calculated in the original 2008 Comprehensive Emission Inventory Report (CEIR) for year 2005 utilized 2008 actual emissions source test data, the approved approach at that time. As requested by the BAAQMD, the revised year 2005 mercury emissions in this protocol uses the above mentioned MBA. This MBA used data from a 2009 raw material sampling program. This mercury estimation for year 2005, therefore calculates a hypothetical number and not a true reality estimation of the

mercury emissions in the year 2005. Again, this is the most conservative method and might overstate the emissions at that time, but has fulfilled the BAAQMD's request to provide this scenario for 2005.

3. All of the 2008 – 2009 estimated emissions are based on the average production of the suppressed market conditions with a similar process calculation approach as in the 2005 assessment as stated above in item 1.

4. The 2010 mercury emissions incorporate the first step, or Phase I, for Permanente's strategy to reduce mercury annualized over an entire year. Phase I is the dust shuttling.

5. The 2011 mercury emissions are calculated incorporating the soon to be utilized activated carbon sorbent injection system. This is Phase II of Lehigh's more aggressive approach to reducing our mercury emissions sooner rather than later.

6. The 2013 mercury emissions include calculations that incorporate process modifications designed to fully adhere to the recently promulgated National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Portland Cement Manufacturing 40 CFR 63 Subpart LLL. This is shown as the 2013 section based on the year of the NESHAPs required compliance.

Please note that revisions of this forthcoming Health Risk Assessment to include 2010, 2011, and 2013 emissions will be made in accordance with current emission calculation models and newly adopted California OHHEA requirements for incorporating age sensitivity to carcinogens.

If you have any questions regarding this report, please feel free to contact me at 408-996-4262.

Sincerely,

Scott Renfrew
Environmental Manager
Lehigh Southwest Cement Company – Permanente Plant

cc: Brian Bateman – BAAQMD
Tim Matz – Lehigh Hanson
Shane Alesi – Heidelberg Technology Center
Axel Conrads – LSCC
Henrik Wesseling – LSCC

February 18, 2011

Project 0111910000.0004.0

Mr. Scott Lutz
Bay Area Air Quality Management District
939 Ellis Street
San Francisco, California 94109

Subject: Final Revised Protocol for Revisions to Mercury Emissions and Development of a 2013 Production Scenario
Lehigh Southwest Cement Company
Cupertino, California

Dear Mr. Lutz:

On behalf of Lehigh Southwest Cement Company (Permit No. A0017), AMEC Geomatrix Inc. (AMEC) is submitting this revised protocol to document revisions to the mercury emissions from the Lehigh Southwest Cement Company (Lehigh) in Cupertino, California and to present a maximum production scenario for 2013 once National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements and other planned changes at Lehigh have been implemented. The original protocol was submitted on November 12, 2010. Based on discussions during a conference call held on December 1, 2010 between you and representatives of Lehigh and AMEC, the November 12, 2010 protocol is being revised to calculate maximum hourly emissions of mercury based on maximum hourly production rather than average hourly production. Once we have received your comments to this revised protocol and any additional comments you may have to the AB2588 Health Risk Assessment (HRA), we will prepare the revised AB2588 HRA as we discussed at our October 12, 2010 meeting between representatives of the Bay Area Air Quality Management District (BAAQMD) and Lehigh and during a December 1, 2010 conference call. Based on activities remaining to complete the AB 2588 HRA, including receiving your approval of and implementing this protocol, the schedule for submitting the revised AB2588 HRA is March 30, 2011.

REVISIONS TO MERCURY EMISSIONS

As discussed at the October 12, 2010 meeting, the mercury emissions summarized in the 2009 Addendum to the 2008 Comprehensive Emission Inventory Report (CEIR) were reviewed. Previous mercury emissions reported in the 2008 CEIR used source test data. As reported in the 2009 CEIR Addendum, the mercury emissions were consistent with the mass balanced approach reported for the Toxics Release Inventory (TRI) for 2008, but did not reflect higher production rates from 2005 used as the basis for the 2008 CEIR. Lehigh's 2005 production was the highest in the last 10 years. Additionally, historical mercury concentration data in pre-blend stone (limestone) was used in the mass balance presented in the 2009 CEIR Addendum. Since that historical data was collected, mercury has been sampled and measured in the pre-blend stone for the purpose of the 2008 CEIR and over a 30-day period in 2009 utilizing a sampling

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protocol from a 2007 EPA 114 request.[1] The results of the two sampling programs were the same. The concentration of mercury in the pre-blend stone was 0.31 parts per million (ppm) in the 2008 CEIR samples as was the average concentration over 30-days of sampling in 2009, excluding two outlier samples as shown in Table 1.

Table 2 presents a comparison of the average mercury concentrations from Table 1 to concentrations used originally in the 2008 CEIR and in the 2009 Addendum to the CEIR. As shown in Table 2, average concentrations in the historical pre-blend limestone were 0.24 ppm as reported in the 2009 Addendum, whereas current data from two separate sampling events report the average concentration of mercury as 0.31 parts per million.

The 0.31 ppm average mercury concentration for the pre-blend limestone was used in the mass balance calculations herein to estimate emissions from the kiln assuming all mercury present in the raw materials was emitted. This is the same mass balance approach used in the 2009 Addendum. Table 3 presents the results of these calculations for annual average and maximum hourly emission rates for:

- the 2005 production year (2008 CEIR);
- average production in 2008/2009 to represent a low production scenario resulting from current economic conditions based on production calculations presented in the AB2588 HRA;
- annualized 2010 emissions to reflect implementation of a kiln mill dust collector (KMDC) dust shuttling system that reduced mercury emissions by approximately 30 percent (Attachment A);[2]
- projected 2011 emissions to reflect both implementation of a KMDC dust shuttling system and the addition of activated carbon sorbent to remove mercury (Attachment B). The activated carbon addition will further reduce mercury emissions in combination with the KMDC dust shuttling system. For the purpose of this protocol 2011 emissions are estimated to be 50 percent of 2010 emissions. and
- projected 2013 scenario (discussed further below).

This information regarding the revisions to the mercury emissions will be included as an Appendix to the AB2588 HRA.

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[1] In 2007, EPA issued a 114 requirement to the eight largest U.S. Cement manufacturers to sample raw material for mercury content. At that time, the Hanson Permanente Cement Company was not part of that sampling requirement, but performed a similar test for informational purposes and consistency within the Company after being acquired by the Heidelberg Cement Group (Lehigh).

[2] Although the kiln mill dust collector conveyance system was only fully operational for about 6 full months in 2010, the emission rates herein are based on 12-month operation of that system.

