



South Coast Air Quality Management District

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Hexavalent Chromium Bulk Material Analysis

Samples were collected from cement and concrete mixing plants in helping to identify the source of hexavalent chromium. The results shown below cover bulk material samples (i.e. material samples, does not include air samples) collected at various cement production and handling facilities along with other locations in the area. Results shown include hexavalent chromium analysis using de-ionized water extraction and may include hexavalent chromium analysis of sieved sample material using a 44 μm mesh size. Additionally results are shown in parts per billion and may also be expressed as nanogram per gram (ng/g); a nanogram is one billionth of a gram.

Caution needs to be taken when interpreting these results. Results from samples collected at these facilities cannot be used to determine exposure to hexavalent chromium. AQMD has deployed a network of air toxic monitors in the area for this purpose. These samples have been useful in identifying materials that have been identified as sources of hexavalent chromium in the area.

Riverside Cement

Date Collected	Type of Material	Description	Cr6+ (ppb) UnSieved	Cr6+ (ppb) Sieved (<44 um)
3/12/2008	Brick	Refractory Brick*	340	
8/21/2007	Cement	White Cement Reference Sample*	290	
3/12/2008	Cement	White Cement*	400	
8/21/2007	Cement	Plastic Cement Reference Sample*	35,100	
8/21/2007	Cement	T-II Cement Reference Sample*	14,600	
8/21/2007	Cement	Block Cement Reference Sample*	2,290	
3/12/2008	Cement	Grey Cement*	8,660	
3/12/2008	Clay	White Plant	50	
3/19/2008	Clay	Bay D surface*	690	
3/19/2008	Clay	Bay D Sub-surface*	120	
3/12/2008	Clinker	White Plant*	140	
3/12/2008	Clinker	Grey Plant*	2,800	
3/12/2008	Clinker	Grey Plant Clinker Fallout	4,800	
3/19/2008	Clinker	Bay A surface, Type II	500	
3/19/2008	Clinker	Bay A sub-surface, Type II	750	3,980
3/19/2008	Clinker	Bay B surface, Type II	800	3,350
3/19/2008	Clinker	Bay B sub-surface, Type II	870	
3/19/2008	Clinker	Bay H surface, Type II	1,320	6,830
3/19/2008	Clinker	Bay H sub-surface, Type II	2,030	
3/19/2008	Clinker	Bay I surface, Type II	1,140	2,070
3/19/2008	Clinker	Bay I sub-surface, Type II	1,120	
3/19/2008	Clinker	Bay J surface, Type II	1,670	15,030
3/19/2008	Clinker	Bay J sub-surface, Type II	1,740	
3/19/2008	Clinker	Bay G surface, Block Clinker	460	4,000
3/19/2008	Clinker	Bay G sub-surface, Block Clinker	500	

* Taken from enclosed area, material has lower potential for creating dust emissions

-All analysis conducted using de-ionized water extraction

Riverside Cement continued on next page

Riverside Cement Continued

Date Collected	Type of Material	Description	Cr6+ (ppb) UnSieved	Cr6+ (ppb) Sieved (<44 um)
3/12/2008	Dust	Baghouse Dust*	420	
3/12/2008	Fuel Oil	Fuel Oil*	<5	
3/12/2008	Gypsum	White Plant	10	
3/12/2008	Gypsum	Grey Plant*	<5	
3/19/2008	Kiln feed	Spillage pile located 150 ft to the east of the control room	90	260
3/19/2008	Kiln feed	Spillage pile located 150 ft to the east of the control room	1,190	13,100
3/12/2008	Limestone	Grey Plant*	10	
3/12/2008	Limestone	White Plant*	380	
3/19/2008	Limestone	Bay C Surface, White Limestone	280	
3/19/2008	Limestone	Bay C Sub-surface, White Limestone	110	
3/12/2008	Sand	White Plant	100	
3/19/2008	Sand	Bay K surface	120	
3/19/2008	Sand	Bay K sub-surface	40	
3/19/2008	Sand	Bay L surface	1,510	
3/19/2008	Sand	Bay L sub-surface	50	
3/19/2008	Scrap	Bay E surface, Scrap and Dirt	650	1,700
3/19/2008	Scrap	Bay E sub-surface, Scrap and Dirt	1,450	
3/19/2008	Scrap	Bay E surface, Scrap clinker, soil, cement	1,240	3,260
3/19/2008	Scrap	Bay E sub-surface, Scrap clinker, soil, cement	1,890	
3/19/2008	Scrap	Bay F surface, Scrap junk pile	1,660	
3/19/2008	Scrap	Bay F Sub-surface, Scrap junk pile	1,780	
3/12/2008	Soil	Old Grey Plant	1,300	
3/12/2008	Soil	North Grass	110	
3/12/2008	Soil	East Berm	50	
3/12/2008	Soil	East, South East Berm	30	
3/12/2008	Soil	South West Perimeter	50	
3/12/2008	Soil	South, South West Perimeter	20	
3/12/2008	Soil	North West Perimeter	30	
3/19/2008	Water	Lake from the dock	10	
3/19/2008	Water	Lake from the dock	10	

