APPENDIX C
Air Quality Emissions Calculations and Record of Non-Applicability

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Final
Environmental Impact Statement/Overseas Environmental Impact Statement
Atlantic Fleet Training and Testing

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APPENDIX C AIR QUALITY EMISSIONS CALCULATIONS AND RECORD OF NON-APPLICABILITY

This appendix discusses emission factor development and calculations including assumptions employed in the analyses presented in the Air Quality section of Chapter 3 (Section 3.1).

C.1 AIR QUALITY EXAMPLE CALCULATIONS

C.1.1 SURFACE ACTIVITIES EMISSIONS

Surface activities consist of activities associated with boat and vessel traffic. Fleet training activities incorporate a variety of marine vessels including cruisers, destroyers, frigates, carriers, riverine vessels, and rigid hull inflatable boats. Larger vessels also have generators operating onboard to provide electricity for non-propulsion functions. Each of these vessels incorporates different propulsion methods such as marine outboard engines, diesel engines, and gas turbines. Calculations are based on the combustion of fossil fuels (primarily diesel) in these engines and the time they run.

C.1.1.1.1 Marine Outboard Engines

The U.S. Environmental Protection Agency (USEPA) has published emissions factors for air pollutants produced by several types of two-stroke and four-stroke outboard engines. These engines are operated on a variety of small boats and vessels involved in nearshore training and testing activities. Emission factors were obtained from USEPA NONROAD documentation for Compression Ignition and Spark Ignition engines.

Emissions estimates for surface craft utilizing outboard engines were calculated using USEPA NONROAD factors multiplied by the engine horsepower and hours of operation.

Emissions = HP×HR/YR×EF×ENG
Where:
Emissions = Surface craft Emissions (pound per year)
HP = Horsepower (reflective of a particular load factor/engine power setting)
HR/YR = Hours per year
EF = Emission factor for specific engine type ENG = Number of engine

To determine the entire project emissions, a calculation was conducted for each surface vessel type and for each pollutant and converted to tons, then compared to the baseline Study Area emissions. The baseline is defined as the training and testing identified as the Preferred Alternative in the Atlantic Fleet Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statement released in August 2013.These values were summed according to the appropriate pollutant to provide the cumulative emissions associated with surface vessel emissions activities.

C.1.1.1.2 Diesel Engines

Large vessel emissions were calculated in a similar fashion using emission factors from the Naval Sea Systems Command Navy and Military Sealift Command Marine Engine Fuel Consumption and Emission Calculator for the propulsion system and the supplemental ship service generator(s).

Diesel engine emission factors were multiplied by the engine horsepower and annual hours of operation to calculate the pounds of pollutant emissions per year. This value was then converted to a tons per year value for comparison with the Study Area total summed emissions on an individual pollutant basis.

C.1.2 AIR ACTIVITIES EMISSIONS

Fleet training and Naval Air Systems Command testing consists of various activities associated with airplanes or helicopters. Aircraft activities of concern are those that occur from ground level up to 3,000 feet (ft.) above ground level. The 3,000 ft. above ground level ceiling is the default atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level (known as the mixing zone). All pollutant emissions from aircraft generated greater than 3,000 ft. above ground level are excluded from this analysis. The pollutant emission rate is a function of the engine's operating mode, the fuel flow rate, and the engine's overall efficiency. Emissions for one complete flight for a particular aircraft are calculated by knowing the specific engine pollutant emission factors for each mode of operation.

For this EIS/OEIS, emission factors for most military engines were obtained from Navy's Aircraft Environmental Support Office (AESO) memoranda. For those aircraft for which engine data from AESO was unavailable, applicable data from other reputable data sources was used. Emissions factors vary depending on engine power mode, time in each mode, and fuel flow. Using these data, as well as information on hours of cruise time and number of landing/takeoff activities on a vessel, pollutant emissions for each aircraft and activity were calculated by applying the equation below.

Emissions = TIM×FF×EF×ENG×CF
Where:
Emissions = Aircraft Emissions (lb. per activity) (for EF in lb./1000 gallon fuel) TIM = Time-in-mode at a specified power setting (hr/activity).
FF = Fuel flow at a specified power setting (gallons/hr/engine)
EF = Emission factor for specific engine type and power setting (lb./1000 gallons of fuel used) ENG = Number of engines on aircraft

As the equation indicates, emissions were estimated by first calculating total fuel used in each of the different modes with the appropriate emission factor.

C.1.3 MUNITIONS EMISSIONS

Available emissions factors (AP-42, Compilation of Air Pollutant Emission Factors) were utilized. These factors were then multiplied by the net weight of the explosive (or a conversion factor for pounds per item) and the number of times that the munition was used during a designated time frame. This calculation provided annual pounds per year of emissions, which were converted to tons per year for comparison purposes.

Emissions = EXP/YR×EF
Where:
Emissions = Ordnance Emissions (lb. per year)
EXP/YR = Explosives, propellants, and pyrotechnics used per year EF = Emissions factor

C.1.4 RECORD OF NON-APPLICABILITY

A Record of Non-Applicability For Clean Air Act Conformity has been prepared in accordance with the Navy Guidance for Compliance with the Clean Air Act General Conformity Rule (30 July 2013) and is included In Section C.2.

C.1.5 EMISSIONS ESTIMATES TABLES

The following tables contain data used for the emissions calculations for vessels, aircraft, and munitions, respectively. These tables were converted from excel spreadsheets.

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Appendix Organization

Tab A Appendix C Introduction

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Acronyms

A/C aircraft

AESO Aircraft Environmental Support Office

CO Carbon monoxide

gal gallon

GPH gallons per hour

HC hydrocarbons

hp horsepower

hr hour

lb pound

NM nautical mile

NO_x Nitrogen oxides

PM Particulate matter

SO_x Sulfur dioxide

VOC Volatile organic compounds

yr year

Data Organization

Designation [a]	***Relationship to EPA Region (coastal states)***	
Northeast OPAREA	Region 1:	Maine, New Hampshire, Massachusets, Rhode Island and Connecticut
	Region 2:	New York and New Jersey
VACAPES OPAREA	Region 3:	Delaware, Virginia
Cherry Pt OPAREA	Region 4:	North Carolina, South Carolina, Georgia
JAX OPAREA	Region 4:	Florida
Key West OPAREA	Region 4:	Florida
GOMEX OPAREA	Region 4:	Florida and Alabama
	Region 6:	Louisiana and Texas
Outside Range Complexes	Other locations within the Study Area that are not in the OPAREA boundaries	

[a] the OPAREA designation includes adjacent state waters. These are also separately delineated in the calculations.

Tab B: Baseline (Preferred Alternative in the Atlantic Fleet Forces Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact Statementvreleased in August 2013)

Tab B Table 1. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Northeast Range Complex						
State waters (0-3 nm)						
Aircraft	0.04	0.17	0.01	0.01	0.04	0.04
Vessel	0.24	0.25	0.10	0.05	0.01	0.01
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.27**	**0.42**	**0.11**	**0.06**	**0.05**	**0.05**
Waters of the U.S. (3-12 nm)						
Aircraft	0.02	0.07	0.00	0.00	0.02	0.02
Vessel	0.52	0.63	0.28	0.12	0.01	0.01
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.54**	**0.71**	**0.29**	**0.12**	**0.03**	**0.03**
International waters (>12 nm)						
Aircraft	0.76	3.13	0.16	0.15	0.76	0.76
Vessel	5.84	6.38	0.51	1.28	0.14	0.14
Ordnance	0.04	0.00	0.00	0.00	0.03	0.00
Total	**6.64**	**9.50**	**0.68**	**1.43**	**0.92**	**0.90**
Total for Northeast Range Complex						
Aircraft	0.81	3.37	0.17	0.16	0.81	0.81
Vessel	6.60	7.26	0.90	1.45	0.16	0.16
Ordnance	0.04	0.00	0.00	0.00	0.03	0.01
Total	**7.46**	**10.63**	**1.07**	**1.61**	**1.00**	**0.98**
				Percent In-State		**0.04**
Virginia Capes Range Complex						
State waters (0-3 nm)						
Aircraft	24.43	25.29	2.16	1.58	8.27	8.27
Vessel	1.49	30.89	2.92	3.37	0.20	0.20
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**25.92**	**56.18**	**5.08**	**4.94**	**8.47**	**8.47**
Waters of the U.S. (3-12 nm)						
Aircraft	1.98	2.14	0.18	0.13	0.69	0.69
Vessel	124.12	81.21	19.50	25.76	2.35	2.35
Ordnance	2.27	0.09	0.00	0.00	0.13	0.09
Total	**128.38**	**83.45**	**19.68**	**25.89**	**3.17**	**3.13**
International waters (>12 nm)						
Aircraft	22.81	52.66	2.70	2.19	13.35	13.35
Vessel	593.25	390.35	56.02	182.75	16.80	16.80
Ordnance	20.47	0.82	0.00	0.00	1.21	0.79
Total	**636.53**	**443.84**	**58.72**	**184.94**	**31.37**	**30.94**

Tab B Table 1. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Total for Virginia Capes Range Complex						
Aircraft	49.22	80.10	5.04	3.90	22.31	22.31
Vessel	718.86	502.46	78.43	211.87	19.36	19.36
Ordnance	22.75	0.91	0.00	0.00	1.35	0.87
Total	**790.82**	**583.47**	**83.48**	**215.77**	**43.01**	**42.54**
				Percent In-State		0.06
Cherry Point Range Complex						
State waters (0-3 nm)						
Aircraft	5.74	5.82	0.52	0.36	1.85	1.85
Vessel	16.35	34.36	3.46	35.46	3.09	3.09
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**22.09**	**40.18**	**3.98**	**35.82**	**4.94**	**4.94**
Waters of the U.S. (3-12 nm)						
Aircraft	0.86	0.89	0.07	0.05	0.30	0.30
Vessel	41.97	46.86	4.88	39.63	3.48	3.48
Ordnance	0.56	0.01	0.00	0.00	0.01	0.01
Total	**43.39**	**47.76**	**4.95**	**39.69**	**3.79**	**3.78**
International waters (>12 nm)						
Aircraft	19.72	187.44	2.59	5.56	42.85	42.85
Vessel	858.49	472.22	72.86	191.08	14.90	14.90
Ordnance	5.00	0.13	0.00	0.00	0.13	0.07
Total	**883.21**	**659.79**	**75.44**	**196.63**	**57.88**	**57.82**
Total for Cherry Point Range Complex						
Aircraft	26.32	194.15	3.18	5.97	45.00	45.00
Vessel	916.81	553.44	81.20	266.17	21.47	21.47
Ordnance	5.56	0.15	0.00	0.00	0.14	0.07
Total	**948.69**	**747.73**	**84.37**	**272.14**	**66.61**	**66.54**
				Percent In-State		0.05
Jacksonville Range Complex						
State waters (0-3 nm)						
Aircraft	5.07	5.97	0.48	0.36	1.86	1.86
Vessel	4.79	9.78	3.02	6.38	0.56	0.56
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**9.85**	**15.76**	**3.49**	**6.74**	**2.41**	**2.41**
Waters of the U.S. (3-12 nm)						
Aircraft	1.98	2.36	0.19	0.14	0.74	0.74
Vessel	73.59	50.01	14.31	19.36	1.68	1.68
Ordnance	1.24	0.05	0.00	0.00	0.13	0.08
Total	**76.81**	**52.43**	**14.50**	**19.50**	**2.55**	**2.49**

Tab B Table 1. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
International waters (>12 nm)						
Aircraft	31.55	214.14	4.32	6.83	49.42	49.42
Vessel	758.55	440.02	65.39	182.69	15.09	15.09
Ordnance	11.18	0.49	0.00	0.00	1.15	0.68
Total	**801.28**	**654.64**	**69.72**	**189.53**	**65.66**	**65.19**
Total for Jacksonville Range Complex						
Aircraft	38.60	222.48	4.99	7.33	52.02	52.02
Vessel	836.93	499.81	82.72	208.44	17.33	17.33
Ordnance	12.42	0.54	0.00	0.00	1.28	0.75
Total	**887.95**	**722.83**	**87.71**	**215.77**	**70.62**	**70.10**
				Percent In-State		0.02
Key West Range Complex						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.01	0.34	0.00	0.04	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.01**	**0.34**	**0.00**	**0.04**	**0.00**	**0.00**
Waters of the U.S. (3-12 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.09	0.00	0.00	0.00	0.00	0.00
Total	**0.09**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
International waters (>12 nm)						
Aircraft	10.07	10.37	0.89	0.65	3.40	3.40
Vessel	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.83	0.01	0.00	0.00	0.02	0.01
Total	**10.90**	**10.38**	**0.89**	**0.65**	**3.41**	**3.41**
Total for Key West Range Complex						
Aircraft	10.07	10.37	0.89	0.65	3.40	3.40
Vessel	0.01	0.34	0.00	0.04	0.00	0.00
Ordnance	0.92	0.01	0.00	0.00	0.02	0.01
Total	**11.00**	**10.72**	**0.89**	**0.68**	**3.42**	**3.41**
				Percent In-State		0.01
Gulf of Mexico Range Complex						
State waters (0-9 nm)						
Aircraft	4.34	4.45	0.38	0.28	1.46	1.46
Vessel	0.09	3.32	0.14	0.36	0.02	0.02
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**4.43**	**7.77**	**0.53**	**0.63**	**1.48**	**1.48**

Tab B Table 1. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Waters of the U.S. (9-12 nm)						
Aircraft	0.04	0.05	0.00	0.00	0.01	0.01
Vessel	2.41	1.70	0.59	0.56	0.05	0.05
Ordnance	0.16	0.00	0.00	0.00	0.01	0.01
Total	**2.62**	**1.74**	**0.59**	**0.57**	**0.08**	**0.08**
International waters (>12 nm)						
Aircraft	3.57	6.98	0.34	0.32	1.91	1.91
Vessel	69.18	40.81	6.23	18.34	1.58	1.58
Ordnance	1.48	0.03	0.00	0.00	0.10	0.06
Total	**74.23**	**47.82**	**6.57**	**18.66**	**3.59**	**3.55**
Total for GOMEX Range Complex						
Aircraft	7.95	11.47	0.73	0.60	3.38	3.38
Vessel	71.68	45.83	6.96	19.26	1.65	1.65
Ordnance	1.64	0.03	0.00	0.00	0.11	0.07
Total	**81.27**	**57.33**	**7.69**	**19.85**	**5.15**	**5.11**
				Percent In-State		0.09
Other AFTT Areas (Outside Range Complexes)						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.13	0.11	0.13	0.03	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.13**	**0.11**	**0.13**	**0.03**	**0.00**	**0.00**
Waters of the U.S. (3-12 nm)						
Aircraft	0.06	0.07	0.01	0.00	0.02	0.02
Vessel	6.44	4.61	0.95	1.41	0.13	0.13
Ordnance	0.09	0.01	0.00	0.00	0.00	0.00
Total	**6.59**	**4.69**	**0.96**	**1.41**	**0.16**	**0.16**
International waters (>12 nm)						
Aircraft	0.42	0.45	0.05	0.02	0.13	0.13
Vessel	26.01	19.79	2.37	7.75	0.73	0.73
Ordnance	0.78	0.07	0.00	0.00	0.02	0.01
Total	**27.22**	**20.32**	**2.42**	**7.77**	**0.87**	**0.87**
Total for Other AFTT Areas (Outside Range Complexes)						
Aircraft	0.49	0.52	0.06	0.03	0.15	0.15
Vessel	32.57	24.51	3.45	9.18	0.86	0.86
Ordnance	0.87	0.08	0.00	0.00	0.02	0.02
Total	**33.93**	**25.12**	**3.51**	**9.21**	**1.03**	**1.03**
				Percent In-State		0.01

Tab B Table 1. Estimated Annual Criteria Air Pollutant Emissions from Training, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Total for AFTT Study Area (Training-Related Emissions)						
State waters (0-3 nm)						
Aircraft	39.62	41.70	3.55	2.58	13.47	13.47
Vessel	23.08	79.06	9.77	45.68	3.89	3.89
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**62.70**	**120.76**	**13.32**	**48.26**	**17.35**	**17.35**
Waters of the U.S. (3-12 nm)						
Aircraft	4.94	5.58	0.45	0.34	1.78	1.78
Vessel	249.06	185.02	40.51	86.84	7.71	7.71
Ordnance	4.42	0.17	0.00	0.00	0.29	0.18
Total	**258.42**	**190.77**	**40.96**	**87.18**	**9.78**	**9.67**
International waters (>12 nm)						
Aircraft	88.90	475.16	11.06	15.72	111.81	111.81
Vessel	2,311.32	1,369.57	203.38	583.89	49.24	49.24
Ordnance	39.79	1.56	0.00	0.00	2.65	1.62
Total	**2440.01**	**1846.29**	**214.44**	**599.61**	**163.70**	**162.68**
Total for Study Area Complexes						
Aircraft	133.47	522.44	15.06	18.64	127.06	127.06
Vessel	2583.45	1633.66	253.66	716.40	60.83	60.83
Ordnance	44.21	1.73	0.00	0.00	2.94	1.80
Total	**2761.13**	**2157.83**	**268.72**	**735.04**	**190.84**	**189.70**

Tab B Table 2. Estimated Annual Criteria Air Pollutant Emissions from Testing, Alternative 2

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Northeast Range Complex						
State waters (0-3 nm)						
Aircraft	0.01	0.03	0.00	0.00	0.01	0.01
Vessel	0.98	3.60	0.08	0.39	0.06	0.06
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.99**	**3.62**	**0.08**	**0.39**	**0.08**	**0.07**
Waters of the U.S. (3-12 nm)						
Aircraft	0.26	0.28	0.02	0.02	0.09	0.09
Vessel	3.34	3.25	0.30	0.78	0.08	0.08
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**3.61**	**3.52**	**0.32**	**0.80**	**0.17**	**0.17**
International waters (>12 nm)						
Aircraft	1.27	1.76	0.14	0.11	0.54	0.54
Vessel	62.53	40.17	5.75	19.02	1.70	1.70
Ordnance	0.02	0.00	0.00	0.00	0.01	0.00
Total	**63.83**	**41.93**	**5.89**	**19.12**	**2.25**	**2.25**
Total for Northeast Range Complex						
Aircraft	1.54	2.06	0.16	0.12	0.64	0.64
Vessel	66.86	47.02	6.12	20.19	1.85	1.85
Ordnance	0.02	0.00	0.00	0.00	0.01	0.00
Total	**68.42**	**49.08**	**6.29**	**20.31**	**2.50**	**2.49**
Virginia Capes Range Complex						
State waters (0-3 nm)						
Aircraft	1.29	1.34	0.11	0.08	0.44	0.44
Vessel	1.91	3.02	0.16	0.48	0.06	0.06
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**3.20**	**4.36**	**0.27**	**0.57**	**0.50**	**0.50**
Waters of the U.S. (3-12 nm)						
Aircraft	1.80	1.86	0.16	0.12	0.61	0.61
Vessel	18.91	13.84	1.75	4.08	0.39	0.39
Ordnance	0.41	0.02	0.00	0.00	0.06	0.04
Total	**21.11**	**15.72**	**1.91**	**4.19**	**1.06**	**1.04**
International waters (>12 nm)						
Aircraft	12.15	17.10	1.15	0.88	4.96	4.96
Vessel	289.14	171.98	25.43	67.95	5.71	5.71
Ordnance	3.65	0.17	0.00	0.00	0.52	0.35
Total	**304.94**	**189.24**	**26.58**	**68.83**	**11.19**	**11.01**
Total for Virginia Capes Range Complex						
Aircraft	15.23	20.30	1.42	1.07	6.01	6.01
Vessel	309.96	188.84	27.34	72.51	6.16	6.16
Ordnance	4.06	0.19	0.00	0.00	0.58	0.39
Total	**329.25**	**209.32**	**28.76**	**73.59**	**12.74**	**12.55**
				Percent In-State		0.01

