TABLE 3-22a1 - SUMMARY OF ENGINE EMISSIONS - HYDROCARBONS - ALL AREAS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL HYDRO CARBON - ALL AREAS.

MONTH	POUNDS POLLUTANTS HC TOTAL	HIGH HC DAY	LOW HC DAY	AVERAGE HC
JAN	162,738	6,926 6	4,139 2	5,250
FEB	151,254	7,129 53	3,800 48	5,216
MAR	170,084	6,504 76	3,961 61	5,487
APR	158,914	6,349 109	4,325 118	5,297
MAY	169,518	6,736 124	4,269 127	5,468
JUN	167,700	6,988 181	4,390 159	5,590
JUL	174,302	7,040 191	4,403 188	5,623
AUG	168,910	7,225 237	4,420 228	5,449
SEP	156,703	6,618 249	4,309 261	5,223
OCT	169,543	6,304 297	3,734 284	5,469
NOV	160,167	6,222 307	3,626 331	5,339
DEC	162,212	6,819 354	2,850 361	5,233
TOTAL	1,972,045			5,388

Scott Environmental Technology Inc.

TABLE 3-22a2 - SUMMARY OF ENGINE EMISSIONS - CARBON MONOXIDE - ALL AREAS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

SUMMARY OF ENGINE EMISSIONS: TOTAL CARBON MONOXIDE - ALL AREAS.

MONTH	POUNDS POLLUTANTS CO TOTAL	HIGH CO DAY	LOW CO DAY	AVERAGE CO
JAN	499,351	20,569 6	13,636 2	16,108
FEB	462,845	21,214 41	12,402 48	15,960
MAR	520,570	19,577 76	12,282 61	16,793
APR	482,799	18,753 109	13,189 96	16,093
MAY	514,576	19,945 147	13,359 127	16,599
JUN	511,379	20,473 181	13,518 159	17,046
JUL	532,967	20,900 191	13,900 188	17,192
AUG	519,749	20,956 237	13,931 228	16,766
SEP	481,666	19,562 249	13,296 261	16,056
OCT	521,038	19,986 281	12,117 284	16,808
NOV	495,066	18,536 307	11,703 331	16,502
DEC	495,970	20,138 354	8,798 361	15,999
TOTAL	6,037,976			16,497

TABLE 3-22a3 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF NITROGEN - ALL AREAS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL NITROGEN OXIDES - ALL AREAS.

MONTH	POUNDS POLLUTANTS - NO TOTAL	HIGH NO DAY	LOW NO DAY	AVERAGE NO
JAN	2,470,487	103,063 6	67,125 30	79,693
FEB	2,280,347	101,281 41	62,208 48	78,633
MAR	2,592,274	98,071 86	59,264 61	83,622
APR	2,389,043	92,876 109	63,794 96	79,635
MAY	2,553,606	99,658 147	65,821 127	82,374
JUN	2,526,866	101,404 163	66,252 159	84,229
JUL	2,674,283	105,757 191	68,114 188	86,267
AUG	2,609,381	102,280 237	70,320 228	84,174
SEP	2,421,406	98,144 249	64,781 261	80,714
OCT	2,619,234	99,873 281	61,249 284	84,491
NOV	2,509,765	95,056 315	59,105 331	83,659
DEC	2,515,976	100,120 354	46,702 361	81,161
TOTAL	30,162,668			82,412

TABLE 3-22a4 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF SULFUR - ALL AREAS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL SULPHUR OXIDES - ALL AREAS.

MONTH	POUNDS POLLUTANTS - SO TOTAL	HIGH SO DAY	LOW SO DAY	AVERAGE SO
JAN	4,659,408	182,826 6	128,351 1	150,303
FEB	4,215,091	177,368 43	115,475 60	145,348
MAR	4,828,965	189,906 86	105,705 61	155,773
APR	4,194,432	172,164 106	103,989 96	139,814
MAY	4,633,876	190,286 147	123,398 127	149,480
JUN	4,787,919	197,634 162	113,844 159	159,597
JUL	5,141,830	204,939 211	124,271 200	165,865
AUG	5,138,682	199,227 218	117,720 214	165,764
SEP	4,655,152	192,395 268	120,826 256	155,172
OCT	5,134,378	200,079 281	124,400 284	165,625
NOV	4,996,173	208,431 315	130,078 331	166,539
DEC	5,325,605	203,783 357	142,445 360	171,794
TOTAL	57,711,511			157,682

TABLE 3-22a5 - SUMMARY OF ENGINE EMISSIONS - TOTAL PARTICULATES - ALL AREAS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL PARTICULATES - ALL AREAS.

MONTH	POUNDS POLLUTANTS - PT TOTAL	HIGH PT DAY	LOW PT DAY	AVERAGE PT
JAN	449,497	17,592 6	12,661 1	14,500
FEB	409,745	17,159 41	11,953 60	14,129
MAR	465,281	17,824 86	10,715 61	15,009
APR	413,763	16,302 106	10,781 96	13,792
MAY	450,854	17,949 147	12,153 127	14,544
JUN	459,128	18,483 163	11,535 159	15,304
JUL	489,334	18,805 211	12,785 213	15,785
AUG	486,630	18,464 224	11,966 214	15,698
SEP	445,442	17,796 268	12,135 261	14,848
OCT	486,633	18,670 281	12,010 284	15,698
NOV	471,596	18,904 315	12,325 331	15,720
DEC	489,338	18,848 357	12,124 361	15,785
TOTAL	5,517,241			15,074

Scott Environmental Technology Inc.

TABLE 22b1 - SUMMARY OF ENGINE EMISSIONS - HYDROCARBONS - AREA 1

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL HYDRO CARBON - ALL AREA 01.

MONTH	POUNDS POLLUTANTS HC TOTAL	HIGH HC	DAY	LOW HC	DAY	AVERAGE HC
JAN	19,563	731	23	492	1	631
FEB	18,278	804	41	462	47	630
MAR	20,298	837	75	534	80	655
APR	18,692	853	108	526	116	623
MAY	20,069	801	149	502	137	647
JUN	20,295	838	163	529	159	677
JUL	20,491	800	203	535	185	661
AUG	19,755	782	237	508	232	637
SEP	18,899	737	273	476	257	630
OCT	20,648	846	291	555	285	666
NOV	19,392	828	329	521	317	646
DEC	20,133	848	356	462	337	649
TOTAL	236,513					646

Scott Environmental Technology Inc.

TABLE 3-22b2 - SUMMARY OF ENGINE EMISSIONS - CARBON MONOXIDE - AREA 1

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

SUMMARY OF ENGINE EMISSIONS: TOTAL CARBON MONOXIDE - ALL AREA #1.

MONTH	POUNDS POLLUTANTS CO TOTAL	HIGH CO DAY	LOW CO DAY	AVERAGE CO
JAN	56,792	2,174 28	1,378 1	1,832
FEB	52,546	2,364 41	1,353 47	1,812
MAR	59,033	2,393 75	1,539 80	1,904
APR	53,771	2,588 108	1,462 119	1,792
MAY	58,270	2,396 150	1,445 127	1,880
JUN	59,129	2,416 177	1,485 159	1,971
JUL	59,775	2,331 203	1,545 185	1,928
AUG	57,169	2,245 237	1,466 239	1,844
SEP	54,633	2,145 273	1,302 257	1,821
OCT	60,013	2,460 291	1,616 285	1,936
NOV	56,383	2,432 314	1,469 317	1,879
DEC	58,668	2,448 349	1,264 337	1,893
TOTAL	686,182			1,875

Scott Environmental Technology Inc.

TABLE 3-22b3 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF NITROGEN - AREA 1

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL NITROGEN OXIDES - ALL AREA #1.

MONTH	POUNDS POLLUTANTS - NO TOTAL	HIGH NO - DAY	LOW NO - DAY	AVERAGE NO
JAN	267,666	10,387 28	6,526 1	8,634
FEB	242,309	11,192 41	6,694 47	8,355
MAR	278,151	10,762 75	7,010 79	8,973
APR	254,229	12,995 108	6,694 119	8,474
MAY	277,595	11,307 150	6,762 127	8,955
JUN	276,332	11,347 177	6,795 159	9,211
JUL	282,440	10,826 202	7,505 185	9,111
AUG	268,710	10,728 227	6,751 239	8,668
SEP	254,899	10,197 248	5,651 257	8,497
OCT	277,671	11,142 291	7,549 283	8,957
NOV	263,198	10,858 314	6,874 317	8,773
DEC	263,589	12,262 349	5,759 337	8,503
TOTAL	3,206,789			8,762

Scott Environmental Technology Inc

TABLE 3-22b4 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF SULFUR - AREA 1

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL SULPHUR OXIDES - ALL AREA #1.

MONTH	POUNDS POLLUTANTS SO TOTAL	HIGH SO DAY	LOW SO DAY	AVERAGE SO
JAN	1,042,997	44,443 28	23,331 1	33,645
FEB	945,580	46,082 41	25,123 47	32,606
MAR	1,082,066	43,180 76	26,294 79	34,905
APR	939,320	49,383 108	22,491 119	31,311
MAY	1,045,189	47,390 150	25,164 145	33,716
JUN	1,098,516	46,339 153	23,799 159	36,617
JUL	1,108,397	48,951 188	26,112 185	35,755
AUG	1,041,093	42,400 237	23,638 239	33,584
SEP	999,376	39,819 272	20,437 257	33,313
OCT	1,122,327	49,479 301	28,440 285	36,204
NOV	1,051,345	51,811 314	23,229 317	35,045
DEC	1,135,285	52,229 349	19,808 337	36,622
TOTAL	12,611,491			34,458

TABLE 3-22b5 - SUMMARY OF ENGINE EMISSIONS - TOTAL PARTICULATES - AREA 1

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL PARTICULATES - ALL AREA #1.

MONTH	POUNDS POLLUTANTS PT TOTAL	HIGH PT	DAY	LOW PT	DAY	AVERAGE PT
JAN	84,440	3,515	28	1,944	1	2,724
FEB	76,776	3,658	41	2,071	47	2,647
MAR	87,521	3,452	76	2,169	79	2,823
APR	76,855	3,931	106	1,908	119	2,562
MAY	84,909	3,747	150	2,084	127	2,739
JUN	88,460	3,672	153	1,999	159	2,949
JUL	89,380	3,828	188	2,166	185	2,883
AUG	84,383	3,384	237	1,983	239	2,722
SEP	80,950	3,192	273	1,730	257	2,698
OCT	90,298	3,879	301	2,335	285	2,913
NOV	84,759	4,042	314	1,964	317	2,825
DEC	90,067	4,095	349	1,684	337	2,905
TOTAL	1,018,798					2,784

Scott Environmental Technology Inc.

TABLE 3-22c1 - SUMMARY OF ENGINE EMISSIONS - HYDROCARBONS - AREA 2

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL HYDRO CARBON - ALL AREA #2.

MONTH	POUNDS POLLUTANTS HC TOTAL	HIGH HC	DAY	LOW HC	DAY	AVERAGE HC
JAN	28,174	1,060	30	790	10	909
FEB	25,486	1,112	33	669	60	879
MAR	26,887	1,050	79	747	89	867
APR	24,117	964	92	664	117	804
MAY	26,263	1,047	145	651	122	847
JUN	27,740	1,023	173	751	159	925
JUL	28,471	1,079	191	708	201	918
AUG	28,703	1,121	233	804	244	926
SEP	25,650	1,114	259	673	256	855
OCT	27,624	1,069	289	708	277	891
NOV	25,901	1,201	316	746	334	863
DEC	25,496	1,035	345	331	366	822
TOTAL	320,512					876

Scott Environmental Technology Inc.

TABLE 3-22c2 - SUMMARY OF ENGINE EMISSIONS - CARBON MONOXIDE - AREA 2

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL CARBON MONOXIDE - ALL AREA 62.

MONTH	POUNDS POLLUTANTS - CO TOTAL	HIGH CO DAY	LOW CO DAY	AVERAGE CO
JAN	88,866	3,302 21	2,523 10	2,867
FEB	80,778	3,420 33	2,142 60	2,785
MAR	85,330	3,245 79	2,372 89	2,753
APR	77,223	3,065 92	2,161 117	2,574
MAY	82,999	3,255 145	2,083 122	2,677
JUN	88,062	3,244 173	2,441 159	2,935
JUL	90,256	3,336 191	2,261 201	2,911
AUG	90,783	3,453 233	2,567 241	2,928
SEP	81,370	3,383 259	2,195 256	2,712
OCT	88,169	3,377 289	2,299 277	2,844
NOV	82,744	3,705 316	2,398 334	2,758
DEC	81,051	3,275 355	991 366	2,615
TOTAL	1,017,626			2,780

Scott Environmental Technology Inc.

TABLE 3-22c3 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF NITROGEN - AREA 2

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL NITROGEN OXIDES - ALL AREA #2.

MONTH	POUNDS POLLUTANTS NO TOTAL	HIGH NO	DAY	LOW NO	DAY	AVERAGE NO
JAN	383,445	14,180	21	10,666	10	12,369
FEB	348,389	14,671	33	9,244	60	12,013
MAR	374,315	13,708	79	9,999	89	12,075
APR	339,210	13,753	105	9,418	109	11,307
MAY	356,301	14,139	145	8,734	122	11,494
JUN	380,256	14,508	173	10,687	159	12,675
JUL	398,567	15,386	192	9,683	201	12,857
AUG	393,718	14,553	233	10,996	241	12,701
SEP	355,539	15,407	259	9,390	256	11,851
OCT	390,228	15,552	302	9,957	277	12,588
NOV	362,851	16,060	316	10,268	312	12,095
DEC	356,259	15,107	355	4,197	366	11,492
TOTAL	4,439,078					12,129

Scott Environmental Technology Inc.

TABLE 3-22c4 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF SULFUR - AREA 2

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL SULPHUR OXIDES - ALL AREA #2.

MONTH	POUNDS POLLUTANTS SO TOTAL	HIGH SO DAY	LOW SO DAY	AVERAGE SO
JAN	1,038,611	43,816 2	26,031 14	33,504
FEB	917,895	45,791 44	17,240 60	31,652
MAR	945,757	41,949 72	21,643 89	30,508
APR	821,554	39,883 92	16,837 117	27,385
MAY	904,641	41,244 145	16,162 122	29,182
JUN	1,056,917	44,962 169	25,490 159	35,231
JUL	1,073,961	41,198 192	19,412 200	34,644
AUG	1,079,235	46,016 239	26,667 228	34,814
SEP	881,283	42,643 268	20,811 262	29,376
OCT	1,026,414	47,662 289	21,272 283	33,110
NOV	954,792	47,843 316	22,215 334	31,826
DEC	1,078,672	41,870 345	23,079 366	34,796
TOTAL	11,779,732			32,185

TABLE 3-22c5 - SUMMARY OF ENGINE EMISSIONS - TOTAL PARTICULATES - AREA 2

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL PARTICULATES - ALL AREA #2.

MONTH	POUNDS POLLUTANTS PT TOTAL	HIGH PT	DAY	LOW PT	DAY	AVERAGE PT
JAN	91,914	3,706	20	2,424	14	2,965
FEB	81,855	3,863	44	1,737	60	2,823
MAR	85,084	3,574	72	2,072	89	2,745
APR	75,078	3,440	92	1,719	117	2,503
MAY	81,813	3,556	145	1,655	122	2,639
JUN	92,746	3,783	169	2,352	159	3,092
JUL	94,663	3,574	192	1,948	201	3,054
AUG	94,962	3,902	239	2,462	242	3,063
SEP	79,775	3,630	268	2,030	256	2,659
OCT	91,012	4,001	289	2,039	283	2,936
NOV	85,009	4,082	316	2,121	334	2,834
DEC	92,065	3,598	345	1,733	366	2,970
TOTAL	1,045,976					2,858

Scott Environmental Technology Inc

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TABLE 3-22d1 - SUMMARY OF ENGINE EMISSIONS - HYDROCARBONS - PORT OF LONG BEACH

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL HYDRO CARBON - LB PORT.

