EXECUTIVE SUMMARY

This report presents the preliminary results from a program designed to detect the possibility of toxic air pollutions associated with incinerator incomplete combustion, at Naval Air Facility, Atsugi, Japan. The incinerators in question were located just outside the facility perimeter fence and were owned and operated by a private Japanese firm. The major concern of the Command of the Naval Air Facility was the possible health hazards which might be attributed to the base population from breathing the downwind exhaust plume from the incinerations. During southerly wind conditions the exhaust plume extends over the facility and disperses slowly, hovering low to the ground.

The field sampling portion of the program began on 12 September 1988 and concluded on 2 October 1988. During this time period samples were collected at two locations on a daily basis. These locations were changed frequently in order to be downwind of the incinerators. Primary locations were the pistol range, the roof of Bldg. 3043, the skeet range, and various locations of the golf course. The samples were collected over a 24 hour period using high volume air sampling equipment for the collections of particulate matter. The sampler was equipped with a particle size pre-cut separator to filter out non-respirotory particles.

Weather conditions during the sampling period were less then ideal. Days were overcast and wind directions were generally not favorable for plume desperation over the facility. The final report will correlate weather conditions and wind direction with individual samples.

This preliminary report presents results which indicate a strong possibility of health hazards associated with direct contact with the downwind exhaust plume of the incinerators. The final report will present a more detail evaluation of the test result including analysis of the samples for a set of heavy m

In addition to Polynuclear aromatic hydrocarbons, the samples were analyzed for the presence of any polychlorinated-dibenzodioxins and polychlorinated-dibenzofurans (PCDD/PCDF), Dioxin and Furans. There are 75 different chlorinated dioxins, divided into 8 homologs (groups), each with different physical and chemical properties depending on the number and location of chlorine atom substitutions. One of 22 isomers with four chlorine atoms, 2,3,7,8-tetrachlorodibenzo-p-dioxin (2378-TCDD), is of primary concern because it is the most toxic dioxin isomer, with the potential of presenting significant health and disposal issues.

Following the QA/QC requirements set forth in the HRGC/MS/MS method (The rapid analysis of 2,3,7,8-TCDD in soil and sediment by HRGC/MS/MS, USEPA Region VII) no PCDD's or PCDF's were positively detected. The method detection limits are considerably higher than the instrument detection limits due to chemical interferences (i.e., co-elution of compounds with the analytes of interest during GC/MS/MS analysis).

As the purpose of this task order was to perform survey work at the Naval Air Station, Atsugi, Japan, the results are by nature indicative rather than confirmatory. The exact values for adverse health effects of airborne dioxins are still being determined by USEPA under the rules of the Clean Air Act. It would be YORK's recommendation that additional samples be obtained under more favorable weather conditions. This would maximize the opportunity for capturing airborne dioxins. These samples would then be put through a more rigorous analytical protocol including extensive chemical "clean-ups" to remove outside interferences. These steps would enable the stated detection limit to approach the instrument detection limit. These values would then be used to perform a health risk assessment program.

YORK RESEARCH CONSULTANTS: 9 FEBRUARY 1989

A 3 point calibration curve was run for the following 16 compounds:

Benzo(g,h,i)Perylene
Dibenz(a,h)Anthracene
Indeno(1,2,3-cd)Pyrene
Benzo(a)Pyrene
Benzo(k)Fluoranthene
Benzo(b)Fluoranthene
Chrysene
Benzo(a)Anthracene
Pyrene
Fluoranthene
Anthracene
Phenanthrene
Fluorene
Acenaphthene
Acenaphthylene
Naphthalene

Supelco standard PAH Mix 610-M (Cat. #: 4-8743, Lot #: LA18325) was used as the standard.

In addition a single point calibration was done for the two surrogate compounds:

2-Fluorobiphenyl
Terphenyl-d14

The standard printout from the HP-MSD system is included in Appendix 1. Also included in Appendix 1 are the standard curves and calibration table printouts. The standard is not exactly 10 ng Benzo(a)Pyrene because of the 3 point curve interpolation. The lowest level standard is presented (1:10 dilution of Supelco standard).