Projected 2013 Scenario

As we discussed at the October 12, 2010 meeting, an emission scenario to reflect expected conditions in 2013 will be added to the AB2588 HRA. Table 4 presents a summary of NESHAPs requirements and where those requirements will change emission rates relevant to the AB2588 HRA by 2013. As noted in Table 4, the NESHAPs requirements will specifically affect emissions of hydrochloric acid and mercury. In addition, the kiln at Lehigh will be reconfigured to emit from a single 300 foot stack rather than the 32 rooftop stacks currently in place. The previous and projected source parameters for the kiln stack(s) are as follows:

Parameter	2008 CEIR (1 of 30 individual stacks)*	Projected 2013 Scenario
Base elevation (meters)	199.03	199.03
Release Height (meters)	18.29	91.44
Exit Temp (degrees Fahrenheit)	320	320
Stack Diameter (feet)	2.198	19
Exit Velocity (meters/second)	16.063	9.406
Flow Rate (cubic feet/minute)	12000	525000

* There are a total of 32 roof-top stacks on the kiln but only 30 are in operation at any given time.

Revisions will be made to the AB2588 HRA following your concurrence with these proposed changes. Please call either of the undersigned if you have any questions.

Sincerely yours,
AMEC Geomatrix, Inc.

Caryn Kelly
Senior Toxicologist

Ann Holbrow Verwiel
Senior Toxicologist

CK/AHV/bfw/jh

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Attachments: Table 1 Summary of Mercury Analysis in 2009
Table 2 Revisions to Mercury Concentrations Based on 2009 Sampling
Table 3 Revisions to Mercury Emissions - Mass Balance Based on 2009 Raw Material Sampling
Table 4 Revisions to Emissions for Projected 2013 Scenario Based on NESHAPS Requirements

Attachment A – 2010 Kiln Mill Dust Conveying System Emission Calculations
Attachment B – Powdered Sorbent Injection Reduction of Mercury Emissions

cc: Scott A. Renfrew, Lehigh Southwest Cement Company
Henrik Wesseling, Lehigh Southwest Cement Company
Robert Hull, Bay Area Air Quality Management District
Brian Bateman, Bay Area Air Quality Management District
Shane Alesi, HTC - Heidelberg Technology Center
Tim Matz, Lehigh Hanson

TABLES

TABLE 1

SUMMARY OF MERCURY ANALYSIS IN 2009

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations in micrograms per gram (μg/g)

Date	Run	Pre-Blend Stone	Iron Ore	Bauxite
3/25/2009	1	0.394	0.087	0.034
	2	0.396	0.087	0.034
3/26/2009	1	0.774 [1]	0.205	0.045
	2	0.780	0.202	0.045
3/27/2009	1	1.44	0.156	0.032
	2	1.42	0.455	0.033
3/28/2009	1	0.401	0.172	0.040
	2	0.397	0.173	0.040
3/29/2009	1	0.302	0.158	0.039
	2	0.306	0.157	0.040
3/30/2009	1	0.298	0.236	0.037
	2	0.296	0.236	0.037
3/31/2009	1	0.328	0.458	0.031
	2	0.328	0.455	0.030
4/1/2009	1	0.483	0.197	0.030
	2	0.480	0.195	0.031
4/2/2009	1	0.272	0.185	0.034
	2	0.271	0.185	0.036
4/3/2009	1	0.346	<0.02	0.039
	2	0.342	<0.02	0.039
4/4/2009	1	0.384	0.2208	0.032
	2	0.384	0.208	0.032
4/5/2009	1	0.263	<0.02	0.030
	2	0.264	<0.02	0.031
4/6/2009	1	0.279	<0.02	0.040
	2	0.283	<0.02	0.040
4/7/2009	1	0.340	0.196	0.030
	2	0.341	0.196	0.030
4/8/2009	1	0.382	0.149	0.035
	2	0.384	0.15	0.035
4/10/2009	1	0.243	0.137	0.033
	2	0.243	0.135	0.034
4/11/2009	1	0.253	0.126	0.032
	2	0.255	0.127	0.033
4/12/2009	1	0.446	0.187	0.058
	2	0.446	0.187	0.058
4/13/2009	1	0.261	0.150	0.033
	2	0.261	0.151	0.033
4/14/2009	1	0.263	0.151	0.035
	2	0.262	0.152	0.034
4/15/2009	1	0.247	0.155	0.033
	2	0.249	0.156	0.033

TABLE 1

SUMMARY OF MERCURY ANALYSIS IN 2009

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations in micrograms per gram (μg/g)

Date	Run	Pre-Blend Stone	Iron Ore	Bauxite
4/16/2009	1	0.351	0.167	0.036
	2	0.352	0.168	0.037
4/17/2009	1	0.238	0.173	0.036
	2	0.238	0.172	0.037
4/18/2009	1	0.267	0.165	0.034
	2	0.267	0.166	0.034
4/19/2009	1	0.200	0.170	0.034
	2	0.200	0.170	0.034
4/20/2009	1	0.232	0.180	0.031
	2	0.232	0.181	0.031
4/21/2009	1	0.216	0.165	0.068
	2	0.217	0.163	0.069
4/22/2009	1	0.274	0.213	0.037
	2	0.273	0.214	0.037
4/23/2009	1	0.326	0.222	0.032
	2	0.325	0.222	0.032
4/24/2009	1	0.295	0.620	0.031
	2	0.296	0.622	0.031
Minimum Detected Value		0.20	0.087	0.030
Maximum Detected Value		0.48	0.62	0.069
Average[2]		0.31	0.19	0.037

Notes

1. Shading indicates an outlier result excluded from summary data.
2. Average based on detection limits for non-detect results.

TABLE 2

REVISIONS TO MERCURY EMISSIONS BASED ON 2009 SAMPLING

Lehigh Southwest Cement Company
Cupertino Facility

Raw Material and Fuel	2009 30-Day Sampling [1]			Previous Results		
	Minimum Mercury	Maximum Mercury (ppm)	Average Mercury (ppm)	Raw Material and Fuel	2008 CEIR Mercury (ppm)	2009 Addendum to 2008 CEIR Mercury (ppm)
Pre-Blend Stone	0.20	0.48	0.31	High Grade (HG)	0.12	--
	--	--	--	All Grade (AG)	0.56	--
	--	--	--	56%HG / 44%AG	0.31	0.24
Iron Ore	0.087	0.62	0.19	Iron Ore	0.01	0.01
Bauxite	0.030	0.069	0.037	Bauxite	0.01	0.01
Coke	-- [2]	-- [2]	0.01	Coke	0.01	0.01

Notes

1. Average values to be used in mass balance calculation for Revised AB2588 HRA.
2. Petroleum coke sampling in 2009 was not representative of mercury content of raw material because samples were collected from the production process. The detection limit for the samples collected from the coke stockpile for the 2008 CEIR was used to represent the mercury content of coke.

