Appendix A

Record of Non-Applicability (RONA) & Air Emissions Calculations

Record of Non-Applicability
For Clean Air Act
Conformity San Diego
County

The Proposed Action, falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State of Federal Implementation Plans; Final Rule* on November 30, 1990 (58 Federal Register [FR] 63214; 40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). The U.S. Department of the Navy (Navy) published Navy Guidance for Compliance with the Clean Air Act (CAA) General Conformity Rule (30 July 2013), as referenced in Chief of Naval Operations Instruction 5090.1E, *Environmental Readiness Program Manual* dated 3 September 2019. These publications provide implementing guidance to document CAA Conformity Determination requirements.

Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the federal agency to determine whether a federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Section 51.850[a]).

The General Conformity Rule applies to federal actions proposed within areas that are designated as either *nonattainment* or *maintenance* for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants. Emissions of criteria pollutants within an area that is designated as *attainment* are exempt from general conformity analyses.

Federal actions within *nonattainment* or *maintenance* areas may be exempt from conformity determinations if their emissions of criteria pollutants do not exceed designated *de minimis* thresholds for the criteria pollutants (40 CFR Section 51.853[b]). The San Diego Air Basin has been determined by USEPA a severe nonattainment area for 8-hour O3 under the 2008 and 2015 standards. San Diego County is classified by USEPA as in attainment/unclassified for all other criteria pollutants. The applicable *de minimis* thresholds for San Diego Air Basin are listed in Table 1.

Table 1 - *de minimis* Levels for Criteria Pollutants in the San Diego Air Basin

Criteria Pollutants	*de minimis Thresholds (tons per year [tpy])*
Volatile Organic Compounds (VOC)	25
Oxides of Nitrogen (NO_x)	25

Note: VOC and NO_x emissions are used to represent O_3 generation because they are precursors of O_3.

PROPOSED ACTION

Action Proponent: Naval Facilities Engineering Command Southwest, Naval Base San Diego (NBSD)

Title of Proposed Action: NBSD Mole Pier South Berth Floating Dry Dock

Project Location: NBSD Mole Pier South Berth

Proposed Action and Emissions Summary: The Navy is proposing emplacement and operation of a floating dry dock, including all required dredging and sediment disposal as well as all required demolition and construction activities, necessary to support the forecasted surface ship dry docking at NBSD as identified by the Commander of the U.S. Pacific Fleet (CPF). The emplacement and operation of dry dock space is necessary to ensure NBSD's capability to conduct berth-side complex repair and maintenance of Navy vessels.

The Navy's Proposed Action is the emplacement of a floating dry dock at the South Berth of the Mole Pier.

Air Emissions Summary: The proposed emplacement and operation of a floating dry dock would result in air emissions from dredging, sediment disposal, in-water and landside construction, transit, and ship maintenance operations. It was determined that dredge material disposal would occur both at an approved upland disposal site, and at an ocean disposal site (ODMDS LA-5) on the basis of sampling and laboratory test results and pursuant to the U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) Green Book (1991) and Inland Testing Manual (1998). Further, it was determined that the project sediment characterization and chemistry results did not meet allowable parameters for beneficial reuse.

Annual operations emission estimates were developed for both the FDD transit operations and a typical annual operations year. The emission calculation methodology was developed using the San Diego Air Pollution Control District Air Emissions Inventory Procedures, the US EPA Ports Emissions Inventory Guidance, and the Port of Long Beach Annual Air Emissions Inventory (San Pedro Bay Ports Emissions Inventory Methodology Report). For purposes of General Conformity, the worst-case potential estimated annual emissions includes one year of estimated ship maintenance operations and usage combined with transit emissions within 3 nautical miles of San Diego.

The results of the air emissions modeling for all elements of the Mole Pier South Berth Floating Dry Dock project are shown in Table 2.

Table 2- Project Emissions and Comparison to de minimis Thresholds

Construction Year	***Emissions (tpy)***					
	CO	***VOC***	***NO_x***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Ocean Disposal (90K CY)						
2024	1.69	0.28	2.44	0.11	0.20	0.19
de minimis Threshold/Major Source Threshold	100	25	25	100	100	100
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
Upland Disposal (20K CY)						
2024	7.41	0.78	8.63	0.11	0.56	0.55
de minimis Threshold/Major Source Threshold	100	25	25	100	100	100
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Demolition, Construction, Dredge and Combined Ocean & Upland Disposal* (110K CY)						
2024	2.73	0.37	3.56	0.11	0.26	0.26
de minimis Threshold/Major Source Threshold	100	25	25	100	100	100
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**
***Annual Operations Within 3 Nautical Miles of Shore** *						
2025-Future	1.7	5.8	8.4	2.6	14.0	13.9
de minimis Threshold/Major Source Threshold	100	25	25	100	100	100
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

* Emissions associated with annual operations conservatively include 12 months of FDD operations as well as transit and unloading operations associated with the delivery of the FDD which could occur within the first year of operations.