YORK RESEARCH CONSULTANTS - REV. 24 MARCH 1989
REPORT TO U.S. NAVY - ATSUGI, JAPAN SAMPLES

TOXICOLOGY REPORT
MASS SPECTROSCOPIST/TOXICOLOGIST: P. V. NEILSON

INTRODUCTION

From a waste burn on the edge of the Atsugi, Japan Naval base plumes of smoke drifted over the base. Some of the trees turned brown. Base personnel developed headaches.

GC/MS ANALYSIS

The samples were run on an HP 5890/5970 GC/MSD. The reconstructed ion chromatograms and ion chromatograms were included in the data package.

GC/MS RESULTS

York found small quantities of Polynuclear aromatic hydrocarbons in the Atsugi, Japan samples. There were also hydrocarbons and Phthalates in the samples which will not be discussed.

TOXICOLOGY

The burn destroyed some of the Polynuclear aromatic Hydrocarbons but the GC/MS still found their signatures. Polynuclear aromatic hydrocarbons can cause headache, nausea, and blindness. Most Polynuclear aromatic hydrocarbons are mutagenic and may be tumorigenic and teratogenic. The degradation products produce acrid fumes which are eye and respiratory irritants. The combination can lead to serious health problems.

RECOMMENDATION

When the plumes come over the base keep all personnel indoors and send as many people off base as possible. Keep all pregnant women off of the base.

Avoidance of plume exposure should be observed as early as possible.

YORK RESEARCH CONSULTANTS - REV. 24 MARCH 1989
REPORT TO U.S. NAVY - ATSUGI, JAPAN SAMPLES

# FILTER	SITE	START DATE	FOUND
41	3043 ROOF	9/13/88	NONE IDENTIFIED
42	PISTOL RANGE	9/14	NONE IDENTIFIED
43	3043 ROOF	9/14	NONE IDENTIFIED
44	SKEET RANGE	9/15	NONE IDENTIFIED
45	3043 ROOF	9/16	NONE IDENTIFIED
46	SKEET RANGE	9/16	NONE IDENTIFIED
47	3043 ROOF	9/17	BENZO(K)FLUORANTHENE
48	DRIVING RANGE	9/17	BENZO(ghi)PERYLENE BENZO(K)FLUORANTHENE
49	DRIVING RANGE	9/19	BENZO(ghi)PERYLENE
50	3043 ROOF	9/19	NONE IDENTIFIED
51	PISTOL RANGE	9/19	NONE IDENTIFIED
52	3043 ROOF	9/20	NONE IDENTIFIED
53	PISTOL RANGE	9/21	NO GC/MS SAMPLE
54	3043 ROOF	9/21	NO GC/MS SAMPLE
55	GOLF COURSE	9/27	NONE IDENTIFIED
56	1st TEE	9/29	CHRYSENE
57	PISTOL RANGE	9/29	INDENO(1,2,3-cd)PYRENE BENZO(ghi)PERYLENE BENZO(K)FLUORANTHENE
58	PISTOL RANGE	9/30	BENZO(K)FLUORANTHENE
59	1st TEE	9/30	BENZO(A)ANTHRACENE CHRYSENE BENZO(B)FLUORANTHENE BENZO(A)PYRENE BENZO(ghi)PERYLENE INDENO(1,2,3-cd)PYRENE

YORK RESEARCH CONSULTANTS - REV. 24 MARCH 1989
REPORT TO U.S. NAVY - ATSUGI, JAPAN SAMPLES

# FILTER	SITE	START DATE	FOUND
60	PISTOL RANGE	10/2	NAPHTHALENE BENZO(ghi)PERYLENE INDENO(1,2,3-cd)PYRENE
61	1st TEE	10/2	NAPHTHALENE BENZO(ghi)PERYLENE BENZO(B)FLUORANTHENE

There was also very small amounts of fluoranthene and pyrene in most of the samples.

YORK RESEARCH CONSULTANTS - REV. 23 MARCH 1989
REPORT TO U.S. NAVY - ATSUGI, JAPAN SAMPLES

TOXICOLOGY REPORT

MASS SPECTROSCOPIST/TOXICOLOGIST: P. V. NEILSON

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TOXICOLOGY

The burn destroyed some of the Polynuclear aromatic Hydrocarbons but the GC/MS still found their signatures. Polynuclear aromatic hydrocarbons can cause headache, nausea, and blindness. Most Polynuclear aromatic hydrocarbons are mutagenic and may be tumorigenic and teratogenic. The degradation products produce acrid fumes which are eye and respiratory irritants. The combination can lead to serious health problems.