Tab B Table 2. Estimated Annual Criteria Air Pollutant Emissions from Testing, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Cherry Point Range Complex						
State waters (0-3 nm)						
Aircraft	0.00	0.01	0.00	0.00	0.00	0.00
Vessel	0.52	2.20	0.04	0.23	0.04	0.04
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.53**	**2.22**	**0.04**	**0.23**	**0.04**	**0.04**
Waters of the U.S. (3-12 nm)						
Aircraft	0.09	0.09	0.01	0.01	0.03	0.03
Vessel	0.73	1.30	0.08	0.26	0.03	0.03
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.82**	**1.40**	**0.09**	**0.26**	**0.06**	**0.06**
International waters (>12 nm)						
Aircraft	3.99	4.33	0.36	0.27	1.39	1.39
Vessel	32.86	22.86	3.25	12.87	1.22	1.22
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**36.86**	**27.19**	**3.61**	**13.13**	**2.61**	**2.61**
Total for Cherry Point Range Complex						
Aircraft	4.08	4.43	0.37	0.27	1.42	1.42
Vessel	34.12	26.36	3.37	13.35	1.29	1.29
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**38.20**	**30.80**	**3.74**	**13.62**	**2.72**	**2.71**
				Percent In-State		0.03
Jacksonville Range Complex						
State waters (0-3 nm)						
Aircraft	0.01	0.03	0.00	0.00	0.01	0.01
Vessel	0.72	2.32	0.06	0.26	0.04	0.04
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.72**	**2.35**	**0.06**	**0.27**	**0.05**	**0.05**
Waters of the U.S. (3-12 nm)						
Aircraft	0.43	0.45	0.04	0.03	0.15	0.15
Vessel	10.27	9.28	1.06	1.97	0.23	0.23
Ordnance	0.17	0.00	0.00	0.00	0.02	0.01
Total	**10.86**	**9.73**	**1.10**	**2.00**	**0.39**	**0.39**
International waters (>12 nm)						
Aircraft	5.77	6.90	0.54	0.40	2.14	2.14
Vessel	93.10	74.89	9.56	28.51	2.90	2.90
Ordnance	1.52	0.04	0.00	0.00	0.16	0.12
Total	**100.39**	**81.83**	**10.09**	**28.91**	**5.21**	**5.16**
Total for Jacksonville Range Complex						
Aircraft	6.21	7.37	0.58	0.43	2.30	2.30
Vessel	104.09	86.49	10.67	30.75	3.17	3.17
Ordnance	1.69	0.05	0.00	0.00	0.18	0.13
Total	**111.98**	**93.91**	**11.25**	**31.18**	**5.65**	**5.59**

Tab B Table 2. Estimated Annual Criteria Air Pollutant Emissions from Testing, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Percent In-State						0.01
Key West Range Complex						
State waters (0-3 nm)						
Aircraft	0.00	0.00	0.00	0.00	0.00	0.00
Vessel	0.05	0.07	0.00	0.01	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.05**	**0.07**	**0.00**	**0.01**	**0.00**	**0.00**
Waters of the U.S. (3-12 nm)						
Aircraft	0.10	0.11	0.01	0.01	0.03	0.03
Vessel	1.11	0.89	0.11	0.29	0.03	0.03
Ordnance	0.01	0.00	0.00	0.00	0.00	0.00
Total	**1.23**	**1.00**	**0.12**	**0.30**	**0.06**	**0.06**
International waters (>12 nm)						
Aircraft	0.42	0.48	0.04	0.03	0.15	0.15
Vessel	7.85	5.89	0.74	1.91	0.18	0.18
Ordnance	0.11	0.03	0.00	0.00	0.00	0.00
Total	**8.38**	**6.40**	**0.78**	**1.94**	**0.34**	**0.34**
Total for Key West Range Complex						
Aircraft	0.52	0.59	0.05	0.04	0.19	0.19
Vessel	9.02	6.85	0.86	2.22	0.21	0.21
Ordnance	0.12	0.03	0.00	0.00	0.00	0.00
Total	**9.66**	**7.47**	**0.90**	**2.25**	**0.41**	**0.40**
				Percent In-State		0.01
Gulf of Mexico Range Complex						
State waters (0-9 nm)						
Aircraft	3.86	3.96	0.34	0.25	1.30	1.30
Vessel	1.32	2.76	0.11	0.38	0.05	0.05
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**5.18**	**6.72**	**0.45**	**0.63**	**1.35**	**1.35**
Waters of the U.S. (9-12 nm)						
Aircraft	1.43	1.47	0.13	0.09	0.48	0.48
Vessel	4.11	4.23	0.46	2.51	0.25	0.25
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**5.54**	**5.70**	**0.58**	**2.60**	**0.73**	**0.73**
International waters (>12 nm)						
Aircraft	1.12	1.43	0.11	0.09	0.45	0.45
Vessel	23.88	20.61	2.62	14.08	1.36	1.36
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**25.00**	**22.05**	**2.73**	**14.16**	**1.81**	**1.81**
Total for GOMEX Range Complex						

Tab B Table 2. Estimated Annual Criteria Air Pollutant Emissions from Testing, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Aircraft	6.42	6.87	0.58	0.43	2.23	2.23
Vessel	29.30	27.60	3.18	16.96	1.67	1.67
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**35.72**	**34.47**	**3.76**	**17.39**	**3.89**	**3.89**
				Percent In-State		0.16
Other AFTT Areas (Outside Range Complexes)						
State waters (0-3 nm)						
Aircraft	0.01	0.02	0.00	0.00	0.01	0.01
Vessel	0.04	0.04	0.00	0.01	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.04**	**0.06**	**0.00**	**0.01**	**0.01**	**0.01**
Waters of the U.S. (3-12 nm)						
Aircraft	0.00	0.01	0.00	0.00	0.00	0.00
Vessel	0.65	0.65	0.07	0.20	0.02	0.02
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.65**	**0.66**	**0.07**	**0.20**	**0.03**	**0.03**
International waters (>12 nm)						
Aircraft	0.10	0.49	0.02	0.02	0.11	0.11
Vessel	4.84	4.37	0.51	1.35	0.15	0.15
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**4.95**	**4.85**	**0.54**	**1.37**	**0.26**	**0.26**
Total for Other AFTT Areas (Outside Range Complexes)						
Aircraft	0.11	0.52	0.03	0.02	0.12	0.12
Vessel	5.53	5.05	0.59	1.56	0.17	0.17
Ordnance	0.00	0.00	0.00	0.00	0.01	0.00
Total	**5.64**	**5.57**	**0.61**	**1.58**	**0.30**	**0.29**
				Percent In-State		0.01
Total for AFTT Study Area (Testing-Related Emissions)						
State waters (0-3 nm)						
Aircraft	5.16	5.40	0.46	0.34	1.76	1.76
Vessel	5.55	14.00	0.45	1.77	0.26	0.26
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Total	**10.71**	**19.40**	**0.91**	**2.10**	**2.02**	**2.01**
Waters of the U.S. (3-12 nm)						
Aircraft	4.11	4.28	0.37	0.27	1.40	1.40
Vessel	39.12	33.43	3.83	10.08	1.03	1.03
Ordnance	0.59	0.03	0.00	0.00	0.08	0.05
Total	**43.82**	**37.74**	**4.19**	**10.35**	**2.51**	**2.48**
International waters (>12 nm)						
Aircraft	24.84	32.48	2.36	1.79	9.75	9.75
Vessel	514.21	340.77	47.86	145.69	13.22	13.22
Ordnance	5.30	0.24	0.00	0.00	0.70	0.47
Total	**544.34**	**373.49**	**50.22**	**147.48**	**23.67**	**23.44**

Tab B Table 2. Estimated Annual Criteria Air Pollutant Emissions from Testing, Alternative 2 (continued)

	Emissions by Criteria Air Pollutant (TPY)					
Source	***CO***	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
Total for Study Area Complexes						
Aircraft	**34.11**	**42.15**	**3.18**	**2.39**	**12.91**	**12.90**
Vessel	**558.87**	**388.21**	**52.14**	**157.54**	**14.51**	**14.51**
Ordnance	**5.89**	**0.26**	**0.00**	**0.00**	**0.78**	**0.52**
Total	**598.88**	**430.62**	**55.32**	**159.93**	**28.20**	**27.93**

Tab C: Emissions Summary

Tab C Table 1. Vessel Emissions by OPAREA - outside of state waters

	Annual Totals in Tons per Year for Alternative 1					*Metric Tons*	*Annual Totals in Tons per Year for Alternative 2*					*Metric Tons*
	VOCs	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***	***VOCs***	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***
Northeast	1.2	6.4	31.9	10.4	1.5	5,562	0.1	2.2	4.2	0.6	0.2	306
VACAPES	108.2	755.4	3405.0	932.5	107.6	502,660	101.8	727.4	3,649.0	1,011.1	118.4	520,997
Cherry Pt	34.7	284.4	802.7	155.7	25.0	71,511	24.0	121.6	705.7	177.9	27.2	82,995
JAX	33.1	348.9	972.3	291.3	26.8	156,452	44.4	460.5	1,887.4	522.9	54.1	273,108
Key West	2.6	8.3	75.1	12.3	1.6	6,215	0.6	8.2	26.5	9.4	0.8	4,906
GOMEX	7.3	106.7	404.1	104.7	14.4	54,137	0.7	11.9	47.7	15.8	1.8	9,430
Outside RCs	52.8	322.5	1672.1	380.0	49.1	215,403	158.8	530.0	4,084.2	641.6	80.4	325,203

Tab C Table 2. Vessel Emissions by OPAREA - inside of state waters

	Annual Totals in Tons per Year for Alternative 1					*Metric Tons*	*Annual Totals in Tons per Year for Alternative 2*					*Metric Tons*
	VOCs	***CO***	***NO_x***	***SOx***	***PM***	***CO^2e***	***VOCs***	***CO***	***NOx***	***SO_x***	***PM***	***CO^2e***
Northeast	0.0	0.1	0.9	0.2	0.0	99	0.0	0.1	0.4	0.0	0.0	15
VACAPES	2.3	12.8	71.2	18.9	2.2	11,587	2.5	15.2	75.4	19.4	2.4	11,619
Cherry Pt	0.1	0.3	2.2	0.5	0.1	237	0.1	0.2	1.7	0.3	0.0	163
JAX	0.3	2.6	11.1	3.0	0.4	1,889	0.5	5.6	17.2	4.2	0.7	2,559
Key West	0.0	0.1	0.7	0.2	0.0	107	0.0	0.1	0.6	0.1	0.0	79
GOMEX	0.1	0.4	1.4	0.2	0.1	112	0.0	0.1	0.7	0.1	0.0	58
Outside RCs	0.1	0.4	2.4	0.5	0.1	273	2.6	28.4	66.3	11.7	2.6	6,865

Tab C Table 3. Small Boat and Riverine Vessels by OPAREA, Alternative 1 & Alternative 2

	Annual Totals in Tons per Year					*Metric Tons*
	VOCs	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***
Northeast	4.1	10.1	98.4	14.7	2.4	5,552
VACAPES	3.6	33.8	87.4	9.8	3.0	6,363
Chesapeake Bay	37.1	139.5	746.9	104.3	20.9	47,922
Charleston	3.5	8.8	85.6	12.8	2.1	4,673
JAX	0.9	3.4	12.9	1.7	0.5	1,103
Cape Canaveral/ SE FL	3.8	9.5	92.7	13.8	2.2	5,359
Key West	0.0	0.0	0.0	0.0	0.0	0
Panama City	0.3	1.0	3.5	0.5	0.1	249
GOMEX	0.0	0.0	0.0	0.0	0.0	0

Tab C Table 4. Aircraft Emissions by OPAREA

	Annual Totals in Tons per Year for Alternative 1					*Metric Tons*	*Annual Totals in Tons per Year for Alternative 2*					*Metric Tons*
Area	***VOCs***	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***	***VOCs***	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***
Northeast	0.8	7.7	12.1	3.0	4.7	4,339	1.3	13.2	17.8	5.0	8.4	7,184
VACAPES	7.8	88.6	159.0	22.8	39.5	47,176	10.0	110.2	181.2	30.5	54.0	58,316
Cherry Pt	5.5	39.3	28.2	3.7	4.9	7,693	5.5	39.3	28.2	3.7	4.9	7,693
JAX	15.1	96.0	73.6	10.5	12.8	18,961	15.4	98.5	76.1	11.4	14.5	20,236
Key West	0.1	0.9	1.0	0.3	0.6	496	0.3	3.1	3.2	1.1	2.1	1,603
GOMEX	1.0	11.8	11.0	3.7	6.6	5,408	1.0	12.0	11.2	3.8	6.8	5,501
Panama City	0.9	8.4	8.6	3.0	5.7	4,352	1.0	10.0	10.2	3.5	6.7	5,148

Tab C Table 5. Aircraft Emissions within state waters boundaries by OPAREA

	Annual Totals in Tons per Year for Alternative 1					*Metric Tons*	*Annual Totals in Tons per Year for Alternative 2*					*Metric Tons*
Area	***VOCs***	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***	***VOCs***	***CO***	***NO_x***	***SO_x***	***PM***	***CO^2e***
Northeast	0	0	0	0	0	0	0	0	0	0	0	0
VACAPES	1.0	11.1	28.0	3.3	6.4	7,797	1.0	11.1	28.0	3.3	6.4	7,797
Cherry Pt	11.8	193.6	101.9	40.8	77.1	59,064	11.8	193.6	101.9	40.8	77.1	59,064
JAX	0.1	0.6	0.6	0.2	0.4	307	0.1	0.6	0.6	0.2	0.4	307
Key West	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0.0	0
GOMEX	0.0	0.1	0.1	0.0	0.1	39	0.0	0.1	0.1	0.0	0.1	39
Panama City	0.9	8.4	8.6	3.0	5.7	4,352	1.0	10.0	10.2	3.5	6.7	5,148

Tab C Table 6. Munition Emissions by OPAREA

	Alternative 1								Alternative 2							
	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	CO^2e	Pb	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	CO^2e	Pb
Location	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Mton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Mton/yr	Ton/yr
Northeast / NUWC Newport	0.0	0.7	0.0	0.0	1.1	0.8	1.51	0.0	0.0	0.7	0.0	0.0	1.1	0.8	1.50	0.0
Virginia Capes	0.0	49.2	0.9	0.0	33.7	25.8	38.42	0.2	0.0	49.2	0.9	0.0	33.7	25.8	38.42	0.2
Cherry Pt.	0.0	16.0	0.3	0.0	5.8	4.3	10.35	0.0	0.0	16.0	0.3	0.0	5.8	4.3	10.35	0.0
Jacksonville	0.0	34.8	0.6	0.0	19.1	14.3	31.03	0.2	0.0	34.8	0.6	0.0	19.1	14.3	31.03	0.2
Key West	0.0	2.9	0.1	0.0	0.8	0.5	3.02	0.0	0.0	2.9	0.1	0.0	0.8	0.5	3.02	0.0
GOMEX / Panama City	0.0	3.4	0.1	0.0	1.2	0.8	4.09	0.0	0.0	3.4	0.1	0.0	1.2	0.8	4.09	0.0
Other AFTT	0.0	1.4	0.0	0.0	0.4	0.3	0.65	0.0	0.0	1.4	0.0	0.0	0.4	0.3	0.65	0.0
Study Area Total	**0.04**	**108.39**	**1.95**	**0.01**	**62.08**	**46.77**	**89.07**	**0.44**	**0.04**	**108.39**	**1.95**	**0.01**	**62.07**	**46.76**	**89.07**	**0.44**

Tab C Table 7. Emissions within State Water Boundaries

	All Emissions in State Waters, Alternative 1 in tons/yr					All Emissions in State Waters, Alternative 2 in tons/yr				
Area	VOCs	CO	NO_x	SO_x	PM	VOCs	CO	NO_x	SO_x	PM
Northeast	4.1	10.2	99.4	14.9	3.4	4.1	10.2	98.8	14.7	3.4
VACAPES	6.9	57.7	186.6	32.1	11.6	7.2	60.1	190.8	32.5	11.8
Chesapeake Bay	37.8	139.5	746.9	104.3	36.8	37.8	139.5	746.9	104.3	36.8
Cherry Pt	0.1	0.3	2.2	0.5	0.1	11.9	193.8	103.6	41.1	77.2
Charleston	3.5	8.8	85.6	12.8	2.1	3.5	8.8	85.6	12.8	2.1
JAX	1.3	6.6	24.6	4.9	1.3	1.5	9.6	30.7	6.1	1.6
Cape Canaveral/ SE FL	3.8	9.5	92.7	13.8	3.2	3.8	9.5	92.7	13.8	3.2
Key West	0.0	0.1	0.7	0.2	0.0	0.0	0.1	0.6	0.1	0.0
Panama City	1.1	9.5	12.2	3.5	5.8	1.3	11.0	13.8	4.0	6.9
GOMEX	0.1	0.5	1.5	0.3	0.1	0.0	0.2	0.8	0.1	0.1
Outside RCs	0.1	0.4	2.4	0.5	0.1	2.6	28.4	66.3	11.7	2.6

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Tab D: Ship Emissions

Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 1*					
		Steaming Hrs[1]	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Annual Emissions in Tons*						*Restricted Waters Only Annual Emissions in Tons*					
		Open Water	*State Waters*	*Open Water*	*State Waters*	*CO*	*NOx*	*HC*	*SO_x*	*PM_{10}*	*CO^2*	*CO*	*NO_x*	*HC*	*SO_x*	*PM_{10}*	*CO^2*
CVN	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	2,761	57	1,728	35	1.70	23.14	0.43	1.92	0.17	946	0.00	0.05	0.00	0.00	0.00	2
	Cherry Pt	46	1	0	0	0.03	0.39	0.01	0.03	0.00	16	0.00	0.00	0.00	0.00	0.00	0
	JAX	1,207	13	1,032	10	0.74	10.11	0.19	0.84	0.07	413	0.00	0.01	0.00	0.00	0.00	0
	Key West	86	1	96	1	0.05	0.72	0.01	0.06	0.01	29	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	551	1	792	1	0.34	4.61	0.09	0.38	0.03	188	0.00	0.00	0.00	0.00	0.00	0
CG	Northeast	91	1	0	0	2.81	3.76	0.20	2.53	0.11	1,136	0.01	0.14	0.00	0.05	0.01	35
	VACAPES	6,699	137	4,032	81	207.93	286.11	14.64	190.08	8.22	85,811	1.90	19.56	0.17	7.53	0.69	4,784
	Cherry Pt	1,122	2	552	1	34.53	44.93	2.43	30.68	1.27	13,641	0.03	0.29	0.00	0.11	0.01	70
	JAX	2,756	28	3,384	34	85.15	113.66	5.99	76.64	3.24	34,313	0.39	4.00	0.03	1.54	0.14	978
	Key West	47	1	120	1	1.46	2.01	0.10	1.34	0.06	603	0.01	0.14	0.00	0.05	0.01	35
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	551	1	1,704	2	16.96	22.07	1.19	15.07	0.62	6,699	0.01	0.14	0.00	0.05	0.01	35
DDG -1000	Northeast	110	1	0	0	1.86	8.76	0.11	3.30	0.32	2,051	0.02	0.03	0.00	0.01	0.00	12
	VACAPES	15,326	313	16,272	325	263.47	1226.03	15.01	462.62	44.70	287,865	7.14	10.14	0.45	4.68	0.63	3,764
	Cherry Pt	47	1	1,368	1	0.81	3.76	0.05	1.42	0.14	883	0.02	0.03	0.00	0.01	0.00	12
	JAX	4,875	50	5,400	54	82.68	388.38	4.70	146.41	14.12	90,970	1.14	1.62	0.07	0.75	0.10	601
	Key West	86	1	96	1	1.46	6.86	0.08	2.58	0.25	1,606	0.02	0.03	0.00	0.01	0.00	12
	GOMEX	148	1	408	1	2.50	11.77	0.14	4.44	0.43	2,756	0.02	0.03	0.00	0.01	0.00	12
	Outside RCs	7,466	8	2,976	264	125.05	592.57	7.10	223.20	21.48	138,495	0.18	0.26	0.01	0.12	0.02	96
LCS	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
	VACAPES	0	0	3,240	65	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
	Cherry Pt	0	0	696	1	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
	JAX	756	14	9,000	90	17.99	71.67	1.25	18.92	2.57	9,723	0.55	1.06	0.04	0.16	0.05	77
	Key West	24	1	120	1	0.59	2.32	0.04	0.61	0.08	312	0.04	0.08	0.00	0.01	0.00	6
	GOMEX	3,858	7	120	1	89.28	360.81	6.17	95.82	12.89	49,253	0.28	0.53	0.02	0.08	0.03	39
	Outside RCs	314	1	8,592	536	7.28	29.41	0.50	7.81	1.05	4,014	0.02	0.04	0.00	0.01	0.00	3
LSD	Northeast	57	1	0	0	0.63	9.84	0.32	0.72	0.06	474	0.02	0.30	0.01	0.02	0.00	11
	VACAPES	2,756	57	2,400	48	30.42	478.18	15.52	35.19	3.05	23,014	1.14	17.22	0.58	1.29	0.06	602
	Cherry Pt	1,093	2	840	1	11.65	183.41	5.94	13.49	1.19	8,909	0.04	0.60	0.02	0.05	0.00	21
	JAX	14	1	0	0	0.17	2.64	0.09	0.19	0.02	124	0.02	0.30	0.01	0.02	0.00	11
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	19	1	0	0	0.22	3.48	0.11	0.26	0.02	165	0.02	0.30	0.01	0.02	0.00	11
	Outside RCs	1,088	2	1,128	50	11.60	182.58	5.92	13.43	1.18	8,869	0.04	0.60	0.02	0.05	0.00	21
LHA	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0	0	16	1	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0	0	2	1	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	62	1	22	1	0.26	8.75	0.46	2.11	0.26	1,132	0.00	0.14	0.01	0.03	0.00	18

