

APPENDIX B.2

Analysis of Aromatic Content in Binders Used in Plants 706 and 1603

APPENDIX B.2: ANALYSIS OF AROMATIC CONTENT IN BINDERS USED IN PLANTS 706 AND 1603

An evaluation of binder usage in Plant 703 over a period from January 2004 through June 2006 indicated the maximum amount of binder used during that period is approximately 40,000 lbs/month, as shown in Table B.2.1. The MSDS for GP 862D60 Resi-Shell Binder indicates the binder is up to 2.5% phenol and does not list any other aromatic compounds. The MSDS for GP 5520 PARAC Powdered Phenolic Resin indicates the resin is up to 4.7% phenol and does not list any other aromatic compounds. Assuming that phenol represents all the aromatic content in the binder and conservatively assuming that the only binder used is the one with the higher phenol content (up to 4.7%), Plant 703 uses approximately 1,900 lbs aromatic per month in the binder.

A similar evaluation of binder composition and usage in Plant 1603 was also conducted for comparison. From the MSDS for the three binders/catalysts used in the greatest quantities at Plant 1603, the aromatic content is in the range of 63 – 96.1% for PepSet I 1670, 90 – 99% for PepSet II 2670 and 100% for PepSet 3400 (catalyst). Based on PepSet consumption records for 2005, the average monthly usage of the PepSets were approximately 18,000, 14,500, and 1,000 lbs/month of PepSet I 1670, PepSet II 2670 and PepSet 3400, respectively. As a conservative assumption, the lowest aromatic content was used to calculate the total monthly aromatic consumption (as an example, for PepSet I 1670, using 63% aromatic and 18,000 lbs/month results in approximately 11,000 lbs aromatic/month) and a total average monthly aromatic usage was approximately 25,000 lbs/month.

Therefore, as shown in Table B.2.3 the maximum aromatic usage at Plant 703 is roughly 8% that of the average used at Plant 1603. Note that this is conservative estimate as the maximum quantity calculated for Plant 703 is compared to an average value from Plant 1603.

Table B.2.1
Plant 703 Binder Aromatic Content Determination
 Pacific Steel Casting Company
 Berkeley, California

Binders used and aromatic content of binders		Maximum monthly binder usage	Monthly aromatic throughput
GP 862D60 Resi-Shell Binder	2.5% phenol	40,000 lbs/month	1,880 lbs/month
GP 5520 PARAC Powdered Phenolic Resin	4.7% phenol		

Notes:

Maximum monthly binder throughput for a period from January 2004 through June 2006, based on Facility records
 Phenol represents all the aromatic content in the binder
 Use higher aromatic content (4.7% from GP 5520)

Acronyms:

lbs = pounds

Table B.2.2
Plant 1603 Binder Aromatic Content Determination
 Pacific Steel Casting Company
 Berkeley, California

Binders used and aromatic content of binders		Average monthly binder usage	Monthly aromatic throughput
PepSet I 1670	63% to 96% aromatic	18,000 lbs/month	11,340 lbs/month
PepSet II 2670	90% to 99% aromatic	14,500 lbs/month	13,050 lbs/month
PepSet 3400 (catalyst)	100% aromatic	1,000 lbs/month	1,000 lbs/month
Total:			25,390 lbs/month

Notes:

Average monthly binder throughput for a period from January 2005 through December 2005, based on Facility records

Acronyms:

lbs = pounds

**Table B.2.3. Ratio of Aromatic Content Usage in
Plants 703 and 1603**
Pacific Steel Casting Company
Berkeley, California

$$\frac{1,880 \text{ lbs/month aromatic, Plant 703}}{25,390 \text{ lbs/month aromatic, Plant 1603}} = 7.4\%$$

Acronyms:

lbs = pounds

APPENDIX B.3

Control Efficiency for Plant 1603 Exempt Finishing Sources

Table B.3.1
Determination of Composite Control Efficiency of Plant 1603 Exempt Finishing Sources
 Pacific Steel Casting Company
 Berkeley, California

ID	Name	Device Control	Control Efficiency ^a	Air Flow ^b (cfm)	Weighted Control Efficiency ^c (% of total control)
35	Small Grind	Knock-out box	50%	16,000	6%
36	Large Weld	None	0%	6,500	0%
37	Medium Weld	None	0%	12,300	0%
38	Small Weld	None	0%	16,000	0%
39	Small Chip	Dust Collector	65%	16,000	8%
40	Small & med Arc	Bag House	98%	20,000	14%
41	Large Arc	Bag House	98%	30,000	21%
42	Large Chip	Knock-out box	50%	9,600	3%
43	Medium Chip	None	0%	11,250	0%
Overall Weighted Control Efficiency ^d					52%

Notes:

^aControl efficiency for baghouses assume to be the same as the lower bound presented in AP-42 Table 12.13-2 for baghouses on an electric arc furnace (98%); control efficiency for dust collector assumed the same as that of the carbon treatment unit prefilter (65%) as they are both similar cartridge systems; and the control efficiency of knockout boxes estimated as 50% by T. Mitchell Engineers.

^bAir flow based on estimates provided in Figure B.2-1, provided by T. Mitchell Engineers.

^cWeighted control efficiency = (Assumed control efficiency * Air flow)/Total air flow

^dAssumes air flow rate approximates particulate loading (e.g., lower air flow, less particulate), therefore composite control efficiency is weighted by flow rate.

Abbreviations:

cfm - cubic feet per minute

ROOM	ROOM	TREATMENT	APPROX AIR FLOW	NOTES
(35)	SMALL GRIND&MAG	KNOCK OUT BOX	16,000	DUCT VELOCITY 3500FPM / APPROX 200 FPM THRU KNOCK OUT
(36)	LARGE WELDING	DISCHARGE THRU ROOF	6,500	12X18.5 RECT DUCT THRU ROOF APPROX 5000FPM
(37)	MEDIUM WELDING	DISCHARGE THRU ROOF	12,300	16.5X18.5 RECT DUCT THRU ROOF APPROX 58000FPM
(38)	SMALL WELDING	DISCHARGE THRU ROOF	16,000	
(39)	SMALL CHIP&GRIND	DUST COLLECTOR	16,000	ORIGINAL KNOCK OUT RETROFIT WITH CARTRIDGE FILTERS
(40)	SMALL&MED ARC	BAG HOUSE	20,000	TO CLEANING ROOM BAG HOUSE(S)
(41)	LARGE ARC	BAG HOUSE	30,000	TO CLEANING ROOM BAG HOUSE(S)
(42)	LARGE CHIP&GRIND	KNOCK OUT BOX	9,600	15X20.5 RECT DUCT THRU ROOF APPROX 4500FPM APPROX 150FPM THRU KNOCK OUT
(43)	MEDIUM CHIP&GRIND	DISCHARGE THRU ROOF	11,250	21.5X21.5 RECT DUCT THRU ROOF APPROX 3500FPM

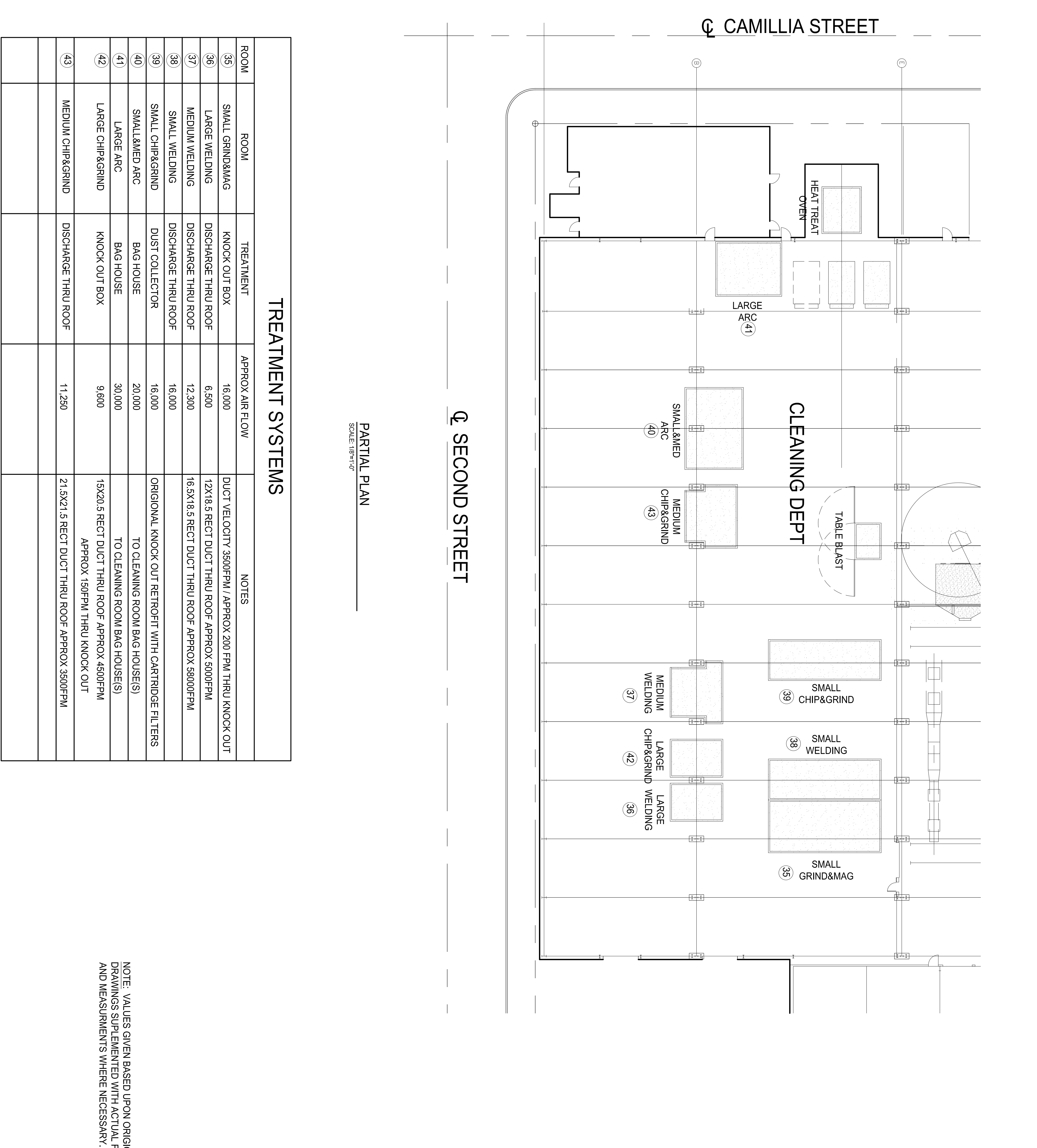
TREATMENT SYSTEMS

Q SECOND STREET

PARTIAL PLAN
SCALE: 1/8"=1'-0"

NOTE: VALUES GIVEN BASED UPON ORIGINAL SYSTEM DESIGN DRAWINGS SUPPLEMENTED WITH ACTUAL FIELD OBSERVATIONS AND MEASUREMENTS WHERE NECESSARY.