Based on the air quality analysis summarized in Table 2, the maximum estimated emissions would be below the conformity *de minimis* levels.

Date RONA Prepared:

EMISSIONS EVALUATION AND CONCLUSION

The Proposed Action would involve minor construction and operational emissions; all emissions are *de minimis*.

The Navy concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the proposed action. The emissions modeling data supporting the conclusion shown in Tables 2, is included in the attachment to the RONA. Therefore, the Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate and I concur with the finding that the Proposed Action is not subject to the General Conformity Rule.

(Intentionally left unsigned in draft EA)

Date

United States Navy

P508 Mole Pier Floating Dry Dock
Annual Emissions Summary
June 2023

Emissions Summary

Emission Process	Annual Emissions (tons/year)						Annual Emissions (metric tons/year)		
	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Maritime Transit (Mobile, Alabama to San Diego, California)	59.3	1525.1	141.6	1119.9	150.9	120.6	58974	1.1	2.9
Maritime Transit (Greater than 12nm of San Diego, California)	59.0	1517.8	141.1	1115.7	150.3	120.2	58754	1.1	2.9
Maritime Transit (Between 0nm and 12nm of San Diego, California)	0.2	7.3	0.6	4.2	0.6	0.5	220.4	0.004	0.01
Maritime Transit (Between 0nm and 3nm of San Diego, California)	0.1	4.4	0.3	2.6	0.3	0.3	134.9	0.003	0.01
Worker Commute	0.01	0.02	0.3	0.001	0.01	0.00	83.6	0.001	0.002
Welding	--	--	--	--	0.6	0.6	--	--	--
Blasting Operations	--	--	--	--	9.7	9.7	--	--	--
Solvent Operations	0.1	--	--	--	--	--	--	--	--
Marine Coating Application Operations	5.1	--	--	--	3.1	3.1	--	--	--
Adhesive Application Operations	0.0	--	--	--	--	--	--	--	--
PERP Equipment	0.4	3.9	0.8	0.001	0.3	0.3	129.6	0.005	0.008
Stationary Diesel Emergency Generator	0.01	0.02	0.2	0.000001	0.001	0.001	26.1	0.000001	0.000000

General Conformity Threshold Comparision

Emission Process	Annual Emissions (tons/year)								
	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Project Emissions within 3nm of San Diego, California [a, b]	**5.8**	**8.4**	**1.7**	**2.6**	**14.0**	**13.9**	**374.2**	**0.0**	**0.0**
General Conformity Threshold	**25**	**25**	**100**	**100**	**100**	**100**	**--**	**--**	**--**
Exceeds General Conformity Threshold	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

[a] General Conformity thresholds are compared to the scope of emissions within 3nm of San Diego, California. This analysis conservatively includes the emissions from evaluated sources except emergency generators which would be permitted with the San Diego Air Pollution Control District.

[b] Subtotals may not add up due to rounding

Additional Emissions Summary for Purposes of NEPA

Emission Process [a]	Annual Emissions (tons/year)								
	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Project Total Including Maritime Transit from Mobile, Alabama to 0nm from San Diego, California	**65**	**1,536**	**144**	**1,124**	**165**	**135**	**59,434**	**1**	**3**
Project Emissions within 12nm of San Diego, California	**6**	**11**	**2**	**4**	**14**	**14**	**460**	**0.01**	**0.02**

[a] Subtotals may not add up due to rounding

nm = nautical mile

VOC = volatile organic ocompound(s)

NOx = oxides of nitrogen

CO = carbon monoxide

SO_2 = sulfur dioxide

PM_{10} = Particulate matter less than 10 micrometers in diameter

$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter

CO_2 = carbon dioxide

CH_4 = methane

N_2O = nitrous oxide

United States Navy
P508 Mole Pier Floating Dry Dock
Maritime Vessel Emission Calculations
June 2023

Heavy Lift Vessel Operations Data

Trip Portion	Trip Length One Way (nm) [a]	Average Speed (knots) [b]	Hotel/Idle Period Per One Way (hours)	Loading/Unloading Operations (hours) [c]
Mobile AL to 0nm within San Diego, CA	14,700	10	8	10
Within 12 NM of San Diego (including operations within 3 NM)	12	10	8	10
Within 3 NM of San Diego [d]	3	5	8	10