MONTH	POUNDS POLLUTANTS HC TOTAL	HIGH HC	DAY	LOW HC	DAY	AVERAGE HC
JAN	10,334	455	28	226	1	333
FEB	9,990	429	37	264	60	344
MAR	11,642	529	70	282	79	376
APR	10,703	500	108	287	113	357
MAY	10,661	483	142	262	135	344
JUN	12,028	640	177	270	169	401
JUL	11,351	481	202	292	200	366
AUG	11,079	529	224	275	232	357
SEP	10,548	450	245	265	250	352
OCT	11,469	495	301	281	304	370
NOV	10,420	459	314	243	334	347
DEC	10,092	487	356	191	364	326
TOTAL	130,317					356

TABLE 3-22d2 - SUMMARY OF ENGINE EMISSIONS - CARBON MONOXIDE - PORT OF LONG BEACH

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL CARBON MONOXIDE - LB PORT.

MONTH	POUNDS POLLUTANTS CO TOTAL	HIGH CO	DAY	LOW CO	DAY	AVERAGE CO
JAN	29,006	1,318	28	604	1	936
FEB	27,797	1,224	40	721	60	959
MAR	32,896	1,506	70	782	79	1,061
APR	30,242	1,467	108	784	113	1,008
MAY	29,797	1,388	142	751	135	961
JUN	34,225	1,813	177	732	169	1,141
JUL	31,895	1,416	202	812	200	1,029
AUG	31,112	1,476	224	761	229	1,004
SEP	29,557	1,272	266	736	250	985
OCT	32,611	1,472	279	786	304	1,052
NOV	29,339	1,310	314	687	306	978
DEC	28,379	1,361	356	552	346	915
TOTAL	366,856					1,002

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TABLE 3-22d3 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF NITROGEN - PORT OF LONG BEACH

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL NITROGEN OXIDES - LB PORT.

MONTH	POUNDS POLLUTANTS NO TOTAL	HIGH NO	DAY	LOW NO	DAY	AVERAGE NO
JAN	134,594	6,063	28	2,781	1	4,342
FEB	127,732	6,049	40	3,300	51	4,405
MAR	151,103	6,491	70	3,589	79	4,874
APR	140,922	7,218	108	3,572	113	4,697
MAY	139,129	6,421	142	3,639	128	4,488
JUN	156,346	8,089	177	3,205	169	5,212
JUL	147,186	6,581	202	3,678	194	4,748
AUG	143,592	6,480	224	3,424	229	4,632
SEP	133,919	5,953	266	3,369	247	4,464
OCT	147,883	7,020	279	3,826	304	4,770
NOV	135,258	5,528	314	3,310	306	4,509
DEC	126,023	5,889	349	2,233	364	4,065
TOTAL	1,683,687					4,600

TABLE 3-22d4 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF SULFUR - PORT OF LONG BEACH

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

SUMMARY OF ENGINE EMISSIONS: TOTAL SULPHUR OXIDES - LB PORT.

MONTH	POUNDS POLLUTANTS SO TOTAL	HIGH SO DAY		LOW SO DAY		AVERAGE SO
JAN	426,977	23,408	28	7,176	19	13,773
FEB	399,430	21,468	41	8,406	60	13,773
MAR	511,647	27,445	70	9,591	88	16,505
APR	453,299	23,318	108	8,342	120	15,110
MAY	427,256	22,717	142	7,062	144	13,782
JUN	551,141	28,967	177	9,551	169	18,371
JUL	488,197	25,258	202	10,551	213	15,748
AUG	469,326	25,975	237	8,105	214	15,140
SEP	456,610	21,415	245	8,847	250	15,220
OCT	533,203	29,724	279	10,586	304	17,200
NOV	452,102	23,826	314	8,051	306	15,070
DEC	469,519	23,258	356	5,122	346	15,146
TOTAL	5,638,707					15,406

Scott Environmental Technology Inc.

TABLE 3-22d5 - SUMMARY OF ENGINE EMISSIONS - TOTAL PARTICULATES - PORT OF LONG BEACH

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL PARTICULATES - LB PORT.

MONTH	POUNDS POLLUTANTS PT TOTAL	HIGH PT DAY	LOW PT DAY	AVERAGE PT
JAN	37,231	1,920 28	710 19	1,201
FEB	34,934	1,767 41	799 60	1,205
MAR	43,641	2,224 70	905 88	1,408
APR	39,138	1,940 108	822 120	1,305
MAY	37,404	1,886 142	720 144	1,207
JUN	46,408	2,377 177	876 169	1,547
JUL	41,840	2,062 202	966 213	1,350
AUG	40,440	2,103 237	790 214	1,305
SEP	39,171	1,759 245	834 250	1,306
OCT	44,973	2,374 279	960 304	1,451
NOV	38,851	1,936 314	771 306	1,295
DEC	39,285	1,908 356	552 346	1,267
TOTAL	483,316			1,321

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TABLE 3-22e1 - SUMMARY OF ENGINE EMISSIONS - HYDROCARBONS - PORT OF LOS ANGELES

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL HYDRO CARBON - LA PORT.

MONTH	POUNDS POLLUTANTS HC TOTAL	HIGH HC	DAY	LOW HC	DAY	AVERAGE HC
JAN	8,319	393	23	171	14	268
FEB	7,561	374	51	146	47	261
MAR	7,940	402	75	150	85	256
APR	7,508	359	110	178	104	250
MAY	8,645	405	131	194	146	279
JUN	7,538	430	163	133	160	251
JUL	8,497	364	197	196	186	274
AUG	7,806	363	229	143	225	252
SEP	7,637	354	271	131	258	255
OCT	8,440	389	291	186	296	272
NOV	8,422	351	329	191	317	281
DEC	8,977	362	349	162	337	290
TOTAL	97,290					266

TABLE 3-22e2 - SUMMARY OF ENGINE EMISSIONS - CARBON MONOXIDE - PORT OF LOS ANGELES

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL CARBON MONOXIDE - LA PORT.

	POUNDS POLLUTANTS					
MONTH	CO TOTAL	HIGH CO	DAY	LOW CO	DAY	AVERAGE CO
JAN	24,019	1,124	23	472	14	775
FEB	21,576	1,068	41	397	47	744
MAR	22,920	1,137	76	431	85	739
APR	21,313	996	110	522	104	710
MAY	25,076	1,190	131	530	146	809
JUN	21,688	1,247	163	362	160	723
JUL	25,052	1,085	197	545	185	808
AUG	22,379	1,095	229	393	225	722
SEP	22,014	1,041	271	359	258	734
OCT	24,231	1,128	291	524	296	782
NOV	24,506	1,009	334	556	330	817
DEC	26,108	1,089	349	458	337	842
TOTAL	280,882					767

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TABLE 3.22e3 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF NITROGEN - PORT OF LOS ANGELES

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL NITROGEN OXIDES - LA PORT.

MONTH	POUNDS POLLUTANTS - NO TOTAL	HIGH NO DAY	LOW NO DAY	AVERAGE NO
JAN	111,973	5,008 12	2,270 14	3,612
FEB	95,779	4,818 41	1,749 47	3,303
MAR	107,215	5,128 76	2,072 85	3,459
APR	99,409	4,898 108	2,430 119	3,314
MAY	117,887	5,791 131	2,454 127	3,803
JUN	100,674	5,472 163	1,674 160	3,356
JUL	118,500	5,248 197	2,679 185	3,823
AUG	103,865	5,102 229	1,845 225	3,350
SEP	103,128	4,872 273	1,607 258	3,438
OCT	111,097	5,041 291	2,576 280	3,584
NOV	112,021	4,466 324	2,378 330	3,734
DEC	115,941	5,112 349	2,191 362	3,740
TOTAL	1,297,489			3,545

TABLE 3.22e4 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF SULFR - PORT OF LOS ANGELES

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

SUMMARY OF ENGINE EMISSIONS: TOTAL SULPHUR OXIDES - LA PORT.

MONTH	POUNDS POLLUTANTS SO TOTAL	HIGH SO DAY		LOW SO DAY		AVERAGE SO
JAN	497,406	23,891	12	9,334	14	16,045
FEB	444,216	23,072	58	8,208	47	15,318
MAR	465,290	22,018	76	7,618	70	15,009
APR	413,279	21,441	117	9,725	98	13,776
MAY	507,735	24,503	150	9,589	146	16,379
JUN	443,460	26,953	163	5,382	177	14,782
JUL	529,260	22,227	197	9,771	185	17,073
AUG	454,310	23,425	229	7,174	225	14,655
SEP	444,849	23,167	271	7,809	262	14,828
OCT	487,140	24,792	291	9,525	296	15,714
NOV	515,766	24,068	334	10,960	317	17,192
DEC	537,696	23,463	349	8,782	337	17,345
TOTAL	5,740,407					15,684

Scott Environmental Technology Inc.

TABLE 3.22e5 - SUMMARY OF ENGINE EMISSIONS - TOTAL PARTICULATES - PORT OF LOS ANGELES

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL PARTICULATES - LA PORT.

MONTH	POUNDS POLLUTANTS PT TOTAL	HIGH PT	DAY	LOW PT	DAY	AVERAGE PT
JAN	38,528	1,820	12	740	14	1,243
FEB	34,373	1,746	58	647	47	1,185
MAR	36,179	1,709	76	629	70	1,167
APR	32,388	1,630	117	778	104	1,080
MAY	39,437	1,875	150	764	146	1,272
JUN	34,441	2,060	163	458	177	1,148
JUL	40,877	1,720	197	781	185	1,319
AUG	35,338	1,797	229	575	225	1,140
SEP	34,614	1,768	271	619	258	1,154
OCT	37,854	1,897	291	758	296	1,221
NOV	39,792	1,823	334	872	317	1,326
DEC	41,405	1,801	349	697	337	1,336
TOTAL	445,226					1,216

Scott Environmental Technology Inc.

TABLE 3.22f1 - SUMMARY OF ENGINE EMISSIONS - HYDROCARBONS - CALIFORNIA COASTAL WATERS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMMARY OF ENGINE EMISSIONS: TOTAL HYDRO CARBON-NCW/SCW COASTAL WATERS

MONTH	POUNDS POLLUTANTS HC TOTAL	HIGH HC DAY		LOW HC DAY		AVERAGE HC
JAN	91,289	4,629	6	1,830	2	2,945
FEB	85,322	4,981	53	1,604	48	2,942
MAR	98,982	4,090	76	1,778	61	3,193
APR	93,101	4,127	109	2,237	96	3,103
MAY	99,536	4,467	124	2,084	127	3,211
JUN	96,652	4,638	181	2,090	170	3,222
JUL	101,350	4,522	191	2,015	188	3,269
AUG	95,757	4,580	237	2,139	228	3,089
SEP	88,504	4,349	249	2,067	251	2,950
OCT	96,759	3,940	299	1,667	284	3,121
NOV	91,205	3,942	307	1,382	331	3,040
DEC	96,061	4,699	363	1,832	361	3,099
TOTAL	1,134,518					3,100

Scott Environmental Technology Inc.

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TABLE 3.22f2 - SUMMARY OF ENGINE EMISSIONS - CARBON MONOXIDE - CALIFORNIA COASTAL WATERS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUM OF ENGINE EMISSIONS: TOTAL CARBON MONOXIDE-NCW/SCW COASTAL WATERS.

MONTH	POUNDS POLLUTANTS CO TOTAL	HIGH CO DAY		LOW CO DAY		AVERAGE CO
JAN	291,239	13,922	6	6,774	30	9,395
FEB	271,187	14,270	53	6,038	48	9,351
MAR	312,956	12,537	86	5,852	61	10,095
APR	291,007	12,201	109	6,963	96	9,700
MAY	311,011	12,883	124	7,048	127	10,033
JUN	303,518	13,665	181	7,296	170	10,117
JUL	319,619	13,599	191	6,856	188	10,310
AUG	306,013	13,288	237	7,288	228	9,871
SEP	283,026	12,900	249	6,922	251	9,434
OCT	307,837	12,819	281	6,072	284	9,930
NOV	293,108	11,876	307	5,112	331	9,770
DEC	301,696	12,859	363	5,671	361	9,732
TOTAL	3,592,217					9,815

TABLE 3.22f3 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF NITROGEN - CALIFORNIA COASTAL WATERS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMM OF ENGINE EMISSIONS: TOTAL NITROGEN OXIDES-NCH/SCH COASTAL WATERS

MONTH	POUNDS POLLUTANTS NO TOTAL	HIGH NO DAY	LOW NO DAY	AVERAGE NO
JAN	1,507,684	72,224 6	35,046 30	48,635
FEB	1,398,656	71,572 53	32,533 48	48,230
MAR	1,623,543	66,046 86	28,974 61	52,372
APR	1,491,057	61,786 109	34,135 96	49,702
MAY	1,607,057	67,315 147	36,655 127	51,841
JUN	1,567,466	69,639 181	38,546 159	52,249
JUL	1,659,356	70,456 191	35,672 188	53,528
AUG	1,594,986	66,860 237	38,316 228	51,451
SEP	1,475,513	65,818 249	35,699 251	49,184
OCT	1,601,218	65,566 281	32,253 284	51,652
NOV	1,531,479	60,912 315	26,534 331	51,049
DEC	1,594,174	67,435 363	32,717 361	51,425
TOTAL	18,652,189			50,962

Scott Environmental Technology Inc.

TABLE 3.22f4 - SUMMARY OF ENGINE EMISSIONS - OXIDES OF SULFUR - CALIFORNIA COASTAL WATERS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMM OF ENGINE EMISSIONS: TOTAL SULPHUR OXIDES-NCW/SCW COASTAL WATERS.

MONTH	POUNDS POLLUTANTS SO TOTAL	HIGH SO DAY		LOW SO DAY		AVERAGE SO
JAN	2,455,873	114,202	6	58,507	30	79,222
FEB	2,241,297	95,775	43	53,995	58	77,286
MAR	2,654,451	112,994	86	39,167	61	85,627
APR	2,303,033	111,078	106	42,324	96	76,768
MAY	2,558,517	112,194	147	60,846	145	82,533
JUN	2,507,815	117,720	175	54,694	160	83,594
JUL	2,716,359	122,961	211	60,841	188	87,624
AUG	2,669,439	117,427	218	54,664	214	86,111
SEP	2,462,370	110,340	270	55,456	261	82,079
OCT	2,651,746	117,611	281	60,976	284	85,540
NOV	2,596,255	126,086	315	46,638	331	86,542
DEC	2,739,412	118,213	357	66,119	353	88,368
TOTAL	30,556,567					83,488

Scott Environmental Technology Inc.

TABLE 3.22f5 - SUMMARY OF ENGINE EMISSIONS - TOTAL PARTICULATES - CALIFORNIA COASTAL WATERS

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING SUMM OF ENGINES EMISSIONS: TOTAL PARTICULATES-NCW/SCW COASTAL WATERS.

MONTH	POUNDS POLLUTANTS - PT TOTAL	HIGH PT	DAY	LOW PT	DAY	AVERAGE PT
JAN	235,930	10,868	6	5,694	30	7,611
FEB	216,581	9,610	41	5,640	51	7,468
MAR	253,643	10,525	86	4,182	61	8,182
APR	224,908	10,160	106	4,610	96	7,497
MAY	246,695	10,527	147	6,004	127	7,958
JUN	241,427	10,639	175	5,610	160	8,048
JUL	259,213	11,114	211	5,874	188	8,362
AUG	253,430	10,528	218	5,660	214	8,175
SEP	234,523	9,962	270	5,538	261	7,817
OCT	252,596	10,898	281	5,735	284	8,148
NOV	245,620	11,158	315	4,566	331	8,187
DEC	257,042	10,900	357	6,090	361	8,292
TOTAL	2,921,608					7,983

Scott Environmental Technology Inc.