RECOMMENDATION

When the plumes come over the base keep all personnel indoors and send as many people off base as possible. Keep all pregnant women off of the base.

Keep the golf course closed for at least a week after the burn for observation of the trees and other plants.

YORK RESEARCH CONSULTANTS: 9 FEBRUARY 1989

A 3 point calibration curve was run for the following 16 compounds:

Benzo(g,h,i)Perylene
Dibenz(a,h)Anthracene
Indeno(1,2,3-cd)Pyrene
Benzo(a)Pyrene
Benzo(k)Fluoranthene
Benzo(b)Fluoranthene
Chrysene
Benzo(a)Anthracene
Pyrene
Fluoranthene
Anthracene
Phenanthrene
Fluorene
Acenaphthene
Acenaphthylene
Naphthalene

Supelco standard PAH Mix 610-M (Cat. #: 4-8743, Lot #: LA18325) was used as the standard.

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The standard printout from the HP-MSD system is included in Appendix 1. Also included in Appendix 1 are the standard curves and calibration table printouts. The standard is not exactly 10 ng Benzo(a)Pyrene because of the 3 point curve interpolation. The lowest level standard is presented (1:10 dilution of Supelco standard).

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REPORT TO U.S. NAVY - ATSUGI, JAPAN SAMPLES

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43	3043 ROOF	9/14	NONE IDENTIFIED
44	SKEET RANGE	9/15	NONE IDENTIFIED
45	3043 ROOF	9/16	NONE IDENTIFIED
46	SKEET RANGE	9/16	NONE IDENTIFIED
47	3043 ROOF	9/17	BENZO(K)FLUORANTHENE
48	DRIVING RANGE	9/17	BENZO(ghi)PERYLENE BENZO(K)FLUORANTHENE
49	DRIVING RANGE	9/19	BENZO(ghi)PERYLENE
50	3043 ROOF	9/19	NONE IDENTIFIED
51	PISTOL RANGE	9/19	NONE IDENTIFIED
52	3043 ROOF	9/20	NONE IDENTIFIED
53	PISTOL RANGE	9/21	NO GC/MS SAMPLE
54	3043 ROOF	9/21	NO GC/MS SAMPLE
55	GOLF COURSE	9/27	NONE IDENTIFIED
56	1st TEE	9/29	CHRYSENE
57	PISTOL RANGE	9/29	INDENO(1,2,3-cd)PYRENE BENZO(ghi)PERYLENE BENZO(K)FLUORANTHENE
58	PISTOL RANGE	9/30	BENZO(K)FLUORANTHENE
59	1st TEE	9/30	BENZO(A)ANTHRACENE CHRYSENE BENZO(B)FLUORANTHENE BENZO(A)PYRENE BENZO(ghi)PERYLENE INDENO(1,2,3-cd)PYRENE

YORK RESEARCH CONSULTANTS - REV. 23 MARCH 1989
REPORT TO U.S. NAVY - ATSUGI, JAPAN SAMPLES

# FILTER	SITE	START DATE	FOUND
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61	1st TEE	10/2	NAPHTHALENE BENZO(ghi)PERYLENE BENZO(B)FLUORANTHENE

There was also very small amounts of fluoranthene and pyrene in most of the samples.