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Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 1*					
		Steaming Hrs[1]	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Annual Emissions in Tons*						*Restricted Waters Only Annual Emissions in Tons*					
		Open Water	*State Waters*	*Open Water*	*State Waters*	*CO*	*NOx*	*HC*	*SO_x*	*PM_{10}*	*CO^2*	*CO*	*NO_x*	*HC*	*SO_x*	*PM_{10}*	*CO^2*
LHD	Northeast	57	1	0	0	0.23	1.38	0.17	2.77	0.83	1,381	0.00	0.02	0.00	0.06	0.01	24
	VACAPES	1,957	40	2,328	47	8.06	47.60	5.75	95.49	28.44	47,558	0.15	0.80	0.10	2.41	0.48	950
	Cherry Pt	1,155	2	1,056	1	4.67	27.66	3.34	55.05	16.52	27,555	0.01	0.04	0.01	0.12	0.02	47
	JAX	28	1	0	0	0.12	0.69	0.08	1.39	0.41	691	0.00	0.02	0.00	0.06	0.01	24
	Key West	47	1	0	0	0.19	1.14	0.14	2.30	0.68	1,143	0.00	0.02	0.00	0.06	0.01	24
	GOMEX	14	1	0	0	0.06	0.35	0.04	0.73	0.21	357	0.00	0.02	0.00	0.06	0.01	24
	Outside RCs	892	1	960	1	3.61	21.35	2.58	42.48	12.75	21,268	0.00	0.02	0.00	0.06	0.01	24
LPD	Northeast	67	1	0	0	1.07	9.25	0.57	1.27	0.11	569	0.01	0.13	0.01	0.02	0.00	8
	VACAPES	1,839	38	3,216	64	29.60	255.37	15.79	35.14	3.08	15,703	0.53	5.01	0.28	0.63	0.05	285
	Cherry Pt	758	1	888	1	11.99	103.33	6.40	14.24	1.25	6,362	0.01	0.13	0.01	0.02	0.00	8
	JAX	157	2	48	1	2.51	21.64	1.34	2.98	0.26	1,331	0.03	0.26	0.01	0.03	0.00	15
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	86	1	168	1	1.37	11.84	0.73	1.63	0.14	729	0.01	0.13	0.01	0.02	0.00	8
	Outside RCs	1,160	2	1,800	3	18.36	158.19	9.79	21.81	1.91	9,740	0.03	0.26	0.01	0.03	0.00	15
PC	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	122	3	8	2	20.64	4.64	0.38	1.03	0.14	480	0.06	0.12	0.01	0.03	0.00	12
	Cherry Pt	1,088	2	5	1	183.57	40.43	3.28	8.96	1.22	4,184	0.04	0.08	0.01	0.02	0.00	8
	JAX	622	7	44	5	105.07	23.34	1.90	5.17	0.70	2,416	0.15	0.27	0.03	0.06	0.01	28
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	33	1	2	1	5.59	1.26	0.10	0.28	0.04	131	0.02	0.04	0.00	0.01	0.00	4
	Outside RCs	311	1	22	1	52.48	11.57	0.94	2.56	0.35	1,198	0.02	0.04	0.00	0.01	0.00	4
JHSV	Northeast	0	0	11	1	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	621	13	23	6	119.97	232.82	5.35	35.45	11.31	16,951	0.66	1.30	0.03	0.20	0.06	94
	Cherry Pt	9	1	1	1	1.78	3.46	0.08	0.53	0.17	252	0.05	0.10	0.00	0.02	0.00	7
	JAX	123	2	8	1	23.73	46.06	1.06	7.01	2.24	3,353	0.10	0.20	0.00	0.03	0.01	15
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	43	1	9	1	8.31	16.13	0.37	2.46	0.78	1,174	0.05	0.10	0.00	0.02	0.00	7
	Outside RCs	311	1	45	1	59.80	116.05	2.67	17.67	5.64	8,449	0.05	0.10	0.00	0.02	0.00	7
MV	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	231	5	0	0	0.80	15.66	0.44	1.43	0.26	631	0.01	0.22	0.01	0.09	0.03	46
	Cherry Pt	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	1,026	2	2,256	2	3.50	68.70	1.92	5.99	1.06	2,621	0.00	0.09	0.00	0.04	0.01	18
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	451	1	312	1	1.54	30.20	0.84	2.63	0.47	1,153	0.00	0.04	0.00	0.02	0.01	9
SSGN	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	204	3	1,920	19	0.01	0.41	0.01	0.02	0.00	14	0.00	0.00	0.00	0.00	0.00	0
	Key West	566	1	888	1	0.03	1.15	0.02	0.07	0.01	37	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	148	1	240	1	0.01	0.30	0.01	0.02	0.00	10	0.00	0.00	0.00	0.00	0.00	0

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Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 1*					
		Steaming Hrs[1]	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Annual Emissions in Tons*						*Restricted Waters Only Annual Emissions in Tons*					
		Open Water	*State Waters*	*Open Water*	*State Waters*	*CO*	*NOx*	*HC*	*SO_x*	*PM_{10}*	*CO^2*	*CO*	*NO_x*	*HC*	*SO_x*	*PM_{10}*	*CO^2*
SSN	Northeast	10,050	11	0	0	0.60	4.57	0.25	0.85	0.15	409	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	3,871	80	6,888	138	0.23	1.76	0.10	0.33	0.06	158	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	354	1	0	0	0.02	0.16	0.01	0.03	0.01	14	0.00	0.00	0.00	0.00	0.00	0
	JAX	1,397	15	1,920	19	0.08	0.64	0.03	0.12	0.02	57	0.00	0.00	0.00	0.00	0.00	0
	Key West	129	1	0	0	0.01	0.06	0.00	0.01	0.00	5	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	23	1	0	0	0.00	0.01	0.00	0.00	0.00	1	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	11,458	12	20,424	7340	0.69	5.21	0.29	0.97	0.17	467	0.00	0.00	0.00	0.00	0.00	0
T-AH	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	38	1	72	1	0.27	2.02	0.13	1.41	0.40	698	0.01	0.05	0.00	0.04	0.01	18
	Cherry Pt	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	4	1	24	0	0.03	0.26	0.02	0.18	0.05	89	0.01	0.05	0.00	0.04	0.01	18
T-AKE	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	1,505	31	600	12	7.82	228.84	22.56	27.83	3.53	13,053	0.08	1.34	0.19	0.17	0.02	83
	Cherry Pt	331	1	144	1	1.70	50.08	4.93	6.09	0.77	2,855	0.00	0.04	0.01	0.01	0.00	3
	JAX	395	4	192	2	2.04	59.88	5.90	7.28	0.92	3,415	0.01	0.17	0.02	0.02	0.00	11
	Key West	19	1	0	0	0.10	2.92	0.29	0.35	0.04	166	0.00	0.04	0.01	0.01	0.00	3
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	892	1	3,888	4	4.59	134.88	13.27	16.40	2.08	7,690	0.00	0.04	0.01	0.01	0.00	3
T-AO	Northeast	9	1	0	0	0.25	3.48	0.11	0.23	0.02	102	0.02	0.27	0.01	0.02	0.00	8
	VACAPES	2,018	42	2,328	47	52.73	730.84	23.85	48.44	4.29	21,393	0.75	11.31	0.38	0.82	0.07	325
	Cherry Pt	1,098	2	624	1	28.31	392.04	12.79	25.95	2.30	11,479	0.04	0.54	0.02	0.04	0.00	15
	JAX	955	10	1,056	11	24.78	343.20	11.20	22.73	2.01	10,048	0.18	2.69	0.09	0.20	0.02	77
	Key West	139	1	0	0	3.60	49.83	1.63	3.30	0.29	1,459	0.02	0.27	0.01	0.02	0.00	8
	GOMEX	28	1	0	0	0.74	10.25	0.33	0.68	0.06	300	0.02	0.27	0.01	0.02	0.00	8
	Outside RCs	1,477	2	5,688	6	38.08	527.17	17.20	34.89	3.09	15,436	0.04	0.54	0.02	0.04	0.00	15
T-AOE	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	658	14	2,328	47	36.36	105.54	3.53	28.65	2.82	2,789	0.25	3.12	0.04	0.94	0.09	570
	Cherry Pt	283	1	624	1	15.55	44.27	1.50	11.99	1.18	995	0.02	0.22	0.00	0.07	0.01	41
	JAX	76	1	264	3	4.19	12.05	0.41	3.27	0.32	297	0.02	0.22	0.00	0.07	0.01	41
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
T-ARS	Northeast	4	1	0	0	0.01	0.08	0.00	0.02	0.00	9	0.00	0.02	0.00	0.00	0.00	2
	VACAPES	555	12	720	14	0.91	9.17	0.36	1.93	0.25	970	0.02	0.23	0.00	0.05	0.00	24
	Cherry Pt	268	1	0	0	0.43	4.34	0.17	0.91	0.12	459	0.00	0.02	0.00	0.00	0.00	2
	JAX	142	2	96	1	0.23	2.33	0.09	0.49	0.06	246	0.00	0.04	0.00	0.01	0.00	4
	Key West	499	1	0	0	0.80	8.06	0.32	1.69	0.22	853	0.00	0.02	0.00	0.00	0.00	2
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	758	1	2,784	3	1.21	12.23	0.48	2.57	0.34	1,295	0.00	0.02	0.00	0.00	0.00	2

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Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 1*					
		Steaming Hrs[1]	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Steaming Hrs[1]*	*Annual Emissions in Tons*						*Restricted Waters Only Annual Emissions in Tons*					
		Open Water	*State Waters*	*Open Water*	*State Waters*	*CO*	*NOx*	*HC*	*SO_x*	*PM_{10}*	*CO^2*	*CO*	*NO_x*	*HC*	*SO_x*	*PM_{10}*	*CO^2*
T-ATF	Northeast	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	527	11	816	16	4.92	28.26	0.57	2.12	0.25	974	0.07	0.77	0.01	0.06	0.01	27
	Cherry Pt	148	1	24	1	1.37	7.79	0.16	0.58	0.07	268	0.01	0.07	0.00	0.01	0.00	2
	JAX	204	3	0	0	1.90	10.85	0.22	0.81	0.09	374	0.02	0.21	0.00	0.02	0.00	7
	Key West	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	57	1	0	0	0.53	3.04	0.06	0.23	0.03	105	0.01	0.07	0.00	0.01	0.00	2

Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 2						*Alternative 2*					
		Annual Emissions in Tons						*Restricted Waters Only Annual Emissions in Tons*					
		CO	*NO_x*	*HC*	*SO_x*	*PM_{10}*	*CO^2*	*CO*	*NO_x*	*HC*	*SO_x*	*PM_{10}*	*CO^2*
CVN	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	1.06	14.48	0.27	1.20	0.10	592	0.00	0.03	0.00	0.00	0.00	1
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.64	8.64	0.16	0.72	0.06	353	0.00	0.01	0.00	0.00	0.00	0
	Key West	0.06	0.80	0.01	0.07	0.01	33	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.49	6.63	0.12	0.55	0.05	271	0.00	0.00	0.00	0.00	0.00	0
CG	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	125.13	172.00	8.81	114.33	4.94	51,597	1.12	11.56	0.10	4.45	0.41	2,828
	Cherry Pt	16.99	22.11	1.19	15.10	0.63	6,712	0.01	0.14	0.00	0.05	0.01	35
	JAX	104.55	139.50	7.35	94.08	3.98	42,118	0.47	4.85	0.04	1.87	0.17	1,187
	Key West	3.70	4.92	0.26	3.32	0.14	1,486	0.01	0.14	0.00	0.05	0.01	35
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	52.43	68.09	3.68	46.54	1.93	20,680	0.03	0.29	0.00	0.11	0.01	70
DG-1000	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	279.57	1,301.47	15.92	491.07	47.44	305,545	7.42	10.53	0.46	4.86	0.66	3,908
	Cherry Pt	22.90	108.56	1.30	40.89	3.94	25,371	0.02	0.03	0.00	0.01	0.00	12
	JAX	91.55	430.16	5.21	162.16	15.63	100,750	1.23	1.75	0.08	0.81	0.11	649
	Key West	1.63	7.65	0.09	2.88	0.28	1,792	0.02	0.03	0.00	0.01	0.00	12
	GOMEX	6.85	32.40	0.39	12.21	1.18	7,575	0.02	0.03	0.00	0.01	0.00	12
	Outside RCs	55.80	244.65	3.20	92.87	9.09	58,341	6.03	8.55	0.38	3.95	0.53	3,175
LCS	Northeast	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	77.32	307.53	5.37	81.16	11.05	41,691	2.57	4.96	0.20	0.76	0.24	361
	Cherry Pt	16.10	65.07	1.11	17.28	2.32	8,884	0.04	0.08	0.00	0.01	0.00	6
	JAX	211.19	847.33	14.63	224.38	30.35	115,306	3.56	6.87	0.28	1.05	0.33	500
	Key West	2.81	11.28	0.19	2.99	0.40	1,536	0.04	0.08	0.00	0.01	0.00	6
	GOMEX	2.81	11.28	0.19	2.99	0.40	1,536	0.04	0.08	0.00	0.01	0.00	6
	Outside RCs	219.42	843.26	15.34	219.45	30.64	112,580	21.20	40.90	1.64	6.24	1.98	2,979

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Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 2						*Alternative 2*					
		Annual Emissions in Tons						*Restricted Waters Only Annual Emissions in Tons*					
		CO	***NO_x***	***HC***	***SO_x***	***PM_{10}***	***CO^2***	***CO***	***NO_x***	***HC***	***SO_x***	***PM_{10}***	***CO^2***
LSD	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	26.46	415.91	13.50	30.61	2.66	20,024	0.96	14.50	0.49	1.09	0.05	507
	Cherry Pt	8.95	140.80	4.56	10.35	0.91	6,841	0.02	0.30	0.01	0.02	0.00	11
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	12.99	203.77	6.62	15.01	1.28	9,701	1.00	15.11	0.51	1.13	0.05	528
LHA	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0.07	2.36	0.12	0.57	0.07	305	0.00	0.14	0.01	0.03	0.00	18
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.01	0.42	0.02	0.10	0.01	54	0.00	0.14	0.01	0.03	0.00	18
	Outside RCs	0.10	3.24	0.17	0.78	0.10	419	0.00	0.14	0.01	0.03	0.00	18
LHD	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	9.59	56.62	6.84	113.56	33.82	56,560	0.18	0.94	0.12	2.84	0.57	1,116
	Cherry Pt	4.27	25.27	3.05	50.28	15.10	25,174	0.00	0.02	0.00	0.06	0.01	24
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	3.88	22.98	2.77	45.72	13.73	22,887	0.00	0.02	0.00	0.06	0.01	24
LPD	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	51.73	446.27	27.59	61.42	5.38	27,442	0.90	8.44	0.48	1.06	0.09	481
	Cherry Pt	14.05	121.02	7.49	16.68	1.46	7,452	0.01	0.13	0.01	0.02	0.00	8
	JAX	0.77	6.67	0.41	0.92	0.08	410	0.01	0.13	0.01	0.02	0.00	8
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	2.67	23.00	1.42	3.17	0.28	1,416	0.01	0.13	0.01	0.02	0.00	8
	Outside RCs	28.49	245.45	15.20	33.84	2.97	15,113	0.04	0.40	0.02	0.05	0.00	23
PC	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	1.39	0.38	0.03	0.08	0.01	39	0.04	0.08	0.01	0.02	0.00	8
	Cherry Pt	0.81	0.21	0.02	0.05	0.01	22	0.02	0.04	0.00	0.01	0.00	4
	JAX	7.60	1.84	0.15	0.41	0.06	190	0.11	0.19	0.02	0.04	0.01	20
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.41	0.13	0.01	0.03	0.00	13	0.02	0.04	0.00	0.01	0.00	4
	Outside RCs	3.67	0.84	0.07	0.19	0.03	87	0.02	0.04	0.00	0.01	0.00	4
JHSV	Northeast	2.16	4.20	0.10	0.64	0.20	306	0.05	0.10	0.00	0.02	0.00	7
	VACAPES	4.65	9.04	0.21	1.38	0.44	658	0.29	0.57	0.01	0.09	0.03	41
	Cherry Pt	0.24	0.47	0.01	0.07	0.02	34	0.05	0.10	0.00	0.02	0.00	7
	JAX	1.67	3.25	0.07	0.49	0.16	236	0.05	0.09	0.00	0.01	0.00	7
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	1.78	3.46	0.08	0.53	0.17	252	0.05	0.10	0.00	0.02	0.00	7
	Outside RCs	8.69	16.86	0.39	2.57	0.82	1,228	0.05	0.10	0.00	0.02	0.00	7

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Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 2						*Alternative 2*					
		Annual Emissions in Tons						*Restricted Waters Only Annual Emissions in Tons*					
		CO	***NO_x***	***HC***	***SO_x***	***PM_{10}***	***CO^2***	***CO***	***NO_x***	***HC***	***SO_x***	***PM_{10}***	***CO^2***
MV	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	7.70	150.95	4.21	13.12	2.31	5,740	0.00	0.09	0.00	0.04	0.01	18
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	1.07	20.91	0.58	1.83	0.32	800	0.00	0.04	0.00	0.02	0.01	9
SSGN	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.11	3.89	0.07	0.22	0.02	127	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.05	1.80	0.03	0.10	0.01	59	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.01	0.49	0.01	0.03	0.00	16	0.00	0.00	0.00	0.00	0.00	0
SSN	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0.41	3.14	0.17	0.59	0.10	281	0.00	0.01	0.00	0.00	0.00	1
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.12	0.87	0.05	0.16	0.03	78	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	1.26	9.62	0.51	1.81	0.31	861	0.04	0.33	0.00	0.07	0.00	29
T-AH	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	0.50	3.79	0.25	2.64	0.74	1,306	0.01	0.05	0.00	0.04	0.01	18
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.16	1.25	0.08	0.87	0.24	429	0.00	0.00	0.00	0.00	0.00	0
T-AKE	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	3.12	91.21	8.99	11.09	1.41	5,203	0.03	0.52	0.07	0.07	0.01	32
	Cherry Pt	0.74	21.81	2.15	2.65	0.34	1,244	0.00	0.04	0.01	0.01	0.00	3
	JAX	0.99	29.11	2.87	3.54	0.45	1,660	0.01	0.09	0.01	0.01	0.00	5
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	19.99	587.88	57.82	71.46	9.08	33,518	0.01	0.17	0.02	0.02	0.00	11
T-AO	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.02	0.27	0.01	0.02	0.00	8
	VACAPES	60.80	842.72	27.50	55.85	4.95	24,669	0.75	11.31	0.38	0.82	0.07	325
	Cherry Pt	16.09	222.76	7.27	14.74	1.31	6,522	0.04	0.54	0.02	0.04	0.00	15
	JAX	27.39	379.48	12.38	25.13	2.23	11,110	0.18	2.69	0.09	0.20	0.02	77
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.02	0.27	0.01	0.02	0.00	8
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.02	0.27	0.01	0.02	0.00	8
	Outside RCs	146.60	2,029.70	66.21	134.33	11.90	59,430	0.04	0.54	0.02	0.04	0.00	15

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Tab D Table 1. Vessel Steaming Hours by State vs International Waters and by OPAREA (continued)

		Alternative 2						*Alternative 2*					
		Annual Emissions in Tons						*Restricted Waters Only Annual Emissions in Tons*					
		CO	***NO_x***	***HC***	***SO_x***	***PM_{10}***	***CO^2***	***CO***	***NO_x***	***HC***	***SO_x***	***PM_{10}***	***CO^2***
T-AOE	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	128.59	372.84	12.48	101.19	9.97	9,766	0.82	10.46	0.14	3.15	0.29	1,915
	Cherry Pt	34.26	97.35	3.31	26.35	2.60	2,145	0.02	0.22	0.00	0.07	0.01	41
	JAX	14.54	41.76	1.41	11.32	1.12	1,013	0.05	0.67	0.01	0.20	0.02	122
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
T-ARS	Northeast	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0
	VACAPES	1.18	11.86	0.46	2.49	0.33	1,256	0.02	0.27	0.01	0.06	0.00	28
	Cherry Pt	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	JAX	0.16	1.57	0.06	0.33	0.04	166	0.00	0.02	0.00	0.00	0.00	2
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	4.46	44.89	1.77	9.44	1.24	4,754	0.01	0.06	0.00	0.01	0.00	6
T-ATF	Northeast	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	VACAPES	7.62	43.68	0.88	3.27	0.38	1,505	0.11	1.12	0.02	0.08	0.01	39
	Cherry Pt	0.23	1.32	0.03	0.10	0.01	46	0.01	0.07	0.00	0.01	0.00	2
	JAX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Key West	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	GOMEX	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0
	Outside RCs	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0

[1] Steaming hours provided by the US Navy, AFTT Gray Ship Steaming Hours for Air Analysis.docx, 12 September, 2016.