0	FOR CLIENT REVIEW	TH	
1	DESCRIPTION	BY	DATE
PACIFIC STEEL CASTING CO. BERKELEY, CALIF.			
T. MITCHELL ENGINEERS OAKLAND CALIFORNIA			
SCALE	1/8"=1'-0"	FOR	PLANT III CLEANING ROOM
DATE	3/07	DRAWN	
CHECKED		TITLE	GENERAL ARRANGEMENT
APPROVED		DWG. NO.	SK-1
<small>THE USE OF THESE DRAWINGS AND SPECIFICATIONS SHALL BE RESTRICTED TO THE ORIGINAL USE FOR WHICH THEY WERE PUBLISHED, IN WHOLE OR IN PART, IS PROHIBITED WITHOUT THE CONSENT OF T. MITCHELL ENGINEERS.</small>			



APPENDIX B.4

Revised Emissions Estimates for Existing Operations

Table B.4.1: Plant 187 COPC Emissions by Source

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Pacific Steel Casting Company
Berkeley, California

District	Source List	Source ID	Source Description	Throughput ⁽¹⁾		Emission Factors				Primary Emissions Calculation													Secondary Emissions Calculation				Total Emissions	
				Maximum Hourly	Throughput Unit	Uncontrolled Emission Factor-Upstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Uncontrolled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Controlled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	COPC	CAS Number	Basis for Emissions			Primary Capture Device/Area			Max. Hourly Primary Stack Emissions (t/yr)	Annual Avg. Primary Stack Emissions (t/yr)	COPC	CAS Number	Secondary Capture Area	Secondary Control Efficiency	Secondary Discharge Point	Max. Hourly Secondary Stack Emissions (t/yr)	Annual Avg. Secondary Stack Emissions (t/yr)	Total Max. Hourly Emissions (t/yr)	Total Annual Avg. Emissions (t/yr)	
											Primary	Secondary	Tertiary	Primary	Secondary	Tertiary												
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	6.15E-04	ND	Arsenic	7440382	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	9.25E-06	3.05E-02	Arsenic	7440382							9.25E-06	3.05E-02	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	NA	ND	Beryllium	7440417	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	0.00E+00	0.00E+00	Beryllium	7440417							0.00E+00	0.00E+00	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	NA	1.37E-05	Cadmium	7440439	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	4.80E-05	1.58E-01	Cadmium	7440439							4.80E-05	1.58E-01	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	3.02E-04	ND	Chromium, Total	7440473	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	1.06E-03	3.49E+00	Chromium, Total	7440473							1.06E-03	3.49E+00	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	2.66E-06	ND	Chromium(VI)	18540299	Ratio to Chromium, total based on PSC Source Test ⁽⁴⁾ TAB 7.27 & 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	9.29E-06	3.07E-02	Chromium(VI)	18540299							9.29E-06	3.07E-02	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	1.57E-04	ND	Copper	7440508	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	5.49E-04	1.81E+00	Copper	7440508							5.49E-04	1.81E+00	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	1.09E-04	ND	Lead	7439921	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	3.72E-04	1.23E+00	Lead	7439921							3.72E-04	1.23E+00	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	2.68E-03	ND	Manganese	7439965	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	9.39E-03	3.10E+01	Manganese	7439965							9.39E-03	3.10E+01	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	1.86E-05	ND	Nickel	7439976	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	6.52E-05	2.15E-01	Nickel	7439976							6.52E-05	2.15E-01	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	9.22E-05	ND	Nickel	7440020	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	3.23E-04	1.06E+00	Nickel	7440020							3.23E-04	1.06E+00	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	2.05E-05	ND	Selenium	778492	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	7.17E-05	2.37E-01	Selenium	778492							7.17E-05	2.37E-01	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550	tons steel	NA	1.38E-02	ND	Zinc	7440666	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ TAB 7.30	A5 Baghouse	95%	95.7%	Plant 1 P5	4.83E-02	1.59E+02	Zinc	7440666							4.83E-02	1.59E+02	

Table B.4.1: Plant 187 COPC Emissions by Source

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**Pacific Steel Casting Company
Berkeley, California**

NOTES:

- (1) Throughput information:
Maximum hourly throughput based on limits set forth in BAAQMD permit to operate except for S32001. S32001 based on annual throughput divided by 2000 hours of operation.
Annual throughput based on "Plant #187 Permit Update" submitted to BAAQMD by PSC on September 12, 2006, reports throughput from August 1, 2005 to July 31, 2006. S3 and S4 are based on previous year's values as quantities not requested by BAAQMD in 2006.
- (2) ND = COPC was not detected in all test runs. NA = not applicable
- (3) Capture efficiency represents the percentage of emissions routed to primary capture device or area. Values based on analysis by T. Mitchell Engineers & Associates dated August 30, 2006 (included as Appendix A of the February 15, 2007 EIR) with certain modifications based on discussions with the BAAQMD or as mandated by the BAAQMD in the comments (included as Appendix F of the February 15, 2007 EIR) on the November 16, 2006 EIR.
For S2 (Casting, Pour-off Area), the capture efficiency was assumed a composite of the capture efficiencies estimated for the "A" side and "B" side pour areas, scaled by the relative sand throughput of the "A" side and "B" side shakeout areas.
S4 ("A" Shake out) is in an enclosed room with all ventilation routed to A1 baghouse/prefilter/A7 carbon.
- (4) Control efficiency represents percent of mass emissions reduced by abatement device.
Baghouses:
Control efficiency for baghouses based on Plant 703 EAF baghouse inlet and outlet source test for particulate matter (PSC Source Test (8), Tables 7-26 and 7-29. As mandated by the BAAQMD, particulate control calculated as 99.57% for particulate-bound COPCs.
Activated Carbon Adsorbers:
Control efficiency for adsorbers assumed to be 90.5% for VOCs, based on data collected at the Plant 1603 carbon unit.
90.5% control efficiency used unless data from manufacturer suggest high frequency breakthrough. For example, 0% control used for formaldehyde.
Carbon adsorbers have particulate prefilters to prevent fouling of activated carbon, the prefilter has a control efficiency of 65% for particulates larger than 1 micron. The carbon adsorption unit will likely remove additional particulate, however, for this analysis it is conservatively assumed that no additional particulate removal will occur in the carbon unit.
- (5) Derivation of speciated metals emissions for finishing processes:
Speciated metal emission factors (lb metal/tons steel) are estimated by multiplying the weight fraction of metals COPCs (metal/PM10) found in the testing for the finishing operations of P703, S33-S40 to arc-air booth PM10 emission factors (lb PM10/tons steel).
Speciated metal emission factors (lb metal/tons steel) are derived using following PM10 emission factors.
1.7 PM10 Emission factor (lb PM10/ton steel) for Casting Cleaning, AP-42, Chapter 12.13 Steel Foundries, January 1995, Table 12.13-2. Used to convert S33-S40 source test results into Metal/PM10 weight fraction [metal/PM10=unabated emission factor for S33-S40 (lb metal/tons steel) / PM10 emission factor (lb PM10/ton steel)].
Assume weight fractions between Plant 703 S33-S40 and Plant 187 are similar.
0.001 PM10 Emissions (lb/ton) from BAAQMD's PSC inventory data bank for Arc Air Booth. Used to convert metal weight fractions (metal/PM10) to uncontrolled metal emission factors (lb metal/tons steel).
0.040 PM10 Emission factor (lb PM10/ton steel) for Abrasive Blasting with steel shots. Based on AP-42, Table 13.2.6-1, emission factor=(1.3 lb PM10/1000 lb steel shots) x (2000 lb/ 1 ton) x(121 tons steel shots/7947 tons steel casting).
Steel shots and steel casting quantities based on Plant 187 throughput from August 1, 2004 through July 31, 2005. Casting quantity based on 90% of EAF, assumes 10% lost to slag.
Per AP-42 Chapter 13.2.6, assume PM10 from using shots equals 10% of using sand for abrasive blasting.

COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for arc air booth (lb metal/ton steel)	Uncontrolled Emission Factor for pangborn table and rotoblats (lb metal/ton steel)
Arsenic	4.85E-06	4.85E-09	1.92E-07
Beryllium	ND	ND	ND
Cadmium	2.22E-06	2.22E-09	8.77E-08
Chromium, Total	1.93E-05	1.93E-08	7.62E-07
Copper	5.38E-05	5.38E-08	2.13E-06
Lead	4.66E-04	4.66E-07	1.84E-05
Manganese	6.33E-04	6.33E-07	2.51E-05
Mercury	4.59E-06	4.59E-09	1.82E-07
Nickel	ND	ND	ND
Selenium	ND	ND	ND
Zinc	3.21E-04	3.21E-07	1.27E-05

- (6) Natural gas combustion emissions factors from AP-42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion." Upon BAAQMD request, emissions for benzene, toluene and formaldehyde were calculated.
Assumes 1 therm = 100 scf for natural gas
- (7) As emissions of chromium (VI) were only measured in the Plant 703 EAF (Source 27), a separate analysis was conducted by GT Engineering (included as Appendix B of the February 15, 2007 EIR) to determine the potential for other sources of chromium (VI) in other operations at the facility. Based on that analysis, emissions of chromium (VI) are estimated for areas where molten steel is produced (i.e., in the EAF and welding operations). As mandated by the BAAQMD, the chromium (VI) emission factor is based on Plant 703 EAF source test data (inlet) using the chromium (VI) to chromium (total) ratio listed below (Note: this is an extremely conservative assumption for arc air welding processes as only portions of the cast are welded):
0.88% chromium (VI)/chromium (total)
- (8) BAAQMD Comments (dated October 18, 2006) on "Source Test Report 2005-2006 Emissions Source Tests Toxic Air Contaminants, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 30, 2006
- (9) The following permitted sources were not considered as potentially emitting COPCs.
- | Source | Description |
|--------|-------------------------------|
| S5 | Sand system (dust collection) |
| S6 | Sand cooler 6 screen |
| S7 | Sand screen |
| S8 | Muller |
| S10 | Muller, core sand |
| S11 | Muller |
| S19 | Raw sand receiving |
- (10) As requested by the BAAQMD, emissions from the Plant 187 EAF (Source 1) are based on source test of Plant 703 EAF (Source 27), scaled by a ratio of the filterable particulate matter measured at Plant 187 EAF (Source 1) to that measured at Plant 703 EAF (Source 27)
0.095 Filterable particulate matter emission factor (lb/ton steel) at Plant 187 EAF (Source 1) baghouse outlet, Table 6-9(8)
0.051 Filterable particulate matter emission factor (lb/ton steel) at Plant 703 EAF (Source 27) baghouse outlet, Table 7-29(8)
1.9 Ratio
As discussed for the Plant 703 EAF (Source 27), since arsenic was ND at the outlet of the baghouse but detected at the inlet of the baghouse, then the inlet value was used and the appropriate baghouse control efficiency applied, as mandated by the BAAQMD.
- (11) As mandated by the BAAQMD, fugitive emissions for the EAFs from all three plants were calculated based on the emission factors measured at the Plant 703 EAF (Source 27) baghouse inlet. To implement this methodology, the emission estimates for EAFs were split into two categories - primary and fugitive (denoted by the source number modified with "-fug", e.g., S1-fug). To ensure emission estimates were not double-counted, secondary emission were not calculated for the primary emissions and primary emissions were not calculated for the fugitive emissions.