TABLE 1: TOTAL SUSPENDED PARTICULATE

ATSUGI NAVAL AIR FACILITY - ATSUGI, JAPAN
AMBIENT AIR STUDY - INCINERATOR EMISSIONS
08 SEPTEMBER - 04 OCTOBER 1990

SAMPLE DATE START/STOP HRS	SAMPLE LOCATION	FILTER NO.	FLOW RATE CU.FT/MR	SAMPLE TIME HOURS	TOTAL SAMPLE VOLUME CU.METER	PART MASS NET WEIGHT	PM-10 TSP MICRO GRMS/M3
13 - 14 SEPT. 1500-1315 HRS.	BUILDING 3043 ROOF	000041	3120	23.25	2054	0.0517	25.1686
14 - 15 SEPT. 1305-0930 HRS.	BUILDING 959 PISTOL RANGE	000042	2880	20.53	1678	0.0575	34.2682
14 - 15 SEPT. 1537-1000 HRS.	BUILDING 3043 ROOF	000043	3150	21.62	1926	0.0345	17.8990
15 - 16 SEPT. 0952-0900 HRS.	BUILDING 974 SKEET RANGE	000044	2220	23.17	1457	0.0191	13.1130
16 - 17 SEPT. 0850-1000 HRS.	BUILDING 3043 ROOF	000045	3072	25.17	2190	0.0576	26.3066
16 - 17 SEPT. 0905-1030 HRS.	BUILDING 974 SKEET RANGE	000046	2772	25.20	1978	0.0665	33.6182
17 - 19 SEPT. 1005-0845 HRS.	BUILDING 3043 ROOF	000047	3228	46.07	4283	0.1317	30.8719
17 - 19 SEPT. 1050-0930 HRS.	BUILDING DRIVING RANGE	000048	2772	31.80	2509	0.108	43.0499
19 - 20 SEPT. 0835-0845 HRS.	BUILDING DRIVING RANGE	000049	2820	24.17	1930	0.1268	65.6962
19 - 20 SEPT. 0950-0947 HRS.	BUILDING 3043 ROOF	000050	3060	23.95	2075	0.1077	51.8962
20 - 21 SEPT.	BUILDING 959 PISTOL RANGE	000051	3036	23.67	2035	0.0928	45.6032
20 - 21 SEPT.	BUILDING 3043 ROOF	000052	3120	23.08	2039	0.0718	35.2112
21 - 22 SEPT. 1220-0835 HRS.	BUILDING 959 PISTOL RANGE	000053	1920	20.25	1101	0.0615	55.8593
21 - 22 SEPT. 1200-0925 HRS.	BUILDING 3043 ROOF	000054	2010	21.45	1221	0.0649	53.1580
27 - 29 SEPT. 1550-0940 HRS.	GOLF COURSE 1st TEE	000055	2010	44.17	2514	0.0533	21.2007
29 - 30 SEPT. 1330-1410 HRS.	GOLF COURSE 1st TEE	000056	1920	24.67	1341	0.0598	44.4348
29 - 30 SEPT. 1150-1355 HRS.	BUILDING 959 PISTOL RANGE	000057	2010	26.42	1504	0.0737	49.0101

TABLE 1: TOTAL SUSPENDED PARTICULATE (cont.)

ATSUGI NAVAL AIR FACILITY - ATSUGI, JAPAN
AMBIENT AIR STUDY - INCINERATOR EMISSIONS
08 SEPTEMBER - 04 OCTOBER 1988

SAMPLE DATE START/STOP HRS	SAMPLE LOCATION	FILTER NO.	FLOW RATE CU.FT/MN	SAMPLE TIME HOURS	TOTAL SAMPLE VOLUME CU.METER	PART MASS WET WEIGHT	PM-10 TSP MICRO GRMS/MS
30SEPT - 02 OCT 1400-1130 HRS.	BUILDING 959 PISTOL RANGE	000058	1800	45.50	2432	0.2057	84.8817
30SEPT - 02 OCT 1420-1200 HRS.	GOLF COURSE 1st TEE	000059	2370	46.67	3085	0.1788	57.7159
02 - 03 OCT. 1145-1045 HRS.	BUILDING 959 PISTOL RANGE	000080	1950	23.00	1270	0.0695	70.7067
02 - 03 OCT. 1215-1015 HRS.	GOLF COURSE 1st TEE	000081	2010	22.00	1252	0.0808	64.5287
21 - 28 OCT. 1215-1755 HRS.	BUILDING 959 PISTOL RANGE	010401	1950	173.33	9572	0.2699	28.1995
21 - 28 OCT. 1220-1725 HRS.	BUILDING DRIVING RANGE	010402	2010	173.08	9652	0.6305	65.0315