Abbreviations

-- = Not applicable
ppm = parts per million

TABLE 3

REVISIONS TO MERCURY EMISSIONS - MASS BALANCE APPROACH BASED ON 2009 RAW MATERIAL SAMPLING
Lehigh Southwest Cement Company
Cupertino Facility

	Revised Mercury Emissions based on 2008 CEIR Addendum (Lehigh, 2009)			2005 Mercury Emissions		Average 2008/2009 Mercury Emissions		2010 Mercury Emissions		2011 Mercury Emissions		Projected 2013 Mercury Emissions	
Raw Material and Fuel	**Annual Raw Materials Consumption (short tons)**	**Average Mercury Concentration (ppm)**	**Revised Average Annual Emissions (lb/year)**	**Maximum Hourly Emissions [4] (lb/hour)**	**Annual Average Emissions [5] (lb/year)**	**Maximum Hourly Emissions [6] (lb/hour)**	**Annual Average Emissions [7] (lb/year)**	**Maximum Hourly Emissions [8] (lb/hour)**	**Annual Average Emissions [8] (lb/year)**	**Maximum Hourly Emissions [9] (lb/hour)**	**Annual Average Emissions [9] (lb/year)**	**Maximum Hourly Emissions [10] (lb/hour)**	**Annual Average Emissions [11] (lb/year)**
Preblend Stone [1]	1,228,889	0.31	762	0.19	1253	0.18	727	0.13	532	0.063	254	--	--
Iron Ore [1]	35,346	0.19	13	0.0034	22	0.0031	13	0.0022	9	0.0011	4	--	--
Bauxite [1]	55,723	0.037	4.1	0.0010	7	0.0010	4	0.00067	3	0.00033	1	--	--
Coke [2]	100,731	0.01	2.0	0.00051	3	0.00047	2	0.00033	1	0.00017	1	--	--
Total Mercury Emissions (lb)			781	0.20	1284	0.18	745	0.13	546	0.064	261	0.011	88
Total Clinker Production (tons/hour or tons/year) [3]	851,370			217	1,399,692	200	811,821	200	850,000	200	850,000	200	1,600,000

Notes
1. Concentrations in raw feed material based on measurements between March 25, 2009 and April 24, 2009 presented in Table 1.
2. Concentrations in petroleum coke based on detection limits for samples from coke stockpiles collected for the 2008 CEIR. Mercury was not detected in the samples.
3. Tons of clinker production = (preblend stone + iron ore + bauxite) * 0.645. Tons per hour applies to maximum hourly production and tons per year applies to annual production.
4. Max Hourly emissions in 2005 for 2008 CEIR scenario based on a maximum daily clinker production rate of 5200 tons/day (217 tons/hour).
Max hourly Hg emissions from materials = (tons/hr clinker/0.645 * (tons material/tons total all materials) * Conc of Hg in raw material * 2000 lbs/ton * 0.000001 kg/mg).
Max hourly Hg emissions from coke = (tons/hr clinker production) * (tons coke /year) / (tons clinker /year) * Conc of mercury in coke * 2000 lbs/ton * 0.000001 kg/mg.
5. Annual average emissions in 2005 for 2008 CEIR scenario based on a total clinker production rate of 1,399,692 tons of clinker.
Total annual average Hg emissions = 2005 clinker production/2008 clinker production * 2008 Hg emissions.
6. Maximum hourly emissions in 2008/2009 for current low production scenario based on maximum hourly production for 2008/2009. Maximum hourly production is limited by permit condition on use of petroleum coke set in 2007.
7. Annual average emissions in 2008/2009 for current low production scenario based on a total clinker production rate of 811,821 tons of clinker.
Total annual average Hg emissions = 2008_2009 clinker production/2008 clinker production * 2008 Hg emissions.
8. In April 2010, kiln mill dust collector (KMDC) dust shuttling modification was implemented to control mercury emissions and resulted in a reduction of approximately 30 percent in months when fully operational. Actual annual production rates for 2010 were used and mercury emissions were reduced by 30 percent to evaluate annual exposure although the system was only in operation for 6 full months.
9. In 2011, an activated carbon system was tested to reduce emissions of mercury. For the purpose of the AB2588 HRA, the new system is assumed to achieve an additional reduction of emissions by approximately 50 percent over 2010 emissions.
10. Maximum hourly emissions were projected for the 2013 production scenario based on a maximum production rate of 200 tons per hour. Annual average mercury emissions (88 pounds per year) were divided by 8424 hours of production (assuming a two week shut down period) and then were increased by the ratio of the maximum clinker production rate (200 tons per hour) to the average production rate (189 tons per hour) for that period.
11. Annual average emissions projected for 2013 production scenario based on the NESHAP requirement of 88 pounds per year mercury emissions and is not based on the specific contribution of raw materials.

Abbreviations
-- = not applicable
Hg = mercury
lb = pounds
NESHAP = National Emission Standards for Hazardous Air Pollutants
ppm = parts per million

TABLE 4

REVISIONS TO EMISSIONS FOR PROJECTED 2013 SCENARIO BASED ON NESHAP REQUIREMENTS [1]

Lehigh Southwest Cement Company
Cupertino Facility

NESHAP Requirements for Kiln	Specific Requirement	2013 Scenario	2008 CEIR Emission Rates		2013 Emission Rates	
			lb/hour	lb/year	lb/hour	lb/year
Total Mercury Emissions [2]	55 lbs/million tons of clinker	88 lbs/year based on 1.6 million tons clinker production	0.20	1284	0.011	88
Total Hydrocarbon Emissions	9 ppm @ 7 % oxygen of total hazardous air pollutants[1]	No change; requirement met under current conditions	No revision made			
Hydrochloric acid emissions	3 ppm @ 7% oxygen	Assumed to be 50 percent reduction from current emissions	16	1.1E+05	7.8	5.4E+04
Particulate matter	0.04 lb/ton of clinker	No change; requirement met under current conditions	No revision made			

Notes
1. In addition, the kiln stack parameters will be revised as discussed in the text.
2. 2008 Mercury emissions are the final 2008 CEIR emissions (based on production in 2005) as discussed in previous section of the protocol.

Abbreviations
lb(s) = pound(s)
NESHAP = National Emission Standards for Hazardous Air Pollutants
ppm = parts per million

ATTACHMENT A

2010 Kiln Mill Dust Conveying System Emission Calculations

ATTACHMENT A

2010 KMDC DUST SHUTTLING SYSTEM
EMISSION CALCULATIONS

Lehigh Southwest Cement Company
Cupertino, California

The kiln mill dust collector dust shuttling system (KMDC dust shuttling system) purges a small amount of the dust from the kiln mill dust collector (KMDC) baghouse removing the dust (and associated mercury) from the pyro-processing system. Then the removed process dust is inter-ground within the cement finish mills as a process addition. Removing this dust from the pyro-system reduces the concentrations of mercury in the baghouse exhaust gases. KMDC dust samples collected and analyzed in September 2008 showed increased mercury levels when both raw mills are down. Under this condition, the mercury does not condense inside the raw mill attached to the raw meal/ kiln feed; rather, it condenses in the main baghouse. Rather than reintroducing this mercury enriched dust back into the pyro-system, it is removed and incorporated safely into the cement. The addition of kiln mill dust from the KMDC does not result in an appreciable increase in the mercury content of the cement product. Presently, the kiln mill baghouse collects the dust and an FK pump system conveys the dust to the finish mill.