[a] One way trip length from Mobile, Alabama to San Diego is 14,000 nauitcal miles with no stops. An additional 5% has been added to this trip length to account for fuel/supply stops.
[b] Data developed by estimates provided by U.S. Navy for a similar vessel
[c] Loading and unloading operations assume 6 hours for unloading and 4 hours for ballasting.
[d] The heavy lift vessel is assumed to move at a slower speed than routine transit within 3nm of San Diego of 5 knots.
nm = nautical mile

Heavy Lift Vessel Propulsion Engine Data

Propulsion Engine Power (MW) [a]	Propulsion Engine Power (horsepower)	Transit Propulsion Engine Load Factor	Transit Propulsion Engine Low Load Adjustment Factor	Hotel/Idle Propulsion Engine Load Factor [b]	Hotel/Idle Propulsion Engine Low Load Adjustment Factor [b]
26.1	35,001	1	N/A	0.2	1.0

[a] Data developed by estimates provided by U.S. Navy for a similar vessel
[b] Load emission factors are based upon 20% engine load, which applies to all pollutants as per EPA *Ports Emissions Inventory Guidance* and calculation methodology for ocean going vessels of *Installed Power(kW)*Load Factor(%)*Activity(h)*Emission Factor(g/kW-hr)*Low-Load Ajustment Factor* .
MW= megawatt(s)
gal/hr = gallon(s) per hour

Heavy Lift Vessel Auxiliary Engine Data

Auxiliary Engine Power (MW) [a]	Auxiliary Engine Power (horsepower) [a]	Transit Auxiliary Engine Load Factor	Transit Auxiliary Engine Activity	Transit Auxilary Engine Low Load Adjustment Factor	Hotel/Idle Auxiliary Engine Load Factor	Hotel/Idle Auxilary Engine Low Load Adjustment Factor
6	8,046	1	1	N/A	1	N/A

[a] Auxiliary engine power based upon 4 CAT3512C ATAAC, each rated at 1,500 kW.
MW= megawatt(s)

10,000 Horsepower Tug Vessel Data

Trip Portion	Count [a]	Propulsion Engine Size (hp) [a]	Auxiliary Engine Size (hp) [b]	Hours of Operation Per Day	Days of Operation for Project	Propulsion Engine Load Adjustment Factor [c]	Auxiliary Engine Load Adjustment Factor [c]	Propulsion Engine Load Activity Factor [d]	Auxiliary Engine Load Activity Factor [d]	Propulsion Engine Low Load Adjustment Factor [e]	Auxiliary Engine Low Load Adjustment Factor [e]
Mobile AL to 0nm within San Diego, CA	1	10,000	306	8	2	0.50	0.43	1.0	1.0	N/A	N/A
Within 12 NM of San Diego (including operations within 3 NM)	1	10,000	306	8	2	0.50	0.43	1.0	1.0	N/A	N/A
Within 3 NM of San Diego d	1	10,000	306	8	2	0.50	0.43	1.0	1.0	N/A	N/A

[a] Data developed by estimates provided by U.S. Navy for a similar vessel
[b] Data obtained from Port of Long Beach 2021 Air Emission Inventory Table 3.4 for ATB Tug average auxiliary engine.
[c] Load factor obtained from EPA *Ports Emissions Inventory Guidance* Table 4.4.
[d] Activity factor assumed to be 1.0 in lack of site specific data.
[e] Low load adjustment factors not applicable as the propulsion engine will be greater than 20% load and the adjustment factor is not applicable to auxiliary engines
hp = horsepower

6,000 Horsepower Tug Vessel Data

Trip Portion	Count [a]	Propulsion Engine Size (hp) [a]	Auxiliary Engine Size (hp) [b]	Hours of Operation Per Day	Days of Operation for Project	Propulsion Engine Load Adjustment Factor [c]	Auxiliary Engine Load Adjustment Factor [c]	Propulsion Engine Load Activity Factor [d]	Auxiliary Engine Load Activity Factor [d]	Propulsion Engine Low Load Adjustment Factor [e]	Auxiliary Engine Low Load Adjustment Factor [e]
Mobile AL to San Diego, CA	4	6,000	306	8	2	0.50	0.43	1.0	1.0	N/A	N/A
Within 12 NM of San Diego (including operations within 3 NM)	4	6,000	306	8	2	0.50	0.43	1.0	1.0	N/A	N/A
Within 3 NM of San Diego	4	6,000	306	8	2	0.50	0.43	1.0	1.0	N/A	N/A

