
Appendix D: Air Quality Example Emissions Calculations and Example Record of Non- Applicability

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APPENDIX D AIR QUALITY EXAMPLE EMISSIONS CALCULATIONS AND EXAMPLE RONA

This appendix discusses emission factor development, calculations, and assumptions used in the air quality analyses presented in the Air Quality section of Chapter 3 (see Section 3.2).

D.1 SURFACE OPERATIONS EMISSIONS

Surface operations are activities associated with vessel movements. Fleet training activities use a variety of marine vessels, including cruisers, destroyers, frigates, carriers, submarines, amphibious vessels, and small boats. Testing activities use a variety of marine vessels, including various testing support vessels, work boats, torpedo recovery vessels, unmanned surface vehicles, and small boats. These vessels use a variety of propulsion methods, including marine outboard engines, diesel engines, and gas turbines.

Marine Outboard Engines:

The United States (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. The most conservative emission factors for two-stroke engines of various horsepower are presented in Table D.1-1.

Table D.1-1: Emission Factors for Two Stroke Engines

USEPA Outboard Engine Emissions Factors (grams/hp-hr.)			
NO _x	CO	VOC	SO _x
0.018	0.63	0.25	0.00108

Notes: USEPA = United States Environmental Protection Agency, hp = horsepower, hr. = hour; NO_x = nitrogen oxides, CO = carbon monoxide, VOC = volatile organic compounds, SO_x = sulfur oxides

Source: USEPA, 1999, Exhaust Emissions Factors for Non-Road Engine Modeling-Spark Ignition. Report No. NR-010b; Office of Mobile Sources, Assessment and Modeling Division, EPA-R-99-009

Emissions for surface craft using outboard engines were calculated using USEPA AP-42 factors, and multiplied by the engine horsepower and hours of operation.

$$Emissions = HP \times HR/YR \times EF \times ENG$$

Where:

Emissions = surface craft emissions

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 engines

To obtain the total criteria pollutant emissions for the Proposed Action, emissions were calculated for each training or testing activity, type of surface vessel, and criteria pollutant. These individual estimates of emissions, in units of tons per year, were then summed by criteria pollutant to obtain the aggregate emissions for surface vessel emissions activities.

Diesel Engines:

Limited data were available for large marine diesel engines. Therefore, USEPA AP-42 emissions factors for industrial reciprocating engines were used to calculate diesel engine emissions. Other sources of vessel emissions factors were previous U.S. Department of the Navy (Navy) Environmental Impact Statement (EIS)/Overseas EIS (OEIS) documents (citing JJMA 2001). Diesel was assumed to be the primary fuel to ensure a conservative estimate. Calculation methods similar to those described for Marine Outboard Engines were used to obtain emissions estimates for diesel engines.

$$\text{Emissions} = \text{HP} \times \text{HR/YR} \times \text{EF} \times \text{ENG}$$

Where:

Emissions = surface craft emissions

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 engines

Diesel engine emission factors were multiplied by the engine horsepower and annual hours of operation to calculate the pollutant emissions per year.

D.2 AIR OPERATIONS EMISSIONS

Fleet training and Naval Air Systems Command testing consists of the activities of various aircraft, including the F/A-18, P-3, SH-60B, MH-53, MH-60S, and Lear jet. RDT&E air operations consist of the activities of various aircraft, including the 1UH-1N, SH-60B, MH-53, MH-60S, and Cessna-172. Aircraft operations of concern are those that occur from ground level up to 3,000 feet (ft.) (914 meters [m]) above ground level (AGL). The 3,000 ft. (914 m) AGL ceiling was assumed to be the atmospheric mixing height above which any pollutant generated would not contribute to increased pollutant concentrations at ground level (known as the mixing zone). All criteria pollutant emissions from aircraft generated above 3,000 ft. (914 m) AGL are excluded from analysis of compliance with National Ambient Air Quality Standards. The pollutant emission rate is a function of the aircraft engine's fuel flow rate and efficiency. Emissions for one complete training activity 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 and previous Navy EIS/OEIS documentation (primarily citing the Federal Aviation Administration's EDMS model). For those aircraft for which engine data were unavailable, an applicable surrogate was used. Table D-2 is an example of emission factors for the aircraft engines. The table lists the various engine power modes, time in each mode, fuel flow, and corresponding pollutant emission factors. Using these data, as well as information on activity levels (i.e., number of sorties), pollutant emissions for each aircraft/organization were calculated by applying the equation below.

$$\text{Emissions} = \text{TIM} \times \text{FF} \times \text{EF} \times \text{ENG} \times \text{CF}$$

Where:

Emissions = aircraft emissions (pounds [lb.]) (for EF in lb./1,000 gallons [gal.] fuel)

TIM = time-in-mode at a specified power setting (hours [hr.]/operation).