The estimated reduction in mercury emissions is based on a mass balance approach, which conservatively assumes that all mercury inputs to the system exit the system to the atmosphere. The mass balance calculation considers the content of mercury in the raw materials, the mass of raw materials, the content of mercury in the dust in the KMDC, and the mass of dust removed from the KMDC and conveyed to the finish mill. The calculation of the reduced mercury emissions is as follows:

Hg Emissions = Hg Input – Hg removed (KMDC)

Where:

Hg Input = Mercury in raw materials (pounds; limestone, bauxite, iron, and coke)
Hg Removed `= Mercury in KMDC dust that is removed to the finish mill and put directly into cement product (pounds)

Table A-1 presents the calculations provided by Lehigh for assessing the effectiveness of this approach for removing mercury from the kiln emissions. When in full operation, the average removal of mercury is approximately 30 percent. The system began operation in April 2010, but the kiln was shut down in May and August. Tables A-2 through A-7 present emissions of all chemicals for the 2010 emission scenario.

TABLE A-1

KILN MILL DUST CONVEYANCE REDUCTION OF MERCURY EMISSIONS BY MONTH FOR 2010 PRODUCTION[1]

Lehigh Southwest Cement Company
Cupertino Facility

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KMDC Hg (ppm)	*11.06*	*11.06*	*11.06*	11.07	17.91	11.06	6.28	4.45	7.72	5.96	5.05	*7.18*
Limestone Hg (ppm)	*0.34*	*0.34*	*0.34*	0.34	*0.30*	0.30	0.26	0.26	0.29	0.22	0.28	*0.40*
Production (mTons)												
Clinker	48114	69787	85517	63667	0	96174	106138	5463	94274	97967	58332	*43069*
Cement	52829	39691	71294	73694	33450	89411	93983	44470	95505	89098	55892	*54990*
Consumption (mTons)												
Kiln Feed	74595	108197	132584	98709	0	149107	164555	8470	146161	151887	90437	*66774*
Limestone	71000	103447	126075	93931	0	139579	154912	7893	138049	142561	85961	*63962*
Iron	1656	2186	2652	2102	0	4369	4328	289	4093	4283	1899	*968*
Bauxite	1939	2564	3858	2675	0	5159	5315	288	4019	5043	2577	*1843*
Coke	4831	7096	8776	6458	0	9778	10949	692	9108	9129	5713	*4357*
KMDC to Finish Mills	0.0	0.0	0.0	125.7	157.3	1411.4	2210.0	643	1666	1850	1023	*961*
Consumption (Lbs)												
Limestone	156527909	228061758	2.8E+08	2.1E+08	0.0E+00	3.1E+08	3.4E+08	1.7E+07	3.0E+08	3.1E+08	1.9E+08	1.4E+08
Iron	3650892.603	4818374.1	5.8E+06	4.6E+06	0.0E+00	9.6E+06	9.5E+06	6.4E+05	9.0E+06	9.4E+06	4.2E+06	2.1E+06
Bauxite	4275820.165	5653240.9	8.5E+06	5.9E+06	0.0E+00	1.1E+07	1.2E+07	6.3E+05	8.9E+06	1.1E+07	5.7E+06	4.1E+06
Coke	10650533.71	15644005	1.9E+07	1.4E+07	0.0E+00	2.2E+07	2.4E+07	1.5E+06	2.0E+07	2.0E+07	1.3E+07	9.6E+06
KMDC to FM's	0	0	0.0E+00	2.8E+05	3.5E+05	3.1E+06	4.9E+06	1.4E+06	3.7E+06	4.1E+06	2.3E+06	2.1E+06
Total Hg Input (Lbs)	54.40	79.07	96.42	71.91	NA	96.08	92.55	NA	91.72	72.82	54.74	57.32
Total Hg Removed (Lbs)	0.00	0.00	0.00	3.07	NA	34.42	30.60	NA	28.35	24.31	11.39	15.21
Percent Reduction	0%	0%	0%	4%	NA	36%	33%	NA	31%	33%	21%	27%
Net Hg Emissions (Lbs)	**54.40**	**79.07**	**96.42**	**68.84**	**NA**	**61.65**	**61.96**	**NA**	**63.37**	**48.51**	**43.35**	**42.11**

Notes

1. Data and calculations proviided by Lehigh.

Abbreviations:

Hg - mercury
Lbs - pounds
mTons - metric tons
NA - not applicable during kiln maitenance
ppm - parts per million

Raw Materials	**Hg ppm**
Iron	0.33475
Bauxite	0.03425
Coke	0.00675

TABLE A-2

ANNUAL AVERAGE EMISSION RATES FOR THE KILN - 2010 PRODUCTION SCENARIO

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per year (lbs/yr)

CAS No.	Chemical	2010
75070	Acetaldehyde	7.03E+02
107028	Acrolein	2.73E+01
7440382	Arsenic	4.61E-01
56553	Benz[a]anthracene	7.96E-03
71432	Benzene	5.86E+03
50328	Benzo[a]pyrene	1.79E-04
205992	Benzo[b]fluoranthene	1.14E-03
207089	Benzo[k]fluoranthene	1.79E-04
100447	Benzyl chloride	6.14E+01
7440417	Beryllium	2.31E-01
106990	1,3-Butadiene	5.58E+01
7440439	Cadmium	2.31E-01
56235	Carbon tetrachloride	3.74E+01
108907	Chlorobenzene	3.37E+02
67663	Chloroform	1.74E+01
18540299	Chromium VI	2.04E-01
218019	Chrysene	2.35E-02
7440508	Copper	2.58E+00
1175	Crystalline silica	0.00E+00
53703	Dibenz[a,h]anthracene	1.79E-04
106467	p-Dichlorobenzene	3.58E+01
75343	1,1-Dichloroethane	1.20E+01
78875	1,2-Dichloropropane	1.65E+01
542756	1,3-Dichloropropene	6.75E+01
9901	Diesel PM	0.00E+00
75003	Ethyl chloride	2.35E+01
100414	Ethylbenzene	5.83E+02
106934	Ethylene dibromide	3.66E+01
107062	Ethylene dichloride	1.44E+01
50000	Formaldehyde	3.83E+01
35822469	1,2,3,4,6,7,8-HpCDD	5.85E-06
67562394	1,2,3,4,6,7,8-HpCDF	2.84E-06
55673897	1,2,3,4,7,8,9-HpCDF	7.31E-07
39227286	1,2,3,4,7,8-HxCDD	1.63E-06

TABLE A-2

ANNUAL AVERAGE EMISSION RATES FOR THE KILN - 2010 PRODUCTION SCENARIO

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per year (lbs/yr)