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Tab E: Training in State Waters

Tab E Table 1. State Waters Activities[1]

Total Annual Hours									
Vessel Type	***NE - Naragansett***	***VACAPES***	***Ches Bay + Tribe***	***Charleston***	***JAX /St Johns/ Mayport***	***Cape Canaveral/ SE FL***	***St. Andrews Bay / Panama City***	***Key West***	***GOMEX/ Corpus Christie***
RCB	1,616	0	14,072	0	0	2,676	0	0	0
RAB	1,616	0	16,204	0	0	2,676	0	0	0
RPB	1,616	0	23,752	0	0	2,676	0	0	0
SEA ARK	7,886	0	16,352	12,651	225	2,676	0	0	0
LCAC	0	3,278	8,013	0	750	0	0	0	0
LCU/LCM	0	1,080	1,426	0	0	0	0	0	0
RIB (Zodiac)	0	2,910	9,159	0	381	0	75	0	0
Mark V	0	660	2,987	0	200	0	75	0	0
CRRC	0	228	2,111	0	200	0	75	0	0
T-ATF	0	250	680	0	0	0	0	0	0
T-ARS	0	250	680	0	0	0	0	0	0
HSMST	0	0	36	0	0	0	0	0	0

[1] State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx

Emissions by Area

Tab E Table 2. Vessel Type NE - Naragansett Bay, RI

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	0.91	2.27	22.14	3.30	0.53	1,286
RAB	0.47	1.18	11.46	1.70	0.27	677
RPB	0.47	1.18	11.46	1.70	0.27	677
SEA ARK	2.21	5.48	53.39	7.96	1.30	2,913
LCAC (SSGTG/MPGT)(80/3955)	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0	0	0	0	0	0
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**4.1**	**10.1**	**98.4**	**14.7**	**2.4**	**5,552**

Tab E Table 3. Vessel Type VA Capes

	VOC	CO	NO_x	SO_x	$PM_{10}/PM_{2.5}$	CO_2
RCB	0	0	0	0	0	0
RPB	0	0	0	0	0	0
RAB	0	0	0	0	0	0
SEA ARK	0	0	0	0	0	0
LCAC	0.57	2.02	4.80	0.62	0.41	1,094
LCU/LCM	0.28	19.55	24.27	1.68	0.85	909
RIB (Zodiac)	0.09	0.49	13.30	2.10	0.22	1,693
Mark V	2.26	8.98	27.86	3.62	1.26	1,780
CRRC	0.00	0.03	0.11	0.00	0.00	10
T-ATF	0.26	2.30	13.04	0.98	0.11	449
T-ARS	0.16	0.40	4.03	0.85	0.11	426
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**3.6**	**33.8**	**87.4**	**9.8**	**3.0**	**6,363**

Tab E Table 4. Chesapeake Bay & Tributaries

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	7.91	19.78	192.79	28.70	4.65	11,195
RPB	4.08	10.27	99.77	14.85	2.39	5,893
RAB	4.08	10.27	99.77	14.85	2.39	5,893
SEA ARK	3.94	9.78	95.26	14.21	2.32	5,198
LCAC	1.40	4.93	11.74	1.52	1.00	2,674
LCU/LCM	0.37	25.82	32.05	2.22	1.12	1,201
RIB (Zodiac)	0.27	1.56	41.86	6.59	0.69	5,330
Mark V	10.23	40.62	126.08	16.37	5.69	8,057
CRRC	0.01	0.24	1.01	0.00	0.03	92
T-ATF	0.72	6.26	35.47	2.66	0.31	1,222
T-ARS	0.43	1.09	10.95	2.30	0.30	1,160
HSMST	3.65	8.88	0.13	0.00	0.01	8
Total Emissions in Tons	**37.1**	**139.5**	**746.9**	**104.3**	**20.9**	**47,922**

Tab E Table 5. Vessel Type Charleston

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	0	0	0	0	0	0
RPB	0	0	0	0	0	0
RAB	0	0	0	0	0	0
SEA ARK	3.54	8.79	85.65	12.78	2.09	4673
LCAC	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0	0	0	0	0	0
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
BW	0	0	0	0	0	0
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**3.5**	**8.8**	**85.6**	**12.8**	**2.1**	**4,673**

Tab E Table 6. Vessel Type JAX/ St John/ Mayport

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	0	0	0	0	0	0
RPB	0	0	0	0	0	0
RAB	0	0	0	0	0	0
SEA ARK	0.06	0.16	1.52	0.23	0.04	83
LCAC	0.13	0.46	1.10	0.14	0.09	250
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.01	0.06	1.74	0.27	0.03	222
Mark V	0.69	2.72	8.44	1.10	0.38	540
CRRC	0.00	0.02	0.10	0.00	0.00	9
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**0.9**	**3.4**	**12.9**	**1.7**	**0.5**	**1,103**

Tab E Table 7. Vessel Type Cape Canaveral/ SE FL

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	1.50	3.76	36.66	5.46	0.88	2,129
RPB	0.78	1.95	18.97	2.82	0.45	1,121
RAB	0.78	1.95	18.97	2.82	0.45	1,121
SEA ARK	0.75	1.86	18.12	2.70	0.44	988
LCAC	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0	0	0	0	0	0
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**3.81**	**9.53**	**92.73**	**13.81**	**2.23**	**5,359**

Tab E Table 8. Vessel Type Panama City

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	0	0	0	0	0	0
RPB	0	0	0	0	0	0
RAB	0	0	0	0	0	0
SEA ARK	0	0	0	0	0	0
LCAC	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0.00	0.01	0.34	0.05	0.01	44
Mark V	0.26	1.02	3.17	0.41	0.14	202
CRRC	0.00	0.01	0.04	0.00	0.00	3
BW	0	0	0	0	0	0
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**0.3**	**1.0**	**3.5**	**0.5**	**0.1**	**249**

Tab E Table 9. Vessel Type Key West

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	0	0	0	0	0	0
RPB	0	0	0	0	0	0
RAB	0	0	0	0	0	0
SEA ARK	0	0	0	0	0	0
LCAC	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0	0	0	0	0	0
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0**

Tab E Table 10. Vessel Type GOMEX/ Corpus Christie

	VOC	*CO*	*NO_x*	*SO_x*	*$PM_{10}/PM_{2.5}$*	*CO_2*
RCB	0	0	0	0	0	0
RPB	0	0	0	0	0	0
RAB	0	0	0	0	0	0
SEA ARK	0	0	0	0	0	0
LCAC	0	0	0	0	0	0
LCU/LCM	0	0	0	0	0	0
RIB (Zodiac)	0	0	0	0	0	0
Mark V	0	0	0	0	0	0
CRRC	0	0	0	0	0	0
BW	0	0	0	0	0	0
T-ATF	0	0	0	0	0	0
T-ARS	0	0	0	0	0	0
HSMST	0	0	0	0	0	0
Total Emissions in Tons	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0**

[1] State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx

Tab F: Inland Water Training Events and Locations[1]

Tab F Table 1. Inland Water Training Events and Locations

Event	*Locations*		*Hours*	*Boat Type*
Amphibious Vehicle Maneuvers				
	LCB	VA	1426	LCU
			8013	LCAC
			3390	RHIB
	VACAPES		1080	LCU
			3278	LCAC
			228	RHIB
Dive and Salvage				
	LCB	VA	780	RHIB
			780	CRRC
			780	MK V
	JR & Tributaries	VA	30	RHIB
			15	MK V
	NS Mayport	FL	160	RHIB
			160	MK V
			160	CRRC
Personnel Insertion/Extraction - Air				
	LCB	VA		
			358	CRRC
			701	RHIB
	JR & Tributaries	VA	595	RHIB
			595	CRRC
	YR	VA	44	RHIB
			12	CRRC
	VA CAPES	VA	220	RHIB
			108	CRRC
	NS Mayport	FL	40	RHIB
			40	CRRC
			40	MK V
	St Andrews Bay	FL	75	RHIB
			75	MK V
			75	CRRC
	St Johns River	FL	131	RHIB
			750	LCAC

Tab F Table 1. Inland Water Training Events and Locations (continued)

Personnel Insertion/Extraction -				
Surface and Subsurface				
	LCB	VA	112	CRRC
			168	RHIB
			3,198	RCB
			11,178	RPB
			3,198	SEA ARK
			3,198	RAB
	JR & Tributaries	VA	504	RHIB
			3734	RPB
			3734	RAB
			2034	RCB
			1530	SEA ARK
	YR	VA	1960	RPB
			1960	RAB
			1960	RCB
			1960	SEA ARK
U/W Mine Countermeasure				
	LCB	VA		
			1,647	RHIB
			1,647	RPB
			1,647	MK V
			505	T-ATF
			505	T-ARS
	JR & Tributaries	VA	545	RHIB
			545	MK V
	YR	VA	175	T-ATF
			175	T-ARS
			156	RHIB
	VA CAPES	VA	250	T-ATF
			250	T-ARS
			740	RHIB
			660	MK V
			120	CRRC
Maritime Security Operations	LCB	VA	135	RHIB
			2352	RAB
			4704	SEA ARK
			7	HSMST

Tab F Table 1. Inland Water Training Events and Locations (continued)

	NSN	VA	216	RHIB
			28.75	HSMST
	JR & Tributaries	VA	7,920	SEA ARK
	VA CAPES	VA	162	RHIB
	NS Mayport	FL	50	RHIB
	Naragansett Bay	RI	1616	RPB
			1616	RAB
			1616	RCB
			1616	SEA ARK
	Port Canaveral	FL	2676	RPB
			2676	RAB
			2676	RCB
			2676	SEA ARK
Precision Anchoring	JR & Tributaries	VA	150	RHIB
Search and Rescue	JR & Tributaries	VA	25	RHIB
	VA CAPES	VA	1560	RHIB
	NS Mayport	FL	28	RHIB
Waterborne Training	JR & Tributaries	VA	2880	RPB
			2880	RAB
			2880	RCB
			2880	SEA ARK
	LCB	VA		
			74	RHIB
			266	CRRC
			3040	RPB
			1120	RAB
			1120	RCB
			1120	SEA ARK
	YR		960	RPB
			960	RAB
			2880	RCB
			960	SEA ARK
	NS Mayport	FL	225	SEA ARK
	Narragansett Bay	RI	6270	SEA ARK
	Cooper River	SC	12651	SEA ARK

[1] State water activities provided by US Navy, *AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx*

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Tab G: Aircraft Emissions

Tab G Table 1. Training Aircraft Operational Hours below 3,000 Ft (except for GHG) by OPAREA (all activities in international waters)

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 2*					
			Cruise[1]		*Cruise*[1]	*Annual Emissions in Tons*						*Annual Emissions in Tons*					
		LTOs (#)[1]	(Hrs)	LTOs (#)[1]	(Hrs)	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO^2e	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO^2e
F-18/EA-18G	VACAPES	58	37	58	37	1.63	6.97	1.69	0.42	1.18	583	1.63	6.97	1.69	0.42	1.18	583
	GOMEX		5		5	0.01	0.04	0.11	0.04	0.10	52	0.01	0.04	0.11	0.04	0.10	52
	JAX	491	41	491	41	13.34	57.07	8.27	1.53	4.25	2092	13.34	57.07	8.27	1.53	4.25	2,092
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	157	24	157	24	4.29	18.34	2.90	0.57	1.60	787	4.29	18.34	2.90	0.57	1.60	787
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	58	37	58	37	0.25	18.61	9.22	2.36	1.30	3713	0.25	18.61	9.22	2.36	1.30	3,713
F-35	GOMEX		5		5	0.03	2.43	1.11	0.31	0.17	467	0.03	2.43	1.11	0.31	0.17	467
	JAX	491	41	491	41	0.38	24.13	17.01	3.10	1.47	5759	0.38	24.13	17.01	3.10	1.47	5,759
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	157	24	157	24	0.19	13.24	7.97	1.69	0.87	2905	0.19	13.24	7.97	1.69	0.87	2,905
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MV-22	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	110		110		0.00	0.17	0.39	0.11	0.07	163.4	0.00	0.17	0.39	0.11	0.07	163.41
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES		15		15	0.02	0.07	0.31	0.08	0.15	119	0.02	0.07	0.31	0.08	0.15	119
P-3	GOMEX		15		15	0.02	0.07	0.31	0.08	0.15	119	0.02	0.07	0.31	0.08	0.15	119
	JAX		53		53	0.06	0.23	1.07	0.28	0.51	410	0.06	0.23	1.07	0.28	0.51	410
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast		8		8	0.01	0.03	0.16	0.04	0.08	61	0.01	0.03	0.16	0.04	0.08	61
	Cherry Pt		4		4	0.00	0.02	0.08	0.02	0.04	31	0.00	0.02	0.08	0.02	0.04	31
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES		64		64	0.08	1.10	7.45	0.77		1088	0.08	1.10	7.45	0.77	0.00	1,088
P-8	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		185		185	0.23	3.17	21.40	2.20		3124	0.23	3.17	21.40	2.20	0.00	3,124
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast		42		42	0.05	0.73	4.91	0.51		718	0.05	0.73	4.91	0.51	0.00	718
	Cherry Pt		16		16	0.02	0.28	1.89	0.19		276	0.02	0.28	1.89	0.19	0.00	276
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Tab G Table 1. Training Aircraft Operational Hours below 3,000 Ft (except for GHG) by OPAREA (all activities in international waters) (continued)

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 2*					
			Cruise[1]		*Cruise*[1]	*Annual Emissions in Tons*						*Annual Emissions in Tons*					
		LTOs (#)[1]	(Hrs)	LTOs (#)[1]	(Hrs)	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO^2e	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO^2e
AV-8B	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	107	3	107	3	0.50	2.64	0.49	0.15	0.41	211	0.50	2.64	0.49	0.15	0.41	211
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	64	14,149	64	19,914	5.41	53.36	54.41	18.88	35.70	27395	7.60	74.97	76.54	26.56	50.23	38,534
H-60	GOMEX		2,469		2,517	0.94	9.25	9.48	3.29	6.22	4770	0.95	9.43	9.66	3.35	6.34	4,863
	JAX	129	2,447	129	3,107	1.02	9.80	9.57	3.33	6.28	4836	1.27	12.28	12.10	4.21	7.94	6,111
	Key West		243		816	0.09	0.91	0.93	0.32	0.61	470	0.31	3.06	3.13	1.09	2.06	1,577
	Northeast		1,843		3,315	0.70	6.91	7.07	2.45	4.64	3561	1.26	12.43	12.73	4.41	8.35	6,405
	Cherry Pt	234	612	234	612	0.40	3.43	2.67	0.95	1.75	1377	0.40	3.43	2.67	0.95	1.75	1,377
	Panama City		2,252		2,664	0.85	8.44	8.65	3.00	5.67	4352	1.01	9.99	10.23	3.55	6.71	5,148
	VACAPES		1,812			0.42	8.35	85.02	0.00	0.61	13807	0.42	8.35	85.02	0.00	0.61	13,807
H-53	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		342			0.08	1.58	16.05	0.00	0.12	2607	0.08	1.58	16.05	0.00	0.12	2,607
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		250			0.06	1.15	11.73	0.00	0.08	1905	0.06	1.15	11.73	0.00	0.08	1,905
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES		398			0.02	0.14	0.80	0.31	0.58	442	0.02	0.14	0.80	0.31	0.58	442
UH-1	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		118			0.01	0.04	0.24	0.09	0.17	131	0.01	0.04	0.24	0.09	0.17	131
	Key West		24			0.00	0.01	0.05	0.02	0.03	27	0.00	0.01	0.05	0.02	0.03	27
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		27			0.00	0.01	0.05	0.02	0.04	30	0.00	0.01	0.05	0.02	0.04	30
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AH-1	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX		2			0.00	0.01	0.00	0.00	0.00	3	0.00	0.01	0.00	0.00	0.00	3
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt		5			0.00	0.02	0.01	0.00	0.01	7	0.00	0.02	0.01	0.00	0.01	7
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES		13			0.00	0.02	0.15	0.02	0.00	31	0.00	0.02	0.15	0.02	0.00	31
Learjet	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Tab G Table 1. Training Aircraft Operational Hours below 3,000 Ft (except for GHG) by OPAREA (all activities in international waters) (continued)

		Alternative 1		*Alternative 2*		*Alternative 1*						*Alternative 2*					
			Cruise[1]		*Cruise*[1]	*Annual Emissions in Tons*						*Annual Emissions in Tons*					
		LTOs (#)[1]	(Hrs)	LTOs (#)[1]	(Hrs)	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO^2e	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO^2e
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tab G Table 2. Aircraft Operational Hours below 3,000 Ft (except for GHG) by OPAREA (all activities in state waters)

		Alternative 1							*Alternative 2*						
		Cruise[1]	*Annual Emissions in Tons*						*Cruise*	*Annual Emissions in Tons*					
		(Hrs)	*VOC*	*CO*	*NOx*	*SO2*	$PM_{10/2.5}$	*CO2e*	*(Hrs)*	*VOC*	*CO*	*NOx*	*SO2*	$PM_{10/2.5}$	*CO2e*
H-60	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	2,489	0.94	9.33	9.56	3.31	6.27	4810	2,489	0.94	9.33	9.56	3.31	6.27	4,810
	Cherry Pt	2	0.00	0.01	0.01	0.00	0.01	5	2	0.00	0.01	0.01	0.00	0.01	5
	JAX	159	0.06	0.60	0.61	0.21	0.40	307	159	0.06	0.60	0.61	0.21	0.40	307
	Key West									0.00	0.00	0.00	0.00	0.00	0
	GOMEX	20	0.01	0.07	0.08	0.03	0.05	39	20	0.01	0.07	0.08	0.03	0.05	39
	Panama City	2,252	0.85	8.44	8.65	3.00	5.67	4352	2,664	1.01	9.99	10.23	3.55	6.71	5,148
H-53	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	392	0.09	1.81	18.40	0.00	0.13	2988	392	0.09	1.81	18.40	0.00	0.13	2,988
	Cherry Pt	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UH-1	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AH-1	Northeast	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VACAPES	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cherry Pt	22	11.83	193.56	101.92	40.77	77.13	59060	22	11.83	193.56	101.92	40.77	77.13	59,060
	JAX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Key West	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GOMEX	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Panama City	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] LTOs and Cruise time from US Navy, NAVAIR Assumptions.docx, Marine Corps Training Cycle.xlsx, C2X sorties hours.xlsx, IKE C2X.xlsx. AFTT Training Air Analysis.xlsx.