TABLE 3-23

SUMMARY OF PETROLEUM CARGO TRANSFERRED

Product Code	Amount (Bbls) Loaded	Amount (Bbls) Discharged
A	2,388,418	200,883
B	22,417	296,294
C	92,323,673	379,283,274
D	18,153,163	26,220,233
DF	10,458,033	1,421,768
F	61,195,081	63,524,806
FC	1,343,660	0
G	25,208,303	23,969,852
J	7,661,602	3,785,989
JP4	1,024,961	1,686,432
JP5	1,479,709	209,607
K	619,959	529,453
KFM	1,011,489	0
L	4,174,643	2,500,226
LCH	307,035	0
N	99,231	1,430,322
NC	1,056,632	1,215,888
P	0	71,871
S	3,426,765	1,283,049
T	3,144,053	2,236,243
Grand Total	233,768,827	509,866,190

3.4.8 Fuel Consumed

During calendar year 1976 and winthin the study area, 184.6 million gallons of fuel was burned. Fuel consumed was during all modes of operation of all types of vessels except pleasure craft and included both diesel and bunker fuel.

3.5 DISCUSSION OF RESULTS

Table 3.24 presents a summary of emission results (including in-transit losses) for marine activities within California Coastal Waters during 1976:

Table 3.24

Summary of 1976 Marine Emission Inventory Results

Emission	Pounds Total Emitted	Tons Total Emitted	Tons Per Day
Carbon Monoxide (CO)	6,068,688	3,034.3	8.3
Oxides of Nitrogen (NO_x)	30,341,329	15,170.7	41.4
Oxides of Sulfur (SO_2)	57,969,333	28,984.7	79.2
Particulate (Part.)	5,540,224	2,770.1	7.6
Hydrocarbons (HC)	15,722,876	7,861.4	21.5
Class 1 Hydrocarbons	1,575,970	788.0	2.2
Class 2 Hydrocarbons	12,528,388	6,264.2	17.1
Class 3 Hydrocarbons	1,613,107	806.6	2.2

These emission inventory results compare favorably to previous calculations by various regulatory agencies applying summary scenario assumptions (i.e., average vessel, average trip, etc.) and, as such, are felt to have a relatively high degree of confidence. The only identified emission which is not included in the inventory is hydrocarbons emitted during tanker purging or cleaning. This emission was not included for three reasons: first, it was reported that operation of these types occur infrequently due to being costly, secondly, records of these operations are only maintained on board each vessel and, as such, were unavailable, and thirdly, emissions generated during these operations are included indirectly by the fact that arrival vapors are included for all cargos arriving or originating in the study area.

When compared to total emissions generated within the State of California (13) all marine emission categories, except oxides of sulfur, are approximately 1% or less than the total state emissions, with carbon monoxide less than .1%. Oxides of sulfur emissions are equal to between 6% and 7% of the total state SO_x emissions.

The majority of hydrocarbons emitted are in the Class II reactivity group which are considered moderately reactive. Approximately 10% of the hydrocarbons emitted are in the highly reactive Class III.

As would be expected referring to Table 3.13, the majority of the CO, NO_x, SO_x and particulate emissions are engine related and the majority of hydrocarbon emissions are related to petroleum transfers and subsequent ballasting.

Referring to Table 3.18 indicates that approximately 50% of the hydrocarbons emitted occurred in the San Francisco and Los Angeles areas and 50% of the CO, NO_x, SO_x and particulate emissions were emitted while vessels were in-transit (sea lanes).

4.0 TRENDS IN MARINE OPERATIONS

With the exception of the United States, most of the world's shipbuilders are using ever-increasing numbers of diesel engines to power commercial vessels. In the present study, both motor vessels and steamships were logged during 1976.

The principal reason for using diesels as opposed to steam driven vessels is the substantial reduction in fuel consumption. Large diesel engines in marine applications consume approximately 40 percent less fuel than their steam turbine horsepower equivalents at cruising speeds. In addition, marine diesels (2 cycle in-line) operate efficiently using very viscous residual fuels.

It is not clear as to why American shipbuilders still largely use steam turbines, but to date, no VLCC domestic built vessels have incorporated diesel engines. Perhaps one reason may be that no very large diesel engines are manufactured in the United States.

Without a doubt, the trend worldwide is toward greater use of the heat cycle internal combustion engine. The impact of this engine's emissions on the atmosphere result in excessive NO_x and higher CO emissions as compared to the steam turbine.

It is unclear at this time as to how these emissions may be reduced. A major consideration insofar as control systems are concerned, is the enormous throughput of exhaust from engines ranging to 40,000 horsepower.

The simplest method of reducing the combustion temperature and consequently, NO_x emission, is to retard the injection timing. However, retarding the injection produces greater smoke (particulate) emissions and also causes a deterioration in power output and fuel economy.

Exhaust gas recirculation and turbocharging offer the best possibilities for NO_x reduction without power or fuel consumption penalties. As a result of economic considerations, the majority of vessels being built in the world today are powered by diesel engines. This trend is expected to continue for the foreseeable future.

Efforts are currently underway at the federal level to investigate the feasibility of converting marine steam power plants from oil to coal. Alternate control techniques will be required if a significant portion of marine vessels convert to coal power.

Barring any drastic change in the world's oil supply, except for lightering activities, petroleum and petroleum product transfer activities are expected to remain unchanged for the immediate future. During the second half of 1976, lightering was practiced off San Clemente Island; however, this practice was discontinued in 1977. It is not known what future intentions the oil industry has for lightering. With crude oil available from Alaska, increased on shore production using traditional and non-traditional recovery techniques and a stabilization of demand in California, it would appear the necessity of importing oil via ultra large crude carriers (ULCC) would be minimal. Expansion of the Port of Valdez to accomodate ULCC's could alter this necessity.

A large portion of petroleum product transfers occur between coastal ports within California and the states of Oregon and Washington. These transfers involve both interim and finished products. Transfers of this type are expected to remain unchanged.

5.0 MARINE EMISSION CONTROL TECHNOLOGY

The two principle emission sources associated with marine activites within California coastal waters are related to marine power requirements and the transfers of liquid organic cargos. Many of the emissions from engines and cargo transfers can be reduced with the current available technology. Other emissions can not be effectively reduced by current control techniques.

The four controlling factors which must be considered in the application of emission control related to marine activities are:

1. Ability of control devices or techniques to pass safety requirements.
2. Available and demonstrated technologies or designs.
3. Economic impact of controls.
4. Logistics of international cooperation related to additional controls.

Of primary importance when considering any control technique for marine use is safety. The responsibility for the safety of United States marine vessels rests with the United States Coast Guard. Because of this, the Coast Guard has established regulations for the approval of equipment which is intended to be used on board vessels under Marine Inspection and Navigation Laws. When equipment is approved to the satisfaction of the U.S. Coast Guard, the equipment is added to a published list of approved instruments, machines, and equipment (CG-190).

Additional items which are approved subsequent to the publication of the list are found in the Federal Register. Foreign registered vessels must meet certain basic safety requirements while within United States waters, but do not have to meet or conform to the Coast Guard equipment list. In such cases, equivalent type equipment is considered as meeting the safety requirements.

The Merchant Marine Technical Branch of the Coast Guard has the responsibility of approving and publishing the approved equipment lists. Before equipment is included on the published list, three steps must take place:

Step 1 - Testing must take place to develop specifications for the device.

Step 2 - The device must be established as being mandatory.

Step 3 - Regulations related to the device must be approved.

An example of the specifications developed for Flame Arresters is included as Figure 5.1. As might be expected, flame or detonation arresters are an important component of any control system which must transfer explosive vapor for processing. The ability of a flame arrester to control an accidental ignition becomes increasingly more difficult as the size or cross section of a transfer line increases. The extra cross section of a transfer line is important when large quantities of gas must be transferred without a crtical pressure buildup in a transfer source such as a cargo tank of a vessel being loaded. Because of the potential need for extensive vapor handling during future control functions, the Coast Guard has recently sponsored research on flame and detonation arresters.

Initial information on flame or detonation arresters indicates a potential problem of containing a flame front under conditions where large diameter transfer lines are used. At this time, most of the control techniques used on land based truck terminals have not been formally approved by the Coast Guard. This lack of approved devices or systems which can be utilized in control of emissions must be considered in establishing a workable schedule for overall marine emissions control.

A number of techniques utilizing a number of specific technology based hardware are theoretically available for the control of marine emissions. Control techniques related to petroleum cargo transfers can be divided into hardware dependent or procedure dependent. Among the hardware dependent techniques are:

- Tank Cleaning operations
- Vapor Balance Systems/Inert Blanket Transfer
- Refrigeration/Collection of Hydrocarbon Vapors
- Incineration of Hydrocarbon Vapors
- Segregated Ballast Tanks
- Adsorption of Hydrocarbon Vapors

Among the procedures dependent hydrocarbon control measures are:

- Cargo Fill Rates
- Diffusion Barrier or Diffusion Time Frame
- Ullage Level - Ballast

- Ullage Level - Cargo
- Tank Breathing - P/V Setting
- Temperature Control
- Double Porting

Air pollutants from marine combustion equipment such as boilers, gasoline and diesel engines are not normally controlled at the present. Such control methods would be space and power limited in a harsh operating environment. The most direct and desirable method would be the modification of the combustion process or control of the fuel burned. Emission control of marine boilers and diesel power plants could be effected by the following methods:

- Optimum use of low sulfur fuel.
- Optimum control of fuel/air mixtures.
- Power loading.
- Diesel Injector Design.
- Boiler fuel atomizer design.
- Water injection (reduction of carbon buildup).
- Salt water scrubbing action.

Two and four cycle gasoline powered marine engines are predominantly used on pleasure craft. Control measures applicable to gasoline power plants in non-commercial service are:

- Two cycle crank case recycling system.
- Two cycle reduced oil to fuel ratio design requirement.
- Underwater exhaust - sea water scrubbing.
- Evaporative control on fuel tanks.

Sulfur emissions are not significant with gasoline powered equipment because of the low sulfur content of gasoline. The excessive dirty outboard hydrocarbon emission has been improved by the new fuel/oil mixture requirements. In the past, fuel to oil ratios have ranged from greater than 30:1 to 50:1. Present fuel/oil ratios call for a mixture of 100:1.

The marine transportation industry, like many other competitive industries, is highly responsive to economic constraints. Other than domestic trade by U.S. flag vessels, the world fleet must be competitive or drop from the commercial trade. Additionally, many local control measures may not affect

most of the foreign flag vessels because of the lack of any world controlling agency.

Among the economic considerations of emission control requirements are:

- o The return associated with the capital which is required.
- o Vessel downtime needed to complete installation or modifications - loss of shipping revenues.
- o Increased maintenance requirements due to vapor handling systems and additional training or personnel.

The economic costs related to the installation of vapor control systems is dependent upon the control principle selected. Systems are available which convert vapors into useable product. When systems of this type are selected, the cost impact of control is decreased. In the area of controlling engine emissions, cost may be decreased by employing sound engine operating principles resulting in lower emissions and increased fuel economy.

VAREC FLAME ARRESTER FIG. NO. 50/53 SERIES

VAREC Flame Arresters are designed to inhibit flame propagation in gas piping systems. These arresters are usually installed either horizontally (Fig. 53) or vertically (Fig. 50) in gas lines where fire protection is required in combination with pressure relief of shut-off valves in vapor balancing, recovery or open vent piping systems.

The standard unit consists of a heavy cast aluminum housing which contains a removable multi-plate flame arresting bank. Plates in the flame arresting bank are made of aluminum which is noncorrosive in hydrocarbon gases and resistant to the attack of hydrogen sulphide and the corrosive elements common to sludge.

Net free area through the grid is approximately three to four times the corresponding pipe size. Grid design permits greater net free area through each passageway, greatly reducing surface friction and increasing flow capacity.

All VAREC Fig. 50 and 53 Flame Arresters are suitable for working pressures up to 10 PSIG as standard. (Consult factory for higher working pressures.)

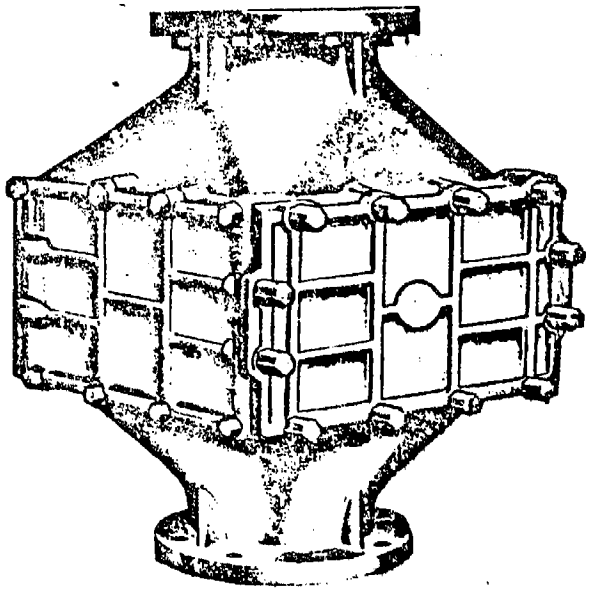
Flow requirements through any VAREC Flame Arrester should be obtained with a MAXIMUM pressure drop through the arrester of one (1) PSIG.

VAREC Fig. 50-E Flame Arresters, all aluminum construction with aluminum extensible type bank assembly are approved by the Underwriters Laboratories. (NOTE: 8" and 12" size pending.)

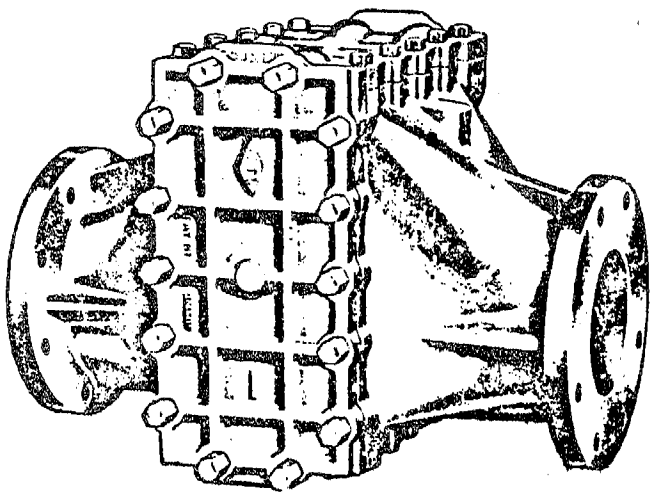
VAREC Fig. 53-E Flame Arresters are also available with U.L. listing same as above except 2" thru 6" sizes only. (NOTE: 6" size pending.)

Housings are available in other materials of construction and with special coatings. Fixed type bank assemblies are available in 316 stainless steel and monel.

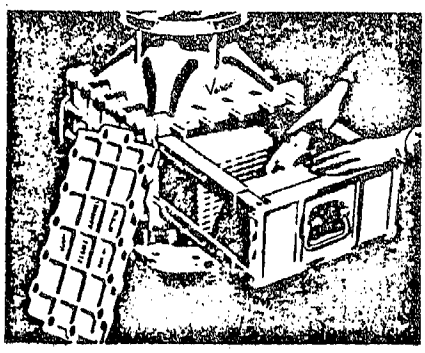
FIGURE 5.1
FLAME ARRESTOR SPECIFICATION

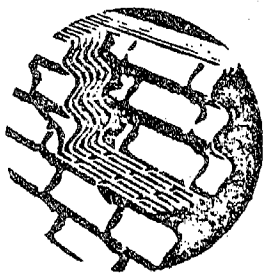


VERTICAL TYPE — Fig. No. 50 with Aluminum Telescopic Bank.



HORIZONTAL TYPE — Fig. No. 53 with Aluminum Telescopic Bank.