Table B.4.2: Plant 703 COPC Emissions by Source

Page 4 of 4
Pacific Steel Casting Company
Berkeley, California

NOTES:

- (1) Throughput information:
 Maximum hourly throughput based on limits set forth in BAAQMD permit to operate.
 Annual throughput based on "Plant #703 Permit Update" submitted to BAAQMD by PSC on September 12, 2006, reports throughput from August 1, 2005 to July 31, 2006
- (2) ND = COPC was not detected in all test runs. NA = not applicable
- (3) Capture efficiency represents the percentage of emissions routed to primary capture device or area. Values based on analysis by T. Mitchell Engineers & Associates dated August 30, 2006 (included as Appendix A of the February 15, 2007 EIR) with certain modifications based on discussions with the BAAQMD or as mandated by the BAAQMD in the comments (included as Appendix F of the February 15, 2007 EIR) on the November 16, 2006 EIR.
 Sources 6-12 are enclosed devices under negative pressure.
 Source 30 (cast mold cooling room) is fully enclosed under negative pressure.
- (4) Control efficiency represents percent of mass emissions reduced by abatement device.
 Baghouses:
 Control efficiency for baghouses based on Plant 703 EAF baghouse inlet and outlet source test for particulate matter (PSC Source Test (8), Tables 7-26 and 7-29. As mandated by the BAAQMD, particulate control calculated as 99.57% for particulate-bound COPCs.
 Activated Carbon Adsorbers:
 Control efficiency for adsorbers assumed to be 90.5% for VOCs, based on data collected at the Plant 1603 carbon unit.
 90.5% control efficiency used unless data from manufacturer suggest high frequency breakthrough. For example, 0% control used for formaldehyde.
 Carbon adsorbers have particulate prefilters to prevent fouling of activated carbon, the prefilter has a control efficiency of 65% for particulates larger than 1 micron. The carbon adsorption unit will likely remove additional particulate, however, for this analysis it is conservatively assumed that no additional particulate removal will occur in the carbon unit.
- (5) Unabated phenol emission factor from BAAQMD source testing of P4 stack dated 4/14/05 and following per source equation
 $S7-S12 \text{ lbs phenol/ton steel} = (P4 \text{ emissions from Plant 703 source test, lb/hr}) / (1.25 \text{ tons steel/hr}) / (6 \text{ sources})$; Assumes no phenol in S6 (binder not added until S7)
- (6) Primary capture emission factor from source testing of stack P4 and following per source equation:
 $S7-S12 \text{ lbs/ton} = (P4 \text{ emissions from Plant 703 source test, } 0.094 \text{ lb/hr}) * (8 \text{ hrs/day}) * (250 \text{ days/yr}) / (6,270 \text{ tons sand/yr}) / (6 \text{ sources}) = 5.00E-3 \text{ lb formaldehyde/ton sand}$, Table V-Corrected Formaldehyde Emission Results in "AB2588 Compliance Source Test Results, Emissions Quantification and Forms PRO", January 8, 1990.; S6 does not handle "coated" sand.
- (7) Isopropanol emission factor based on ratio of phenol to IPA as listed on the GP 862D60 Resi Shell Binder MSDS - <2% IPA to 2.5% phenol.
- (8) BAAQMD Comments (dated October 18, 2006) on "Source Test Report 2005-2006 Emissions Source Tests Toxic Air Contaminants, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 30, 2006
 All core and shell mold machine emission factors based on S21 source test.
 For the Plant 703 EAF (Source 27), as arsenic was ND at the outlet of the baghouse but detected at the inlet of the baghouse, then the inlet value was used and the appropriate baghouse control efficiency applied, as mandated by the BAAQMD.
- (9) As mandated by the BAAQMD, fugitive emissions for the EAFs from all three plants were calculated based on the emission factors measured at the Plant 703 EAF (Source 27) baghouse inlet. To implement this methodology, the emission estimates for EAFs were split into two categories - primary and fugitive (denoted by the source number modified with "-fug", e.g., S1-fug). To ensure emission estimates were not double-counted, secondary emission were not calculated for the primary emissions and primary emissions were not calculated for the fugitive emissions.
- (10) Speciated metals emissions for S32 Rotoblast based on following:

1.7	Speciated metal emission factors (lb metal/tons steel) are estimated by multiplying the weight fraction of COPC metals (metal/PM10) found in the testing for the finishing operations of P703, S33-S40 to ladle station and rotoblast PM10 emission factors (lb PM10/tons steel). Speciated metal emission factors (lb metal/tons steel) are derived using following PM10 emission factors.																																				
0.034	PM10 Emission factor (lb PM10/ton steel) for Casting Cleaning, AP-42, Chapter 12.13 Steel Foundries, January 1995, Table 12.13-2. Used to convert S33-S40 source test results into Metal/PM10 weight fraction [metal/PM10=unabated emission factor for S33-S40 (lb metal/tons steel) / PM10 emission factor (lb PM10/ton steel)]. Assume weight fractions between S33-S40 and rotoblast are the same since handling same casting.																																				
	<table border="1"> <thead> <tr> <th>COPC</th> <th>Speciation profile (lb metal/lb PM10) From S33-40 Source Test</th> <th>Uncontrolled Emission Factor for roto-blast (lb metal/ton steel)</th> </tr> </thead> <tbody> <tr><td>Arsenic</td><td>4.85E-06</td><td>1.64E-07</td></tr> <tr><td>Beryllium</td><td>ND</td><td>ND</td></tr> <tr><td>Cadmium</td><td>2.22E-06</td><td>7.49E-08</td></tr> <tr><td>Chromium, Total</td><td>1.93E-05</td><td>6.51E-07</td></tr> <tr><td>Copper</td><td>5.38E-05</td><td>1.82E-06</td></tr> <tr><td>Lead</td><td>4.66E-04</td><td>1.57E-05</td></tr> <tr><td>Manganese</td><td>6.33E-04</td><td>2.14E-05</td></tr> <tr><td>Mercury</td><td>4.59E-06</td><td>1.55E-07</td></tr> <tr><td>Nickel</td><td>ND</td><td>ND</td></tr> <tr><td>Selenium</td><td>ND</td><td>ND</td></tr> <tr><td>Zinc</td><td>3.21E-04</td><td>1.09E-05</td></tr> </tbody> </table>	COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for roto-blast (lb metal/ton steel)	Arsenic	4.85E-06	1.64E-07	Beryllium	ND	ND	Cadmium	2.22E-06	7.49E-08	Chromium, Total	1.93E-05	6.51E-07	Copper	5.38E-05	1.82E-06	Lead	4.66E-04	1.57E-05	Manganese	6.33E-04	2.14E-05	Mercury	4.59E-06	1.55E-07	Nickel	ND	ND	Selenium	ND	ND	Zinc	3.21E-04	1.09E-05
COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for roto-blast (lb metal/ton steel)																																			
Arsenic	4.85E-06	1.64E-07																																			
Beryllium	ND	ND																																			
Cadmium	2.22E-06	7.49E-08																																			
Chromium, Total	1.93E-05	6.51E-07																																			
Copper	5.38E-05	1.82E-06																																			
Lead	4.66E-04	1.57E-05																																			
Manganese	6.33E-04	2.14E-05																																			
Mercury	4.59E-06	1.55E-07																																			
Nickel	ND	ND																																			
Selenium	ND	ND																																			
Zinc	3.21E-04	1.09E-05																																			

- (11) Controlled emission factors based on BAAQMD emission rate data for S33-S40. BAAQMD data from Table III-Emission Results for Stack P5 reported in "AB2588 Compliance Source Test Results, Emissions Quantification and Forms PRO", January 8, 1990.
 Emission rate values in report preceded by "<" indicates that values are less than the method detection limit. Per AB2588 guidelines, half of these values are used in calculating the emission factor.

Controlled lbs metal/tons steel = (controlled emission rate, mg/hr) * (lbs/453600mg) * (8 hrs/day) * (5 days/wk) * (50 wks/yr)/(6400 tons/yr) / (8 sources); Equation uses abatement and capture efficiency of stack P5, Plant 703.

Uncontrolled and uncaptured emission factors based on following efficiencies for S33-S40

Capture Efficiency (%)	90.0%
Control Efficiency (%)	99.57%

Saw and Grinding Emission Factors

COPC:	Controlled Emission Rate (mg/hr)	Controlled Emission Factor (lb/tons)	Uncontrolled/Uncaptured Emission Factors (lb/ton)
Arsenic	0.28	2.38E-08	8.25E-06
Beryllium	ND	ND	ND
Cadmium	0.13	1.09E-08	3.77E-06
Chromium, Total	1.10	9.43E-08	3.27E-05
Copper	3.06	2.63E-07	9.15E-05
Lead	26.47	2.28E-06	7.91E-04
Manganese	35.98	3.10E-06	1.08E-03
Mercury	0.26	2.25E-08	7.80E-06
Nickel	ND	ND	ND
Selenium	ND	ND	ND
Zinc	18.260	1.57E-06	5.46E-04

- (12) Natural gas combustion emissions factors from AP-42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion." Upon BAAQMD request, emissions for benzene, toluene and formaldehyde were calculated.
 Assumes 1 therm = 100 scf for natural gas

- (13) As mandated by the BAAQMD, the chromium (VI) emission factor is based on Plant 703 EAF source test data (inlet) using the chromium (VI) to chromium (total) ratio listed below:
 0.88% chromium (VI)/chromium (total)

- (14) From "Source Test Report 2006 Dioxin/Furan Emissions Tests, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC for BAAQMD dated July 14, 2006

These source test data are dependent on, and therefore only representative of, the materials used in Plant 1603. The sand molds and cores used in the other two Plants are prepared with binders and additives that are different than the ones used in Plant 1603. Plant 703 and 1603 use phenolic-type binders, however as shown in Appendix C of the February 15, 2007 EIR, none of the same binders and additives are used at both plants. Appendix C also shows the chemical constituents of the binders and additives used in plants 703 and 1603 and there are only three chemicals – isopropanol, phenol and water – that are common to the binders and additives used at both plants. Because of different chemical composition of the binders and additives used at Plant 703, the source test of Plant 1603 would not likely be representative of the operations at Plant 703, however the BAAQMD mandated that PCDDs/PCDFs were estimated for Plant 703 Source 29/31, scaled by the ratio of the aromatic content of the binders used in each plant. If PCDDs/PCDFs were present in the pouring/cooling area of Plant 703 and if aromatic content is a predictor of dioxin formation, then the concentrations of PCDDs/PCDFs in the pouring/cooling area of Plant 703 would theoretically at a maximum be approximately 8% of those measured at Plant 1603 pouring/cooling, which is well below the detection limits for PCDDs/PCDFs in source testing conducted by the BAAQMD.

- (15) The following permitted sources were not considered as potentially emitting COPCs.