[a] Data developed by estimates provided by U.S. Navy for a similar vessel
[b] Data obtained from Port of Long Beach 2021 Air Emission Inventory Table 3.4 for ATB Tug average auxiliary engine.
[c] Load factor obtained from EPA *Ports Emissions Inventory Guidance* Table 4.4.
[d] Activity factor assumed to be 1.0 in lack of site specific data.
[e] Low load adjustment factors not applicable as the propulsion engine will be greater than 20% load and the adjustment factor is not applicable to auxiliary engines
hp = horsepower

Maritime Vessel Emission Factors

Vessel and Engine Type	VOC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Heavy Lift Vessel									
Main Engine (g/kW-hr) [a]	0.6	14.4	1.4	10.293	1.404	1.123	607	0.012	0.031
Auxiliary Engine (g/kW-hr) [b]	0.4	14.7	1.1	11.98	1.54	1.23	707	0.008	0.031
10,000 Horsepower Tug									
Main Engine (g/kW-hr) [c]	0.6	18.1	1.4	10.293	1.404	1.123	607	0.012	0.031
Auxiliary Engine (g/kW-hr) [b]	0.4	14.7	1.1	11.98	1.54	1.23	707	0.008	0.031
6,000 Horsepower Tug									
Main Engine (g/kW-hr) [c]	0.6	18.1	1.4	10.293	1.404	1.123	607	0.012	0.031
Auxiliary Engine (g/kW-hr) [b]	0.4	14.7	1.1	11.98	1.54	1.23	707	0.008	0.031

[a] Data obtained from EPA *Ports Emissions Inventory Guidance* (NOx from Table 3.5 for Tier II SDD, VOC and CO from Table 3.8 for SSD), San Pedro Bay Ports Inventory Tables 2.3 and 2.4 (SO_2, PM_{10}, $PM_{2.5}$, CO_2, N_2O, and CH_4).
[b] Data obtained from San Pedro Bay Ports Inventory Methodology Table 2.9 and 2.10 for 2.7% sulfur HFO Tier 0 medium speed auxiliary engines
[c] Data obtained from San Pedro Bay Ports Inventory Methodology Tables 2.3 and 2.4 for 2.7% sulfur HFO Tier 0 slow speed propulsion engines
lbs/gal = pound(s) per gallon
VOC = volatile organic ocompound(s)
NOx = oxides of nitrogen
CO = carbon monoxide
SO_2 = sulfur dioxide
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
CO_2 = carbon dioxide
CH_4 = methane
N_2O = nitrous oxide

Data Conversion

pounds per gallon of heavy fuel oil	8.42
grams per pound	453.6
pounds per kilogram	2.2
gallons per tonne of heavy fuel oil	261.8

United States Navy
P508 Mole Pier Floating Dry Dock
Maritime Vessel Emission Calculations
June 2023

Maritime Vessel Emissions(tons/year)