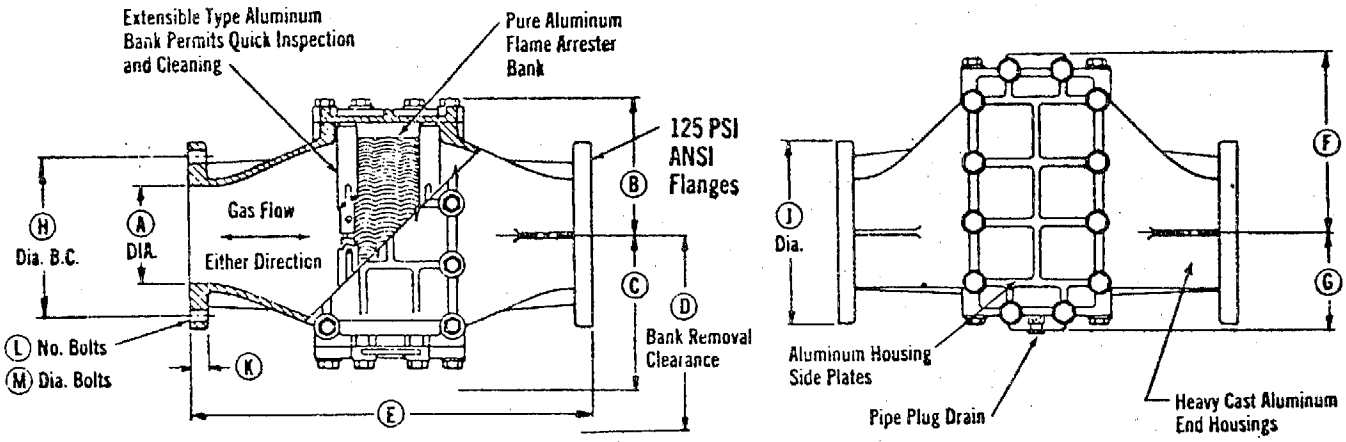


The Arrester Element. To inspect, simply pull out bank, which then may be extended to facilitate inspection. Each individual sheet then may be cleaned, if necessary, by using a distillate-moistened rag or medium-hard long bristle brush, or washed in a suitable cleaning solution.

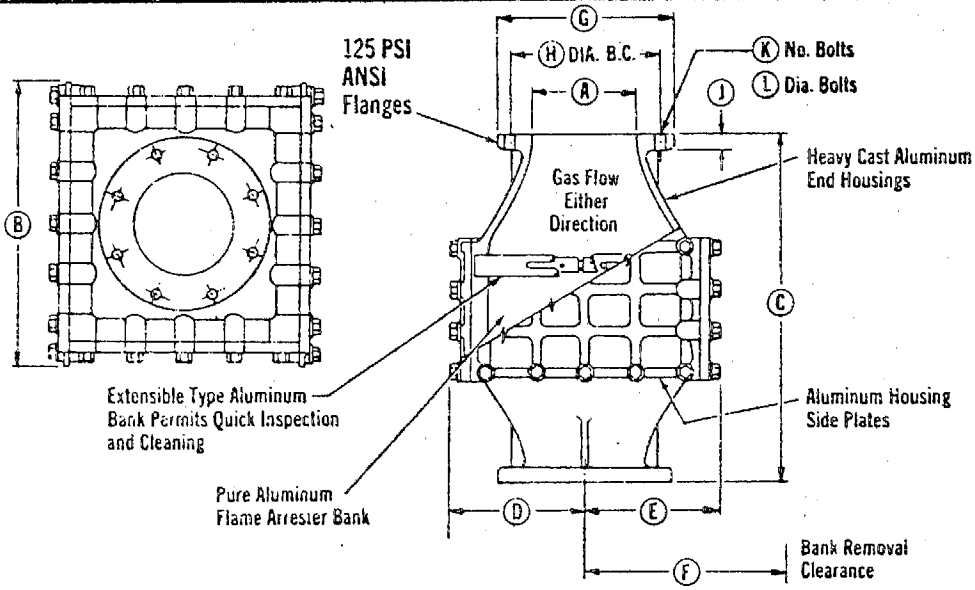
All designs subject to change without notice. Such change does not imply any obligation on the part of Varec with respect to prior equipment shipments. Installation, mounting arrangement, and dimensions are preliminary general information not to be used for construction. Certified drawings are available.

FIGURE 5.1 - FLAME ARRESTOR SPECIFICATION, Page 2

VAREC FLAME ARRESTER FIG. NO. 50/53 SERIES



SIZES, DIMENSIONS AND APPROXIMATE SHIPPING WEIGHTS, FIGURE NO. 53-E												
SIZE (A)	B	C	D	E	F	G	H	J	K	L	M	SHIP. WT.
2"	4¼	4 5/16	18¾	14½	5⅜	3⅝	4¾	6	⅝	4	⅝	25#
3"	5⅝	5¾	22 7/8	16	7¼	4½	6	7½	¾	4	⅝	45#
4"	7	7 1/8	27	20	9	5	7½	9	15/16	8	⅝	60#
6"	8¼	8⅜	30¾	24⅜	10¾	5⅝	9½	11	1	8	¾	105#
8"	10¾	10⅞	38¼	32⅛	14⅜	7¼	11¾	13½	1⅛	8	¾	185#
10"	11⅞	12	41⅝	35⅜	16	8	14¼	16	1 3/16	12	⅞	345#
12"	14½	14⅝	49½	34⅜	20	11	17	19	1¼	12	⅞	395#



SIZES, DIMENSIONS AND APPROXIMATE SHIPPING WEIGHT, FIGURE NO. 50-E											
SIZE (A)	B	C	D	E	F	G	H	J	K	L	SHIP. WT.
2"	9	12⅝	4¼	4 5/16	19	6	4¾	⅝	4	⅝	25#
3"	11¾	13⅞	5⅝	5¾	23¼	7½	6	¾	4	⅝	45#
4"	14½	16⅝	7	7 1/8	23⅛	9	7½	15/16	8	⅝	60#
6"	16½	21½	8¼	8⅜	31⅛	11	9½	1	8	¾	105#
8"	21⅝	27¼	10¾	10⅞	38⅝	13½	11¾	1⅛	8	¾	185#
10"	24	28⅜	11⅞	12	41⅝	16	14¼	1 3/16	12	⅞	345#
12"	31	34⅜	14½	14⅝	50	19	17	1¼	12	⅞	395#

When ordering, please specify Fig. No. size and Operating Pressure.

All designs subject to change without notice. Such change does not imply any obligation on the part of Varec with respect to prior equipment shipments. Installation, mounting arrangement, and dimensions are preliminary general information not to be used for construction. Certified drawings are available.

FLOW CAPACITY CURVES FIG. NO. 50 & 53 SERIES

VAREC DIVISION
EMERSON ELECTRIC CO

Figure 50 Flame Arresters

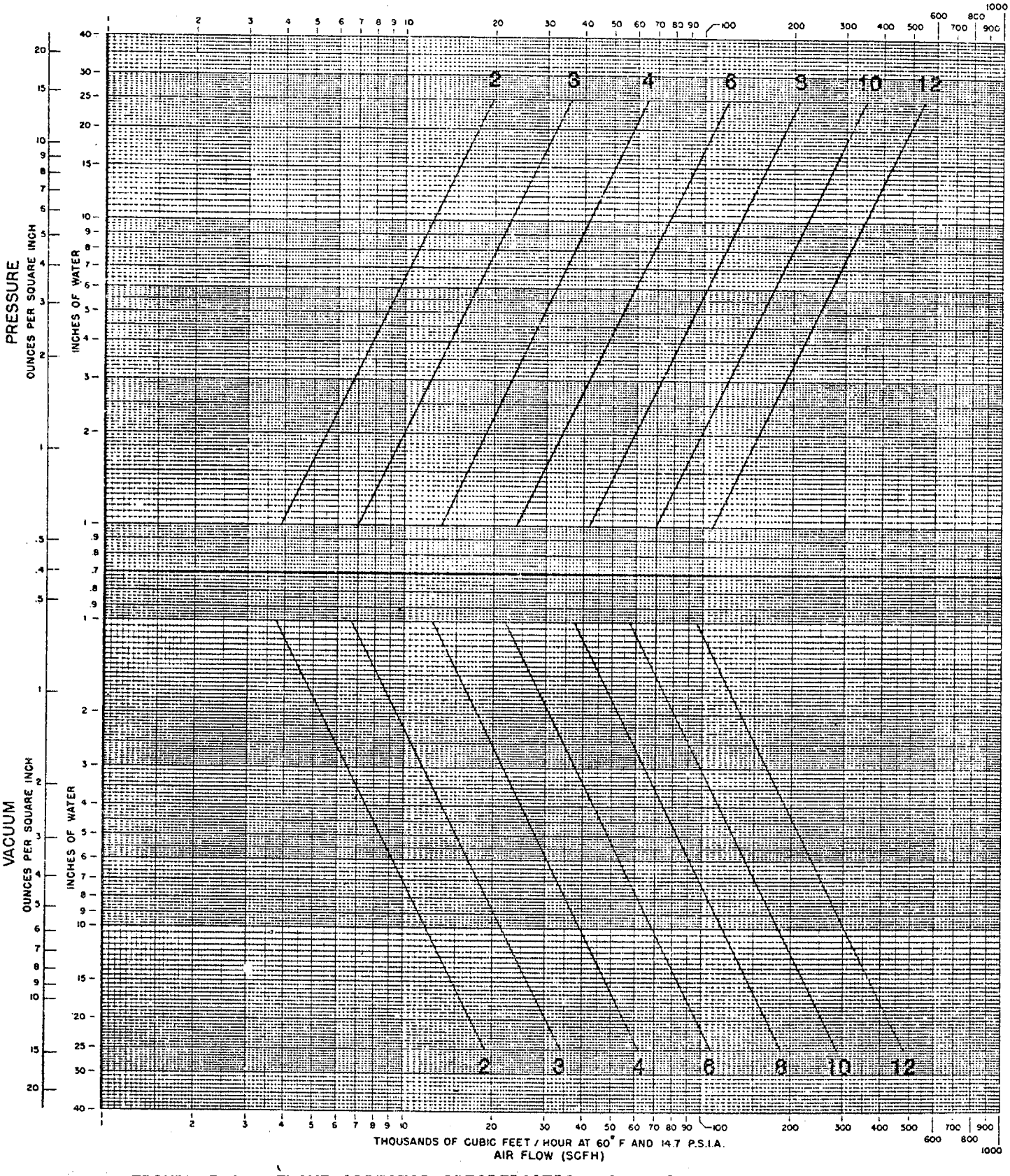


FIGURE 5.1 - FLAME ARRESTOR SPECIFICATION, Page 3

All designs subject to change without notice. Such change does not imply any obligation on the part of Varec with respect to prior equipment shipments. Installation, mounting arrangement, and dimensions are preliminary general information not to be used for construction. Certified drawings are available.

6.0 EMISSIONS FROM SMALL CRAFT WITHIN SOUTHERN CALIFORNIA COASTAL WATERS

As previously outlined, the original intent of the study undertaken was to inventory emissions from marine operations within what was defined as Southern California waters. Southern California Coastal Waters (SCCW) begin at Pt. Conception on the north, end at the Los Angeles/Orange County border on the south, and extend leeward approximately 50 miles. Emissions from small craft were originally intended to be included in the inventory being conducted. Concurrent with expanding Scott's Marine Emission Study to all California Coastal Waters, as an unexpected outgrowth of a separate California Air Resources Board research study (12), a small craft emission inventory was produced. As a result, emissions from small craft were not considered in the expanded area and the emission inventory results from small craft in Southern California Coastal Waters has been excluded from total emissions presented in this report. For information purposes, the results of Scott's investigation of emissions from small craft generated during 1976 within Southern California Coastal Waters is included in this section. An exception to excluding small craft from the study is tug emissions. Emissions from tugs operating in harbors along the coast were included in the inventory presented in Section 3 of this report.

Emissions from small craft operating within Southern California Coastal Waters were estimated using emission factors and estimates of total fuel consumed. Figure 6.1 presents how the total boat population was subdivided. To determine fuel consumption, diesel burning craft were separated from gasoline burning craft and analyzed separately. Gasoline burning vessels were broken down into registered and documented vessels for analysis purposes. These vessels were further divided into categories by propulsion type, size and geographic location.

Table 6.1 demonstrates that emissions produced by small craft within Southern California Coastal Waters during 1976 were significant. Approximately 30 million gallons of gasoline were consumed by small craft. Excluding tug operations, more than 3 million gallons of diesel fuel was consumed. For reference purposes, tugs operating in Southern California Coastal Waters were estimated to consume approximately 2.3 million gallons of diesel fuel during 1976.

FIGURE 6.1 - SUBDIVISION OF BOAT POPULATION

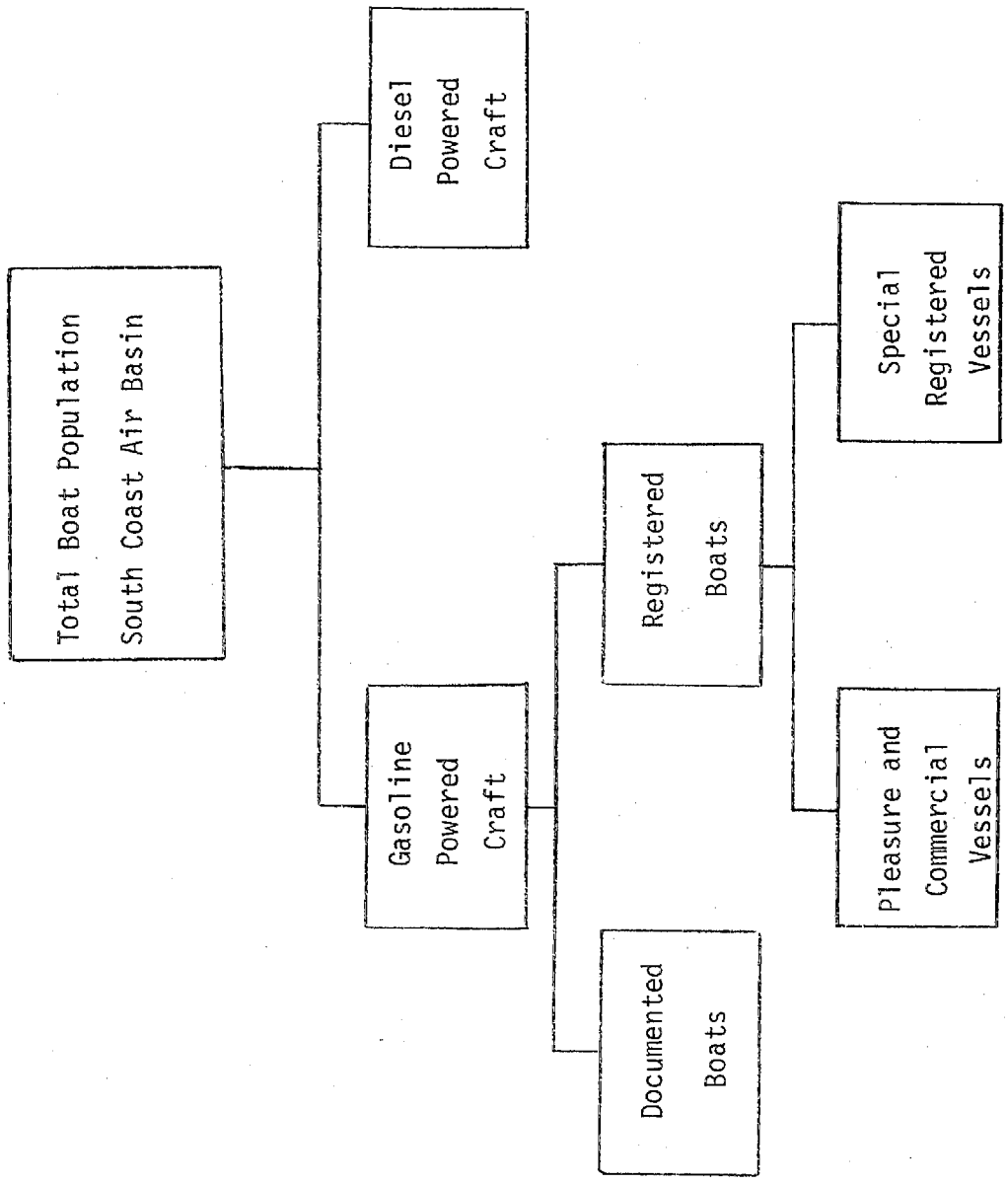


TABLE 6.1

SUMMARY OF GASOLINE AND DIESEL CONSUMPTION
AND POLLUTANT EMISSIONS BY SMALL CRAFT
IN THE SOUTHERN CALIFORNIA COASTAL WATERS

	Fuel Gallons	SO_x Tons/Yr	CO Tons/Yr	HC Tons/Yr	NO_x Tons/Yr	Part. Tons/Yr
I Gasoline						
A) Registered Vessels						
1. Berthable						
a) Santa Barbara	463,027	5.7	118.2	66.7	69.7	-----
b) Ventura	786,874	9.8	184.1	108.4	120.2	-----
c) Los Angeles	10,312,643	129.6	2190.7	1355.8	1598.2	-----
d) Orange	4,703,593	59.7	911.3	592.8	738.2	-----
2. Trailerable						
a) Santa Barbara	834,789	5.9	889.3	317.0	54.3	-----
b) Ventura	1,294,024	9.6	1291.7	466.2	93.3	-----
c) Los Angeles	4,001,767	30.3	3927.0	1421.9	295.5	-----
d) Orange	4,319,603	34.6	3934.0	1446.1	351.2	-----
3. Special						
a) Santa Barbara	602,179	8.1	42.2	54.2	102.4	-----
b) Ventura	347,709	4.7	24.3	31.3	59.1	-----
c) Los Angeles	1,105,449	14.9	77.4	99.5	187.9	-----
d) Orange	1,017,432	13.7	71.2	91.6	173.0	-----
B) Documented Vessels	328,327	4.4	23.0	29.5	55.8	-----
SUB-TOTAL	30,117.416	331.0	13,684.4	6081.0	3898.8	-----
II Diesel						
A) Non-Tugs	3,150,000	21.8	121.1	47.8	544.7	43.7
GRAND TOTAL	33,267,416	352.8	13,805.5	6128.8	4443.5	43.7

From these quantities of fuel consumed it was estimated that approximately 14,000 tons of carbon monoxide, 6,000 tons of hydrocarbons, 4,500 tons of oxides of nitrogen and 350 tons of oxides of sulfur were emitted by small craft. Particulate emissions were only significant from diesel powered vessels amounting to 40 tons during the year.

