



TETRA TECH EM INC.

March 6, 2008

Mr. Nabil Al-Hadithy
City of Berkeley
Toxics Management Division
2118 Milvia Street
Berkeley CA 94704

SUBJECT – PACIFIC STEEL CASTING HEALTH RISK ASSESSMENT

Dear Mr. Al-Hadithy;

This letter is in response to your request last week to combine and summarize the information previously provided to you related the toxicity factors used in the Hot Spots and Reporting Program (HARP) as related to the Pacific Steel Casting Company (PSC) health risk assessment (HRA) (PSC 2007). This work was completed in addition to the numerous sets of comments, responding to comments and strategic consulting that Tetra Tech provided related to multiple drafts of the Emissions Inventory Report, the HRA workplan and the HRA in 2007.

Introduction\Background

In 2007, PSC released a HRA report for their Berkeley facility. The HRA was conducted in accordance with the Air Toxics “Hot Spots” Act (AB2588) to evaluate potential health impacts to nearby human receptors. The City of Berkeley (the “City”) has contracted Tetra Tech to conduct a peer review of the HRA. The peer review included an evaluation of the emission inventory, exposure assumptions, toxicity values, and analysis as well as a site visit to determine the adequacy of this HRA. A key function of Tetra Tech’s review was to assess the HRA in terms of human health risks above and beyond the limited risk scenarios prescribed for analysis by the Hot Spots Program. After reviewing the document, Tetra Tech identified a number of deficiencies in the PSC HRA. A number of the most critical deficiencies are listed by topic below:

1.0 Community Notification Levels

Community notification levels are thresholds above which facility operators must notify all exposed persons of the risk assessment results from air emissions from the facility. The report incorrectly assumes that if notification levels that were established by the Bay Area Air Quality Management District (BAAQMD) are not exceeded, no adverse effects are likely to occur. For instance, the report states that adverse noncancer health effects are not expected due to exposure to PSC emissions because the noncancer hazard indices (HI’s) are below the notification level of 10. However, an HI greater than 1 is typically considered to be above the target threshold and therefore the risk evaluation indicates that there may be some concern from noncancer impacts to potential receptors. Notification levels are determined by Air Quality Management Districts (AQMDs) and vary by AQMDs. For instance, notification is triggered if an HI is greater than 1

for an AQMD such as South Coast and San Joaquin AQMDs. In addition, it is our understanding from conversations with the BAAQMD that the notification level for noncancer effects is 1 and not 10 as stated in the report. Therefore, the reported HI's for off-site workers that exceed an HI of 1 may pose a potential concern from facility emissions and should be evaluated further.

2.0 Cumulative Impact of Emissions

Although AB2588 does not specifically require an evaluation of emissions from other sources besides the target facility, facility related mobile sources have a high potential to impact sensitive receptors from an inhalation pathway standpoint. Mobile sources have not been considered in this HRA. In addition, Berkeley Forge and Steel is located adjacent to the PSC facility. Emissions from the Berkeley Forge and Steel facility as well as mobile sources likely increase the cumulative risks to nearby receptors such as those at the Duck's Nest Day Care Center. These impacts are important to the City of Berkeley and its citizens and should be evaluated if the HRA is to be fully representative.

3.0 Toxicity Values

A table reporting toxicity values used for this risk assessment were not provided in the HRA. Reporting these values would provide the reader an understanding of which chemicals are most toxic and should be documented in the report. Although toxicity values were provided to Tetra Tech in January 2008, a table in the report is recommended. In addition, the current reference exposure level (REL) for manganese is 0.2 ug/m^3 and was used in this evaluation. In November 2007, a revised REL for manganese of 0.03 ug/m^3 was submitted by OEHHA for public review. The proposed REL would significantly increase the estimated impacts from manganese. Tetra Tech recognizes that this report was produced prior to the submission of the revised REL for public review; however, an evaluation using the revised REL may be appropriate for the revised report.

4.0 Emission Rates

Emission rates were developed for the HRA using a number of techniques include mass balance calculations, stack tests, and literature review. In reviewing emission rates used in the HRA, the following issues were identified:

Source Data – Source test data from 1989 was used in conjunction with data from 2005-2006. This is a cause for concern in terms of potential differences in raw materials, operations and chemistry that may have occurred during the 15 years that have elapsed. This could have led to significant changes in emissions chemistry.

Isopropyl Alcohol (IPA) Emissions – Scaling IPA emissions to phenol on a ratio of 2% to 2.5% seems unrealistic. IPA and phenol have significantly different percents volatile so the two would be expected to volatilize at different rates and percentages. This may have led to an underestimation of IPA emissions.

Baghouse Testing - Only one baghouse was tested for control efficiency. Although the material used in the other baghouses may be the same, it is unclear if the other baghouses

would have the same control efficiencies since mechanical configurations may be different resulting in a different control efficiency. Tetra Tech recommends that a larger sample size be tested to ensure accuracy for a HRA with such sensitivity to small differences in modeled concentrations.

PAH Methodology – The PAH Methodology is unusual. This method is based on ambient data and not source testing data and is not appropriate. A comparison of the calculated fractionation in the document with those listed in the Hazardous Waste Combustion Guidance indicates that the partitioning is significantly different. This may have led to an underestimation of PAH emissions.

