
Appendix C

Air Emissions Calculations

Table C-8. Ordnance Expenditures—Alternative 1

NOTE: Units of Measure (UOM) for ordnance rounds are 1 each (ea.) and for Demolitions and Other Ordnance are in pounds Net Explosive Weight (NEW).										Emission Factor (lb per lb or lb per item)						Emissions, tons/year					
Ordnance Group	AQ Data	Ordnance Type	Quantity Fired	NEW ea.	UOM/ Cum NEW	CO2	CO	Nox	PM10	PM2.5	SO2	Lead	CO2	CO	Nox	PM10	PM2.5	SO2	Lead		
BOMB	No Data	CBU MK20 ROCKEYE		99	ea.																
	No Data	GBU32 JDAM		385	ea.																
	No Data	UGTR		0	ea.																
		MK76			Neg.	ea.															
	No Data	BDU 48			Neg.	ea.															
		MK82 HE		18	192	ea.		0.3184						0	0.550195	0	0	0	0	0	
	No Data	GBU12 500 lb			192	ea.															
	NA	MK82 INERT		110	0	ea.															
	No Data	BDU 45			0	ea.															
		MK83 HE		8	445	ea.		0.1482						0	0.263796	0	0	0	0	0	
No Data	GBU 16			445	ea.																
NA	MK83 INERT			0	ea.																
OTHER ORD			No AQ data	Type	Total	NEW															
CHAP & SPAWAR	No Data	EER/IEER ANIS/QQ-110		136	4.2	571.2	1.2	0.0044	0.011			0.00004	0.34272	0.001257	0.0031416	0	0	0	0	1.14E-05	
	No Data	BLASTING CAP MKY1		3,117	Neg.	0															
	No Data	FIRING DEVICE		103	Neg.	0															
	No Data	Fuse		18,700																	
	No Data	Igniters		550	Neg.	0															
		GRENADE SIMULATOR		0.0813	0.0	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0	0	0	0	0	0	0	0	
		Grenades		183	0.0813	14.9	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0.004687	0.000156	4.68654E-05	0.000156	0.000112	8.92674E-07	1.04E-05	
	No Data	M1A2 BANGALORE TORP		10.00	0									0	0	0	0	0	0	0	
		M7 BANDOLEER MK57 (Claymore mine)		8.16	0		0.15108														
	AP-42	M112 DEMO CHARGE		1,143	1.20	1371.6	7.90E-01	2.60E-02	7.90E-03	2.60E-02	1.90E-02		1.70E-04	0.541782	0.017831	0.00541782	0.017831	0.01303	0	0.000117	
No Data	M700 BLASTING FUSE			0.001	0																
No Data	MK20 Cable Cutter			0.0028	0.0																
No Data	MK22 Projectile Unit			Neg.	Neg.																
No Data	MK36 MO DEMO CHARGE			4.10	0								0	0	0	0	0	0	0		
No Data	MK75 CHARGE			50.00	0								0	0	0	0	0	0	0		
No Data	MK84 [86] EOD Shaped Charge			8	0.08	0.64							0	0	0	0	0	0	0		
No Data	MK120 NONELEC DET (R)			0.00001	0.0000																
No Data	MK123 NONELEC DET (R)			0.00001	0.0000																
No Data	MK138 DEMO CHG ASSEMBLY			20.00	0	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0	0	0	0	0	0	0		
No Data	MK140 FLEXIBLE CHARGE			0.04	0																
No Data	MK174			972																	
No Data	PBXN-109 TEST Det Cord			0.0060	0																
No Data	SIGNAL MK 18(G950) SMOKE			0.23	0																
No Data	C4 0.5 LB		4	0.50	2	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	6.30E-04	0.000021	0.0000063	0.000021	0.000015	0.00000012	1.4E-07		
No Data	C4 2.5 LB		60	2.50	150	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	4.73E-02	0.001575	0.0004725	0.001575	0.001128	0.000009	1.05E-05		
No Data	C4 5 LB		551	5.00	2755	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0.867825	0.028928	0.00867825	0.028928	0.020663	0.0001653	0.000193		
No Data	C4 20 LB		78	20.00	1520	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0.47381	0.01596	0.0047381	0.01596	0.0114	0.0000012	0.000108		
No Data	C4 300 LB		1.00	0	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0	0	0	0	0	0	0	0		
No Data	C4 500 LB		1.00	0	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0	0	0	0	0	0	0	0		
No Data	TNT Blocks 0.5 lbd		1.00	0	0																
No Data	DEMO SHEET		1,192	6.00	7152																
No Data	DETONATING CORD		36,667	0.006	220.002																
No Data	DEMO CHARGE			5.00	0																
AP-42	SIMULATED ARTILLERY			0.1375	0	6.30E-01	0.021	6.30E-03	2.10E-02	1.50E-02	1.20E-04	1.40E-04	0	0	0	0	0	0	0		
			Totals	63,464	13,757																
GUNFIRE (Large)	AP-42	155MM HE			ea.	6.51	2.35E+01	1.43E+00	0.496	0.2418		2.28E-03	0	0	0	0	0	0	0		
	AP-42	155MM ILL			ea.	1.8	2.62E-02	9.40E-02	3	3	5.80E-05	0	0	0	0	0	0	0	0		
	5754	5754 BLP		1,351		ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0.010808	0.01351	0	0.000811	0.000628	0	0	4.05E-06		
		5754 HCVT+52 (EOD)				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0		
		5754 HCVT				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0		
	5762	5754 HEPD				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0		
		5754 HCVT				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0		
		5754 ILL				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0		
	5762	5754 VTNF				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0		
		5762		1,000		ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0.006	0.01	0	0.0006	0.000468	0	0	0.00003		
5762 HE-MFF					ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0			
60mm	5762 HCVT				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0			
	5762 HE-E				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0			
	5762 KE-E				ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0			
76mm	60MM		700		ea.	2.90E-01	3.00E-02	4.20E-03	3.20E-02	1.70E-02	2.30E-04	0.1015	0.0105	0.00147	0.0112	0.000556	0	8.05E-05			
	60MM W/P		800		ea.	1.90E-01	3.00E-02	4.20E-03	3.20E-02	1.70E-02	2.30E-04	0	0	0	0	0	0	0			
	76MM BLP				ea.	5.44E-02	1.80E-02	1.08E-03	8.37E-04	5.40E-06	0.00576	0.0072	0	0.000432	0.000339	0	2.16E-05				
AP-42	81MM HE			ea.	1.60E-02	2.00E-02	1.20E-03	9.30E-04	6.00E-06	0	0	0	0	0	0	0	0				
AP-42	81MM ILL			ea.	1.50E-02	1.40E-02	3.60E-04	9.20E-04	7.60E-04	1.30E-06	0	0	0	0	0	0	0				
CAS	GAU-17 30mm				ea.																
			Totals	3,851																	
GUNFIRE (small)	AMW 114,1125	20MM		11,600	ea.	2.60E-04	3.50E-04	3.60E-05	2.60E-05	2.30E-05		6.70E-04	0.001508	0.00203	0.0002088	0.000151	0.000133	0	0.003888		
	25MM			17,500	ea.	2.60E-04	3.50E-04	3.60E-05	2.60E-05	2.30E-05		6.70E-04	0.002275	0.003063	0.000315	0.000228	0.000201	0	0.005983		
	No Data	30MM EPV Main Gun			ea.	2.60E-04	3.50E-04	3.60E-05	2.60E-05	2.30E-05		6.70E-04	0	0	0	0	0	0	0		
	AP-42	40MM HE			ea.	6.60E-02	7.00E-03	1.60E-03	1.30E-02	6.60E-03		7.30E-05	0	0	0	0	0	0	0		
	No Data	40MM ILL			ea.	2.60E-04	3.50E-04	3.60E-05	2.60E-05	2.30E-05		6.70E-04	0	0	0	0	0	0	0		
	AP-42	60MM PRACTICE			ea.	2.60E-04	3.50E-04	3.60E-05	2.60E-05												