Sources

- S1 - Sand silo loading elevator
- S2 - Sand silo #1
- S3 - Sand silo #2
- S4 - Bucket elevator
- S5 - Resin tank (liqui-bin)
- S19 - Coated sand bin
- S25 - Abrasive blaster, core area
- S28 - EAF ladle station w/ canopy hood (not in service)

Table B.4.3: Plant 1603 COPC Emissions by Source

Page 2 of 3
Pacific Steel Casting Company
Berkeley, California

Sources			Throughput ⁽¹⁾			Emission Factors				Primary Emissions Calculation					Secondary Emissions Calculation				Total Emissions					
District Source List	Source ID	Source Description	Maximum Hourly	Annual	Throughput Unit	Uncontrolled Emission Factor-Upstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Uncontrolled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Controlled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	COPC	CAS Number	Basis for Emissions	Primary Capture Device/Area	Primary Capture Efficiency (%) ⁽³⁾	Primary Control Efficiency (%) ⁽⁴⁾	Primary Discharge Point	Max. Hourly Primary Emissions (lb/hr)	Annual Avg. Primary Emissions (lb/yr)	Secondary Capture Area	Secondary Control Efficiency	Secondary Discharge Point	Max. Hourly Secondary Emissions (lb/hr)	Annual Avg. Secondary Emissions (lb/yr)	Total Max. Hourly Emissions (lb/hr)	Total Annual Avg. Emissions (lb/yr)
Exempt-Heat Treat Furnaces	Plant 3 Exempt-Heat Treat Furnaces	Heat treat furnaces	12	98,445	therms	2.10E-07	NA	NA	Benzene	71432	AP-42, Section 1.4, Table 1.4-3 ⁽⁵⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room	2.46E-06	2.07E-02				0.00E+00	0.00E+00	2.46E-06	2.07E-02
Exempt-Heat Treat Furnaces	Plant 3 Exempt-Heat Treat Furnaces	Heat treat furnaces	12	98,445	therms	7.50E-06	NA	NA	Formaldehyde	50000	AP-42, Section 1.4, Table 1.4-3 ⁽⁵⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room	8.79E-05	7.38E-01				0.00E+00	0.00E+00	8.79E-05	7.38E-01
Exempt-Heat Treat Furnaces	Plant 3 Exempt-Heat Treat Furnaces	Heat treat furnaces	12	98,445	therms	3.40E-07	NA	NA	Toluene	108853	AP-42, Section 1.4, Table 1.4-3 ⁽⁵⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room	3.98E-06	3.95E-02				0.00E+00	0.00E+00	3.98E-06	3.95E-02
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	8.25E-06	NA	NA	Arsenic	7440382	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	1.11E-05	3.65E-02				0.00E+00	0.00E+00	1.11E-05	3.65E-02
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	ND	NA	NA	Beryllium	7440417	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	0.00E+00	0.00E+00				0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	3.77E-06	NA	NA	Cadmium	7440439	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	5.09E-06	1.67E-02				0.00E+00	0.00E+00	5.09E-06	1.67E-02
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	3.27E-05	NA	NA	Chromium, Total	7440473	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	4.42E-05	1.45E-01				0.00E+00	0.00E+00	4.42E-05	1.45E-01
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	9.15E-05	NA	NA	Copper	7440508	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	1.23E-04	4.05E-01				0.00E+00	0.00E+00	1.23E-04	4.05E-01
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	7.91E-04	NA	NA	Lead	7439921	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	1.07E-03	3.50E+00				0.00E+00	0.00E+00	1.07E-03	3.50E+00
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	1.08E-03	NA	NA	Manganese	7439965	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	1.45E-03	4.76E+00				0.00E+00	0.00E+00	1.45E-03	4.76E+00
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	7.80E-06	NA	NA	Mercury	7439976	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	1.05E-05	3.45E-02				0.00E+00	0.00E+00	1.05E-05	3.45E-02
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	ND	NA	NA	Nickel	7440220	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	0.00E+00	0.00E+00				0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	ND	NA	NA	Selenium	7782492	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	0.00E+00	0.00E+00				0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853	tons steel	5.46E-04	NA	NA	Zinc	7440666	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	7.37E-04	2.42E+00				0.00E+00	0.00E+00	7.37E-04	2.42E+00
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	4.85E-09	NA	NA	Arsenic	7440382	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	6.55E-09	2.15E-05				0.00E+00	0.00E+00	6.55E-09	2.15E-05
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	ND	NA	NA	Beryllium	7440417	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	0.00E+00	0.00E+00				0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	2.22E-09	NA	NA	Cadmium	7440439	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	2.99E-09	9.81E-06				0.00E+00	0.00E+00	2.99E-09	9.81E-06
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	1.93E-08	NA	NA	Chromium, Total	7440473	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	2.60E-08	8.53E-05				0.00E+00	0.00E+00	2.60E-08	8.53E-05
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	1.69E-10	NA	NA	Chromium(VI)	18540299	Ratio to Chromium, total based on PSC Source Test ⁽⁶⁾ Tables 7.27 and 7.28	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	2.29E-10	7.50E-07				0.00E+00	0.00E+00	2.29E-10	7.50E-07
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	5.38E-08	NA	NA	Copper	7440508	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	7.26E-08	2.38E-04				0.00E+00	0.00E+00	7.26E-08	2.38E-04
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	4.66E-07	NA	NA	Lead	7439921	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	6.29E-07	2.06E-03				0.00E+00	0.00E+00	6.29E-07	2.06E-03
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	6.33E-07	NA	NA	Manganese	7439965	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	8.54E-07	2.80E-03				0.00E+00	0.00E+00	8.54E-07	2.80E-03
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	4.59E-09	NA	NA	Mercury	7439976	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	6.20E-09	2.03E-05				0.00E+00	0.00E+00	6.20E-09	2.03E-05
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	ND	NA	NA	Nickel	7440220	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	0.00E+00	0.00E+00				0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	ND	NA	NA	Selenium	7782492	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	0.00E+00	0.00E+00				0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853	tons steel	3.21E-07	NA	NA	Zinc	7440666	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room	4.34E-07	1.42E-03				0.00E+00	0.00E+00	4.34E-07	1.42E-03

Table B.4.3: Plant 1603 COPC Emissions by Source
Page 3 of 3
Pacific Steel Casting Company
Berkeley, California

NOTES:

- (1) Throughput information:
 Maximum hourly throughput based on limits set forth in BAAQMD permit to operate, except for the following:
 Hourly for S13 through S24 (mold mixing area) based on the sum of maximum throughput of the new (3.25 tons per hour) and reclaimed (15 tons per hour) sand feeds.
 Annual throughput based on "Plant #1603 Permit Update" submitted to BAAQMD by PSC on July 31, 2006, reports throughput from May 1, 2005 to April 30, 2006
- (2) ND = COPC was not detected in all test runs. NA = not applicable
- (3) Capture efficiency represents the percentage of emissions routed to primary capture device or area. Values based on analysis by T. Mitchell Engineers & Associates dated August 30, 2006 (included as Appendix A of the February 15, 2007 EIR) with certain modifications based on discussions with the BAAQMD or as mandated by the BAAQMD in the comments (included as Appendix F of the February 15, 2007 EIR) on the November 16, 2006 EIR.
- (4) Control efficiency represents percent of mass emissions reduced by abatement device.
 Baghouses:
 Control efficiency for baghouses based on Plant 703 EAF baghouse inlet and outlet source test for particulate matter (PSC Source Test (8), Tables 7-26 and 7-29. As mandated by the BAAQMD, particulate control calculated as 99.57% for particulate-bound COPCs.
 Activated Carbon Adsorbers:
 Control efficiency for adsorbers assumed to be 90.5% for VOCs, based on data collected at the Plant 1603 carbon unit.
 90.5% control efficiency used unless data from manufacturer suggest high frequency breakthrough. For example, 0% control used for formaldehyde.
 Carbon adsorbers have particulate prefilters to prevent fouling of activated carbon, the prefilter has a control efficiency of 65% for particulates larger than 1 micron. The carbon adsorption unit will likely remove additional particulate, however, for this analysis it is conservatively assumed that no additional particulate removal will occur in the carbon unit.
 For S4/S19, the source test was taken at a point after the baghouse, before the prefilter and carbon unit, therefore the control efficiency reflect the those of the prefilter and carbon units.

- (5) Speciated metals emissions for S5 blast table and S6 tumbler blaster based on following:
 Speciated metal emission factors (lb metal/tons steel) are estimated by multiplying the weight fraction of metals COPCs (metal/PM10) found in the testing for the finishing operations of P703, S33-S40 to arc-air booth PM10 emission factors (lb PM10/tons steel).
 Speciated metal emission factors (lb metal/tons steel) are derived using following PM10 emission factors.
- | | |
|-------|--|
| 1.7 | PM10 Emission factor (lb PM10/ton steel) for Casting Cleaning, AP-42, Chapter 12.13 Steel Foundries, January 1995, Table 12.13-2. Used to convert S33-S40 source test results into Metal/PM10 weight fraction [metal/PM10=unabated emission factor for S33-S40 (lb metal/tons steel) / PM10 emission factor (lb PM10/ton steel)]. Assume weight fractions between Plant 703 S33-S40 and Plant 187 are similar. |
| 0.033 | PM10 Emission factor (lb PM10/ton steel) for Abrasive Blasting with steel shots. Based on AP-42, Table 13.2.6-1, emission factor=(1.3 lb PM10/1000 lb steel shots) x (2000 lb/ 1 ton) x(112 tons steel shots/8853 tons steel casting). Steel shots and steel casting quantities based on Plant 1603 throughput from May 1, 2005 through A Casting quantity based on 90% of EAF, assumes 10% lost to slag and pigs. Per AP-42 Chapter 13.2.6, assume PM10 from using shots equals 10% of using sand for abrasive blasting. |
| 0.001 | PM10 Emissions (lb/ton) from BAAQMD's PSC inventory data bank for Arc Air Booth. Used to convert metal weight fractions (metal/PM10) to uncontrolled metal emission factors (lb metal/tons steel). |

COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for blast table and tumbler blast	Uncontrolled Emission Factor for arc air booth (lb metal/ton steel)
Arsenic	4.85E-06	1.60E-07	4.85E-09
Beryllium	ND	ND	ND
Cadmium	2.22E-06	7.29E-08	2.22E-09
Chromium, Total	1.93E-05	6.33E-07	1.93E-08
Copper	5.38E-05	1.77E-06	5.38E-08
Lead	4.66E-04	1.53E-05	4.66E-07
Manganese	6.33E-04	2.08E-05	6.33E-07
Mercury	4.59E-06	1.51E-07	4.59E-09
Nickel	ND	ND	ND
Selenium	ND	ND	ND
Zinc	3.21E-04	1.06E-05	3.21E-07