FF = fuel flow at a specified power setting (gal./hr./engine)
EF = emission factor for specific engine type and power setting (lb./1,000 gal. of fuel used)
ENG = number of engines on aircraft
CF = conversion factor (0.001)

D.3 ORDNANCE AND MUNITIONS EMISSIONS

Available emissions factors (AP-42, *Compilation of Air Pollutant Emission Factors*) were used. These factors were then multiplied by the net weight of the explosive and the number of items that were used per year. This calculation provides estimates of annual emissions.

$$\text{Emissions} = \text{EXP/YR} \times \text{EF} \times \text{Net Wt}$$

Where:

Emissions = ordnance emissions
EXP/YR = explosives, propellants, and pyrotechnics used per year
EF = emissions factor
Net Wt = net weight of explosive

D.4 EMISSIONS ESTIMATES SPREADSHEETS

The following spreadsheets are examples of the emissions calculations for aircraft, vessels, and munitions. The examples provided for aircraft are for baseline training within the Southern California Range Complex. These examples are representative of calculation spreadsheets developed for each range complex or testing area. They are also representative of calculation spreadsheets developed for testing events. Moreover, they are representative of the calculations developed for each alternative analyzed in this EIS/OEIS. The example ordnance emissions calculation is for baseline ordnance emissions. The full set of calculation spreadsheets is available on the Hawaii-Southern California Training and Testing (HSTT) EIS project website.

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Table D.4-1: Sample Air Emissions Calculations Table (Training Ops Information – Sample only)

Training - Aircraft Air Emissions—No-Action Alternative																		
Training or Testing Event	Location	Annual Operations (#)	TRAINING OPS INFORMATION - AIRCRAFT													Training Platform Information		
			Distribution	Aircraft		Time		Altitude		Distribution (%)			Distribution (hr)			Engine Model	Engines (#)	Fuel Flow (lb/hr)
				A/C Sorties (#)	Type	Ave Time on Range (hr)	Total Time on Range (hr)	Time < 3,000 ft (%)	Time < 3,000 ft (hr)	0-3 nm from shore	3-12 nm from Shore	>12 nm from Shore	Total Time 0-3 nm from shore	Total Time 3-12 nm from shore	Total Time >12 nm from shore			
Anti-Air Warfare																		
Air Combat Maneuver	SOCAL	0	1.75	4060	FA-18E/F	1.0	4060.0	0%	0.0	4%	11%	85%	0.00	0.00	0.00	F414-GE-40	2	4049
	Hawaii	2320	0.25	580	AV-8B	1.0	580.0	0%	0.0	4%	11%	85%	0.00	0.00	0.00	F402-RR-40	1	5785
	Transit	385																
	Total	2705																
Air Defense Exercise	SOCAL	0	0.14	83	E-2	1.0	83.3	50%	41.7	0%	0%	100%	0.00	0.00	41.65	T56-A-425	2	1100
	Hawaii	595	0.86	512	FA-18E/F	1.0	511.7	50%	255.9	0%	0%	100%	0.00	0.00	255.85	F414-GE-40	2	4049
	Transit	21																
	Total	616																
Gunnery Exercise, Air-to-Air (Medium Caliber)	SOCAL	0	1.75	53	FA-18E/F	1.0	52.5	0%	0.0	4%	11%	85%	0.00	0.00	0.00	F414-GE-40	2	4049
	Hawaii	30	0.25	8	AV-8B	1.0	7.5	0%	0.0	4%	11%	85%	0.00	0.00	0.00	F402-RR-40	1	5785
	Transit	10																
	Total	40																
Missile Exercise, Air-to-Air	SOCAL	0	0.33	53	FA-18A/C	2.0	105.6	0%	0.0	0%	0%	100%	0.00	0.00	0.00	F404-GE-40	2	3318
	Hawaii	160	0.5	80	FA-18E/F	2.0	160.0	0%	0.0	0%	0%	100%	0.00	0.00	0.00	F414-GE-40	2	4049
	Transit	20	0.09	14	E-2C	4.0	57.6	0%	0.0	0%	0%	100%	0.00	0.00	0.00	T56-A-425	2	1100
	Total	180																
Gunnery Exercise, Surface-to-Air (Large)	SOCAL	0	0.58	10	Learjet	3.0	31.3	50%	15.7	0%	0%	100%	0.00	0.00	15.66	TFE 731-2-2	2	532
	Hawaii	18																
	Transit	0																
	Total	18																
Missile Exercise, Surface-to-Air	SOCAL	0	0.33	8	SH-60B	3.0	23.8	100%	23.8	0%	0%	100%	0.00	0.00	23.76	T700-GE-40	2	600
	Hawaii	24	0.33	8	P-3	3.0	23.8	67%	15.8	0%	0%	100%	0.00	0.00	15.85	T56-A-14 (a	4	1500
	Transit	8	0.33	8	Learjet	3.0	23.8	67%	15.8	0%	0%	100%	0.00	0.00	15.85	TFE 731-2-2	2	531.76
	Total	32																

