Studies of Emissions from Oil Fires

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Abstract

Over 45 mesoscale burns were conducted to study various aspects of diesel and crude oil burning in-situ. Extensive sampling and monitoring of these burns was conducted at downwind stations, upwind stations, and in the smoke plume.

Particulate samples were taken in air and analysed for Polycyclic Aromatic Hydrocarbons (PAHs). PAHs were found to be lower in the soot than in the starting oil, although higher concentrations of the larger molecular PAHs were found in the soot and residue, especially for diesel burns. Overall, the amount of PAHs in the soot and residue were about 2 to 8 % of that in the starting oil. This implies a destruction of PAHs by 92 to 98 %. Particulates in the air were measured by several means and were found to be greater than recommended exposure levels up to 500 metres downwind at ground level, depending on the size and type of fire. Diesel fires emit much more particulate matter and have longer danger zones. Combustion gases including carbon dioxide and carbon monoxide are below exposure level maximums. Volatile organic compound (VOCs) emissions are extensive from fires, but the levels were less than from an evaporating oil spill. Over 140 compounds were identified and quantified. Carbonyls, including aldehydes and ketones, were found to below human health concern levels.

Emission data from the experimental burns have been used to develop prediction equations for over 150 specific compounds or emission categories. These are used to calculate safe distances and levels of concern for various burn sizes that would typically be contained in a boom. The safe distance for a crude oil burn of 500 m^2 is about 500 m and for a diesel burn, much further.

1.0 Introduction

In-situ burning of oil spills has been tried for more than thirty years with limited acceptance as an oil spill cleanup option in certain parts of the world. Such lack of acceptance is primarily because of the lack of understanding regarding combustion products and the issues involving the combustibility of oil-on-water.

Arctic and Marine Oilspill Program (AMOP) Technical Seminar, 24th. Proceedings. June 12-14, 2001, Edmonton, Canada, Environment Canada, Ottawa, Ontario, 767-823 pp, 2001.

Extensive research was undertaken to understand the many facets of burning oil. A consortium of several agencies in the United States and Canada have joined forces to study burning and to conduct large scale experiments. This effort has resulted in data which has led to broader acceptance of in-situ burning as an acceptable spill countermeasure alternative.

The concern over atmospheric emissions remains the biggest barrier to the widespread use of burning. The burning of all kinds of materials is believed to be questionable because of concern over combustion by-products. And while analysis is difficult, extensive studies have been conducted and technology now permits an assessment of key compounds and comparison to ambient levels of pollution.

Emissions include the smoke plume, particulate matter precipitating from the smoke plume, combustion gases, unburned hydrocarbons, organic compounds produced during the burning process and the residue left at the burning pool site. Soot particles, although consisting largely of carbon particles, have a variety of chemicals absorbed and adsorbed. Complete analysis of the emissions from a burn involves measuring all of these components.

2.0 Measurement of Emissions

Extensive measurement of burn emissions began in 1991 with the instrumentation of several burns conducted at Mobile, Alabama, to measure various physical facets of oil burning (Fingas *et al.*, 1993). Analysis of the data from these burns showed several interesting facts and several data gaps. Monitoring of burns continued for several years. In 1992, two further series of burns were monitored for emissions (Fingas *et al.*, 1993; Booher and Janke, 1997). In 1993, two major burns were conducted at sea specifically to measure emissions, but many other measurements were taken as well (Fingas *et al.*, 1994a; 1994b; 1995a; 1995b). Further tests were conducted in 1994, 1997 and 1998 (Fingas *et al.*, 1996a; 1996b; 1998, 1999, 2000; Lambert *et al.*, 1998). Detailed analytical methods are given in these papers.

The monitoring of emissions at these burns was intended to be comprehensive and used the best field samplers or instrumentation available at the time. Measurement techniques have progressed through the years and are now available to measure many suspected emissions with high accuracy.

The emphasis on sampling has been the air emissions at ground level. Such heights are usually 5 feet or 1 metre and the typical receptor heights for humans. This is the primary concern and also is the basis of the regulated value for human health purposes. This paper will focus on the same measurements and correlate these to yield prediction equations.

Volatile Organic Compounds (VOCs) were sampled using sorption tubes in 1991 and 1992. Whole air samples were also taken using 6 L pre-evacuated (to 0.05 mm Hg) stainless steel canisters (Summa canisters). Upwind and background samples were always taken. Analysis was by GC-MS. Over 150 compounds were measured by 1997 and over 90 hydrocarbons identified in the vapours from an evaporating or burning slick.

Carbonyls were sampled by reacting them on a DNPH (2,4-dinitrophenylhydrazine)-silica cartridge through which air was pumped. The sample was subsequently analyzed using HPLC.

Polycyclic Aromatic Hydrocarbons (PAHs) were sampled in air using filters

and sorbent tubes initially, but later from particulates collected on high volume samplers. Analysis of PAHs was also conducted from various particulate sampling including fractionation samplers, PM-10, PM- 2.5 or cascade samplers, and filters from low and medium-volume pumps. Analysis was by standard methods using GC-MS.

Heavy metals on soot were collected using personal sampling pumps and filters. Analysis was by ICP, using standard techniques.

Polychlorinated dibenzo-p-dioxin/furan were measured on particulate samples. High volume samplers were employed to collect cumulative samples at upwind and downwind locations. Sampling media were glass-fibre filters followed by a polyurethane foam plug (PUF). These same samples were used to measure TSP, or Total Suspended Particulate levels and sometimes were analysed for PAHs, other organics or metals.

PM-10 particulate (PM-10 are particulates less than 10 μm in size, a critical size below which human lungs are affected) air sampling was performed using a General Metal Works model PM-10 instrument. The sampling media consisted of a quartz fibre filter. Some of these filters were also analyzed for PAHs.

PM-2.5 are particulates less than 2.5 μm in diameter, and are particularly dangerous to human lungs. PM-2.5 particulate air sampling was accomplished using a Partisol PM-2.5 sampler. A Teflon filter was placed in the apparatus and used to collect sample.

Real-time particulate measurements were taken with RAMs or DataRAMs. The Ram-1 instrument was used to perform real-time aerosol monitoring and measure relative concentrations of airborne particulates. This instrument responds to a physical particle size of 0.1 to 30 microns. The DataRAM (MIE Inc, Bedford MA) is an updated version of the RAM. The advantage of this unit over the RAM is its internal data logging and processing capabilities. The apparatus is capable of employing several different sampling head configurations. These are total particulate, the 0 to10 μm particulate fractions or the 0 to2.5 μm particulate fractions.

Sulphur dioxide was measured using the Biosystems Cannonball. These data were logged electronically. Sulphur dioxide in acid form was measured using a Gilian pump and a sodium hydroxide-filled impinger. The impinger fluid is titrated to determine the amount of sulphuric acid/dioxide. The detection limit of the impinger is approximately 100 $\mu g/m^3$ or 38 ppb. The detection limit of the Cannonball is about 1 ppm.

Carbon Dioxide was measured using two electronic instruments, the Metrosonics AQ501and the Armstrong CD-1 carbon dioxide analyser. All these data were recorded at intervals of one minute averages of 10 second measurement intervals. Carbon dioxide was also measured in some Summa samples using gas chromatography. The Metrosonics instrument also measures carbon monoxide, moisture and temperature.

Nitric oxides were measured using the Biosystems Cannonball. Electronic output data was recorded in manner similar to the above.

3.0 Results of Emission Measurement

Summarized data appears in the references. These data are very extensive. Summaries of these results appear in the Appendix. The following summarizes the basic results:

3.1 Particulates

All burns, especially those of diesel fuel, produced an abundance of particulate matter. The concentrations of particulates from diesel at the same distances were approximately 4 times that for similar-sized crude oil burns. PM-10 concentrations were sometimes about 0.7 of the total particulate concentration (TSP), as would be expected, but sometimes were the same as the TSP. The PM-2.5 concentrations were sometimes 0.5 of the TSP, as would be expected, but sometimes were closer to the PM-10 values.

3.2 PAHs

PAHs or Poly Aromatic Hydrocarbons are aromatic compounds found in crude oil and are often produced as a result of combustion. Many PAHs are toxic to man and the environment, particularly the larger PAHs. Crude oil burns result in PAH downwind of the fire, but the concentration on the particulate matter is often an order-of-magnitude less than the concentration in the starting oil and sometimes several orders-of-magnitude less. Diesel contains significant levels of PAHs of smaller molecular size, the 2- 3-ring PAHs predominating. Burning diesel results in more pyrogenic PAHs of larger molecular sizes. Larger PAHs are either created or concentrated by the fire. Larger PAHs, some of which are not even detectable in the Diesel fuel, are found both in the soot and in the residue. The concentrations of these larger PAHs are low and often just above detection limits. Overall, more PAHs are destroyed by the fires than are created.

3.3 VOCs

VOCs or volatile organic compounds are hydrocarbons having a significant concentration in the vapour phase. One-hundred and forty-eight volatile organic compounds were measured from samples taken in Summa canisters and some on carbon absorption tubes. The concentrations of VOCs are about the same in a crude or diesel burn. Concentrations appear to be under human health limits even at the closest monitoring station. VOC concentrations are about three times higher when the oil is not burning and is just evaporating. Unfortunately, this is difficult to measure at all burns.

3.4 Dioxins and Dibenzofurans

Dioxins and Dibenzofurans are toxic compounds sometimes produced from the combustion of organic materials containing chlorine. Particulates precipitated downwind and oil residue were analyzed for dioxins and dibenzofurans. The levels of these toxic compounds were at background levels indicating no production by either crude or diesel fires.

3.5 Carbonyls

Oil burns produce low amounts of the small aldehydes (formaldehyde,

acetaldehyde, etc.) and ketones (acetone, etc.), collectively known as carbonyls. These would not be a health concern because of the low levels detected at distances from the source fire. Carbonyls from crude oil fires are found at very low concentrations and those from diesel fires are detected at slightly higher concentrations.

3.6 Carbon Dioxide

Carbon dioxide is the end result of combustion and is found in increased concentrations around a burn. Normal atmospheric levels are about 300 ppm and levels near a burn can be around 500 to 800 ppm. There is no human danger in this level. The three-dimensional distributions of carbon dioxide around a burn have been measured. Concentrations of carbon dioxide are highest at the 1 m level and fall to near background levels at the 4 m level. Concentrations at ground level are as high as 10 times that of the plume. Distribution along the ground is broader than for particulates.

3.7 Carbon Monoxide

Carbon monoxide levels are usually at or below the lowest detection levels of the instruments and thus do not pose any hazard to humans. The gas has only been measured when the burn appears to be inefficient, such as when water is sprayed into the fire. Carbon monoxide appears to be distributed in the same way as carbon dioxide.

3.8 Sulphur Dioxide

Sulphur dioxide, per se, is usually not detected at significant levels or sometimes not even at measurable levels. Sulphuric acid, or sulphur dioxide that has reacted with water, is detected at fires. Sulphur dioxide must be measured using impingers rather than conventional gas detectors. The measured concentrations of sulphuric acid are below concern levels and appear to correspond to the sulphur contents of the oil.

3.9 Other Gases

Attempts were made to measure oxides of nitrogen which might be the result of combustion. None were measured in about 10 experiments.

3.10 Other Compounds

A concern about burning crude oil lies with any "hidden" compounds that might be produced. One study was conducted several years ago in which soot and residue samples were extracted and "totally" analyzed in various ways. The study was not conclusive, but no compounds of the several hundred identified, were of serious environmental concern. The soot analysis revealed that the bulk of the material was carbon and that all other detectable compounds were present on this carbon matrix in abundances of parts-per-million or less. The most frequent compounds identified were aldehydes, ketones, esters, acetates and acids. These are formed by incomplete oxygenation of the oil. Similar analysis of the residue shows that the same minority compounds are present at about the same levels. The bulk of the residue is unburned oil.

A preliminary study of nitro-PAHs showed that these may be present at the parts-per-billion level. Because of the difficulty of analysis of these, further work was not done.

4.0 Data Synthesis and Calculation

Sufficient data are now available to correlate emission data results with spatial and burn parameters. The extensive work is described in the literature. Many correlations were tried, however, it was found that atmospheric emissions correlated relatively well with distance from the fire and the area of the fire. This information was used to develop prediction equations for each pollutant, using the data gathered from the 30 test burns conducted to date. Sufficient data were available to calculate prediction equations for more than 150 individual compounds and for all the major groups. In some cases, however, there were not enough data to yield high correlation coefficients and low errors. This will improve as more data are collected. The result of the correlation will significantly increase understanding of in-situ burning in the areas of assessing the importance of specific emissions and classes, predicting 'safe' distances, and predicting concentrations at a given point. These predictions are far more accurate than those obtained from models because they are based solely on actual data.

The emissions at a given downwind site are a function of various factors including wind direction and speed, atmospheric stability conditions, and the size of the fire. The data available correlate satisfactorily because they were obtained in about the same conditions, at wind speeds of about 10 km/h, and at standard daylight atmospheric stabilities. Previous workers have shown that the area of the fire yields the burn rate and not the volume of the oil to be burned. Thus, the area correlates satisfactorily. The data are subject to a variety of sources of noise, including patchiness of emissions caused by turbulence and wind anomalies in the field. In addition, some of the data sets are derived when the wind changed and emissions that are very dependant on wind direction, such as particulates, impact a different set of sensors. This can cause some readings to be low.

At least four data points involving different distances and burn areas are needed in order to perform a three-way correlation on area of burn, distance downwind at the most impacted set of sensors, and concentration. In some cases, these data were not available. In other cases, very poor correlation was achieved and the following procedures were performed in order of preference to improve the data. 1) Data from questionable sets were added, which often improved the situation, especially at distances remote from the fire. 2) The data that appeared to be causing the difficulty were verified in experimental logs, and sometimes data was not correctly copied. 3) Data from questionable sets that appeared to be causing the difficulty were removed. If all these steps failed, the correlation was not done. The latter two corrections were rarely necessary, especially for the diesel emissions where there is more recent, and probably more reliable, data.

The data available to perform the correlations are summarized in Tables A1 to A8. The data for VOCs from crude oil are shown in Table A1 and from diesel burns in Table A2. PAHs from crude oil are shown in Table A3 and from diesel in Table A4. Carbonyls from both crude and diesel burns are shown in Table A5. Particulates from both types of burns are shown in Table A6 and fixed gases from both types of

burns are shown in Table A7.

The correlation procedure involved collecting all emission data from the studies and then finding the best correlation procedure and the best equation that fit most data. A simple equation (concentration = constant + constant X fire size - constant X natural logarithm of distance from fire) was found to fit the data most universally using the software package, TableCurve 3D (San Raphael, CA). This software calculates up to 2000 equations and sorts them in terms of fits (best regression coefficient, r^2). The graph and statistics for some typical correlations are shown in Figures 1 and 2. The resulting calculation formulae for the two examples and some statistics are given. The formulae resulting from the calculations for VOCs are given in Table 1, for PAHs in Table 2, and for total groupings, gases, and carbonyls in Table 3.

These tables show the regression coefficient for each equation and the error. The error given is the standard error from regression fitting and is roughly equivalent to standard deviation. As can be seen from this table, the 'quality' of fit as evidenced by the regression coefficient varies with emission type. The lower ones are generally associated with lesser amounts of data. The number of data points available to calculate each compound or class varied from 5 to about 40 data points.

These data were then used to calculate the difference between the regulated level (typically the time weight average recommended exposure to a substance) and the calculated amount of the substance for several burns. Results of a simple exercise of this type are shown in Table 4. This table shows that emissions, especially of particulate matter, are significantly higher from a diesel fire than from crude oil fire, as had been noted in several studies of particulate emissions (Fingas *et al.*, 1996a; 1996b). Other emissions of concern are similar for diesel and crude oil, although the PAHs are somewhat higher when diesel burns. This calculation confirms that particulate matter is the greatest concern, followed by the PAHs on the particulate matter, and then total VOCs.

Summation of the VOCs shows these to be close to being a matter of concern, however, it should be noted that the level of VOCs is much higher (as much as three times higher as measured in some tests) when oil is evaporating in the absence of burning than when burning. Carbonyls are another emission of concern, although they are significantly below concern levels for the scenarios in Table 4. The level of concern is the percentage of the regulated level attained by the emission. For example, if a regulated level is 75 mg/m^3 and the calculated value is 150, then the level of concern is given as 200%. There is no concern for fixed gases such as carbon dioxide or carbon monoxide.

Safe distances downwind from a crude oil burn can be calculated as:

$$\text{Safe Distance}(m) = \exp\left[\frac{12.5 + 0.0347\ X\ \text{fire size}\ (\text{m}^2)}{4.79}\right]$$

Safe distances downwind from a diesel fire can be calculated as:

$$\text{Safe Distance}(m) = \exp\left[\frac{1.19 + 0.0052\ X\ \text{fire size}\ (\text{m}^2)}{0.437}\right]$$

Based on these data, safe distances have been calculated for a variety of fire sizes. These are given in Table 5.

Table 1a

Prediction Equation Parameters for VOCs

y= a + b(size of fire,m) - c*ln(distance from fire, m)*

	Crude Oil					Diesel					
Substance	**a**	**b**	**c**	**r^2**	**Error**	**a**	**b**	**c**	**r^2**	**Error**	**Units**
1,2,3-Trimethylbenzene	11.4	0.0106	2.53	0.13	4.2	2.99	0.00443	0.853	0.35	0.48	$\mu g/m^3$
1,2,4-Trimethylbenzene	22.4	0.0239	4.58	0.08	10	15.3	0.105	4	0.2	3.37	$\mu g/m^3$
1,2-Diethylbenzene						0.894	0.003	0.254	0.2	0.26	$\mu g/m^3$
1,3,5-Trimethylbenzene	17.3	0.0191	4.28	0.21	4.8	5.55	0.00442	1.45	0.19	1.2	$\mu g/m^3$
1,3-Butadiene						6.49	0.0244	2.27	0.45	1.9	$\mu g/m^3$
1,3-Diethylbenzene						0.623	0.00104	0.129	0.06	0.24	$\mu g/m^3$
1,4-Diethylbenzene	4.66	0.0053	0.947	0.08	2	3.57	0.00179	0.836	0.1	1.1	$\mu g/m^3$
1-Butene/2-Methylpropene						7.5	0.0404	2.43	0.69	2.1	$\mu g/m^3$
1-Heptene						2.14	0.0202	0.717	0.89	0.56	$\mu g/m^3$
1-Hexene/2-Methyl-1-Pentene						1.01	0.00241	0.228	0.3	0.27	$\mu g/m^3$
1-Methylcyclohexene						1.13	0.00563	0.392	0.42	0.61	$\mu g/m^3$
1-Methylcyclopentene						0.238	0.00116	0.044	0.15	0.24	$\mu g/m^3$
1-Nonene						4.09	0.0088	1.33	0.6	0.59	$\mu g/m^3$
1-Octene						0.777	0.00065	0.164	0.14	0.23	$\mu g/m^3$
1-Pentene						1.55	0.0248	0.635	0.36	2.9	$\mu g/m^3$
2,2,3-Trimethylbutane	25	0.0256	7.49	0.75	1.4	0.694	0.00125	0.208	0.91	0.091	$\mu g/m^3$
2,2,4-Trimethylpentane	5.41	0.0131	1.66	0.68	1.18	3.23	0.00263	0.801	0.23	0.63	$\mu g/m^3$
2,2,5-Trimethylhexane	8.49	0.0081	2.58	0.8	0.38	1.09	0.00323	0.314	0.42	0.28	$\mu g/m^3$
2,2-Dimethylbutane	61	0.105	19.3	0.72	8.2	1.69	0.00274	0.475	0.3	0.38	$\mu g/m^3$
2,2-Dimethylpentane	52.3	0.0799	16.5	0.54	16.5						$\mu g/m^3$
2,2-Dimethylpropane	25.2	0.0271	7.93	0.87	0.99	0.335	0.00145	0.089	0.41	0.12	$\mu g/m^3$
2,3,4-Trimethylpentane	14	0.0249	4.53	0.81	3.1	1.92	0.00285	0.542	0.37	0.41	$\mu g/m^3$
2,3-Dimethylbutane	168	0.308	57	0.53	38	3.35	0.0158	1.1	0.57	1.2	$\mu g/m^3$
2,3-Dimethylpentane	173	0.294	56.8	0.6	32	7.62	0.0145	2.33	0.28	1.6	$\mu g/m^3$
2,4-Dimethylhexane	72.2	0.109	22.7	0.56	22	2.23	0.00445	0.646	0.25	0.52	$\mu g/m^3$
2,4-Dimethylpentane	99	0.164	32	0.53	20	3.26	0.0062	1.02	0.48	0.54	$\mu g/m^3$
2,5-Dimethylhexane	40.5	0.0787	14.3	0.56	11	1.12	0.00228	0.298	0.2	0.32	$\mu g/m^3$
2-Ethyltoluene	5.98	0.0083	1.47	0.29	1.8	3.32	0.00295	0.857	0.18	0.71	$\mu g/m^3$
2-Methyl-1-Butene						0.951	0.00207	0.275	0.51	0.17	$\mu g/m^3$
2-Methyl-2-Butene						1.67	0.00406	0.53	0.43	0.38	$\mu g/m^3$
2-Methylbutane	2221	4.58	821	0.48	895	43.1	0.0762	13.2	0.33	9.4	$\mu g/m^3$
2-Methylheptane	240	0.384	77.4	0.57	44	7.87	0.0205	2.45	0.31	2.14	$\mu g/m^3$
2-Methylhexane						13.4	0.0399	4.44	0.34	4	$\mu g/m^3$
2-Methylpentane						15.7	0.0366	4.17	0.35	3.5	$\mu g/m^3$
3,6-Dimethyloctane						-0.034	0.0259	1.27	0.51	0.55	$\mu g/m^3$
3-Ethyltoluene						5.74	0.004	1.44	0.17	1.3	$\mu g/m^3$
3-Methylheptane						4.9	0.0124	1.51	0.26	1.5	$\mu g/m^3$
3-Methylhexane	526	0.896	175	0.6	93	34.1	0.0889	12.2	0.46	5.9	$\mu g/m^3$
3-Methylpentane	822	1.41	272	0.54	170	7.11	0.0139	2.09	0.42	1.3	$\mu g/m^3$
4-Ethyltoluene	4.79	0.0051	0.85	0.11	2	2.84	0.00266	0.717	0.14	0.7	$\mu g/m^3$
4-Methylheptane	30.1	0.063	9.44	0.28	28	1.62	0.00668	0.49	0.31	0.79	$\mu g/m^3$
Benzene	72	0.0242	14.1	0.11	23	27.4	0.0649	8.15	0.32	6.5	$\mu g/m^3$
Butane	1700	3.31	604	0.51	420	19.6	0.0286	5.55	0.35	3.8	$\mu g/m^3$
c-1,3-Dimethylcyclohexane	82.4	0.21	28	0.34	80	5.81	0.022	1.95	0.4	2	$\mu g/m^3$
c-1,4/t-1,3-Dimethylcyclohexane	22.4	0.0626	6.74	0.3	32	2.46	0.00776	0.837	0.4	0.8	$\mu g/m^3$
c-2-Butene	4.73	0.0108	1.6	0.99	0.16	0.673	0.00265	0.205	0.53	0.21	$\mu g/m^3$
c-2-Heptene						2.02	0.00134	0.53	0.9	0.09	$\mu g/m^3$
c-2-Hexene						1.91	0.00492	0.697	0.89	0.14	$\mu g/m^3$
c-2-Pentene						0.596	0.00233	0.178	0.6	0.15	$\mu g/m^3$
Cyclohexane	726	1.43	256	0.59	160	8.27	0.024	2.74	0.34	2.4	$\mu g/m^3$
Cyclohexene						1.55	0.00346	0.479	0.26	0.4	$\mu g/m^3$

