BAY AREA AIR QUALITY MANAGEMENT DISTRICT

# Revised Health Risk Screening Analysis
# Evaluation of Toxic Air Contaminant Impacts for California Environmental Quality Act (CEQA)

**for**

## Schnitzer Steel Products Company
## Modification of Shredder; Ship and Truck Traffic

**Facility Address:**
1101 Embarcadero West
Oakland, CA 94607

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**Toxics Evaluation Review Engineer:** Ted Hull

**Permit Application #016721**
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# Health Risk Assessment – Schnitzer Steel Products

## A. BACKGROUND

Schnitzer Steel Products (SSP) has requested an increase in steel throughput at the Shredder S-6 from 431,471 tons per year to 720,000 tons per year. Scrap metal is brought into the facility by trucks and shredded metal products are transferred from the facility by ship. The company states that the increased throughput will require an increase of as many as 10 ships per year and 70 trucks per day. This will bring the total number of ships to 26 per year and the total number of trucks to 175 per day. Ships and trucks are mobile sources and as such are not subject to District permitting or Regulation 2, Rule 5 "New Source Review of Toxic Air Contaminants". However, since material transport is an integral part of this facility's operations, its impacts on air quality must be considered as part of a permit evaluation for the facility in accordance with the requirements of the California Environmental Quality Act (CEQA).

In order to evaluate the impact of toxic air contaminant (TAC) emissions to people who live and work in the area of the proposed facility, the Toxics Evaluation Section of the BAAQMD has prepared a health risk screening analysis (HRSA) for the project. The project includes (TAC) emissions from the Shredder S-6 (up to its full modified capacity) and incremental diesel PM* emissions from ships and tugs associated with the additional transportation requirements.

* Diesel PM is used as a surrogate for all TACs found in the exhaust of combusted fuel oils.

## B. EMISSIONS SUMMARY

TAC emissions from the Shredder S-6 and from shipping and truck traffic are assumed to be average values in units of grams per second (based on estimated annual emissions for each source category). Emissions from the shredder occur from a fixed location (stack) and are modeled accordingly as a point source. Trucks and ships, being mobile sources, are modeled as area sources. It is assumed that their emissions are released uniformly over the areas defined by the local roadways and waterways used to access the facility, at a height consistent with the stack height of the truck or ship.

### Diesel Fueled Trucks

An emission factor of 0.21 g/mile was used to estimate diesel PM emissions from trucks. This factor is derived from CARB EMFAC2007 calculations for On-road Heavy Heavy-Duty Diesel Trucks (>33,000 lbs gross vehicle weight) assuming average operating conditions for the Bay Area. Because diesel PM emissions from trucks are expected to decline over time as a result of regulatory action and technological advances, the factor used in the HRSA is a weighted average of the estimated emissions for a 40 year period going forward. In addition to the transport emissions, it was determined that trucks idling at the facility would generate 22.8 lb/yr of diesel PM (assumes 22 minutes of idling per truck).

Incremental truck activity related to the project will result in up to 70 truck calls per day at the terminal. At 7 operating days per week, 52 weeks per year, the increased annual truck traffic will be 25,550 trucks per year. The domain for the analysis of the impact of truck traffic for this HRSA includes the traffic at the facility and the access roads to the freeway. Trucks are assumed to exit US 880, travel south on Martin Luther King Jr. Way, turn west onto Embarcadero West, enter the facility at 1101 Embarcadero West, pull past and back up to the unloading/loading area, the follow the same route back to the freeway. Due to the number of potential routes onto and off of the freeway, the modeling only goes as far as the intersection of Martin Luther King Jr. Way and US 880.

Truck routes were modeled as a series of connected area sources shaped to fit the roadways described above. Idling emissions were added to the area source emissions for those sections of roadway on SSP property. The emissions release height for all trucks was assumed to be 3 meters. A summary of area source characteristics and emission values is attached (see spreadsheet Table III).

**Ships and Tugs**
The California Air Resources Board (CARB) recommends an emission PM emission factor of 1.5 grams per kilowatt hour (g/kW-hr) for cargo ships burning heavy fuel oil with a sulfur content of 2.5% (Ref. "A Critical Review of Ocean-Going Vessel Particulate Emission Factors", CARB 11/9/07). This factor will be applied to the cargo ships servicing Schnitzer. Tug PM emissions factors were provided by the operator and are approved by the BAAQMD. PM emissions from shipping are based on the following scenario:

(10) cargo ships per year will make deliveries to the facility. (2) Tugs will meet each cargo carrier at the south side of the Bay Bridge and escort it along the shipping channel and Inner Harbor to the (SSP) berth. The tugs then return to their home berth (Berth 8) and the ship "hotels" at SSP for approximately 4 days during loading. When the loaded ship is ready to depart, the tugs return and escort the ship back to the Bay Bridge. During shipping operations, cargo carriers and tugs operate at number of different engine power levels depending on the operating mode. A summary of the shipping emissions used in the HRSA is given below in Table 1 below.