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Tab H: Munition Emissions

Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1]

Category	Location – Range Complex	Number of Items (Annual) for Training & Testing Activities	Number of Items (Annual) for Training & Testing Activities	Emission Factors (lb/item)								Emissions (lb/year) Alternative 1							
		Alternative 1	Alternative 2	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO^2	Pb	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	CO_2	Pb
Bombs																			
Bombs (High Explosive)	Northeast / NUWC Newport	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Virginia Capes	92	92	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5612.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cherry Pt.	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Jacksonville	56	56	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3416.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Key West	0	0	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	4	4	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	244.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other AFTT	12	12	61.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	732.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**164**	**164**																
Projectiles																			
Small Caliber (Non-Explosive Practice Munitions)	Northeast / NUWC Newport	31,800	31,800	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	57.24	0.89	0.00	0.00	3.12	2.80	66.78	0.38
	Virginia Capes	2,344,800	2,344,800	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	4220.64	65.65	0.00	0.00	229.79	206.34	4924.08	28.14
	Cherry Pt.	397,800	397,800	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	716.04	11.14	0.00	0.00	38.98	35.01	835.38	4.77
	Jacksonville	1,035,800	1,035,800	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	1864.44	29.00	0.00	0.00	101.51	91.15	2175.18	12.43
	Key West	4,800	4,800	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	8.64	0.13	0.00	0.00	0.47	0.42	10.08	0.06
	GOMEX / NSWC Panama City	107,800	107,800	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	194.04	3.02	0.00	0.00	10.56	9.49	226.38	1.29
	Other AFTT	100,000	100,000	0.00	2.80E-05	0.00	0.00	9.80E-05	8.80E-05	0.00	1.20E-05	180.00	2.80	0.00	0.00	9.80	8.80	210.00	1.20
	Total	4,022,800	4,022,800																

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Category	*Location – Range Complex*	*Number of Items (Annual) for Training & Testing Activities*	*Number of Items (Annual) for Training & Testing Activities*	*Emission Factors (lb/item)*								*Emissions (lb/year) Alternative 1*							
		Alternative 1	*Alternative 2*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*	*Pb*
Medium Caliber (High Explosive)	Northeast / NUWC Newport	3,860	3,860	0.085	0.0015	0.0000	0.0000	0.0033	0.0017	0.043	0.000049	328.10	5.79	0.00	0.00	12.74	6.56	165.98	0.19
	Virginia Capes	63,370	63,370	0.085	0.0015	0.0000	0.0000	0.0033	0.0017	0.043	0.000049	5386.45	95.06	0.00	0.00	209.12	107.73	2724.91	3.11
	Cherry Pt.	23,360	23,360	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.000049	1985.60	35.04	0.00	0.00	77.09	39.71	1004.48	1.14
	Jacksonville	60,460	60,460	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.000049	5139.10	90.69	0.00	0.00	199.52	102.78	2599.78	2.96
	Key West	3,360	3,360	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.000049	285.60	5.04	0.00	0.00	11.09	5.71	144.48	0.16
	GOMEX / NSWC Panama City	9,360	9,360	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.000049	795.60	14.04	0.00	0.00	30.89	15.91	402.48	0.46
	Other AFTT	0	0	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.000049	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	163,770	163,770																
Medium Caliber (Non-Explosive Practice Munitions)	Northeast / NUWC Newport	10,060	10,060	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	855.10	15.09	0.00	0.00	33.20	17.10	432.58	0.49
	Virginia Capes	893,226	893,226	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	75924.21	1339.84	0.00	0.00	2947.65	1518.48	38408.72	43.77
	Cherry Pt.	336,309	336,309	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	28586.27	504.46	0.00	0.00	1109.82	571.73	14461.29	16.48
	Jacksonville	621,221	621,221	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	52803.79	931.83	0.00	0.00	2050.03	1056.08	26712.50	30.44
	Key West	60,660	60,660	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	5156.10	90.99	0.00	0.00	200.18	103.12	2608.38	2.97
	GOMEX / NSWC Panama City	56,910	56,910	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	4837.35	85.37	0.00	0.00	187.80	96.75	2447.13	2.79
	Other AFTT	21,150	21,150	0.0850	0.0015	0.0000	0.0000	0.0033	0.0017	0.0430	0.0000	1797.75	31.73	0.00	0.00	69.80	35.96	909.45	1.04
	Total	1,999,536	1,999,536																
Large Caliber (High Explosive)	Northeast / NUWC Newport	1,632	1,632	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	158.30	26.11	0.00	0.00	277.44	151.78	2284.80	1.13
	Virginia Capes	5,525	5,525	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	535.93	88.40	0.00	0.00	939.25	513.83	7735.00	3.81
	Cherry Pt.	1,842	1,842	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	178.67	29.47	0.00	0.00	313.14	171.31	2578.80	1.27
	Jacksonville	8,518	8,518	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	826.25	136.29	0.00	0.00	1448.06	792.17	11925.20	5.88
	Key West	2,332	2,332	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	226.20	37.31	0.00	0.00	396.44	216.88	3264.80	1.61
	GOMEX / NSWC Panama City	2,637	2,637	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	255.79	42.19	0.00	0.00	448.29	245.24	3691.80	1.82
	Other AFTT	114	114	0.0970	0.0160	0.0000	0.0000	0.1700	0.0930	1.4000	0.0007	11.06	1.82	0.00	0.00	19.38	10.60	159.60	0.08
	Total	22,600	22,600																

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Category	*Location – Range Complex*	*Number of Items (Annual) for Training & Testing Activities*	*Number of Items (Annual) for Training & Testing Activities*	*Emission Factors (lb/item)*								*Emissions (lb/year) Alternative 1*							
		Alternative 1	*Alternative 2*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*	*Pb*
Large Caliber (Non-Explosive Practice Munition)	Northeast / NUWC Newport	1,761	1,761	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Virginia Capes	13,077	13,077	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cherry Pt.	3,714	3,714	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Jacksonville	17,058	17,058	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Key West	3,190	3,190	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	3,552	3,552	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other AFTT	210	210	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	42,562	42,562																
Rockets (High Explosive)	Northeast / NUWC Newport	0	0	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Virginia Capes	1,954	1,954	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	2931.00	50.80	0.00	0.00	214.94	195.40	4689.60	99.65
	Cherry Pt.	76	76	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	114.00	1.98	0.00	0.00	8.36	7.60	182.40	3.88
	Jacksonville	2,024	2,024	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	3036.00	52.62	0.00	0.00	222.64	202.40	4857.60	103.22
	Key West	0	0	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	190	190	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	285.00	4.94	0.00	0.00	20.90	19.00	456.00	9.69
	Other AFTT	0	0	1.5000	0.0260	0.0000	0.0000	0.1100	0.1000	2.4000	0.0510	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	4,244	4,244																
Rockets (Non-Explosive)	Northeast / NUWC Newport	2	2	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	1.06	0.00	0.00	0.00	0.32	0.34	9.60	0.14
	Virginia Capes	2,938	2,938	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	1557.14	0.00	0.00	0.00	470.08	499.46	14102.40	205.66
	Cherry Pt.	304	304	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	161.12	0.00	0.00	0.00	48.64	51.68	1459.20	21.28
	Jacksonville	2,748	2,748	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	1456.44	0.00	0.00	0.00	439.68	467.16	13190.40	192.36
	Key West	0	0	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	192	192	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	101.76	0.00	0.00	0.00	30.72	32.64	921.60	13.44
	Other AFTT	0	0	0.5300	0.0000	0.0000	0.0000	0.1600	0.1700	4.8000	0.0700	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	6,184	6,184																

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Category	*Location – Range Complex*	*Number of Items (Annual) for Training & Testing Activities*	*Number of Items (Annual) for Training & Testing Activities*	*Emission Factors (lb/item)*								*Emissions (lb/year) Alternative 1*							
		Alternative 1	*Alternative 2*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*	*Pb*
Pyrotechnic Buoys (e.g. MK-58 Marine Marker)	Northeast / NUWC Newport	0	0	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Virginia Capes	1,022	1,022	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	909.58	2.86	22.48	3.27	30660.00	23506.00	521.22	16.35
	Cherry Pt.	332	332	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	295.48	0.93	7.30	1.06	9960.00	7636.00	169.32	5.31
	Jacksonville	1,060	1,060	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	943.40	2.97	23.32	3.39	31800.00	24380.00	540.60	16.96
	Key West	30	30	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	26.70	0.08	0.66	0.10	900.00	690.00	15.30	0.48
	GOMEX / NSWC Panama City	53	53	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	47.17	0.15	1.17	0.17	1590.00	1219.00	27.03	0.85
	Other AFTT	24	24	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	21.36	0.07	0.53	0.08	720.00	552.00	12.24	0.38
	Total	2,521	2,521																
Grenades	Northeast / NUWC Newport	56	56	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	Virginia Capes	4,070	4,070	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	Cherry Pt.	28	28	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	Jacksonville	28	28	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	Key West	0	0	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	GOMEX / NSWC Panama City	28	28	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	Other AFTT	0	0	0.0008	0.0007	0.0000	0.0260	0.0700	0.0490	0.0110	0.0000	0.04	0.04	0.00	1.38	3.71	2.60	0.58	0.00
	Total	4,210	4,210																
Flares (countermeasure)	Northeast / NUWC Newport	0	0	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	Virginia Capes	21,235	21,235	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	Cherry Pt.	22,348	22,348	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	Jacksonville	38,048	38,048	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	Key West	31,008	31,008	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	GOMEX / NSWC Panama City	2,440	2,440	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	Other AFTT	0	0	0.0013	0.0001	0.0004	0.0000	0.0062	0.0062	0.0110	0.0000	0.07	0.01	0.02	0.00	0.33	0.33	0.58	0.00
	Total	115,079	115,079																

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Category	*Location – Range Complex*	*Number of Items (Annual) for Training & Testing Activities*	*Number of Items (Annual) for Training & Testing Activities*	*Emission Factors (lb/item)*								*Emissions (lb/year) Alternative 1*							
		Alternative 1	*Alternative 2*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO_2*	*Pb*
Illumination Flares	Northeast / NUWC Newport	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Virginia Capes	40	40	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.44	0.12	0.01	0.00	4.80	4.80	5.60	0.00
	Cherry Pt.	48	48	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.53	0.15	0.02	0.00	5.76	5.76	6.72	0.00
	Jacksonville	48	48	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.53	0.15	0.02	0.00	5.76	5.76	6.72	0.00
	Key West	8	8	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.09	0.02	0.00	0.00	0.96	0.96	1.12	0.00
	GOMEX / NSWC Panama City	28	28	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.31	0.09	0.01	0.00	3.36	3.36	3.92	0.00
	Other AFTT	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	172	172																

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 1								Emissions (lb/year) Alternative 2							
CO	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5612.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3416.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	244.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	732.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57.24	0.89	0.00	0.00	3.12	2.80	66.78	0.38
2.1	0.0	0.0	0.0	0.1	0.1	2.5	0.0	4220.64	65.65	0.00	0.00	229.79	206.34	4924.08	28.14
0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0	716.04	11.14	0.00	0.00	38.98	35.01	835.38	4.77
0.9	0.0	0.0	0.0	0.1	0.0	1.1	0.0	1864.44	29.00	0.00	0.00	101.51	91.15	2175.18	12.43
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.64	0.13	0.00	0.00	0.47	0.42	10.08	0.06
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	194.04	3.02	0.00	0.00	10.56	9.49	226.38	1.29
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	180.00	2.80	0.00	0.00	9.80	8.80	210.00	1.20
3.6	**0.1**	**0.0**	**0.0**	**0.2**	**0.2**	**4.2**	**0.0**								
0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	328.10	5.79	0.00	0.00	12.74	6.56	165.98	0.19
2.7	0.0	0.0	0.0	0.1	0.1	1.4	0.0	5386.45	95.06	0.00	0.00	209.12	107.73	2724.91	3.11
1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1985.60	35.04	0.00	0.00	77.09	39.71	1004.48	1.14
2.6	0.0	0.0	0.0	0.1	0.1	1.3	0.0	5139.10	90.69	0.00	0.00	199.52	102.78	2599.78	2.96
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	285.60	5.04	0.00	0.00	11.09	5.71	144.48	0.16
0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	795.60	14.04	0.00	0.00	30.89	15.91	402.48	0.46
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7.0	**0.1**	**0.0**	**0.0**	**0.3**	**0.1**	**3.5**	**0.0**								
0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	855.10	15.09	0.00	0.00	33.20	17.10	432.58	0.49
38.0	0.7	0.0	0.0	1.5	0.8	19.2	0.0	75924.21	1339.84	0.00	0.00	2947.65	1518.48	38408.72	43.77
14.3	0.3	0.0	0.0	0.6	0.3	7.2	0.0	28586.27	504.46	0.00	0.00	1109.82	571.73	14461.29	16.48

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 1								*Emissions (lb/year) Alternative 2*							
CO	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
26.4	0.5	0.0	0.0	1.0	0.5	13.4	0.0	52803.79	931.83	0.00	0.00	2050.03	1056.08	26712.50	30.44
2.6	0.0	0.0	0.0	0.1	0.1	1.3	0.0	5156.10	90.99	0.00	0.00	200.18	103.12	2608.38	2.97
2.4	0.0	0.0	0.0	0.1	0.0	1.2	0.0	4837.35	85.37	0.00	0.00	187.80	96.75	2447.13	2.79
0.9	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1797.75	31.73	0.00	0.00	69.80	35.96	909.45	1.04
85.0	**1.5**	**0.0**	**0.0**	**3.3**	**1.7**	**43.0**	**0.0**								
0.1	0.0	0.0	0.0	0.1	0.1	1.1	0.0	158.30	26.11	0.00	0.00	277.44	151.78	2284.80	1.13
0.3	0.0	0.0	0.0	0.5	0.3	3.9	0.0	535.93	88.40	0.00	0.00	939.25	513.83	7735.00	3.81
0.1	0.0	0.0	0.0	0.2	0.1	1.3	0.0	178.67	29.47	0.00	0.00	313.14	171.31	2578.80	1.27
0.4	0.1	0.0	0.0	0.7	0.4	6.0	0.0	826.25	136.29	0.00	0.00	1448.06	792.17	11925.20	5.88
0.1	0.0	0.0	0.0	0.2	0.1	1.6	0.0	226.20	37.31	0.00	0.00	396.44	216.88	3264.80	1.61
0.1	0.0	0.0	0.0	0.2	0.1	1.8	0.0	255.79	42.19	0.00	0.00	448.29	245.24	3691.80	1.82
0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	11.06	1.82	0.00	0.00	19.38	10.60	159.60	0.08
1.1	**0.2**	**0.0**	**0.0**	**1.9**	**1.1**	**15.8**	**0.0**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.5	0.0	0.0	0.0	0.1	0.1	2.3	0.0	2931.00	50.80	0.00	0.00	214.94	195.40	4689.60	99.65
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	114.00	1.98	0.00	0.00	8.36	7.60	182.40	3.88
1.5	0.0	0.0	0.0	0.1	0.1	2.4	0.1	3036.00	52.62	0.00	0.00	222.64	202.40	4857.60	103.22
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	285.00	4.94	0.00	0.00	20.90	19.00	456.00	9.69
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 1								*Emissions (lb/year) Alternative 2*							
CO	*NOx*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*
3.2	**0.1**	**0.0**	**0.0**	**0.2**	**0.2**	**5.1**	**0.1**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.06	0.00	0.00	0.00	0.32	0.34	9.60	0.14
0.8	0.0	0.0	0.0	0.2	0.2	7.1	0.1	1557.14	0.00	0.00	0.00	470.08	499.46	14102.40	205.66
0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0	161.12	0.00	0.00	0.00	48.64	51.68	1459.20	21.28
0.7	0.0	0.0	0.0	0.2	0.2	6.6	0.1	1456.44	0.00	0.00	0.00	439.68	467.16	13190.40	192.36
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0	101.76	0.00	0.00	0.00	30.72	32.64	921.60	13.44
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.6	**0.0**	**0.0**	**0.0**	**0.5**	**0.5**	**14.8**	**0.2**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.5	0.0	0.0	0.0	15.3	11.8	0.3	0.0	909.58	2.86	22.48	3.27	30660.00	23506.00	521.22	16.35
0.1	0.0	0.0	0.0	5.0	3.8	0.1	0.0	295.48	0.93	7.30	1.06	9960.00	7636.00	169.32	5.31
0.5	0.0	0.0	0.0	15.9	12.2	0.3	0.0	943.40	2.97	23.32	3.39	31800.00	24380.00	540.60	16.96
0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0	26.70	0.08	0.66	0.10	900.00	690.00	15.30	0.48
0.0	0.0	0.0	0.0	0.8	0.6	0.0	0.0	47.17	0.15	1.17	0.17	1590.00	1219.00	27.03	0.85
0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	21.36	0.07	0.53	0.08	720.00	552.00	12.24	0.38
1.1	**0.0**	**0.0**	**0.0**	**37.8**	**29.0**	**0.6**	**0.0**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.03	0.07	0.05	0.01	0.00
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 1								*Emissions (lb/year) Alternative 2*							
CO	***NOx***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**								
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.44	0.12	0.01	0.00	4.80	4.80	5.60	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.53	0.15	0.02	0.00	5.76	5.76	6.72	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.53	0.15	0.02	0.00	5.76	5.76	6.72	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.09	0.02	0.00	0.00	0.96	0.96	1.12	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.31	0.09	0.01	0.00	3.36	3.36	3.92	0.00
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**								

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Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.1	0.0	0.0	0.0	0.1	0.1	2.5	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.4	0.0
0.9	0.0	0.0	0.0	0.1	0.0	1.1	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
3.6	**0.1**	**0.0**	**0.0**	**0.2**	**0.2**	**4.2**	**0.0**
0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0

Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
2.7	0.0	0.0	0.0	0.1	0.1	1.4	0.0
1.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
2.6	0.0	0.0	0.0	0.1	0.1	1.3	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7.0	**0.1**	**0.0**	**0.0**	**0.3**	**0.1**	**3.5**	**0.0**
0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0
38.0	0.7	0.0	0.0	1.5	0.8	19.2	0.0
14.3	0.3	0.0	0.0	0.6	0.3	7.2	0.0
26.4	0.5	0.0	0.0	1.0	0.5	13.4	0.0
2.6	0.0	0.0	0.0	0.1	0.1	1.3	0.0
2.4	0.0	0.0	0.0	0.1	0.0	1.2	0.0
0.9	0.0	0.0	0.0	0.0	0.0	0.5	0.0
85.0	**1.5**	**0.0**	**0.0**	**3.3**	**1.7**	**43.0**	**0.0**
0.1	0.0	0.0	0.0	0.1	0.1	1.1	0.0
0.3	0.0	0.0	0.0	0.5	0.3	3.9	0.0
0.1	0.0	0.0	0.0	0.2	0.1	1.3	0.0
0.4	0.1	0.0	0.0	0.7	0.4	6.0	0.0
0.1	0.0	0.0	0.0	0.2	0.1	1.6	0.0

Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.1	0.0	0.0	0.0	0.2	0.1	1.8	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1.1	**0.2**	**0.0**	**0.0**	**1.9**	**1.1**	**15.8**	**0.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.0	0.0	0.0	0.1	0.1	2.3	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
1.5	0.0	0.0	0.0	0.1	0.1	2.4	0.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
3.2	**0.1**	**0.0**	**0.0**	**0.2**	**0.2**	**5.1**	**0.1**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.8	0.0	0.0	0.0	0.2	0.2	7.1	0.1
0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.0
0.7	0.0	0.0	0.0	0.2	0.2	6.6	0.1
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	0.0	0.0	0.0	0.0	0.0	0.5	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.6	**0.0**	**0.0**	**0.0**	**0.5**	**0.5**	**14.8**	**0.2**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.5	0.0	0.0	0.0	15.3	11.8	0.3	0.0
0.1	0.0	0.0	0.0	5.0	3.8	0.1	0.0
0.5	0.0	0.0	0.0	15.9	12.2	0.3	0.0
0.0	0.0	0.0	0.0	0.5	0.3	0.0	0.0
0.0	0.0	0.0	0.0	0.8	0.6	0.0	0.0
0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0
1.1	**0.0**	**0.0**	**0.0**	**37.8**	**29.0**	**0.6**	**0.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Tab H Table 1. Munition Emissions Estimates – Testing and Training – Offshore [1] (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Tab H Table 2. Munition Emissions Estimates – Testing and Training – Statewaters

Category	*Location – Range Complex*	*Number of Items (Annual) for Training & Testing Activities*	*Number of Items (Annual) for Training & Testing Activities*	*Emission Factors (lb/item)*								*Emissions (lb/year) Alternative 1*							
		Alternative 1	*Alternative 2*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO2*	*Pb*
Small Caliber	Northeast / NUWC Newport	8,320	8,320	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	14.98	0.23	0.00	0.00	0.82	0.73	17.47	0.10
	Virginia Capes/ Ches Bay + Trib	175,920	175,920	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	316.66	4.93	0.00	0.00	17.24	15.48	369.43	2.11
	Cherry Pt./Charleston	5,100	5,100	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	9.18	0.14	0.00	0.00	0.50	0.45	10.71	0.06
	Jacksonville/ C Canaveral	12,800	12,800	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	23.04	0.36	0.00	0.00	1.25	1.13	26.88	0.15
	Key West	0	0	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	0	0	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other AFTT	0	0	1.80E-03	2.80E-05	0.00E+00	0.00E+00	9.80E-05	8.80E-05	2.10E-03	1.20E-05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**202,140**	**202,140**																
Pyrotechnic Buoys (e.g. MK-58 Marine Marker)	Northeast / NUWC Newport	64	64	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	56.96	0.18	1.41	0.20	1920.00	1472.00	32.64	1.02
	Virginia Capes/ Ches Bay + Trib	978	978	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	870.42	2.74	21.52	3.13	29340.00	22494.00	498.78	15.65
	Cherry Pt./Charleston	0	0	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Jacksonville/ C Canaveral	64	64	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	56.96	0.18	1.41	0.20	1920.00	1472.00	32.64	1.02
	Key West	0	0	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	0	0	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other AFTT	0	0	0.8900	0.0028	0.0220	0.0032	30.0000	23.0000	0.5100	0.0160	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**1106**	**1106**																

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Tab H Table 2. Munition Emissions Estimates – Testing and Training – Statewaters (continued)

Category	*Location – Range Complex*	*Number of Items (Annual) for Training & Testing Activities*	*Number of Items (Annual) for Training & Testing Activities*	*Emission Factors (lb/item)*								*Emissions (lb/year) Alternative 1*							
		Alternative 1	*Alternative 2*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO2*	*Pb*
Flares (Illumination)	Northeast / NUWC Newport	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Virginia Capes/ Ches Bay + Trib	20,400	20,400	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	224.40	63.24	6.73	1.49	2448.00	2448.00	2856.00	0.05
	Cherry Pt./Charleston	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Jacksonville/ C Canaveral	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Key West	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GOMEX / NSWC Panama City	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other AFTT	0	0	0.0110	0.0031	0.0003	0.0001	0.1200	0.1200	0.1400	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Tab H Table 2. Munition Emissions Estimates – Testing and Training – Statewaters (continued)

Emissions (TPY) Alternative 1								*Emissions (lb/year) Alternative 2*							
CO	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO2*	*Pb*	*CO*	*NO_x*	*VOC*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO^2*	*Pb*
0.0075	0.0001	0.0000	0.0000	0.0004	0.0004	0.0087	0.0000	14.98	0.23	0.00	0.00	0.82	0.73	17.47	0.10
0.1583	0.0025	0.0000	0.0000	0.0086	0.0077	0.1847	0.0011	316.66	4.93	0.00	0.00	17.24	15.48	369.43	2.11
0.0046	0.0001	0.0000	0.0000	0.0002	0.0002	0.0054	0.0000	9.18	0.14	0.00	0.00	0.50	0.45	10.71	0.06
0.0115	0.0002	0.0000	0.0000	0.0006	0.0006	0.0134	0.0001	23.04	0.36	0.00	0.00	1.25	1.13	26.88	0.15
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.2	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**								
0.0285	0.0001	0.0007	0.0001	0.9600	0.7360	0.0163	0.0005	56.96	0.18	1.41	0.20	1920.00	1472.00	32.64	1.02
0.4352	0.0014	0.0108	0.0016	14.6700	11.2470	0.2494	0.0078	870.42	2.74	21.52	3.13	29340.00	22494.00	498.78	15.65
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0285	0.0001	0.0007	0.0001	0.9600	0.7360	0.0163	0.0005	56.96	0.18	1.41	0.20	1920.00	1472.00	32.64	1.02
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.5	**0.0**	**0.0**	**0.0**	**16.6**	**12.7**	**0.3**	**0.0**								
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1122	0.0316	0.0034	0.0007	1.2240	1.2240	1.4280	0.0000	224.4000	63.2400	6.7320	1.4892	2448.0000	2448.0000	2856.0000	0.0469
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1	**0.0**	**0.0**	**0.0**	**1.2**	**1.2**	**1.4**	**0.0**								