- (6) Natural gas combustion emissions factors from AP-42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion." Upon BAAQMD request, emissions for benzene, toluene and formaldehyde were calculated.
 Assumes 1 therm = 100 scf for natural gas
- (7) As emissions of chromium (VI) were only measured in the Plant 703 EAF (Source 27), a separate analysis was conducted by GT Engineering (included as Appendix B of the February 15, 2007 EIR) to determine the potential for other sources of chromium (VI) in other operations at the facility. Based on that analysis, emissions of chromium (VI) are estimated for areas where molten steel is produced (i.e., in the EAF and welding operations). As mandated by the BAAQMD, the chromium (VI) emission factor is based on Plant 703 EAF source test data (inlet) using the chromium (VI) to chromium (total) ratio listed below (Note: this is an extremely conservative assumption for arc air welding processes as only portions of the cast are welded):
- | |
|--------------------------------------|
| 0.88% chromium (VI)/chromium (total) |
|--------------------------------------|
- (8) BAAQMD Comments (dated October 18, 2006) on "Source Test Report 2005-2006 Emissions Source Tests Toxic Air Contaminants, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 30, 2006.
- (9) As requested by the BAAQMD, emissions from the Plant 1603 EAF (Source 1) are based on source test of Plant 703 EAF (Source 27), scaled by a ratio of the filterable particulate matter measured at Plant 1603 EAF (Source 1) to that measured at Plant 703 EAF (Source 27)
 0.008 Filterable particulate matter emission factor (lb/ton steel) at Plant 1603 EAF (Source 1) baghouse outlet, Table 1-2 of BAAQMD Comments (dated October 19, 2006) on "2006 Particulate Matter Tests, Plant 3 Electric Arc Furnace, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 24, 2006.
 Pacific Steel conducted this re-test because of the concern that the baghouse was not operating as it routinely does when initially tested in December 2005. Prior to the June 2006 source test, Pacific Steel performed and documented maintenance on the baghouse to address this concern.
 0.051 Filterable particulate matter emission factor (lb/ton steel) at Plant 703 EAF (Source 27) baghouse outlet, Table 7-29(8)
 0.16 Ratio
 As discussed for the Plant 703 EAF (Source 27), if a specific metal was ND at the outlet of the baghouse but detected at the inlet of the baghouse, then the inlet value was used and the appropriate baghouse control efficiency applied, as recommended by the BAAQMD.
- (10) On March 6-8, 2007, the BAAQMD conducted a source test to measure fugitive emissions from the EAF through roof vents in the meltshop. Emission factors developed from that source test are used directly to estimate fugitive emissions from the EAF; as a result a capture efficiency is not used in the calculation.
- (11) From "Source Test Report 2006 Dioxin/Furan Emissions Tests, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC for BAAQMD dated July 14, 2006
 These source test data are dependent on, and therefore only representative of, the materials used in Plant 1603. The sand molds and cores used in the other two Plants are prepared with binders and additives that are different than the ones used in Plant 1603. Plant 187 uses a green sand process where natural clay, corn starch, and water are used as binders to form the casting molds. Since no chemical binders are used, the source test for Plant 1603 would not be representative of operations at Plant 187. Plant 703 and 1603 use phenolic-type binders, however as shown in Appendix C of the February 15, 2007 EIR, none of the same binders and additives are used at both plants. Appendix C of the February 15, 2007 EIR also shows the chemical constituents of the binders and additives used in plants 703 and 1603 and there are only three chemicals – isopropanol, phenol and water – that are common to the binders and additives used at both plants. Because of different chemical composition of the binders and additives used at Plant 703, the source test of Plant 1603 would not likely be representative of the operations at Plant 703.
- (12) BAAQMD Comments (dated October 19, 2006) on "2006 Particulate Matter and Trace Metals Emissions Re-Tests, Plant 3 Cast Mold Pouring / Cooling / and Shakeout, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated September 22, 2006.
 From this source test, the BAAQMD deemed results for copper, lead and zinc to be anomalous and rejected their use in the EIR. For all other detected metals, the average emission factor for metals reported in (8) were averaged with the average emission factor reported in this source test (12) to develop the emission factor used in the EIR.
- (13) Ceramol is the only coating used in S18 that contains IPA, at a maximum of 7% by weight. Based on facility records of Ceramol usage the total annual quantity of IPA in Ceramol is 1970 lbs/yr.
 The maximum hourly value is based on the maximum over the reporting period of average daily usage (as calculated from monthly logs) divided by an 8 hour shift.
- (14) As requested by the BAAQMD, since naphthalene was not measured at the mold mixing area, emissions were estimated based on measured phenol emissions in the mold mixing area and the ratio of phenol to naphthalene emissions measured at S4/19 pour area.
- (15) The following permitted sources were not considered as potentially emitting COPCs.

Source	
S2	Ladle heater (out of service)
S7	New sand silo #1
S9	Sand cooler classifier
S10	Sand conditioning unit #1
S11	Sand conditioning unit #2
S12	Return sand bin #1
S13	Reclaimed sand bin #2
S15	Bucket elevator #1, new sand receiving
S16	Bucket elevator #2, returned sand
S17	Bucket elevator #3, reclaimed sand

APPENDIX B.5

Emissions Estimates for Future Controlled Conditions

Table B.5.1: Plant 187 COPC Emissions by Source
Page 1 of 3
Pacific Steel Casting Company
Berkeley, California

District Source List	Source ID	Source Description	Throughput ⁽¹⁾		Emission Factors				Primary Emissions Calculation										Secondary Emissions Calculation				Total Emissions						
			Maximum Hourly	Throughput Unit	Uncontrolled Emission Factor-Upstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Uncontrolled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Controlled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	COPC	CAS Number	Basis for Emissions	Primary Capture Efficiency (%) ⁽³⁾	Primary Control Efficiency (%) ⁽³⁾	Primary Discharge Point	Max. Hourly Primary Stack Emissions (t/yr)	Annual Avg. Primary Stack Emissions (t/yr)	COPC	CAS Number	Secondary Capture Area	Secondary Control Efficiency	Secondary Discharge Point	Max. Hourly Secondary Stack Emissions (t/yr)	Annual Avg. Secondary Stack Emissions (t/yr)	Total Max. Hourly Emissions (t/yr)	Total Annual Avg. Emissions (t/yr)					
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	6.15E-04	ND	Arsenic	7440382	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	9.25E-06	3.05E-02	Arsenic	7440382									9.25E-06	3.05E-02	
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	ND	Beryllium	7440417	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	0.00E+00	0.00E+00	Beryllium	7440417										0.00E+00	0.00E+00
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	1.37E-05	Cadmium	7440439	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	4.80E-05	1.58E-01	Cadmium	7440439										4.80E-05	1.58E-01
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	3.02E-04	Chromium, Total	7440473	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	1.06E-03	3.49E+00	Chromium, Total	7440473										1.06E-03	3.49E+00
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	2.66E-06	Chromium(VI)	18540299	Ratio to Chromium, total based on PSC Source Test ⁽⁴⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	9.29E-06	3.07E-02	Chromium(VI)	18540299										9.29E-06	3.07E-02
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	1.57E-04	Copper	7440508	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	5.48E-04	1.81E+00	Copper	7440508										5.48E-04	1.81E+00
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	1.09E-04	Lead	7439921	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	3.72E-04	1.23E+00	Lead	7439921										3.72E-04	1.23E+00
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	2.68E-03	Manganese	7439965	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	6.99E-03	3.10E+01	Manganese	7439965										9.39E-03	3.10E+01
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	1.86E-05	Mercury	7439976	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	6.52E-05	2.15E-01	Mercury	7439976										6.52E-05	2.15E-01
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	9.22E-05	Nickel	7440020	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	3.23E-04	1.06E+00	Nickel	7440020										3.23E-04	1.06E+00
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	2.05E-05	Selenium	7782492	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	7.17E-05	2.37E-01	Selenium	7782492										7.17E-05	2.37E-01
S1	Plant 1 S1	Electric Arc Furnace	3.5	11,550 tons steel	NA	NA	1.38E-02	Zinc	7440666	PSC Source Test for Plant 703 EAP ⁽¹⁰⁾ T ₉₀₀ 7.30	A5 Baghouse	99%	99.57%	Plant 1 P5	4.83E-02	1.59E+02	Zinc	7440666										4.83E-02	1.59E+02

Table B.5.1: Plant 187 COPC Emissions by Source

Pacific Steel Casting Company
Berkeley, California

District Source List	Source ID	Source Description	Throughput ⁽¹⁾			Emission Factors			Primary Emissions Calculation					Secondary Emissions Calculation				Total Emissions											
			Maximum Hourly	Annual	Throughput Unit	Uncontrolled Emission Factor-Upstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Uncontrolled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Controlled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	COPC	CAS Number	Basis for Emissions	Primary Capture Device/Area	Primary Capture Efficiency (%) ⁽³⁾	Primary Control Efficiency (%) ⁽⁴⁾	Primary Discharge Point	Max. Hourly Primary Stack Emissions (lb/hr)	Annual Avg. Primary Stack Emissions (lb/yr)	COPC	CAS Number	Secondary Capture Area	Secondary Control Efficiency	Secondary Discharge Point	Max. Hourly Secondary Stack Emissions (lb/hr)	Annual Avg. Secondary Stack Emissions (lb/yr)	Total Max. Hourly Emissions (lb/hr)	Total Annual Avg. Emissions (lb/yr)			
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	1.92E-07	NA	NA	Arsenic	7440382	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	8.26E-09	2.89E-06	Arsenic	7440382			0.00E+00	0.00E+00	8.26E-09	2.89E-06				
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	ND	NA	NA	Beryllium	7440417	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	0.00E+00	0.00E+00	Beryllium	7440417			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	8.77E-08	NA	NA	Cadmium	7440439	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	3.77E-09	1.31E-06	Cadmium	7440439			0.00E+00	0.00E+00	3.77E-09	1.31E-06	0.00E+00	0.00E+00	3.77E-09	1.31E-06
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	7.62E-07	NA	NA	Chromium, Total	7440473	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	3.28E-08	1.14E-05	Chromium, Total	7440473			0.00E+00	0.00E+00	3.28E-08	1.14E-05	0.00E+00	0.00E+00	3.28E-08	1.14E-05
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	2.13E-06	NA	NA	Copper	7440508	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	9.16E-08	3.17E-05	Copper	7440508			0.00E+00	0.00E+00	9.16E-08	3.17E-05	0.00E+00	0.00E+00	9.16E-08	3.17E-05
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	1.84E-05	NA	NA	Lead	7439921	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	7.93E-07	2.75E-04	Lead	7439921			0.00E+00	0.00E+00	7.93E-07	2.75E-04	0.00E+00	0.00E+00	7.93E-07	2.75E-04
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	2.51E-05	NA	NA	Manganese	7439965	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	1.08E-06	3.73E-04	Manganese	7439965			0.00E+00	0.00E+00	1.08E-06	3.73E-04	0.00E+00	0.00E+00	1.08E-06	3.73E-04
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	1.82E-07	NA	NA	Mercury	7439976	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	7.81E-09	2.71E-06	Mercury	7439976			0.00E+00	0.00E+00	7.81E-09	2.71E-06	0.00E+00	0.00E+00	7.81E-09	2.71E-06
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	ND	NA	NA	Nickel	7440020	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	0.00E+00	0.00E+00	Nickel	7440020			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	ND	NA	NA	Selenium	7782492	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	0.00E+00	0.00E+00	Selenium	7782492			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
S15	Plant 1 S15	Pangborn table blast	10	3,465	tons steel	1.27E-05	NA	NA	Zinc	7440666	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁵⁾	A3 Baghouse	100%	99.57%	Plant 1 P3	5.47E-07	1.89E-04	Zinc	7440666			0.00E+00	0.00E+00	5.47E-07	1.89E-04	0.00E+00	0.00E+00	5.47E-07	1.89E-04