TABLE 2: HEAVY METAL CONCENTRATIONS

TISSUE NAVAL AIR FACILITY - TUSTIN, JOHN WAYNE AIR STATION - INCINERATOR EMISSIONS 08 SEPTEMBER - 04 OCTOBER 1980

FILTER NO. DOWNWIND TRS. LOCATION	080904 NONE BUILDING 30-13	080904-2 NONE BUILDING 30-13	080904-3 NONE DRIVING RANGE	080904-4 NO DRIVING RANGE	080905 #1 PISTOL RANGE	080905 #2 GOLF COURSE Ln. TEE	080905 #3 PISTOL RANGE	080905 #4 GOLF CRS Ln. TEE
CHROMIUM MG/SAMPLE	<0.000055	<0.000055	<0.000055	<0.000050	<0.000054	<0.000055	0.00512	<0.000055	<0.000055
UG/M3	~~<0.00255~~ 2.00255	~~<0.00255~~ 2.00123	~~<0.00255~~ 2.00209	~~<0.00255~~ 2.00291	~~<0.00255~~ 2.00348	~~<0.00255~~ 2.00215	~~0.0159~~ 2.0159	~~<0.00412~~ 2.00412	~~<0.00412~~ 2.00412
CHROMIUM MG/SAMPLE	<0.00110	0.00165	<0.00110	<0.00110	0.00110	0.00165	0.00165	<0.00110	<0.00110
UG/M3	~~<0.00510~~ 2.00510	~~0.00368~~ 0.00368	~~<0.00417~~ 2.00417	~~<0.00595~~ 2.00595	~~<0.00692~~ 2.00692	~~0.00645~~ .00645	~~0.00573~~ .00573	~~<0.00825~~ 2.00825	~~<0.00836~~ 2.00836
LEAD MG/SAMPLE	<0.00788	0.01694	0.01379	0.01221	0.01124	0.04394	0.02206	0.01380	0.01386
UG/M3	~~<0.03642~~ 2.03642	~~0.03771~~ .03771	~~0.05217~~ .05217	~~0.06007~~ .06007	~~0.06465~~ .06465	~~0.16895~~ 0.16895	~~0.06833~~ .06833	~~0.09918~~ .09918	~~0.07169~~ .07169
MERCURY MG/SAMPLE	0.0000119	0.0000107	0.0000057	0.00013	0.0000124	0.000011	0.0000088	0.0000136	0.0000039
UG/M3 ~~mg/m3~~	0.0001	0.0001	0.0001	0.0003	0.0001	0.0001	0.0001	0.0002	0.0002
ARSENIC MG/SAMPLE	0.000027	0.000013	0.000052	0.00087	0.00011	0.000023	0.00059	0.00056	0.00019
UG/M3	~~0.0144~~ .0144	~~.00013~~ .00013	~~0.0012~~ 0.0012	~~0.0088~~ 0.0088	~~0.0055~~ 0.0055	~~0.0003~~ 0.0003	~~0.0065~~ 0.0065	~~0.0293~~ 0.0293	~~0.01~~ 0.01
~~mg/m3~~									
Air flow (m^3)	2054	4265	2509	1930	1504	2435	3065	1270	1252