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Tab H Table 2. Munition Emissions Estimates – Testing and Training – Statewaters (continued)

Emissions (TPY) Alternative 2							
CO	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.0**
0.0285	0.0001	0.0007	0.0001	0.9600	0.7360	0.0163	0.0005
0.4352	0.0014	0.0108	0.0016	14.6700	11.2470	0.2494	0.0078
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0285	0.0001	0.0007	0.0001	0.9600	0.7360	0.0163	0.0005
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.5	**0.0**	**0.0**	**0.0**	**16.6**	**12.7**	**0.3**	**0.0**
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1122	0.0316	0.0034	0.0007	1.2240	1.2240	1.4280	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.1	**0.0**	**0.0**	**0.0**	**1.2**	**1.2**	**1.4**	**0.0**

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Tab H Table 3. Emission Totals by OPAREA

	Alternative 1								*Alternative 2*							
Location	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***	***CO***	***NO_x***	***VOC***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***	***CO^2***	***Pb***
Northeast / NUWC Newport	0.7	0.0	0.0	0.0	1.1	0.8	1.5	0.0	0.7	0.0	0.0	0.0	1.1	0.8	1.5	0.0
Virginia Capes	49.2	0.9	0.0	0.0	33.7	25.8	38.4	0.2	49.2	0.9	0.0	0.0	33.7	25.8	38.4	0.2
Cherry Pt.	16.0	0.3	0.0	0.0	5.8	4.3	10.4	0.0	16.0	0.3	0.0	0.0	5.8	4.3	10.4	0.0
Jacksonville	34.8	0.6	0.0	0.0	19.1	14.3	31.0	0.2	34.8	0.6	0.0	0.0	19.1	14.3	31.0	0.2
Key West	2.9	0.1	0.0	0.0	0.8	0.5	3.0	0.0	2.9	0.1	0.0	0.0	0.8	0.5	3.0	0.0
GOMEX / Panama City	3.4	0.1	0.0	0.0	1.2	0.8	4.1	0.0	3.4	0.1	0.0	0.0	1.2	0.8	4.1	0.0
Other AFTT	1.4	0.0	0.0	0.0	0.4	0.3	0.6	0.0	1.4	0.0	0.0	0.0	0.4	0.3	0.6	0.0
Study Area Total	**108.4**	**2.0**	**0.0**	**0.0**	**62.1**	**46.8**	**89.1**	**0.4**	**108.4**	**2.0**	**0.0**	**0.0**	**62.1**	**46.8**	**89.1**	**0.4**

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Tab I: Ship and Boat Emission Factors

Tab I Table 1. Ship and Boat Emission Factors

Ship/Boat Type	Acronym		Emissions Factors (lb/hr) Propulsion Engines + Generators					Engine model[1]	#[1]	
		HC	CO	NO_x	SO_x	$PM_{10/2.5}$	CO^2		Engines	Use[1]
Nuclear Aircraft Carrier - Nimitz Class	CVN-1	0.31	1.23	16.73	1.39	0.12	683.62	16-645E5	4	Emergency Diesel Generator
	CVN-R	0.03	0.12	1.65	0.14	0.01	67.61			
Guided Missile Cruiser - Ticonderoga	CG-68	4.32	61.51	79.58	54.5	2.25	24,190.71	501-K17 LM2500	3 4	Ship Service Gas Turbine Generator Gas Turbines
	CG-R	2.46	27.73	285.54	109.99	10.04	69,838.52			
Guided Missile Destroyer - Arleigh Burk Class	DDG-51	4.01	59.72	114.52	62.15	2.96	27,564.55	501-K34	3	Ship Service Gas Turbine Generator
	DDG-51R	2.39	30.57	374.80	134.53	12.27	85141	LM2500	4	Gas Turbines
Guided Missile Destroyer - Zumwalt Class	DDG-1000	1.90	33.45	158.67	59.76	5.75	37,074.37	C-18 MT-5 MT-30	2 2 2	Emergency Diesel Generator Auxiliary Turbine Generator Main Turbine Generator
	DDG-1000R	2.86	45.65	64.80	29.91	4.05	24,051.17			
Littoral Combat Ship	LCS-1	3.19	46.14	186.77	49.63	6.67	25,512.41	16PA6B-STC MT-30 V1708	2 2 4	Main Propulsion Diesel Engine Main Turbine Generator Ship Service Diesel Generator
	LCS-1R	6.12	79.12	152.6	23.27	7.40	11,115.68			
Torpdeo Retrieval Boats Replaced by Dock Landing Ship	LSD 44	10.84	21.25	334.51	24.6	2.17	16,263.96	38D8-1/8 PC2.5V	4 4	Ship Service Diesel Generator Main Propulsion Diesel Engine
	LSD 44R	20.43	40.02	604.28	45.39	2.17	21,126.47			
Amphibious Assault Ship - America Class	LHA-6	14.48	8.38	277.87	66.87	8.38	35,922.07	12PA6B LM2500+	6 2	Ship Service Diesel Generator Main Turbine Generator
	LHA-6R	15.15	18.73	199.99	47.97	5.84	28,059.16			
Amphibious Assault Ship - Wasp	LHD-5	5.77	8.08	47.83	95.12	28.57	47,632.68	Boiler 16-251C	2	Emergency Diesel Generator
	LHD-5R	5.10	7.66	40.12	120.70	24.23	47,490.25			
Landing Transport Dock - San Antonio Class	LPD-19	16.86	31.61	272.28	37.54	3.29	16,767.15	3608 (Tier I) PC2.5STC	5 4	Ship Service Diesel Generator Main Propulsion Diesel Engine
	LPD-19R	14.95	28.08	263.75	32.98	2.81	15,025.58			
Patrol Coastal	PC-14	6.02	337.36	74.18	16.43	2.24	7,676.62	16RP200M 3306B	4 2	Main Propulsion Diesel Engine Ship Service Diesel Generator
	PC-14R	7.22	43.15	78.36	17.51	2.37	8,054.32			

Data Source: Navy and MSC Marine Engine Fuel Consumption and Emission Calculator

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Tab I Table 1. Ship and Boat Emission Factors (continued)

Ship/Boat Type	Acronym	Emissions Factors (lb/hr) Propulsion Engines + Generators						Engine model[1]	#[1]	
		HC	CO	NO_x	SO_x	$PM_{10/2.5}$	CO^2		Engines	Use[1]
Joint High Speed Vessel (JHSV) or Expeditionary Fast Transport (EPF)	JHSV-1	17.13	384.26	745.63	113.53	36.23	54,287.50	20V8000M71L 3406	4 4	Main Propulsion Diesel Engine Ship Service Diesel Generator
	JHSV-1R	4.65	100.83	200.57	30.32	9.80	14,530.65			
Amphibious Combat Command (LCC)	LCC 20	2.23	2.96	19.10	36.49	10.96	18,271.08	Boiler 38D8-1/8	2	Emergency Diesel Generator
	LCC 20R	2.19	2.96	17.38	36.40	10.95	18,217.39			
MV Deloros Chouest	MV DC	3.73	6.82	133.74	11.60	2.04	5,072.73	3306 3608TA	2 2	Ship Service Diesel Generator Main Propulsion Diesel Engine
	MV DCR	2.64	4.95	86.92	36.40	10.95	18,217.39			
SSGN	SSGN-728	0.07	0.11	4.05	0.23	0.02	132.35	38D8-1/8	1	Emergency Diesel Generator
	SSGN-728R	0.01	0.01	0.40	0.02	0.00	12.98			
SSN	SSN-774	0.05	0.12	0.91	0.17	0.03	81.42	3512B (Tier I)	1	Emergency Diesel Generator
	SSN-774R	0.00	0.01	0.09	0.02	0.00	8.00			
T-AH	AH-19	6.82	13.73	103.87	72.21	20.28	35,773.75	Boiler 12V 25/30 18V 20/27 3508	1 3 1	Ship Service Diesel Generator Auxiliary Diesel Generator Emergency Diesel Generator
	AH-19R	6.83	13.71	101.56	71.91	20.05	35,663.29			
TAKE	T-AKE-5	29.73	10.28	302.32	36.75	4.67	17,236.10	3516B HD 8L 48/60 9L 48/60	1 2 2	Emergency Diesel Generator IPG IPG
	T-AKE-5R	12.00	5.31	86.45	11.23	0.99	5,368.46			
TAO	T-AO-189	23.26	51.51	713.11	47.19	4.18	20,880.33	16V-92TA 8163-7305 18-251F PC4.2V	1 2 2	Emergency Diesel Generator Ship Service Diesel Generator Main Propulsion Diesel Engine
	T-AO-189R	17.96	35.91	538.70	39.08	3.45	15,482.22			
TAOE	T-AOE-8	10.60	109.76	311.32	84.23	8.32	6,744.69	3608 LM2500	5 4	Ship Service Diesel Generator Main Propulsion Gas Turbine
	T-AOE-8R	5.85	35.08	445.24	134.08	12.22	81,478.38			
T-ARS	T-ARS-52	1.27	3.20	32.21	6.77	0.89	3,410.91	D399(M) D399(S)	4 3	Main Propulsion Diesel Engine Ship Service Diesel Generator
	T-ARS-52R	0.82	3.37	38.12	8.10	0.68	3,975.10			
T-ATF	T-ATF-172	2.11	18.41	104.32	7.82	0.91	3,594.48	16V-71T 7163-7305 20-645E7	3 2	Ship Service Diesel Generator Main Propulsion Diesel Engine
	T-ATF-172R	2.59	13.35	139.75	10.24	1.07	4,845.75			

Data Source: Navy and MSC Marine Engine Fuel Consumption and Emission Calculator

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Tab I Table 1. Ship and Boat Emission Factors (continued)

Ship/Boat Type	Acronym	Emissions Factors (lb/hr) Propulsion Engines + Generators						Engine model[1]	Engines	Use[1]
		HC	CO	NO_x	SO_x	$PM_{10/2.5}$	CO^2			
Landing Craft Air Cushion	LCAC	0.35	1.23	2.93	0.38	0.25	668	T-62T-60-7	2	80 HP
								TF40B	4	3955 HP
Landing Craft Utility	LCU/LCM	0.52	36.21	44.95	3.11	1.57	1,683.91	2- Detroit 12V-71 Diesel engines, twin shaft, 680 hp sustained, used for both LCU and LCM data		
Amphibious Assault Vehicle	AAV-2	0.82	0.76	6.22	1.25	0.26		Detroit Diesel 8V-53T (P-7), Cummins VT 400 903 (P-7A1)		
Mark V	MK V	6.85	27.20	84.43	10.96	3.81	5,395	2x 2285 HP MTU 12V396 TE94 engines		
Rigid Inflatable Boat (zodiac)	RIB-4	0.06	0.34	9.14	1.44	0.15	1,163.88	Dual Caterpillar 3126 DITA, 6 in-line cylinder diesel, turbocharged, aftercooled.		470 HP x2
Combat Rubber Raiding Craft	CRRC	0.0128	0.2242	0.9538	0.0005	0.0289	87.23	55	HP 2-stroke engine	gas diesel EFs for small craft
High Speed Maneuverable Surface Target	HSMST	203.98	496.660	7.100	0.200	0.300	466.84	200	HP - 2 Mercury Optimax outboards	24.6 lb/hr fuel use jp-5
River Command Boat	RCB	1.12	2.81	27.40	4.08	0.66	1591	850	HP X 2	43.5 lb/hr fuel use diesel
River Assault Boat	RAB	0.58	1.46	14.18	2.11	0.34	838	440	HP X 2	22.9 lb/hr fuel use diesel
River Patrol Boat	RPB	0.58	1.46	14.18	2.11	0.34	838	440	HP X 2	22.9 lb/hr fuel use diesel
SEAARK	PB	0.56	1.39	13.54	2.02	0.33	739	420	HP X 2	20.2 lb/hr fuel use

F470 = CRRC

[1] Data from Navy and MSC Marine Engine Fuel Consumption & Emissions Calculator, US Navy, October 2016

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GPH =	specific fuel consumption constant X HP/ Fuel specific weight							
SFC diesel =		0.4						
SFC gas =		0.5						
FSW diesel =		7.2						
FSW gas =		6.1						
			0.138	MMBtu/gal diesel	161.5	lb/MMBTU	22.287	lb CO2/gal diesel
			0.125	MMBtu/gal motor gas	154.8	lb/MMBTU	19.35	lb CO2/gal motor gas
LCAC	889	GPH						
LCU	76	GPH						
MK V	254	GPH						
RIB	52	GPH						

EFs for small craft[2]			lb/hp-hr				
HP	HC	CO	NOx	SO2	PM	CO2	
50-100	0.000231938	0.004077	0.017342	9.86258E-06	0.000526	1.065422	0.953794
174-302	0.000231938	0.004077	0.017342	9.86258E-06	0.000526	1.065422	

[2] 2014 National Emissions Inventory, Version 1 Technical Support Document, USEPA. December 2016. Table 4-110.

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Tab J: Munition Emission Factors [1]

Tab J Table 1. Munitions Emission Factors

	Study Area					*Emission Factor (lb/item)*				
Type	***Category***	***DODEC ID***	***CO_2***	***CO***	***NO_x***	***VOC***	***SO_2***	***PM_{10}***	***$PM_{2.5}$***	***Pb***
.50 CAL Blank	Small cal	A557	0.0021	0.0018	0.000028	0	0	0.000098	0.000088	0.000012
25 MM	medium cal	M793	0.043	0.085	0.0015	0	0	0.0033	0.0017	0.000049
81 MM HE Cartridge	large cal	C256	1.4	0.097	0.016	0	0	0.17	0.093	0.00069
2.75 In Rocket HE	rocket	H163	0.7	0.4	0.0056	0	0	0.24	0.12	0.0006
2.75 in Rocket (Practice)	rocket	H974	4.8	0.53	0	0	0	0.16	0.17	0.07
Floating Smoke Pot	for marine marker	K867	0.51	0.89	0.0028	0.022	0.0032	30	23	0.016
Grenade	grenade	G900	0.021	0.0008	0.00067	0.00000032	0.026	0.07	0.049	0.011
Flare	CM flare	L410	0.011	0.0013	0.00013	0.0004	0.0000079	0.0062	0.0062	0
Flare	Ill. Flare	L311	0.14	0.011	0.0031	0.00033	0.000073	0.12	0.12	0.0000023
2.75 In Rocket fleschette	rocket	H459	2.4	1.5	0.026	0	0	0.11	0.1	0.051

[1]Emission Factors from USEPA AP-42 Section 15 (various dates)

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Tab K: Aircraft Engine Emissions Factors and Profiles

Tab K Table 1. H-53 Emissions

Flight Operation	*Fuel used lb*	*Emissions in lbs/1000 lbs fuel*						*Total Pounds/op*					
		HC	*CO*	*NOx*	*SO_2*	*PM_{10}*	*CO_2*	*VOC*	*CO*	*NOx*	*SO_2*	*$PM_{10/2.5}$*	*CO_2*
LTO Total:	2,448.44				2.22			0.94	8.39	27.26	5.44	0.22	7,718
Cruise:													
Hourly	4,464	0.15	2.13	8.08	2.22	2.21	3,221	0.46	9.22	93.87		0.68	15,243

Tab K Table 2. H-60 Emissions

[1]Flight Operation	*[1]Total Number of Operations*	*Engine Power Setting*	*# Engines*	*Time in Mode (min)*	*Fuel Flow per engine lb/hr*	*Fuel used lb*	*Emissions in lbs/1000 lbs fuel*						*Total Pounds/op*					
							[2]HC	*[2]CO*	*[2]NOx*	*[4]SO2*	*[2]$PM_{10/2.5}$*	*[2]CO2*	*VOC*	*CO*	*NOx*	*SO2*	*$PM_{10/2.5}$*	*CO2e*
Departure:																		
APU Use		On	1	30	102	51	9.04	42.77	3.94	2.22	0.22	3,154.46	0.46	2.18	0.20	0.11	0.01	161
Start/Warm Up		15% Torque	2	10	274	91	0.77	18.65	4.6	2.22	4.20	3,182.96	0.07	1.70	0.42	0.20	0.38	291
Unstick		25% Torque	2	0.25	341	3	0.61	14.04	5.07	2.22	4.20	3,204.69	0.00	0.04	0.01	0.01	0.01	9
Taxi Out		20% Torque	2	5	308	51	0.66	16.01	4.85	2.22	4.20	3,196.08	0.03	0.82	0.25	0.11	0.22	164
Hover		80% Torque	2	2	707	47	0.55	4.61	6.9	2.22	4.20	3,220.14	0.03	0.22	0.33	0.10	0.20	152
Climbout		90% Torque	2	2	786	52	0.55	3.74	7.27	2.22	4.20	3,218.61	0.03	0.20	0.38	0.12	0.22	169
Total	1																	
Arrival:																		
APU Use		On	1	35	102	60	9.04	42.77	3.94	2.22	0.22	3154	0.54	2.54	0.23	0.13	0.01	188
Approach		50% Torque	2	5	501	84	0.55	8.34	5.93	2.22	4.20	3220	0.05	0.70	0.50	0.19	0.35	269
Unstick		25% Torque	2	0.25	341	3	0.61	14.04	5.07	2.22	4.20	3205	0.00	0.04	0.01	0.01	0.01	9
Taxi in/shut down		20% Torque	2	8	308	82	0.66	16.01	4.85	2.22	4.20	3196	0.05	1.31	0.40	0.18	0.34	263
Total	1																	
LTO Total:													**1.45**	**9.76**	**2.73**	**1.16**	**1.76**	**1,673**
Cruise:																		
Hourly	1	65% Torque	2	60	599.85	1199.7	0.55	6.25	6.40	2.22	4.20	3,221.36	**0.76**	**7.50**	**7.68**	**2.66**	**5.04**	**3,865**

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Tab K Table 3. E-2C Emissions

[1]Type of Operation	[1]Total Number of Operations	Engine Power Setting	No. of Engines in Use	Time in Mode/engine (min)	Fuel Flow per Engine (lb/hr)	Total Fuel Used (lb)	Emissions in lbs/1000 lbs fuel						Total Emissions in pounds/op					
							[2,3] HC	[2,3] CO	[2,3] NOx	[5] SO2	$PM_{10/2.5}$	[2,3] CO2	VOC	CO	NOx	SO2	$PM_{10/2.5}$	CO2e
Departure																		
Start/Warm up		L/S G Idle	2	12.0	599	240	22.32	30.11	3.53	2.22	3.97	3149.25	5.35	7.21	0.85	0.53	0.95	755
Taxi Out		H/S G Idle	2	5.0	756	126	1.42	5.65	6.35	2.22	3.97	3182.25	0.18	0.71	0.80	0.28	0.50	401
Engine Run-up		62% SHP	2	0.5	1,600	27	0.25	1.12	9.47	2.22	3.97	3225.67	0.01	0.03	0.25	0.06	0.11	86
Takeoff		Military	2	0.5	2,219	37	0.16	0.65	10.45	2.22	3.97	3229.32	0.01	0.02	0.39	0.08	0.15	119
Climbout		Military	2	2.0	2,219	148	0.16	0.65	10.45	2.22	3.97	3229.32	0.02	0.10	1.55	0.33	0.59	478
Total	1																	
Straight In Arrival																		
Approach		30% SHP	2	5.0	1100	183	0.49	2.16	8.06	2.22	3.97	3211.71	0.09	0.40	1.48	0.41	0.73	588.81
On runway		Flight Idle	2	1.0	836	28	1.10	4.54	6.52	2.22	3.97	3192.41	0.03	0.13	0.18	0.06	0.11	88.96
Taxi		H/S G Idle	1	3.0	756	38	1.42	5.65	6.35	2.22	3.97	3182.25	0.05	0.21	0.24	0.08	0.15	120.29
Shut down		L/S G Idle	1	1.0	599	10	22.32	30.11	3.53	2.22	3.97	3149.25	0.22	0.30	0.04	0.02	0.04	31.44
Total	1																	
LTO Total													**6.85**	**9.11**	**5.77**	**1.86**	**3.32**	**2,668**
Cruise																		
Hourly	1	30% SHP	2	60.0	1137	2,274	0.49	2.16	8.06	2.22	3.97	3211.71	**1.28**	**4.91**	**18.33**	**5.05**	**9.03**	**7,303**