Vessel and Engine Type	VOC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
From Mobile, Alabama to San Diego, California Round Trip									
Heavy Lift Vessel									
Main Engine	5.09E+01	1.22E+03	1.19E+02	8.73E+02	1.19E+02	9.52E+01	5.15E+04	1.02E+00	2.63E+00
Auxiliary Engine	7.87E+00	2.89E+02	2.17E+01	2.36E+02	3.03E+01	2.42E+01	1.39E+04	1.57E-01	6.10E-01
10,000 Horsepower Tug									
Main Engine	7.89E-02	2.38E+00	1.84E-01	1.35E+00	1.85E-01	1.48E-01	7.98E+01	1.58E-03	4.08E-03
Auxiliary Engine	1.38E-03	5.09E-02	3.81E-03	4.15E-02	5.33E-03	4.26E-03	2.45E+00	2.77E-05	1.07E-04
6,000 Horsepower Tug									
Main Engine	4.73E-02	1.43E+00	1.10E-01	8.12E-01	1.11E-01	8.86E-02	4.79E+01	9.47E-04	2.45E-03
Auxiliary Engine	1.38E-03	5.09E-02	3.81E-03	4.15E-02	5.33E-03	4.26E-03	2.45E+00	2.77E-05	1.07E-04
Between 0 nm and 12 nm of San Diego, California									
Heavy Lift Vessel									
Main Engine	1.66E-01	3.98E+00	3.87E-01	2.84E+00	3.88E-01	3.10E-01	1.68E+02	3.31E-03	8.56E-03
Auxiliary Engine	1.02E-01	3.73E+00	2.79E-01	3.04E+00	3.91E-01	3.12E-01	1.80E+02	2.03E-03	7.87E-03
10,000 Horsepower Tug									
Main Engine	7.89E-02	2.38E+00	1.84E-01	1.35E+00	1.85E-01	1.48E-01	7.98E+01	1.58E-03	4.08E-03
Auxiliary Engine	1.38E-03	5.09E-02	3.81E-03	4.15E-02	5.33E-03	4.26E-03	2.45E+00	2.77E-05	1.07E-04
6,000 Horsepower Tug									
Main Engine	4.73E-02	1.43E+00	1.10E-01	8.12E-01	1.11E-01	8.86E-02	4.79E+01	9.47E-04	2.45E-03
Auxiliary Engine	1.38E-03	5.09E-02	3.81E-03	4.15E-02	5.33E-03	4.26E-03	2.45E+00	2.77E-05	1.07E-04
Between 0 nm and 3 nm of San Diego, California									
Heavy Lift Vessel									
Main Engine	1.45E-01	3.48E+00	3.38E-01	2.49E+00	3.39E-01	2.71E-01	1.47E+02	2.90E-03	7.49E-03
Auxiliary Engine	9.84E-02	3.62E+00	2.71E-01	2.95E+00	3.79E-01	3.03E-01	1.74E+02	1.97E-03	7.63E-03
10,000 Horsepower Tug									
Main Engine	7.89E-02	2.38E+00	1.84E-01	1.35E+00	1.85E-01	1.48E-01	7.98E+01	1.58E-03	4.08E-03
Auxiliary Engine	1.38E-03	5.09E-02	3.81E-03	4.15E-02	5.33E-03	4.26E-03	2.45E+00	2.77E-05	1.07E-04
6,000 Horsepower Tug									
Main Engine	4.73E-02	1.43E+00	1.10E-01	8.12E-01	1.11E-01	8.86E-02	4.79E+01	9.47E-04	2.45E-03
Auxiliary Engine	1.38E-03	5.09E-02	3.81E-03	4.15E-02	5.33E-03	4.26E-03	2.45E+00	2.77E-05	1.07E-04
Subtotal Maritime Emissions From Mobile Alabama to Shoreline San Diego, California	**59**	**1,525**	**142**	**1,120**	**151**	**121**	**66,051**	**1.2**	**3.3**
Subtotal Maritime Emissions between 0 nm and 12 nm of San Diego, California	**0.24**	**7.3**	**0.56**	**4.2**	**0.57**	**0.46**	**247**	**0.00**	**0.01**
Subtotal Maritime Emissions between 0 nm and 3 nm of San Diego, California	**0.15**	**4.4**	**0.34**	**2.6**	**0.35**	**0.28**	**151**	**0.00**	**0.01**

United States Navy
Worker Onroad Emission Calculations
Annual Emissions Summary
June 2023

Worker Commute Data

Trip Type	One Way Trip Length (miles) [a]	Number of New Employees	Work Days Per Week	Work Weeks Per Year	Vehicle Type
Local San Diego Worker	11.8	41	5	52	50% gasoline light duty cars, 50% light duty trucks (type 1 and 2)

[a] Trip length based upon CalEEMOD Version 2022.1.1 Default Data for San Diego Air Pollution Control District residential trip legth for home to work.

Worker Commute Emission Factors [a]

Trip Type	Emission Factors (lbs/VMT)								
	VOC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Local San Diego Worker	7.21E-05	1.94E-04	2.45E-03	7.36E-06	4.02E-05	1.48E-05	7.45E-01	1.17E-05	1.61E-05

[a] Equipment emission factors were obtained from EFMAC 2021 for San Diego Air Pollution Control District defaults and aggregated speed and vehicle age. Emission factors assume 50% LDA, 25 LDT1, and 25% LDT2 vehicel types.

lbs/VMT = pound(s) per vehicle mile traveled

VOC = volatile organic ocompound(s)

NOx = oxides of nitrogen

CO = carbon monoxide

SO_2 = sulfur dioxide

PM_{10} = Particulate matter less than 10 micrometers in diameter

$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter

CO_2 = carbon dioxide

CH_4 = methane

N_2O = nitrous oxide

Worker Commute Emissions

Trip Type	Annual Emissions (tons/year)								
	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Local San Diego Worker	9.07E-03	2.45E-02	3.08E-01	9.26E-04	5.06E-03	1.87E-03	9.37E+01	1.47E-03	2.02E-03
Total Emissions	**9.07E-03**	**2.45E-02**	**3.08E-01**	**9.26E-04**	**5.06E-03**	**1.87E-03**	**9.37E+01**	**1.47E-03**	**2.02E-03**

tons/year = ton(s) per year

grams per pound 453.6

United States Navy

P508 Mole Pier Floating Dry Dock
Welding Emission Calculations
June 2023

Welding Rod Usage

Welding Type	Annual Welding Rod Usage (lbs) [a]	Notes
BRAZING	20	--
FCAW	1,990	Assumed as unshielded 71T Welding based upon histroical data of similar drydock operations
GMAW	10	Assumed as 5356 welding based upon histroical data of similar drydock operations indicating most
GTAW	1,010	Assumed as N67 welding based upon histroical data of similar drydock operations indicating most
SMAW	460	Assumed as 7018 welding based upon histroical data of similar drydock operations indicating most

[a] Annual usage of welding rod estimated based upon similar U.S. Navy operated drydock operations.