**Table 1: Summary of Shipping Emissions**

| Ship Type | Operating Mode | Engine Type | Engine Power (kW) | Load Factor | Op. Time per trip (hours) | Diesel PM E-Factor (g/kW-hr) | Diesel PM per trip (lb) | Total Trips per year | Diesel PM Emissions (lb/yr) |
|---|---|---|---|---|---|---|---|---|---|
| Cargo Carrier | Transit, Leg 3 | Main | 7,308 | 31% | 0.17 | 1.5 | 1.3 | 20 | 25.5 |
| | | Aux | 1,836 | 27% | 0.17 | 1.5 | 0.3 | 20 | 5.6 |
| | Maneuvering, Leg 4 | Main | 7,308 | 6% | 0.67 | 1.5 | 1.0 | 20 | 19.4 |
| | | Aux | 1,836 | 45% | 0.67 | 1.5 | 1.8 | 20 | 36.6 |
| | Hotelling SSP: | Aux | 1,836 | 22% | 96 | 1.5 | 128.2 | 10 | 1,282.3 |
| Tug | Berth to BB | Main | 3,728 | 10% | 0.50 | 0.67 | 0.3 | 20 | 5.5 |
| | Escort In, Leg 3 | Main | 3,728 | 30% | 0.17 | 0.67 | 0.3 | 20 | 5.6 |
| | Escort In, Leg 4 | Main | 3,728 | 30% | 0.67 | 0.67 | 1.1 | 20 | 22.1 |
| | Return Trips | Main | 3,728 | 10% | 1.50 | 0.67 | 0.8 | 20 | 16.5 |
| | Escort Out, Leg 4 | Main | 3,728 | 80% | 0.67 | 0.67 | 3.0 | 20 | 59.0 |
| | Escort Out, Leg 3 | Main | 3,728 | 80% | 0.17 | 0.67 | 0.7 | 20 | 15.0 |
| | Final Return | Main | 3,728 | 10% | 0.50 | 0.67 | 0.3 | 20 | 5.5 |
| | Auxillary Engine Use | Aux | 83 | 31% | 4.18 | 0.95 | 0.2 | 20 | 4.5 |

Like the truck routes, shipping lanes were modeled as a series of connected area sources from the Bay Bridge to the SSP berth, with each segment approximating the size of a "Panamax" class cargo carrier. For the main route, both cargo carriers and tugs use the same shipping lanes, but have separate emissions values and pollutant release heights. Tugs follow separate routes when leaving from and returning to home (Berth 8). These “tug only” trips were also modeled in a similar fashion.

## C. DISPERSION MODELING

The ISCST3 air dispersion computer model was used to estimate average ambient air concentrations. The model was run with Alameda (ANA) meteorological data for one representative year (1989). Model runs were made with Rural land use dispersion coefficients because most emissions occur over the water, which does not fit the profile for “Urban” land use.

TAC emissions entered into the model were adjusted for toxicity and assumed exposure levels, to derive a risk based emission factor adjustment for each receptor category (see spreadsheet Tables III through X). Using this approach, the model calculates increased Cancer Risk (in terms of chances in a million) and Chronic Hazard Index directly. Emissions scalars were applied to all trucking and shipping sources (except cargo ship hotelling) in the model to account for an assumed daytime operational schedule of 6am to 6pm.

Project risk was determined for each of the following categories: (1) Residential Cancer Risk, (2) Residential Chronic Hazard Index, (3) Off-site Worker Cancer Risk, and (4) Off-site Worker Chronic Hazard Index. In addition, the risks for trucking and shipping were calculated separately for informational purposes.

## D. HEALTH RISK ASSESSMENT

The maximum health risks were estimated using guideline procedures adopted for use in the Air Toxics Hot Spots Program. The general approach involves using air emission estimates and dispersion modeling to estimate maximum ambient air concentrations of toxic air contaminants, and then using these concentrations to estimate an individual’s maximum exposure and health risk based on toxicity values adopted by the Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA).

Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 245 day per year, for 40 years. The estimated health risks for this project are presented in the Table 2 below.

**Table 2: Maximum Incremental Health Risk**

| Receptor | Health Risk | Trucks | Ships/Tugs | Project |
|---|---|---|---|---|
| Residential | Max. Cancer risk (in a million) | 1.2 | 5.2 | 5.9 |
| | Max. Chronic Hazard Index | 0.0008 | 0.003 | 0.011 |
| Worker | Max. Cancer risk (in a million) | 2.7 | 3.6 | 4.5 |
| | Max. Chronic Hazard Index | 0.002 | 0.003 | 0.027 |

**Note:** Reported risk values are at the highest receptor in each category and different receptors are reflected between categories. Therefore, there is no direct relationship between the 3 categories. The “project risk” represents the total risk values.

## E. SUMMARY OF FINDINGS

The HRSA estimates that the highest increased cancer risk to any individual receptor is **5.9 in a million** and the highest non-cancer chronic hazard index is **0.027**. In the BAAQMD, a significant air quality impact with respect to emissions of toxic air contaminants is an increased cancer risk above 10.0 in a million or a non-cancer chronic hazard index above 1.0. Since the health risk impacts associated with this project are below these levels they are not considered to be significant for the purpose of CEQA review or public notification under the Air Toxics Hot Spots Program.

By: _Signed by Ted Hull ___

Ted Hull

Senior Air Quality Engineer