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-All analysis conducted using de-ionized water extraction

Cal Portland Cement Co.

Date Collected	Type of Material	Description	Cr6+ (ppb)	Cr6+ (ppb)
			UnSieved	Sieved (<44 um)
4/24/2008	Brick	Recyclable material shed kiln brick powder Bay No. 7	2,890	
4/24/2008	Brick	Recyclable material shed used/cleanout kiln brick-shed Bay No. 7	2,960	
4/24/2008	Brick	Refractory brick from kiln (replacement)	150	
4/24/2008	Catalyst	Recyclable material shed Claus catalyst balls Bay No. 5	1,570	
4/24/2008	Catalyst	Recyclable material Claus catalyst powder Bay No. 5	3,080	
4/23/2008	Cement	Silo 6 Block Cement*	2,730	
4/23/2008	Cement	Silo 10 Plastic Cement*	3,440	
4/23/2008	Cement	Mojave Fast Set*	7,680	
4/23/2008	Cement	Mojave T:5 Imported*	8,470	
4/24/2008	Clay	Lone clay pile-open pile south by well 6	20	
4/24/2008	Clay	Acton clay pile-open pile north by well 6	5	
4/24/2008	Clay	Red clay Jack's pad	70	
4/23/2008	Clinker	Silo 7 Type III High Early*	2,830	
4/23/2008	Clinker	Silo 18 Type II/5*	5,760	
4/23/2008	Clinker	Barn Station 16 Clinker Type II*		4,950
4/23/2008	Clinker	West outside Storage Type III Clinker	1,365	2,970
4/23/2008	Clinker	6-Belt Type III Clinker		2,770
4/24/2008	Clinker	Jim's Park (outside storage) Clinker Type II	6,517	7,960
4/24/2008	Clinker	Type 3 clinker	3,760	
4/24/2008	Coal	Coal stock pile-open pile near bridge	50	
4/24/2008	Dirt	Diatomaceous earth Jack's pad	30	
4/24/2008	Dust	Cement kiln dust baghouse catch H5 area*	5,130	
4/24/2008	Gypsum	Gypsum	300	
4/24/2008	Limestone	Limestone	220	
4/24/2008	Residue	Cement kiln dust pond (dry)	2,710	
4/24/2008	Rock	Mill rock-open pile North of crusher	10	
4/24/2008	Sand	Foundry sand Jack's pad	13	
4/24/2008	Silica	Silver state silica Jack's pad	250	
4/24/2008	Slag	Granulated blast furnace slag north of crusher	44	
4/24/2008	Slag	Recyclable material shed Bay No. 1 copper slag	390	
4/24/2008	Slag	Recyclable material shed Bay No. 1/2 copper slag	80	
4/24/2008	Slag	Recyclable material shed Nassco copper slag Bay No. 2	6	
4/24/2008	Slag	Recyclable material shed mill scale/copper slag Bay No. 4A	30	
4/24/2008	Slag	Recyclable material shed copper slag Back of Bay No. 2	1,440	
4/24/2008	Slag Limestone	Granulated blast furnace slag/limestone mix near J hopper	30	
4/24/2008	Water	Cement kiln dust pond (water)	610	

* Taken from enclosed area, material has lower potential for creating dust emissions