Table B.5.1: Plant 187 COPC Emissions by Source

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**Pacific Steel Casting Company
Berkeley, California**

NOTES:

- (1) Throughput information:
Maximum hourly throughput based on limits set forth in BAAQMD permit to operate except for S32001. S32001 based on annual throughput divided by 2000 hours of operation.
Annual throughput based on "Plant #187 Permit Update" submitted to BAAQMD by PSC on September 12, 2006, reports throughput from August 1, 2005 to July 31, 2006. S3 and S4 are based on previous year's values as quantities not requested by BAAQMD in 2006.
- (2) ND = COPC was not detected in all test runs. NA = not applicable
- (3) Capture efficiency represents the percentage of emissions routed to primary capture device or area. Values based on analysis by T. Mitchell Engineers & Associates dated August 30, 2006 (included as Appendix A of the February 15, 2007 EIR) with certain modifications based on discussions with the BAAQMD or as mandated by the BAAQMD in the comments (included as Appendix F of the February 15, 2007 EIR) on the November 16, 2006 EIR.
For S2 (Casting, Pour-off Area), the capture efficiency was assumed a composite of the capture efficiencies estimated for the "A" side and "B" side pour areas, scaled by the relative sand throughput of the "A" side and "B" side shakeout areas.
S4 ("A" Shake out) is in an enclosed room with all ventilation routed to A1 baghouse/prefilter/A7 carbon.
- (4) Control efficiency represents percent of mass emissions reduced by abatement device.
Baghouses:
Control efficiency for baghouses based on Plant 703 EAF baghouse inlet and outlet source test for particulate matter (PSC Source Test (8), Tables 7-26 and 7-29. As mandated by the BAAQMD, particulate control calculated as 99.57% for particulate-bound COPCs.
Activated Carbon Adsorbers:
Control efficiency for adsorbers assumed to be 90.5% for VOCs, based on data collected at the Plant 1603 carbon unit.
90.5% control efficiency used unless data from manufacturer suggest high frequency breakthrough. For example, 0% control used for formaldehyde.
Carbon adsorbers have particulate prefilters to prevent fouling of activated carbon, the prefilter has a control efficiency of 65% for particulates larger than 1 micron. The carbon adsorption unit will likely remove additional particulate, however, for this analysis it is conservatively assumed that no additional particulate removal will occur in the carbon unit.
- (5) Derivation of speciated metals emissions for finishing processes:
Speciated metal emission factors (lb metal/tons steel) are estimated by multiplying the weight fraction of metals COPCs (metal/PM10) found in the testing for the finishing operations of P703, S33-S40 to arc-air booth PM10 emission factors (lb PM10/tons steel).
Speciated metal emission factors (lb metal/tons steel) are derived using following PM10 emission factors.
1.7 PM10 Emission factor (lb PM10/ton steel) for Casting Cleaning, AP-42, Chapter 12.13 Steel Foundries, January 1995, Table 12.13-2. Used to convert S33-S40 source test results into Metal/PM10 weight fraction [metal/PM10=unabated emission factor for S33-S40 (lb metal/tons steel) / PM10 emission factor (lb PM10/ton steel)].
Assume weight fractions between Plant 703 S33-S40 and Plant 187 are similar.
0.001 PM10 Emissions (lb/ton) from BAAQMD's PSC inventory data bank for Arc Air Booth. Used to convert metal weight fractions (metal/PM10) to uncontrolled metal emission factors (lb metal/tons steel).
0.040 PM10 Emission factor (lb PM10/ton steel) for Abrasive Blasting with steel shots. Based on AP-42, Table 13.2.6-1, emission factor=(1.3 lb PM10/1000 lb steel shots) x (2000 lb/ 1 ton) x(121 tons steel shots/7947 tons steel casting).
Steel shots and steel casting quantities based on Plant 187 throughput from August 1, 2004 through July 31, 2005. Casting quantity based on 90% of EAF, assumes 10% lost to slag.
Per AP-42 Chapter 13.2.6, assume PM10 from using shots equals 10% of using sand for abrasive blasting.

COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for arc air booth (lb metal/ton steel)	Uncontrolled Emission Factor for pangborn table and rotoblats (lb metal/ton steel)
Arsenic	4.85E-06	4.85E-09	1.92E-07
Beryllium	ND	ND	ND
Cadmium	2.22E-06	2.22E-09	8.77E-08
Chromium, Total	1.93E-05	1.93E-08	7.62E-07
Copper	5.38E-05	5.38E-08	2.13E-06
Lead	4.66E-04	4.66E-07	1.84E-05
Manganese	6.33E-04	6.33E-07	2.51E-05
Mercury	4.59E-06	4.59E-09	1.82E-07
Nickel	ND	ND	ND
Selenium	ND	ND	ND
Zinc	3.21E-04	3.21E-07	1.27E-05

- (6) Natural gas combustion emissions factors from AP-42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion." Upon BAAQMD request, emissions for benzene, toluene and formaldehyde were calculated.
Assumes 1 therm = 100 scf for natural gas
- (7) As emissions of chromium (VI) were only measured in the Plant 703 EAF (Source 27), a separate analysis was conducted by GT Engineering (included as Appendix B of the February 15, 2007 EIR) to determine the potential for other sources of chromium (VI) in other operations at the facility. Based on that analysis, emissions of chromium (VI) are estimated for areas where molten steel is produced (i.e., in the EAF and welding operations). As mandated by the BAAQMD, the chromium (VI) emission factor is based on Plant 703 EAF source test data (inlet) using the chromium (VI) to chromium (total) ratio listed below (Note: this is an extremely conservative assumption for arc air welding processes as only portions of the cast are welded):
0.88% chromium (VI)/chromium (total)
- (8) BAAQMD Comments (dated October 18, 2006) on "Source Test Report 2005-2006 Emissions Source Tests Toxic Air Contaminants, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 30, 2006
- (9) The following permitted sources were not considered as potentially emitting COPCs.
- | Source | Description |
|--------|-------------------------------|
| S5 | Sand system (dust collection) |
| S6 | Sand cooler 6 screen |
| S7 | Sand screen |
| S8 | Muller |
| S10 | Muller, core sand |
| S11 | Muller |
| S19 | Raw sand receiving |
- (10) As requested by the BAAQMD, emissions from the Plant 187 EAF (Source 1) are based on source test of Plant 703 EAF (Source 27), scaled by a ratio of the filterable particulate matter measured at Plant 187 EAF (Source 1) to that measured at Plant 703 EAF (Source 27)
0.095 Filterable particulate matter emission factor (lb/ton steel) at Plant 187 EAF (Source 1) baghouse outlet, Table 6-9(8)
0.051 Filterable particulate matter emission factor (lb/ton steel) at Plant 703 EAF (Source 27) baghouse outlet, Table 7-29(8)
1.9 Ratio
As discussed for the Plant 703 EAF (Source 27), since arsenic was ND at the outlet of the baghouse but detected at the inlet of the baghouse, then the inlet value was used and the appropriate baghouse control efficiency applied, as mandated by the BAAQMD.
- (11) As mandated by the BAAQMD, fugitive emissions for the EAFs from all three plants were calculated based on the emission factors measured at the Plant 703 EAF (Source 27) baghouse inlet. To implement this methodology, the emission estimates for EAFs were split into two categories - primary and fugitive (denoted by the source number modified with "-fug", e.g., S1-fug). To ensure emission estimates were not double-counted, secondary emission were not calculated for the primary emissions and primary emissions were not calculated for the fugitive emissions.

Table B.5.2: Plant 703 COCP Emissions by Source

Pacific Steel Casting Company Berkeley, California

Table with columns: Sources, Throughput, Emission Factors, Primary Emissions Calculation, Secondary Emissions Calculation, Total Emissions. Rows include various sources like S26, S27, S29A-S31, S30, S32, and S33-S40, detailing their respective emissions for numerous pollutants.

Table B.5.2: Plant 703 COPC Emissions by Source

Page 4 of 4
Pacific Steel Casting Company
Berkeley, California

NOTES:

- (1) Throughput information:
 Maximum hourly throughput based on limits set forth in BAAQMD permit to operate.
 Annual throughput based on "Plant #703 Permit Update" submitted to BAAQMD by PSC on September 12, 2006, reports throughput from August 1, 2005 to July 31, 2006
- (2) ND = COPC was not detected in all test runs. NA = not applicable
- (3) Capture efficiency represents the percentage of emissions routed to primary capture device or area. Values based on analysis by T. Mitchell Engineers & Associates dated August 30, 2006 (included as Appendix A of the February 15, 2007 EIR) with certain modifications based on discussions with the BAAQMD or as mandated by the BAAQMD in the comments (included as Appendix F of the February 15, 2007 EIR) on the November 16, 2006 EIR.
 Sources 6-12 are enclosed devices under negative pressure.
 Source 30 (cast mold cooling room) is fully enclosed under negative pressure.
- (4) Control efficiency represents percent of mass emissions reduced by abatement device.
 Baghouses:
 Control efficiency for baghouses based on Plant 703 EAF baghouse inlet and outlet source test for particulate matter (PSC Source Test (8), Tables 7-26 and 7-29. As mandated by the BAAQMD, particulate control calculated as 99.57% for particulate-bound COPCs.
 Activated Carbon Adsorbers:
 Control efficiency for adsorbers assumed to be 90.5% for VOCs, based on data collected at the Plant 1603 carbon unit.
 90.5% control efficiency used unless data from manufacturer suggest high frequency breakthrough. For example, 0% control used for formaldehyde.
 Carbon adsorbers have particulate prefilters to prevent fouling of activated carbon, the prefilter has a control efficiency of 65% for particulates larger than 1 micron. The carbon adsorption unit will likely remove additional particulate, however, for this analysis it is conservatively assumed that no additional particulate removal will occur in the carbon unit.
- (5) Unabated phenol emission factor from BAAQMD source testing of P4 stack dated 4/14/05 and following per source equation
 $S7-S12 \text{ lbs phenol/ton steel} = (P4 \text{ emissions from Plant 703 source test, lb/hr}) / (1.25 \text{ tons steel/hr}) / (6 \text{ sources})$; Assumes no phenol in S6 (binder not added until S7)
- (6) Primary capture emission factor from source testing of stack P4 and following per source equation:
 $S7-S12 \text{ lbs/ton} = (P4 \text{ emissions from Plant 703 source test, } 0.094 \text{ lb/hr}) * (8 \text{ hrs/day}) * (250 \text{ days/yr}) / (6,270 \text{ tons sand/yr}) / (6 \text{ sources}) = 5.00E-3 \text{ lb formaldehyde/ton sand, Table V-Corrected Formaldehyde Emission Results in "AB2588 Compliance Source Test Results, Emissions Quantification and Forms PRO", January 8, 1990; S6 does not handle "coated" sand.}$
- (7) Isopropanol emission factor based on ratio of phenol to IPA as listed on the GP 862D60 Resi Shell Binder MSDS - <2% IPA to 2.5% phenol.
- (8) BAAQMD Comments (dated October 18, 2006) on "Source Test Report 2005-2006 Emissions Source Tests Toxic Air Contaminants, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 30, 2006
 All core and shell mold machine emission factors based on S21 source test.
 For the Plant 703 EAF (Source 27), as arsenic was ND at the outlet of the baghouse but detected at the inlet of the baghouse, then the inlet value was used and the appropriate baghouse control efficiency applied, as mandated by the BAAQMD.
- (9) As mandated by the BAAQMD, fugitive emissions for the EAFs from all three plants were calculated based on the emission factors measured at the Plant 703 EAF (Source 27) baghouse inlet. To implement this methodology, the emission estimates for EAFs were split into two categories - primary and fugitive (denoted by the source number modified with "-fug", e.g., S1-fug). To ensure emission estimates were not double-counted, secondary emission were not calculated for the primary emissions and primary emissions were not calculated for the fugitive emissions.
- (10) Speciated metals emissions for S32 Rotoblast based on following:

1.7	Speciated metal emission factors (lb metal/tons steel) are estimated by multiplying the weight fraction of COPC metals (metal/PM10) found in the testing for the finishing operations of P703, S33-S40 to ladle station and rotoblast PM10 emission factors (lb PM10/tons steel). Speciated metal emission factors (lb metal/tons steel) are derived using following PM10 emission factors.																																				
0.034	PM10 Emission factor (lb PM10/ton steel) for Casting Cleaning, AP-42, Chapter 12.13 Steel Foundries, January 1995, Table 12.13-2. Used to convert S33-S40 source test results into Metal/PM10 weight fraction [metal/PM10=unabated emission factor for S33-S40 (lb metal/tons steel) / PM10 emission factor (lb PM10/ton steel)]. Assume weight fractions between S33-S40 and rotoblast are the same since handling same casting.																																				
	<table border="1"> <thead> <tr> <th>COPC</th> <th>Speciation profile (lb metal/lb PM10) From S33-40 Source Test</th> <th>Uncontrolled Emission Factor for roto-blast (lb metal/ton steel)</th> </tr> </thead> <tbody> <tr><td>Arsenic</td><td>4.85E-06</td><td>1.64E-07</td></tr> <tr><td>Beryllium</td><td>ND</td><td>ND</td></tr> <tr><td>Cadmium</td><td>2.22E-06</td><td>7.49E-08</td></tr> <tr><td>Chromium, Total</td><td>1.93E-05</td><td>6.51E-07</td></tr> <tr><td>Copper</td><td>5.38E-05</td><td>1.82E-06</td></tr> <tr><td>Lead</td><td>4.66E-04</td><td>1.57E-05</td></tr> <tr><td>Manganese</td><td>6.33E-04</td><td>2.14E-05</td></tr> <tr><td>Mercury</td><td>4.59E-06</td><td>1.55E-07</td></tr> <tr><td>Nickel</td><td>ND</td><td>ND</td></tr> <tr><td>Selenium</td><td>ND</td><td>ND</td></tr> <tr><td>Zinc</td><td>3.21E-04</td><td>1.09E-05</td></tr> </tbody> </table>	COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for roto-blast (lb metal/ton steel)	Arsenic	4.85E-06	1.64E-07	Beryllium	ND	ND	Cadmium	2.22E-06	7.49E-08	Chromium, Total	1.93E-05	6.51E-07	Copper	5.38E-05	1.82E-06	Lead	4.66E-04	1.57E-05	Manganese	6.33E-04	2.14E-05	Mercury	4.59E-06	1.55E-07	Nickel	ND	ND	Selenium	ND	ND	Zinc	3.21E-04	1.09E-05
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- (11) Controlled emission factors based on BAAQMD emission rate data for S33-S40. BAAQMD data from Table III-Emission Results for Stack P5 reported in "AB2588 Compliance Source Test Results, Emissions Quantification and Forms PRO", January 8, 1990.
 Emission rate values in report preceded by "<" indicates that values are less than the method detection limit. Per AB2588 guidelines, half of these values are used in calculating the emission factor.

Controlled lbs metal/tons steel = (controlled emission rate, mg/hr) * (lbs/453600mg) * (8 hrs/day) * (5 days/wk) * (50 wks/yr)/(6400 tons/yr) / (8 sources); Equation uses abatement and capture efficiency of stack P5, Plant 703.
 Uncontrolled and uncaptured emission factors based on following efficiencies for S33-S40

Capture Efficiency (%)	90.0%
Control Efficiency (%)	99.57%

Saw and Grinding Emission Factors

COPC	Controlled Emission Rate (mg/hr)	Controlled Emission Factor (lb/tons)	Uncontrolled/Uncaptured Emission Factors (lb/ton)
Arsenic	0.28	2.38E-08	8.25E-06
Beryllium	ND	ND	ND
Cadmium	0.13	1.09E-08	3.77E-06
Chromium, Total	1.10	9.43E-08	3.27E-05
Copper	3.06	2.63E-07	9.15E-05
Lead	26.47	2.28E-06	7.91E-04
Manganese	35.98	3.10E-06	1.08E-03
Mercury	0.26	2.25E-08	7.80E-06
Nickel	ND	ND	ND
Selenium	ND	ND	ND
Zinc	18.260	1.57E-06	5.46E-04

- (12) Natural gas combustion emissions factors from AP-42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion." Upon BAAQMD request, emissions for benzene, toluene and formaldehyde were calculated.
 Assumes 1 therm = 100 scf for natural gas

- (13) As mandated by the BAAQMD, the chromium (VI) emission factor is based on Plant 703 EAF source test data (inlet) using the chromium (VI) to chromium (total) ratio listed below:
 0.88% chromium (VI)/chromium (total)

- (14) From "Source Test Report 2006 Dioxin/Furan Emissions Tests, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC for BAAQMD dated July 14, 2006

These source test data are dependent on, and therefore only representative of, the materials used in Plant 1603. The sand molds and cores used in the other two Plants are prepared with binders and additives that are different than the ones used in Plant 1603. Plant 703 and 1603 use phenolic-type binders, however as shown in Appendix C of the February 15, 2007 EIR, none of the same binders and additives are used at both plants. Appendix C also shows the chemical constituents of the binders and additives used in plants 703 and 1603 and there are only three chemicals – isopropanol, phenol and water – that are common to the binders and additives used at both plants. Because of different chemical composition of the binders and additives used at Plant 703, the source test of Plant 1603 would not likely be representative of the operations at Plant 703, however the BAAQMD mandated that PCDDs/PCDFs were estimated for Plant 703 Source 29/31, scaled by the ratio of the aromatic content of the binders used in each plant. If PCDDs/PCDFs were present in the pouring/cooling area of Plant 703 and if aromatic content is a predictor of dioxin formation, then the concentrations of PCDDs/PCDFs in the pouring/cooling area of Plant 703 would theoretically at a maximum be approximately 8% of those measured at Plant 1603 pouring/cooling, which is well below the detection limits for PCDDs/PCDFs in source testing conducted by the BAAQMD.

- (15) The following permitted sources were not considered as potentially emitting COPCs.

Sources

- S1 - Sand silo loading elevator
- S2 - Sand silo #1
- S3 - Sand silo #2
- S4 - Bucket elevator
- S5 - Resin tank (liqui-bin)
- S19 - Coated sand bin
- S25 - Abrasive blaster, core area
- S28 - EAF ladle station w/ canopy hood (not in service)

Table B.5.3: Plant 1603 COPC Emissions by Source

Page 2 of 3
Pacific Steel Casting Company
Berkeley, California

Sources			Throughput ⁽¹⁾			Emission Factors				Primary Emissions Calculation				Secondary Emissions Calculation				Total Emissions				
District Source List	Source ID	Source Description	Maximum Hourly	Annual	Throughput Unit	Uncontrolled Emission Factor-Upstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Uncontrolled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	Controlled Emission Factor-Downstream of Vent Inlet (lb/throughput unit) ⁽²⁾	COPC	CAS Number	Basis for Emissions	Primary Capture Device/Area	Primary Capture Efficiency (%) ⁽³⁾	Primary Control Efficiency (%) ⁽⁴⁾	Primary Discharge Point	Secondary Capture Area	Secondary Control Efficiency	Secondary Discharge Point	Max. Hourly Secondary Stack Emissions (lb/hr)	Annual Avg. Secondary Stack Emissions (lb/yr)	Total Max. Hourly Emissions (lb/hr)	Total Annual Avg. Emissions (lb/yr)
Exempt-Heat Treat Furnaces	Plant 3 Exempt-Heat Treat Furnaces	Heat treat furnaces	12	98,445 (therms)		2.10E-07	NA	NA	Benzene	74432	AP-42, Section 1.4, Table 1.4-3 ⁽⁵⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			2.46E-06	2.07E-02	2.46E-06	2.07E-02	
Exempt-Heat Treat Furnaces	Plant 3 Exempt-Heat Treat Furnaces	Heat treat furnaces	12	98,445 (therms)		7.66E-06	NA	NA	Formaldehyde	50000	AP-42, Section 1.4, Table 1.4-3 ⁽⁵⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			8.79E-05	7.39E-01	8.79E-05	7.39E-01	
Exempt-Heat Treat Furnaces	Plant 3 Exempt-Heat Treat Furnaces	Heat treat furnaces	12	98,445 (therms)		3.40E-07	NA	NA	Toluene	108883	AP-42, Section 1.4, Table 1.4-3 ⁽⁵⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			3.98E-06	3.35E-02	3.98E-06	3.35E-02	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		8.25E-06	NA	NA	Arsenic	7440382	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		ND	NA	NA	Beryllium	7440417	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		3.77E-06	NA	NA	Cadmium	7440439	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		3.27E-05	NA	NA	Chromium, Total	7440473	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			8.84E-05	2.90E-01	8.84E-05	2.90E-01	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		9.15E-05	NA	NA	Copper	7440508	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		7.91E-04	NA	NA	Lead	7439921	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			2.14E-03	7.01E+00	2.14E-03	7.01E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		1.08E-03	NA	NA	Manganese	7439965	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		7.80E-06	NA	NA	Mercury	7439976	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		ND	NA	NA	Nickel	7440020	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		ND	NA	NA	Selenium	7782492	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Finishing	Plant 3 Exempt-Finishing	Cleaning and Grinding in Finishing Room	2.7	8,853 (tons steel)		5.46E-04	NA	NA	Zinc	7440668	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	0%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		4.85E-09	NA	NA	Arsenic	7440382	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		ND	NA	NA	Beryllium	7440417	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		2.22E-09	NA	NA	Cadmium	7440439	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		1.93E-08	NA	NA	Chromium, Total	7440473	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			2.60E-08	8.53E-05	2.60E-08	8.53E-05	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		1.69E-10	NA	NA	Chromium(VI)	18540299	Ratio to Chromium, total based on PSC Source Test ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		5.38E-08	NA	NA	Copper	7440508	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		4.66E-07	NA	NA	Lead	7439921	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			6.29E-07	2.06E-03	6.29E-07	2.06E-03	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		6.33E-07	NA	NA	Manganese	7439965	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		4.59E-09	NA	NA	Mercury	7439976	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		ND	NA	NA	Nickel	7440020	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		ND	NA	NA	Selenium	7782492	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Exempt-Arc Air Booth/Welding	Plant 3 Exempt-Arc Air Booth/Welding	Welding in Finishing Room	2.7	8,853 (tons steel)		3.21E-07	NA	NA	Zinc	7440668	PSC Source Test for Plant 703, S33-S40, Nov. 1989 ⁽⁶⁾	P3 Finishing Room	100%	50%	Roof vents - P3 Finishing Room			0.00E+00	0.00E+00	0.00E+00	0.00E+00	