6.1 GASOLINE CONSUMPTION

In 1972, Arthur Young and Company conducted a survey of gasoline useage by small craft in the State of California. A series of consumption factors were reported expressed as the average number of gallons of gasoline consumed by boats divided into categories of propulsion method and vessel length. Documented and registered vessels were figured separately. Lists of registered vessels are maintained by the California Department of Motor Vehicles. A list of documented vessels is maintained by the United States Coast Guard. The Coast Guard requires all commercial vessels of greater than five net tons gross burden to be documented. Pleasure vessels of five tons or greater have the option of being registered or documented. The Bureau of Customs defines one ton gross burden as equal to 100 cubic feet displacement.

6.1.1 Registered Vessels

Registered vessels are broken down into three groups: berthable boats, trailerable boats, and special registered vessels. A more detailed explanation of these categories will follow.

Adjustment of Consumption Factors - The number of registered vessels has increased since 1972 when Young and Company published consumption factors. It is assumed, however, that the average annual consumption has remained relatively constant. There is a significant different, however, in vessel useage pat terns in coastal waters of the South Coast Air Basin compared with the rest of the state as a whole. Vessels in the South Coast region are used an average of 28.4 days compared to a state average of 27.5 days. Gasoline consumption also increases in coastal waters compared with inland waters. The average days of use in California Coastal Waters and bays is 32.6. As a result of these factors, fuel consumption factors which were figured for the state as a whole were adjusted for Southern California Coastal Waters by 1.2.

Berthable Boats - Berthable boats are defined as 50% of all boats between 18 and 21 feet in length and all boats 21 feet and longer.

The reason for the differentiation between berthable and trailerable boats is to account for differing useage patterns. Trailered boats especially do not stay just in the county they are registered in. Berthable boats do tend to stay in the counties in which they are registered, but their numbers are adjusted by subtracting the number of berths located in inland waters. It was necessary to use 1973 registration statistics.

Trailerable Boats - Trailerable boats are defined as 50% of all boats between 18 and 21 feet and all boats less than 18 feet in length. An adjusted number of calculated by factoring out boats launched in inland waters and factoring in boats trailered from other counties.

Special Registered Vessels - Special categories of registered vessels were analyzed separately from registered commercial and pleasure vessels, due to the fact useage patterns of these boats is substantially different. Ownership tends to be by business and governmental interests rather than individuals.

The population of special registered boats consists of 1) livery or rental boats, 2) boats owned by dealers and manufacturers, and 3) boats owned by government agencies or youth groups.

There was no data available to tell what percentage of these boats are used on coastal waters and how many are used in inland waters, so an assumption was made that special registered boats occupy coastal waters in the same proportion as pleasure and commercial vessels.

6.1.2 Documented Vessels

The estimate of gasoline consumption by documented vessels is also based upon the Arthur Young and Company tax study for 1971. In 1971, there were 1,304 gas burning documented vessels in California. Each used an average of 614.5 gallons of gasoline. Projecting an increase of 1% per year, there were approximately 1,370 gas burning documented vessels at the end of 1976. One thousand three hundred seventy vessels times 614.5 gallons of gasoline equals 841,865 total gallons used in the State of California.

Approximately 39% of all documented vessels have Los Angeles/Long Beach as home port. We will assume the amount of gasoline used by local boats out of the area is balance by non-local boats burning gasoline in this area.

Therefore, the total gasoline used by documented craft in the South Coast Air Basin is as follows:

841,865 gallons x 39% = 328,327 gallons

6.1.3 Emission Factors

Emission factors applied to fuel consumption estimated for small gasoline powered craft were obtained from AP-42. Table 6.2 presents a summary of the factors used.

TABLE 6.2

GASOLINE POWERED SMALL CRAFT EMISSION FACTORS

	Emission Factors #/10^3 Gallons			
Propulsion	SO_x	CO	HC	NO_x
Inboard	27	140	180	340
Outboard	6.4	3300	1100	6.6
Other	6.4	3300	1100	6.6

6.2 DIESEL USEAGE BY SMALL CRAFT

A mail and telephone survey was performed on fuel docks in the South Coast Air Basin. It was felt that if we knew how much diesel fuel was sold at area fuel docks, we would know the impact of diesel used by small craft. It is assumed that any error introduced by outside craft entering the area would be offset by local craft leaving the area.

The response to the survey was incomplete, but enough information to make a rough estimate was received. Total gallons dispensed was compared to the number of slips to arrive at an average gallons used per slip. This method did not correlate very well for two reasons: 1) not all slips are occuped by diesel burning small craft (as a matter of fact, a rather small percentage are), and 2) different marinas have a higher percentage of commercial vessels. For example, Santa Barbara has significant commercial fishing operations. It's 794 slips were supplied with 578,509 gallons. Huntington Beach, on the other hand, has almost no commercial vessels. The 1,570 slips at Huntington Beach were supplied by 29,200 gallons of diesel in 1976.

The most plausible estimate of consumption was arrived at by calculating two separate average consumptions. One for ports or marinas which are highly commercial, and one for marinas that are primarily for pleasure craft.

The consumption factor for highly commercial ports was arrived at by dividing 578,509 gallons in Santa Barbara by 794 slips for an average of 728.6 gallons per slip. This factor times the 5,133 berths in Los Angeles Harbor, Long Beach Harbor and Santa Barbara equals 3,739,904 gallons.

The consumption factor for primarily pleasure craft was arrived at by summing the gallons dispensed from Dana Point, Huntington Beach, Oxnard and Ventura and dividing by total slips. Four hundred ninety-two thousand, three hundred ninety-eight total gallons divided by 6,536 slips equals 75.22 average gallons per slip. This factor, times the total number of slips in the South Coast Air Basin that are used primarily by pleasure craft, 21,668, equals 1,629,867 gallons.

For all small craft, 5,369,771 gallons of diesel were used in 1976. To corroborate this figure, a rather extensive survey of tugboat usage was conducted. It was found that approximately 2,250,000 gallons of diesel was consumed by tugs in the South Coast Air Basin. An estimate of diesel use by the fishing industry in a report published by the Los Angeles County Air Pollution Control District states that the fishing industry consumes 5,040 gallons per day, or 1,840,000 gallons per year. That figure, plus the 500,000 consumed by the Santa Barbara fishing industry leaves approximately 800,000 gallons for use by other diesel burning commercial and pleasure boats.

Emission factors for carbon monoxide, hydrocarbons and oxides of nitrogen are taken from Table 3.2.3-3 of AP-42. Emission factors for a 600 horsepower marine diesel in cruise mode were assumed to be average. Emission factors for particulate and oxides of sulfur were taken from the APCD's report on Emissions From Railroads and Marine Sources in Los Angeles County.

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APPENDIX A

M. A. N.
TWO AND FOUR STROKE DIESEL EXHAUST

Scott Environmental Technology Inc.
2600 CAJON BLVD., SAN BERNARDINO, CALIFORNIA 92411 (714) 887-2571

December 28, 1978

Manager
American M-A-N Corporation
502 Fifth Avenue
New York, New York 10017

Dear Sir:

Scott Environmental Technology, Inc. is currently conducting an extensive marine program for the California Air Resources Board. The purpose of the program is the formation of an accurate 1976 emission inventory associated with marine shipping activity in the California coastal waters. A secondary purpose involves an estimate of available and feasible emission control methods.

During the program, Scott has tested several steam power plants of 7,000 to 26,000 Hp for emission characteristics. It is anticipated that power emission factors from both our testing and published sources will be combined with detailed movement and operational information to calculate inventory values.

Because the inventory should reflect the best information available, we are seeking additional information sources regarding marine power operations. As a manufacturer of marine power equipment, we are interested in specific information which you may have or be aware of.

We would like information in two areas; power operations and power emissions. Operational information would include problems associated with shifting power loads and startups in relation to safety and pollution requirements. Desirable information on emissions would include emission levels under different load conditions, specification of required fuel, consumption, and the emission impact of newer techniques or power designs.

Any information or source of information which relates to a better understanding of marine power operation and emissions would be appreciated. All questions can be directed to my attention or I can be contacted directly at 714/887-2571.

Sincerely,

Dyrle Quick

Dyrle L. Quick
Program Manager

DLQs

CHEMICAL ANALYSIS OF EXHAUSTGAS OF 14 V 52/55 A
Your Memo to Dr. Zapf (Received in MF on 3/15/78)

Enclosed please find the computer print of the chemical analysis of the exhaust gas of the 14 V 52/55 A under full (14,770 Hp. load (p_e = 17.7 bar; n_M = 450 min^{-1}. These date are based on the values of air- and fuel-consumption according to TVU, the testing of pollution emission according to AV-MF/0116/75, and also the fuel anaylsis as supplied by you.

The indicated SO_2-value has been calculated theoretically under the assumption that the total sulphur (2.16 %) contained in the fuel burns into SO_2 und that SO_2-share only goes into the exhaust gas. In other words, this SO_2-figure represents the maximum possible value on a given fuel-sulphur-contents.

Exhaust gas component		in g/kWh
	N_2	6060.0
	O_2	1213.8
	CO_2	618.9
	H_2O	194.1
	SO_2	8.5
	Ashe	.8
polluting material (measured)	NO_x	7.129
	CO	.698
	HC	.913

Encl. 1: Your fuel analysis
Encl. 2: Computer Print

M·A·N
AMERICAN M . A . N . CORPORATION
1114 Avenue of the Americas, New York, N.Y. 10036 (212) 221-3340
WEST COAST OFFICE
50 California Street, San Francisco, CA 94111 (415) 391-2935

Enclosure 2, Page 1

Chemical Analysis of Exhaust Gas on complete Combustion

14 V 52/55A

Installed Capacity 1o360.0 KW

* (Standard Condition: Temperature = 0°C; Pressure = 1013 Mbar)

Fuel:

Consumption:	2030.56 KG/h	.196 KG/KWh

Chemical Analysis:

		Share in Weight
Carbon	C	.8618
Hydrogen	H_2	.1106
Sulphur	S	.0216
Water	H_2O	.0020
Ashe		.0040

Dry Air:

Consumption:	81844.00 KG/h	7.900 KG/KWh
*(Stdt.Condition)	63581.48 M3/h	6.137 M3/KWh

Chemical Analysis:

		Share in Volume
Oxygen	O_2	.2100
Nitrogen	N_2	.7900

Enclosure 2, Page 2

Exhaust Gas

Exhaust gas qty.	83874.56 kg/h	8.096 kg/KWh
Air quantity minimum	27855.98 kg/h	2.689 kg/KWh
	*(Standard Condition)	
Exhaust gas volume	64834.97 M3/h	6.2582 M3/KWh
Exhaust gas density	1.2937 kg/M3	
Air volume minimum	21640.24 M3/h	
Total Air Ratio	2.94	

Chemical Analysis

		Volume Share	Quty. kg/h	Volume (Stdt. Cond.) M3/h
Oxygen	O_2	.1358	12574.76	8807.66
Carbon Dioxide	CO_2	.0504	6411.91	3265.36
Water (Steam)	H_2O	.0386	2011.04	2501.93
Nitrogen	N_2	.7747	62781.10	50229.37
Sulphur Dioxide	SO_2	.0005	87.63	30.66
Ashe		-	8.12	

		kg/KWh	M3/KWh
Oxygen	O_2	1.2138	.3502
Carbon Dioxide	CO_2	.6189	.3152
Water (Steam)	H_2O	.1941	.2415
Nitrogen	N_2	6.0600	4.8484
Sulphur Dioxide	SO_2	.0085	.0030
Ashe		.0008	-

Pollution Material (Measured values) g/KWh

HC	.913
NO	7.129
CO	.698

FUEL CHEMICAL ANALYSIS:

Share in weight

Carbon C	.8618
Hydrogen H_2	.1106
Sulphur S	.0216
water H_2O	.0020
Ash	.0040

	KSZ 70/125B m.e.p. = 13.07 bar speed 144 r.p.m. sulphur content		V 52/52 m.e.p. = 18.7 bar speed 514 r.p.m. sulphur content	
	2.16%	1.0%	2.16%	1.0%
	kg / kWh		kg / kWh	
Nitrogen N_2	6.597	6.597	5.676	5.676
Oxygen O_2	1.319	1.314	1.073	1.067
Carbon Dioxide CO_2	0.676	0.684	0.643	0.651
Water H_2O	0.212	0.214	0.201	0.204
Sulphurdioxide SO_2	0.0092	0.0043	0.0088	0.0041
Nitric Oxide NO	0.00744	0.00744	0.00713	0.00713
Carbonmonoxide CO	0.00228	0.00228	0.000698	0.000698
Carbon Hydroxide HC	0.00072	0.00072	0.000913	0.000913
Total exhaust gas weight	8.82	8.82	7.61	7.61

1.1 Please find enclosed the article "Future fuels and the diesel" which was published by M.A.N. in the Motor Ship in August 1978.

2. Noise level and accustical measures for noise attenuation

2.2 Noise level:

One (1) engine V 52/55A or V 52/52

exhaust gas noise

(undampened, i.e. without silencer)
measured in one meter distance $L_{ex.gas}$ = 117 d.B.(

./.3

Air intake noise:

(undampened, i.e. without silencer)
measured in 1 meter distance L_{intake} = 133 dB (A)

One (1) engine KSZ 70/125B

exhaust gas noise:

(undampened, i.e. without silencer)
measured in 1 meter distance $L_{ex.gas}$ = 115 dB (A)

Air inteake noise:

(undampened, i.e. without silencer)
measured in 1 meter distance L_{intake} = 135 dB (A)

The total noise level of (n) engines can be calculated as follows:

$$L_{total} = L + 5 \lg n$$

(because of the different frequency ranges an addition of the noise levels of the exhaust gas and the intake air need not to be considered).