FCAW = Flux-cored arc welding

GMAW = Gas metal arc welding

GTAW = Gas tungsten arc welding

SMAW = Shielded metal arc welding

lbs = pound(s)

Welding Emission Factors

Welding Type	PM_{10} (lbs/lbs of welding rod)	$PM_{2.5}$ (lbs/lbs of welding rod) [a]	Source
BRAZING	Negligable	Negligable	Emissions assumed as negligable based upon EPA AP42 Section 12.19 Electric Arc Welding
FCAW	0.551	0.551	SDAPCD default emission factor F101 - 71T Self-Shielded, Flux Core Arc Welding (FCAW) Welding Process Emission Factors (July 2022)
GMAW	0.01	0.01	SDAPCD default emission factor G113 - 5356, Gas Metal Arc Welding (GMAW) Welding Process Emission Factors (July 2022)
GTAW	0.01	0.01	SDAPCD default emission factor G124 - N67, Gas Metal Arc Welding (GMAW) Welding Process Emission Factors (July 2022)
SMAW	0.0184	0.0184	SDAPCD default emission factor S120 - 7018, Shielded Metal Arc Welding (SMAW) Welding Process Emission Factors (July 2022)

[a] $PM_{2.5}$ emissions assumed equal to PM_{10} emissions.

lb/lbs = pound(s) per pound of welding rod

PM_{10} = Particulate matter less than 10 micrometers in diameter

$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter

Welding Emissions

Welding Type	PM_{10} Emissions (tons/year)	$PM_{2.5}$ Emissions (tons/year)
BRAZING	Negligable	Negligable
FCAW	5.48E-01	5.48E-01
GMAW	5.00E-05	5.00E-05
GTAW	5.05E-03	5.05E-03
SMAW	4.23E-03	4.23E-03
Total Emissions	**5.58E-01**	**5.58E-01**

tons/year = ton(s) per year

United States Navy

P508 Mole Pier Floating Dry Dock
Welding Emission Calculations
June 2023

Blasting Material Usage

Blasting Material	Annual Usage (Tons) [a]	Vacuum Device and Baghouse Control
Copper Slag (Shrouded)	2680	Yes
Copper Slag (Not Shrouded)	1280	Yes
Steel Shot (Shrouded)	120	Yes
Steel Shot (Not Shrouded)	240	Yes

[a] Annual usage of blasting materials estimated based upon similar U.S. Navy operated drydock operations.

Blasting Emission Factors

Blasting Material	PM_{10} (lbs/ton blast material)	$PM_{2.5}$ (lbs/ton blast material)	Source
Copper Slag (Shrouded)	1.5	1.5	SDAPCD default emission factor A02 - Abrasive Blasting, Copper Slag, assumed control efficiency of 85% from shrouding with a baghouse.
Copper Slag (Not Shrouded)	10	10	SDAPCD default emission factor A02 - Abrasive Blasting, Copper Slag, Uncontrolled.
Steel Shot (Shrouded)	1.5	1.5	SDAPCD default emission factor A08 - Abrasive Blasting, Steel Shot, assumed control efficiency of 85% from shrouding with a baghouse.
Steel Shot (Not Shrouded)	10	10	SDAPCD default emission factor A08 - Abrasive Blasting, Steel Shot, Uncontrolled.

Shoruded capture and control efficiency of 85% obtained from South Coast Air Quality Management District *Guidelines for Reporting Abrasive Blasting Operations Emissions* (December 2014) for indoor blasting.

PM_{10} = Particulate matter less than 10 micrometers in diameter

$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter

lbs/ton = pound(s) per ton of blast material

Blasting Emissions

Blasting Material	PM_{10} Emissions (tons/year)	$PM_{2.5}$ Emissions (tons/year)
Copper Slag (Shrouded)	2.01	2.01
Copper Slag (Not Shrouded)	6.40	6.40
Steel Shot (Shrouded)	0.09	0.09
Steel Shot (Not Shrouded)	1.20	1.20
Total Emissions	**9.70**	**9.70**

tons/year = ton(s) per year

United States Navy

Solvent Usage Emission Calculations
Annual Emissions Summary
June 2023

Solvent Usage

Solvent Type	Annual Usage (Gallons) [a]	Annual Usage (liters)	Average Solvent VOC Content (grams/liter)
Miscellaneous Solvents [b]	40	151	734

[a] Annual usage of solvents estimated based upon similar U.S. Navy operated drydock operations.

