APPENDIX E

Response to District Comments (dated 16 August 2007) on
Pacific Steel Casting's Health Risk Assessment Report (dated 23 July 2007)

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BAAQMD Comment	ENVIRON Response
1. The HRA report should include the results of a cancer burden analysis for receptors within the zone of impact (greater than one in a million).	Cancer burden was calculated and included in the report. Please see Appendix F for the methods and results of the analysis. A brief discussion of the results is also presented in the Executive Summary and Sections 6.5 & 7 of the report. Based on the results of the cancer burden analysis, less than a single case of cancer would be expected in the zone of impact of the Facility under both the existing operational and future controlled conditions.
2. Maps should include isopleths at one in a million and 10 in a million for cancer risk (residential exposure), as well as cancer risk values for specific grid points. Maps should include isopleths at 0.5 and 1.0 for chronic hazard index (residential exposure), as well as HI values for specific grid points. We suggest close proximity fine-detail maps (e.g., Figure 6.2) as well as zoomed-out course grid maps that show risk over a larger area of the community (at least to San Pablo Ave.)	District requested maps are provided in Appendix D.4. Please note that isopleths for chronic hazard index (residential exposure) are not presented as there are no residential receptors that exceed an HI of 0.5.

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3. Table 6.1 should be amended. The column labeled "Exposure Duration" should be labeled "Exposure Duration, Cancer Risk" and/or be located under the Cancer Risk Heading. We suggest that Table 6.1 also include the results of an alternative analysis that calculates the incremental chronic HI from PSC emissions for these off-site workers during their actual hours of work.	To aid presentation, Table 6.1 has been split into three tables: Table 6.1a – Cancer Risk Summary Table 6.1b – Chronic Hazard Index Summary Table 6.1c – Acute Hazard Index Summary The column identifying "Exposure Duration" has been modified to be included under Cancer Risk in Table 6.1a. Dose adjusted chronic HIs, calculated using the District and OEHHA recommended methodology discussed in Section 5.4 of the report, have been calculated for the MEIWs and are presented in Table 6.1b Non-dose adjusted HIs are also presented in the table notes of Table 6.1b. Additionally, the cancer risk for the MEIW (existing operating and future controlled conditions, for all three worker shifts) were refined according to OEHHA Hot Spots Guidance (Cal/EPA 2003a) and discussions with the District. As was done in the July 23, 2007 HRA, the 8-hour shift air concentration was used to evaluate cancer risks from chemical exposure through the inhalation pathway. However for non-inhalation pathways, the annual average concentration is used in the deposition modeling for both residents and workers, as recommended by OEHHA (Cal/EPA 2003a). This recommendation is based on the assumption that a chemical will be deposited and accumulate in the soil over the entire period that the facility operates regardless of whether or not a worker is present at an off-site location. A summary of results of this updated analysis is presented in Table 6.1a.

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4. The HRA report should include summary tables that show chemical-specific non-cancer hazard quotients and total hazard indexes (similar to those provided for the cancer risk in Tables 6.3 & 6.5) including target organ systems.	As discussed above, to aid in presentation Table 6.1 has been three tables: Table 6.1a – Cancer Risk Summary Table 6.1b – Chronic Hazard Index Summary Table 6.1c – Acute Hazard Index Summary Tables 6.1b and 6.1c have been modified to present the maximum target organ specific HI for each receptor population. Additionally, tables showing chronic non-cancer hazard quotients and total hazard indexes (HI) have been included as Tables 6.8 and 6.9. Target organ specific breakdowns are only provided for the MEIW, as this was the only receptor to exceed an HI of one.
5. The HRA report should contain detailed examples of risk calculations for residential cancer risk, off-site worker cancer risk, residential chronic HI, worker chronic HI, and acute HI. In particular, show and explain the calculation of chronic HI for off-site workers using the standard OEHHA method and an alternative analysis that determines the incremental impact from PSC emissions by considering the workers' duration of exposure.	Detailed examples of risk calculations have been added as Appendix D.2. The District and OEHHA recommended methodology used to calculate the worker exposure adjusted chronic HIs is discussed in Section 5.4 of the report. These worker adjusted values have been calculated for the MEIWs and are presented in Table 6.1b. Non-adjusted HIs are also presented in the table notes of Table 6.1b.
6. The acute HI calculations use a simplified approach where the maximum 1-hour concentrations from each emission source are superimposed at a receptor, irrespective of different meteorological conditions. A more refined analysis superimposes impacts from multiple sources at a particular receptor for a particular hour of meteorological data, and determines the overall maximum 1-hour exposure and the particular hour of the year that this condition occurs. The District's refined analysis indicated a value approximately 70% of the reported acute HI at the MEI_R. While your intended method is acceptable, the District recommends an expanded discussion.	An expanded discussion of the conservative approach we present has been added to Section 5.4.3.