Table D.4-2: Sample Air Emissions Calculations Table (Emissions Factors – Sample only)

Training - Aircraft Air Emissions—No-Action Alternative												
		EMISSIONS FACTORS										
Training or Testing Region	Location	Annual Operations	Emission Indices, lb/1,000 lb fuel					Emissions Factors (lb/hr)				
			CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
Anti-Air Warfare												
Air Combat Maneuver	SOCAL	0	0.89	11.58	0.12	0.40	6.31	7.21	93.77	0.97	3.24	51.10
	Hawaii	2320	7.70	8.60	0.54	0.40	3.80	44.54	49.75	3.12	2.31	21.98
	Transit	385										
	Total	2705										
Air Defense Exercise	SOCAL	0	2.16	8.06	0.49	0.40	3.97	4.75	17.73	1.08	0.88	8.73
	Hawaii	595	0.89	11.58	0.12	0.40	6.31	7.21	93.77	0.97	3.24	51.10
	Transit	21										
	Total	616										
Gunnery Exercise, Air-to-Air (Medium Caliber)	SOCAL	0	0.89	11.58	0.12	0.40	6.31	7.21	93.77	0.97	3.24	51.10
	Hawaii	30	7.70	8.60	0.54	0.40	3.80	44.54	49.75	3.12	2.31	21.98
	Transit	10										
	Total	40										
Missile Exercise, Air-to-Air	SOCAL	0	2.44	6.74	0.44	0.40	6.36	16.19	44.73	2.92	2.65	42.20
	Hawaii	160	0.89	11.58	0.12	0.40	6.31	7.21	93.77	0.97	3.24	51.10
	Transit	20	2.16	8.06	0.49	0.40	3.97	4.75	17.73	1.08	0.88	8.73
	Total	180										
Gunnery Exercise, Surface-to-Air (Large)	SOCAL	0	22.38	5.90	4.28	0.54	4.20	23.80	6.27	4.55	0.57	4.47
	Hawaii	18										
	Transit	0										
	Total	18										
Missile Exercise, Surface-to-Air	SOCAL	0	6.25	6.40	0.55	0.40	4.20	7.50	7.68	0.66	0.48	5.04
	Hawaii	24	1.82	8.43	0.41	0.40	3.97	10.92	50.58	2.46	2.40	23.82
	Transit	8	22.38	5.90	4.28	0.54	4.20	23.80	6.27	4.55	0.57	4.47
	Total	32										

Table D.4-3: Sample Air Emissions Calculations Table (Emissions – Sample only)

Training - Aircraft Air Emissions—No-Action Alternative																										
EMISSIONS (lb/yr)																										
Training or Testing	Location	Annual Operations	State (0-3 nm)					U.S. (3-12 nm)					International (>12 nm)					Annual Fuel Use		GHG Emissions (lb)						
			CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM	Pounds	Gallons	CO ₂	N ₂ O	CH ₄	CO _{2-e}			
Anti-Air Warfare																										
Air Combat Maneuver	SOCAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,438,940	2,417,491	50,897,859	1,651	1,438	51,439,921	
	Hawaii	2320	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,355,300	493,426	10,388,601	337	294	10,499,239	
	Transit	385																								
	Total	2705	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,794,240	2,910,918	61,286,460	1,988	1,732	61,939,161	
Air Defense Exercise	SOCAL	0	0	0	0	0	0	0	0	0	0	198	739	45	37	364	91,630	13,475	283,703	9	8	286,724				
	Hawaii	595	0	0	0	0	0	0	0	0	0	1844	23992	249	829	13074	2,071,873	304,687	6,414,885	208	181	6,483,204				
	Transit	21																								
	Total	616	0	0	0	0	0	0	0	0	0	2,042	24,731	294	865	13,437	2,163,503	318,162	6,698,588	217	189	6,769,928				
Gunnery Exercise, Air-to-Air (Medium Caliber)	SOCAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	212,573	31,261	658,162	21	19	665,171				
	Hawaii	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43,388	6,381	134,335	4	4	135,766				
	Transit	10																								
	Total	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,960	37,641	792,497	26	22	800,937				
Missile Exercise, Air-to-Air	SOCAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	350,381	51,527	1,084,841	35	31	1,096,394				
	Hawaii	160	0	0	0	0	0	0	0	0	0	0	0	0	0	0	647,840	95,271	2,005,827	65	57	2,027,189				
	Transit	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63,360	9,318	196,174	6	6	198,263				
	Total	180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,061,581	156,115	3,286,841	107	93	3,321,846				
Gunnery Exercise, Surface-to-Air (Large)	SOCAL	0	0	0	0	0	0	0	0	0	0	373	98	71	9	70	16,655	2,449	51,566	2	1	52,115				
	Hawaii	18																								
	Transit	0																								
	Total	18	0	0	0	0	0	0	0	0	0	373	98	71	9	70	16,655	2,449	51,566	2	1	52,115				
Missile Exercise, Surface-to-Air	SOCAL	0	0	0	0	0	0	0	0	0	0	178	182	16	11	120	14256	2096	44139	1	1	44,609				
	Hawaii	24	0	0	0	0	0	0	0	0	0	173	802	39	38	377	35640	5241	110348	4	3	111,523				
	Transit	8	0	0	0	0	0	0	0	0	0	377	99	72	9	71	12635	1858	39119	1	1	39,536				
	Total	32	0	0	0	0	0	0	0	0	0	728	1,084	127	59	568	62,531	9,196	193,606	6	5	195,668				