× Anomalous data

→ These need to be rechecked still. CFR

TABLE 3: POLYNUCLEAR AROMATIC HYDROCARBONS

ATSUGI NAVAL AIR FACILITY - ATSUGI, JAPAN
AMBIENT AIR STUDY - INCINERATOR EMISSIONS
08 SEPTEMBER - 04 OCTOBER 1988

SAMPLE DATE START/STOP HRS	SAMPLE LOCATION /DOWNWIND HOURS	FILTER NUMBER	COMPOUNDS DETECTED	CONCENTRATION MICRO GRMS/M3
13 - 14 SEPT. 1500-1315 HRS.	BUILDING 3043 ROOF/*	000041	Benzo[k]fluoranthene	1.81E-03
			Benzo[a]pyrene	1.77E-03
14 - 15 SEPT. 1305-0930 HRS.	BUILDING 959 PISTOL RANGE/ *	000042	Benzo[k]fluoranthene	2.32E-03
			Benzo[a]pyrene	2.21E-03
			Indeno[1,2,3-cd]pyrene	9.30E-04
			Benzo[ghi]perylene	2.71E-03
14 - 15 SEPT. 1537-1000 HRS.	BUILDING 3043 ROOF/ *	000043	2-Fluorobiphenol	2.52E-03
			Benzo[k]fluoranthene	1.82E-03
			Benzo[a]pyrene	1.82E-03
15 - 16 SEPT. 0950-0900 HRS.	BUILDING 974 SKEET RANGE/ *	000044	2-Fluorobiphenol	2.03E-03
			Benzo[k]fluoranthene	2.37E-03
			Benzo[a]pyrene	2.45E-03
			Indeno[1,2,3-cd]pyrene	9.68E-04
			Benzo[ghi]perylene	2.91E-03
16 - 17 SEPT. 0850-1000 HRS.	BUILDING 3043 ROOF/ *	000045	2-Fluorobiphenol	9.97E-03
			Benzo[k]fluoranthene	1.68E-03
			Benzo[a]pyrene	1.64E-03
			Benzo[ghi]perylene	2.02E-03
16 - 17 SEPT. 0905-1030 HRS.	BUILDING 974 SKEET RANGE/ *	000046	2-Fluorobiphenol	7.74E-03
			Benzo[k]fluoranthene	1.76E-03
			Benzo[a]pyrene	1.82E-03
17 - 19 SEPT. 1005-0845 HRS.	BUILDING 3043 ROOF/*	000047	2-Fluorobiphenol	4.20E-03
			Benzo[k]fluoranthene	9.91E-04
			Benzo[a]pyrene	1.00E-03
			Indeno[1,2,3-cd]pyrene	3.74E-04
			Benzo[ghi]perylene	1.12E-03
17 - 19 SEPT. 1050-0930 HRS.	BUILDING DRIVING RANGE/ *	000048	Benzo[k]fluoranthene	1.90E-03
			Benzo[a]pyrene	1.77E-03
			Indeno[1,2,3-cd]pyrene	9.44E-04
			Benzo[ghi]perylene	2.00E-03
19 - 20 SEPT. 0835-0845 HRS.	BUILDING DRIVING RANGE/ 10	000049	2-Fluorobiphenol	4.00E-03
			Benzo[k]fluoranthene	2.12E-03
			Benzo[a]pyrene	2.15E-03
			Indeno[1,2,3-cd]pyrene	1.00E-03
			Benzo[ghi]perylene	6.90E-03

TABLE 3: POLYNUCLEAR AROMATIC HYDROCARBONS (cont.)