The dampening effect due to the distance from 1 meter to 80 meters (250 ft) results to:

Exhaust gas noise: $\Delta L_{80\ m}$ 30 dB (A)

Intake air: $\Delta L_{80\ m}$ 35 dB (A)

Consequently, the expected noise level at the border of the site of the power station can be calculated as follows:

./.4

$$L_{border} = L + 5 \lg n - \Delta L_{80\ m} - \Delta L_{silencer}$$

($\Delta L_{silencer}$ = dampening effect of the relevant exhaust gas or intake air silencer, i.e. 30, 45 or 60 dB (A)).

2.3 Noise attenuation:

In order to achieve an effective noise attenuation certain measures have to be observed.

As an example we give you below details of the Power Station Harelbeke which is located in a condensed, populated, residential area.

The walls consist of 15 cm (approx. 6") re-inforced concrete and are cladded on the inside with a layer of 10 cm (approx. 4") of mineral wool as an absorbtion material.

This layer is covered by an other layer of ventilated bricks, the air holes of which are arranged horizontally towards the mineral wool.

The roof should provide a similar attenuation like the walls which again can be achieved by means of re-inforced concrete and an absorbtion material.

All windows in the outer wall should preferably be made from glass bricks.

The gate is designed in a double construction with an air cushion of o.5 m between the two gates.

All openings of the building for ventilation etc. have to be provided with silencers or attenuation devices.

The height of the two stacks at Harelbeke is approx. 70 meters (approx. 210 ft) and was mainly requested for environmental conditions because of sulphur emissions.

The stacks were built in re-inforced concrete, including 4 exhaust ducts each.

./5

(Exhaust Gas Analysis.)

Abgaszusammensetzung

		L/V 52/52		KSZ 78/155 B		KSZ 78/155 BL		KSZ 90/160 B		KSZ 90/160 BL	
MCR	p_e bar	18,7		13,02		14,4		13,04		14,5	
	n_M min^{-1}	514		122		110		122		110	
85 %-MCR	S-Content wt. %	2,5	4,0	2,5	4,0	2,5	4,0	2,5	4,0	2,5	4,0
	$\dot{m}_A$ kg/kWh	7,37	7,37	8,88	8,88	8,88	8,88	9,08	9,08	8,88	8,88
	N_2	5,4846	5,4846	6,6353	6,6353	6,6353	6,6353	6,7887	6,7887	6,6353	6,6353
	O_2	0,9862	0,9934	1,3048	1,3123	1,2996	1,3072	1,3599	1,3673	1,3031	1,3107
	CO_2	0,6709	0,6605	0,7012	0,6904	0,7064	0,6955	0,6928	0,6822	0,7029	0,6921
	H_2O	0,2096	0,2063	0,2191	0,2157	0,2207	0,2173	0,2164	0,2131	0,2196	0,2162
	SO_2 +) kg/kWh	0,0106	0,0169	0,0111	0,0177	0,0111	0,0178	0,0109	0,0175	0,0111	0,0177
	NO	0,0071	0,0071	0,0077	0,0077	0,0076	0,0076	0,0088	0,0088	0,0088	0,0088
	CO	0,0010	0,0010	0,0017	0,0017	0,0035	0,0035	0,0015	0,0015	0,0016	0,0016
	HC	0,0008	0,0008	0,0006	0,0006	0,0007	0,0007	0,0003	0,0003	0,0002	0,0002
60 %-MCR	$\dot{m}_A$ kg/kWh	7,23	7,23	9,33	9,33	9,34	9,34	9,33	9,33	9,33	9,33
	N_2	5,3696	5,3696	6,9805	6,9805	6,9805	6,9805	6,9805	6,9805	6,9805	6,9805
	O_2	0,9288	0,9363	1,4009	1,4085	1,3976	1,4053	1,4112	1,4187	1,4009	1,4086
	CO_2	0,6930	0,6823	0,7099	0,6989	0,7131	0,7021	0,6996	0,6889	0,7098	0,6989
	H_2O	0,2165	0,2132	0,2217	0,2183	0,2228	0,2193	0,2186	0,2152	0,2217	0,2183
	SO_2 +) kg/kWh	0,0109	0,0175	0,0112	0,0179	0,0112	0,0180	0,0110	0,0177	0,0112	0,0179
	NO	0,0071	0,0071	0,0079	0,0079	0,0078	0,0078	0,0089	0,0089	0,0089	0,0089
	CO	0,0021	0,0021	0,0012	0,0012	0,0025	0,0025	0,0014	0,0014	0,0014	0,0014
	HC	0,0008	0,0008	0,0006	0,0006	0,0007	0,0007	0,0003	0,0003	0,0003	0,0003

(Fuel) (Heavy oil)
Kraftstoff: Schweröl (s = 2,5 %), c = 0,8643, h = 0,1107, s = 0,025
(Heavy oil)
Schweröl (s = 4,0 %), c = 0,851, h = 0,109, s = 0,04

H_u = 39536 kJ/kg = L.H.V.

+) Der SO_2-Anteil im Abgas ist ein theoretischer Wert, der auftritt, wenn der gesamte über den Kraftstoff zugeführte Schwefel zu SO_2 verbrennt. Dieser SO_2-Wert gibt damit den für den jeweiligen Kraftstoff maximal möglichen Wert an.

+) The SO_2-portion of the exhaust gas is a theoretical value calculated under the assumption that all the sulphur contained in the fuel burns into SO_2 and that the SO_2 passes into the exhaust gas. In other words, this SO_2 figure represents the maximum possible value on a given fuel-sulphur conten

APPENDIX B

DISTRIBUTION OF EMISSIONS BY PORT/LOCATION AND MONTH

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 1 - LA/LB/EC/HB

PORT		POUNDS POLLUTANTS THC	CO	NOx	SOX	PART
ES	JAN TOTALS	117,991	3,789	20,859	118,642	8,689
ES	FEB TOTALS	76,435	2,468	14,689	79,497	5,824
ES	MAR TOTALS	103,247	2,827	17,634	92,696	6,793
ES	APR TOTALS	74,238	1,978	12,127	64,431	4,721
ES	MAY TOTALS	105,511	3,170	18,755	101,899	7,466
ES	JUN TOTALS	131,362	3,062	18,246	98,625	7,220
ES	JUL TOTALS	60,085	2,495	14,043	76,730	5,767
ES	AUG TOTALS	81,643	3,346	19,414	106,961	7,835
ES	SEP TOTALS	76,884	2,659	14,952	83,920	6,145
ES	OCT TOTALS	68,564	3,119	17,770	99,003	7,252
ES	NOV TOTALS	47,140	2,013	12,775	66,527	4,873
ES	DEC TOTALS	60,749	4,015	20,422	122,329	8,959
	GRAND TOTALS	1,003,819	34,941	201,681	1,113,260	81,544

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING - 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 1 - LA/LB/ES/HB

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
HB	JAN TOTALS	6,040	204	1,257	6,651	487
HB	FEB TOTALS	5,365	552	3,507	18,225	1,334
HB	MAR TOTALS	4,420	419	2,541	13,583	995
HB	APR TOTALS	3,568	288	2,205	10,268	752
HB	MAY TOTALS	26	153	1,177	5,459	400
HB	JUN TOTALS	32	165	1,167	5,705	418
HB	JUL TOTALS	4,260	318	2,363	11,197	820
HB	AUG TOTALS	3,070	324	1,997	10,566	774
HB	SEP TOTALS	65	342	2,443	11,841	867
HB	OCT TOTALS	36	211	1,644	7,603	556
HB	NOV TOTALS	75	364	2,415	12,246	897
HB	DEC TOTALS	2,224	164	1,228	5,803	425
	GRAND TOTALS	29,181	3,504	23,944	119,147	8,725

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 1 - LA/LB/ES/HB

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
LA	JAN TOTALS	151,320	25,273	119,056	513,745	40,083
LA	FEB TOTALS	121,969	23,388	105,514	472,779	36,901
LA	MAR TOTALS	147,957	22,735	109,362	442,765	34,865
LA	APR TOTALS	126,671	22,083	105,339	415,753	32,938
LA	MAY TOTALS	189,943	24,318	107,450	542,198	40,873
LA	JUN TOTALS	136,540	20,883	99,942	407,225	32,124
LA	JUL TOTALS	180,603	26,677	125,555	553,199	42,983
LA	AUG TOTALS	129,902	22,737	106,064	447,191	35,151
LA	SEP TOTALS	167,238	20,170	88,220	452,441	34,070
LA	OCT TOTALS	143,140	24,624	114,099	477,956	37,520
LA	NOV TOTALS	134,543	24,982	117,178	510,166	39,781
LA	DEC TOTALS	142,772	23,558	98,950	513,922	38,765
	GRAND TOTALS	1,772,598	281,426	1,298,725	5,749,340	446,054

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 1 - LA/LB/ES/HB

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
LB	JAN TOTALS	60,193	33,614	156,120	466,325	41,664
LB	FEB TOTALS	72,014	32,169	150,150	414,301	37,905
LB	MAR TOTALS	120,166	35,759	168,238	505,903	44,767
LB	APR TOTALS	117,560	33,083	157,196	436,903	39,627
LB	MAY TOTALS	83,795	20,636	87,535	468,431	35,228
LB	JUN TOTALS	83,409	36,235	168,343	511,424	45,173
LB	JUL TOTALS	75,589	35,065	164,294	489,609	43,499
LB	AUG TOTALS	79,486	34,551	161,574	477,585	42,593
LB	SEP TOTALS	73,685	21,342	84,464	513,040	38,250
LB	OCT TOTALS	96,487	33,234	156,588	465,931	41,575
LB	NOV TOTALS	118,107	34,340	158,598	492,170	43,509
LB	DEC TOTALS	56,600	17,416	71,882	407,587	30,538
	GRAND TOTALS	1,037,091	367,444	1,684,982	5,649,209	484,328

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT ALC	POUNDS POLLUTANTS				
	THC	CO	NOX	SOX	PART
GRAND TOTALS	0	0	0	0	0

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
ALM	JAN TOTALS	92	274	818	7,148	523
ALM	FEB TOTALS	166	497	1,490	12,986	952
ALM	MAR TOTALS	175	518	1,554	13,566	993
ALM	APR TOTALS	318	956	2,866	25,027	1,833
ALM	MAY TOTALS	140	422	1,270	11,067	809
ALM	JUN TOTALS	174	527	1,581	13,772	1,009
ALM	JUL TOTALS	217	647	1,943	16,966	1,244
ALM	AUG TOTALS	238	713	2,137	18,640	1,364
ALM	SEP TOTALS	110	328	987	8,602	631
ALM	OCT TOTALS	140	424	1,272	11,090	811
ALM	NOV TOTALS	77	228	684	5,968	437
ALM	DEC TOTALS	128	384	1,157	10,082	738
	GRAND TOTALS	1,975	5,918	17,759	154,914	11,344

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
ANT	JAN TOTALS	6	18	54	471	35
ANT	FEB TOTALS	12	34	100	872	63
ANT	MAR TOTALS	12	37	110	959	70
ANT	APR TOTALS	5	16	47	412	30
ANT	MAY TOTALS	16	48	143	1,248	91
ANT	JUN TOTALS	9	26	78	682	50
ANT	JUL TOTALS	7	19	59	509	38
ANT	AUG TOTALS	18	53	160	1,386	101
ANT	SEP TOTALS	6	18	55	481	35
ANT	OCT TOTALS	11	33	99	864	63
ANT	NOV TOTALS	12	37	110	958	70
ANT	DEC TOTALS	8	22	67	585	43
	GRAND TOTALS	122	361	1,082	9,427	689

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
AVN	JAN TOTALS	33,751	724	4,913	24,526	1,797
AVN	FEB TOTALS	39,239	461	2,447	14,225	1,041
AVN	MAR TOTALS	36,233	384	2,615	13,046	956
AVN	APR TOTALS	39,980	374	2,331	12,233	895
AVN	MAY TOTALS	19,432	73	599	2,676	195
AVN	JUN TOTALS	22,813	182	1,099	5,872	430
AVN	JUL TOTALS	34,407	210	1,181	6,609	484
AVN	AUG TOTALS	30,113	278	1,597	8,791	644
AVN	SEP TOTALS	37,426	468	2,201	13,854	1,014
AVN	OCT TOTALS	22,919	574	3,541	18,758	1,375
AVN	NOV TOTALS	22,895	315	1,720	9,801	717
AVN	DEC TOTALS	43,019	542	3,360	17,735	1,298
	GRAND TOTALS	382,227	4,585	27,604	148,126	10,846

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
BAY	JAN TOTALS	89,134	80,632	358,551	448,525	52,739
BAY	FEB TOTALS	59,597	74,407	334,204	304,968	41,967
BAY	MAR TOTALS	99,495	75,981	343,539	325,546	43,687
BAY	APR TOTALS	48,623	72,350	325,830	282,738	40,112
BAY	MAY TOTALS	35,037	15,832	78,841	262,283	20,866
BAY	JUN TOTALS	110,417	77,016	344,205	361,714	46,241
BAY	JUL TOTALS	61,647	78,231	355,557	374,038	47,454
BAY	AUG TOTALS	57,954	78,794	353,288	384,273	48,141
BAY	SEP TOTALS	11,599	13,771	71,959	191,289	15,721
BAY	OCT TOTALS	67,725	77,879	349,981	365,356	46,687
BAY	NOV TOTALS	88,220	75,399	337,802	342,128	44,629
BAY	DEC TOTALS	65,686	16,316	83,962	261,543	20,960
	GRAND TOTALS	795,134	736,608	3,337,719	3,904,401	469,204

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
BEN	JAN TOTALS	51,404	975	5,968	31,733	2,322
BEN	FEB TOTALS	64,270	815	4,778	26,128	1,916
BEN	MAR TOTALS	118,721	1,241	6,895	38,924	2,851
BEN	APR TOTALS	91,374	1,106	6,362	35,176	2,576
BEN	MAY TOTALS	62,384	1,260	6,582	38,660	2,832
BEN	JUN TOTALS	96,319	1,176	7,880	39,657	2,906
BEN	JUL TOTALS	78,291	1,394	8,752	45,822	3,353
BEN	AUG TOTALS	76,064	985	5,459	30,831	2,259
BEN	SEP TOTALS	47,230	996	4,646	29,460	2,160
BEN	OCT TOTALS	41,418	1,110	6,255	34,990	2,561
BEN	NOV TOTALS	51,394	1,093	6,150	34,520	2,528
BEN	DEC TOTALS	75,080	1,924	8,814	56,518	4,137
	GRAND TOTALS	853,949	14,075	78,541	442,419	32,401

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
BSY	MAY TOTALS	149	447	1,342	11,703	857
	GRAND TOTALS	149	447	1,342	11,703	857

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
CRK	JAN TOTALS	37	111	331	2,879	211
CRK	FEB TOTALS	39	115	346	3,017	221
CRK	MAR TOTALS	55	165	494	4,313	316
CRK	APR TOTALS	43	127	382	3,336	245
CRK	MAY TOTALS	55	164	493	4,300	315
CRK	JUN TOTALS	48	147	442	3,847	282
CRK	JUL TOTALS	52	155	465	4,055	297
CRK	AUG TOTALS	25	78	236	2,058	151
CRK	SEP TOTALS	31	92	277	2,419	177
CRK	OCT TOTALS	20	62	187	1,622	119
CRK	NOV TOTALS	36	109	328	2,858	210
CRK	DEC TOTALS	45	136	413	3,598	262
	GRAND TOTALS	486	1,461	4,394	38,302	2,806

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
MTZ	JAN TOTALS	71,918	2,191	9,813	63,981	4,686
MTZ	FEB TOTALS	89,323	1,658	8,634	50,835	3,724
MTZ	MAR TOTALS	70,540	1,872	9,762	57,396	4,205
MTZ	APR TOTALS	75,240	1,467	7,190	44,035	3,223
MTZ	MAY TOTALS	42,708	1,755	8,860	53,242	3,901
MTZ	JUN TOTALS	59,602	2,233	11,896	69,044	5,059
MTZ	JUL TOTALS	111,929	2,234	11,675	68,584	5,025
MTZ	AUG TOTALS	76,898	1,869	10,066	58,021	4,246
MTZ	SEP TOTALS	54,740	2,911	13,016	84,909	6,220
MTZ	OCT TOTALS	45,916	1,666	9,846	53,447	3,911
MTZ	NOV TOTALS	89,971	1,557	8,450	48,484	3,552
MTZ	DEC TOTALS	95,965	2,253	12,128	69,859	5,119
	GRAND TOTALS	884,750	23,666	121,336	721,837	52,871