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D.5 DRAFT RECORD OF NON-APPLICABILITY

This appendix provides a Record of Non-Applicability (RONA) Memorandum (Figure D.5-1) and draft Records of Non-Applicability and Conformity Analyses (Figures D.5-2 through D.5-5) for each California Air Basin potentially impacted by the Proposed Action (South Coast Air Basin and San Diego Air Basin).

MEMORANDUM FOR THE RECORD

From: _____

Subj: Applicability Analyses for Hawaii-Southern California Training and Testing (HSTT) Environmental Impact Statement/Overseas Environmental Impact Statement – Operations in State of California Waters

Ref: (a) 40 C.F.R., 51.853(b)

Encl: (1) Record of Non-Applicability (RONA) for Hawaii-Southern Training and Testing in State of California Waters, South Coast Air Basin; and

(2) Record of Non-Applicability (RONA) for Hawaii-Southern Training and Testing in State of California Waters, San Diego Air Basin.

1. Enclosure (1) is a RONA for those Pacific Fleet training and testing activities that are expected to occur annually in State of California waters in South Coast Air Basin (SCAB). The Preferred Alternative (Alternative 2) emissions of carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOC), and particulates under 10 microns (PM₁₀) and under 2.5 microns (PM_{2.5}), in SCAB are provided in Enclosure 1. A comparison of the relevant criteria air pollutant emissions of the Proposed Action with Reference (a) shows that the anticipated emissions are *de minimis*.

2. Enclosure (2) is a RONA for those Pacific Fleet training and testing activities that are expected to occur annually in State of California waters in San Diego Air Basin (SDAB). The Preferred Alternative (Alternative 2) emissions of CO, NO_x, and VOC in SDAB are provided in Enclosure 2. A comparison of the relevant criteria air pollutant emissions of the Proposed Action with Reference (a) shows that the anticipated emissions are *de minimis*.

2. If there are any questions or if additional information is needed, please call _____ at _____.

Name

Title

Figure D.5-1: Record of Non-Applicability Memorandum

NAVY RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

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

Action Proponents: United States Pacific Fleet
 Naval Sea Systems Command
 Naval Air Systems Command

Proposed Action: Hawaii-Southern California Training and Testing (HSTT)

Proposed Action Location: Southern California Range Complex, CA

Proposed Action and Emissions Summary:

See attached Conformity Analysis

Affected Air Basin: South Coast Air Basin

Date RONA prepared: _____

RONA prepared by: Naval Facilities Engineering Command, Southwest

Attainment Area Status and Emissions Evaluation Conclusion:

To the best of my knowledge and belief, the information contained within this General Conformity Applicability Analysis is correct and accurate. By signing this statement, I am in agreement with the finding that the total of all reasonably foreseeable direct and indirect emissions that will result from this action is below the *de minimis* threshold set forth in 40 C.F.R. 51.853(b). Accordingly, it is my determination that this action conforms to the applicable State Implementation Plan (SIP).

RONA Approval:

Signature: _____

Name/Rank: _____ Date: _____

Position: _____ Commanding Officer: _____ Activity: _____

Enclosure 1

Figure D.5-2: Record of Non-Applicability Form, South Coast Air Basin

Subject: Conformity Analysis for Navy Training and Testing, South Coast Air Basin**INTRODUCTION**

The Proposed Action falls under the Record of Non-Applicability (RONA) category pursuant to 40 Code of Federal Regulations (CFR) Parts 52 and 93, and the basis for exemption from conformity requirements is documented with this RONA.

The United States (U.S.) Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule*, in the Federal Register (40 CFR Parts 6, 51, and 93) on November 30, 1993. The U.S. Navy published *Clean Air Act General Conformity Guidance* in Chief of Naval Operations Instruction (OPNAVINST) 5090.1C CH-1 (18 July 2011). These publications provide guidance to document Clean Air Act Conformity requirements. Federal regulations state that no department, agency, or instrumentality of the federal government shall engage in, support in any way, or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable implementation plan. The federal agency that is the action proponent is responsible for determining whether a federal action conforms to the applicable implementation plan before the Proposed Action is taken (40 CFR Part 1, Section 51.850[a]).

Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels for criteria pollutants as set forth in 40 CFR § 93.153(c) (Table 1). These standards are reflected in Appendix F of OPNAVINST 5090.1C CH-1.