CAS No.	Chemical	2010
57653857	1,2,3,6,7,8-HxCDD	1.61E-06
19408743	1,2,3,7,8,9-HxCDD	1.67E-06
70648269	1,2,3,4,7,8-HxCDF	2.47E-06
57117449	1,2,3,6,7,8-HxCDF	2.31E-06
72918219	1,2,3,7,8,9-HxCDF	7.79E-07
60851345	2,3,4,6,7,8-HxCDF	1.42E-06
7647010	Hydrochloric acid	6.51E+04
193395	Indeno[1,2,3-c,d] pyrene	1.33E-04
7439921	Lead	5.38E-01
7439965	Manganese	2.42E+00
7439976	Mercury	5.46E+02
74839	Methyl bromide	3.80E+02
71556	Methyl chloroform	1.95E+01
75092	Methylene chloride	7.84E+01
91203	Naphthalene	8.42E+01
7440020	Nickel	3.96E+00
3268879	1,2,3,4,6,7,8,9-OCDD	1.22E-05
39001020	1,2,3,4,6,7,8,9-OCDF	2.80E-06
40321764	1,2,3,7,8-PeCDD	1.44E-06
57117416	1,2,3,7,8-PeCDF	1.11E-05
57117314	2,3,4,7,8-PeCDF	1.67E-05
127184	Perchloroethylene	3.23E+01
7782492	Selenium	2.58E+00
100425	Styrene	1.47E+02
1746016	2,3,7,8-TCDD	1.41E-06
51207319	2,3,7,8-TCDF	7.00E-05
79345	1,1,2,2-Tetrachloroethane	2.45E+01
108883	Toluene	5.25E+03
79005	1,1,2-Trichloroethane	3.24E+01
79016	Trichloroethylene	2.56E+01
1314621	Vanadium	2.31E+00
75014	Vinyl chloride	8.61E+01
75354	Vinylidene chloride	2.36E+01
95476	o-Xylene	8.26E+02
1330207	Xylenes (mixed)	4.22E+03

TABLE A-3

ANNUAL AVERAGE EMISSION RATES BY SOURCE GROUP FOR 2010 PRODUCTION SCENARIO - DUST COLLECTORS

Lehigh Southwest Cement Company

Cupertino Facility

Concentrations reported in pounds per year (lbs/yr)

CAS No.	Chemical	Emission Source Group												
		1D4	2D1	3D1	3D4	3D5	4D3	4D4	5D1	5D2	5D3	5D5	5D6	5D11_20
7440382	Arsenic	3.84E-02	2.20E-02	1.01E-02	1.10E-02	1.05E-02	1.40E-02	1.43E-02	1.82E-02	1.82E-02	3.28E-02	1.71E-02	1.69E-02	9.57E-02
7440417	Beryllium	4.12E-03	3.58E-03	1.65E-03	1.74E-03	1.68E-03	2.18E-03	2.22E-03	2.83E-03	2.83E-03	5.09E-03	1.03E-02	1.01E-02	1.55E-02
7440439	Cadmium	6.86E-03	9.01E-03	4.15E-03	5.95E-03	2.80E-03	5.31E-03	5.42E-03	6.90E-03	6.90E-03	1.24E-02	1.71E-02	1.69E-02	2.58E-02
7440473	Chromium (total)	7.61E-02	1.66E-01	7.64E-02	9.60E-02	6.11E-02	9.51E-02	9.70E-02	1.24E-01	1.24E-01	2.22E-01	1.24E-01	1.23E-01	1.61E+00
18540299	Chromium VI	2.74E-04	2.13E-03	9.82E-04	1.87E-03	2.24E-04	1.19E-03	1.21E-03	1.55E-03	1.55E-03	2.78E-03	1.37E-03	1.35E-03	2.48E-01
7440508	Copper	1.67E-01	1.64E-01	7.58E-02	8.03E-02	7.62E-02	9.88E-02	1.01E-01	1.28E-01	1.28E-01	2.31E-01	8.77E-02	8.66E-02	3.99E-01
1175	Crystalline silica	8.96E-01	5.76E+00	2.66E+00	3.29E+00	2.10E+00	3.22E+00	3.28E+00	4.18E+00	4.18E+00	7.53E+00	1.40E-01	1.38E-01	2.11E-01
7439921	Lead	1.87E-02	8.59E-03	3.96E-03	6.00E-03	2.80E-03	5.67E-03	5.79E-03	7.37E-03	7.37E-03	1.33E-02	1.71E-02	1.69E-02	7.23E-02
7439976	Mercury	1.18E-03	1.50E-03	6.90E-04	1.22E-03	2.69E-04	8.85E-04	9.03E-04	1.15E-03	1.15E-03	2.07E-03	5.34E-02	5.28E-02	2.06E-04
7440020	Nickel	1.18E+00	2.05E-01	9.44E-02	1.59E-01	7.85E-02	1.72E-01	1.76E-01	2.24E-01	2.24E-01	4.03E-01	5.21E+00	5.14E+00	1.55E+00
7782492	Selenium	1.37E-02	1.19E-02	5.50E-03	5.80E-03	5.60E-03	7.25E-03	7.40E-03	9.42E-03	9.42E-03	1.70E-02	3.43E-02	3.38E-02	5.16E-02
1314621	Vanadium	3.57E+00	9.65E-01	4.45E-01	5.22E-01	4.93E-01	7.11E-01	7.25E-01	9.23E-01	9.23E-01	1.66E+00	1.51E+01	1.49E+01	8.40E+00

CAS No.	Chemical	Emission Source Group											
		5D23	5D27	5D28	6D17	6D19	6D2	6D1218	6D1	6D8	7PD7	8D31	999DC
7440382	Arsenic	1.66E-02	4.37E-03	4.37E-03	1.85E-02	2.08E-02	1.86E-02	1.15E-02	1.97E-02	1.22E-02	9.25E-03	3.67E-03	1.07E-01
7440417	Beryllium	2.69E-03	7.07E-04	7.07E-04	3.17E-03	3.57E-03	3.20E-03	1.97E-03	3.20E-03	2.09E-03	1.59E-03	2.20E-03	1.72E-02
7440439	Cadmium	4.49E-03	1.18E-03	1.18E-03	5.29E-03	5.95E-03	5.33E-03	3.28E-03	5.33E-03	3.48E-03	2.64E-03	3.67E-03	3.07E-02
7440473	Chromium (total)	2.79E-01	7.34E-02	7.34E-02	2.74E-01	3.08E-01	2.76E-01	1.70E-01	3.32E-01	1.80E-01	1.37E-01	7.05E-02	1.20E+00
18540299	Chromium VI	4.31E-02	1.13E-02	1.13E-02	7.30E-02	8.21E-02	7.35E-02	4.52E-02	5.11E-02	4.81E-02	3.65E-02	2.94E-04	2.37E-01
7440508	Copper	6.94E-02	1.82E-02	1.82E-02	9.41E-02	1.06E-01	9.48E-02	5.83E-02	8.24E-02	6.20E-02	4.71E-02	4.11E-02	5.61E-01
1175	Crystalline silica	3.66E-02	9.62E-03	9.62E-03	2.59E-01	2.91E-01	2.61E-01	1.60E-01	4.35E-02	1.71E-01	1.29E-01	1.09E+01	9.49E+00
7439921	Lead	1.26E-02	3.30E-03	3.30E-03	1.31E-02	1.48E-02	1.32E-02	8.13E-03	1.49E-02	8.64E-03	6.56E-03	3.82E-03	6.77E-02
7439976	Mercury	3.59E-05	9.43E-06	9.43E-06	4.23E-05	4.76E-05	4.26E-05	2.62E-05	4.26E-05	2.79E-05	2.11E-05	5.87E-04	2.26E-03
7440020	Nickel	2.69E-01	7.07E-02	7.07E-02	4.55E-01	5.12E-01	4.58E-01	2.82E-01	3.20E-01	3.00E-01	2.27E-01	6.75E-02	2.80E+00
7782492	Selenium	8.98E-03	2.36E-03	2.36E-03	1.06E-02	1.19E-02	1.07E-02	6.56E-03	1.07E-02	6.97E-03	5.29E-03	7.34E-03	5.70E-02
1314621	Vanadium	1.46E+00	3.84E-01	3.84E-01	1.52E+00	1.71E+00	1.53E+00	9.44E-01	1.73E+00	1.00E+00	7.61E-01	5.58E-02	9.14E+00