Table 1b

Prediction Equation Parameters for VOCs

y= a + b(size of fire,m) - c*ln(distance from fire, m)*

	Crude Oil					Diesel					
Substance	**a**	**b**	**c**	**r^2**	**Error**	**a**	**b**	**c**	**r^2**	**Error**	**Units**
Cyclopentane	262	0.526	93.8	0.58	61	2.6	0.00684	0.811	0.59	0.55	$\mu g/m^3$
Cyclopentene						0.229	0.0016	0.007	0.68	0.085	$\mu g/m^3$
Decane	97	0.0899	24.5	0.19	27	23.1	0.0124	6.05	0.19	5.5	$\mu g/m^3$
Dodecane	27.1	0.0368	7.43	0.41	7	139	0.121	40.1	0.38	22.9	$\mu g/m^3$
Ethylbenzene	25	0.0391	6.69	0.35	6.2	6.53	0.00714	1.69	0.24	1.33	$\mu g/m^3$
Heptane	1170	2.11	400	0.6	220	32.2	0.096	10.9	0.33	9.5	$\mu g/m^3$
Hexylbenzene						4.55	0.00942	1.38	0.69	0.6	$\mu g/m^3$
Indan (2,3-Dihydroindene)	2.64	0.0031	0.557	0.36	0.78	0.761	0.00181	0.191	0.21	0.24	$\mu g/m^3$
Indene						0.309	0.00142	0.097	0.91	0.04	$\mu g/m^3$
Isobutane (2-Methylpropane)	414	1.05	165	0.76	130	7.22	0.00282	1.58	0.12	2.1	$\mu g/m^3$
iso-Butylbenzene	3.48	0.0057	1.06	0.24	1.8						$\mu g/m^3$
Isoprene (2-Methyl-1,3-Butadiene)	17.4	0.0314	5.51	0.86	1.8						$\mu g/m^3$
iso-Propylbenzene	21.4	0.0178	6.41	0.6	1.2						$\mu g/m^3$
m,p-Xylene	88.6	0.109	20.8	0.16	34	29.7	0.0458	8.13	0.18	7.3	$\mu g/m^3$
Methylcyclohexane	1660	3.03	571	0.6	334	27.9	0.0806	9.44	0.32	8	$\mu g/m^3$
Methylcyclopentane	2090	2.9	713	0.57	260	5.21	0.0131	1.55	0.23	1.7	$\mu g/m^3$
Naphthalene	5.92	0.0099	1.7	0.13	1.8	10.8	0.0146	3.05	0.22	2.7	$\mu g/m^3$
n-Butylbenzene	3.28	0.003	0.806	0.25	0.81	1.63	0.00128	0.433	0.15	0.43	$\mu g/m^3$
Nonane	232	0.328	70.5	0.53	0.41	19.6	0.0284	5.68	0.26	3.77	$\mu g/m^3$
n-Propylbenzene	6.85	0.0073	1.52	0.25	1.7	1.77	0.00178	0.435	0.13	0.45	$\mu g/m^3$
Octane	513	0.776	162	0.61	82	13.9	0.041	4.31	0.25	5	$\mu g/m^3$
o-Xylene	26	0.0186	5.38	0.16	8.4	20.9	0.0356	6.3	0.44	3.5	$\mu g/m^3$
p-Cymene (1-Methyl-4-iso-propylbenzene)	2.52	0.0055	0.013	0.21	3.1	1.02	0.00028	0.275	0.23	0.36	$\mu g/m^3$
Pentane	2590	5.05	920	0.51	640	29.2	0.0587	9.1	0.37	6.29	$\mu g/m^3$
Propane	733	0.789	236	0.73	40	19.5	0.002	4.5	0.21	3.87	$\mu g/m^3$
Propene	21.8	0.062	8.28	0.73	6	10.2	0.0436	3.25	0.45	3.6	$\mu g/m^3$
Propyne						0.874	0.00155	0.236	0.61	0.11	$\mu g/m^3$
sec-Butylbenzene						0.882	0.00158	0.247	0.22	0.2	$\mu g/m^3$
Styrene						3.96	0.021	1.37	0.52	1.5	$\mu g/m^3$
t-1,2-Dimethylcyclohexane						2.86	0.0111	0.933	0.41	0.99	$\mu g/m^3$
t-2-Butene						0.898	0.00256	0.281	0.57	0.19	$\mu g/m^3$
t-2-Heptene						1.89	0.00392	0.553	0.46	0.64	$\mu g/m^3$
t-2-Hexene						0.377	0.032	1.53	0.54	0.62	$\mu g/m^3$
t-2-Octene						4.58	0.112	4.67	0.57	1.75	$\mu g/m^3$
t-2-Pentene						2.24	0.00797	0.677	0.48	0.75	$\mu g/m^3$
t-3-Heptene						85.4	0.0688	25.7	0.55	8.2	$\mu g/m^3$
tert-Butylbenzene						1.37	0.0026	0.411	0.78	0.18	$\mu g/m^3$
Toluene						34.6	0.0696	8.94	0.11	13	$\mu g/m^3$
Total	13400	24	4430	0.35	4700	570	1.06	163	0.36	99	$\mu g/m^3$
Undecane	50	0.0525	12.4	0.14	19	48.8	0.0395	13.8	0.32	10	$\mu g/m^3$
Average				***0.464***	***161***				***0.39***	***3.42***	

Table 2

Prediction Equation Parameters for PAHs

*y= a + b(size of fire,m) - c*ln(distance from fire, m)*

	Crude Oil					Diesel					
Substance	**a**	**b**	**c**	**r^2**	**Error**	**a**	**b**	**c**	**r^2**	**Error**	**Units**
1-Methylnaphthalene	1.01	0.0042	0.381	0.4	0.678	1.79	0.00435	0.585	0.61	0.264	$\mu g/m^3$
1-Methylphenanthrene	0.115	5E-06	0.019	0.32	0.029	0.698	0.00182	0.238	0.46	0.14	$\mu g/m^3$
2,3,5-Trimethylnaphthalene	0.286	0.0005	0.08	0.47	0.079	9.51	0.0218	3.05	0.65	1.23	$\mu g/m^3$
2,6 -Dimethylnaphthalene	0.614	0.0025	0.249	0.54	0.32	2.87	0.00657	0.923	0.65	0.37	$\mu g/m^3$
2-Methylnaphthalene	1.4	0.004	0.462	0.45	0.57	2.37	0.00568	0.775	0.57	0.37	$\mu g/m^3$
Acenaphthene	0.067	2E-05	0.01	0.19	0.022	5.67	0.0132	1.88	0.47	1.1	$\mu g/m^3$
Acenaphthylene	0.067	2E-05	0.01	0.19	0.022	11.3	0.0248	3.65	0.53	1.9	$\mu g/m^3$
Anthracene	0.32	0.0002	0.065	0.07	0.19	4.22	0.0101	1.39	0.49	0.79	$\mu g/m^3$
Benz(a)anthracene	0.14	1E-09	0.398	0.35	0.13	0.315	0.00076	0.105	0.44	0.07	$\mu g/m^3$
Benzo(a)pyrene	0.617	0.0004	0.145	0.31	0.2	0.379	0.00114	0.141	0.44	0.082	$\mu g/m^3$
Benzo(b) fluoranthene	0.108	1E-05	0.023	0.11	0.057	0.536	0.00129	0.178	0.48	0.1	$\mu g/m^3$
Benzo(k) fluoranthene						0.014	4.5E-05	0.004	0.15	0.007	$\mu g/m^3$
Benzo(e)pyrene	0.108	1E-04	0.023	0.11	0.057	0.213	0.00064	0.079	0.51	0.04	$\mu g/m^3$
Benzo(g,h,i)perylene	0.228	9E-05	0.048	0.18	0.098	0.326	0.00081	0.109	0.44	0.069	$\mu g/m^3$
Biphenyl	0.507	1E-05	0.071	0.24	0.15	1.86	0.00435	0.603	0.59	0.28	$\mu g/m^3$
Chrysene	0.122	0.0001	0.031	0.41	0.026	0.325	0.00078	0.108	0.46	0.065	$\mu g/m^3$
Dibenz(a,h)anthracene	0.019	3E-06	0.002	0.31	0.005	0.378	7.7E-05	0.012	0.51	0.006	$\mu g/m^3$
Dimethylnaphthalenes	1.75	0.0008	0.257	0.06	1	1.62	0.0037	0.52	0.65	0.21	$\mu g/m^3$
Fluoranthene	0.851	3E-06	0.152	0.17	0.32	1.95	0.00463	0.647	0.46	0.39	$\mu g/m^3$
Fluorene	0.299	0.0003	0.072	0.42	0.11	0.101	0.0002	0.028	0.61	0.025	$\mu g/m^3$
Indenol(1,2,3-cd)pyrene	0.161	0.0001	0.039	0.52	0.052	0.261	0.00064	0.087	0.46	0.05	$\mu g/m^3$
Methylphenanthrenes	0.322	0.0002	0.075	0.26	0.09	0.276	0.00077	0.092	0.36	0.075	$\mu g/m^3$
Naphthalene	1.86	0.0023	0.385	0.05	1.4	2.01	0.00541	0.674	0.45	0.44	$\mu g/m^3$
Perylene	0.068	7E-05	0.015	0.33	0.029	0.049	0.00012	0.016	0.43	0.01	$\mu g/m^3$
Phenanthrene	0.787	0.0002	0.141	0.33	0.24	1.62	0.00375	0.527	0.56	0.26	$\mu g/m^3$
Pyrene	0.542	0.0002	0.117	0.23	0.2	1.99	0.00465	0.66	0.45	0.4	$\mu g/m^3$
Trimethylnaphthalenes	0.856	0.0009	0.21	0.29	0.23	0.8	0.0024	0.269	0.33	0.24	$\mu g/m^3$
average				**0.281**	**0.242**				**0.489**	**0.333**	

Table 3 **Prediction Equation Parameters for Particulates and Gases**

y= a + b(size of fire,m) - c*ln(distance from fire, m)* [1]

	Crude Oil					Diesel				
Substance	**a**	**b**	**c**	**r^2**	**Error**	**a**	**b**	**c**	**r^2**	**Error**
Total particulates	12.7	0.0347	4.79	0.69	2.6	2.65	0.00886	0.854	0.55	0.58
PM-10	12.7	0.0347	4.79	0.69	1.8	1.49	0.00558	0.467	0.56	0.33
PM-2.5	12.7	0.0347	4.79	0.69	1.5	1.34	0.00523	0.412	0.52	0.33
Total VOCs	13450	24.02	4426	0.35	4700	203	2.1	4.77	0.36	99
PAHs	16.2	0.0048	3.03	0.19	4.8	51.7	0.124	16.9	0.57	8.2
Fixed gases										
Sulphur Dioxide	19.4	0.0266	5.29	0.69	2.8	0.557	0.00114	0.183	0.54	0.06
Carbon Dioxide	520	0.523	81.5	0.18	130	77	0.246	19.6	0.49	25
Carbon Monoxide	7.72	0.0012	1.56	0.18	1.8	3.06	0.0237	1.935	0.63	0.67
Carbonyls										
Acetaldehyde	23.3	0.115	12.9	0.36	23	0.499	0.0325	18.4	0.81	7.8
Acetone	11.3	0.0445	5.11	0.18	15	14.7	0.0573	3.84	0.73	3.8
2-butanone						115.1	0.0407	3.64	0.52	4.4
Butyraldehydes						22.5	0.0344	5.68	0.74	2.8
Formaldehyde	58.4	0.103	20.1	0.39	17.4	35.4	0.107	9.18	0.77	6.5
Proprionaldehyde						19.6	0.0371	4.85	0.69	3.1
Average				0.42					0.599	

1- the concentration of particulates will be in mg/m^3, of fixed gases in ppm and of Carbonyls in $\mu g/m^3$

Table 4 **Calculation of Concern Levels for Emission Groups**

Substance	Crude Oil 500 square metre burn/ continuous burn			Diesel 500 square metre burn/ continuous burn		
	Percent of Concern Level at 500 m	Percent of Concern Level at 1500 m	Distance to the Safe Health Level (m)	Percent of Concern Level at 500 m	Percent of Concern Level at 1500 m	Distance to the Safe Health Level (m)
Total particulates	130	0	510	1180	560	3340
PM-10	130	0	520	920	580	6930
PM-2.5	300	0	530	1910	1170	7340
Total VOCs	0	0	-	0	0	-
PAHS	0	0	-	4	0	-
Fixed gases	0	0	-	0	0	-
Carbonyls	0	0	-	0	0	-

Table 5 **Safe Distance Calculations**

	Safe Distance in Kilometres	Safe Distance in Miles
Crude Oil burns		
small area 250 m^2 (2700 ft^2)	0.08	0.05
full boom pull 500 m^2 (5400 ft^2)	0.5	0.3
large boom pull 750 m^2 (8100 ft^2)	3.2	2
Diesel burns		
small area 250 m^2 (2700 ft^2)	0.35	0.2
full boom pull 500 m^2 (5400 ft^2)	6.9	4.3

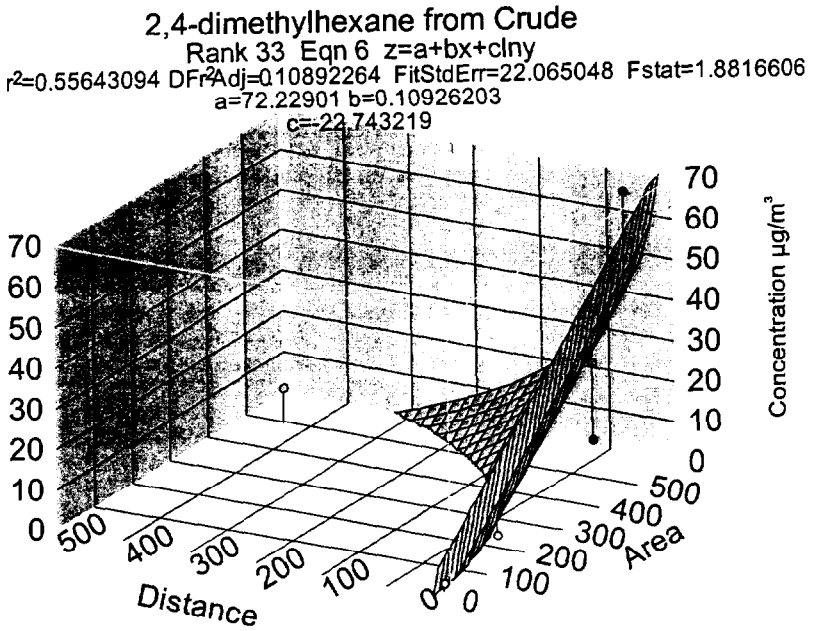

Figure 1 - Example of a TABLECURVE Correlation

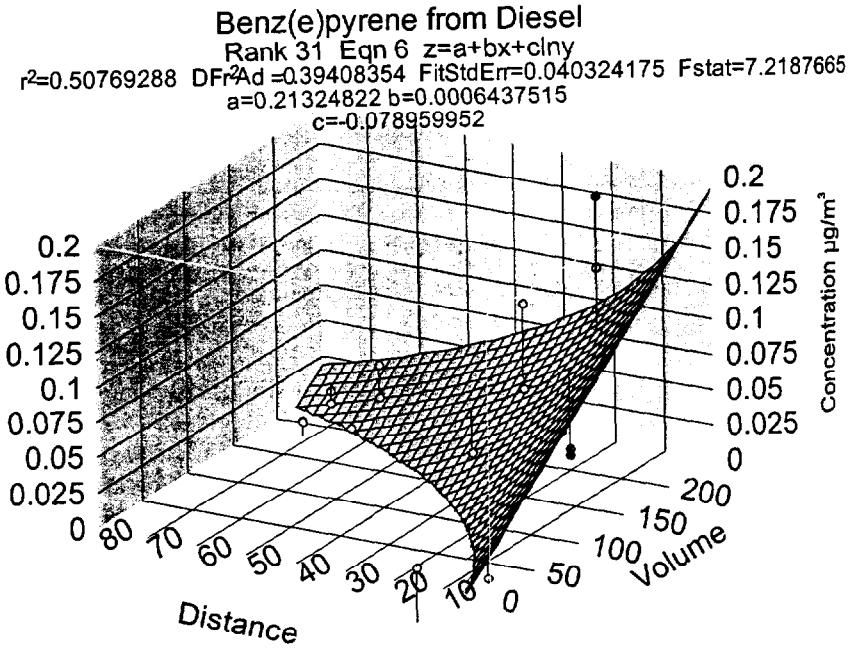

Figure 2 - Example of a TABLECURVE Correlation

A calculation using the spreadsheet for diesel fuel is shown in Table 6 and one for Crude oil in Table 7. The shaded area at the top of these spreadsheets shows the input values. As can be seen from these tables, there are a number of differences between diesel and crude emissions. While some of these differences may be real, the differences may be accentuated by the fact that most of the diesel burns were small (about 25 to 50 m^2), with only two burns of 233 m^2. Furthermore, the crude burns were all conducted in 1993 and earlier, with some monitoring techniques not as well developed as in later burns. However, examination of the data itself, as illustrated in the appendix, the variations are largely real. The most important difference is the amount of soot produced. Figure 3 shows that the amount of soot varies with the size of burn so that at a value of 233 m^2, the difference is a factor of about 8 (soot produced by diesel burns is 8 times as abundant as that from crude oil burns). The values after 233 m^2 are suspect since they are only from mathematical prediction and no empirical data support these. The largest crude oil burn was the NOBE burn with a size of about 450 m^2. The spread sheet predications would be reliable only at values below these maximum sizes and perhaps slightly higher. Figure 4 shows a comparison of the PAHs and VOCs from diesel and crude oil fires. Again we can see that the large diesel divergence occurs after the maximum size of the diesel burn, again suggesting that this is the last reliable point.

5.0 Conclusions

The measurement of emissions and calculation using equations developed from emission data have revealed several facts about the fate, behaviour and quantity of the basic emissions from burning.

Particulate Matter/Soot - Particulate matter at ground level is a matter of concern (greater than occupational health criteria maximum values) close to the fire and under the plume. The concentration of particulates in the smoke plume may not be a concern past about 1000 metres for typical crude oil burns. The level of respirable particulates, those which have a size less than 10 μm, or 2.5 μm, is not understood well, but follows the trends noted for TSP. Diesel fuel burns result in significantly more soot production and safe distances are much farther.

PAHs - Oils contain significant quantities of PAHs. These are largely destroyed in combustion. The total amount of PAHs in the smoke, both in the plume and the particulate precipitation at ground level are much less than the starting oil. This also includes the multi-ringed PAHs that are often created in other combustion processes such as low-temperature incinerators and diesel engines. The burn residue does, however, show a slight increase in the concentration of multi-ringed PAHs. Burns of diesel fuel show an increase in the concentration of multi-ringed PAHs, but still a net destruction of the total PAHs is noted.

Gases - Combustion gases such as carbon dioxide and carbon monoxide are significantly under any concern level.

VOCs - Many volatile organic compounds are emitted by fires, but in lesser quantity than when the oil is not burning. VOCs are not a primary concern, but can rise to close to concern levels very near a fire (<100 m).

Organic Compounds - No exotic or highly-toxic compounds are thought to be generated as a result of the combustion process. Organic macro-molecules are in lesser concentration in the smoke and downwind than they are in the oil itself.