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
NYP	MAY TOTALS	4	11	33	287	21
	GRAND TOTALS	4	11	33	287	21

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
OAK	JAN TOTALS	1,714	5,133	15,393	134,287	9,832
OAK	FEB TOTALS	1,550	4,643	13,922	121,383	8,885
OAK	MAR TOTALS	2,064	6,178	18,515	161,511	11,834
OAK	APR TOTALS	1,559	4,686	14,062	122,685	8,992
OAK	MAY TOTALS	1,845	5,526	16,574	144,545	10,590
OAK	JUN TOTALS	1,786	5,364	16,096	140,389	10,286
OAK	JUL TOTALS	1,916	5,744	17,245	150,375	11,017
OAK	AUG TOTALS	1,737	5,204	15,620	136,266	9,979
OAK	SEP TOTALS	1,834	5,491	16,476	143,754	10,529
OAK	OCT TOTALS	1,557	4,664	13,997	122,109	8,943
OAK	NOV TOTALS	1,738	5,207	15,604	136,103	9,972
OAK	DEC TOTALS	2,343	7,011	21,027	183,401	13,434
	GRAND TOTALS	21,643	64,851	194,531	1,696,808	124,293

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
OLM	JAN TOTALS	37,482	810	3,767	23,953	1,755
OLM	FEB TOTALS	24,365	633	3,601	20,031	1,468
OLM	MAR TOTALS	28,335	836	4,096	25,077	1,836
OLM	APR TOTALS	47,433	1,349	5,939	39,153	2,869
OLM	MAY TOTALS	29,157	654	2,946	19,155	1,404
OLM	JUN TOTALS	34,478	663	3,654	20,705	1,519
OLM	JUL TOTALS	41,707	845	4,157	25,449	1,866
OLM	AUG TOTALS	38,546	860	4,031	25,466	1,866
OLM	SEP TOTALS	29,671	1,026	4,795	30,327	2,221
OLM	OCT TOTALS	25,199	1,001	4,754	29,744	2,180
OLM	NOV TOTALS	22,149	853	4,363	25,995	1,905
OLM	DEC TOTALS	35,368	853	3,818	24,910	1,826
	GRAND TOTALS	393,890	10,383	49,921	309,965	22,715

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
OZL	OCT TOTALS	11	47	264	1,482	108
OZL	NOV TOTALS	2,076	228	1,203	7,042	515
OZL	DEC TOTALS	9	34	172	1,034	76
	GRAND TOTALS	2,096	309	1,639	9,558	699

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
PCH	JAN TOTALS	257	770	2,311	20,160	1,477
PCH	FEB TOTALS	396	1,189	3,568	31,123	2,280
PCH	MAR TOTALS	219	659	1,979	17,259	1,264
PCH	APR TOTALS	201	602	1,804	15,731	1,153
PCH	MAY TOTALS	760	2,280	6,837	59,640	4,369
PCH	JUN TOTALS	641	1,922	5,766	50,298	3,685
PCH	JUL TOTALS	16	48	143	1,244	91
PCH	AUG TOTALS	231	694	2,082	18,152	1,330
PCH	SEP TOTALS	355	1,065	3,194	27,860	2,041
PCH	NOV TOTALS	5	14	41	358	26
PCH	DEC TOTALS	192	576	1,729	15,077	1,104
	GRAND TOTALS	3,273	9,819	29,454	256,902	18,820

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
PIT	JAN TOTALS	2,444	360	2,641	12,602	925
PIT	FEB TOTALS	2,699	423	2,908	14,399	1,056
PIT	MAR TOTALS	2,623	429	2,906	14,498	1,063
PIT	APR TOTALS	1,128	355	1,866	10,943	800
PIT	MAY TOTALS	528	245	1,175	7,316	536
PIT	JUN TOTALS	1,631	422	2,162	12,888	944
PIT	JUL TOTALS	2,490	387	2,455	12,776	934
PIT	AUG TOTALS	866	437	2,443	13,743	1,007
PIT	SEP TOTALS	2,035	258	1,820	8,959	656
PIT	OCT TOTALS	2,227	465	2,334	14,094	1,031
PIT	NOV TOTALS	1,638	299	1,790	9,633	705
PIT	DEC TOTALS	2,483	388	2,463	12,829	940
	GRAND TOTALS	22,792	4,468	26,963	144,680	10,597

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
RC	JAN TOTALS	18	53	158	1,382	101
RC	MAR TOTALS	18	55	164	1,431	105
RC	APR TOTALS	7	21	64	560	41
RC	MAY TOTALS	14	53	253	1,577	116
RC	JUL TOTALS	825	62	288	1,835	135
RC	SEP TOTALS	4	19	119	617	45
RC	OCT TOTALS	41	144	594	4,078	298
RC	DEC TOTALS	43	70	335	2,080	152
	GRAND TOTALS	970	477	1,975	13,560	993

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
RCH	JAN TOTALS	86,833	5,603	23,746	160,815	11,780
RCH	FEB TOTALS	99,273	4,371	20,869	130,300	9,548
RCH	MAR TOTALS	82,147	4,788	22,665	142,173	10,415
RCH	APR TOTALS	89,905	4,058	19,774	121,607	8,904
RCH	MAY TOTALS	97,947	4,698	21,016	137,060	10,039
RCH	JUN TOTALS	88,829	4,782	21,637	140,016	10,253
RCH	JUL TOTALS	155,358	4,905	24,930	149,289	10,939
RCH	AUG TOTALS	147,355	6,124	28,774	181,402	13,286
RCH	SEP TOTALS	125,857	4,025	20,119	121,843	8,928
RCH	OCT TOTALS	189,705	5,868	31,594	182,084	13,336
RCH	NOV TOTALS	200,141	5,317	26,681	161,049	11,798
RCH	DEC TOTALS	177,759	5,847	29,636	177,591	13,003
	GRAND TOTALS	1,541,109	60,386	291,441	1,805,229	132,229

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
SAC	JAN TOTALS	181	542	1,627	14,194	1,039
SAC	FEB TOTALS	34	102	304	2,652	194
SAC	MAR TOTALS	110	327	975	8,500	623
SAC	APR TOTALS	49	148	444	3,872	283
SAC	MAY TOTALS	308	924	2,774	24,184	1,771
SAC	JUN TOTALS	198	592	1,775	15,484	1,134
SAC	JUL TOTALS	516	1,544	4,628	40,377	2,958
SAC	AUG TOTALS	298	896	2,687	23,437	1,718
SAC	SEP TOTALS	245	735	2,206	19,240	1,409
SAC	OCT TOTALS	441	1,320	3,955	34,493	2,529
SAC	NOV TOTALS	95	283	849	7,411	543
SAC	DEC TOTALS	155	466	1,403	12,249	897
	GRAND TOTALS	2,630	7,879	23,627	206,093	15,098

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
SEQ	JAN TOTALS	26	79	237	2,067	151
SEQ	APR TOTALS	1,437	158	1,253	5,719	418
SEQ	MAY TOTALS	15	75	489	2,498	183
SEQ	JUN TOTALS	12,511	347	2,068	11,157	817
SEQ	JUL TOTALS	21,599	607	3,442	19,193	1,406
SEQ	AUG TOTALS	19,696	751	3,666	22,544	1,651
SEQ	SEP TOTALS	25,453	986	5,084	30,141	2,208
SEQ	OCT TOTALS	13,476	521	2,674	15,936	1,167
SEQ	NOV TOTALS	27,246	771	4,211	24,075	1,762
SEQ	DEC TOTALS	23,969	783	4,065	24,027	1,760
	GRAND TOTALS	145,428	5,078	27,189	157,357	11,523

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
SF	JAN TOTALS	2,487	7,329	22,003	191,795	14,048
SF	FEB TOTALS	2,107	6,076	18,257	159,034	11,647
SF	MAR TOTALS	1,839	5,439	16,332	142,432	10,428
SF	APR TOTALS	1,607	3,917	11,883	102,819	7,535
SF	MAY TOTALS	2,199	5,488	16,578	143,905	10,541
SF	JUN TOTALS	1,112	3,336	10,003	87,286	6,391
SF	JUL TOTALS	2,347	6,136	18,543	160,922	11,790
SF	AUG TOTALS	2,021	5,335	16,107	139,762	10,239
SF	SEP TOTALS	1,051	2,963	8,907	77,576	5,683
SF	OCT TOTALS	2,743	7,113	21,468	186,423	13,656
SF	NOV TOTALS	2,074	4,616	13,990	121,111	8,873
SF	DEC TOTALS	1,544	3,583	10,822	93,893	6,874
	GRAND TOTALS	23,131	61,331	184,893	1,606,958	117,705

Scott Environmental Technology Inc.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 2 - SF PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
STK	JAN TOTALS	670	377	1,301	10,192	748
STK	FEB TOTALS	641	293	1,038	7,962	583
STK	MAR TOTALS	139	435	1,453	11,707	857
STK	APR TOTALS	161	519	1,836	14,121	1,036
STK	MAY TOTALS	152	480	1,642	12,989	952
STK	JUN TOTALS	965	700	2,389	18,904	1,387
STK	JUL TOTALS	136	445	1,724	12,447	911
STK	AUG TOTALS	150	460	1,463	12,216	895
STK	SEP TOTALS	106	332	1,140	8,958	656
STK	OCT TOTALS	138	409	1,228	10,732	784
STK	NOV TOTALS	1,785	355	1,064	9,274	680
STK	DEC TOTALS	172	515	1,544	13,464	987
	GRAND TOTALS	5,215	5,320	17,822	142,966	10,476

Scott Environmental Technology Inc.

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 3 - SD

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
SD	JAN TOTALS	30,552	76,815	386,127	83,443	42,373
SD	FEB TOTALS	30,083	76,630	385,352	77,989	41,973
SD	MAR TOTALS	30,487	76,899	386,295	85,094	42,501
SD	APR TOTALS	29,965	76,504	385,214	75,134	41,765
SD	MAY TOTALS	1,985	563	2,829	14,129	1,061
SD	JUN TOTALS	29,742	76,731	385,662	80,805	42,181
SD	JUL TOTALS	29,606	76,267	384,234	69,184	41,323
SD	AUG TOTALS	30,385	78,014	389,674	114,034	44,621
SD	SEP TOTALS	637	1,054	3,757	26,080	1,935
SD	OCT TOTALS	30,415	76,637	385,565	75,405	41,801
SD	NOV TOTALS	29,572	76,093	383,469	64,490	40,975
SD	DEC TOTALS	760	1,311	4,607	31,994	2,383
	GRAND TOTALS	274,189	693,518	3,482,785	797,781	384,892

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
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1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
COP	JAN TOTALS	2,882	43	129	900	69
COP	FEB TOTALS	5,626	81	243	1,896	141
COP	MAR TOTALS	2,049	34	101	662	51
COP	APR TOTALS	2,239	49	145	1,042	79
COP	MAY TOTALS	10,651	84	250	2,177	160
COP	JUN TOTALS	1,197	42	124	859	66
COP	JUL TOTALS	2,271	44	131	920	70
COP	AUG TOTALS	5,853	82	238	1,851	138
COP	SEP TOTALS	2,616	51	154	1,341	98
COP	OCT TOTALS	2,412	37	111	751	58
COP	NOV TOTALS	2,767	49	146	1,050	79
COP	DEC TOTALS	3,626	48	126	1,098	88
	GRAND TOTALS	44,389	642	1,898	14,547	1,097

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
CRP	JAN TOTALS	5,011	165	632	4,020	303
CRP	FEB TOTALS	5,697	122	439	2,741	209
CRP	MAR TOTALS	5,406	152	530	3,519	267
CRP	APR TOTALS	6,273	148	525	3,437	261
CRP	MAY TOTALS	2,697	36	107	930	68
CRP	JUN TOTALS	7,878	100	355	2,118	165
CRP	JUL TOTALS	2,263	109	416	2,450	189
CRP	AUG TOTALS	2,615	167	654	4,077	308
CRP	SEP TOTALS	2,602	21	63	551	40
CRP	OCT TOTALS	4,040	185	683	4,499	338
CRP	NOV TOTALS	4,846	153	537	3,572	271
CRP	DEC TOTALS	5,709	92	344	2,361	173
	GRAND TOTALS	55,037	1,450	5,285	34,275	2,592

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
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1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
EB	JAN TOTALS	57,964	1,154	3,515	15,773	1,262
EB	FEB TOTALS	45,517	1,063	3,246	13,424	1,090
EB	MAR TOTALS	69,677	1,009	3,105	12,101	993
EB	APR TOTALS	64,965	1,272	3,870	18,877	1,490
EB	MAY TOTALS	57,171	660	1,975	17,228	1,260
EB	JUN TOTALS	54,791	1,021	3,120	12,322	1,008
EB	JUL TOTALS	47,380	1,107	3,375	14,557	1,171
EB	AUG TOTALS	71,622	1,171	3,570	16,262	1,297
EB	SEP TOTALS	51,212	527	1,582	13,789	1,010
EB	OCT TOTALS	54,640	1,124	3,432	15,058	1,210
EB	NOV TOTALS	61,516	1,142	3,481	15,508	1,241
EB	DEC TOTALS	65,421	684	2,036	17,717	1,300
	GRAND TOTALS	701,876	11,934	36,307	182,616	14,332

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
ENC	JAN TOTALS	862	221	1,760	8,012	587
ENC	FEB TOTALS	851	186	1,685	7,216	529
ENC	MAR TOTALS	1,699	294	2,430	10,843	794
ENC	APR TOTALS	68	372	2,737	13,056	957
ENC	MAY TOTALS	62	286	1,821	9,469	694
ENC	JUN TOTALS	859	169	1,210	5,862	430
ENC	JUL TOTALS	862	240	2,034	8,983	656
ENC	AUG TOTALS	1,727	434	3,387	15,610	1,145
ENC	SEP TOTALS	873	297	2,452	10,967	804
ENC	OCT TOTALS	990	692	4,055	22,167	1,624
ENC	NOV TOTALS	55	311	2,367	11,090	813
ENC	DEC TOTALS	878	270	1,940	9,390	688
	GRAND TOTALS	9,786	3,774	27,878	132,665	9,723

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CARB MARINE EMISSIONS INVENTORY
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1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
GV	JAN TOTALS	0	1	3	0	0
GV	FEB TOTALS	0	1	3	0	0
GV	MAR TOTALS	0	1	3	0	0
GV	APR TOTALS	0	1	3	0	0
GV	MAY TOTALS	3,126	7	21	187	14
GV	JUN TOTALS	0	1	3	0	0
GV	JUL TOTALS	721	14	42	351	30
GV	AUG TOTALS	0	1	3	0	0
GV	OCT TOTALS	0	1	3	0	0
GV	NOV TOTALS	0	1	3	0	0
GV	DEC TOTALS	0	3	6	0	0
	GRAND TOTALS	3,847	32	93	538	44

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
MB	JAN TOTALS	503	123	598	1,647	134
MB	FEB TOTALS	1,337	234	1,271	5,256	399
MB	MAR TOTALS	1,450	220	1,294	5,009	381
MB	APR TOTALS	1,944	271	1,672	6,793	512
MB	MAY TOTALS	1,092	150	800	3,643	266
MB	JUN TOTALS	19	103	317	682	64
MB	JUL TOTALS	18	100	307	592	57
MB	AUG TOTALS	1,688	261	1,507	6,254	471
MB	SEP TOTALS	949	99	681	3,366	246
MB	OCT TOTALS	534	216	876	4,091	313
MB	NOV TOTALS	2,389	290	1,899	7,636	572
MB	DEC TOTALS	2,826	393	2,698	13,283	980
	GRAND TOTALS	14,749	2,410	13,922	58,252	4,395