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7. Table B.4.3 does not explain the use of testing data for fugitive emissions from S1, Electric Arc Furnace at Plant 1603. Capture efficiency is listed at 95%; this value is not used for emission estimates, please discuss in footnotes. In addition, the fugitive emission estimate from S4, Casting Mold Shakeout Station, does not appear to consider the breakup of large molds (with flask containment) outside of the shakeout booth. Please review/correct your emission estimate.	This footnote has been added to Table B.4.3. ENVIRON understands that the practice described by the District (breakup of large molds with flask containment outside of the shakeout booth) is not a standard practice at PSC and does not routinely occur. Therefore the emissions estimates used for the HRA are appropriate. It is ENVIRON's understanding that when District personnel observed this practice, the normal plant supervisor was on vacation and the PSC staff responsible for shakeout that day was not operating the source in accordance with standard practices. That individual has since been warned regarding inappropriate shakeout procedures. Finally, ENVIRON understands that District personnel, in a visit to PSC during the week of September 17, 2007, observed airflow patterns outside the Mold Shakeout Station which directed airflow to the cooling and pouring area, which is abated through the carbon adsorption system in Plant 1603.
8. SO EMISFACT a. "Season by hour by day of week emission rate factors" were used: 1's for the hours the source operates and 0's when the source is no operating. The report should include a discussion on the methodology for calculating the averaged emissions and the period(s) used. b. The runs for the worker receptor include additional "seasoned by hour by day of week emission rate factors" (0s) for the periods when the worker is not present. This should be discussed in detail.	Additional discussion and example calculations have been added as Appendix D.2. Average dispersion factor for each source-receptor combination over the five-year modeling period (a total of 43,180 hours which results from a total of 43,848 hours in the five-year period minus 553 hours of missing data and 115 hours of calm winds) was determined using AERMOD. For the modeling, each source was assumed to operate on the schedule presented in Table 4.1. As an example, Plant 187 Source 2 operates from 9 PM to 1 PM the following day (for a total of 16 hours) for 5 days per week. The emissions at Stack P7 from Plant 187 Source 2 were only modeled for the period of operation, therefore the dispersion factor determined using AERMOD represents the period average for this source over the entire five-year period modeled, accounting for periods of operation and non-operation. *Resident Receptor:* For the residential receptor, average dispersion factors over the five-year period was used as the residential receptor is assumed to be exposed 24 hours per day, 365 days per year (for a total of 43,180 hours over the modeled five-year period, as discussed previously).

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	Worker Receptor: For the worker receptor, dispersion factors were developed for each of the three shifts described previously in Sections 4.8 and 5.2 (8 am – 4 pm, 4 pm – 12 am, and 12 am – 8 am) to take account of which sources are operating during the specified shift period. Continuing with the example of the Plant 187 Source 2 which operates 5 days a week from 9 PM to 1 PM the following day, the periods of operation and non-operation were considered for each shift. For the 8 am – 4 pm shift, Plant 187 Source 2 was assumed to operate for 5 hours (8 am – 1 pm); for the 4 pm – to 12 am shift, the source was assumed to operate for 3 hours (9 pm – 12 am); and for the 12 am – 8 am shift, the source was assumed to operate for 8 hours (the whole shift); for a total of 16 hours of operation over all three shifts. For periods of non-operation, the emission rate was set to zero. As dispersion factors calculated by AERMOD are based on the entire 43,180 hour modeling period, the dispersion factor for each shift had to be adjusted as the worker populations are assumed to be exposed while they are at work, a total of 8 hours per day, 5 days per week for a total of 10,440 hours over that same modeling period. Therefore, for the worker population, the AERMOD-predicted dispersion factor was multiplied by a factor of 43,180 (hours) /10,440 (hours) to determine the average 8-hour air concentration over the five-year modeled period.
9. Figure 4.1 descriptions of modeled SCR 2, 4, and 5 emission point locations do not match model emission point descriptions.	This transcription error has been corrected in the revised Figure 4.1.
10. Table 4.1 grouping for plant 187 source emissions out Main roof A_B doesn't match grouping in "tblemissions" for S2 fugitives, S22, and S32001. Operating hours for S29 pour fugitive don't match hours in model input. Table 4.1 should include a column to map sources to the model source ID#.	Table 4.1 has been corrected so that the grouping for Plant 187 Main Roof A-B emissions match the groupings in "tblemissions" for S2 fugitives, S22 and S32001. Operating hours for Plant 703 S29 pour fugitives has been corrected in Table 4.1 and they match what was modeled. Four columns have been added to Table 4.1 to maps sources to the model source ID number (SRC#s).