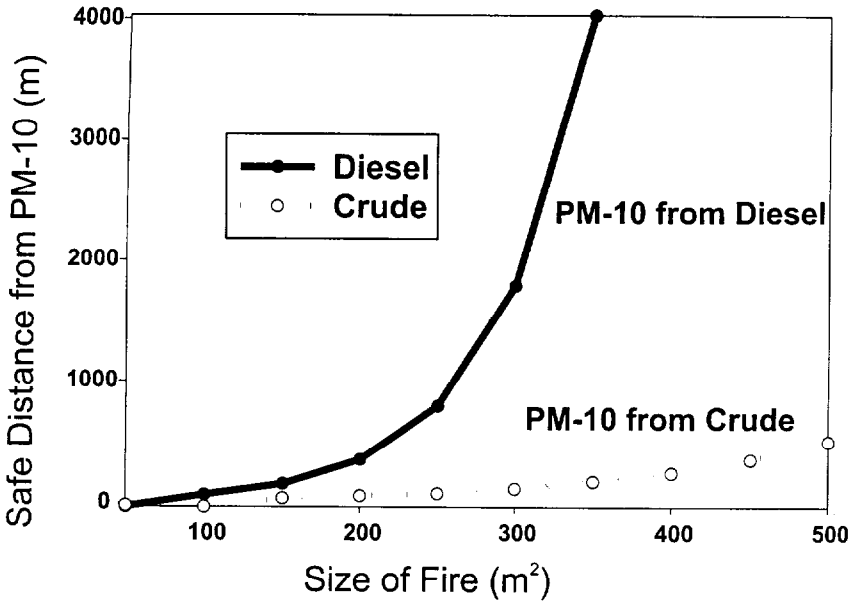

Figure 3 Safe Distances for Crude and Diesel Based on PM-10 Concentrations

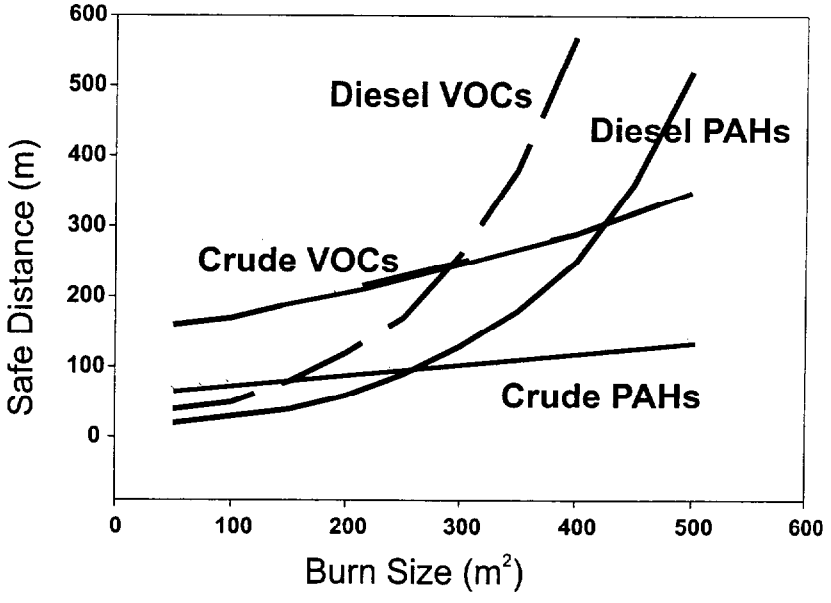

Figure 4 Safe Distances for Crude and Diesel Based on VOCs and PAHs

Table 6 **Emission Predictor for Diesel Oil Burns**

INPUTS Burn Area (m^2) 250 Burn Time (hrs) 24
Distance (m) 500 Threshold Time (hrs 24

Substance	Concentration (mg/m^3)	% of Limit	Safe Distance (m)	Normal Threshold Limit (mg/m^3)	Equation parameters a	b	c
Total particulates	0.05	14	370	0.25	1.998	0.00817	0.642
PM-10	**0.21**	**142**	**800**	0.15	1.019	0.00532	0.329
PM-2.5	**0.04**	**94**	**530**	0.065	1.34	0.00523	0.412
	($\mu g/m^3$)			($\mu g/m^3$)			
Total VOCs	**33**	**9**	**170**	1110			
PAHs	**0**	**0**	**90**	10			
Fixed Gases	**99**	**1**	**0**	3370			
Carbonyls	**113**	**24**	**0**	280			
Fixed gases							
Sulphur Dioxide	0	0	0	20	0.5329	0.001	0.173
Carbon Dioxide	99	1	0	10000	14.9	0.224	-4.56
Carbon Monoxide	0	0	0	100	0.87	-48.5	88.4
Carbonyls							
Acetaldehyde	0	0	0	200	0.499	0.0325	18.4
Acetone	5	2	0	170	14.7	0.0573	3.84
2-butanone	103	21	0	350	115.1	0.0407	3.64
Butyraldehydes	0	0	0	350	22.5	0.0344	5.68
Formaldehyde	5	1	0	260	35.4	0.107	9.18
Proprionaldehyde	0	0	0	350	19.6	0.0371	4.85
PAHs							
1-Methylnaphthalene	0	0	0	20	1.79	0.00435	0.585
1-Methylphenanthrene	0	0	40	0.3	0.698	0.00182	0.238
2,3,5-Trimethylnaphthalene	0	0	10	10	9.51	0.0218	3.05
2,6-Dimethylnaphthalene	0	0	0	30	2.87	0.00657	0.923
2-Methylnaphthalene	0	0	0	20	2.37	0.00568	0.775
Acenaphthene	0	0	10	5	5.67	0.0132	1.88
Acenaphthylene	0	0	70	2	11.3	0.0248	3.65
Anthracene	0	0	110	0.2	4.22	0.0101	1.39
Benz(a)anthracene	0	0	20	0.2	0.315	0.000762	0.105
Benzo(a)pyrene	0	0	30	0.2	0.379	0.00114	0.141
Benzo(b) fluoranthene	0	0	40	0.2	0.536	0.00129	0.178
Benzo(k) fluoranthene	0	0	0	0.2	0.0137	4.48E-05	0.00441
Benzo(e)pyrene	0	0	10	0.2	0.213	0.000644	0.079
Benzo(g,h,i)perylene	0	0	50	0.1	0.326	0.000808	0.109
Biphenyl	0	0	20	1.3	1.86	0.00435	0.603
Chrysene	0	0	20	0.2	0.325	0.00078	0.108
Dibenz(a,h)anthracene	0	0	30	0.2	0.378	0.00078	0.108
Dimethylnaphthalenes	0	0	0	30	1.62	0.0037	0.52
Fluoranthene	0	0	90	0.2	1.95	0.00463	0.647
Fluorene	0	0	0	5	0.101	0.000195	0.0283
Indenol(1,2,3-cd)pyrene	0	0	10	0.2	0.261	0.000635	0.0873
Methylphenanthrenes	0	0	10	0.3	0.276	0.000772	0.0921
Naphthalene	0	0	0	52	2.01	0.00541	0.674
Perylene	0	0	0	0.2	0.0486	0.000116	0.0162
Phenanthrene	0	0	90	0.2	1.62	0.00375	0.527
Pyrene	0	0	90	0.2	1.99	0.00465	0.66
Trimethylnaphthalenes	0	0	0	10	0.8	0.0024	0.269
VOCs							
1,2,3-Trimethylbenzene	0	0	0	123	2.99	0.00443	0.853
1,2,4-Trimethylbenzene	17	9	0	123	15.3	0.105	4
1,2-Diethylbenzene	0	0	0	123	0.894	0.003	0.254
1,3,5-Trimethylbenzene	0	0	0	123	5.55	0.00442	1.45
1,3-Butadiene	0	0	0	400	6.49	0.0244	2.27
1,3-Diethylbenzene	0	0	0	260	0.623	0.00104	0.129
1,4-Diethylbenzene	0	0	0	260	3.57	0.00179	0.836
1-Butene/2-Methylpropene	2	0	0	500	7.5	0.0404	2.43
1-Heptene	3	0	0	1500	2.14	0.0202	0.717
1-Hexene/2-Methyl-1-Pentene	0	0	0	1500	1.01	0.00241	0.228
1-Methylcyclohexene	0	0	0	1500	1.13	0.00563	0.392
1-Methylcyclopentene	0	0	0	1500	0.238	0.00116	0.0442
1-Nonene	0	0	0	1500	4.09	0.0088	1.33
1-Octene	0	0	0	1500	0.777	0.000651	0.164
1-Pentene	4	0	0	1500	1.55	0.0248	0.635
2,2,3-Trimethylbutane	0	0	0	1230	0.694	0.00125	0.208
2,2,4-Trimethylpentane	0	0	0	1230	3.23	0.00263	0.801

Substance	Concentration (mg/m^3)	% of Limit	Safe Distance (m)	Normal Threshold Limit (mg/m^3)	Equation parameters a	b	c
2,2,5-Trimethylhexane	0	0	0	1230	1.09	0.00323	0.314
2,2-Dimethylbutane	0	0	0	1230	1.69	0.00274	0.475
2,2-Dimethylpropane	0	0	0	1230	0.335	0.00145	0.0886
2,3,4-Trimethylpentane	0	0	0	1230	1.92	0.00285	0.542
2,3-Dimethylbutane	0	0	0	1230	3.35	0.0158	1.1
2,3-Dimethylpentane	0	0	0	1230	7.62	0.0145	2.33
2,4-Dimethylhexane	0	0	0	1230	2.23	0.00445	0.646
2,4-Dimethylpentane	0	0	0	1230	3.26	0.0062	1.02
2,5-Dimethylhexane	0	0	0	1230	1.12	0.00228	0.298
2-Ethyltoluene	0	0	0	123	3.32	0.00295	0.857
2-Methyl-1-Butene	0	0	0	1230	0.951	0.00207	0.275
2-Methyl-2-Butene	0	0	0	1230	1.67	0.00406	0.53
2-Methylbutane	0	0	0	1230	43.1	0.0762	13.2
2-Methylheptane	0	0	0	1230	7.87	0.0205	2.45
2-Methylhexane	0	0	0	1230	13.4	0.0399	4.44
2-Methylpentane	0	0	0	1230	15.7	0.0366	4.17
3,6-Dimethyloctane	0	0	0	1230	-0.0342	0.0259	1.27
3-Ethyltoluene	0	0	0	434	5.74	0.004	1.44
3-Methylheptane	0	0	0	1230	4.9	0.0124	1.51
3-Methylhexane	0	0	0	1230	34.1	0.0889	12.2
3-Methylpentane	0	0	0	1230	7.11	0.0139	2.09
4-Ethyltoluene	0	0	0	1230	2.84	0.00266	0.717
4-Methylheptane	0	0	0	1230	1.62	0.00668	0.49
Benzene	0	0	170	1.6	27.4	0.0649	8.15
Butane	0	0	0	1900	19.6	0.0286	5.55
c-1,3-Dimethylcyclohexane	0	0	0	2000	5.81	0.022	1.95
c-1,4/t-1,3-Dimethylcyclohexane	0	0	0	2000	2.46	0.00776	0.837
c-2-Butene	0	0	0	1100	0.673	0.00265	0.205
c-2-Heptene	0	0	0	1100	2.02	0.00134	0.53
c-2-Hexene	0	0	0	1100	1.91	0.00492	0.697
c-2-Pentene	0	0	0	1100	0.596	0.00233	0.178
Cyclohexane	0	0	0	1030	8.27	0.024	2.74
Cyclohexene	0	0	0	600	1.55	0.00346	0.479
Cyclopentane	0	0	0	1720	2.6	0.00684	0.811
Cyclopentene	1	0	0	1030	0.229	0.0016	0.0066
Decane	0	0	0	2000	23.1	0.0124	6.05
Dodecane	0	0	0	2000	139	0.121	40.1
Ethylbenzene	0	0	0	434	6.53	0.00714	1.69
Heptane	0	0	0	1640	32.2	0.096	10.9
Hexylbenzene	0	0	0	600	4.55	0.00942	1.38
Indan (2,3-Dihydroindene)	0	0	0	83	0.761	0.00181	0.191
Indene	0	0	0	123	0.309	0.00142	0.0972
Isobutane (2-Methylpropane)	0	0	0	1610	7.22	0.00282	1.58
m,p-Xylene	0	0	0	434	29.7	0.0458	8.13
Methylcyclohexane	0	0	0	1610	27.9	0.0806	9.44
Methylcyclopentane	0	0	0	2687	5.21	0.0131	1.55
Naphthalene	0	0	0	52	10.8	0.0146	3.05
n-Butylbenzene	0	0	0	260	1.63	0.00128	0.433
Nonane	0	0	0	1050	19.6	0.0284	5.68
n-Propylbenzene	0	0	0	246	1.77	0.00178	0.435
Octane	0	0	0	1400	13.9	0.041	4.31
o-Xylene	0	0	0	434	20.9	0.0356	6.3
p-Cymene (1-Methyl-4-iso-propylbenzene)	0	0	0	140	1.02	0.000282	0.275
Pentane	0	0	0	1770	29.2	0.0587	9.1
Propane	0	0	0	4508	19.5	0.002	4.5
Propene	1	0	0	2615	10.2	0.0436	3.25
Propyne	0	0	0	1000	0.874	0.00155	0.236
sec-Butylbenzene	0	0	0	123	0.882	0.00158	0.247
Styrene	1	0	0	123	3.96	0.021	1.37
t-1,2-Dimethylcyclohexane	0	0	0	1600	2.86	0.0111	0.933
t-2-Butene	0	0	0	1600	0.898	0.00256	0.281
t-2-Heptene	0	0	0	1600	1.89	0.00392	0.553
t-2-Hexene	0	0	0	1600	0.377	0.032	1.53
t-2-Octene	4	0	0	1600	4.58	0.112	4.67
t-2-Pentene	0	0	0	1600	2.24	0.00797	0.677
t-3-Heptene	0	0	0	1600	85.4	0.0688	25.7
tert-Butylbenzene	0	0	0	123	1.37	0.0026	0.411
Toluene	0	0	0	123	34.6	0.0696	8.94

Table 7 **Emission Predictor for Crude Oil Burns**

INPUTS Burn Area (m^2) 250 Burn Time (hrs) 24
Distance (m) 500 Threshold Time (hrs 24

Substance	Concentration (mg/m^3)	% of Limit	Safe Distance (m)	Normal Threshold Limit (mg/m^3)	Equation parameters a	b	c
Total particulates	-8.39	-2938	80	0.2	12.7	0.0347	4.79
PM-10	**-5.88**	**-3917**	**80**	0.15	12.7	0.0347	4.79
PM-2.5	**-4.2**	**-9039**	**90**	0.065	12.7	0.0347	4.79
Total VOCs	**5**	**2**	**230**	161990.6			
PAHs	**0**	**7**	**100**	188.4			
Fixed Gases	**144**	**1**	**0**	10120			
Carbonyls	**0**	**0**	**0**	630			
Fixed gases							
Sulphur Dioxide	0	0	0	20	19.4	0.0266	5.29
Carbon Dioxide	144	1	0	10000	520	0.523	81.5
Carbon Monoxide	0	0	0	100	7.72	0.00124	1.56
Carbonyls							
Acetaldehyde	0	0	0	200	23.3	0.115	12.9
Acetone	0	0	0	170	11.3	0.0445	5.11
Formaldehyde	0	0	0	260	58.4	0.103	20.1
PAHs							
1-Methylnaphthalene	0	0	0	20	1.01	0.00424	0.381
1-Methylphenanthrene	0	0	0	0.3	0.115	4.83E-06	0.0192
2,3,5-Trimethylnaphthalene	0	0	0	10	0.286	0.00053	0.08
2,6 -Dimethylnaphthalene	0	0	0	30	0.614	0.0025	0.249
2-Methylnaphthalene	0	0	0	20	1.4	0.00397	0.462
Acenaphthene	0	0	0	5	0.0673	2.13E-05	0.00989
Acenaphthylene	0	0	0	2	0.0673	2.13E-05	0.00989
Anthracene	0	0	10	0.2	0.32	0.000189	0.0653
Benz(a)anthracene	0	0	0	0.2	0.14	1.43E-09	0.398
Benzo(a)pyrene	0	0	30	0.2	0.617	0.000361	0.145
Benzo(b) fluoranthene	0	0	0	0.2	0.108	9.98E-06	0.0229
Benzo(e)pyrene	0	0	0	0.2	0.108	9.98E-05	0.0229
Benzo(g,h,i)perylene	0	0	20	0.1	0.228	0.000091	0.0479
Biphenyl	0	4	0	1.3	0.507	1.27E-05	0.0708
Chrysene	0	0	0	0.2	0.1224	0.000127	0.0305
Dibenz(a,h)anthracene	0	2	0	0.2	0.0189	2.97E-06	0.00227
Dimethylnaphthalenes	0	1	0	30	1.75	0.000804	0.257
Fluoranthene	0	0	70	0.2	0.851	2.97E-06	0.1523
Fluorene	0	0	0	5	0.299	0.000309	0.0716
Indenol(1,2,3-cd)pyrene	0	0	0	0.2	0.161	0.000145	0.0394
Methylphenanthrenes	0	0	0	0.3	0.322	0.000244	0.075
Naphthalene	0	0	0	52	1.86	0.00226	0.385
Perylene	0	0	0	0.2	0.0675	7.09E-05	0.0152
Phenanthrene	0	0	100	0.2	0.787	0.000224	0.141
Pyrene	0	0	30	0.2	0.542	0.000226	0.117
Trimethylnaphthalenes	0	0	0	10	0.856	0.000891	0.21
VOCs							
1,2,3-Trimethylbenzene	0	0	0	123	11.4	0.0106	2.53
1,2,4-Trimethylbenzene	0	0	0	123	22.4	0.0239	4.58
1,3,5-Trimethylbenzene	0	0	0	123	17.3	0.0191	4.28
1,4-Diethylbenzene	0	0	0	260	4.66	0.00529	0.947
2,2,3-Trimethylbutane	0	0	0	2850	25	0.0256	7.49
2,2,4-Trimethylpentane	0	0	0	1230	5.41	0.0131	1.66
2,2,5-Trimethylhexane	0	0	0	925	8.49	0.00806	2.58
2,2-Dimethylbutane	0	0	0	1550	61	0.105	19.3
2,2-Dimethylpentane	0	0	0	1440	52.3	0.0799	16.5
2,2 Dimethylpropane	0	0	0	1500	25.2	0.0271	7.93
2,3,4-Trimethylpentane	0	0	0	1230	14	0.0249	4.53
2,3-Dimethylbutane	0	0	0	1550	168	0.308	57
2,3-Dimethylpentane	0	0	0	1445	173	0.294	56.8
2,4-Dimethylhexane	0	0	0	1230	72.2	0.109	22.7
2,4-Dimethylpentane	0	0	0	1445	99	0.164	32
2,5-Dimethylhexane	0	0	0	1230	40.5	0.0787	14.3
2-Ethyltoluene	0	0	0	123	5.98	0.00826	1.47
2-Methylbutane	0	0	10	1500	2221	4.58	821
2-Methylheptane	0	0	0	1230	240	0.384	77.4
3-Methylhexane	0	0	0	1445	526	0.896	175

Substance	Concentration (mg/m^3)	% of Limit	Safe Distance (m)	Normal Threshold Limit (mg/m^3)	Equation parameters a	b	c
3-Methylpentane	0	0	0	1550	822	1.41	272
4-Ethyltoluene	1	0	0	2850	4.79	0.0051	0.85
4-Methylheptane	0	0	0	1230	30.1	0.063	9.44
Benzene	0	0	230	1.6	72	0.0242	14.1
Butane	0	0	0	1900	1700	3.31	604
c-1,3-Dimethylcyclohexane	0	0	0	2000	82.4	0.21	28
c-1,4/t-1,3-Dimethylcyclohexane	0	0	0	2000	22.4	0.0626	6.74
c-2-Butene	0	0	0	1100	4.73	0.0108	1.6
Cyclohexane	0	0	0	1030	726	1.43	256
Cyclopentane	0	0	0	1720	262	0.526	93.8
Decane	0	0	0	935	97	0.0899	24.5
Dodecane	0	0	0	740	27.1	0.0368	7.43
Ethylbenzene	0	0	0	434	25	0.0391	6.69
Heptane	0	0	0	1640	1170	2.11	400
Indan (2,3-Dihydroindene)	0	0	0	83	2.64	0.00305	0.557
Isobutane (2-Methylpropane)	0	0	0	1670	414	1.05	165
iso-Butylbenzene	0	0	0	260	3.48	0.00574	1.06
Isoprene (2-Methyl-1,3-Butadiene)	0	0	10	13	17.4	0.0314	5.51
iso-Propylbenzene	0	0	0	246	21.4	0.0178	6.41
m,p-Xylene	0	0	0	434	88.6	0.109	20.8
Methylcyclohexane	0	0	0	1610	1660	3.03	571
Methylcyclopentane	0	0	0	2687	2090	2.9	713
Naphthalene	0	0	0	52	5.92	0.00991	1.7
n-Butylbenzene	0	0	0	260	3.28	0.003	0.806
Nonane	0	0	0	1050	232	0.328	70.5
n-Propylbenzene	0	0	0	246	6.85	0.0073	1.52
Octane	0	0	0	1400	513	0.776	162
o-Xylene	0	0	0	434	26	0.0186	5.38
p-Cymene (1-Methyl-4-iso-propylbenzene)	4	2	0	140	2.52	0.0055	0.0125
Pentane	0	0	10	1770	2590	5.05	920
Propane	0	0	0	4508	733	0.789	236
Propene	0	0	0	2615	21.8	0.062	8.28
Total	0	0	0	100000	13400	24	4430
Undecane	0	0	0	830	50	0.0525	12.4

Dioxins and dibenzofurans are not created by oil fires.