Table 1: De Minimis Thresholds for Conformity Determinations

Pollutant	Nonattainment or Maintenance Area Type	De Minimis Threshold (TPY)
Ozone (VOC or NO _x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO _x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO ₂ and NO ₂	All nonattainment & maintenance	100
PM ₁₀	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
PM _{2.5}	All nonattainment & maintenance	100
Lead (Pb)	All nonattainment & maintenance	25

Notes: NO_x = nitrogen oxides; Pb = lead; PM₁₀ = particulate matter under 10 microns; SO_x = sulfur oxides; TPY = tons per year; VOC = volatile organic compounds

Figure D.5-3: Conformity Analysis, South Coast Air Basin

PROPOSED ACTIONProposed Action Summary

The Proposed Action consists of increases in training and testing activities on the at-sea portions of the Southern California (SOCAL) Range Complex required to address a training shortfall, and to accommodate expected force-structure changes and range enhancements. The assessment of air quality impacts includes all military training activities in the SOCAL Range Complex involving vessels, aircraft, and weapons systems in State of California waters.

Proposed Action Emissions*Aircraft*

To estimate aircraft emissions, the operating modes (e.g., “cruise” mode), number of hours of operation, and types of engine for each type of aircraft were evaluated. All aircraft are assumed to travel to and from training ranges at or above 3,000 ft. (914 m) above ground level and, therefore, their transits to and from the ranges do not affect surface air quality. Air combat maneuvers and air-to-air missile exercises are primarily conducted at altitudes well in excess of 3,000 ft. (914 m) above ground level and, therefore, are not included in the estimated emissions of criteria air pollutants. Activities or portions of those training or testing activities occurring below 3,000 ft. (914 m) are included in emissions estimates. Examples of activities typically occurring below 3,000 ft. (914 m) include those involving helicopter platforms such as mine warfare, anti-surface warfare, and anti-submarine warfare training and testing activities.

The types of aircraft used and the numbers of flights flown under the No Action Alternative are derived from historical data. The types of aircraft identified include the typical aircraft platforms that conduct a particular training or testing exercise (or the closest surrogate when information is not available), including range support aircraft (e.g., non-Navy commercial air services). For the Preferred Alternative, estimates of future aircraft sorties are based on evolutionary changes in the Navy’s force structure and mission assignments. Where there are no major changes in types of aircraft, future activity levels are estimated from the distribution of baseline activities.

Time on range (activity duration) under the No Action Alternative was calculated from average times derived from range records and Navy subject matter experts. To estimate time on range for each aircraft activity under the Preferred Alternative, the average flight duration approximated in the baseline data was used in the calculations. Estimated altitudes of activities for all aircraft were obtained from aircrew members in operational squadrons. Several testing activities are similar to training activities, and therefore similar assumptions were made for such activities in terms of aircraft type, altitude, and flight duration. Where aircraft testing activities were dissimilar to training activities, assumptions for time on range were derived from Navy subject matter experts.

Air pollutant emissions were estimated based on the Navy’s Aircraft Environmental Support Office Memorandum Reports for individual aircraft categories (Aircraft Emission Estimates: Mission Operations). For aircraft for which Aircraft Environmental Support Office emission factors were not available, emission factors were obtained from other published sources.

Figure D.5-3: Conformity Analysis, South Coast Air Basin (continued)

The emissions calculations for each alternative conservatively assume that each aircraft activity is separately conducted. In practice, a testing activity may be conducted during a training flight. Two or more training activities also may be conducted during one flight (e.g., chaff or flare exercises may occur during electronic warfare operations; or air-to-surface gunnery and air-to-surface bombing activities may occur during a single flight operation). Using conservative assumptions may produce elevated aircraft emissions estimates, but accounts for the possibility (however remote) that each aircraft training and testing activity is separately conducted.

Vessels

The methods of estimating marine vessel emissions involve evaluating the type of activity, the number of hours of operation, the type of propulsion, and the type of onboard generator for each vessel type. The types of surface ships and numbers of activities for the No Action Alternative are derived from range records and Navy subject matter experts regarding vessel participant data. For the Preferred Alternative, estimates of future ship activities are based on anticipated evolutionary changes in the Navy's force structure and mission assignments. Where there are no major changes in types of ships, estimates of future activities are based on the historical distribution of ship use. Navy aircraft carriers and submarines are nuclear-powered, and have no air pollutant emissions associated with propulsion.

For surface ships, the durations of activities were estimated by taking an average over the total number of activities for each type of training and testing. Emissions for baseline activities and for future activities were estimated based on discussions with exercise participants. In addition, information provided by subject-matter experts was used to develop a breakdown of time spent at each operational mode (i.e., power level) used during activities in which marine vessels participated. Several testing activities are similar to training activities, and therefore similar assumptions were made for such activities in terms of vessel type, power level, and activity duration.