[b] Specific solvent products for the Proposed Project are unknown therefore they are characterized as miscenllaneous solvents with physical data based upon average solvent usage at similar U.S. Navy operated drydock operations

grams/liter = gram(s) per liter

VOC = volatile organic ocompound(s)

Liters per Gallon 3.785

Solvent Emissions

Solvent Type	Annual VOC Emissions (tons/year) [a]
Miscellaneous Solvents	0.12
Total Emissions	**0.12**

[a] Emissions assume 100% volatilization of VOC content to atmosphere

tons/year = ton(s) per year

grams per pound 453.6

United States Navy
Marine Coating Usage Emission Calculations
Annual Emissions Summary
June 2023

Marine Coating Usage

Coating Type	Annual Usage (Gallons) [a]	Average Coating VOC Content (grams/liter)	Average Coating Density (lbs/gallon)	Average Coating Solids Content (Weight Fraction)	Transfer Efficiency [c]	Fallout Fraction [c]	Capture Efficiency	Particulate Control
Miscellaneous Airless Coatings - Inside Tank [b]	290	75	11.7	0.715	70%	50%	0%	0%
Miscellaneous Airless Coatings - Inside Ship [b]	40	191	13.6	0.715	70%	50%	0%	0%
Miscellaneous Airless Coatings - Shrouded Tank [b]	4,180	264	12.9	0.715	70%	50%	0%	0%
Miscellaneous Brush/Roller Coatings [b]	620	149	12.0	N/A	100%	N/A	N/A	N/A

[a] Annual usage of marine coatings estimated based upon similar U.S. Navy operated drydock operations.

[b] Specific marine coating products for the Proposed Project are unknown therefore they are characterized as miscenllaneous coatings with physical data based upon average coatingusage at similar U.S. Navy operated drydock operations

[c] Transfer efficiency and fallout fraction obtained from SDAPCD Painting and Surface Coating Operations Emission Inventory Guidance for airless application on large surfaces. No vacuum or additional emission controls are assumed.

grams/liter = gram(s) per liter
VOC = volatile organic ocompound(s)
lbs/gallon = pound(s) per gallon
N/A = Not applicable
Liters per Gallon 3.785

Marine Coating Emissions

Coating Type	Annual VOC Emissions (tons/year) [a]	PM_{10} Emissions (tons/year)	$PM_{2.5}$ Emissions (tons/year)
Miscellaneous Airless Coatings - Inside Tank	0.09	0.18	0.18
Miscellaneous Airless Coatings - Inside Ship	0.03	0.03	0.03
Miscellaneous Airless Coatings - Shrouded Tank	4.61	2.90	2.90
Miscellaneous Brush/Roller Coatings	0.38	0.00	0.00
Total Emissions	**5.12**	**3.11**	**3.11**

[a] Emissions assume 100% volatilization of VOC content to atmosphere
PM_{10} = Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter
tons/year = ton(s) per year
grams per pound 453.6

United States Navy

Adhesive Usage Emission Calculations
Annual Emissions Summary
June 2023

Solvent Usage

Adhesive Type	Annual Usage (Gallons) [a]	Annual Usage (liters)	Average Adhesive VOC Content (grams/liter)
Miscellaneous Adhesives [b]	20	76	379

[a] Annual usage of ahesives estimated based upon similar U.S. Navy operated drydock operations.
[b] Specific adhesive products for the Proposed Project are unknown therefore they are characterized as miscenllaneous adhesives with physical data based upon average adhesive usage at similar U.S. Navy operated drydock operations

grams/liter = gram(s) per liter

VOC = volatile organic ocompound(s)

Liters per Gallon 3.785

Adhesive Emissions

Adhesive Type	Annual VOC Emissions (tons/year) [a]
Miscellaneous Adhesives	0.03
Total Emissions	**0.03**

[a] Emissions assume 100% volatilization of VOC content to atmosphere

tons/year = ton(s) per year

grams per pound 453.6

United States Navy

PERP Usage Emission Calculations
Annual Emissions Summary
June 2023

PERP Usage

PERP Type	PERP Size (Horsepower)	Annual Hours of Operation [a]	Annual Diesel Usage (Gallons) [a]
Miscellaneous Diesel Engines [b]	290	1,490	12,900

[a] Annual usage of PERP equipment estimated based upon similar U.S. Navy operated drydock operations.