-All analysis conducted using de-ionized water extraction

Concrete Mixing Plants

Date Collected	Source Name	Source Address	Type of Material	Description	Cr6+ ** (ppb)
4/25/2008	Angelus Block	3435 Riverside Ave	Sand	Bulk sample of sand	2,000
4/25/2008	Angelus Block	3435 Riverside Ave	Sand	Bulk sample of sand #2	<4
4/25/2008	Angelus Block	3435 Riverside Ave	Cement	Bulk sample of cement*	3,050
4/25/2008	Rancho Ready Mix	1150 S. Rancho Ave	Sand	Bulk sample of sand	10
4/25/2008	Rancho Ready Mix	1150 S. Rancho Ave	Cement	Bulk sample of cement*	14,000
4/24/2008	Alpha Materials	6170 20th St.	Cement	Bulk Sample of Cement, B Plant*	2,550
4/24/2008	Alpha Materials	6170 20th St.	Fly Ash	Bulk Sample of Fly Ash, B Plant*	1,250
4/24/2008	Alpha Materials	6170 20th St.	Sand	Bulk Sample of Sand, B Plant	<5
4/23/2008	Robertson Ready Mix	6120 20th St	Cement	Type II Cement*	8,170
4/25/2008	Robertson Ready Mix	6120 20th St.	Fly Ash	Bulk Sample of Fly Ash*	9,250
4/25/2008	Robertson Ready Mix	6120 20th St.	Sand	Bulk Sample of Sand	10
4/24/2008	Engelauf	5610 Market St.	Concrete	Bulk Sample of Base Material (Recycled concrete) *	1,740
4/24/2008	Engelauf	5610 Market St.	Sand	Bulk Sample of Sand	2,100
4/24/2008	Abandoned Gravel Operation	Avalon and 26th St.	Gravel	Bulk Sample of gravel from abandoned gravel pile	40
4/24/2008	Oglebay Norton	2157 Avalon	Sand	Bulk sample of silica sand	40
4/24/2008	Oglebay Norton	2157 Avalon	Silica	Bulk sample of bag house fine*	14
4/24/2008	Oglebay Norton	2157 Avalon	Silica	Bulk sample of end process material*	10
4/24/2008	Inland Concrete Products	2434 Rubidoux Blvd.	Sand	Bulk Sample of Sand	20
4/24/2008	Inland Concrete Products	2434 Rubidoux Blvd.	Cement	Bulk sample of cement from spillage pile at batch plant*	8,370

