

**REVIEW OF NATIONAL STEEL AND SHIPBUILDING COMPANY (NASSCO)  
AB2588 HEALTH RISK ASSESSMENT (HRA)**

October 05, 2020

Emissions Inventory Facility ID: 19

Toxics Emissions Inventory Year: 2013

Review Conducted by: Michael Kehetian, SDAPCD

A Health Risk Assessment (HRA) was performed for National Steel and Shipbuilding Company (NASSCO), 28<sup>th</sup> Street and Harbor Drive, San Diego, CA 92113 by Kleinfelder and submitted to the District for review on December 28, 2016, and subsequently revised and updated on August 11, 2017, based on the 2013 Emissions Inventory that was revised and approved on June 13, 2017.

A further revision to the HRA, dated and received by the District on January 30, 2018, was evaluated using Perkins Elementary School (2010-2012) AERMET Version 16216 u\* (Ustar adjusted) meteorology data for low wind speed stable conditions. The results and conclusions of the District's review of this most recent Revised Submittal HRA are presented below.

**Summary of Risk Assessment Results**

Cancer Point of Maximum Impact (PMI)	68 in one million
Cancer Maximum Exposed Individual Resident (MEIR)	53 in one million
Cancer Maximum Exposed Individual Worker (MEIW)	5.6 in one million
Chronic Noncancer Health Hazard Index (PMI)	0.40
Chronic Noncancer Health Hazard Index (MEIR)	0.26
Chronic Noncancer Health Hazard Index (MEIW)	0.56
8-Hour Noncancer Health Hazard Index (MEIW)	0.04
Acute Noncancer Health Hazard Index (PMI)	1.9
Acute Noncancer Health Hazard Index (MEIR)	0.44
Acute Noncancer Health Hazard Index (MEIW)	0.60
Population Excess Cancer Burden	0.81

The maximum sub-chronic 30-day lead concentration at the Maximum Offsite Concentration (MOC) is 0.01 ug/m<sup>3</sup> which is below the Air Resources Board (ARB) High Exposure Scenario approval level of 0.12 ug/m<sup>3</sup>.

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**Summary of Health Impacts by Pollutant**

Cancer risk at the MEIR is due primarily to diesel exhaust particulate matter (~68%) and hexavalent chromium (~21%).

The Chronic Health Hazard Index (HHI) to the Respiratory System at the MEIW is due primarily to arsenic (~60%) and nickel (~38%).

The 8-Hour HHI is due to manganese (92%) and arsenic (8%).

The Acute HHI is due to nickel's (100%) impact to the immune system.

The submitted HRA concludes that cancer risk levels impact receptors subject to public notification according to District Rule 1210. The District concurs with this conclusion. Appropriately, risk contours were included where offsite cancer risk exceeds 10 in one million.

**Emission Sources**

Welding  
Adhesive Use  
Painting and Coating Operations  
Abrasive Blasting  
Metal Cutting Operations  
Combustion of Natural Gas in Boilers  
Combustion of Diesel in IC Engines (small engines and cranes)  
Solvent Use

**Air Dispersion Modeling**

AERMOD (Version 16216r) and AERMET (Version 16216) preprocessed 2010-2012 Ustar-adjusted surface and profile meteorological data for Perkins Elementary and urban dispersion coefficients were modelled.

**Source Release Parameters**

Volume sources are modelled as adjacent 25 meter x 25 meter cubes to not overstate the size and fugitive dispersion impacts in the model.

For each volume source emissions group, emissions are evenly distributed among the number of volume sources representing the source group.

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Majority of Volume Sources Modelled for Welding/Abrasive Blasting/Coatings:

<b>Volume Source Emissions Groups</b>	<b>Release Height (m)</b>	<b>Initial Horizontal Dimension (m)</b>	<b>Initial Vertical Dimension (m)</b>
Births/Dry Dock	10/2 = 5	25 / 4.3 = 5.81	10 / 2.15 = 4.65
Building Dock Welding/Blasting	2/1=1	5.81	0.93

Refer to Table 2-3 of the HRA submittal for the Volume Source Release Parameters and Appendix B for emission rates.