Emission factors for marine vessels were obtained from the database developed for Naval Sea Systems Command by John J. McMullen Associates, Inc. (John J. McMullen Associates 2001). Emission factors were provided for each marine vessel type and power level. The resulting calculations provided information on the time spent at each power level in each part of the Study Area, emission factors for that power level (in pounds of pollutant per hour), and total emissions for each marine vessel for each operational type and mode.

The pollutants for which calculations are made include exhaust total hydrocarbons, CO, NO_x, PM, CO₂, and SO₂. For non-road engines, all particulate matter emissions are assumed to be smaller than PM₁₀, and 92 percent of the particulate matter from gasoline and diesel-fueled engines is assumed to be smaller than PM_{2.5}. For gaseous-fueled engines (liquefied petroleum gas/compressed natural gas), 100 percent of the particulate matter emissions are assumed to be smaller than PM_{2.5}.

The emissions calculations for each alternative conservatively assume that each vessel activity is separately conducted and separately produces vessel emissions. In practice, one or more testing activities may take advantage of an opportunity to travel at sea aboard and test from a vessel conducting a related or unrelated training activity. It is also probable that two or more training activities may be conducted during one training vessel movement (e.g., a ship may conduct large-, medium-, and small-caliber surface-to-surface gunnery exercises during one vessel movement). Furthermore, multiple unit level training activities may be conducted during a larger composite training unit exercise. Using conservative assumptions may produce elevated vessel emissions estimates, but accounts for the possibility (however remote) that each training or testing activity is separately conducted.

Figure D.5-3: Conformity Analysis, South Coast Air Basin (continued)

Naval Gunfire, Missiles, Bombs, Other Munitions and Military Expended Material

Naval gunfire, missiles, bombs, and other types of munitions used in training and testing activities emit air pollutants. To estimate the amounts of air pollutants emitted by ordnance during their use, the numbers and types of munitions used during training or testing activities are first totaled. Then generally accepted emissions factors (AP-42, Compilation of Air Pollutant Emission Factors, Chapter 15: Ordnance Detonation [USEPA 1995]) for criteria air pollutants are applied to the total amounts. Finally, the total amounts of air pollutants emitted by each munition type are summed to produce total amounts of each criteria air pollutant under each alternative.

The estimated annual operational emissions for the No Action Alternative and Preferred Alternative are presented in Table 2. Annual emissions are expected to increase from the No Action Alternative levels to the Preferred Alternative levels over several years. All annual Preferred Alternative emissions would be below General Conformity *de minimis* levels.

Table 2: Estimated Air Pollutant Emissions Under the Proposed Action

Parameter	Emissions by Air Pollutant (TPY)				
	CO	NO _x	VOC	PM ₁₀	PM _{2.5}
No Action Alternative	229	540	285	42	39
Preferred Alternative	252	540	284	42	39
Net Change	23	0	-1	0	0
<i>De Minimis</i> Threshold	100	10	10	70	100
Exceeds Threshold?	No	No	No	No	No

Notes: Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. CO = carbon monoxide; NO_x = nitrogen oxides; PM₁₀ = particulates under 10 microns; PM_{2.5} = particulates under 2.5 microns; TPY = tons per year; VOC = volatile organic compounds

EMISSIONS EVALUATION CONCLUSION

The U.S. Navy concludes that the *de minimis* thresholds for applicable criteria pollutants would not be exceeded by implementation of the Proposed Action. The emissions data supporting that conclusion are shown in Table 2, which summarizes the calculated estimates and *de minimis* limits. Therefore, the U.S. Navy concludes that further formal Conformity Determination procedures are not required, resulting in this record of Non-Applicability.

Figure D.5-3: Conformity Analysis, South Coast Air Basin (continued)

NAVY RECORD OF NON-APPLICABILITY FOR CLEAN AIR ACT CONFORMITY

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

Action Proponents: United States Pacific Fleet
 Naval Sea Systems Command
 Naval Air Systems Command

Proposed Action: Hawaii-Southern California Training and Testing (HSTT)

Proposed Action Location: Southern California Range Complex, CA

Proposed Action and Emissions Summary:

See attached Conformity Analysis

Affected Air Basin: San Diego Air Basin

Date RONA prepared: _____

RONA prepared by: Naval Facilities Engineering Command, Southwest

Attainment Area Status and Emissions Evaluation Conclusion:

To the best of my knowledge and belief, the information contained within this General Conformity Applicability Analysis is correct and accurate. By signing this statement, I am in agreement with the finding that the total of all reasonably foreseeable direct and indirect emissions that will result from this action is below the *de minimis* threshold set forth in 40 C.F.R. 51.853(b). Accordingly, it is my determination that this action conforms to the applicable State Implementation Plan (SIP).