TABLE A-4

ANNUAL AVERAGE EMISSION RATES BY SOURCE GROUP FOR FUGITIVE AND OTHER POINT SOURCES - 2010 PRODUCTION SCENARIO

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per year (lbs/yr)

CAS No.	Chemical	2010 Production															
		S501	S502	1	2	3	4A	4B	4C	4D	5	6A	6B	6C	6D	7	8
7440382	Arsenic	-	-	5.70E-02	5.70E-02	6.52E-02	2.83E-02	2.83E-02	2.83E-02	2.83E-02	2.00E-02	2.12E-02	2.12E-02	2.12E-02	2.12E-02	2.68E-03	4.08E-03
71432	Benzene	-	-	-	-	-	-	-	-	-	-	1.38E-03	1.38E-03	1.38E-03	1.38E-03	8.20E-05	-
7440417	Beryllium	-	-	2.08E-02	2.08E-02	1.63E-02	4.11E-03	4.11E-03	4.11E-03	4.11E-03	1.14E-02	8.17E-03	8.17E-03	8.17E-03	8.17E-03	1.61E-03	6.01E-03
7440439	Cadmium	-	-	3.46E-02	3.46E-02	3.51E-02	1.00E-02	1.00E-02	1.00E-02	1.00E-02	2.00E-02	1.36E-02	1.36E-02	1.36E-02	1.36E-02	2.68E-03	3.92E-03
18540299	Chromium VI	-	-	2.77E-03	2.77E-03	6.46E-03	2.01E-02	2.01E-02	2.01E-02	2.01E-02	1.52E-03	1.92E-02	1.92E-02	1.92E-02	1.92E-02	2.14E-04	3.14E-04
7440508	Copper	-	-	6.38E-01	6.38E-01	5.37E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	2.21E-01	2.81E-01	2.81E-01	2.81E-01	2.81E-01	3.00E-02	3.40E-02
1175	Crystalline silica	-	-	1.55E+02	1.55E+02	5.28E+01	4.81E+00	4.81E+00	4.81E+00	4.81E+00	5.64E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	7.95E+00	8.15E+00
9901	Diesel PM	3.14E+00	6.28E+00	-	-	-	-	-	-	-	3.83E+00	2.30E+00	2.30E+00	2.30E+00	2.30E+00	2.30E+00	-
7439921	Lead	-	-	3.46E-02	3.46E-02	3.46E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.98E-02	3.29E-02	3.29E-02	3.29E-02	3.29E-02	2.78E-03	4.03E-03
7439976	Mercury	-	-	7.94E-03	7.94E-03	5.85E-03	9.69E-03	9.69E-03	9.69E-03	9.69E-03	3.08E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	4.28E-04	1.47E-03
7440020	Nickel	-	-	1.09E+00	1.09E+00	7.35E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01	3.52E-01	7.34E-01	7.34E-01	7.34E-01	7.34E-01	4.92E-02	5.36E-02
7782492	Selenium	-	-	6.93E-02	6.93E-02	5.45E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	3.81E-02	1.89E-02	1.89E-02	1.89E-02	1.89E-02	5.35E-03	7.84E-03
108883	Toluene	-	-	-	-	-	-	-	-	-	-	5.45E-03	5.45E-03	5.45E-03	5.45E-03	3.28E-03	-
1314621	Vanadium	-	-	1.28E+00	1.28E+00	2.47E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	3.97E-01	1.69E+00	1.69E+00	1.69E+00	1.69E+00	4.07E-02	6.18E-02
1330207	Xylenes (mixed)	-	-	-	-	-	-	-	-	-	-	7.98E-03	7.98E-03	7.98E-03	7.98E-03	2.97E-02	-

TABLE A-5

MAXIMUM HOURLY EMISSION RATES FOR THE KILN - 2010 PRODUCTION SCENARIO [1]

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per hour (lbs/hr)

CAS No.	Chemical	2010
75070	Acetaldehyde	1.68E-01
107028	Acrolein	6.51E-03
7440382	Arsenic	1.10E-04
7440393	Barium	1.42E-03
56553	Benz[a]anthracene	1.90E-06
71432	Benzene	1.40E+00
50328	Benzo[a]pyrene	4.27E-08
205992	Benzo[b]fluoranthene	2.71E-07
207089	Benzo[k]fluoranthene	4.27E-08
100447	Benzyl chloride	1.47E-02
7440417	Beryllium	5.52E-05
106990	1,3-Butadiene	1.33E-02
7440439	Cadmium	5.52E-05
56235	Carbon tetrachloride	8.94E-03
108907	Chlorobenzene	8.04E-02
67663	Chloroform	4.16E-03
7440473	Chromium (total)	8.04E-04
18540299	Chromium VI	4.87E-05
218019	Chrysene	5.60E-06
7440508	Copper	6.15E-04
1175	Crystalline silica	0.00E+00
53703	Dibenz[a,h]anthracene	4.27E-08
106467	p-Dichlorobenzene	8.54E-03
75343	1,1-Dichloroethane	2.87E-03
78875	1,2-Dichloropropane	3.94E-03
542756	1,3-Dichloropropene	1.61E-02
9901	Diesel PM	0.00E+00
75003	Ethyl chloride	5.62E-03
100414	Ethylbenzene	1.39E-01
106934	Ethylene dibromide	8.73E-03
107062	Ethylene dichloride	3.45E-03
50000	Formaldehyde	9.15E-03
87683	Hexachlorobutadiene	1.52E-02
35822469	1,2,3,4,6,7,8-HpCDD	1.40E-09

TABLE A-5

MAXIMUM HOURLY EMISSION RATES FOR THE KILN - 2010 PRODUCTION SCENARIO [1]

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per hour (lbs/hr)