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**All samples sieved <44um

-All analysis conducted using de-ionized water extraction

Other Bulk Samples

Soil Samples Collected Near Glass Plates

Glass Plates were deployed on 1/11/2008 & picked up on 1/17/2008

Date Collected	Type of Sample	Sample Location		Cr6+ (ppb) UnSieved	Corresponding Glass Plates
1/11/2008	Soil	AQMD HQ Diamond Bar 21865 Copley Dr.	Soil collected immediately after heavy rains	<1	Plate Broken
1/17/2008	Soil	AQMD HQ Diamond Bar 21865 Copley Dr.	Soil collected same day glass plates picked up	17	Plate Broken
1/11/2008	Soil	Fontana AMS*** 14300 block of Arrow Hwy	Soil collected immediately after heavy rains	<1	1,350
1/17/2008	Soil	Fontana AMS 14300 block of Arrow Hwy	Soil collected same day glass plates picked up	10	1,350
1/11/2008	Soil	Mira Loma AMS 5100 block of Poinsetta Pl.	Soil collected immediately after heavy rains	<1	410
1/17/2008	Soil	Mira Loma AMS 5100 block of Poinsetta Pl.	Soil collected same day glass plates picked up	82	410
1/11/2008	Soil	Rubidoux AMS 5800 block of Mission Blvd.	Soil collected immediately after heavy rains	<1	1780****
1/17/2008	Soil	Rubidoux AMS 5800 block of Mission Blvd.	Soil collected same day glass plates picked up	31	1780****
1/11/2008	Soil	Riverside-Magnolia AMS (Magnolia & Arlington)	Soil collected immediately after heavy rains	20	2,800
1/17/2008	Soil	Riverside-Magnolia AMS (Magnolia & Arlington)	Soil collected same day glass plates picked up	53	2,800
1/11/2008	Soil	San Bernardino AMS 24300 block of E. 4th St.	Soil collected immediately after heavy rains	10	460
1/17/2008	Soil	San Bernardino AMS 24300 block of E. 4th St.	Soil collected same day glass plates picked up	59	460
1/11/2008	Soil	5300 block of Via Ricardo, Riverside (Sampling site #2)	Soil collected immediately after heavy rains	15	14,000
1/17/2008	Soil	5301 block of Via Ricardo, Riverside (Sampling site #2)	Soil collected same day glass plates picked up	88	14,000
1/11/2008	Soil	11700 block of Cedar in Bloomington	Soil collected immediately after heavy rains	9	4,100
1/17/2008	Soil	11701 block of Cedar in Bloomington	Soil collected same day glass plates picked up	18	4,100
1/11/2008	Soil	1200 block of S. Rancho Ave.	Soil collected immediately after heavy rains	17	5,300
1/17/2008	Soil	1201 block of S. Rancho Ave.	Soil collected same day glass plates picked up	22	5,300
1/11/2008	Soil	Flabob Airport 4100 Block of Mennes Ave.	Soil collected immediately after heavy rains	<1	Plate Broken
1/17/2008	Soil	Flabob Airport 4100 Block of Mennes Ave.	Soil collected same day glass plates picked up	9	Plate Broken
1/11/2008	Soil	6000 block of Terragona Ave., Riverside	Soil collected immediately after heavy rains	36	Plate Broken
1/17/2008	Soil	6000 block of Terragona Ave., Riverside	Soil collected same day glass plates picked up	29	Plate Broken
1/11/2008	Soil	Veterans Park, Colton	Soil collected immediately after heavy rains	<1	2,300
1/17/2008	Soil	Veterans Park, Colton	Soil collected same day glass plates picked up	4	2,300
1/11/2008	Soil	3500 block of Rubidoux Blvd	Soil collected immediately after heavy rains	<1	2,940
1/17/2008	Soil	3500 block of Rubidoux Blvd	Soil collected same day glass plates picked up	26	2,940
1/11/2008	Soil	2900 block of S. Riverside Ave., Colton	Soil collected immediately after heavy rains	12	700
1/17/2008	Soil	2900 block of S. Riverside Ave., Colton	Soil collected same day glass plates picked up	19	700
1/11/2008	Soil	2400 block of 24th St., Riverside	Soil collected immediately after heavy rains	7	7,700
1/17/2008	Soil	2400 block of 24th St., Riverside	Soil collected same day glass plates picked up	23	7,700
1/11/2008	Soil	1100 block of Hall Ave., Riverside (site #1)	Soil collected immediately after heavy rains	38	Plate Broken
1/17/2008	Soil	1100 block of Hall Ave., Riverside (site #1)	Soil collected same day glass plates picked up	31	Plate Broken
1/11/2008	Soil	400 block of Chandler Pl., San Bernardino, (Sampling site #4)	Soil collected immediately after heavy rains	2	9,900
1/17/2008	Soil	400 block of Chandler Pl., San Bernardino, (Sampling site #4)	Soil collected same day glass plates picked up	10	9,900

***AMS = Air monitoring station operated by AQMD

****Rubidoux glass plates were average of two glass plates at same location (Cr6+ concentration: glass plate 1 = 1668 ppb; glass plate 2 = 1889 ppb)

-All Analysis conducted using de-ionized water extraction

Other Bulk Samples Continued

Private Residences

Date Collected	Type of Sample	Source Location	Sample Description	Cr6+ (ppb) UnSieved
4/25/2008	Scraping	19000 block El Rivino Rd, Riverside	Scrape sample from AC filter in Residence A	490
4/25/2008	Wipe	19000 block El Rivino Rd, Riverside	Wipe sample from window in Residence A	1,980
4/25/2008	AC Filter	19000 block El Rivino Rd, Riverside	AC filter sample from Residence A	336
4/25/2008	Scraping	19000 block El Rivino Rd, Riverside	Scrape sample from AC filter in Residence B	200
4/25/2008	AC Filter	19000 block El Rivino Rd, Riverside	AC filter sample from Residence B	330
4/25/2008	Wipe	19000 block Katydid, Bloomington	Wipe sample from car #1 windshield (backyard Residence C)	1,560
4/25/2008	Scraping	19000 block Katydid, Bloomington	Scrape sample from car #2 windshield (backyard Residence C)	740
4/25/2008	Wipe	19000 block Katydid, Bloomington	Wipe sample from window of car #2 windshield (backyard Residence C)	2,140
4/25/2008	Wipe	19000 block Katydid, Bloomington	Wipe sample from AC filter (inside house of Residence C, roof mount AC)	890
4/25/2008	Wipe	19000 block Katydid, Bloomington	Wipe sample from AC grate (inside house of Residence C, roof mount AC)	1,360

-All Analysis conducted using de-ionized water extraction