**Emission Rate Scalars**

Annual emissions were scaled based on the daily activity of NASSCO operations.

- First Shift (7 am to 4 pm).
- Second Shift (4 pm to 12 pm).
- Third Shift (12 am to 7 am).

For welding, the maximum hourly emissions were scaled by the percentage of welding that occurred in the shift. The hourly scalars for each shift for most welding operations are as follows:

- Shift 1 Hourly Factor – 1.0.
- Shift 2 Hourly Factor – 30% / 65% = 0.46.
- Shift 3 Hourly Factor – 5% / 65% = 0.08.

For all other operations except welding, maximum hourly emissions were only scaled for those shifts that had no activity and then the HROFDY value would be a zero for that shift, otherwise the HROFDY value was one.

Inconel welding occurred 95% during the first shift, 5% during the second shift, and 0% during the third shift. The hourly scalars for Inconel welding are as follows:

- Shift 1 Hourly Factor – 1.0.
- Shift 2 Hourly Factor – 5% / 95% = 0.05.
- Shift 3 Hourly Factor – 0.0.

Refer to Table 2-4 of the HRA submittal for the Hour of Day (HROFDY) scaled emission rate activity for the source hours of operation.

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**Cancer Risk Calculations**

HARP, Version 17023 was used to calculate risk along with the appropriate health data, independently verified by the District.

Cancer risk at the Maximum Exposed Individual Resident (MEIR) is due to diesel exhaust particulate matter (68%), hexavalent chromium (21%), ethyl benzene (6%), nickel (3%), and arsenic (2%).

Source contribution (90% of Total Resident Cancer Risk) at the MEIR

SRC GROUP	Source Description	Risk	Source Contribution %
GC11	Gantry Crane 11	8.58E-06	14.7
PE11	Portable Compressor	2.88E-06	4.9
PE10	Portable Compressor	2.30E-06	4.0
PE9	Portable Compressor	2.24E-06	3.8
PE8	Portable Compressor	2.19E-06	3.8
PD6	Portable Diesel	2.17E-06	3.7
PD6	Portable Diesel	2.17E-06	3.7
PE7	Portable Compressor	2.16E-06	3.7
PE6	Portable Compressor	1.76E-06	3.0
GC15	Gantry Crane 15	1.44E-06	2.5
PE3	Portable Compressor	1.32E-06	2.3
PE5	Portable Compressor	1.32E-06	2.3
PD5	Portable Diesel	1.28E-06	2.2
PD5	Portable Diesel	1.28E-06	2.2
PE4	Portable Compressor	1.11E-06	1.9
PE2	Portable Compressor	9.48E-07	1.6
GC10	Gantry Crane 10	9.10E-07	1.6
GC16	Gantry Crane 16	8.47E-07	1.5
PD4	Portable Diesel	8.30E-07	1.4
PD4	Portable Diesel	8.30E-07	1.4
PD2	Portable Diesel	6.68E-07	1.1
PD2	Portable Diesel	6.68E-07	1.1
V2L	Floating Dry Dock Welding	6.33E-07	1.1
V2J	Floating Dry Dock Welding	5.98E-07	1.0
V2K	Floating Dry Dock Welding	5.81E-07	1.0
V2H	Floating Dry Dock Welding	5.64E-07	1.0
V2I	Floating Dry Dock Welding	5.54E-07	0.9
V2G	Floating Dry Dock Welding	5.26E-07	0.9
V2F	Floating Dry Dock Welding	4.99E-07	0.9
V2D	Floating Dry Dock Welding	4.73E-07	0.8
V2E	Floating Dry Dock Welding	4.67E-07	0.8
V2B	Floating Dry Dock Welding	4.47E-07	0.8
V2C	Floating Dry Dock Welding	4.45E-07	0.8