CAS No.	Chemical	2010
67562394	1,2,3,4,6,7,8-HpCDF	6.77E-10
55673897	1,2,3,4,7,8,9-HpCDF	1.75E-10
39227286	1,2,3,4,7,8-HxCDD	3.90E-10
57653857	1,2,3,6,7,8-HxCDD	3.85E-10
19408743	1,2,3,7,8,9-HxCDD	3.98E-10
70648269	1,2,3,4,7,8-HxCDF	5.90E-10
57117449	1,2,3,6,7,8-HxCDF	5.52E-10
72918219	1,2,3,7,8,9-HxCDF	1.86E-10
60851345	2,3,4,6,7,8-HxCDF	3.40E-10
7647010	Hydrochloric acid	1.55E+01
193395	Indeno[1,2,3-c,d] pyrene	3.17E-08
7439921	Lead	1.28E-04
7439965	Manganese	5.79E-04
7439976	Mercury	1.28E-01
74839	Methyl bromide	9.07E-02
71556	Methyl chloroform	4.65E-03
75092	Methylene chloride	1.87E-02
91203	Naphthalene	2.01E-02
7440020	Nickel	9.46E-04
3268879	1,2,3,4,6,7,8,9-OCDD	2.92E-09
39001020	1,2,3,4,6,7,8,9-OCDF	6.69E-10
40321764	1,2,3,7,8-PeCDD	3.44E-10
57117416	1,2,3,7,8-PeCDF	2.66E-09
57117314	2,3,4,7,8-PeCDF	3.98E-09
127184	Perchloroethylene	7.70E-03
7782492	Selenium	6.17E-04
7440224	Silver	1.07E-04
100425	Styrene	3.52E-02
1746016	2,3,7,8-TCDD	3.38E-10
51207319	2,3,7,8-TCDF	1.67E-08
79345	1,1,2,2-Tetrachloroethane	5.85E-03
7440280	Thallium	6.17E-04
108883	Toluene	1.25E+00
79005	1,1,2-Trichloroethane	7.75E-03

TABLE A-5

MAXIMUM HOURLY EMISSION RATES FOR THE KILN - 2010 PRODUCTION SCENARIO [1]

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per hour (lbs/hr)

CAS No.	Chemical	2010
79016	Trichloroethylene	6.10E-03
1314621	Vanadium	5.52E-04
75014	Vinyl chloride	2.06E-02
75354	Vinylidene chloride	5.64E-03
95476	o-Xylene	1.97E-01
1330207	Xylenes (mixed)	1.01E+00

Note
1. Only mercury emissions were revised from 2005 production scenario.

TABLE A-6

MAXIMUM HOURLY EMISSION RATES BY SOURCE GROUP FOR 2010 PRODUCTION SCENARIO - DUST COLLECTORS [1]

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per hour (lbs/hr)

CAS No.	Chemical	Emission Source Group																								
		1D4	2D1	3D1	3D4	3D5	4D3	4D4	5D1	5D2	5D3	5D5	5D6	5D11_20	5D23	5D27	5D28	6D17	6D19	6D2	6D1218	6D1	6D8	7PD7	8D31	999DC
7440382	Arsenic	9.60E-06	6.33E-06	2.37E-06	3.41E-06	3.22E-06	4.36E-06	4.36E-06	4.36E-06	4.36E-06	7.84E-06	4.13E-06	4.13E-06	2.28E-05	3.97E-06	1.59E-06	1.59E-06	4.50E-06	5.06E-06	5.63E-06	3.60E-06	5.96E-06	3.83E-06	2.25E-06	1.82E-06	4.16E-05
7440417	Beryllium	1.03E-06	1.03E-06	3.86E-07	5.40E-07	5.14E-07	6.75E-07	6.75E-07	6.75E-07	6.75E-07	1.22E-06	2.48E-06	2.48E-06	3.70E-06	6.43E-07	2.57E-07	2.57E-07	7.71E-07	8.68E-07	9.64E-07	6.17E-07	9.64E-07	6.56E-07	3.86E-07	1.09E-06	6.52E-06
7440439	Cadmium	1.71E-06	2.59E-06	9.71E-07	1.84E-06	8.57E-07	1.65E-06	1.65E-06	1.65E-06	1.65E-06	2.96E-06	4.13E-06	4.13E-06	6.16E-06	1.07E-06	4.29E-07	4.29E-07	1.29E-06	1.45E-06	1.61E-06	1.03E-06	1.61E-06	1.09E-06	6.43E-07	1.82E-06	1.15E-05
7440473	Chromium (total)	1.90E-05	4.76E-05	1.79E-05	2.98E-05	1.87E-05	2.95E-05	2.95E-05	2.95E-05	2.95E-05	5.31E-05	2.99E-05	2.99E-05	3.84E-04	6.67E-05	2.67E-05	2.67E-05	6.66E-05	7.49E-05	8.33E-05	5.33E-05	1.00E-04	5.66E-05	3.33E-05	3.50E-05	4.37E-04
18540299	Chromium VI	6.86E-08	6.12E-07	2.29E-07	5.81E-07	6.86E-08	3.69E-07	3.69E-07	3.69E-07	3.69E-07	6.64E-07	3.30E-07	3.30E-07	5.92E-05	1.03E-05	4.11E-06	4.11E-06	1.77E-05	2.00E-05	2.22E-05	1.42E-05	1.54E-05	1.51E-05	8.87E-06	1.46E-07	8.40E-05
7440508	Copper	4.18E-05	4.72E-05	1.77E-05	2.49E-05	2.33E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	5.52E-05	2.11E-05	2.11E-05	9.53E-05	1.66E-05	6.63E-06	6.63E-06	2.29E-05	2.57E-05	2.86E-05	1.83E-05	2.49E-05	1.95E-05	1.14E-05	2.04E-05	2.12E-04
1175	Crystalline silica	2.24E-04	1.66E-03	6.21E-04	1.02E-03	6.43E-04	9.98E-04	9.98E-04	9.98E-04	9.98E-04	1.80E-03	3.37E-05	3.37E-05	5.03E-05	8.74E-06	3.50E-06	3.50E-06	6.29E-05	7.08E-05	7.87E-05	5.04E-05	1.31E-05	5.35E-05	3.15E-05	5.41E-03	3.77E-03
7439921	Lead	4.66E-06	2.47E-06	9.26E-07	1.86E-06	8.57E-07	1.76E-06	1.76E-06	1.76E-06	1.76E-06	3.17E-06	4.13E-06	4.13E-06	1.73E-05	3.00E-06	1.20E-06	1.20E-06	3.19E-06	3.59E-06	3.99E-06	2.55E-06	4.50E-06	2.71E-06	1.59E-06	1.89E-06	2.62E-05
7439976	Mercury	2.95E-07	4.30E-07	1.61E-07	3.80E-07	8.23E-08	2.75E-07	2.75E-07	2.75E-07	2.75E-07	4.94E-07	1.29E-05	1.29E-05	4.93E-08	8.57E-09	3.43E-09	3.43E-09	1.03E-08	1.16E-08	1.29E-08	8.23E-09	1.29E-08	8.74E-09	5.14E-09	2.91E-07	1.30E-06
7440020	Nickel	2.95E-04	5.89E-05	2.21E-05	4.93E-05	2.40E-05	5.34E-05	5.34E-05	5.34E-05	5.34E-05	9.61E-05	1.25E-03	1.25E-03	3.70E-04	6.43E-05	2.57E-05	2.57E-05	1.11E-04	1.24E-04	1.38E-04	8.85E-05	9.64E-05	9.40E-05	5.53E-05	3.35E-05	1.11E-03
7782492	Selenium	3.43E-06	3.43E-06	1.29E-06	1.80E-06	1.71E-06	2.25E-06	2.25E-06	2.25E-06	2.25E-06	4.05E-06	8.25E-06	8.25E-06	1.23E-05	2.14E-06	8.57E-07	8.57E-07	2.57E-06	2.89E-06	3.21E-06	2.06E-06	3.21E-06	2.19E-06	1.29E-06	3.64E-06	2.17E-05
1314621	Vanadium	8.91E-04	2.78E-04	1.04E-04	1.62E-04	1.51E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	3.97E-04	3.63E-03	3.63E-03	2.00E-03	3.49E-04	1.39E-04	1.39E-04	3.70E-04	4.17E-04	4.63E-04	2.96E-04	5.23E-04	3.15E-04	1.85E-04	2.77E-05	3.60E-03