Tab K Table 4. FA-18E/F and EA-18G Emissions

[1]Type of Operation	Total Number of Operations	[2,3] Engine Power Setting	[2,3] No. of Engines in Use	[2,3] Time in Mode/engine (min)	[2,3] Fuel Flow per Engine (lb/hr)	[2,3] Total Fuel Used (lb)	Emissions in lbs/1000 lbs fuel						Total Emissions in pounds/op					
							[2,3] HC	[2,3] CO	[2,3] NOx	[5] SO2	$PM_{10/2.5}$	[2,3] CO2	VOC	CO	NOx	SO2	$PM_{10/2.5}$	CO2e
Departure/Taxi out/Idle																		
APU Use	1	ON	1	5.0	197	16	0.25	2.00	6.25	2.22	0.22	3,170	0.00	0.03	0.10	0.04	0.00	52
Start/Warm-up	1	G Idle	2	15.0	695	348	65.33	98.18	3.18	2.22	12.64	2,973	22.70	34.12	1.11	0.77	4.39	1,033
Unstick	1	75% N2	2	0.3	1720	17	1.98	15.20	5.58	2.22	10.73	3,190	0.03	0.26	0.10	0.04	0.18	55
Taxi Out	1	G Idle	2	5.0	695	116	65.33	98.18	3.18	2.22	12.64	2,973	7.57	11.37	0.37	0.26	1.46	344
Engine Run-up	1	80% N2	2	0.5	3079	51	0.14	1.86	8.98	2.22	8.78	3,205	0.01	0.10	0.46	0.11	0.45	164
Takeoff	1	Max AB	2	0.5	35763	596	4.87	274.97	9.67	2.22	0.00	2,712	2.90	163.90	5.76	1.32	0.00	1,617
Climbout	1	95% N2	2	1.0	11320	377	0.12	0.70	36.29	2.22	2.95	3,179	0.05	0.26	13.69	0.84	1.11	1,200
Straight In Arrival																		
Approach	1	85% N2	2	3.0	5169	517	0.12	0.72	14.75	2.22	6.56	3,191	0.06	0.37	7.62	1.15	3.39	1,650
On Runway (WOW)	1	G Idle	2	1.0	695	23	65.33	98.18	3.18	2.22	12.64	2,973	1.51	2.27	0.07	0.05	0.29	69
Unstick	1	75% N2	2	0.3	1720	17	1.98	15.20	5.58	2.22	10.73	3,190	0.03	0.26	0.10	0.04	0.18	55
Taxi in/Shut Down	1	G Idle	2	8.0	695	185	65.33	98.18	3.18	2.22	12.64	2,973	12.11	18.20	0.59	0.41	2.34	551
LTO Total													**54.03**	**231.14**	**29.97**	**5.03**	**13.82**	**6,790**
Cruise																		
Hourly	1	85% N2	2	60	3318	6636	0.51	2.44	6.74	2.22	6.36	3,154	**3.89**	**16.19**	**44.73**	**14.73**	**42.20**	**20,930**

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Tab K Table 5. P-3 Emissions

[1]Type of Operation	Total Number of Operations	[2,3] Engine Power Setting	[2,3] No. of Engines in Use	[2,3] Time in Mode/engine (min)	[2,3] Fuel Flow per Engine (lb/hr)	[2,3] Total Fuel Used (lb)	Emissions in lbs/1000 lbs fuel						Total Emissions in lb/op					
							[2,3] HC	[2,3] CO	[2,3] NOx	[5] SO2	$PM_{10/2.5}$	[2,3] CO2	VOC	CO	NOx	SO2	$PM_{10/2.5}$	CO2e
Cruise																		
Hourly	1	37% shp	4	60	1200	4800	0.41	1.82	8.42	2.22	3.97	3216	**2.26**	**8.74**	**40.42**	**10.66**	**19.06**	**15,437**

Tab K Table 6. P-8 Emissions

[1]Type of Operation	Total Number of Operations	[2,3] Engine Power Setting	[2,3] No. of Engines in Use	[2,3] Time in Mode/engine (min)	[2,3] Fuel Flow per Engine (lb/hr)	[2,3] Total Fuel Used (lb)	Emissions in lbs/ lbs fuel						Total Emissions in lb/op					
							[2,3] HC	[2,3] CO	[2,3] NOx	[5] SO2	$PM_{10/2.5}$	[2,3] CO2	VOC	CO	NOx	SO2	$PM_{10/2.5}$	CO2e
Cruise																		
Hourly	1	30	4	60	2683	10732	0.000	0.003	0.022	0.002	ND	3.154	**2.47**	**34.34**	**231.81**	**23.83**	**ND**	**33,849**

Tab K Table 7. AV-8B Emissions

[1]Type of Operation		Total Number of Operations	[2] Engine Power Setting	[2] No. of Engines in Use	[2] Time in Mode/engine (min)	[2] Fuel Flow per Engine (lb/hr)	[2] Total Fuel Used (lb)	Emissions in lbs/1000 lbs fuel						Total Emissions in lb/op					
								[2] HC	[2] CO	[2] NOx	[4] SO2	$PM_{10/2.5}$	[3]CO2	VOC	CO	NOx	SO2	$PM_{10/2.5}$	CO2e
Short Takeoff																			
	APU Use	1	ON	1	5	197	16.4	0.25	2	6.25	2.22	0.22	3170	0.0	0.0	0.1	0.0	0.0	52
	Start/Warm-up	1	26% RPM	1	10	1137	189.5	19.66	106.3	1.8	2.22	11.1	2919	3.7	20.1	0.3	0.4	2.1	553
	Unstick	1	40% RPM	1	0.3	1786	8.9	3.67	65.7	2.5	2.22	9.1	3040	0.0	0.6	0.0	0.0	0.1	27
	Taxi Out	1	26% RPM	1	5	1137	94.8	19.66	106.3	1.8	2.22	11.1	2919	1.9	10.1	0.2	0.2	1.1	277
	Engine Run-up	1	59% RPM	1	0.5	3321	27.7	1.26	25.5	4.5	2.22	6.4	3114.5	0.0	0.7	0.1	0.1	0.2	86
	Takeoff	1	91% RPM	1	0.5	9441	78.7	0.35	3.6	12.7	2.22	2.5	3151.8	0.0	0.3	1.0	0.2	0.2	248
	Climbout	1	95% RPM	1	0.5	7037	58.6	0.49	6.4	9.5	2.22	3.5	3153.6	0.0	0.4	0.6	0.1	0.2	185
Vertical Landing Straight In															0.0				
	Approach	1	79% RPM	1	2.5	6381	265.9	0.54	7.7	8.6	2.22	3.8	3144	0.1	2.0	2.3	0.6	1.0	836
	Set up for VL	1	84% RPM	1	1.5	5785	144.6	0.61	9.3	7.8	2.22	4.2	3141.2	0.1	1.3	1.1	0.3	0.6	454
	VL Landing	1	99% RPM	1	0.75	12258	153.2	0.26	2.2	16.5	2.22	1.9	3155	0.0	0.3	2.5	0.3	0.3	483
	On Runway	1	26% RPM	1	0.3	1137	5.7	19.66	106.3	1.8	2.22	11.1	2919	0.1	0.6	0.0	0.0	0.1	17
	Unstick	1	40% RPM	1	0.3	1786	8.9	3.67	65.7	2.5	2.22	9.1	3040	0.0	0.6	0.0	0.0	0.1	27
	Taxi In/Shut down	1	26% RPM	1	5	1137	94.8	19.66	106.3	1.8	2.22	11.1	2919	1.9	10.1	0.2	0.2	1.1	277
	LTO Total													**9.2**	**47.2**	**8.5**	**2.5**	**6.9**	**3,522**
Cruise																			
	Hourly	1	67% RPM	1	60	4313	4313.0	0.88	16	5.9	2.22	5.3	3130	**4.4**	**69.0**	**25.4**	**9.6**	**22.9**	**13,499**

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Tab K Table 8. MV-22 Emissions

Flight Mode	*Fuel Used (lbs)*	*Emission Indices (lb per 1,000 lb fuel)*							*Total Emissions in lb/op*				
		HC	*CO*	*NOx*	*SO_2*	*$PM_{10/2.5}$*	*CO_2*	*VOC*	*CO*	*NOx*	*SO_2*	*$PM_{10/2.5}$*	*CO_2*
Short Take Off													
APU	103.3	0.19	5.89	5.95	2.22	0.22	3,235	0.02	0.61	0.61	0.23	0.02	334
Start/Warm up	60	0.1	8.9	4.09	2.22	1.58	3,221	0.01	0.53	0.25	0.13	0.09	193
Warm up	220	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.73	1.32	0.49	0.35	708
Taxi Out	110	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.37	0.66	0.24	0.17	354
Engine Run up	17.2	0.02	1.58	8.41	2.22	1.58	3,216	0.00	0.03	0.14	0.04	0.03	55
Takeoff	68.7	0.01	0.45	15.06	2.22	1.58	3,208	0.00	0.03	1.03	0.15	0.11	220
FW Climbout	54.7	0.01	0.69	12.35	2.22	1.58	3,211	0.00	0.04	0.68	0.12	0.09	176
Vertical Landing													
FW Approach	121.0	0.02	1.20	9.57	2.22	1.58	3,215	0.00	0.15	1.16	0.27	0.19	389
Transition (90°) Landing	43.7	0.02	1.04	10.22	2.22	1.58	3,214	0.00	0.05	0.45	0.10	0.07	140
Taxi to apron	66.0	0.02	3.33	6.02	2.22	1.58	3,219	0.00	0.22	0.40	0.15	0.10	212
Cool/Shut down	24.0	0.1	8.90	4.09	2.22	1.58	3,221	0.00	0.21	0.10	0.05	0.04	77
APU	34.4	0.19	5.89	5.95	2.22	0.22	3,235	0.01	0.20	0.20	0.08	0.01	111
LTO Total								**0.05**	**3.16**	**7.00**	**2.05**	**1.27**	**2,971**
Cruise													
Hourly	3,540	0.01	0.60	13.19	2.22	1.58	3210	**0.04**	**2.12**	**46.69**	**7.86**	**5.59**	**11,363**

Tab K Table 9. Learjet Emissions

Flight Mode	*Fuel Used (lbs)*	*Emission Indices (lb per 1,000 lb fuel)*						*Emissions from 1 Hour in Flight Mode in Pounds*					
		HC	*CO*	*NOx*	*SO_2*	*$PM_{10/2.5}$*	*CO_2*	*VOC*	*CO*	*NOx*	*SO_2*	*$PM_{10/2.5}$*	*CO_2*
Cruise - Hourly	1,476	0.07	1.62	16.08	2.22	0.085	3252.46	0.118818	2.39	23.73	3.28	0.13	4,801

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Tab K Table 9. F-35 Emissions

Mode/Starting Point for Leg	Power	Time (min)	Flight Emissions (lb/operation)					
			HC	CO	NOx	SO_2	PM10/2.5	CO_2
IPP Use	Main Engine Start	0.58	< 0.000	0.00	0.01	0.00	0.00	4
Start/Warm Up	GI (10% ETR)	6.00	< 0.098	3.74	0.43	0.19	0.02	647
Unstick	35% ETR	0.08	< 0.000	0.01	0.10	0.01	0.00	32
Taxi	GI (10% ETR)	6.00	< 0.098	3.74	0.43	0.20	0.02	649
Unstick	35% ETR	0.08	< 0.000	0.01	0.10	0.01	0.00	32
Taxi to position & hold	GI (10% ETR)	0.50	< 0.008	0.31	0.04	0.02	0.00	54
P3-F-35B Short Takeoff (STO)	Departure	1	< 0.002	0.18	12.12	0.46	0.05	1,537
P25-F-35B STOVL Pattern Takeoff Portion (Austere Ops)	Pattern	1	< 0.000	0.06	3.56	0.14	0.02	471
P13-F-35B Overhead Break/Carrier Break Arrival to Vertical Landing (VL)	Arrival	1	< 0.014	0.68	14.07	0.84	0.08	2,803
Rollout to taxiway	FI (15% ETR)	0.55	< 0.005	0.10	0.16	0.03	0.00	100
Weapon check	GI (10% ETR)	3.00	< 0.049	1.87	0.21	0.10	0.01	323
Unstick	35% ETR	0.08	< 0.000	0.01	0.11	0.01	0.00	34
Taxi	GI (10% ETR)	3.00	< 0.048	1.82	0.22	0.10	0.01	326
Hot refuel	GI (10% ETR)	7.00	< 0.114	4.37	0.50	0.23	0.02	754
Unstick	35% ETR	0.08	< 0.000	0.01	0.11	0.01	0.00	34
Taxi to park & shutdown	GI (10% ETR)	0.60	< 0.010	0.36	0.04	0.02	0.00	65
Total for 1 LTO	**1**		**< 0.513**	**17.29**	**32.20**	**2.37**	**0.22**	**7,866**
	Fuel Use							
*Cruise - 1 hour	60860.90	60	12.60	979.86	448.54	124.16	69.99	188,608

*from Lemoore Op AQ Calcs May 2014 in Final Environmental Impact Statement US Navy F-35C West Coast Homebasing, Vol II, Appendix D.

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Tab K Table 10. UH-1 Emissions

Flight Operation	Fuel used lb	Emissions in lbs/1000 lbs fuel							Flight Emissions (lb/operation)					
		HC	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO2
Departure:														
Warm Up	74.0	6.21	28.36	3.13	2.22	4.20	4.20	3,145	0.46	2.10	0.23	0.16	0.31	233
Taxi Out	33.8	0.13	1.11	5.67	2.22	4.20	4.20	3,207	0.00	0.04	0.19	0.08	0.14	108
Hover	23.1	0.13	1.01	5.79	2.22	4.20	4.20	3,207	0.00	0.02	0.13	0.05	0.10	74
Climbout	36.3	0.13	0.88	6.02	2.22	4.20	4.20	3,207	0.00	0.03	0.22	0.08	0.15	116
Arrival:														
Descent	24.1	0.28	5.76	4.3	2.22	4.20	4.20	3,202	0.01	0.14	0.10	0.05	0.10	77
Approach	25.8	0.20	4.22	4.54	2.22	4.20	4.20	3,204	0.01	0.11	0.12	0.06	0.11	83
Taxi to Sdrn	22.5	0.13	1.11	5.67	2.22	4.20	4.20	3,207	0.00	0.02	0.13	0.05	0.09	72
Shut Down	4.9	6.21	28.36	3.13	2.22	4.20	4.20	3,145	0.03	0.14	0.02	0.01	0.02	16
								Total in Pounds	0.59	2.60	1.14	0.54	1.03	779
1- hr Cruise:	692	0.13	1.01	5.79	2.22	4.20	4.20	3,207	0.10	0.70	4.01	1.54	2.91	2,221

Tab K Table 11. AH-1 Emissions

Flight Operation	Fuel used lb	Emissions in lbs/1000 lbs fuel							Flight Emissions (lb/operation)					
		HC	CO	NOx	SO_2	PM_{10}	$PM_{2.5}$	CO_2	VOC	CO	NOx	SO_2	$PM_{10/2.5}$	CO2
Departure:														
Warm Up	79.5	0.98	22.49	4.29	2.22	4.20	4.20	3,162	0.08	1.79	0.34	0.18	0.33	251
Taxi Out	39.32	0.57	11.7	5.37	2.22	4.20	4.20	3,213	0.02	0.46	0.21	0.09	0.17	126
Hover	13.11	0.57	11.7	5.37	2.22	4.20	4.20	3,213	0.01	0.15	0.07	0.03	0.06	42
Climbout	29.19	0.56	10.13	5.61	2.22	4.20	4.20	3,217	0.02	0.30	0.16	0.06	0.12	94
Arrival:														
Approach	113.8	0.61	14.04	5.07	2.22	4.20	4.20	3,205	0.07	1.60	0.58	0.25	0.48	365
Taxi to Sdrn	39.3	0.57	11.7	5.37	2.22	4.20	4.20	3,213	0.02	0.46	0.21	0.09	0.17	126
Shut Down	10.9	2.54	39.81	3.28	2.22	4.20	4.20	3,060	0.03	0.44	0.04	0.02	0.05	33
								Total in Pounds	0.28	5.19	1.61	0.72	1.37	1,038
1- hr Cruise:	850	0.56	10.54	5.55	2.22	4.20	4.20	3,216	0.55	8.96	4.72	1.89	3.57	2,734

[1] for information on aircraft references, see Tab O, Aircraft Engine Emission Factor Sources

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Tab L: Aircraft Activity – Testing

Tab L Table 1. Aircraft Activity – Testing

H-60	*# a/c*	*Hr/event*	*Alternative 1 Total Hrs*													*Panama City*
			# Events	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*	
Anti-Submarine Warfare Torpedo Test	1	30		0	29	870	72	2,160	0	0	0	0	0	0	0	0
Anti-Submarine Warfare Tracking Test – Helicopter	1	30	5	150	6	180	190	5,700	8	240	61	1,830	0	0	0	0
Kilo Dip	1	1	3	3	3	3	30	30	3	3	2	2	0	0	0	0
Chaff Test	3	30	20	1,800	4	360	24	2,160	0	0	0	0	0	0	0	0
Flare Test	1	30	10	300	0	0	20	600	0	0	0	0	0	0	0	0
Airborne Dipping Sonar Minehunting Test	1	30	0	0	0	0	8	240	0	0	0	0	0	0	19	570
Airborne Laser Based Mine Detection System Test	1	2	0	0	0	0	50	100	0	0	0	0	0	0	40	80
Airborne Mine Neutralization System Test	1	2	0	0	0	0	29	58	0	0	0	0	0	0	21	42
Airborne Sonobuoy Minehunting Test	1	30	0	0	0	0	24	720	0	0	0	0	0	0	52	1,560
Air-to-Surface Gunnery Test	1	2	0	0	43	86	128	256	0	0	0	0	0	0	0	0
Air-to-Surface Missile Test	1	3	5	15	33	99	133	399	0	0	0	0	0	0	0	0
High-Energy Laser Weapons Test	1	2	0	0	0	0	108	216	0	0	0	0	0	0	0	0
Laser Targeting Test	3	0.5	0	0	0	0	8	12	0	0	0	0	0	0	0	0
Rocket Test	1	3	0	0	51	153	33	99	0	0	0	0	0	0	0	0
Maritime Security	1	4	0	0	12	48	20	80	0	0	0	0	12	48	0	0
	Alternative 1 Totals			**2,268**		**1,799**		**12,830**		**243**		**1,832**		**48**		**2,252**

[1] Provided by US Navy, NAVAIR Assumptions.docx, March 30, 2017.