5.0 Operating Schedule

The HRA assumed a consistent production schedule for the entire year. During the site visit, facility personnel indicated that operations were under a “winter schedule”. This indicates that operations are seasonal in nature and therefore emissions would vary from season to season. An evaluation with seasonal changes will impact the modeling and in turn impact the risk evaluation. For example, emissions during the Winter inversion season will presumably disperse more slowly leading to higher receptor concentrations. While it is unclear as to the ultimate impact seasonal differences would bring about, the HRA should address this at minimum on a conceptual level.

6.0 HARP-Factors

The HARP model is a program that assists in the evaluation of human health impacts in accordance with AB2588. HARP includes an air dispersion module to estimate air concentrations as well as a risk module that evaluates human health impacts. At the request of the BAAQMD, PSC used the AERMOD air dispersion model to estimate air concentrations in the vicinity of PSC. Since AERMOD is not part of the HARP program, PSC generated “HARP-Factors” that combined toxicity values and exposure parameters. These HARP-Factors were combined with the air modeling results to estimate risks. Although AERMOD is not integrated into the current version of HARP, the Air Resources Board (ARB) has provided a program to convert AERMOD files into text files that can be input into HARP (<http://www.arb.ca.gov/toxics/harp/downloads.htm>). Because PSC did not use this approach, their method may increase the possibility of transposition and other errors in the final HRA results.

7.0 Vegetable Ingestion

One exposure pathway evaluated in the HRA was ingestion of homegrown produce by nearby residents. Section 2.5.2 of the report indicates that homegrown produce is comprised of root and leafy vegetables. It is unclear if other vegetables such as exposed vegetables or protected vegetables were evaluated.

8.0 Evaluation of Other Sources of Toxicity Values

As described above, the HRA uses toxicity values obtained from HARP. These toxicity values are consistent with California Environmental Protection Agency (Cal EPA) Office of

Environmental Health Hazard Assessment (OEHHA) values. At the request of the City of Berkeley, Tetra Tech compared the OEHHA toxicity values for the inhalation pathway to other sources of toxicity values including the World Health Organization (WHO) and the United States Environmental Protection Agency (EPA). Chemicals evaluated include those identified as chemicals of concern by OEHHA staff (OEHHA 2007) and chemicals of concern identified by nearby ambient air monitoring results. Table 1 presents a comparison of both inhalation cancer unit risk factors and inhalation chronic RELs. Although cancer unit risk factors for most of the evaluated chemicals were more conservative for the OEHHA database than WHO or EPA values, chronic RELs were less conservative (less health-protective) than WHO or EPA values when WHO or EPA values were available.

TABLE 1

Compound	Inhalation Cancer Unit Risk Factor (unit risk per ug/m3)			Inhalation Chronic REL (ug/m3)		
	OEHHA	WHO	EPA	OEHHA	WHO	EPA
Acetaldehyde	2.7E-06	NA	2.2E-06	9.0E+00	NA	9.0E+00
Benzene	2.9E-05	6.0E-06	7.8E-06	6.0E+01	NA	3.0E+01
Formaldehyde	6.0E-06	NA	1.3E-05	3.0E+00	1.0E-01	NA
Hexavalent Chromium	1.5E-01	4.0E-02	1.0E-02	2.0E-01	NA	1.0E-01
Manganese	NA	NA	NA	2.0E-01	1.5E-01	5.0E-02
Nickel	2.6E-04	3.8E-04	2.4E-04	5.0E-02	NA	NA
Phenol	NA	NA	NA	2.0E+02	NA	NA
Toluene	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	3.5E+01	NA	NA

Notes:

Bold indicates most conservative value. For inhalation cancer unit risk factors, the larger value indicates a more conservative value. For inhalation chronic RELs, the smaller value indicates a more conservative value.

NA – Not available

OEHHA values provided by PSC

WHO values from Air Quality Guidelines for Europe (WHO 2000)

EPA values from Integrated Risk Information System (EPA 2008)

9.0 Conclusions

Based on a review of the PSC HRA, Tetra Tech identified a number of issues described in this letter that include the following:

- Use of community notification levels
- Lack of evaluation of cumulative impact of emissions
- Toxicity values used in the HRA
- Estimation of emission rates
- Variable operating schedule
- Use of HARP-Factors
- Uncertainty in vegetable ingestion pathway
- Comparison of toxicity values from other sources

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These issues, if addressed properly, would provide a better understanding of the impact of emissions from PSC on the community.

10.0 References

Office of Environmental Health Hazard Assessment (OEHHA) 2007. Letter Regarding Review of Risk Assessment for Pacific Steel. From James F. Collins, Staff Toxicologist, Air Risk Assessment Unit, OEHHA. To Scott Lutz, Manager, Toxics Evaluation Section, BAAQMD. December 14.

Pacific Steel Casting Company (PSC). 2007. Health Risk Assessment Report, Pacific Steel Casting Company, 1333 Second Street, Berkeley, California 94710. September 24.

U.S. Environmental Protection Agency (EPA) 2008. Integrated Risk Information System. Online Database. Office of Research and Development, National Center for Environmental Assessment. Available Online at: <http://www.epa.gov/iris>.

WHO 2000. Air Quality Guidelines for Europe. Second Edition.

We appreciate the opportunity to perform this analysis for you. Should you have any further questions or concerns please contact me at 415/222-8226.

Sincerely,



Bryan Chen
Senior Risk Assessor

Copy Chris Easter (Tetra Tech)