RONA Approval:

Signature: _____

Name/Rank: _____ Date: _____

Position: _____ Commanding Officer: _____ Activity: _____

Enclosure 2

Figure D.5-4: Record of Non-Applicability Form, San Diego Air Basin

Subject: Conformity Analysis for Navy Training and Testing, San Diego Air Basin**INTRODUCTION**

The Proposed Action falls under the Record of Non-Applicability (RONA) category pursuant to 40 Code of Federal Regulations (CFR) Parts 52 and 93, and the basis for exemption from conformity requirements is documented with this RONA.

The United States (U.S.) Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule*, in the Federal Register (40 CFR Parts 6, 51, and 93) on November 30, 1993. The U.S. Navy published *Clean Air Act General Conformity Guidance* in Chief of Naval Operations Instruction (OPNAVINST) 5090.1C CH-1 (18 July 2011). These publications provide guidance to document Clean Air Act Conformity requirements. Federal regulations state that no department, agency, or instrumentality of the federal government shall engage in, support in any way, or provide financial assistance for, license or permit, or approve any activity that does not conform to an applicable implementation plan. The federal agency that is the action proponent is responsible for determining whether a federal action conforms to the applicable implementation plan before the Proposed Action is taken (40 CFR Part 1, Section 51.850[a]).

Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels for criteria pollutants as set forth in 40 CFR § 93.153(c) (Table 1). These standards are reflected in Appendix F of OPNAVINST 5090.1C CH-1.

Table 1: De Minimis Thresholds for Conformity Determinations

Pollutant	Nonattainment or Maintenance Area Type	De Minimis Threshold (TPY)
Ozone (VOC or NO _x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO _x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO ₂ and NO ₂	All nonattainment & maintenance	100
PM ₁₀	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
PM _{2.5}	All nonattainment & maintenance	100
Lead (Pb)	All nonattainment & maintenance	25

Notes: NO_x = nitrogen oxides; Pb = lead; PM₁₀ = particulate matter under 10 microns; SO_x = sulfur oxides; TPY = tons per year; VOC = volatile organic compounds

Figure D.5-5: Conformity Analysis, San Diego Air Basin

PROPOSED ACTIONProposed Action Summary

The Proposed Action consists of increases in training and testing activities on the at-sea portions of the Southern California (SOCAL) Range Complex required to address a training shortfall, and to accommodate expected force-structure changes and range enhancements. The assessment of air quality impacts includes all military training activities in the SOCAL Range Complex involving vessels, aircraft, and weapons systems in State of California waters.

Proposed Action Emissions*Aircraft*

To estimate aircraft emissions, the operating modes (e.g., “cruise” mode), number of hours of operation, and types of engine for each type of aircraft were evaluated. All aircraft are assumed to travel to and from training ranges at or above 3,000 ft. (914 m) above ground level and, therefore, their transits to and from the ranges do not affect surface air quality. Air combat maneuvers and air-to-air missile exercises are primarily conducted at altitudes well in excess of 3,000 ft. (914 m) above ground level and, therefore, are not included in the estimated emissions of criteria air pollutants. Activities or portions of those training or testing activities occurring below 3,000 ft. (914 m) are included in emissions estimates. Examples of activities typically occurring below 3,000 ft. (914 m) include those involving helicopter platforms such as mine warfare, anti-surface warfare, and anti-submarine warfare training and testing activities.

The types of aircraft used and the numbers of flights flown under the No Action Alternative are derived from historical data. The types of aircraft identified include the typical aircraft platforms that conduct a particular training or testing exercise (or the closest surrogate when information is not available), including range support aircraft (e.g., non-Navy commercial air services). For the Preferred Alternative, estimates of future aircraft sorties are based on evolutionary changes in the Navy’s force structure and mission assignments. Where there are no major changes in types of aircraft, future activity levels are estimated from the distribution of baseline activities.

Time on range (activity duration) under the No Action Alternative was calculated from average times derived from range records and Navy subject matter experts. To estimate time on range for each aircraft activity under the Preferred Alternative, the average flight duration approximated in the baseline data was used in the calculations. Estimated altitudes of activities for all aircraft were obtained from aircrew members in operational squadrons. Several testing activities are similar to training activities, and therefore similar assumptions were made for such activities in terms of aircraft type, altitude, and flight duration. Where aircraft testing activities were dissimilar to training activities, assumptions for time on range were derived from Navy subject matter experts.

Air pollutant emissions were estimated based on the Navy’s Aircraft Environmental Support Office Memorandum Reports for individual aircraft categories (Aircraft Emission Estimates: Mission Operations). For aircraft for which Aircraft Environmental Support Office emission factors were not available, emission factors were obtained from other published sources.

Figure D.5-5: Conformity Analysis, San Diego Air Basin (continued)

The emissions calculations for each alternative conservatively assume that each aircraft activity is separately conducted. In practice, a testing activity may be conducted during a training flight. Two or more training activities also may be conducted during one flight (e.g., chaff or flare exercises may occur during electronic warfare operations; or air-to-surface gunnery and air-to-surface bombing activities may occur during a single flight operation). Using conservative assumptions may produce elevated aircraft emissions estimates, but accounts for the possibility (however remote) that each aircraft training and testing activity is separately conducted.