Table B.5.3: Plant 1603 COPC Emissions by Source

**Page 3 of 3
Pacific Steel Casting Company
Berkeley, California**

NOTES:

- (1) Throughput information:
Maximum hourly throughput based on limits set forth in BAAQMD permit to operate, except for the following:
Hourly for S13 through S24 (mold mixing area) based on the sum of maximum throughput of the new (3.25 tons per hour) and reclaimed (15 tons per hour) sand feeds.
Annual throughput based on "Plant #1603 Permit Update" submitted to BAAQMD by PSC on July 31, 2006, reports throughput from May 1, 2005 to April 30, 2006
- (2) ND = COPC was not detected in all test runs. NA = not applicable
- (3) Capture efficiency represents the percentage of emissions routed to primary capture device or area. Values based on analysis by T. Mitchell Engineers & Associates dated August 30, 2006 (included as Appendix A of the February 15, 2007 EIR) with certain modifications based on discussions with the BAAQMD or as mandated by the BAAQMD in the comments (included as Appendix F of the February 15, 2007 EIR) on the November 16, 2006 EIR.
- (4) Control efficiency represents percent of mass emissions reduced by abatement device.
Baghouses:
Control efficiency for baghouses based on Plant 703 EAF baghouse inlet and outlet source test for particulate matter (PSC Source Test (8), Tables 7-26 and 7-29. As mandated by the BAAQMD, particulate control calculated as 99.57% for particulate-bound COPCs.
Activated Carbon Adsorbers:
Control efficiency for adsorbers assumed to be 90.5% for VOCs, based on data collected at the Plant 1603 carbon unit.
90.5% control efficiency used unless data from manufacturer suggest high frequency breakthrough. For example, 0% control used for formaldehyde.
Carbon adsorbers have particulate prefilters to prevent fouling of activated carbon, the prefilter has a control efficiency of 65% for particulates larger than 1 micron. The carbon adsorption unit will likely remove additional particulate, however, for this analysis it is conservatively assumed that no additional particulate removal will occur in the carbon unit.
For S4/S19, the source test was taken at a point after the baghouse, before the prefilter and carbon unit, therefore the control efficiency reflect the those of the prefilter and carbon units.
- (5) Speciated metals emissions for S5 blast table and S6 tumbler blaster based on following:
Speciated metal emission factors (lb metal/tons steel) are estimated by multiplying the weight fraction of metals COPCs (metal/PM10) found in the testing for the finishing operations of P703, S33-S40 to arc-air booth PM10 emission factors (lb PM10/tons steel).
Speciated metal emission factors (lb metal/tons steel) are derived using following PM10 emission factors.
1.7 PM10 Emission factor (lb PM10/ton steel) for Casting Cleaning, AP-42, Chapter 12.13 Steel Foundries, January 1995, Table 12.13-2. Used to convert S33-S40 source test results into Metal/PM10 weight fraction [metal/PM10=unabated emission factor for S33-S40 (lb metal/tons steel) / PM10 emission factor (lb PM10/ton steel)].
Assume weight fractions between Plant 703 S33-S40 and Plant 187 are similar.
0.033 PM10 Emission factor (lb PM10/ton steel) for Abrasive Blasting with steel shots. Based on AP-42, Table 13.2.6-1, emission factor=(1.3 lb PM10/1000 lb steel shots) x (2000 lb/ 1 ton) x(112 tons steel shots/8853 tons steel casting). Steel shots and steel casting quantities based on Plant 1603 throughput from May 1, 2005 through April 30, 2006.
Casting quantity based on 90% of EAF, assumes 10% lost to slag and pigs. Per AP-42 Chapter 13.2.6, assume PM10 from using shots equals 10% of using sand for abrasive blasting.
0.001 PM10 Emissions (lb/ton) from BAAQMD's PSC inventory data bank for Arc Air Booth. Used to convert metal weight fractions (metal/PM10) to uncontrolled metal emission factors (lb metal/tons steel).

COPC	Speciation profile (lb metal/lb PM10) From S33-40 Source Test	Uncontrolled Emission Factor for blast table and tumbler blast	Uncontrolled Emission Factor for arc air booth (lb metal/ton steel)
Arsenic	4.85E-06	1.60E-07	4.85E-09
Beryllium	ND	ND	ND
Cadmium	2.22E-06	7.29E-08	2.22E-09
Chromium, Total	1.93E-05	6.33E-07	1.93E-08
Copper	5.38E-05	1.77E-06	5.38E-08
Lead	4.66E-04	1.53E-05	4.66E-07
Manganese	6.33E-04	2.08E-05	6.33E-07
Mercury	4.59E-06	1.51E-07	4.59E-09
Nickel	ND	ND	ND
Selenium	ND	ND	ND
Zinc	3.21E-04	1.06E-05	3.21E-07

- (6) Natural gas combustion emissions factors from AP-42, Chapter 1.4 Natural Gas Combustion, Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion." Upon BAAQMD request, emissions for benzene, toluene and formaldehyde were calculated.
Assumes 1 therm = 100 scf for natural gas
- (7) As emissions of chromium (VI) were only measured in the Plant 703 EAF (Source 27), a separate analysis was conducted by GT Engineering (included as Appendix B of the February 15, 2007 EIR) to determine the potential for other sources of chromium (VI) in other operations at the facility. Based on that analysis, emissions of chromium (VI) are estimated for areas where molten steel is produced (i.e., in the EAF and welding operations). As mandated by the BAAQMD, the chromium (VI) emission factor is based on Plant 703 EAF source test data (inlet) using the chromium (VI) to chromium (total) ratio listed below (Note: this is an extremely conservative assumption for arc air welding processes as only portions of the cast are welded):
0.88% chromium (VI)/chromium (total)
- (8) BAAQMD Comments (dated October 18, 2006) on "Source Test Report 2005-2006 Emissions Source Tests Toxic Air Contaminants, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 30, 2006.
- (9) As requested by the BAAQMD, emissions from the Plant 1603 EAF (Source 1) are based on source test of Plant 703 EAF (Source 27), scaled by a ratio of the filterable particulate matter measured at Plant 1603 EAF (Source 1) to that measured at Plant 703 EAF (Source 27)
0.008 Filterable particulate matter emission factor (lb/ton steel) at Plant 1603 EAF (Source 1) baghouse outlet, Table 1-2 of BAAQMD Comments (dated October 19, 2006) on "2006 Particulate Matter Tests, Plant 3 Electric Arc Furnace, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated August 24, 2006.
Pacific Steel conducted this re-test because of the concern that the baghouse was not operating as it routinely does when initially tested in December 2005. Prior to the June 2006 source test, Pacific Steel performed and documented maintenance on the baghouse to address this concern.
0.051 Filterable particulate matter emission factor (lb/ton steel) at Plant 703 EAF (Source 27) baghouse outlet, Table 7-29(8)
0.16 Ratio
As discussed for the Plant 703 EAF (Source 27), if a specific metal was ND at the outlet of the baghouse but detected at the inlet of the baghouse, then the inlet value was used and the appropriate baghouse control efficiency applied, as recommended by the BAAQMD.
- (10) On March 6-8, 2007, the BAAQMD conducted a source test to measure fugitive emissions from the EAF through roof vents in the meltshop. Emission factors developed from that source test were adjusted to incorporate the effects of the modification that will be made to the EAF control devices under the Future Controlled Conditions scenario. For the Current Operating Conditions scenario, the BAAQMD assumed a capture efficiency of 95% and with new modifications, the future capture efficiency is likely to be at least 99%. The fugitive emission factors were adjusted accordingly.
- (11) From "Source Test Report 2006 Dioxin/Furan Emissions Tests, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC for BAAQMD dated July 14, 2006
This source test data was only used for Plant 1603 as the source test data is dependent on, and therefore only representative of, the materials used in Plant 1603. The sand molds and cores used in the other two Plants are prepared with binders and additives that are different than the ones used in Plant 1603. Plant 187 uses a green sand process where natural clay, corn starch, and water are used as binders to form the casting molds. Since no chemical binders are used, the source test for Plant 1603 would not be representative of operations at Plant 187. Plant 703 and 1603 use phenolic-type binders, however as shown in Appendix C, none of the same binders and additives are used at both plants. Appendix C also shows the chemical constituents of the binders and additives used in plants 703 and 1603 and there are only three chemicals – isopropanol, phenol and water – that are common to the binders and additives used at both plants. Because of different chemical composition of the binders and additives used at Plant 703, the source test of Plant 1603 would not likely be representative of the operations at Plant 703.
- (12) BAAQMD Comments (dated October 19, 2006) on "2006 Particulate Matter and Trace Metals Emissions Re-Tests, Plant 3 Cast Mold Pouring / Cooling / and Shakeout, Pacific Steel Casting Company, Berkeley, California" by Avogadro Group, LLC dated September 22, 2006.
From this source test, the BAAQMD deemed results for copper, lead and zinc to be anomalous and rejected their use in the EIR. For all other detected metals, the average emission factor for metals reported in (8) were averaged with the average emission factor reported in this source test (12) to develop the emission factor used in the EIR.
- (13) Ceramol is the only coating used in S18 that contains IPA, at a maximum of 7% by weight. Based on facility records of Ceramol usage the total annual quantity of IPA in Ceramol is 1970 lbs/yr.
The maximum hourly value is based on the maximum over the reporting period of average daily usage (as calculated from monthly logs) divided by an 8 hour shift.
- (14) As requested by the BAAQMD, since naphthalene was not measured at the mold mixing area, emissions were estimated based on measured phenol emissions in the mold mixing area and the ratio of phenol to naphthalene emissions measured at S4/19 pour area.
- (15) The following permitted sources were not considered as potentially emitting COPCs.

Source	Description
S2	Ladle heater (out of service)
S7	New sand silo #1
S9	Sand cooler classifier
S10	Sand conditioning unit #1
S11	Sand conditioning unit #2
S12	Return sand bin #1
S13	Reclaimed sand bin #2
S15	Bucket elevator #1, new sand receiving
S16	Bucket elevator #2, returned sand
S17	Bucket elevator #3, reclaimed sand