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
MGS	MAR TOTALS	11	71	590	2,614	191
MGS	APR TOTALS	18	85	547	2,816	206
MGS	JUN TOTALS	16	75	487	2,514	184
MGS	JUL TOTALS	764	139	1,059	4,951	364
MGS	SEP TOTALS	22	103	673	3,434	252
MGS	OCT TOTALS	19	94	656	3,216	236
MGS	NOV TOTALS	11	68	549	2,481	182
	GRAND TOTALS	861	635	4,561	22,026	1,615

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CARB MARINE EMISSIONS INVENTORY
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1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
ML	JAN TOTALS	1,033	376	2,046	7,931	609
ML	FEB TOTALS	1,990	334	1,915	6,766	524
ML	MAR TOTALS	1,430	500	2,714	11,764	890
ML	APR TOTALS	1,458	426	2,433	9,728	741
ML	MAY TOTALS	3,048	339	2,274	11,407	835
ML	JUN TOTALS	1,780	390	2,030	8,156	624
ML	JUL TOTALS	526	272	1,439	4,585	363
ML	AUG TOTALS	2,820	480	3,008	11,964	904
ML	SEP TOTALS	1,813	238	1,814	8,479	621
ML	OCT TOTALS	1,480	332	1,932	6,805	524
ML	NOV TOTALS	2,137	401	2,333	8,995	687
ML	DEC TOTALS	2,902	405	2,812	13,707	1,008
	GRAND TOTALS	22,417	4,493	26,756	110,287	8,330

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
PH	JAN TOTALS	1,032	102	806	3,703	272
PH	MAR TOTALS	3,275	413	2,689	14,201	1,040
PH	APR TOTALS	430	142	1,187	5,256	386
PH	MAY TOTALS	4,381	443	3,243	15,511	1,138
PH	JUN TOTALS	2,564	286	2,191	10,233	750
PH	JUL TOTALS	1,366	186	1,324	6,424	470
PH	AUG TOTALS	64	400	3,290	14,746	1,079
PH	SEP TOTALS	40	254	2,134	9,472	694
PH	OCT TOTALS	2,223	279	2,144	9,960	729
PH	NOV TOTALS	512	267	2,120	9,696	711
PH	DEC TOTALS	825	232	1,684	8,080	594
	GRAND TOTALS	16,712	3,004	23,014	107,282	7,863

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CARB MARINE EMISSIONS INVENTORY
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1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
PSL	JAN TOTALS	9,690	518	2,141	9,669	744
PSL	FEB TOTALS	15,968	452	1,755	7,589	593
PSL	MAR TOTALS	16,251	426	1,489	6,467	511
PSL	APR TOTALS	5,452	397	1,558	6,048	481
PSL	MAY TOTALS	14,788	225	876	6,266	458
PSL	JUN TOTALS	31,343	462	1,811	7,856	611
PSL	JUL TOTALS	9,603	492	2,081	9,018	698
PSL	AUG TOTALS	9,705	381	1,573	5,777	461
PSL	SEP TOTALS	12,191	193	802	5,487	400
PSL	OCT TOTALS	13,314	467	1,875	8,081	630
PSL	NOV TOTALS	7,018	335	1,206	4,057	335
PSL	DEC TOTALS	5,179	156	684	4,393	324
	GRAND TOTALS	150,502	4,504	17,851	80,708	6,246

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CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 4 - MISC COASTAL PORTS

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
VEN	JAN TOTALS	44,183	201	592	3,982	308
VEN	FEB TOTALS	31,681	154	448	2,736	217
VEN	MAR TOTALS	45,578	209	613	4,177	322
VEN	APR TOTALS	17,739	147	427	2,559	204
VEN	MAY TOTALS	19,588	143	433	3,729	272
VEN	JUN TOTALS	41,596	212	625	4,223	327
VEN	JUL TOTALS	23,613	216	632	4,354	335
VEN	AUG TOTALS	27,585	229	671	4,680	360
VEN	SEP TOTALS	16,428	66	236	1,794	131
VEN	OCT TOTALS	32,059	208	609	4,122	319
VEN	NOV TOTALS	32,654	162	472	2,952	232
VEN	DEC TOTALS	24,796	103	294	2,541	192
	GRAND TOTALS	356,900	2,052	6,017	41,849	3,219

S C O T T E N V I R O N M E N T A L T E C H N O L O G Y I N C.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING 1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 5 - SEA LANES

PORT		POUNDS POLLUTANTS THC	CO	NOX	SOX	PART
NCW	JAN TOTALS	56,985	181,465	920,530	1,466,100	138,139
NCW	FEB TOTALS	36,620	128,183	651,495	1,127,274	104,851
NCW	MAR TOTALS	43,525	148,582	764,499	1,351,131	124,091
NCW	APR TOTALS	38,012	131,366	665,918	1,131,337	105,728
NCW	MAY TOTALS	36,030	109,947	620,429	1,315,664	111,298
NCW	JUN TOTALS	41,619	141,594	720,686	1,226,139	114,183
NCW	JUL TOTALS	44,700	152,082	783,859	1,389,275	127,394
NCW	AUG TOTALS	40,850	142,437	737,096	1,345,373	122,581
NCW	SEP TOTALS	31,230	97,764	560,911	1,256,095	104,961
NCW	OCT TOTALS	42,208	145,170	747,349	1,329,235	121,982
NCW	NOV TOTALS	39,934	139,709	721,965	1,315,519	120,016
NCW	DEC TOTALS	33,375	104,966	603,867	1,364,802	113,821
	GRAND TOTALS	485,088	1,623,267	8,498,604	15,617,944	1,409,045

SCOTT ENVIRONMENTAL TECHNOLOGY INC.

CARB MARINE EMISSIONS INVENTORY
DATA EDIT LISTING

1976 EMISSIONS SUMMARY BY AREA AND MONTH - AREA 5 - SEA LANES

PORT		POUNDS POLLUTANTS				
		THC	CO	NOX	SOX	PART
SCW	JAN TOTALS	190,800	514,149	2,616,623	1,508,590	313,785
SCW	FEB TOTALS	39,725	127,981	646,061	1,086,301	98,751
SCW	MAR TOTALS	45,221	144,825	741,157	1,288,714	115,844
SCW	APR TOTALS	45,185	141,627	712,109	1,147,060	105,452
SCW	MAY TOTALS	46,230	132,968	720,887	1,315,704	115,552
SCW	JUN TOTALS	42,047	135,097	686,170	1,171,815	105,989
SCW	JUL TOTALS	46,039	146,705	749,814	1,292,131	116,458
SCW	AUG TOTALS	45,029	144,824	743,348	1,308,470	117,213
SCW	SEP TOTALS	36,390	107,538	593,969	1,166,827	100,575
SCW	OCT TOTALS	44,430	143,392	737,315	1,308,997	117,026
SCW	NOV TOTALS	41,269	135,113	695,149	1,254,874	111,755
SCW	DEC TOTALS	43,091	126,108	692,065	1,326,440	115,037
	GRAND TOTALS	665,456	2,000,327	10,334,667	15,175,923	1,533,437

APPENDIX C

1976 JULIAN CALENDAR

08290
CARB LIBRARY

01/01/76	1-76	03/02/76	62-76	05/02/76	123-76	07/02/76	184-76	09/01/76	245-76	11/01/76	305-76
01/02/76	2-76	03/03/76	63-76	05/03/76	124-76	07/03/76	185-76	09/02/76	246-76	11/02/76	307-76
01/03/76	3-76	03/04/76	64-76	05/04/76	125-76	07/04/76	186-76	09/03/76	247-76	11/03/76	308-76
01/04/76	4-76	03/05/76	65-76	05/05/76	126-76	07/05/76	187-76	09/04/76	248-76	11/04/76	309-76
01/05/76	5-76	03/06/76	66-76	05/06/76	127-76	07/06/76	188-76	09/05/76	249-76	11/05/76	310-76
01/06/76	6-76	03/07/76	67-76	05/07/76	128-76	07/07/76	189-76	09/06/76	250-76	11/06/76	311-76
01/07/76	7-76	03/08/76	68-76	05/08/76	129-76	07/08/76	190-76	09/07/76	251-76	11/07/76	312-76
01/08/76	8-76	03/09/76	69-76	05/09/76	130-76	07/09/76	191-76	09/08/76	252-76	11/08/76	313-76
01/09/76	9-76	03/10/76	70-76	05/10/76	131-76	07/10/76	192-76	09/09/76	253-76	11/09/76	314-76
01/10/76	10-76	03/11/76	71-76	05/11/76	132-76	07/11/76	193-76	09/10/76	254-76	11/10/76	315-76
01/11/76	11-76	03/12/76	72-76	05/12/76	133-76	07/12/76	194-76	09/11/76	255-76	11/11/76	316-76
01/12/76	12-76	03/13/76	73-76	05/13/76	134-76	07/13/76	195-76	09/12/76	256-76	11/12/76	317-76
01/13/76	13-76	03/14/76	74-76	05/14/76	135-76	07/14/76	196-76	09/13/76	257-76	11/13/76	318-76
01/14/76	14-76	03/15/76	75-76	05/15/76	136-76	07/15/76	197-76	09/14/76	258-76	11/14/76	319-76
01/15/76	15-76	03/16/76	76-76	05/16/76	137-76	07/16/76	198-76	09/15/76	259-76	11/15/76	320-76
01/16/76	16-76	03/17/76	77-76	05/17/76	138-76	07/17/76	199-76	09/16/76	260-76	11/16/76	321-76
01/17/76	17-76	03/18/76	78-76	05/18/76	139-76	07/18/76	200-76	09/17/76	261-76	11/17/76	322-76
01/18/76	18-76	03/19/76	79-76	05/19/76	140-76	07/19/76	201-76	09/18/76	262-76	11/18/76	323-76
01/19/76	19-76	03/20/76	80-76	05/20/76	141-76	07/20/76	202-76	09/19/76	263-76	11/19/76	324-76
01/20/76	20-76	03/21/76	81-76	05/21/76	142-76	07/21/76	203-76	09/20/76	264-76	11/20/76	325-76
01/21/76	21-76	03/22/76	82-76	05/22/76	143-76	07/22/76	204-76	09/21/76	265-76	11/21/76	326-76
01/22/76	22-76	03/23/76	83-76	05/23/76	144-76	07/23/76	205-76	09/22/76	266-76	11/22/76	327-76
01/23/76	23-76	03/24/76	84-76	05/24/76	145-76	07/24/76	206-76	09/23/76	267-76	11/23/76	328-76
01/24/76	24-76	03/25/76	85-76	05/25/76	146-76	07/25/76	207-76	09/24/76	268-76	11/24/76	329-76
01/25/76	25-76	03/26/76	86-76	05/26/76	147-76	07/26/76	208-76	09/25/76	269-76	11/25/76	330-76
01/26/76	26-76	03/27/76	87-76	05/27/76	148-76	07/27/76	209-76	09/26/76	270-76	11/26/76	331-76
01/27/76	27-76	03/28/76	88-76	05/28/76	149-76	07/28/76	210-76	09/27/76	271-76	11/27/76	332-76
01/28/76	28-76	03/29/76	89-76	05/29/76	150-76	07/29/76	211-76	09/28/76	272-76	11/28/76	333-76
01/29/76	29-76	03/30/76	90-76	05/30/76	151-76	07/30/76	212-76	09/29/76	273-76	11/29/76	334-76
01/30/76	30-76	03/31/76	91-76	05/31/76	152-76	07/31/76	213-76	09/30/76	274-76	11/30/76	335-76
01/31/76	31-76	04/01/76	92-76	06/01/76	153-76	08/01/76	214-76	10/01/76	275-76	12/01/76	336-76
02/01/76	32-76	04/02/76	93-76	06/02/76	154-76	08/02/76	215-76	10/02/76	276-76	12/02/76	337-76
02/02/76	33-76	04/03/76	94-76	06/03/76	155-76	08/03/76	216-76	10/03/76	277-76	12/03/76	338-76
02/03/76	34-76	04/04/76	95-76	06/04/76	156-76	08/04/76	217-76	10/04/76	278-76	12/04/76	339-76
02/04/76	35-76	04/05/76	96-76	06/05/76	157-76	08/05/76	218-76	10/05/76	279-76	12/05/76	340-76
02/05/76	36-76	04/06/76	97-76	06/06/76	158-76	08/06/76	219-76	10/06/76	280-76	12/06/76	341-76
02/06/76	37-76	04/07/76	98-76	06/07/76	159-76	08/07/76	220-76	10/07/76	281-76	12/07/76	342-76
02/07/76	38-76	04/08/76	99-76	06/08/76	160-76	08/08/76	221-76	10/08/76	282-76	12/08/76	343-76
02/08/76	39-76	04/09/76	100-76	06/09/76	161-76	08/09/76	222-76	10/09/76	283-76	12/09/76	344-76
02/09/76	40-76	04/10/76	101-76	06/10/76	162-76	08/10/76	223-76	10/10/76	284-76	12/10/76	345-76
02/10/76	41-76	04/11/76	102-76	06/11/76	163-76	08/11/76	224-76	10/11/76	285-76	12/11/76	346-76
02/11/76	42-76	04/12/76	103-76	06/12/76	164-76	08/12/76	225-76	10/12/76	286-76	12/12/76	347-76
02/12/76	43-76	04/13/76	104-76	06/13/76	165-76	08/13/76	226-76	10/13/76	287-76	12/13/76	348-76
02/13/76	44-76	04/14/76	105-76	06/14/76	166-76	08/14/76	227-76	10/14/76	288-76	12/14/76	349-76
02/14/76	45-76	04/15/76	106-76	06/15/76	167-76	08/15/76	228-76	10/15/76	289-76	12/15/76	350-76
02/15/76	46-76	04/16/76	107-76	06/16/76	168-76	08/16/76	229-76	10/16/76	290-76	12/16/76	351-76
02/16/76	47-76	04/17/76	108-76	06/17/76	169-76	08/17/76	230-76	10/17/76	291-76	12/17/76	352-76
02/17/76	48-76	04/18/76	109-76	06/18/76	170-76	08/18/76	231-76	10/18/76	292-76	12/18/76	353-76
02/18/76	49-76	04/19/76	110-76	06/19/76	171-76	08/19/76	232-76	10/19/76	293-76	12/19/76	354-76
02/19/76	50-76	04/20/76	111-76	06/20/76	172-76	08/20/76	233-76	10/20/76	294-76	12/20/76	355-76
02/20/76	51-76	04/21/76	112-76	06/21/76	173-76	08/21/76	234-76	10/21/76	295-76	12/21/76	356-76
02/21/76	52-76	04/22/76	113-76	06/22/76	174-76	08/22/76	235-76	10/22/76	296-76	12/22/76	357-76
02/22/76	53-76	04/23/76	114-76	06/23/76	175-76	08/23/76	236-76	10/23/76	297-76	12/23/76	358-76
02/23/76	54-76	04/24/76	115-76	06/24/76	176-76	08/24/76	237-76	10/24/76	298-76	12/24/76	359-76
02/24/76	55-76	04/25/76	116-76	06/25/76	177-76	08/25/76	238-76	10/25/76	299-76	12/25/76	360-76
02/25/76	56-76	04/26/76	117-76	06/26/76	178-76	08/26/76	239-76	10/26/76	300-76	12/26/76	361-76
02/26/76	57-76	04/27/76	118-76	06/27/76	179-76	08/27/76	240-76	10/27/76	301-76	12/27/76	362-76
02/27/76	58-76	04/28/76	119-76	06/28/76	180-76	08/28/76	241-76	10/28/76	302-76	12/28/76	363-76
02/28/76	59-76	04/29/76	120-76	06/29/76	181-76	08/29/76	242-76	10/29/76	303-76	12/29/76	364-76
02/29/76	60-76	04/30/76	121-76	06/30/76	182-76	08/30/76	243-76	10/30/76	304-76	12/30/76	365-76
03/01/76	61-76	05/01/76	122-76	07/01/76	183-76	08/31/76	244-76	10/31/76	305-76	12/31/76	366-76