Note
1. Only mercury emissions were revised from 2005 production scenario.

TABLE A-7

MAXIMUM HOURLY EMISSION RATES BY SOURCE GROUP FOR FUGITIVE AND OTHER POINT SOURCES - 2010 PRODUCTION SCENARIO [1]

Lehigh Southwest Cement Company
Cupertino Facility

Concentrations reported in pounds per year (lbs/hour)

CAS No.	Chemical	2010 Production															
		S501	S502	1	2	3	4A	4B	4C	4D	5	6A	6B	6C	6D	7	8
7440382	Arsenic	-	-	3.22E-05	3.22E-05	9.69E-06	1.98E-05	1.98E-05	1.98E-05	1.98E-05	1.88E-05	8.76E-06	8.76E-06	8.76E-06	8.76E-06	1.12E-06	1.68E-06
71432	Benzene	-	-	-	-	-	-	-	-	-	-	9.10E-07	9.10E-07	9.10E-07	9.10E-07	5.40E-08	-
7440417	Beryllium	-	-	1.21E-05	1.21E-05	2.43E-06	2.99E-06	2.99E-06	2.99E-06	2.99E-06	1.10E-05	2.33E-06	2.33E-06	2.33E-06	2.33E-06	6.71E-07	2.43E-06
7440439	Cadmium	-	-	2.01E-05	2.01E-05	5.22E-06	7.23E-06	7.23E-06	7.23E-06	7.23E-06	1.88E-05	3.86E-06	3.86E-06	3.86E-06	3.86E-06	1.12E-06	1.62E-06
18540299	Chromium VI	-	-	1.61E-06	1.61E-06	9.60E-07	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.47E-06	5.03E-06	5.03E-06	5.03E-06	5.03E-06	8.95E-08	1.29E-07
7440508	Copper	-	-	3.69E-04	3.69E-04	7.98E-05	1.36E-04	1.36E-04	1.36E-04	1.36E-04	2.10E-04	8.57E-05	8.57E-05	8.57E-05	8.57E-05	1.25E-05	1.42E-05
1175	Crystalline silica	-	-	9.19E-02	9.19E-02	7.84E-03	3.88E-03	3.88E-03	3.88E-03	3.88E-03	5.45E-02	9.96E-03	9.96E-03	9.96E-03	9.96E-03	3.32E-03	3.40E-03
9901	Diesel PM	2.99E-01	5.98E-01	-	-	-	-	-	-	-	1.90E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.14E-02	-
7439921	Lead	-	-	2.01E-05	2.01E-05	5.13E-06	9.22E-06	9.22E-06	9.22E-06	9.22E-06	1.91E-05	1.23E-05	1.23E-05	1.23E-05	1.23E-05	1.16E-06	1.66E-06
7439976	Mercury	-	-	4.61E-06	4.61E-06	8.69E-07	3.14E-06	3.14E-06	3.14E-06	3.14E-06	2.95E-06	4.95E-07	4.95E-07	4.95E-07	4.95E-07	1.79E-07	5.94E-07
7440020	Nickel	-	-	6.36E-04	6.36E-04	1.09E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	3.39E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.06E-05	2.24E-05
7782492	Selenium	-	-	4.02E-05	4.02E-05	8.09E-06	1.05E-05	1.05E-05	1.05E-05	1.05E-05	3.67E-05	2.32E-06	2.32E-06	2.32E-06	2.32E-06	2.24E-06	3.23E-06
108883	Toluene	-	-	-	-	-	-	-	-	-	-	3.59E-06	3.59E-06	3.59E-06	3.59E-06	2.16E-06	-
1314621	Vanadium	-	-	7.34E-04	7.34E-04	3.67E-04	1.08E-03	1.08E-03	1.08E-03	1.08E-03	3.30E-04	7.56E-04	7.56E-04	7.56E-04	7.56E-04	1.70E-05	2.55E-05
1330207	Xylenes (mixed)	-	-	-	-	-	-	-	-	-	-	5.25E-06	5.25E-06	5.25E-06	5.25E-06	1.96E-05	-

Note
1. Only mercury emissions were revised from 2005 production scenario.

ATTACHMENT B

Powdered Sorbent Injection Reduction of Mercury Emissions

ATTACHMENT B

POWDERED SORBENT INJECTION
REDUCTION OF MERCURY EMISSIONS

Lehigh Southwest Cement Company
Cupertino, California

In September 2010, Lehigh Southwest Cement Company – Permanente Plant (Lehigh) began testing the reduction of flue gas mercury with the injection of powdered activated carbon (sorbent). This testing was done voluntarily and at Lehigh's own expense. The results of the testing show the potential for significant reduction of mercury emissions using sorbent injection combined with kiln mill dust collector dust shuttling system (KMDC dust shuttling system) (described in Appendix A). For the purpose of evaluating the 2011 emission scenario in the AB2588 HRA, the mercury emissions are assumed to have been reduced by 50 percent. Therefore, the emissions are 50 percent of the emissions estimated for 2010 based on the KMDC dust shuttling system alone. Further long-term testing and implementation is planned to provide a more definitive quantitative emission estimate that can be compared to the assumptions proposed for the 2011 emission scenario in the AB2588 HRA, but it is anticipated that the actual reduction will meet or exceed the 2011 estimate herein.

The sorbent injection system injects sorbent prior to the KMDC baghouse. The vapor phase mercury is adsorbed to the sorbent material and removed from the flue gas, reducing airborne mercury emissions. The sorbent is ultimately collected in the KMDC dust shuttling system.

Lehigh has submitted the Authority to Construct application with BAAQMD for the installation and use of a permanent Sorbent Injection System. Installation of the system is expected to begin in March 2011, completed and operational in May 2011.