Table C-11. Ground Vehicle Emissions - Alternative 1

Scenario	Type Training	Days	Ground Vehicles	Number	Engine Load	Hours per day	Emissions Factors (lb/hr)						Emissions (lbs)							
							CO	NOx	HC	SOx	PM10	CO	NOx	HC	Sox	PM				
1	Air Combat Maneuvers		None																	
2	A-A Missiles		None																	
3	S-A Gunnery Exercise		None																	
4	S-A Missiles		None																	
5	S-S GUNEX		None																	
6	A-S BOMBEX		None																	
7	SINKEX		None																	
8	ASW TRACKEX - MPA		None																	
9	EER-IEER		None																	
10	Surface Ship ASW TRACKEX		None																	
11	Sub ASW TRACKEX		None																	
12	Elec Combat		None																	
13	Mine Countermeasures Training		None																	
14	Land Demolition Training	110	Pickup Trucks	13	1.0	8	0.30	0.03	0.02	0.00	0.00	3482.54	291.61	182.30	3.20	10.42				
15	Insertion/Extraction		None																	
16	NSW Training		None																	
17	HARMEX		None																	
18	ISR		None																	
19	UAV		None																	
Total							Total Ground Vehicle Emissions, tons						Total Ground Vehicle Emissions, tons							
							1.74127146						0.1458027 0.091149 0.001602 0.005208							