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11. Some of the hours of operation for the source stack emissions don't match the hours of operation for the source fugitive emissions. Please review and correct.	Plant 187 Source 2 (Pour):

Plant	Source Description	Stack SCR#	Stack hours of operation	Fugitive SCR#	Fugitive hours of operation
187	Pour	2	22 through 13	12a, 13a (12, 13 for EAF)	20 through 13
703	Saws and Grinders	24	6 through 23	26, 27	1 through 24
1603	Cooling	20	1 through 24	34, 35, 36, 37, 38, 39	19 through 10

Additional model sources were added (SRC301-308) to account for fugitive emissions from the Plant 187 main roof vents from 9 pm to 1 pm the following day (rather than 7 pm to 1 pm the following day).

Plant 703 Sources 33-40 (Abrasive Cut-Off Saws and Grinders):

Model sources SRC 26, 27, 86, 87, 146, 147 206, and 207 were modified so they operate from 5 am to 11 pm rather than 24 hours per day and were remodeled.

Plant 703 (Note: BAAQMD mistakenly refers to Plant 1603, however SRC20 and SRC35-39 refer to Plant 703 sources) Source 30 (Cooling):

Based on the District-approved Emission Inventory Report dated February 15, 2007, primary emissions from this source (99.99% captured) are released 24 hours per day, 5 days per week. For the 0.01% that are fugitive through the six (6) Plant 703 Molding Room Roof Vents, ENVIRON grouped them with the shakeout emissions which operate 16 hours per day (from 6 PM to 10 am), 5 days per week. Though the primary and fugitive emissions have different release durations, we are conservatively assuming the fugitive emissions are released in a shorter duration (i.e., higher emission rates) at times with typically lower wind speeds (night).

Under the existing operation conditions scenario, at the MEIR-Manufacturing Zone, the total risk is 19 in a million. The risk from this source is 0.1195 in a million, with 0.1175 in a million from the primary source of emissions. Correspondingly the fugitive emissions represent 0.002 in a million at the MEIR- Manufacturing Zone. Under this scenario, the total chronic non-cancer HI for the central nervous system at the MEIR-Manufacturing Zone is 0.48. This source's contribution to the total chronic non-cancer HI for the central nervous system is 0.000067, of which 0.000064 from the primary emissions. Correspondingly the fugitive emissions represent less than 0.000003 of the total HI.

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	As the impacts of this source are insignificant with respect to the precision with which the overall results are reported (two significant digits), ENVIRON did not model the additional 48 sources that would have to be modeled (6 roof vents x 4 populations {resident and 3x worker} x 2 scenarios (current & future) to address this discrepancy. Additionally, the discrepancy results in a conservative (i.e., higher) assessment of impacts from this source and correcting it would only reduce the contribution from this source.
12. Plant 703: It does not appear that points SCR40 through SCR45 were used (access "tblemissions"). Please explain or correct.	SRC40 through SRC45 were not used in this analysis. During original model development they were assigned to category of emissions from the molding room roof vents (e.g., fugitive emissions from finishing sources). Those emissions actually exit through the finishing room roof vents (SRC26 & SRC27) and were modeled as such, obviating the need for SRC40 through SRC45.
13. The annual averaged monthly lead emission rate is higher than the maximum one-month lead emission rate. Please correct. For example, the annual averaged monthly lead emission rate for the P#1603 EAF fugitives from Table B.4.3 is: (12 lbs/yr) (yr/12mos.) = 1 lbs/mo The maximum one-month lead emission rate for the P#1603 EAF fugitives from Table C.7.1, Lead Emission Rates, is: (3 emission points) (3.96E-5 g/s/emission point) (lb/453.6g) (3600s/hr) (24hr/day) (30day/mo) = 0.68 lbs/mo	There was a transcription error on Table C.7.1, which has been corrected. Table C.7.1 now reflects the lead emission rates that were modeled. For example, the maximum one-month lead emission rate for the Plant 1603 Source 1-EAF fugitives from Table C.7.1 is: (3 emission points)*(1.21E-4 g/s/emission point)*(lb/453.6g) *(3600s/hr) *(24hr/day) *(30day/mo) = 2.1 lbs/month This reflects the emission rate that was modeled and for which results are presented in Section 6.6.

References:

Cal/EPA. 2003a. *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. August.