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Tab L Table 1. Aircraft Activity – Testing (continued)

# Events	Alternative 2 Total Hrs												
	GOMEX	# Events	JAX	# Events	VACAPES	# Events	KW	# Events	NE	# Events	CHERRY PT	# Events	Panama City
0	0	43	1,290	121	3,630	0	0	0	0	0	0	0	0
6	180	12	360	280	8,400	27	810	110	3,300	0	0	0	0
6	6	6	6	40	40	6	6	4	4	0	0	0	0
20	1,800	4	360	24	2,160	0	0	0	0	0	0	0	0
10	300	0	0	20	600	0	0	0	0	0	0	0	0
0	0	0	0	18	540	0	0	0	0	0	0	32	960
0	0	0	0	50	100	0	0	0	0	0	0	40	80
0	0	0	0	50	100	0	0	0	0	0	0	32	64
0	0	0	0	24	720	0	0	0	0	0	0	52	1,560
0	0	55	110	280	560	0	0	0	0	0	0	0	0
10	30	38	114	444	1,332	0	0	0	0	0	0	0	0
0	0	0	0	108	216	0	0	0	0	0	0	0	0
0	0	0	0	8	12	0	0	0	0	0	0	0	0
0	0	57	171	35	105	0	0	0	0	0	0	0	0
0	0	12	48	20	80	0	0	0	0	12	48	0	0
Alternative 2 Totals	**2,316**		**2,459**		**18,595**		**816**		**3,304**		**48**		**2,664**

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Tab M: Aircraft Activity – Training[1]

Tab M Table 1. Aircraft Activity – Training[1] (5 Years Presented Annually)

UH-1			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Missile Exercise Air-to-Air	15	1	0	0	2	24	8	120	2	24	0	0	2	24	0
Missile Exercise Surface-to-Air	15	1	0	0	0	0	0.4	6	0	0	0	0	0	0	0
Antitsubmarine Warfare Torpedo Exercise - Ship	8	2	0	0	3	51	8	128	0	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Submarine	6	3	0	0	2	43	8	144	0	0	1	22	0	0	0
Gunnery Exercise Air-to-Surface Small Caliber	1	1	0	0	0	0	0	0	0	0	0	0	3	3	0
	Alternative Totals			**0**		**118**		**398**		**24**		**22**		**27**	

Learjet			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Gunnery Exercise Surface-to-Air Medium Caliber	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0
Gunnery Exercise Surface-to-Air Large Caliber	1	1	0	0	0	0	5	5	0	0	0	0	0	0	0
Gunnery Exercise Surface-to-Air Medium Caliber	1	1	0	0	0	0	7	7	0	0	0	0	0	0	0
	Alternative Totals			**0**		**0**		**13**		**0**		**0**		**0**	

H-60			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Gunnery Exercise Air-to-Surface Small Caliber	1	1	0	0	40	40	112	112	0	0	0	0	24	24	0
Missile Exercise Air-to-Surface - Rocket	1	1	2	2	20	20	20	20	0	0	0	0		0	0
Missile Exercise Air-to-Surface	1	1	0	0	18	18	14	14	0	0	0	0	3	3	0
Laser Targeting - Aircraft	1	1	0	0	55	55	27	27	0	0	0	0		0	0
Antisubmarine Warfare Tracking Exercise - Helicopter	1	3	1	2	74	222	2	5	0	0	0	0	2	7	0
Antisubmarine Warfare Torpedo Exercise - Helicopter	1	3	0	0	3	8	1	2	0	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Submarine	3	3	0	0	0	0	0	0	0	0	1	11	0	0	0
Airborne Mine Countermeasures - Mine Detection	1	2	62	124	63	127	308	616	0	0	0	0	74	148	0
Mine Countermeasure Mine Neutralization Remotely Operated Vehicle	1	2	26	53	14	28	126	252	0	0	0	0	14	28	0
Search and Rescue	1	1	0	0	125	125	200	200	0	0	0	0	0	0	0
Personnel Insertion/Extraction - Air	1	2	10	20	2	4	36	71	0	0	0	0	0	0	0
PMINT	1	63.8	0	0	0	0	0	0	0	0	0	0	1	64	0
ARGMEUEX	1	149.3	0	0	0	0	0	0	0	0	0	0	1	149	0
CERTEX	1	139.4	0	0	0	0	0	0	0	0	0	0	1	139	0
	Alternative Totals			**201**		**648**		**1,319**		**0**		**11**		**564**	

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H-53			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Airborne Mine Countermeasures - Towed Mine Neutralization	1	2	0	0	31	62	176	352	0	0	0	0	37	73	0
Airborne Mine Countermeasures - Mine Detection	1	2	0	0	63	127	308	616	0	0	0	0	74	148	0
Mine Countermeasure Mine Neutralization Remotely Operated Vehicle	1	2	0	0	14	28	126	252	0	0	0	0	14	28	0
Search and Rescue	1	1	0	0	125	125	200	200	0	0	0	0		0	0
	Alternative Totals			**0**		**342**		**1,420**		**0**		**0**		**250**	

F-18 E/F			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Gunnery Exercise Air-to-Surface Medium Caliber	2.5	0.33	6	5	49	40	44	36	0	0	0	0	29	24	0
Mine Laying	2.5	0.33	0	0	0.2	0.2	1	1	0	0	0	0	0.4	0.3	0
	Alternative Totals			**5**		**41**		**37**		**0**		**0**		**24**	

F-35			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Gunnery Exercise Air-to-Surface Medium Caliber	2.5	0.33	6	5	49	40	44	36	0	0	0	0	29	24	0
Mine Laying	2.5	0.33	0	0	0.2	0.2	1	1	0	0	0	0	0.4	0.3	0
	Alternative Totals			**5**		**41**		**37**		**0**		**0**		**24**	

P-3			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Antisubmarine Warfare Tracking Exercise - Maritime Patrol Aircraft	2.5	1	0	0	18	46	6	15	0	0	3	8	2	4	0
Antisubmarine Warfare Torpedo Exercise - Maritime Patrol Aircraft	2.5	1	0	0	3	7	0	0	0	0	0	0	0	0	0
	Alternative Totals			**0**		**53**		**15**		**0**		**8**		**4**	

P-8			*Alternative Total Hrs*												
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Antisubmarine Warfare Tracking Exercise - Maritime Patrol Aircraft	2.5	1	0	0	74	184	25	62	0	0	13	32	6	16	0
Antisubmarine Warfare Torpedo Exercise - Maritime Patrol Aircraft	2.5	1	0	0	0	0	1	2	0	0	0	0	0	0	0
Antisubmarine Warfare Torpedo Exercise - Submarine	3	3	0	0	0	0	0	0	0		1	11	0	0	0
Mine Laying	2.5	0.33	0	0	0	0.2	1	1	0	0	0	0	0.4	0.3	0
	Alternative Totals			**0**		**185**		**64**		**0**		**42**		**16**	

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AV-8B			*Alternative Total Hrs*													
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Gunnery Exercise Air-to-Surface Medium Caliber	2.5	0.33	0	0	5	4	0	0	0	0	0	0	4	3	0
	Alternative Totals			**0**		**4**		**0**		**0**		**0**		**3**	

AH-1			*Alternative Total Hrs*													
	# a/c	*Hr/event*	*# Events*	*GOMEX*	*# Events*	*JAX*	*# Events*	*VACAPES*	*# Events*	*KW*	*# Events*	*NE*	*# Events*	*CHERRY PT*	*# Events*
Gunnery Exercise Air-to-Surface Small Caliber	1	1	0	0	0	0	0	0	0	0	0	0	2	2	0
Missile Exercise Air-to-Surface - Rocket	1	1	0	0	2	2	0	0	0	0	0	0	2	2	0
Missile Exercise Air-to-Surface	1	1	0	0	0	0	0	0	0	0	0	0	3	3	0
	Alternative Totals			**0**		**2**		**0**		**0**		**0**		**5**	

[1] Provided by US Navy, AFTT Training Air Analysis.xlsx, March 30 2017; IKE C2X.xlsx, March 29 2017; C2X Sorties hours.xlsx, March 13 2017; Marine Corps training cycle.xlsx, March 29 2017.

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Tab N: Aircarft Activity By Region[1]

Tab N Table 1. VACAPES Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
398	13	14,149	19,914	1,420	37	37	15	64	0	0	0	0

Tab N Table 2. VACAPES LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	64	0	0	58	58	0	0	0	0	0	0

Tab N Table 3. VACAPES Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,489	0	392	0	0	0	0	0	0	0	0

Tab N Table 4. GOMEX Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,469	2,517	0	5	5	0	0	0	0	0	0

Tab N Table 5. GOMEX LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

Tab N Table 6. GOMEX Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	20	0	0	0	0	0	0	0	0	0	0

Tab N Table 7. JAX Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
118	0	2,447	3,107	342	41	41	53	185	0	4	2	0

Tab N Table 8. JAX LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	129	0	0	491	491	0	0	0	0	0	0

Tab N Table 9. JAX Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	159	0	0	0	0	0	0	0	0	0	0

Tab N Table 10. KW Annual Hours Flight Below 3,000 Ft

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
24	0	243	816	0	0	0	0	0	0	0	0	0

Tab N Table 11. KW LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

Tab N Table 12. KW Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

Tab N Table 13. NE Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	1,843	3,315	0	0	0	8	42	0	0	0	0

Tab N Table 14. NE LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

Tab N Table 15. NE Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

Tab N Table 16. CHERRY PT Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
27	0	612	612	250	24	24	4	16	0	3	5	0

Tab N Table 17. CHERRY PT LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	233.5	0	0	157	157	0	0	0	107	0	110

Tab N Table 18. CHERRY PT Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2.4	0	0	0	0	0	0	0	0	22	0

Tab N Table 19. OTHER Annual Hours Flight Below 3,000 Ft.

UH-1	Learjet	Alt 1 H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,252	2,664	0	0	0	0	0	0	0	0	0

Tab N Table 20. OTHER LTOs

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	0	0	0	0	0	0	0	0	0	0	0

Tab N Table 21. OTHER Annual Hours Flight Below 3,000 Ft - State Waters

UH-1	Learjet	H-60	Alt 2 H-60	H-53	F-18	F-35	P-3	P-8	E-2C	AV-8B	AH-1	MV-22
0	0	2,252	2,664	0	0	0	0	0	0	0	0	0

[1] Provided by US Navy, *AFTT Training Air Analysis.xlsx*, March 30 2017; *IKE C2X.xlsx*, March 29 2017; *C2X Sorties hours*.xlsx, March 13 2017; *Marine Corps training cycle.xlsx*, March 29 2017, *NAVAIR Assumptions.docx*, March 30 2017.

Tab O: Aircraft Engine Emission Factor Sources

Tab O Table1. Cruise based on 1 hour

Aircraft	Source of Emissions Indices
AH-1W	AESO Memorandum Report No. 9824, Revision C, November 2015.
AV-8B – LTO	AESO Memorandum Report No. 9913, Revision D, November 2009.
AV-8B – Cruise	AESO Memorandum Report No. 9963, Revision C, November 2009.
CH-53 – LTO CH-53 - cruise	AESO Memorandum Report No. 2015-01 Revision B,September 2015.
E-2 / E-2C – Cruise	AESO Memorandum Report No. 9920, Revision E. September 2015.
P-8 – Cruise	Engine Datasheet 8CM051, ICAO Engine Exhaust Emissions Data Bank (ICAO, 2007)
F-35B – LTO	JSF Emissions Package_2011-12-28.xls from Flint Webb, 2013.
F-35B Cruise	From "Demonstration Sortie Cruise" from F-35 West-Coast Basing EIS, 2014
FA-18E/F & EA-18G – LTO	AESO Memorandum Report No. 9815, Revision H. November 2015
FA-18E/F & EA-18G Cruise	AESO Memorandum Report No. 9933, Revision E, November 2015
Learjet	USAF Institute for Environment, Safety and Occupational Health Risk Analysis, October 2002.
HH-60 - LTO & Cruise	AESO Memorandum Report No. 9929 Revision C. January 2016
P-3	AESO Memorandum Report No. 9911, Revision C, Feb 2010.
V-22 – LTO V-22 - Cruise	AESO Memorandum Report No. 9946, Revision G, April 2016
UH-1N – LTO	AESO Memorandum Report No. 9904, Revision A, May 1999
UH-1N – Cruise	AESO Memorandum Report No. 9962, Rev A November 2009

PM2.5 = PM10 emissions, in accordance with AESO Memorandum Report No. 2013-04 Revision A, January 2014. PM2.5 to PM10 Ratio for Aircraft Emitted Particles.

AESO Report 2012-01D, December 2014. Sulfur Dioxide Emission Index Using JP-5 and JP-8 Fuel.

VOC correction from US Environmental Protection Agency, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet and Turboprop Engines - Vresion 1.0, Report No. EPA-420-R-09-901, May 2009.

Tab P: Munition Activity Data[1]

Tab P Table 1. Inshore Munitions - Alternatives 1 and 2 - State Waters

	Munitions/Materials		
	Projectiles		*Counter measure*
Location	*Small Caliber (Non-explosive)*	*Marine Marker*	*Flare*
	Number	*Number*	*Number*
Boston, MA	0	0	0
Narragansett Bay, RI	8,320	64	0
Earle, NJ	0	0	0
Delaware Bay, DE	0	0	0
Wilmington, DE	0	0	0
Hampton Roads, VA	0	0	0
James River and Tributaries, VA	97,920	728	20,400
York River, VA	0	20	0
Lower Chesapeake Bay	78,000	230	0
Morehead City, NC	0	0	0
Cooper River, SC	5,100	0	0
Savannah, GA	0	0	0
Kings Bay, GA	0	0	0
Mayport, FL	0	0	0
Port Canaveral, FL	12,800	64	0
Tampa, FL	0	0	0
Beaumont, TX	0	0	0
Corpus Christi, TX	0	0	0

Tab P Table 2. Munitions for Use During Training in a Single Year under Alternatives 1 and 2 - Beyond State Waters

Munitions/Materials	*Range Complex*							
	Northeast Number	*VACAPES Number*	*Cherry Point Number*	*JAX Number*	*Key West Number*	*GOMEX Number*	*Other RC Number*	*SINKEX Area Number*
Bombs								
Bombs (Explosive)	0	88	0	56	0	4	0	12
Projectiles								
Small-Caliber (Non-Explosive)	27,000	2,262,000	393,000	1,026,000	0	83,000	100,000	0
Small-Caliber (Casing Only)	0	5,000	0	5,000	0	0	0	0
Medium-Caliber (Explosive)	0	46,100	20,000	45,600	0	6,000	0	0
Medium Caliber (Non-Explosive)	1,000	658,561	328,149	383,861	28,000	28,950	21,150	0
Large-Caliber (Explosive)	0	762	210	642	0	114	114	200
Large-Caliber (Non-Explosive)	0	4,930	1,234	2,534	0	498	210	0
Large-Caliber (Casing only)	0	0	1,040	0	0	0	0	0
Missiles								
Missiles (Explosive)	2	199	187	192	8	2	0	4
Rockets (Explosive)	0	1,748	76	1,824	0	190	0	0
Rockets (Non-Explosive)	1	1,835	304	2,095	0	191	0	0
Rockets (Non-Explosive): Flechette	0	95	0	110	0	0	0	0
Countermeasures								
Flares	0	1,040	22,348	38,048	31,008	1,840	0	0
Other								
Grenades (Explosive)	56	4070	28	28	0	28	0	0
Illumination Flare	0	40	48	48	8	0	0	0
Marine Marker	0	1,022	332	1,060	30	53	24	0
Total	***37,882***	***4,709,821***	***1,361,843***	***2,194,749***	***276,062***	***285,861***	***222,916***	***219***

Tab P Table 3. Munitions for Use During Testing in a Single Year under Alternatives 1 and 2 - Beyond State Waters

Munitions/Materials	*Range Complex*						*Testing Ranges*		
	Northeast Number	*VACAPES Number*	*Cherry Point Number*	*JAX Number*	*Key West Number*	*GOMEX Number*	*NUWC Newport Number*	*SFOMF Number*	*NSWC Panama City Number*
Bombs									
Bombs (Explosive)	0	4	0	0	0	0	0	0	0
Projectiles									
Small-Caliber (Non-Explosive)	4,800	77,800	4,800	4,800	4,800	17,800	0	0	7,000
Medium-Caliber (Explosive)	3,860	17,270	3,360	14,860	3,360	3,360	0	0	0
Medium Caliber (Non-Explosive)	9,060	234,665	8,160	237,360	32,660	22,860	0	0	5,100
Large-Caliber (Explosive)	1632	4,763	1632	7,876	2332	2243	0	4	280
Large-Caliber (Non-Explosive)	1,761	8,147	1,440	14,524	3,190	2,774	0	0	280
Missiles									
Missiles (Explosive)	10	222	0	70	0	12	0	0	0
Missiles (Non-Explosive)	25	1633	25	594	32	42	0	0	0
Rockets (Explosive)	0	206	0	200	0	0	0	0	0
Rockets (Non-Explosive)	1	759	0	407	0	1	0	0	0
Rockets (Non-Explosive): Flechette	0	249	0	136	0	0	0	0	0
Countermeasures									
Flares	0	20,195	0	0	0	600	0	0	0

[1] Munitions Usage Estimates provided by US Navy, AFTT Training Air Analysis.xlsx (March 29), AFTT Inshore Events_08Feb2017_NAEMO Web.xlsx, Appendix F, Draft AFTT EIS May 2017.

Tab Q: Baseline (V2 Preferred Alternative) Munition Summary[1]

Tab Q Table 1. Baseline (V2 Preferred Alternative) Munition Summary

		CO	NOx	VOC	SOx	PM10	PM2.5
TOTALS BY COMPLEX for TRAINING AND TESTING COMBINED (TPY)	Northeast / NUWC Newport	0.0685	0.0018	0.0000	0.0000	0.0344	0.0063
	Virginia Capes	26.8013	1.1019	0.0000	0.0000	1.9281	1.2623
	Navy Cherry Pt.	5.5601	0.1465	0.0000	0.0000	0.1426	0.0755
	Jacksonville	14.1096	0.5870	0.0000	0.0001	1.4573	0.8805
	Key West	1.0447	0.0405	0.0000	0.0000	0.0221	0.0155
	GOMEX / Panama City	1.9943	0.0437	0.0000	0.0000	0.1222	0.0739
	Other AFTT	0.8713	0.0820	0.0000	0.0000	0.0262	0.0159
	Grand Total for ALT 2	**50.4497**	**2.0034**	**0.0000**	**0.0001**	**3.7328**	**2.3300**

Tab R: Assumptions

Assumptions used to build the calculation spreadsheets can be found in the various references used.

Tab D – Ship Emissions: Steaming hours provided by the US Navy, AFTT Gray Ship Steaming Hours for Air Analysis.docx, 12 September, 2016.

Tab E – Training in State Waters: State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx.

Tab F – Inland Water Training Event and Locations: State water activities provided by US Navy, AFTT Inshore Events_08Feb2017_NAEMO WEB.xlsx.

Tab G – Aircraft Emissions: Data on LTOs and Cruise time provided by US Navy, NAVAIR Assumptions.docx, Marine Corps Training Cycle.xlsx, C2X sorties hours.xlsx, IKE C2X.xlsx, AFTT Training Air Analysis.xlsx.

Tab H – Munition Emissions: Munitions Usage Estimates provided by US Navy, AFTT Training Air Analysis.xlsx (March 29), January 2017. AFTT Inshore Events_08Feb2017_NAEMO Web.xlsx, and Appendix F, Final AFTT EIS.

Tab I – Ship and Boat Emission Factors: Data from Navy and MSC Marine Engine Fuel Consumption & Emissions Calculator, US Navy, October 2016

Tab J – Munition Emission Factors: Emission Factors from USEPA AP-42 Section 15 (various dates)

Tab K - Aircraft Emission Factors and Profiles: For information on aircraft references, see Tab O, Aircraft Engine Emission Factor Sources, except for F-35, derived from Lemoore Op AQ Calcs May 2014 in Final Environmental Impact Statement US Navy F-35C West Coast Homebasing, Vol II, Appendix D.

Tab L - Aircraft Activity – Testing: Provided by US Navy, NAVAIR Assumptions.docx, March 30, 2017.

Tab M - Aircraft Activity – Training: Provided by US Navy, AFTT Training Air Analysis.xlsx, March 30 2017; IKE C2X.xlsx, March 29 2017; C2X Sorties hours.xlsx, March 13 2017; Marine Corps training cycle.xlsx, March 29 2017.

Tab N - Aircraft Activity by Region: Provided by US Navy, AFTT Training Air Analysis.xlsx, March 30 2017; IKE C2X.xlsx, March 29 2017; C2X Sorties hours.xlsx, March 13 2017; Marine Corps training cycle.xlsx, March 29 2017, NAVAIR Assumptions.docx, March 30 2017.

Tab O - Aircraft Engine Emission Factor Sources

Tab P - Munition Activity Data: Munitions Usage Estimates provided by US Navy, AFTT Training Air Analysis.xlsx (March 29), AFTT Inshore Events_08Feb2017_NAEMO Web.xlsx, Appendix F, Draft AFTT EIS May 2017.

Tab Q – Baseline (V2 Preferred Alternative) Munition Summary: Atlantic Fleet Forces Training and Testing Final Environmental Impact Statement/Overseas Environmental Impact

C.2 RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

Figure C-1. Navy Record of Non-Applicability (RONA) for Clean Air Act Conformity

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

Proposed Action

Action Proponent: U.S. Navy, Fleet Forces Command
Location: Jacksonville, Florida, and surrounding area
Proposed Action Name: Atlantic Fleet Training and Testing

Proposed Action & Emissions Summary: The Proposed Action (Preferred Alternative, Alternative 1) involves operation of military aircraft, vessels, and small boats in order to achieve requisite training and testing requirements. Small boats and vessels would be operational in the riverine environment in the Jacksonville, Florida, locality. These nearshore activities generate emissions primarily through fossil fuel combustion from engine operation. Part of Nassau County, which is adjacent to Jacksonville, is nonattainment for sulfur dioxide. As a result, Proposed Action emissions were evaluated to assess compliance with the General Conformity Rule *de minimis* thresholds. Table C.2-1 provides a summary of the evaluation.

Table C.2-1: Proposed Action Sulfur Dioxide Emissions Compared to General Conformity Rule *de Minimis Thresholds (Tons Per Year)*

Annual Emissions	SO_2
Alternative 1	4.92
de minimis threshold	100
Potential Exceedance	No

Affected Air Basin: Jacksonville (Florida)-Brunswick (Georgia) Interstate Air Quality Control Region
Date RONA prepared: 3 August 2018
RONA prepared by: Naval Facilities Engineering Command Atlantic

Proposed Action Exemptions

The Proposed Action is exempt from the General Conformity Rule requirements based on the determination that the emissions are below the *de minimis* threshold for SO_2.

Emissions Evaluation Conclusion

The U.S. Navy concludes that *de minimis* thresholds for sulfur dioxide would not be exceeded as a result of implementation of the Proposed Action. The emissions data supporting that conclusion is shown in Table C.2-1 above. The calculations, methodology, data, and references are contained in Section 3.1 and Appendix C of the Atlantic Fleet Training and Testing Environmental Impact Statement. Therefore, the Navy concludes that further formal Conformity Determination procedures are not required, resulting in this RONA.

RONA Approval:

Date: 14 AUG 18

Mark Dussia

U.S. Fleet Forces Environmental Readiness Branch Head

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