Carbonyls - Carbonyls such as aldehydes and ketones are created by oil fires, but do not exceed health exposure limits at reasonable distances from the fires.

Overall, emissions are now understood to the extent that fires of various sizes and types can be evaluated for emission levels and safe distances. A standard crude oil fire such as would be conducted in a full boom tow, would not exceed exposure limits for emissions beyond about 1000 m.

Calculation equations were developed which allow for the prediction of safe distances based on the most serious emissions, that of particulate matter.

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Table A1-1 **Emissions Measured at Previous Test Burns: VOCs from Crude** (concentrations in $\mu g/m^3$)

1,2,3-Trimethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	10.3
NOBE 93	2	600	75	8
NOBE 93	2	600	125	4
NOBE 93	2	600	600	2
Mobile 91	23	181	30	0.9
Mobile 91	28	72.8	30	1.2
Mobile 91	30	37.2	30	0.8
Mobile 91	3	114	30	0.4
Mobile 91	4	114	30	10.4
Mobile 91	5	231	30	5.2

1,2,4-Trimethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	4	114	30	27.0
NOBE 93	2	600	75	19
NOBE 93	2	600	125	10
NOBE 93	2	600	600	9
Mobile 91	23	181	30	3.4
Mobile 91	24	170	30	3.9
Mobile 91	28	72.8	30	3.0
Mobile 91	30	37.2	30	2.2
Mobile 91	3	114	30	3.3
Mobile 91	3	114	30	1.0
Mobile 91	4	114	30	27.3
Mobile 91	5	231	30	18.7

1,3,5-Trimethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	12.1
Mobile 91	5	231	30	10.9
NOBE 93	2	600	75	11
NOBE 93	2	600	125	4
NOBE 93	2	600	600	3
Mobile 91	23	181	30	2.1
Mobile 91	24	170	30	2.8
Mobile 91	28	72.8	30	1.1
Mobile 91	30	37.2	30	0.8
Mobile 91	3	114	30	1.2
Mobile 91	3	114	30	0.8
Mobile 91	4	114	30	12.2
Mobile 91	5	231	30	10.9

1,4-Diethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	4.0
NOBE 93	2	600	75	3
NOBE 93	2	600	600	2
Mobile 91	4	114	30	5.7
Mobile 91	28	72.8	30	0.6
Mobile 91	30	37.2	30	0.4
Mobile 91	3	114	30	0.6
Mobile 91	4	114	30	5.8
Mobile 91	5	231	30	2.1
Mobile 91	28	72.8	30	0.2

1,4-Diethylbenzene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 91	30	37.2	30	0.7
Mobile 91	3	114	30	0.8
Mobile 91	4	114	30	1.1
Mobile 91	5	231	30	3.0

2,2,3-Trimethylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	1.7
NOBE 93	2	600	75	10
NOBE 93	2	600	125	3
Mobile 91	23	181	30	2.7
Mobile 91	24	170	30	3.0
Mobile 91	28	72.8	30	3.0
Mobile 91	30	37.2	30	2.2
Mobile 91	3	114	30	2.7
Mobile 91	3	114	30	1.9
Mobile 91	4	114	30	1.9
Mobile 91	5	231	30	5.5

2,2,4-Trimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	0.9
Mobile 91	5	231	30	3.2
NOBE 93	2	600	75	4
NOBE 93	2	600	125	8
NOBE 93	2	600	600	2
Mobile 91	23	181	30	1.0
Mobile 91	28	72.8	30	1.4
Mobile 91	30	37.2	30	1.1
Mobile 91	3	114	30	2.0
Mobile 91	3	114	30	0.6
Mobile 91	4	114	30	1.1
Mobile 91	5	231	30	3.3
Mobile 91	24	170	30	1.4
Mobile 91	28	72.8	30	0.4
Mobile 91	3	114	30	0.6
Mobile 91	5	231	30	3.6

2,2,5-Trimethylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	23	181	30	0.8
Mobile 91	24	170	30	1.0
Mobile 91	28	72.8	30	0.2
Mobile 91	30	37.2	30	0.2
Mobile 91	3	114	30	0.3
Mobile 91	4	114	30	0.9
Mobile 91	5	231	30	2.2
NOBE 93	2	600	75	2
NOBE 93	2	600	125	1

2,2-Dimethylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	5.6
Mobile 91	5	231	30	20.4
NOBE 93	2	600	75	56

2,2-Dimethylbutane (ctd.)

Burn	Num.	Area	Dist.	Conc.
NOBE 93	2	600	125	16
NOBE 93	2	600	600	3
Mobile 91	23	181	30	7.2
Mobile 91	24	170	30	9.7
Mobile 91	28	72.8	30	8.7
Mobile 91	30	37.2	30	7.8
Mobile 91	3	114	30	8.3
Mobile 91	3	114	30	1.6
Mobile 91	4	114	30	6.1
Mobile 91	5	231	30	20.5

2,2-Dimethylpentane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	1
NOBE 93	2	600	75	48
NOBE 93	2	600	125	15
NOBE 93	2	600	600	1
Mobile 92	2	36	30	0.3
Mobile 92	2	231	60	1

2,2-Dimethylpropane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	1.6
Mobile 91	5	231	30	3.8
NOBE 93	2	600	75	9
NOBE 93	2	600	125	2
Mobile 91	23	181	30	2.4
Mobile 91	24	170	30	2.5
Mobile 91	28	72.8	30	0.3
Mobile 91	30	37.2	30	0.3
Mobile 91	3	114	30	1.0
Mobile 91	4	114	30	1.9
Mobile 91	5	231	30	3.8

2,3,4-Trimethylpentane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	2	600	75	12
NOBE 93	2	600	125	4
NOBE 93	2	600	600	1
Mobile 92	2	36	30	0.2
Mobile 92	2	231	60	0.2

2,3-Dimethylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	10.1
Mobile 91	5	231	30	36.9
NOBE 93	1	600	125	3
NOBE 93	2	600	75	195
NOBE 93	2	600	125	64
NOBE 93	2	600	600	4
Mobile 91	23	181	30	12.5
Mobile 91	24	170	30	5.0
Mobile 91	28	72.8	30	13.1
Mobile 91	30	37.2	30	11.7
Mobile 91	3	114	30	12.7

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A1-2 **Emissions Measured at Previous Test Burns: VOCs from Crude** (concentrations in $\mu g/m^3$)

2,3-Dimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	14.7
NOBE 93	1	600	125	7
NOBE 93	2	600	75	170
NOBE 93	2	600	125	64
NOBE 93	2	600	600	3
Mobile 91	23	181	30	16.2
Mobile 91	24	170	30	22.2
Mobile 91	28	72.8	30	7.0
Mobile 91	30	37.2	30	6.6
Mobile 91	3	114	30	7.0
Mobile 91	3	114	30	7.8
Mobile 91	4	114	30	14.9
Mobile 91	5	231	30	53.5

2,4-Dimethylhexane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	2
NOBE 93	2	600	75	65
NOBE 93	2	600	125	21
NOBE 93	2	600	600	1
Mobile 92	2	36	30	1
Mobile 92	2	231	60	1

2,4-Dimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	7.1
NOBE 93	1	600	125	3
NOBE 93	2	600	75	104
NOBE 93	2	600	125	33
NOBE 93	2	600	600	2
Mobile 91	23	181	30	9.2
Mobile 91	24	170	30	10.5
Mobile 91	28	72.8	30	9.9
Mobile 91	30	37.2	30	8.5
Mobile 91	3	114	30	9.9
Mobile 91	3	114	30	5.0
Mobile 91	4	114	30	7.3
Mobile 91	5	231	30	25.5

2,4-Dimethylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	7.1
NOBE 93	1	600	125	3
NOBE 93	2	600	75	104
NOBE 93	2	600	125	33
NOBE 93	2	600	600	2

2,5-Dimethylhexane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	2
NOBE 93	2	600	75	41
NOBE 93	2	600	125	15
NOBE 93	2	600	600	1
Mobile 91	23	181	30	3.3
Mobile 91	24	170	30	2.2

2,5-Dimethylhexane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	3.4
Mobile 91	5	231	30	12.9

2-Ethyltoluene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	4.4
NOBE 93	2	600	75	6
NOBE 93	2	600	125	2
NOBE 93	2	600	600	2
Mobile 91	23	181	30	0.8
Mobile 91	24	170	30	1.0
Mobile 91	28	72.8	30	0.7
Mobile 91	30	37.2	30	0.6
Mobile 91	3	114	30	0.8
Mobile 91	4	114	30	4.5
Mobile 91	5	231	30	3.7

2-Methylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	23	181	30	119.3
Mobile 91	24	170	30	158.9
Mobile 91	28	72.8	30	11.8
Mobile 91	30	37.2	30	16.3
Mobile 91	3	114	30	11.4
Mobile 91	3	114	30	50.9
Mobile 91	4	114	30	85.7
Mobile 91	5	231	30	329.2
Mobile 91	4	114	30	73.5
Mobile 91	5	231	30	328.1
NOBE 93	1	600	125	1
NOBE 93	2	600	75	2494
NOBE 93	2	600	125	668
NOBE 93	2	600	600	32

2-Methylheptane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	13
NOBE 93	2	600	75	246
NOBE 93	2	600	125	89
NOBE 93	2	600	600	3

2-Methylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	33.4
Mobile 91	5	231	30	102.1
NOBE 93	1	600	125	9
NOBE 93	2	600	75	182
NOBE 93	2	600	125	88
NOBE 93	2	600	600	6
Mobile 91	23	181	30	37.6
Mobile 91	28	72.8	30	12.3
Mobile 91	30	37.2	30	11.1
Mobile 91	3	114	30	10.9
Mobile 91	3	114	30	15.6
Mobile 91	4	114	30	34.5

2-Methylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	61.3
Mobile 91	5	231	30	240.1
NOBE 93	1	600	125	24
NOBE 93	2	600	75	1373
NOBE 93	2	600	125	404
NOBE 93	2	600	600	16
Mobile 91	23	181	30	84.3
Mobile 91	24	170	30	110.1
Mobile 91	28	72.8	30	46.9
Mobile 91	30	37.2	30	41.3
Mobile 91	3	114	30	41.7
Mobile 91	3	114	30	37.3
Mobile 91	4	114	30	65.1
Mobile 91	5	231	30	241.6

2-Methylpropane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	23	181	30	30.2
Mobile 91	24	170	30	41.8
Mobile 91	28	72.8	30	4.0
Mobile 91	30	37.2	30	6.6
Mobile 91	3	114	30	3.8
Mobile 91	3	114	30	11.9
Mobile 91	4	114	30	20.0
Mobile 91	5	231	30	88.0
Mobile 91	4	114	30	15.9
Mobile 91	5	231	30	87.5
Nobe	1	600	125	50
Nobe	2	600	500	1

3,6-Dimethyloctane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	1
NOBE 93	2	600	75	12
NOBE 93	2	600	125	4

3-Ethyltoluene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	10.5
Mobile 91	5	231	30	10.6
NOBE 93	2	600	75	13
NOBE 93	2	600	125	6
NOBE 93	2	600	600	6
Mobile 91	23	181	30	1.9
Mobile 91	24	170	30	2.4
Mobile 91	28	72.8	30	1.3
Mobile 91	30	37.2	30	1.1
Mobile 91	3	114	30	1.6
Mobile 91	3	114	30	0.7
Mobile 91	4	114	30	10.6
Mobile 91	5	231	30	10.6

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A1-3 **Emissions Measured at Previous Test Burns: VOCs from Crude** (concentrations in $\mu g/m^3$)

2-Methylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	73.5
Mobile 91	5	231	30	328.1
NOBE 93	1	600	125	1
NOBE 93	2	600	75	2490
NOBE 93	2	600	125	668
NOBE 93	2	600	600	32

3-Methylheptane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	28.6
NOBE 93	1	600	125	9
NOBE 93	2	600	75	213
NOBE 93	2	600	125	74
NOBE 93	2	600	600	4
Mobile 91	23	181	30	26.1
Mobile 91	24	170	30	17.3
Mobile 91	28	72.8	30	4.1
Mobile 91	30	37.2	30	3.5
Mobile 91	3	114	30	4.5
Mobile 91	3	114	30	9.3
Mobile 91	4	114	30	28.8
Mobile 91	5	231	30	114.5

3-Methylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	40.3
Mobile 91	5	231	30	159.2
NOBE 93	1	600	125	19
NOBE 93	2	600	75	512
NOBE 93	2	600	125	168
NOBE 93	2	600	600	6
Mobile 91	23	181	30	46.8
Mobile 91	24	170	30	64.0
Mobile 91	28	72.8	30	12.2
Mobile 91	30	37.2	30	9.6
Mobile 91	3	114	30	10.8
Mobile 91	3	114	30	4.8
Mobile 91	4	114	30	41.3
Mobile 91	5	231	30	159.5

3-Methylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	50.5
Mobile 91	5	231	30	190.2
NOBE 93	1	600	125	28
NOBE 93	2	600	75	888
NOBE 93	2	600	125	285
NOBE 93	2	600	600	6
Mobile 91	23	181	30	64.0
Mobile 91	24	170	30	84.7
Mobile 91	28	72.8	30	72.2
Mobile 91	30	37.2	30	63.8
Mobile 91	3	114	30	71.5
Mobile 91	3	114	30	30.2

3-Methylpentane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	52.4
Mobile 91	5	231	30	191.1

4-Ethyltoluene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	5.2
NOBE 93	2	600	75	5
NOBE 93	2	600	125	2
NOBE 93	2	600	600	3
Mobile 91	23	181	30	0.9
Mobile 91	24	170	30	1.3
Mobile 91	28	72.8	30	1.0
Mobile 91	30	37.2	30	0.7
Mobile 91	3	114	30	1.5
Mobile 91	4	114	30	5.3
Mobile 91	5	231	30	5.0

4-Methylheptane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	1
NOBE 93	2	600	75	66
NOBE 93	2	600	125	17
NOBE 93	2	600	600	1
Mobile 92	2	231	15	3
Mobile 92	1	36	85	1

Benzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	25.1
Mobile 91	5	231	30	72.5
Mobile 92	1	36	23	55.6
Mobile 92	1	36	46	46.8
Mobile 92	2	231	23	68.9
Mobile 92	2	231	46	13.9
Mobile 92	2	231	76	0.01
Mobile 92	3	231	23	12.7
Mobile 92	4	231	23	13.7
Mobile 92	4	231	46	6
Mobile 92	6	231	23	11.2
NOBE 93	2	600	75	29
NOBE 93	2	600	125	6
NOBE 93	2	600	600	8
Mobile 91	23	181	30	42.4
Mobile 91	24	170	30	32.6
Mobile 91	28	72.8	30	2.8
Mobile 91	30	37.2	30	12.1
Mobile 91	3	114	30	5.0
Mobile 91	3	114	30	12.0
Mobile 91	4	114	30	26.7
Mobile 91	5	231	30	72.9

Butane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	43.6
Mobile 91	5	231	30	245.8

Butane (ctd.)

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	10
NOBE 93	2	600	75	2102
NOBE 93	2	600	125	472
NOBE 93	2	600	600	11
Mobile 91	23	181	30	90.1
Mobile 91	24	170	30	121.4
Mobile 91	28	72.8	30	8.8
Mobile 91	30	37.2	30	9.6
Mobile 91	3	114	30	10.8
Mobile 91	3	114	30	34.9
Mobile 91	4	114	30	56.0
Mobile 91	5	231	30	246.8

c-1,3-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	11
NOBE 93	2	600	75	190
NOBE 93	2	600	125	84
NOBE 93	2	600	600	1
Mobile 92	2	231	15	3
Mobile 92	1	36	85	1

c-1,4/t-1,3-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	2
NOBE 93	2	600	75	66
NOBE 93	2	600	125	21
Mobile 92	2	231	15	9
Mobile 92	1	36	85	1

c-2-Butene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	28	72.8	30	0.3
Mobile 91	3	114	30	0.4
NOBE 93	2	600	600	1
NOBE 93	2	600	600	1
NOBE 93	2	600	50	5
Mobile 91	3	114	30	0.4

Cyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	39.3
Mobile 91	5	231	30	112.9
NOBE 93	1	600	125	40
NOBE 93	2	600	75	849
NOBE 93	2	600	125	286
NOBE 93	2	600	600	3
Mobile 91	23	181	30	42.6
Mobile 91	24	170	30	60.5
Mobile 91	28	72.8	30	7.8
Mobile 91	30	37.2	30	7.8
Mobile 91	3	114	30	7.4
Mobile 91	3	114	30	16.5
Mobile 91	4	114	30	39.7
Mobile 91	5	231	30	113.0

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A1-4 **Emissions Measured at Previous Test Burns: VOCs from Crude** (concentrations in $\mu g/m^3$)

Cyclopentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	7.2
NOBE 93	1	600	125	10
NOBE 93	2	600	75	310
NOBE 93	2	600	125	102
NOBE 93	2	600	600	2
Mobile 91	23	181	30	9.8
Mobile 91	24	170	30	12.9
Mobile 91	28	72.8	30	0.9
Mobile 91	30	37.2	30	1.5
Mobile 91	3	114	30	0.7
Mobile 91	3	114	30	1.3
Mobile 91	4	114	30	7.5
Mobile 91	5	231	30	28.6

Decane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	68.5
NOBE 93	1	600	125	3
NOBE 93	2	600	75	72
NOBE 93	2	600	125	32
NOBE 93	2	600	600	1
Mobile 91	23	181	30	5.9
Mobile 91	24	170	30	11.9
Mobile 91	28	72.8	30	11.4
Mobile 91	30	37.2	30	9.1
Mobile 91	3	114	30	9.9
Mobile 91	3	114	30	1.3
Mobile 91	4	114	30	68.8
Mobile 91	5	231	30	38.3

Dodecane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	15.4
NOBE 93	2	600	75	18
NOBE 93	2	600	125	14
NOBE 93	2	600	600	1
Mobile 91	23	181	30	LDL
Mobile 91	24	170	30	LDL
Mobile 91	28	72.8	30	0.5
Mobile 91	30	37.2	30	0.3
Mobile 91	3	114	30	0.4
Mobile 91	3	114	30	LDL
Mobile 91	4	114	30	15.6
Mobile 91	5	231	30	2.8

Ethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	8.1
Mobile 91	5	231	30	22.9
Mobile 92	2	231	23	9.1
NOBE 93	2	600	75	14
NOBE 93	2	600	600	7
Mobile 91	23	181	30	5.2
Mobile 91	24	170	30	6.5

Ethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	28	72.8	30	2.5
Mobile 91	30	37.2	30	2.6
Mobile 91	3	114	30	3.3
Mobile 91	3	114	30	1.9
Mobile 91	4	114	30	8.4
Mobile 91	5	231	30	22.9

Heptane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	72.2
Mobile 91	5	231	30	297.0
NOBE 93	1	600	125	56
NOBE 93	2	600	75	1224
NOBE 93	2	600	125	361
NOBE 93	2	600	600	6
Mobile 91	23	181	30	80.8
Mobile 91	24	170	30	116.1
Mobile 91	28	72.8	30	1.9
Mobile 91	30	37.2	30	3.5
Mobile 91	3	114	30	2.6
Mobile 91	3	114	30	32.8
Mobile 91	4	114	30	73.0
Mobile 91	5	231	30	297.1

Hexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	98.2
Mobile 91	5	231	30	379.9
NOBE 93	1	600	125	103
NOBE 93	2	600	75	2521
NOBE 93	2	600	125	568
Mobile 91	23	181	30	137.3
Mobile 91	24	170	30	147.2
Mobile 91	28	72.8	30	52.5
Mobile 91	30	37.2	30	47.7
Mobile 91	3	114	30	56.5
Mobile 91	3	114	30	61.4
Mobile 91	4	114	30	101.5
Mobile 91	5	231	30	380.7

Indan

Burn	Num.	Area	Dist.	Conc.
Mobile 91	28	72.8	30	1.3
Mobile 91	30	37.2	30	0.9
Mobile 91	3	114	30	1.4
Mobile 91	5	231	30	0.6
NOBE 93	2	600	75	3
NOBE 93	2	600	125	1
NOBE 93	2	600	600	1

Isobutane (2-Methylpropane)

Burn	Num.	Area	Dist.	Conc.
NOBE 93	2	600	75	441
NOBE 93	2	600	125	98
NOBE 93	2	600	600	5

Isobutane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	15	5
NOBE 93	2	600	600	5

iso-Butylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	5	231	30	0.8
NOBE 93	2	600	75	5
Mobile 91	4	114	30	1.5
Mobile 91	5	231	30	0.8
NOBE 93	2	600	75	0.1
Mobile 91	5	231	30	0.8
NOBE 93	2	600	600	0.001

Isoprene (2-Methyl-1,3-Butadiene)

Burn	Num.	Area	Dist.	Conc.
NOBE 93	2	600	600	1
Mobile 91	30	37.2	30	0.7
Mobile 91	3	114	30	0.8
Mobile 91	5	231	30	6.5

Isopropylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	2.9
NOBE 93	1	600	125	0
NOBE 93	2	600	75	5
NOBE 93	2	600	125	2
Mobile 91	23	181	30	1.3
Mobile 91	24	170	30	1.6
Mobile 91	28	72.8	30	0.7
Mobile 91	30	37.2	30	0.7
Mobile 91	3	114	30	0.6
Mobile 91	4	114	30	3.0
Mobile 91	5	231	30	4.5

Methylcyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	99.8
NOBE 93	1	600	125	81
NOBE 93	2	600	75	1762
NOBE 93	2	600	125	522
NOBE 93	2	600	600	3
Mobile 91	23	181	30	107.3
Mobile 91	24	170	30	146.2
Mobile 91	28	72.8	30	0.9
Mobile 91	30	37.2	30	4.0
Mobile 91	3	114	30	1.1
Mobile 91	3	114	30	47.9
Mobile 91	4	114	30	100.3
Mobile 91	5	231	30	380.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A1-5 **Emissions Measured at Previous Test Burns: VOCs from Crude** (concentrations in $\mu g/m^3$)

Methylcyclopentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	30.1
Mobile 91	5	231	30	114.1
NOBE 93	1	600	125	49
NOBE 93	2	600	75	1307
NOBE 93	2	600	125	382
Mobile 91	23	181	30	36.5
Mobile 91	24	170	30	49.4
Mobile 91	28	72.8	30	38.9
Mobile 91	30	37.2	30	34.1
Mobile 91	3	114	30	38.6
Mobile 91	3	114	30	8.6
Mobile 91	4	114	30	30.6
Mobile 91	5	231	30	114.5

m,p-Xylene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	49.7
Mobile 91	5	231	30	119.5
NOBE 93	2	600	75	45
NOBE 93	2	600	600	21
Mobile 92	1	36	23	10.4
Mobile 92	1	36	46	11.6
Mobile 92	1	36	76	14.0
Mobile 92	2	231	23	33.3
Mobile 92	2	231	46	7.1
Mobile 92	4	231	23	7.3
Mobile 91	23	181	30	27.7
Mobile 91	24	170	30	34.2
Mobile 91	28	72.8	30	9.2
Mobile 91	30	37.2	30	10.0
Mobile 91	3	114	30	10.9
Mobile 91	3	114	30	9.0
Mobile 91	4	114	30	50.4
Mobile 91	5	231	30	119.7

Napthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	28	72.8	30	0.5
Mobile 91	30	37.2	30	0.9
Mobile 91	3	114	30	0.5
Mobile 91	4	114	30	0.8
Mobile 91	5	231	30	5.2
Mobile 91	4	114	30	5.1
NOBE 93	2	600	600	1
Mobile 91	23	181	30	0.2
Mobile 91	24	170	30	0.4
Mobile 91	28	72.8	30	0.2
Mobile 91	30	37.2	30	0.2
Mobile 91	3	114	30	0.2
Mobile 91	4	114	30	2.6
Mobile 91	5	231	30	1.0

n-Butylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	2.5
NOBE 93	2	600	75	1
NOBE 93	2	600	125	1
Mobile 91	23	181	30	0.2
Mobile 91	24	170	30	0.4
Mobile 91	28	72.8	30	0.2
Mobile 91	30	37.2	30	0.2
Mobile 91	3	114	30	0.2
Mobile 91	4	114	30	2.6
Mobile 91	5	231	30	1.0
NOBE 93	2	600	75	2
NOBE 93	2	600	125	1
NOBE 93	2	600	75	2
NOBE 93	2	600	125	1
NOBE 93	2	600	75	2
NOBE 93	2	600	600	0.001

Nonane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	58.7
NOBE 93	1	600	125	12
NOBE 93	2	600	75	192
NOBE 93	2	600	125	73
NOBE 93	2	600	600	1
Mobile 91	23	181	30	21.7
Mobile 91	24	170	30	25.3
Mobile 91	28	72.8	30	11.7
Mobile 91	30	37.2	30	11.0
Mobile 91	3	114	30	10.9
Mobile 91	3	114	30	5.7
Mobile 91	4	114	30	58.9
Mobile 91	5	231	30	103.6

n-Propylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	3.9
NOBE 93	2	600	75	6
NOBE 93	2	600	125	2
NOBE 93	2	600	600	2
Mobile 91	23	181	30	1.0
Mobile 91	24	170	30	1.2
Mobile 91	28	72.8	30	1.4
Mobile 91	30	37.2	30	0.7
Mobile 91	3	114	30	4.3
Mobile 91	4	114	30	4.0
Mobile 91	5	231	30	4.5

Octane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	52.1
Mobile 91	5	231	30	198.8
NOBE 93	1	600	125	24
NOBE 93	2	600	75	418
NOBE 93	2	600	125	151

Octane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	2	600	600	2
Mobile 91	23	181	30	45.9
Mobile 91	28	72.8	30	15.2
Mobile 91	30	37.2	30	14.5
Mobile 91	3	114	30	17.3
Mobile 91	3	114	30	13.6
Mobile 91	4	114	30	52.4
Mobile 91	5	231	30	198.9

ortho-Xylene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	76	10.3
Mobile 92	2	231	23	11.4
Mobile 91	4	114	30	15.2
NOBE 93	2	600	75	12
NOBE 93	2	600	600	1
Mobile 91	23	181	30	6.9
Mobile 91	24	170	30	8.3
Mobile 91	28	72.8	30	3.0
Mobile 91	30	37.2	30	3.1
Mobile 91	3	114	30	3.4
Mobile 91	3	114	30	2.4
Mobile 91	4	114	30	15.5
Mobile 91	5	231	30	31.9

p-Cymene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	3.0
NOBE 93	2	600	75	9
NOBE 93	2	600	125	0.1
Mobile 91	24	170	30	0.6
Mobile 91	28	72.8	30	1.5
Mobile 91	30	37.2	30	1.5
Mobile 91	3	114	30	7.6
Mobile 91	4	114	30	3.1
Mobile 91	5	231	30	2.0
NOBE 93	2	600	500	0.001

Pentane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	79.5
Mobile 91	5	231	30	350.5
NOBE 93	1	600	125	74
NOBE 93	2	600	75	3247
NOBE 93	2	600	125	635
NOBE 93	2	600	600	17
Mobile 91	23	181	30	125.8
Mobile 91	24	170	30	167.2
Mobile 91	28	72.8	30	13.1
Mobile 91	30	37.2	30	23.6
Mobile 91	3	114	30	10.4
Mobile 91	3	114	30	56.3
Mobile 91	4	114	30	87.8
Mobile 91	5	231	30	351.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A1-6 **Emissions Measured at Previous Test Burns: VOCs from Crude** (concentration

Propane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	25.3
Mobile 91	5	231	30	84.9
NOBE 93	1	600	125	11
NOBE 93	2	600	75	269
NOBE 93	2	600	125	71
Mobile 91	23	181	30	37.9
Mobile 91	24	170	30	50.4
Mobile 91	28	72.8	30	10.6
Mobile 91	30	37.2	30	9.3
Mobile 91	3	114	30	12.9
Mobile 91	3	114	30	15.9
Mobile 91	4	114	30	30.3
Mobile 91	5	231	30	87.4

Propene

Burn	Num.	Area	Dist.	Conc.
NOBE 93	2	600	75	30
NOBE 93	2	600	600	4
Mobile 91	5	231	30	1.4
Mobile 91	23	181	30	2.3
Mobile 91	28	72.8	30	1.9
Mobile 91	30	37.2	30	1.6
Mobile 91	3	114	30	1.9
Mobile 91	5	231	30	1.6

t-1,4-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
NOBE 93	1	600	125	6
NOBE 93	2	600	75	90
NOBE 93	2	600	125	46

Toluene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	38.8
Mobile 91	5	231	30	148.9
Mobile 92	1	36	23	7.8
Mobile 92	1	36	46	8.3
Mobile 92	2	231	23	30.7
Mobile 92	2	231	46	5.6
Mobile 92	2	231	76	0.01
Mobile 92	4	231	23	6.9
NOBE 93	2	600	75	170
NOBE 93	2	600	125	20
NOBE 93	2	600	600	1
Mobile 91	23	181	30	39.4
Mobile 91	24	170	30	51.0
Mobile 91	28	72.8	30	159.9
Mobile 91	30	37.2	30	143.7
Mobile 91	3	114	30	158.6
Mobile 91	3	114	30	16.4
Mobile 91	4	114	30	41.0
Mobile 91	5	231	30	150.2

Total

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	1322.3
Mobile 91	5	231	30	4231.6
NOBE 93	1	600	75	644
NOBE 93	1	600	125	615
NOBE 93	1	600	600	0
NOBE 93	2	600	75	22170
NOBE 93	2	600	125	6042
NOBE 93	2	600	600	485
Mobile 91	23	181	30	1506.4
Mobile 91	24	170	30	1597.8
Mobile 91	28	72.8	30	622.9
Mobile 91	30	37.2	30	580.7
Mobile 91	3	114	30	655.9
Mobile 91	3	114	30	536.4
Mobile 91	4	114	30	1396.9
Mobile 91	5	231	30	4251.0

Undecane

Burn	Num.	Area	Dist.	Conc.
Mobile 91	4	114	30	45.0
NOBE 93	2	600	75	37
NOBE 93	2	600	125	19
NOBE 93	2	600	600	1
Mobile 91	23	181	30	1.8
Mobile 91	24	170	30	2.0
Mobile 91	28	72.8	30	4.0
Mobile 91	30	37.2	30	2.7
Mobile 91	3	114	30	3.1
Mobile 91	4	114	30	45.2
Mobile 91	5	231	30	9.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-1 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

1,4-Diethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	2	231	30	1.7
Mobile 94	3	231	30	1.2
Mobile 94	3	231	50	0.3
Mobile 94	3	231	85	0.2
Mobile 94	3	231	45	0.4
Mobile 94	3	231	75	1.5
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	1.0
Mobile 97	2-1	25	30	1.6
Mobile 97	2-2	25	15	0.5
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	1.1
Mobile 97	2-3	25	30	0.5
Mobile 97	3-1	25	15	0.3
Mobile 97	3-1	25	30	0.3
Mobile 97	3a-1	25	30	0.5
Mobile 97	4-1	25	15	0.7
Mobile 97	4-1	25	30	0.4
Mobile 97	4-2	25	15	5.1
Mobile 97	4-2	25	30	2.1
Mobile 97	4-3	25	15	3.1
Mobile 97	4-3	25	30	0.4
Mobile 97	5-1	25	15	1.0

1-Butene/2-Methylpropene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	5.3
Mobile 94	1	199	45	1.4
Mobile 94	1	199	75	1.7
Mobile 94	2	231	50	8.4
Mobile 94	2	231	85	7.5
Mobile 94	2	231	30	11.5
Mobile 94	2	231	45	7.7
Mobile 94	2	231	75	2.5
Mobile 94	3	231	30	14.3
Mobile 94	3	231	50	10.8
Mobile 94	3	231	85	3.7
Mobile 94	3	231	45	5.8
Mobile 94	3	231	75	8.3
Mobile 97	1-1	25	15	0.7
Mobile 97	1-1	25	30	0.6
Mobile 97	1-1	25	45	0.7
Mobile 97	2-1	25	15	1.5
Mobile 97	2-1	25	30	1.7
Mobile 97	2-2	25	15	1.7
Mobile 97	2-2	25	30	0.8
Mobile 97	2-3	25	15	0.8
Mobile 97	2-3	25	30	0.8
Mobile 97	3-1	25	15	1.0
Mobile 97	3-1	25	30	1.1

1-Butene/2-Methylpropene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	3a-1	25	15	1.3
Mobile 97	3a-1	25	30	1.3
Mobile 97	4-1	25	15	0.9
Mobile 97	4-1	25	30	0.8
Mobile 97	4-2	25	15	1.0
Mobile 97	4-2	25	30	1.6
Mobile 97	4-3	25	15	1.0
Mobile 97	4-3	25	30	1.1
Mobile 97	5-1	25	15	1.2
Mobile 97	5-1	25	30	0.7

1-Heptene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.3
Mobile 97	1-1	25	45	0.3
Mobile 97	2-1	25	15	0.5
Mobile 97	2-1	25	30	1.1
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	30	0.5
Mobile 94	3-1	221	15	5.0
Mobile 94	3-1	110	75	0.5

1-Hexene/2-Methyl-1-Pentene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.2
Mobile 97	2-1	25	15	0.5
Mobile 97	2-2	25	15	0.3
Mobile 97	2-3	25	15	0.2
Mobile 97	3-1	25	15	0.3
Mobile 97	3a-1	25	15	0.6
Mobile 97	4-1	25	15	0.3
Mobile 97	4-2	25	15	0.5
Mobile 97	4-3	25	15	0.4
Mobile 97	5-1	25	15	0.3
Mobile 97	1-1	25	30	0.3
Mobile 97	2-1	25	30	0.2
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	30	0.3
Mobile 97	3-1	25	30	0.4
Mobile 97	3a-1	25	30	0.7
Mobile 97	4-1	25	30	0.3
Mobile 97	4-2	25	30	0.9
Mobile 97	4-3	25	30	0.3
Mobile 97	5-1	25	30	0.2
Mobile 97	1-1	25	45	0.3
Mobile 94	2	231	30	0.4
Mobile 94	2	231	15	1.5
Mobile 94	2	231	50	1.0
Mobile 94	3	231	75	0.1

1-Methylcyclohexene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	50	0.1
Mobile 94	1	199	30	0.5
Mobile 94	2	231	85	0.6
Mobile 94	2	231	30	0.9
Mobile 94	2	231	45	0.7
Mobile 94	3	231	30	2.9
Mobile 94	3	231	50	1.3
Mobile 94	3	231	45	0.8
Mobile 97	1-1	25	45	0.0
Mobile 97	2-1	25	30	0.2
Mobile 97	2-2	25	15	0.1
Mobile 97	4-2	25	30	0.1
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.0
Mobile 97	5-1	25	15	0.1

1-Methylcyclopentene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	85	0.2
Mobile 94	2	231	30	0.7
Mobile 94	2	231	45	0.4
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	0.6
Mobile 94	3	231	50	0.2
Mobile 94	3	231	85	0.1
Mobile 94	3	231	45	0.2
Mobile 97	1-1	25	15	0.0
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	0.0
Mobile 97	2-3	25	15	0.0
Mobile 97	2-3	25	30	0.0
Mobile 97	3-1	25	30	0.0
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.1
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	0.4
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.0
Mobile 97	5-1	25	15	0.1

1-Nonene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.3
Mobile 97	2-1	25	15	0.2
Mobile 97	2-1	25	30	0.3
Mobile 97	4-2	25	15	0.7
Mobile 94	1	110	15	2.0
Mobile 94	1	221	75	0.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-2 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

1-Octene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.3
Mobile 97	1-1	25	30	0.0
Mobile 97	1-1	25	45	0.3
Mobile 97	2-1	25	15	0.4
Mobile 97	2-2	25	15	0.3
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	30	0.4
Mobile 97	3a-1	25	30	0.2
Mobile 97	4-1	25	15	0.2
Mobile 97	4-2	25	15	0.7
Mobile 97	4-2	25	30	0.4
Mobile 97	4-3	25	15	0.4
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	15	0.3
Mobile 94	1	199	15	1.0
Mobile 94	2	231	15	0.0

1-Pentene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.3
Mobile 94	1	199	50	1.0
Mobile 94	1	199	30	2.5
Mobile 94	2	231	50	0.9
Mobile 94	2	231	85	3.4
Mobile 94	2	231	30	2.4
Mobile 94	2	231	45	1.3
Mobile 94	3	231	30	14.1
Mobile 94	3	231	50	13.7
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.2
Mobile 97	2-1	25	15	0.4
Mobile 97	2-1	25	30	0.3
Mobile 97	2-2	25	15	0.2
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	15	0.2
Mobile 97	3-1	25	30	0.4
Mobile 97	3a-1	25	15	0.3
Mobile 97	3a-1	25	30	0.4
Mobile 97	4-1	25	15	0.2
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.4
Mobile 97	4-2	25	30	0.8
Mobile 97	4-3	25	15	0.2
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	15	0.2
Mobile 97	5-1	25	30	0.1

2,2,3-Trimethylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	0.3
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	2-2	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	0.1
Mobile 94	1	199	1	1.0
Mobile 94	2	231	85	0.0

2,2,4-Trimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.2
Mobile 97	2-2	25	15	0.3
Mobile 97	2-3	25	15	0.3
Mobile 97	3-1	25	15	1.7
Mobile 97	3a-1	25	15	2.4
Mobile 97	4-1	25	15	1.5
Mobile 97	4-2	25	15	0.7
Mobile 97	4-3	25	15	0.3
Mobile 97	5-1	25	15	0.5
Mobile 97	1-1	25	30	0.3
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	30	0.3
Mobile 97	3-1	25	30	1.8
Mobile 97	3a-1	25	15	1.8
Mobile 97	4-1	25	30	1.3
Mobile 97	4-2	25	15	1.8
Mobile 97	5-1	25	30	0.3
Mobile 97	1-1	25	45	0.2
Mobile 94	1	199	30	0.4
Mobile 94	1	199	45	0.3
Mobile 94	1	199	75	0.3
Mobile 94	2	231	30	2.1
Mobile 94	3	231	30	1.6
Mobile 94	2	231	45	1.3
Mobile 94	3	231	45	0.6
Mobile 94	3	231	50	0.2
Mobile 94	2	231	75	0.2
Mobile 94	3	231	75	0.175
Mobile 94	2	231	85	0.2
Mobile 94	3	231	85	0.2

2,2,5-Trimethylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	0.2
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	45	0.0
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	15	1.0

2,2,5-Trimethylhexane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.3
Mobile 97	3-1	25	30	0.3
Mobile 97	3a-1	25	15	0.5
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.3
Mobile 97	4-1	25	30	0.3
Mobile 97	4-2	25	15	0.3
Mobile 97	4-2	25	30	0.2
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	30	0.1
Mobile 94	2	231	15	1.5

2,2-Dimethylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	45	0.2
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	1.2
Mobile 94	2	231	45	0.3
Mobile 94	3	231	30	0.7
Mobile 94	3	231	50	0.2
Mobile 94	3	231	85	0.2
Mobile 94	3	231	45	0.6
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	30	0.2
Mobile 97	1-1	25	45	0.2
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.6
Mobile 97	3-1	25	30	0.5
Mobile 97	3a-1	25	15	0.7
Mobile 97	3a-1	25	30	0.8
Mobile 97	4-1	25	15	0.7
Mobile 97	4-1	25	30	0.7
Mobile 97	4-2	25	15	0.2
Mobile 97	4-2	25	15	2.2
Mobile 97	4-3	25	15	0.2
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	30	0.1
Mobile 94	1	199	30	0.2
Mobile 94	2	231	30	0.9
Mobile 94	3	231	30	0.4
Mobile 97	2-3	25	15	0.0

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-3 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

2,2-Dimethylpropane

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.0
Mobile 97	1-1	25	45	0.0
Mobile 97	2-1	25	30	0.3
Mobile 97	2-2	25	15	0.0
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.1
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	0.2
Mobile 97	4-3	25	15	0.0
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.0
Mobile 94	1	199	85	0.0
Mobile 94	2	231	15	0.6

2,3,4-Trimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	45	0.1
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	0.4
Mobile 94	3	231	30	0.4
Mobile 94	3	231	85	0.1
Mobile 94	3	231	45	0.6
Mobile 97	2-1	231	30	2.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.5
Mobile 97	3-1	25	30	0.6
Mobile 97	3a-1	25	15	0.8
Mobile 97	3a-1	25	15	1.1
Mobile 97	4-1	25	15	0.6
Mobile 97	4-1	25	30	0.5
Mobile 97	4-2	25	15	0.3
Mobile 97	4-2	25	15	1.3
Mobile 97	4-3	25	15	0.2
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.2
Mobile 97	5-1	25	30	0.1

2,3-Dimethylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.2
Mobile 97	2-1	25	15	0.1
Mobile 97	2-2	25	15	0.1
Mobile 97	2-3	25	15	0.2
Mobile 97	3-1	25	15	0.7
Mobile 97	3a-1	25	15	1.1
Mobile 97	4-1	25	15	0.9
Mobile 97	4-2	25	15	0.3
Mobile 97	4-3	25	15	0.2

2,3-Dimethylbutane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	5-1	25	15	0.1
Mobile 97	1-1	25	30	0.3
Mobile 97	2-1	25	15	5.2
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	30	0.8
Mobile 97	3a-1	25	30	1.2
Mobile 97	4-1	25	30	0.8
Mobile 97	4-2	25	30	3.1
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	30	0.1
Mobile 97	1-1	25	45	0.2
Mobile 94	1	199	30	5.1
Mobile 94	1	199	45	5.4
Mobile 94	2	231	30	4.4
Mobile 94	3	231	30	3.8
Mobile 94	2	231	45	1.3
Mobile 94	3	231	45	1.5
Mobile 94	2	231	50	0.5
Mobile 94	3	231	85	0.2

2,3-Dimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.4
Mobile 94	1	199	50	0.3
Mobile 94	1	199	30	3.2
Mobile 94	1	199	45	0.3
Mobile 94	1	199	75	0.3
Mobile 94	2	231	50	1.5
Mobile 94	2	231	85	0.5
Mobile 94	2	231	30	8.2
Mobile 94	2	231	45	1.2
Mobile 94	2	231	75	0.7
Mobile 94	3	231	30	5.7
Mobile 94	3	231	50	0.6
Mobile 94	3	231	85	0.5
Mobile 94	3	231	45	1.1
Mobile 94	3	231	75	0.54
Mobile 97	2-1	25	30	1.0
Mobile 97	3-1	25	15	0.8
Mobile 97	3-1	25	30	0.9
Mobile 97	3a-1	25	15	1.1
Mobile 97	3a-1	25	30	1.2
Mobile 97	4-1	25	15	0.8
Mobile 97	4-1	25	30	0.7
Mobile 97	4-2	25	15	0.4
Mobile 97	4-2	25	30	2.3
Mobile 97	5-1	25	15	0.2
Mobile 97	5-1	25	30	0.1