Vessels

The methods of estimating marine vessel emissions involve evaluating the type of activity, the number of hours of operation, the type of propulsion, and the type of onboard generator for each vessel type. The types of surface ships and numbers of activities for the No Action Alternative are derived from range records and Navy subject matter experts regarding vessel participant data. For the Preferred Alternative, estimates of future ship activities are based on anticipated evolutionary changes in the Navy's force structure and mission assignments. Where there are no major changes in types of ships, estimates of future activities are based on the historical distribution of ship use. Navy aircraft carriers and submarines are nuclear-powered, and have no air pollutant emissions associated with propulsion.

For surface ships, the durations of activities were estimated by taking an average over the total number of activities for each type of training and testing. Emissions for baseline activities and for future activities were estimated based on discussions with exercise participants. In addition, information provided by subject-matter experts was used to develop a breakdown of time spent at each operational mode (i.e., power level) used during activities in which marine vessels participated. Several testing activities are similar to training activities, and therefore similar assumptions were made for such activities in terms of vessel type, power level, and activity duration.

Emission factors for marine vessels were obtained from the database developed for Naval Sea Systems Command by John J. McMullen Associates, Inc. (John J. McMullen Associates 2001). Emission factors were provided for each marine vessel type and power level. The resulting calculations provided information on the time spent at each power level in each part of the Study Area, emission factors for that power level (in pounds of pollutant per hour), and total emissions for each marine vessel for each operational type and mode.

The pollutants for which calculations are made include exhaust total hydrocarbons, CO, NO_x, PM, CO₂, and SO₂. For non-road engines, all particulate matter emissions are assumed to be smaller than PM₁₀, and 92 percent of the particulate matter from gasoline and diesel-fueled engines is assumed to be smaller than PM_{2.5}. For gaseous-fueled engines (liquefied petroleum gas/compressed natural gas), 100 percent of the particulate matter emissions are assumed to be smaller than PM_{2.5}.

The emissions calculations for each alternative conservatively assume that each vessel activity is separately conducted and separately produces vessel emissions. In practice, one or more testing activities may take advantage of an opportunity to travel at sea aboard and test from a vessel conducting a related or unrelated training activity. It is also probable that two or more training activities may be conducted during one training vessel movement (e.g., a ship may conduct large-, medium-, and small-caliber surface-to-surface gunnery exercises during one vessel movement). Furthermore, multiple unit level training activities may be conducted during a larger composite training unit exercise. Using conservative assumptions may produce elevated vessel emissions estimates, but accounts for the possibility (however remote) that each training or testing activity is separately conducted.

Figure D.5-5: Conformity Analysis, San Diego Air Basin (continued)

Naval Gunfire, Missiles, Bombs, Other Munitions and Military Expended Material

Naval gunfire, missiles, bombs, and other types of munitions used in training and testing activities emit air pollutants. To estimate the amounts of air pollutants emitted by ordnance during their use, the numbers and types of munitions used during training or testing activities are first totaled. Then generally accepted emissions factors (AP-42, Compilation of Air Pollutant Emission Factors, Chapter 15: Ordnance Detonation [USEPA 1995]) for criteria air pollutants are applied to the total amounts. Finally, the total amounts of air pollutants emitted by each munition type are summed to produce total amounts of each criteria air pollutant under each alternative.

The estimated annual operational emissions for the No Action Alternative and Preferred Alternative are presented in Table 2. Annual emissions are expected to increase from the No Action Alternative levels to the Preferred Alternative levels over several years. All annual Preferred Alternative emissions would be below General Conformity *de minimis* levels.

Table 2: Estimated Air Pollutant Emissions Under the Proposed Action

Parameter	Emissions by Air Pollutant (TPY)		
	CO	NO _x	VOC
No Action Alternative	176	546	175
Preferred Alternative	243	592	184
Net Change	67	46	9
<i>De Minimis</i> Threshold	100	100	100
Exceeds Threshold?	No	No	No

Notes: Table includes criteria pollutant precursors (e.g., VOC). Individual values may not add exactly to total values due to rounding. CO = carbon monoxide; NO_x = nitrogen oxides; TPY = tons per year; VOC = volatile organic compounds

EMISSIONS EVALUATION CONCLUSION

The U.S. Navy concludes that the *de minimis* thresholds for applicable criteria pollutants would not be exceeded by implementation of the Proposed Action. The emissions data supporting that conclusion are shown in Table 2, which summarizes the calculated estimates and *de minimis* limits. Therefore, the U.S. Navy concludes that further formal Conformity Determination procedures are not required, resulting in this record of Non-Applicability.

Figure D.5-5: Conformity Analysis, San Diego Air Basin (continued)

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