Table C-12. Ground Vehicle Emissions - Alternative 2

Scenario	Type Training	Days	Ground Vehicles	Number	Engine Load	Hours per day	Emissions Factors (lb/hr)						Emissions (lbs)							
							CO	NOx	HC	SOx	PM10	CO	NOx	HC	Sox	PM				
1	Air Combat Maneuvers		None																	
2	A-A Missiles		None																	
3	S-A Gunnery Exercise		None																	
4	S-A Missiles		None																	
5	S-S GUNEX		None																	
6	A-S BOMBEX		None																	
7	SINKEX		None																	
8	ASW TRACKEX - MPA		None																	
9	EER-IEER		None																	
10	Surface Ship ASW TRACKEX		None																	
11	Sub ASW TRACKEX		None																	
12	Elec Combat		None																	
13	Mine Countermeasures Training		None																	
14	Land Demolition Training	110	Pickup Trucks	13	1.0	8	0.30	0.03	0.02	0.00	0.00	3482.54	291.61	182.30	3.20	10.42				
15	Insertion/Extraction		None																	
16	NSW Training		None																	
17	HARMEX		None																	
18	ISR		None																	
19	UAV		None																	
Total							Total Ground Vehicle Emissions, tons						Total Ground Vehicle Emissions, tons							
							1.74127146						0.1458027 0.091149 0.001602 0.005208							

Table C-13. Total Emissions within 3 nm of Shore

No Action Alternative	CO	NOx	HC	SOx	PM10	PM2.5
Aircraft-Operations	0.93	1.74	0.11	0.09	0.95	0.94
Surface Ships	1.32	3.02	0.12	0.56	0.08	0.08
Ordnance	0.92	0.06	0.00	0.00	0.09	0.09
Ground Vehicles	1.49	0.12	0.08	0.00	0.00	0.00
Total	4.66	4.95	0.31	0.65	1.13	1.12
Alternative 1						
Aircraft-Operations	1.02	1.86	0.12	0.10	1.03	1.02
Surface Ships	1.44	3.31	0.13	0.61	0.08	0.08
Ordnance	1.29	0.07	0.00	0.00	0.10	0.10
Ground Vehicles	1.74	0.15	0.09	0.00	0.01	0.01
Total	5.49	5.39	0.35	0.71	1.22	1.20
Alternative 2						
Aircraft-Operations	1.03	1.90	0.12	0.10	1.04	1.03
Surface Ships	1.44	3.31	0.13	0.61	0.08	0.08
Ordnance	1.60	0.10	0.00	0.00	0.12	0.12
Ground Vehicles	1.74	0.15	0.09	0.00	0.01	0.01
Total	5.81	5.46	0.35	0.71	1.25	1.24
Increases over Baseline						
Alternative 1	0.82	0.44	0.03	0.06	0.09	0.09
Alternative 2	1.15	0.51	0.04	0.06	0.12	0.12
Major Source Threshold	100.00	100.00	10.00	100.00	100.00	100.00
<i>Alternative 1 Above?</i>	NO	NO	NO	NO	NO	NO
<i>Alternative 2 Above?</i>	NO	NO	NO	NO	NO	NO

Table C-14. Total Emissions within U.S. Territory

No Action Alternative	CO	NOx	HC	SOx	PM10	PM2.5
Aircraft-Operations	0.00	0.00	0.00	0.00	0.00	0.00
Surface Ships	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Ground Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
Alternative 1						
Aircraft-Operations	0.00	0.00	0.00	0.00	0.00	0.00
Surface Ships	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Ground Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
Alternative 2						
Aircraft-Operations	0.00	0.00	0.00	0.00	0.00	0.00
Surface Ships	0.00	0.00	0.00	0.00	0.00	0.00
Ordnance	0.00	0.00	0.00	0.00	0.00	0.00
Ground Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00
Increases over Baseline						
Alternative 1	0.00	0.00	0.00	0.00	0.00	0.00
Alternative 2	0.00	0.00	0.00	0.00	0.00	0.00
Major Source Threshold	100.00	100.00	10.00	100.00	100.00	100.00
<i>Alternative 1 Above?</i>	NO	NO	NO	NO	NO	NO
<i>Alternative 2 Above?</i>	NO	NO	NO	NO	NO	NOC-13