2,4-Dimethylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	50	0.1
Mobile 94	1	199	30	0.7
Mobile 94	1	199	45	0.1
Mobile 94	2	231	50	0.6
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	2.6
Mobile 94	2	231	45	0.5
Mobile 94	2	231	75	0.3
Mobile 94	3	231	30	1.9
Mobile 94	3	231	85	0.2
Mobile 94	3	231	45	0.4
Mobile 97	1-1	25	15	0.3
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	2-3	25	15	0.1
Mobile 97	3-1	25	15	0.3
Mobile 97	3-1	25	30	0.3
Mobile 97	3a-1	25	15	0.6
Mobile 97	3a-1	25	30	0.9
Mobile 97	4-1	25	15	0.4
Mobile 97	4-1	25	30	0.3
Mobile 97	4-2	25	15	0.4
Mobile 97	4-2	25	30	1.1
Mobile 97	4-3	25	15	0.5
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	30	0.1

2,4-Dimethylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 97	5-1	25	15	0.1
Mobile 97	1-1	25	15	0.1
Mobile 97	2-3	25	15	0.2
Mobile 97	4-3	25	15	0.2
Mobile 97	4-2	25	15	0.2
Mobile 97	4-1	25	15	0.5
Mobile 97	3-1	25	15	0.6
Mobile 97	3a-1	25	15	0.7
Mobile 97	2-3	25	30	0.1
Mobile 97	2-2	25	30	0.1
Mobile 97	4-3	25	30	0.1
Mobile 94	1	199	30	0.4
Mobile 97	4-1	25	30	0.5
Mobile 97	3-1	25	30	0.6
Mobile 97	3a-1	25	30	0.8
Mobile 94	3	231	30	0.9
Mobile 97	4-2	25	30	1.6
Mobile 94	2	231	30	1.8
Mobile 97	2-1	25	15	3.3
Mobile 94	1	199	45	0.1
Mobile 94	3	231	45	0.3
Mobile 94	2	231	45	0.4
Mobile 94	2	231	50	0.4

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-4 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

2,5-Dimethylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	2	231	30	1.7
Mobile 94	2	231	45	0.3
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	0.8
Mobile 94	3	231	85	0.1
Mobile 94	3	231	45	0.2
Mobile 97	1-1	25	15	0.1
Mobile 97	2-1	25	15	0.2
Mobile 97	2-1	25	30	0.2
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.2
Mobile 97	3-1	25	30	0.3
Mobile 97	3a-1	25	15	0.4
Mobile 97	3a-1	25	30	0.5
Mobile 97	4-1	25	15	0.3
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.4
Mobile 97	4-2	25	30	0.7
Mobile 97	4-3	25	15	0.3
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	30	0.1

2-Ethyltoluene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	1	199	45	0.1
Mobile 94	2	231	50	0.5
Mobile 94	2	231	30	2.4
Mobile 94	2	231	45	0.4
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	1.6
Mobile 94	3	231	85	0.3
Mobile 94	3	231	45	0.6
Mobile 94	3	231	75	0.2
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.7
Mobile 97	2-1	25	30	0.7
Mobile 97	2-2	25	15	0.4
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.8
Mobile 97	2-3	25	30	0.4
Mobile 97	3-1	25	15	0.4
Mobile 97	3-1	25	30	0.5
Mobile 97	3a-1	25	15	0.5
Mobile 97	3a-1	25	30	0.7
Mobile 97	4-1	25	15	0.8
Mobile 97	4-1	25	30	0.6
Mobile 97	4-2	25	15	3.3

2-Ethyltoluene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-2	25	30	2.0
Mobile 97	4-3	25	15	2.1
Mobile 97	4-3	25	30	0.7
Mobile 97	5-1	25	15	0.7
Mobile 97	5-1	25	30	0.1

2-Methyl-1-Butene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	85	0.2
Mobile 94	2	231	30	0.4
Mobile 94	3	231	50	0.0
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.2
Mobile 97	2-1	25	30	0.1
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.2
Mobile 97	3a-1	25	15	0.3
Mobile 97	3a-1	25	30	0.3
Mobile 97	4-1	25	15	0.3
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.2
Mobile 97	4-2	25	15	1.1
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	30	0.1

2-Methyl-2-Butene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.0
Mobile 94	2	231	85	0.5
Mobile 94	2	231	30	0.8
Mobile 94	2	231	45	0.6
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	0.4
Mobile 94	3	231	85	0.1
Mobile 94	3	231	45	0.3
Mobile 94	3	231	75	0.1
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.2
Mobile 97	3-1	25	30	0.2
Mobile 97	3a-1	25	15	0.3

2-Methyl-2-Butene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	3a-1	25	30	0.3
Mobile 97	4-1	25	15	0.3
Mobile 97	4-1	25	30	0.3
Mobile 97	4-2	25	15	0.2
Mobile 97	4-2	25	15	2.6
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1

2-Methylbutane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	30	3.3
Mobile 94	1	199	45	2.5
Mobile 94	1	199	75	2.3
Mobile 94	2	231	50	3.8
Mobile 94	2	231	85	1.5
Mobile 94	2	231	30	12.3
Mobile 94	2	231	45	3.2
Mobile 94	2	231	75	2.3
Mobile 94	3	231	30	9.6
Mobile 94	3	231	50	3.5
Mobile 94	3	231	85	3.7
Mobile 94	3	231	15	56.2
Mobile 94	3	231	75	1.9
Mobile 97	1-1	25	15	2.4
Mobile 97	1-1	25	30	2.5
Mobile 97	1-1	25	45	2.1
Mobile 97	2-1	25	15	1.3
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	0.9
Mobile 97	2-2	25	30	0.9
Mobile 97	2-3	25	15	1.6
Mobile 97	2-3	25	30	1.0
Mobile 97	3-1	25	15	9.9
Mobile 97	3-1	25	30	9.6
Mobile 97	3a-1	25	15	14.5
Mobile 97	3a-1	25	30	13.3
Mobile 97	4-1	25	15	11.7
Mobile 97	4-1	25	30	11.3
Mobile 97	4-2	25	15	3.7
Mobile 97	4-2	25	30	38.4
Mobile 97	4-3	25	15	1.7
Mobile 97	4-3	25	30	2.1
Mobile 97	5-1	25	15	1.1
Mobile 97	5-1	25	30	0.8

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-5 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

2-Methylheptane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.9
Mobile 94	1	199	45	0.2
Mobile 94	2	231	50	2.5
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	12.9
Mobile 94	2	231	45	2.3
Mobile 94	2	231	75	1.4
Mobile 94	3	231	30	6.8
Mobile 94	3	231	85	1.0
Mobile 94	3	231	45	0.8
Mobile 97	1-1	25	15	0.7
Mobile 97	1-1	25	30	0.5
Mobile 97	1-1	25	45	0.4
Mobile 97	2-1	25	15	0.8
Mobile 97	2-1	25	30	1.5
Mobile 97	2-2	25	15	0.5
Mobile 97	2-3	25	15	0.4
Mobile 97	2-3	25	30	0.4
Mobile 97	3-1	25	15	0.3
Mobile 97	3-1	25	30	0.5
Mobile 97	3a-1	25	15	0.7
Mobile 97	3a-1	25	30	0.7
Mobile 97	4-1	25	15	1.0
Mobile 97	4-1	25	30	0.6
Mobile 97	4-2	25	15	2.8
Mobile 97	4-2	25	30	1.8
Mobile 97	4-3	25	15	1.9
Mobile 97	4-3	25	30	0.8
Mobile 97	5-1	25	15	1.0
Mobile 97	5-1	25	30	0.3

2-Methylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	1	199	50	0.4
Mobile 94	1	199	85	0.13
Mobile 94	1	199	30	8.1
Mobile 94	1	199	45	0.7
Mobile 94	1	199	75	0.6
Mobile 94	2	231	50	4.4
Mobile 94	2	231	30	23.1
Mobile 94	2	231	45	3.6
Mobile 94	3	231	30	14.8
Mobile 94	3	231	50	1.2
Mobile 94	3	231	45	2.8
Mobile 97	1-1	25	15	0.5
Mobile 97	1-1	25	30	0.5
Mobile 97	1-1	25	45	0.3
Mobile 97	2-1	25	15	0.4
Mobile 97	2-1	25	30	0.3
Mobile 97	2-2	25	15	0.3
Mobile 97	2-3	25	15	0.3

2-Methylhexane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-3	25	30	0.3
Mobile 97	3-1	25	15	0.9
Mobile 97	3-1	25	30	1.1
Mobile 97	3a-1	25	15	1.6
Mobile 97	3a-1	25	30	1.5
Mobile 97	4-1	25	15	1.2
Mobile 97	4-1	25	30	1.0
Mobile 97	4-2	25	15	1.2
Mobile 97	4-2	25	30	2.6
Mobile 97	4-3	25	15	1.0
Mobile 97	4-3	25	30	0.7
Mobile 97	5-1	25	30	0.2

2-Methylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	85	1.8
Mobile 94	1	199	30	10.5
Mobile 94	1	199	45	5.3
Mobile 94	1	199	75	6.5
Mobile 94	2	231	50	16.2
Mobile 94	2	231	85	5.8
Mobile 94	2	231	30	14.3
Mobile 94	2	231	45	6.7
Mobile 94	2	231	75	4.4
Mobile 94	3	231	30	7.8
Mobile 94	3	231	50	7.2
Mobile 94	3	231	85	2.1
Mobile 94	3	231	45	7.7
Mobile 94	3	231	75	4.0
Mobile 97	2-1	25	30	1.0
Mobile 97	3-1	25	30	2.3
Mobile 97	3a-1	25	15	3.2
Mobile 97	3a-1	25	30	3.8
Mobile 97	4-1	25	15	3.0
Mobile 97	4-1	25	30	2.7
Mobile 97	4-2	25	15	1.4
Mobile 97	4-2	25	30	10.6

3,6-Dimethyloctane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	1	199	45	0.1
Mobile 94	2	231	50	0.5
Mobile 94	2	231	30	0.8
Mobile 94	2	231	75	0.3
Mobile 94	3	231	30	2.4
Mobile 94	3	231	50	0.2
Mobile 94	3	231	85	0.2
Mobile 94	3	231	45	0.4
Mobile 94	3	231	75	0.2

3-Ethyltoluene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	50	0.2
Mobile 94	1	199	30	0.6
Mobile 94	1	199	45	0.2
Mobile 94	1	199	75	0.2
Mobile 94	2	231	50	0.9
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	4.8
Mobile 94	2	231	45	0.8
Mobile 94	3	231	30	3.0
Mobile 94	3	231	50	0.4
Mobile 94	3	231	85	0.3
Mobile 94	3	231	45	1.3
Mobile 94	3	231	75	0.5
Mobile 97	1-1	25	15	0.3
Mobile 97	1-1	25	30	0.3
Mobile 97	1-1	25	45	0.2
Mobile 97	2-1	25	15	1.2
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	0.7
Mobile 97	2-2	25	30	0.3
Mobile 97	2-3	25	15	1.3
Mobile 97	2-3	25	30	0.7
Mobile 97	3-1	25	15	1.1
Mobile 97	3-1	25	30	1.2
Mobile 97	3a-1	25	15	0.8
Mobile 97	3a-1	25	30	0.8
Mobile 97	4-1	25	15	1.9
Mobile 97	4-1	25	30	1.4
Mobile 97	4-2	25	15	5.3
Mobile 97	4-2	25	30	4.8
Mobile 97	4-3	25	15	3.5
Mobile 97	4-3	25	30	1.1
Mobile 97	5-1	25	15	1.2
Mobile 97	5-1	25	30	0.2

3-Methylheptane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	1	199	45	0.2
Mobile 94	2	231	50	1.5
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	8.9
Mobile 94	2	231	45	1.7
Mobile 94	2	231	75	0.8
Mobile 94	3	231	30	4.2
Mobile 94	3	231	50	0.3
Mobile 94	3	231	85	0.7
Mobile 94	3	231	45	0.7
Mobile 97	1-1	25	15	0.4
Mobile 97	1-1	25	30	0.3
Mobile 97	1-1	25	45	0.2

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-6 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

3-Methylheptane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-1	25	15	0.5
Mobile 97	2-1	25	30	1.5
Mobile 97	2-2	25	15	0.2
Mobile 97	2-3	25	15	0.3
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	15	0.3
Mobile 97	3-1	25	30	0.5
Mobile 97	3a-1	25	15	0.5
Mobile 97	3a-1	25	30	0.7
Mobile 97	4-1	25	15	0.7
Mobile 97	4-1	25	30	0.5
Mobile 97	4-2	25	15	1.5
Mobile 97	4-2	25	30	1.1
Mobile 97	4-3	25	15	1.0
Mobile 97	4-3	25	30	0.6
Mobile 97	5-1	25	15	0.6
Mobile 97	5-1	25	30	0.2

3-Methylhexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	1	199	50	0.4
Mobile 94	1	199	85	0.06
Mobile 94	1	199	30	11.3
Mobile 94	1	199	45	0.8
Mobile 94	1	199	75	0.6
Mobile 94	2	231	50	5.7
Mobile 94	2	231	85	1.7
Mobile 94	2	231	30	29.9
Mobile 94	2	231	45	4.4
Mobile 94	2	231	75	2.8
Mobile 94	3	231	30	18.9
Mobile 94	3	231	50	1.6
Mobile 94	3	231	85	2.1
Mobile 94	3	231	45	3.6
Mobile 94	3	231	75	2.2
Mobile 97	2-1	25	30	1.0
Mobile 97	3-1	25	15	1.0
Mobile 97	3a-1	25	15	1.6

3-Methylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.8
Mobile 94	1	199	45	0.4
Mobile 94	1	199	75	0.5
Mobile 94	2	231	50	2.7
Mobile 94	2	231	85	0.3
Mobile 94	2	231	15	7.5
Mobile 94	2	231	45	2.0
Mobile 94	2	231	75	1.1
Mobile 94	3	231	30	3.5
Mobile 94	3	231	50	0.6
Mobile 94	3	231	85	0.9

3-Methylpentane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	3	231	45	2.1
Mobile 94	3	231	75	0.4
Mobile 97	1-1	25	15	0.6
Mobile 97	1-1	25	30	0.9
Mobile 97	1-1	25	45	0.6
Mobile 97	2-1	25	15	0.3
Mobile 97	2-1	25	30	1.0
Mobile 97	2-3	25	15	0.4
Mobile 97	2-3	25	30	0.4
Mobile 97	3-1	25	15	1.5
Mobile 97	3-1	25	30	1.6
Mobile 97	3a-1	25	15	2.2
Mobile 97	3a-1	25	30	2.3
Mobile 97	4-1	25	15	2.2
Mobile 97	4-1	25	30	2.0
Mobile 97	4-2	25	15	0.9
Mobile 97	4-2	25	30	6.4
Mobile 97	4-3	25	15	0.6
Mobile 97	4-3	25	30	0.6
Mobile 97	5-1	25	15	0.3
Mobile 97	5-1	25	30	0.2

4-Ethyltoluene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	1	199	45	0.1
Mobile 94	1	199	75	0.2
Mobile 94	2	231	50	0.5
Mobile 94	2	231	30	2.6
Mobile 94	2	231	45	0.4
Mobile 94	3	231	30	1.7
Mobile 94	3	231	50	0.2
Mobile 94	3	231	85	0.2
Mobile 94	3	231	45	0.6
Mobile 94	3	231	75	0.2
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.6
Mobile 97	2-1	25	30	0.6
Mobile 97	2-2	25	15	0.3
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.6
Mobile 97	2-3	25	30	0.3
Mobile 97	3-1	25	15	0.5
Mobile 97	3-1	25	30	0.5
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.9
Mobile 97	4-1	25	15	0.9
Mobile 97	4-1	25	30	0.7
Mobile 97	4-2	25	15	2.6
Mobile 97	4-2	25	30	2.4

4-Ethyltoluene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-3	25	15	1.7
Mobile 97	4-3	25	30	0.4
Mobile 97	5-1	25	15	0.6
Mobile 97	5-1	25	30	0.1

4-Methylheptane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	2	231	50	0.8
Mobile 94	2	231	30	4.5
Mobile 94	2	231	45	0.7
Mobile 94	3	231	30	1.4
Mobile 94	3	231	45	0.3
Mobile 97	1-1	25	30	0.3
Mobile 97	2-1	25	15	0.2
Mobile 97	2-1	25	30	0.6
Mobile 97	2-2	25	15	0.2
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	15	0.2
Mobile 97	3-1	25	30	0.2
Mobile 97	3a-1	25	15	0.3
Mobile 97	4-1	25	15	0.4
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.7
Mobile 97	4-2	25	30	0.6
Mobile 97	4-3	25	15	0.5
Mobile 97	4-3	25	30	0.3
Mobile 97	5-1	25	15	0.2
Mobile 97	5-1	25	30	0.1

Benzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	2.0
Mobile 94	1	199	50	1.2
Mobile 94	1	199	30	5.1
Mobile 94	1	199	45	2.4
Mobile 94	1	199	75	1.4
Mobile 94	2	231	50	11.0
Mobile 94	2	231	85	2.6
Mobile 94	2	231	30	37.4
Mobile 94	2	231	45	17.5
Mobile 94	2	231	75	8.8
Mobile 94	3	231	30	28.1
Mobile 94	3	231	50	10.7
Mobile 94	3	231	85	4.9
Mobile 94	3	231	45	6.5
Mobile 94	3	231	75	3.1
Mobile 97	1-1	25	15	1.6
Mobile 97	1-1	25	30	1.4
Mobile 97	1-1	25	45	1.2
Mobile 97	2-1	25	15	6.1
Mobile 97	2-1	25	30	1.0

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-7 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

Benzene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-2	25	15	2.6
Mobile 97	2-2	25	30	1.1
Mobile 97	2-3	25	15	2.7
Mobile 97	2-3	25	30	2.1
Mobile 97	3-1	25	15	3.9
Mobile 97	3-1	25	30	4.0
Mobile 97	3a-1	25	15	5.7
Mobile 97	3a-1	25	30	5.0
Mobile 97	4-1	25	15	5.0
Mobile 97	4-1	25	30	4.8
Mobile 97	4-2	25	15	9.7
Mobile 97	4-2	25	30	12.7
Mobile 97	4-3	25	15	6.2
Mobile 97	4-3	25	30	3.2
Mobile 97	5-1	25	15	4.1
Mobile 97	5-1	25	30	2.4

Butane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	2.3
Mobile 94	1	199	45	2.1
Mobile 94	1	199	75	2.2
Mobile 94	2	231	50	2.7
Mobile 94	2	231	85	1.7
Mobile 94	2	231	30	5.2
Mobile 94	2	231	45	2.1
Mobile 94	2	231	75	1.8
Mobile 94	3	231	30	3.2
Mobile 94	3	231	50	2.4
Mobile 94	3	231	85	2.2
Mobile 94	3	231	45	4.9
Mobile 94	3	231	75	1.7
Mobile 97	1-1	25	15	3.2
Mobile 97	1-1	25	30	3.2
Mobile 97	1-1	25	45	2.7
Mobile 97	2-1	25	15	1.3
Mobile 97	2-1	25	30	2.0
Mobile 97	2-2	25	15	1.0
Mobile 97	2-2	25	30	0.9
Mobile 97	2-3	25	15	1.2
Mobile 97	2-3	25	30	1.0
Mobile 97	3-1	25	15	7.8
Mobile 97	3-1	25	30	8.0
Mobile 97	3a-1	25	15	11.8
Mobile 97	3a-1	25	30	11.0
Mobile 97	4-1	25	15	10.1
Mobile 97	4-1	25	30	9.9
Mobile 97	4-2	25	15	4.6
Mobile 97	4-2	25	15	22.7
Mobile 97	4-3	25	15	1.5
Mobile 97	4-3	25	30	2.3
Mobile 97	5-1	25	15	1.1

c-1,3-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.0
Mobile 94	2	231	50	2.3
Mobile 94	2	231	85	0.3
Mobile 94	2	231	30	12.2
Mobile 94	2	231	45	2.3
Mobile 94	3	231	30	5.1
Mobile 94	3	231	45	0.8
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.4
Mobile 97	2-1	25	30	0.3
Mobile 97	2-2	25	15	0.2
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.2
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.5
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	1.5
Mobile 97	4-2	25	30	0.6
Mobile 97	4-3	25	15	1.0
Mobile 97	4-3	25	30	0.4
Mobile 97	5-1	25	15	0.5
Mobile 97	5-1	25	30	0.1

c-1,4/t-1,3-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	2	231	50	0.8
Mobile 94	2	231	30	3.9
Mobile 94	2	231	45	0.7
Mobile 94	2	231	75	0.3
Mobile 94	3	231	30	1.6
Mobile 94	3	231	85	0.3
Mobile 94	3	231	45	0.3
Mobile 97	1-1	25	15	0.0
Mobile 97	1-1	25	45	0.0
Mobile 97	2-2	25	15	0.0
Mobile 97	2-2	25	30	0.0
Mobile 97	2-3	25	30	0.0
Mobile 97	3-1	25	15	0.0
Mobile 97	3-1	25	30	0.1
Mobile 97	4-1	25	15	0.1
Mobile 97	5-1	25	30	0.0

c-2-Butene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	50	0.1
Mobile 94	1	199	30	0.3
Mobile 94	1	199	45	0.2
Mobile 94	2	231	50	0.5

c-2-Butene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	15	1.2
Mobile 94	2	231	30	0.7
Mobile 94	2	231	45	0.8
Mobile 94	2	231	75	0.5
Mobile 94	3	231	30	1.0
Mobile 94	3	231	50	0.3
Mobile 94	3	231	85	0.3
Mobile 94	3	231	45	0.2
Mobile 94	3	231	75	0.4
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.5
Mobile 97	2-2	25	15	0.1
Mobile 97	2-3	25	15	0.0
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.1
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	0.2
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1

c-2-Heptene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	0.6
Mobile 94	2	231	45	0.2
Mobile 97	2-1	25	30	0.3
Mobile 97	2-2	25	30	0.2
Mobile 94	2	231	85	0.0

c-2-Hexene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	45	0.2
Mobile 94	3	231	30	0.8
Mobile 94	3	231	50	0.3
Mobile 94	3	231	85	0.0
Mobile 97	3	25	15	0.1

c-2-Pentene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.2
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-8 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

c-2-Pentene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-2	25	15	0.9
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	85	0.0
Mobile 97	5-1	25	85	0.0

Cyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.0
Mobile 94	1	199	45	0.1
Mobile 94	1	199	75	0.2
Mobile 94	2	231	50	3.5
Mobile 94	2	231	85	0.2
Mobile 94	2	231	30	15.3
Mobile 94	2	231	45	3.0
Mobile 94	2	231	75	1.6
Mobile 94	3	231	30	6.6
Mobile 94	3	231	50	0.2
Mobile 94	3	231	85	1.0
Mobile 94	3	231	45	2.0
Mobile 97	1-1	25	15	0.3
Mobile 97	1-1	25	30	0.3
Mobile 97	1-1	25	45	0.2
Mobile 97	2-1	25	15	0.3
Mobile 97	2-1	25	30	0.9
Mobile 97	2-2	25	15	0.2
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.3
Mobile 97	3-1	25	30	0.3
Mobile 97	3a-1	25	15	0.5
Mobile 97	3a-1	25	30	0.4
Mobile 97	4-1	25	15	0.6
Mobile 97	4-1	25	30	0.5
Mobile 97	4-2	25	15	0.8
Mobile 97	4-2	25	30	0.8
Mobile 97	4-3	25	15	0.8
Mobile 97	4-3	25	30	0.3
Mobile 97	5-1	25	15	0.4
Mobile 97	5-1	25	30	0.1

Cyclohexene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	1	199	50	0.2
Mobile 94	1	199	30	0.6
Mobile 94	1	199	45	0.1
Mobile 94	2	231	85	0.4
Mobile 94	2	231	30	0.4
Mobile 94	2	231	45	0.3
Mobile 94	3	231	30	1.6
Mobile 94	3	231	50	0.7

Cyclopentane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	85	0.0
Mobile 94	2	231	30	1.3
Mobile 94	2	231	45	0.3
Mobile 94	3	231	30	0.6
Mobile 94	3	231	45	1.4
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	30	0.2
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	15	3.4
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.4
Mobile 97	3-1	25	30	0.4
Mobile 97	3a-1	25	15	0.6
Mobile 97	3a-1	25	30	0.7
Mobile 97	4-1	25	15	0.6
Mobile 97	4-1	25	30	0.5
Mobile 97	4-2	25	15	0.2
Mobile 97	4-2	25	15	2.1
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.2

Cyclopentene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	85	0.2
Mobile 94	2	231	30	0.5
Mobile 94	2	231	45	0.4
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	0.4
Mobile 97	1-1	25	15	0.0
Mobile 97	1-1	25	30	0.0
Mobile 97	1-1	25	45	0.0
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.0
Mobile 97	2-3	25	15	0.0
Mobile 97	2-3	25	30	0.0
Mobile 97	3-1	25	30	0.0
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.0
Mobile 97	4-1	25	30	0.0
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	0.3
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.0
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	30	0.0

Decane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.5
Mobile 94	1	199	50	0.1
Mobile 94	1	199	30	2.1
Mobile 94	1	199	45	0.6
Mobile 94	1	199	75	0.8
Mobile 94	2	231	50	2.3
Mobile 94	2	231	85	0.3
Mobile 94	2	231	30	9.3
Mobile 94	2	231	45	2.1
Mobile 94	2	231	75	1.1
Mobile 94	3	231	30	7.7
Mobile 94	3	231	50	0.7
Mobile 94	3	231	85	1.1
Mobile 94	3	231	45	2.2
Mobile 94	3	231	75	0.7
Mobile 97	1-1	25	15	1.0
Mobile 97	1-1	25	30	0.7
Mobile 97	1-1	25	45	0.5
Mobile 97	2-1	25	15	6.0
Mobile 97	2-1	25	30	2.8
Mobile 97	2-2	25	15	2.8
Mobile 97	2-2	25	30	0.9
Mobile 97	2-3	25	15	7.1
Mobile 97	2-3	25	30	3.4
Mobile 97	3-1	25	15	0.9
Mobile 97	3-1	25	30	1.4
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.6
Mobile 97	4-1	25	15	2.6
Mobile 97	4-1	25	30	1.1
Mobile 97	4-2	25	15	31.0
Mobile 97	4-2	25	30	9.6
Mobile 97	4-3	25	15	18.1
Mobile 97	4-3	25	30	3.1
Mobile 97	5-1	25	15	5.8
Mobile 97	5-1	25	30	1.4

Dodecane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	2.3
Mobile 94	1	199	45	1.6
Mobile 94	1	199	75	0.3
Mobile 94	2	231	50	0.6
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	2.2
Mobile 94	2	231	45	0.8
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	6.0
Mobile 94	3	231	50	1.5
Mobile 94	3	231	85	0.9
Mobile 94	3	231	45	1.9
Mobile 94	3	231	75	0.9

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-9 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

Dodecane

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	2.9
Mobile 97	1-1	25	30	1.8
Mobile 97	1-1	25	45	0.8
Mobile 97	2-1	25	15	45.9
Mobile 97	2-1	25	30	12.6
Mobile 97	2-2	25	15	13.8
Mobile 97	2-2	25	30	4.5
Mobile 97	2-3	25	15	50.5
Mobile 97	2-3	25	30	19.5
Mobile 97	3-1	25	15	0.7
Mobile 97	3-1	25	30	1.6
Mobile 97	3a-1	25	30	0.5
Mobile 97	4-1	25	15	6.2
Mobile 97	4-1	25	30	1.5
Mobile 97	4-2	25	15	136.0
Mobile 97	4-2	25	30	37.2
Mobile 97	4-3	25	15	74.6
Mobile 97	4-3	25	30	2.7
Mobile 97	5-1	25	15	36.7
Mobile 97	5-1	25	30	0.4

Ethylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.8
Mobile 94	1	199	45	0.3
Mobile 94	1	199	75	0.4
Mobile 94	2	231	50	1.6
Mobile 94	2	231	85	0.3
Mobile 94	2	231	15	6.5
Mobile 94	2	231	45	1.6
Mobile 94	2	231	75	0.8
Mobile 94	3	231	30	4.3
Mobile 94	3	231	50	0.4
Mobile 94	3	231	85	0.9
Mobile 94	3	231	45	1.5
Mobile 94	3	231	75	0.3
Mobile 97	1-1	25	15	0.8
Mobile 97	1-1	25	30	0.7
Mobile 97	1-1	25	45	0.5
Mobile 97	2-1	25	15	1.2
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	0.7
Mobile 97	2-2	25	30	0.3
Mobile 97	2-3	25	15	1.0
Mobile 97	2-3	25	30	0.6
Mobile 97	3-1	25	15	1.6
Mobile 97	3-1	25	30	1.7
Mobile 97	3a-1	25	15	1.7
Mobile 97	3a-1	25	30	2.3
Mobile 97	4-1	25	15	2.2
Mobile 97	4-1	25	30	1.9
Mobile 97	4-2	25	15	3.1

Ethylbenzene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-2	25	30	5.9
Mobile 97	4-3	25	15	2.2
Mobile 97	4-3	25	30	0.9
Mobile 97	5-1	25	15	1.0
Mobile 97	5-1	25	30	0.3

Heptane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.4
Mobile 94	1	199	30	12.4
Mobile 94	1	199	45	0.9
Mobile 94	1	199	75	0.6
Mobile 94	2	231	50	12.7
Mobile 94	2	231	85	2.2
Mobile 94	2	231	30	59.9
Mobile 94	2	231	45	9.9
Mobile 94	2	231	75	5.4
Mobile 94	3	231	30	33.3
Mobile 94	3	231	50	2.2
Mobile 94	3	231	85	4.1
Mobile 94	3	231	45	5.0
Mobile 94	3	231	75	2.4
Mobile 97	1-1	25	15	1.0
Mobile 97	1-1	25	30	0.9
Mobile 97	1-1	25	45	0.8
Mobile 97	2-1	25	15	1.1
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	0.6
Mobile 97	2-2	25	30	0.3
Mobile 97	2-3	25	15	0.6
Mobile 97	2-3	25	30	0.5
Mobile 97	3-1	25	15	0.8
Mobile 97	3-1	25	30	1.4
Mobile 97	3a-1	25	15	1.1
Mobile 97	3a-1	25	30	1.3
Mobile 97	4-1	25	15	1.6
Mobile 97	4-1	25	30	1.1
Mobile 97	4-2	25	15	3.0
Mobile 97	4-2	25	30	2.9
Mobile 97	4-3	25	15	2.5
Mobile 97	4-3	25	30	1.6
Mobile 97	5-1	25	15	1.4
Mobile 97	5-1	25	30	0.5

Hexane

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	2.9
Mobile 97	1-1	25	30	7.7
Mobile 97	1-1	25	45	4.2
Mobile 97	2-1	25	15	1.4
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	2.4
Mobile 97	2-2	25	30	4.3

Hexane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-3	25	15	2.5
Mobile 97	2-3	25	30	2.7
Mobile 97	3-1	25	15	1.8
Mobile 97	3-1	25	30	2.3
Mobile 97	3a-1	25	15	2.9
Mobile 97	3a-1	25	30	2.9
Mobile 97	4-1	25	15	4.6
Mobile 97	4-1	25	30	3.5
Mobile 97	4-2	25	15	3.0
Mobile 97	4-2	25	30	9.0
Mobile 97	4-3	25	15	1.4
Mobile 97	4-3	25	30	1.2
Mobile 97	5-1	25	15	0.8
Mobile 97	5-1	25	30	0.4

Hexylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	75	0.4
Mobile 94	2	25	30	0.3
Mobile 94	3	231	50	0.6
Mobile 97	1-1	25	30	0.1
Mobile 97	2-1	25	15	1.2
Mobile 97	2-1	25	30	0.4
Mobile 97	2-2	25	15	0.5
Mobile 97	2-3	25	30	0.5
Mobile 97	3-1	25	15	0.0
Mobile 97	4-2	25	15	3.8
Mobile 97	4-2	25	30	0.7
Mobile 97	4-3	25	15	1.4
Mobile 97	5-1	25	15	0.6

Indan (2,3-Dihydroindene)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	1-1	25	15	0.0
Mobile 97	1-1	25	45	0.0
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.7
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.0
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.2
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.2
Mobile 97	4-1	25	15	0.2
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.6
Mobile 97	4-2	25	30	0.5
Mobile 97	4-3	25	15	0.4
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	30	0.3

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-10 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

Indene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	75	0.1
Mobile 94	2	231	30	0.4
Mobile 94	3	231	30	0.3
Mobile 94	3	231	45	0.3
Mobile 94	3	231	45	0.3
Mobile 94	3	231	45	0.3
Mobile 97	3	25	15	0.1
Mobile 97	3	25	45	0.0

Isobutane (2-Methylpropane)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.2
Mobile 94	1	199	45	1.0
Mobile 94	1	199	75	1.1
Mobile 94	2	231	50	0.9
Mobile 94	2	231	85	0.6
Mobile 94	2	231	30	1.3
Mobile 94	2	231	45	0.8
Mobile 94	2	231	75	0.7
Mobile 94	3	231	30	3.4
Mobile 94	3	231	50	1.4
Mobile 94	3	231	85	0.6
Mobile 94	3	231	15	9.0
Mobile 94	3	231	75	0.6
Mobile 97	1-1	25	15	1.5
Mobile 97	1-1	25	30	1.6
Mobile 97	1-1	25	45	1.5
Mobile 97	2-1	25	15	0.5
Mobile 97	2-1	25	30	5.3
Mobile 97	2-2	25	15	0.4
Mobile 97	2-2	25	30	0.4
Mobile 97	2-3	25	15	0.5
Mobile 97	2-3	25	30	0.4
Mobile 97	3-1	25	15	3.9
Mobile 97	3-1	25	30	3.9
Mobile 97	3a-1	25	15	6.6
Mobile 97	3a-1	25	30	5.5
Mobile 97	4-1	25	15	4.6
Mobile 97	4-1	25	30	4.7
Mobile 97	4-2	25	15	2.4
Mobile 97	4-2	25	30	5.0
Mobile 97	4-3	25	15	0.6
Mobile 97	4-3	25	30	0.9
Mobile 97	5-1	25	15	0.3
Mobile 97	5-1	25	30	0.3

iso-Butylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	0.4
Mobile 97	1-1	25	15	0.0
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.2
Mobile 97	2-2	25	15	0.1

iso-Butylbenzene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.0
Mobile 97	3-1	25	30	0.0
Mobile 97	3a-1	25	15	0.0
Mobile 97	3a-1	25	30	0.0
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.0
Mobile 97	4-2	25	15	0.6
Mobile 97	4-2	25	30	0.2
Mobile 97	4-3	25	15	0.4
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	30	0.0

Isoprene (2-Methyl-1,3-Butadiene)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	1	199	50	0.8
Mobile 94	1	199	30	2.9
Mobile 94	1	199	45	0.3
Mobile 94	1	199	75	1.0
Mobile 94	2	231	85	1.3
Mobile 94	2	231	30	1.7
Mobile 94	2	231	45	0.8
Mobile 94	3	231	30	0.6
Mobile 94	3	231	50	2.4
Mobile 94	3	231	45	2.1
Mobile 97	1-1	25	15	0.9
Mobile 97	1-1	25	30	1.0
Mobile 97	1-1	25	45	0.8
Mobile 97	2-1	25	15	0.8
Mobile 97	2-1	25	30	0.8
Mobile 97	2-2	25	15	0.6
Mobile 97	2-2	25	30	0.5
Mobile 97	2-3	25	15	1.0
Mobile 97	2-3	25	30	1.0
Mobile 97	3-1	25	15	2.2
Mobile 97	3-1	25	30	2.2
Mobile 97	3a-1	25	15	1.0
Mobile 97	3a-1	25	30	0.5
Mobile 97	4-1	25	15	0.7
Mobile 97	4-1	25	30	0.6
Mobile 97	4-2	25	15	2.2
Mobile 97	4-2	25	30	1.9
Mobile 97	4-3	25	15	1.4
Mobile 97	4-3	25	30	0.5
Mobile 97	5-1	25	15	0.5
Mobile 97	5-1	25	30	0.2

iso-Propylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	1.0
Mobile 94	2	231	75	0.1
Mobile 94	3	231	30	0.6
Mobile 94	3	231	85	0.1
Mobile 94	3	231	45	0.2
Mobile 94	3	231	75	0.3
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.0
Mobile 97	2-1	25	15	0.2
Mobile 97	2-1	25	30	0.2
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.0
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.2
Mobile 97	3-1	25	30	0.2
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.2
Mobile 97	4-1	25	15	0.3
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.7
Mobile 97	4-2	25	30	0.5
Mobile 97	4-3	25	15	0.5
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	15	0.2
Mobile 97	5-1	25	30	0.1

Methylcyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	4.3
Mobile 94	1	199	45	0.3
Mobile 94	1	199	75	0.2
Mobile 94	2	231	50	10.6
Mobile 94	2	231	85	0.5
Mobile 94	2	231	30	51.5
Mobile 94	2	231	45	9.4
Mobile 94	2	231	75	5.0
Mobile 94	3	231	30	21.5
Mobile 94	3	231	50	0.6
Mobile 94	3	231	85	3.5
Mobile 94	3	231	45	2.9
Mobile 94	3	231	75	0.5
Mobile 97	1-1	25	15	0.7
Mobile 97	1-1	25	30	0.6
Mobile 97	1-1	25	45	0.5
Mobile 97	2-1	25	15	1.0
Mobile 97	2-1	25	30	1.2
Mobile 97	2-2	25	15	0.5
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.5
Mobile 97	2-3	25	30	0.4

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-11 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

Methylcyclohexane					m,p-Xylene					Naphthalene (ctd.)				
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 97	3-1	25	15	0.4	Mobile 97	1-1	25	45	1.8	Mobile 97	2-2	25	30	0.4
Mobile 97	3-1	25	30	0.4	Mobile 97	2-1	25	15	4.7	Mobile 97	2-3	25	15	1.9
Mobile 97	3a-1	25	15	0.7	Mobile 97	2-1	25	30	3.0	Mobile 97	2-3	25	30	0.7
Mobile 97	3a-1	25	30	0.7	Mobile 97	2-2	25	15	2.9	Mobile 97	3-1	25	15	0.2
Mobile 97	4-1	25	15	1.1	Mobile 97	2-2	25	30	1.1	Mobile 97	3-1	25	30	0.7
Mobile 97	4-1	25	30	0.7	Mobile 97	2-3	25	15	4.4	Mobile 97	3a-1	25	15	0.1
Mobile 97	4-2	25	15	3.1	Mobile 97	2-3	25	30	2.4	Mobile 97	3a-1	25	30	0.8
Mobile 97	4-2	25	30	1.6	Mobile 97	3-1	25	15	5.0	Mobile 97	4-1	25	15	1.3
Mobile 97	4-3	25	15	2.7	Mobile 97	3-1	25	30	5.2	Mobile 97	4-1	25	30	0.8
Mobile 97	4-3	25	30	1.1	Mobile 97	3a-1	25	15	4.8	Mobile 97	4-2	25	15	11.5
Mobile 97	5-1	25	15	1.4	Mobile 97	3a-1	25	30	4.0	Mobile 97	4-2	25	30	2.8
Mobile 97	5-1	25	30	0.4	Mobile 97	4-1	25	15	8.7	Mobile 97	4-3	25	15	5.3
Methylcyclopentane					Mobile 97	4-1	25	30	6.0	Mobile 97	4-3	25	30	0.3
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 97	4-2	25	15	16.3	Mobile 97	5-1	25	15	2.3
Mobile 94	1	199	30	0.2	Mobile 97	4-2	25	30	26.1	Mobile 97	5-1	25	30	0.1
Mobile 94	1	199	50	0.2	Mobile 97	4-3	25	15	11.7	n-Butylbenzene				
Mobile 94	1	199	30	0.7	Mobile 97	4-3	25	30	4.0	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 94	1	199	45	0.2	Mobile 97	5-1	25	15	4.1	Mobile 94	2	231	30	0.4
Mobile 94	1	199	75	0.2	Mobile 97	5-1	25	30	1.1	Mobile 94	3	231	75	0.1
Mobile 94	2	231	50	4.4	Mobile 94	1	199	30	3.8	Mobile 97	1-1	25	15	0.1
Mobile 94	2	231	85	0.6	Mobile 94	1	199	45	1.0	Mobile 97	1-1	25	30	0.1
Mobile 94	2	231	30	9.3	Mobile 94	1	199	75	1.4	Mobile 97	1-1	25	45	0.1
Mobile 94	2	231	45	4.2	Mobile 94	2	231	50	7.9	Mobile 97	2-1	25	15	0.3
Mobile 94	2	231	75	2.3	Mobile 94	2	231	85	1.0	Mobile 97	2-1	25	30	0.4
Mobile 94	3	231	30	4.1	Mobile 94	2	231	30	36.7	Mobile 97	2-2	25	15	0.1
Mobile 94	3	231	50	0.3	Mobile 94	2	231	45	7.1	Mobile 97	2-2	25	30	0.1
Mobile 94	3	231	85	0.6	Mobile 94	2	231	75	3.4	Mobile 97	2-3	25	15	0.3
Mobile 94	3	231	45	1.8	Mobile 94	3	231	30	20.9	Mobile 97	2-3	25	30	0.2
Mobile 94	3	231	75	0.2	Mobile 94	3	231	50	1.8	Mobile 97	3-1	25	15	0.1
Mobile 97	1-1	25	15	0.6	Mobile 94	3	231	85	3.5	Mobile 97	3-1	25	30	0.1
Mobile 97	1-1	25	30	1.1	Mobile 94	3	231	45	5.9	Mobile 97	3a-1	25	15	0.0
Mobile 97	1-1	25	45	0.6	Naphthalene					Mobile 97	3a-1	25	30	0.1
Mobile 97	2-1	25	15	0.4	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 97	4-1	25	15	1.9
Mobile 97	2-1	25	30	0.3	Mobile 94	1	199	30	0.2	Mobile 97	4-1	25	30	0.1
Mobile 97	2-2	25	15	0.4	Mobile 94	1	199	45	0.3	Mobile 97	4-2	25	15	1.2
Mobile 97	2-2	25	30	0.6	Mobile 94	1	199	75	1.0	Mobile 97	4-2	25	30	0.5
Mobile 97	2-3	25	15	0.5	Mobile 94	2	231	50	3.1	Mobile 97	4-3	25	15	0.8
Mobile 97	2-3	25	30	0.4	Mobile 94	2	231	85	0.2	Mobile 97	4-3	25	30	0.1
Mobile 97	3-1	25	15	0.8	Mobile 94	2	231	30	6.4	Mobile 97	5-1	25	15	0.3
Mobile 97	3-1	25	30	0.8	Mobile 94	2	231	45	0.9	Mobile 97	5-1	25	30	0.1
Mobile 97	3a-1	25	15	1.2	Mobile 94	3	231	30	7.1	Nonane				
Mobile 97	4-1	25	15	1.4	Mobile 94	3	231	50	2.1	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 97	4-1	25	30	1.2	Mobile 94	3	231	85	0.9	Mobile 94	1	199	30	1.7
Mobile 97	4-2	25	15	0.8	Mobile 94	3	231	45	1.4	Mobile 94	1	199	45	0.2
Mobile 97	4-2	25	30	2.7	Mobile 94	3	231	75	1.4	Mobile 94	1	199	75	0.3
Mobile 97	4-3	25	30	0.3	Mobile 97	1-1	25	15	0.2	Mobile 94	2	231	50	3.9
Mobile 97	5-1	25	30	0.2	Mobile 97	1-1	25	30	0.2	Mobile 94	2	231	85	0.2
m,p-Xylene					Mobile 97	1-1	25	45	0.2	Mobile 94	2	231	30	18.2
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 97	2-1	25	15	3.9	Mobile 94	2	231	45	3.6
Mobile 97	1-1	25	15	2.8	Mobile 97	2-1	25	30	2.2	Mobile 94	2	231	75	1.7
Mobile 97	1-1	25	30	2.2	Mobile 97	2-2	25	15	1.3	Mobile 94	3	231	30	11.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-12 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