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SRC GROUP	Source Description	Risk	Source Contribution %
V2A	Floating Dry Dock Welding	4.24E-07	0.7
PD3	Portable Diesel	4.06E-07	0.7
PD3	Portable Diesel	4.06E-07	0.7
GC12	Gantry Crane 12	3.23E-07	0.6
V1F	Metal Cutting Area	2.39E-07	0.4
V1E	Metal Cutting Area	1.95E-07	0.3
V1D	Metal Cutting Area	1.61E-07	0.3
V16A	Tables 1 and 2 Welding	1.57E-07	0.3
PE1	Portable Compressor	1.57E-07	0.3
V2L1	Floating Dry Dock Coating	1.55E-07	0.3
V2J1	Floating Dry Dock Coating	1.47E-07	0.3
V16B	Tables 1 and 2 Welding	1.45E-07	0.2
V2K1	Floating Dry Dock Coating	1.42E-07	0.2
V2H1	Floating Dry Dock Coating	1.38E-07	0.2
V3O	Sub Assembly Area Welding	1.38E-07	0.2
V2I1	Floating Dry Dock Coating	1.36E-07	0.2
V1C	Metal Cutting Area	1.35E-07	0.2
GC8	Gantry Crane 8	1.34E-07	0.2
V16C	Tables 1 and 2 Welding	1.29E-07	0.2
V16H	Tables 1 and 2 Welding	1.29E-07	0.2
V2G1	Floating Dry Dock Welding	1.29E-07	0.2
V8E	Berths 3 and 4 Welding	1.24E-07	0.2
V12E2	Pipe Shop Welding	1.24E-07	0.2
V2F1	Floating Dry Dock Coating	1.23E-07	0.2
V8F	Berths 3 and 4 Welding	1.19E-07	0.2
V3N	Sub Assembly Area Welding	1.18E-07	0.2
V16I	Tables 1 and 2 Welding	1.18E-07	0.2
V8C	Berths 3 and 4 Welding	1.18E-07	0.2
V12A2	Pipe Shop Welding	1.17E-07	0.2
V12F2	Pipe Shop Welding	1.17E-07	0.2
V2D1	Floating Dry Dock Coating	1.16E-07	0.2
V1B	Metal Cutting Area	1.15E-07	0.2
V2E1	Floating Dry Dock Coating	1.14E-07	0.2
V8D	Berths 3 and 4 Welding	1.14E-07	0.2
V8A	Berths 3 and 4 Welding	1.13E-07	0.2
V16D	Tables 1 and 2 Welding	1.12E-07	0.2
V3R	Sub Assembly Area Welding	1.12E-07	0.2
V12B2	Pipe Shop Welding	1.11E-07	0.2
V12G2	Pipe Shop Welding	1.11E-07	0.2
V2B1	Floating Dry Dock Coating	1.10E-07	0.2
V2C1	Floating Dry Dock Coating	1.09E-07	0.2
V8B	Berths 3 and 4 Welding	1.09E-07	0.2
V12C2	Pipe Shop Welding	1.06E-07	0.2
V16J	Tables 1 and 2 Welding	1.05E-07	0.2

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Residential cancer risks were calculated using the ARB Risk Management Policy (RMP) daily breathing rates (DBR) for inhalation-based residential cancer risk. For the 30-year exposure duration, use the 95th percentile DBR for age groups less than 2 years old (3<sup>rd</sup> trimester through age 2) and the 80th DBR for age groups greater than 2 years old. Reference the ARB/CAPCOA Risk Management Guidance Document, July 2015.

Cancer risk and the chronic HHI included the minimum oral exposure pathways (dermal contact, soil ingestion, and mother's milk for cancer residential exposure) referencing the OEHHA Guidance Manual, Criteria for Exposure Pathway Evaluation, Section 5.2, February 2015.

In accordance with the OEHHA Guidance Manual, Estimation of Concentrations in Air, Soil, and Water, Section 5.3, the OEHHA default deposition rate of 0.05 meters per second for uncontrolled particulate matter was used for the noninhalation exposure pathways.

There is a school within the one in one million cancer risk isopleth, so the 3<sup>rd</sup> trimester to age 16 frequency of time at home (FAH) was not applied. The FAH from age 16 to 70 was applied.

**District Conclusions:**

The District concurs with the air dispersion modeling procedures, including source release parameters, and risk assessment results of the most recent revised Submittal HRA.