ATSUGI NAVAL AIR FACILITY - ATSUGI, JAPAN
AMBIENT AIR STUDY - INCINERATOR EMISSIONS
08 SEPTEMBER - 04 OCTOBER 1988

SAMPLE DATE START/STOP HRS	SAMPLE LOCATION DOWNWIND HOURS	FILTER NUMBER	COMPOUNDS DETECTED	CONCENTRATION MICRO GRMS/M3	
19 - 20 SEPT. 0959-0947 HRS.	BUILDING 3043 ROOF/ *	000050	2-Fluorobiphenol	2.77E-03	(a)
			Benzo[k]fluoranthene	2.09E-03	(a)
			Benzo[a]pyrene	1.96E-03	(a)
20 - 21 SEPT.	BUILDING 959 PISTOL RANGE/ *	000051	2-Fluorobiphenol	2.92E-03	(a)
			Benzo[k]fluoranthene	2.87E-03	(a)
			Benzo[a]pyrene	2.60E-03	(a)
			Indeno[1,2,3-cd]pyrene	1.23E-03	(a)
			Benzo[ghi]perylene	2.31E-03	(a)
20 - 21 SEPT.	BUILDING 3043 ROOF/ *	000052	2-Fluorobiphenol	3.46E-03	(a)
			Benzo[k]fluoranthene	1.94E-03	(a)
			Benzo[a]pyrene	2.1[illegible]E-03	(a)
			Indeno[1,2,3-cd]pyrene	1.02E-03	(a)
			Benzo[ghi]perylene	2.51E-03	(a)
21 - 22 SEPT. 1220-0835 HRS.	BUILDING 959 PISTOL RANGE/ *	000053	No GC/MS sample	-----	
21 - 22 SEPT. 1200-0935 HRS.	BUILDING 3043 ROOF/ *	000054	No GC/MS sample	-----	
27 - 29 SEPT. 1330-0940 HRS.	GOLF COURSE 1st TEE/ *	000055	Benzo[k]fluoranthene	2.20E-03	(a)
			Benzo[a]pyrene	2.14E-03	(a)
			Benzo[ghi]perylene	1.93E-03	(a)
29 - 30 SEPT. 1330-1410 HRS.	GOLF COURSE 1st TEE/ *	000056	Benz[a]anthracene	6.28E-04	
			Benzo[b]fluoranthene	3.58E-04	
			Benzo[k]fluoranthene	6.55E-03	
			Benzo[a]pyrene	5.72E-03	
			Indeno[1,2,3-cd]pyrene	2.70E-0[illegible]	
			Benzo[ghi]perylene	5.71E-[illegible]	
29 - 30 SEPT. 1130-1356 HRS.	BUILDING 959 PISTOL RANGE/ 8	000057	Chrysene	1.27E-03	
			Benzo[b]fluoranthene	3.72E-03	
			Benzo[k]fluoranthene	5.92E-03	
			Benzo[a]pyrene	5.79E-03	
			Indeno[1,2,3-cd]pyrene	4.05E-03	
			Benzo[ghi]perylene	7.56E-03	
30SEPT - 02 OCT 1400-1130 HRS.	BUILDING 959 PISTOL RANGE/ 10	000058	Benz[a]anthracene	1.76E-04	
			Benzo[b]fluoranthene	9.43E-04	
			Benzo[k]fluoranthene	3.32E-03	
			Benzo[a]pyrene	2.91E-03	
			Indeno[1,2,3-cd]pyrene	1.32E-03	

TABLE 3: POLYNUCLEAR AROMATIC HYDROCARBONS (cont.)

ATSUGI NAVAL AIR FACILITY - ATSUGI, JAPAN
AMBIENT AIR STUDY - INCINERATOR EMISSIONS
08 SEPTEMBER - 04 OCTOBER 1988

SAMPLE DATE START/STOP HRS	SAMPLE LOCATION /DOWNWIND HOURS	FILTER NUMBER	COMPOUNDS DETECTED	CONCENTRATION MICRO GRMS/M3
30SEPT - 02 OCT 1420-1200 HRS.	GOLF COURSE 1st TEE/ 10	000059	Benz[a]anthracene	6.39E-04
			Chrysene	2.33E-03
			Benzo[b]fluoranthene	1.09E-02
			Benzo[k]fluoranthene	1.96E-03
			Benzo[a]pyrene	4.91E-01
			Indeno[1,2,3-cd]pyrene	5.91E-03
			Benzo[ghi]perylene	3.91E-03
02 - 03 OCT. 1145-1045 HRS.	BUILDING 959 PISTOL RANGE/ 6	000060	Benz[a]anthracene	4.24E-03
			Chrysene	1.04E-02
			Benzo[b]fluoranthene	2.64E-02
			Benzo[k]fluoranthene	1.70E-02
			Benzo[a]pyrene	1.72E-02
			Indeno[1,2,3-cd]pyrene	1.21E-02
			Benzo[ghi]perylene	1.00E-02
02 - 03 OCT. 1215-1015 HRS.	GOLF COURSE 1st TEE/ 6	000061	Benz[a]anthracene	2.27E-03
			Chrysene	6.67E-03
			Benzo[b]fluoranthene	1.22E-02
			Benzo[k]fluoranthene	1.40E-02
			Benzo[a]pyrene	1.20E-02
			Indeno[1,2,3-cd]pyrene	8.51E-03
			Benzo[ghi]perylene	8.76E-03
21 - 28 OCT. 1215-1735 HRS.	BUILDING 959 PISTOL RANGE/ *	010401	No GC/MS sample	-----
21 - 28 OCT. 1220-1725 HRS.	BUILDING DRIVING RANGE/ *	010402	No GC/MS sample	-----

* No significant downwind hours recorded even if burning occurred.

(a) No spectral fit of compound which may invalidate concentration measurements. Further research of the National Bureau Library of 42,000 standards would clarify spectrometry analyses. All other compounds displayed spectral fits.