[b] Specific PERP equipment for the Proposed Project are unknown therefore they are characterized as miscenllaneous engines with physical data based upon average PERP equipment at similar U.S. Navy operated drydock operations. The Project is planning to use electric equipment as the primary equipment source where avaialble. As a result, the usages used for purposes of this analysis are conservative and would likely be greater than expected operations at the Project.

PERP Emission Data and Factors [a]

PERP Type	Emission Factors (lbs/1,000 gal)								
	VOC [a]	NOx [a]	CO [a]	SO_2 [a]	PM_{10} [a]	$PM_{2.5}$ [a]	CO_2 [b]	CH_4 [b]	N_2O [b]
Miscellaneous Diesel Engines	58.92	604.3	130.18	0.21	42.48	42.48	22,509	0.90	1.32

[a] Equipment emission factors and load factor were obtained from SDAPCD *E15 - Portable Engine, Diesel Fired, 50-600 BHP, Uncontrolled Calculation Methods*

[b] Equipment emission factors and load factor were obtained from *EPA Emission Factors Hub* (April 2023) Tables 2 and 5 for nonroad mobile source bomustion (commercial and industrial equipment)

lbs/1,000 gal = pound(s) per 1,000 gallons of fuel burned

g/hp-hr = gram(s) per horsepower-hour

VOC = volatile organic ocompound(s)

NOx = oxides of nitrogen

CO = carbon monoxide

SO_2 = sulfur dioxide

PM_{10} = Particulate matter less than 10 micrometers in diameter

$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter

CO_2 = carbon dioxide

CH_4 = methane

N_2O = nitrous oxide

PERP Emissions

PERP Type	Annual Emissions (tons/year)								
	VOC	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
Miscellaneous Diesel Engines	0.38	3.90	0.84	0.00	0.27	0.27	145.18	0.01	0.01
Total Emissions	**0.38**	**3.90**	**0.84**	**0.00**	**0.27**	**0.27**	**145.18**	**0.01**	**0.01**

tons/year = ton(s) per year

grams per pound 453.6

United States Navy

Emergency Generator Emission Calculations
Annual Emissions Summary
June 2023

Diesel Emergency Generator Usage

Generator Size (kW) [a]	Count [a]	Engine Size (Horsepower) [b]	Engine Heat Input (MMBtu/hr) [c]	Annual Hours of Operation for Maintenance and Testing
940	1	1,047	7.17	50

[a] Generator size and counts for the Proposed Project are based upon aequipment at similar U.S. Navy operated drydock operations

[b] Generator engine size based upon diesel-fired engines with conversion of mechanical power to electrical output of: 85%

[c] Engine heat input rating calculated based upon fuel consumption of 0.35 lbs/bhp-hr and diesel heat content.

kW = kilowatt

MMBtu/hr = million british thermal units per hour

Density of Diesel Fuel (lbs/gal) 7.05

Heat Content of Diesel (MMBtu/gal) 0.138

Diesel Emergency Generator Emission Factors

Generator Size (kW)	Emission Factors (grams/bhp-hr)						Emission Factors (lbs/MMBtu)		
	VOC [a]	NOx [a]	CO [a]	SO_2 [b]	PM_{10} [a]	$PM_{2.5}$ [a]	CO_2 [c]	CH_4 [c]	N_2O [c]
940	1.75E-01	3.75E-01	3.25E+00	1.05E-05	1.88E-02	1.88E-02	1.63E+02	6.61E-06	1.32E-06

[a] Emission factors represent Tier 4 certified emission rates with a 25% safety factor applied to account for site variability.

[b] SO_2 emission factor based upon a mass balance of sulfur in the fuel of 15 ppmw and all sulfur emitted as SO_2.

[c] Emission factors from 40 CFR 98 Subpart C, Tables C-1 and C-2

grams/bhp-hr = grams per brake horsepower-hour

lbs/MMBtu = pound(s) per million british thermal units of heat input

VOC = volatile organic ocompound(s)

NOx = oxides of nitrogen

CO = carbon monoxide

SO_2 = sulfur dioxide

PM_{10} = Particulate matter less than 10 micrometers in diameter

$PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter

CO_2 = carbon dioxide

CH_4 = methane

N_2O = nitrous oxide

Diesel Emergency Generator Emission Factors

Generator Size (kW)	Emission Factors (tons/year)								
	VOC	Nox	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
940	1.01E-02	2.16E-02	1.88E-01	6.06E-07	1.08E-03	1.08E-03	2.92E+01	1.19E-06	2.37E-07
Total Emissions	**1.01E-02**	**2.16E-02**	**1.88E-01**	**6.06E-07**	**1.08E-03**	**1.08E-03**	**2.92E+01**	**1.19E-06**	**2.37E-07**

tons/year = ton(s) per year