Nonane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	3	231	50	0.6
Mobile 94	3	231	85	1.6
Mobile 94	3	231	45	1.6
Mobile 94	3	231	75	0.3
Mobile 97	1-1	25	15	1.2
Mobile 97	1-1	25	30	0.8
Mobile 97	1-1	25	45	0.6
Mobile 97	2-1	25	15	3.5
Mobile 97	2-1	25	30	1.8
Mobile 97	2-2	25	15	1.8
Mobile 97	2-2	25	30	0.7
Mobile 97	2-3	25	15	3.0
Mobile 97	2-3	25	30	1.6
Mobile 97	3-1	25	15	0.7
Mobile 97	3-1	25	30	1.5
Mobile 97	3a-1	25	15	0.3
Mobile 97	3a-1	25	30	0.7
Mobile 97	4-1	25	15	2.1
Mobile 97	4-1	25	30	1.1
Mobile 97	4-2	25	15	15.3
Mobile 97	4-2	25	30	5.3
Mobile 97	4-3	25	15	10.0
Mobile 97	4-3	25	30	2.9
Mobile 97	5-1	25	15	3.3
Mobile 97	5-1	25	30	1.1

n-Propylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.3
Mobile 94	2	231	30	1.7
Mobile 94	2	231	45	0.3
Mobile 94	2	231	75	0.2
Mobile 94	3	231	30	1.0
Mobile 94	3	231	50	0.0
Mobile 94	3	231	85	0.2
Mobile 94	3	231	45	0.4
Mobile 94	3	231	75	0.3
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.4
Mobile 97	2-1	25	30	0.4
Mobile 97	2-2	25	15	0.2
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	15	0.4
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	15	0.4
Mobile 97	3-1	25	30	0.4
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.6
Mobile 97	4-1	25	15	0.7
Mobile 97	4-1	25	30	0.5

n-Propylbenzene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-2	25	15	1.6
Mobile 97	4-2	25	30	1.6
Mobile 97	4-3	25	15	1.1
Mobile 97	4-3	25	30	0.3
Mobile 97	5-1	25	15	0.4
Mobile 97	5-1	25	30	0.1

Octane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	2.3
Mobile 94	1	199	45	0.2
Mobile 94	1	199	75	0.2
Mobile 94	2	231	50	5.3
Mobile 94	2	231	85	16.3
Mobile 94	2	231	30	27.5
Mobile 94	2	231	45	4.9
Mobile 94	2	231	75	2.5
Mobile 94	3	231	30	13.5
Mobile 94	3	231	50	0.6
Mobile 94	3	231	85	2.1
Mobile 94	3	231	45	1.9
Mobile 94	3	231	75	0.2
Mobile 97	1-1	25	15	1.2
Mobile 97	1-1	25	30	1.0
Mobile 97	1-1	25	45	0.8
Mobile 97	2-1	25	15	2.0
Mobile 97	2-1	25	30	2.0
Mobile 97	2-2	25	15	0.9
Mobile 97	2-2	25	30	0.5
Mobile 97	2-3	25	15	1.2
Mobile 97	2-3	25	30	0.7
Mobile 97	3-1	25	15	0.5
Mobile 97	3-1	25	30	1.3
Mobile 97	3a-1	25	15	0.5
Mobile 97	3a-1	25	30	0.9
Mobile 97	4-1	25	15	1.8
Mobile 97	4-1	25	30	1.0
Mobile 97	4-2	25	15	7.4
Mobile 97	4-2	25	30	3.2
Mobile 97	4-3	25	15	4.7
Mobile 97	4-3	25	30	2.0
Mobile 97	5-1	25	15	2.1
Mobile 97	5-1	25	30	0.7

o-Xylene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.7
Mobile 94	1	199	45	0.4
Mobile 94	1	199	75	0.7
Mobile 94	2	231	50	3.4
Mobile 94	2	231	85	0.3
Mobile 94	2	231	30	15.1
Mobile 94	2	231	45	2.9

o-Xylene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	75	1.6
Mobile 94	3	231	30	8.8
Mobile 94	3	231	50	0.6
Mobile 94	3	231	85	1.4
Mobile 94	3	231	45	2.2
Mobile 94	3	231	15	21.9
Mobile 97	1-1	25	15	0.9
Mobile 97	1-1	25	30	0.7
Mobile 97	1-1	25	45	0.6
Mobile 97	2-1	25	15	2.0
Mobile 97	2-1	25	30	1.0
Mobile 97	2-2	25	15	1.3
Mobile 97	2-2	25	30	0.5
Mobile 97	2-3	25	15	2.2
Mobile 97	2-3	25	30	1.2
Mobile 97	3-1	25	15	1.7
Mobile 97	3-1	25	30	1.8
Mobile 97	3a-1	25	15	2.2
Mobile 97	3a-1	25	30	2.7
Mobile 97	4-1	25	15	3.3
Mobile 97	4-1	25	30	2.0
Mobile 97	4-2	25	15	7.7
Mobile 97	4-2	25	30	8.0
Mobile 97	4-3	25	15	5.3
Mobile 97	4-3	25	30	2.1
Mobile 97	5-1	25	15	2.1
Mobile 97	5-1	25	30	0.6

p-Cymene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	45	0.1
Mobile 94	1	199	75	0.1
Mobile 94	2	231	50	1.4
Mobile 94	2	231	85	0.1
Mobile 94	2	231	30	1.0
Mobile 94	2	231	45	0.2
Mobile 94	3	231	50	0.3
Mobile 94	3	231	45	1.4
Mobile 94	3	231	75	0.6
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.2
Mobile 97	2-1	25	30	0.2
Mobile 97	2-2	25	15	0.1
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.2
Mobile 97	3a-1	25	30	0.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-13 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

	p-Cymene (ctd.)					Propane					Propene			
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 97	4-1	25	30	0.2	Mobile 94	2	231	75	4.5	Mobile 97	2-3	25	15	1.0
Mobile 97	4-2	25	15	1.1	Mobile 94	3	231	30	2.9	Mobile 97	2-3	25	30	1.0
Mobile 97	4-2	25	30	0.5	Mobile 94	3	231	50	5.9	Mobile 97	3-1	25	15	1.4
Mobile 97	4-3	25	15	0.7	Mobile 94	3	231	85	2.8	Mobile 97	3-1	25	30	1.3
Mobile 97	4-3	25	30	0.3	Mobile 94	3	231	15	17.9	Mobile 97	3a-1	25	15	1.9
Mobile 97	5-1	25	15	0.2	Mobile 94	3	231	75	2.8	Mobile 97	3a-1	25	30	2.5
	Pentane				Mobile 97	1-1	25	15	6.6	Mobile 97	4-1	25	15	2.8
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 97	1-1	25	30	6.4	Mobile 97	4-1	25	30	2.8
Mobile 94	1	199	30	2.1	Mobile 97	1-1	25	45	4.9	Mobile 97	4-2	25	15	1.9
Mobile 94	1	199	45	1.5	Mobile 97	2-1	25	15	3.3	Mobile 97	4-2	25	30	1.5
Mobile 94	1	199	75	1.4	Mobile 97	2-1	25	30	3.4	Mobile 97	4-3	25	15	1.1
Mobile 94	2	231	50	3.5	Mobile 97	2-2	25	15	2.2	Mobile 97	4-3	25	30	0.9
Mobile 94	2	231	85	1.0	Mobile 97	2-2	25	30	2.3	Mobile 97	5-1	25	15	1.5
Mobile 94	2	231	30	11.9	Mobile 97	2-3	25	15	2.7	Mobile 97	5-1	25	30	0.5
Mobile 94	2	231	45	2.8	Mobile 97	2-3	25	30	2.4		Propyne			
Mobile 94	2	231	75	1.8	Mobile 97	3-1	25	15	7.3	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 94	3	231	30	6.3	Mobile 97	3-1	25	30	7.9	Mobile 97	2-1	25	15	0.3
Mobile 94	3	231	50	2.2	Mobile 97	3a-1	25	15	11.4	Mobile 97	2-1	25	30	0.2
Mobile 94	3	231	85	2.6	Mobile 97	3a-1	25	30	10.0	Mobile 97	2-2	25	15	0.2
Mobile 94	3	231	15	33.2	Mobile 97	4-1	25	15	12.2	Mobile 97	2-2	25	30	0.1
Mobile 94	3	231	75	1.3	Mobile 97	4-1	25	30	11.9	Mobile 97	2-3	25	15	0.2
Mobile 97	1-1	25	15	1.9	Mobile 97	4-2	25	15	7.6	Mobile 97	2-3	25	30	0.1
Mobile 97	1-1	25	30	2.2	Mobile 97	4-2	25	30	9.6	Mobile 97	3-1	25	15	0.2
Mobile 97	1-1	25	45	1.9	Mobile 97	4-3	25	15	4.2	Mobile 97	3-1	25	30	0.2
Mobile 97	2-1	25	15	1.1	Mobile 97	4-3	25	30	6.5	Mobile 97	3a-1	25	15	0.2
Mobile 97	2-1	25	30	1.0	Mobile 97	5-1	25	15	2.3	Mobile 97	3a-1	25	30	0.3
Mobile 97	2-2	25	15	0.6	Mobile 97	5-1	25	30	1.1	Mobile 97	4-1	25	15	0.2
Mobile 97	2-2	25	30	0.6		Propene				Mobile 97	4-1	25	30	0.2
Mobile 97	2-3	25	15	1.2	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 97	4-2	25	15	0.4
Mobile 97	2-3	25	30	0.7	Mobile 94	1	199	30	2.9	Mobile 97	4-2	25	30	0.2
Mobile 97	3-1	25	15	4.9	Mobile 94	1	199	50	1.5	Mobile 97	4-3	25	15	0.2
Mobile 97	3-1	25	30	5.4	Mobile 94	1	199	30	4.3	Mobile 97	4-3	25	30	0.1
Mobile 97	3a-1	25	15	7.5	Mobile 94	1	199	45	2.0	Mobile 97	5-1	25	15	0.2
Mobile 97	3a-1	25	30	7.2	Mobile 94	1	199	75	1.0	Mobile 97	5-1	25	30	0.1
Mobile 97	4-1	25	15	7.0	Mobile 94	2	231	50	8.0	Mobile 97	5-1	25	15	0.8
Mobile 97	4-1	25	30	6.7	Mobile 94	2	231	85	9.3	Mobile 97	5-1	25	30	0.4
Mobile 97	4-2	25	15	3.0	Mobile 94	2	231	30	21.1	Mobile 97	5-1	25	85	0.0
Mobile 97	4-2	25	30	32.5	Mobile 94	2	231	45	16.3		sec-Butylbenzene			
Mobile 97	4-3	25	15	1.1	Mobile 94	2	231	75	8.1	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 97	4-3	25	30	1.8	Mobile 94	3	231	30	14.0	Mobile 94	2	231	85	0.0
Mobile 97	5-1	25	15	0.9	Mobile 94	3	231	50	6.6	Mobile 94	3	231	30	0.3
	Propane				Mobile 94	3	231	85	3.0	Mobile 97	1-1	25	15	0.0
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 94	3	231	45	2.2	Mobile 97	2-1	25	15	0.2
Mobile 94	1	199	30	11.3	Mobile 94	3	231	75	4.0	Mobile 97	2-1	25	30	0.2
Mobile 94	1	199	30	13.2	Mobile 97	1-1	25	15	0.5	Mobile 97	2-2	25	15	0.1
Mobile 94	1	199	45	4.5	Mobile 97	1-1	25	30	0.5	Mobile 97	2-3	25	15	0.2
Mobile 94	1	199	75	2.5	Mobile 97	1-1	25	45	0.5	Mobile 97	2-3	25	30	0.1
Mobile 94	2	231	50	3.9	Mobile 97	2-1	25	15	2.9	Mobile 97	3-1	25	15	0.1
Mobile 94	2	231	85	3.0	Mobile 97	2-1	25	30	2.4	Mobile 97	3-1	25	30	0.1
Mobile 94	2	231	30	14.9	Mobile 97	2-2	25	15	1.3	Mobile 97	3a-1	25	15	0.1
Mobile 94	2	231	45	3.5	Mobile 97	2-2	25	30	0.9	Mobile 97	3a-1	25	30	0.1

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-14 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

sec-Butylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.1
Mobile 97	4-2	25	15	0.9
Mobile 97	4-2	25	30	0.4
Mobile 97	4-3	25	15	0.6
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	15	0.2
Mobile 97	5-1	25	30	0.0

Styrene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	45	0.6
Mobile 94	1	199	75	0.3
Mobile 94	2	231	30	5.2
Mobile 94	2	231	45	0.3
Mobile 94	3	231	30	7.4
Mobile 94	3	231	50	2.1
Mobile 94	3	231	45	7.6
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.7
Mobile 97	2-1	25	30	0.4
Mobile 97	2-2	25	15	0.2
Mobile 97	2-2	25	30	0.1
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.3
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.5
Mobile 97	4-1	25	15	0.4
Mobile 97	4-1	25	30	0.3
Mobile 97	4-2	25	15	1.2
Mobile 97	4-2	25	30	0.4
Mobile 97	4-3	25	15	0.5
Mobile 97	4-3	25	30	0.0
Mobile 97	5-1	25	15	0.2

t-1,2-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.5
Mobile 94	2	231	50	1.3
Mobile 94	2	231	30	6.6
Mobile 94	2	231	45	1.2
Mobile 94	2	231	75	0.7
Mobile 94	3	231	30	2.8
Mobile 94	3	231	85	0.5
Mobile 94	3	231	45	0.4
Mobile 97	1-1	25	15	0.2
Mobile 97	1-1	25	30	0.2
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.4

t-1,2-Dimethylcyclohexane (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-1	25	30	0.3
Mobile 97	2-2	25	15	0.2
Mobile 97	2-2	25	30	0.2
Mobile 97	2-3	25	15	0.2
Mobile 97	2-3	25	30	0.2
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.4
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	1.5
Mobile 97	4-2	25	30	0.6
Mobile 97	4-3	25	15	1.0
Mobile 97	4-3	25	30	0.5
Mobile 97	5-1	25	15	0.5
Mobile 97	5-1	25	30	0.2

t-1,4-Dimethylcyclohexane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	2	231	50	1.3
Mobile 94	2	231	30	6.1
Mobile 94	2	231	45	1.3
Mobile 94	3	231	30	2.6
Mobile 94	3	231	45	0.5
Mobile 97	1-1	25	15	0.1
Mobile 97	1-1	25	30	0.1
Mobile 97	1-1	25	45	0.1
Mobile 97	2-1	25	15	0.2
Mobile 97	2-2	25	15	0.1
Mobile 97	2-2	25	30	0.0
Mobile 97	2-3	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.1
Mobile 97	4-1	25	15	0.2
Mobile 97	4-1	25	30	0.1
Mobile 97	4-2	25	15	0.7
Mobile 97	4-2	25	30	0.3
Mobile 97	4-3	25	15	0.5
Mobile 97	4-3	25	30	0.2
Mobile 97	5-1	25	15	0.3
Mobile 97	5-1	25	30	0.1

t-2-Butene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.2
Mobile 94	1	199	50	0.1
Mobile 94	1	199	30	0.3
Mobile 94	1	199	45	0.2
Mobile 94	2	231	15	1.2
Mobile 94	2	231	30	0.5
Mobile 94	2	231	45	0.6
Mobile 94	3	231	30	0.9

t-2-Butene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	3	231	50	0.3
Mobile 97	2-1	25	15	0.1
Mobile 97	2-1	25	30	0.1
Mobile 97	2-2	25	15	0.1
Mobile 97	2-3	25	30	0.1
Mobile 97	3-1	25	15	0.1
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.2
Mobile 97	4-1	25	15	0.1
Mobile 97	4-1	25	30	0.1
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	0.3
Mobile 97	4-3	25	15	0.1
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1

t-2-Heptene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	1	199	50	0.3
Mobile 94	1	199	45	0.2
Mobile 94	2	231	30	0.2
Mobile 94	3	231	15	2.2
Mobile 94	3	231	45	1.1
Mobile 94	3	25	15	0.2
Mobile 94	3	25	85	0.0

t-2-Hexene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	1	199	50	0.2
Mobile 94	1	199	30	0.6
Mobile 94	1	199	45	0.3
Mobile 94	2	231	85	0.6
Mobile 94	2	231	45	0.4
Mobile 94	3	231	30	2.8
Mobile 94	3	231	50	1.0
Mobile 94	3	231	45	0.5

t-2-Octene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.6
Mobile 94	1	199	50	0.2
Mobile 94	1	199	30	2.4
Mobile 94	1	199	45	0.2
Mobile 94	2	231	50	1.6
Mobile 94	2	231	30	8.8
Mobile 94	2	231	45	2.4
Mobile 94	2	231	75	2.6
Mobile 94	3	231	50	1.2
Mobile 94	3	231	85	1.5
Mobile 94	3	231	45	2.6

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A2-15 **Emissions Measured at Previous Test Burns: VOCs from Diesel** (concentrations in $\mu g/m^3$)

t-2-Pentene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-1	25	30	1.1
Mobile 97	2-3	25	15	0.1
Mobile 97	3-1	25	15	0.2
Mobile 97	3-1	25	30	0.1
Mobile 97	3a-1	25	15	0.3
Mobile 97	3a-1	25	30	0.3
Mobile 97	4-1	25	15	0.2
Mobile 97	4-1	25	30	0.2
Mobile 97	4-2	25	15	0.1
Mobile 97	4-2	25	30	1.7
Mobile 97	4-3	25	30	0.1
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	85	0.0
Mobile 97	5-1	25	15	3.3
Mobile 97	5-1	25	15	2.0

t-3-Heptene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	9.2
Mobile 94	2	231	50	1.2
Mobile 94	2	231	30	5.2
Mobile 94	3	231	30	24.7
Mobile 94	3	231	50	0.4
Mobile 97	2-1	25	30	0.1

tert-Butylbenzene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-1	25	15	0.1
Mobile 97	2-3	25	45	0.0
Mobile 97	4-2	25	15	0.5
Mobile 97	4-2	25	30	0.2
Mobile 97	4-3	25	15	0.3
Mobile 97	5-1	25	15	0.1
Mobile 97	5-1	25	15	1.0
Mobile 97	5-1	25	85	0.0

Toluene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	5.7
Mobile 94	1	199	45	2.0
Mobile 94	1	199	75	2.8
Mobile 94	2	231	50	15.3
Mobile 94	2	231	85	3.0
Mobile 94	2	231	30	50.6
Mobile 94	2	231	45	13.4
Mobile 94	2	231	75	7.1
Mobile 94	3	231	30	27.1
Mobile 94	3	231	50	4.2
Mobile 94	3	231	85	5.5
Mobile 94	3	231	45	45.2
Mobile 94	3	231	75	7.3
Mobile 97	1-1	25	15	4.5
Mobile 97	1-1	25	30	4.6
Mobile 97	1-1	25	45	3.1

Toluene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2-1	25	15	4.5
Mobile 97	2-1	25	30	3.0
Mobile 97	2-2	25	15	3.0
Mobile 97	2-2	25	30	1.9
Mobile 97	2-3	25	15	5.0
Mobile 97	2-3	25	30	2.9
Mobile 97	3-1	25	15	9.6
Mobile 97	3-1	25	30	9.7
Mobile 97	3a-1	25	15	13.7
Mobile 97	3a-1	25	30	10.0
Mobile 97	4-1	25	15	14.4
Mobile 97	4-1	25	30	15.1
Mobile 97	4-2	25	15	12.3
Mobile 97	4-2	25	30	55.2
Mobile 97	4-3	25	15	7.2
Mobile 97	4-3	25	30	3.8
Mobile 97	5-1	25	15	3.9
Mobile 97	5-1	25	30	1.7

Total VOCs

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	64.35
Mobile 94	1	199	45	38.07
Mobile 94	1	199	85	29.94
Mobile 94	1	199	30	132.2
Mobile 94	1	199	45	44.26
Mobile 94	1	199	75	34.62
Mobile 94	2	231	50	174.8
Mobile 94	2	231	85	73.2
Mobile 94	2	231	30	650.0
Mobile 94	2	231	45	172.5
Mobile 94	2	231	75	85.1
Mobile 94	3	231	30	433.0
Mobile 94	3	231	50	107.4
Mobile 94	3	231	85	67.3
Mobile 94	3	231	45	290.2
Mobile 94	3	231	75	98.45
Mobile 97	1-1	25	15	50.1
Mobile 97	1-1	25	30	49.8
Mobile 97	1-1	25	45	37.7
Mobile 97	2-1	25	15	133.0
Mobile 97	2-1	25	30	107.0
Mobile 97	2-2	25	15	60.9
Mobile 97	2-2	25	30	31.1
Mobile 97	2-3	25	15	130.1
Mobile 97	2-3	25	30	67.2
Mobile 97	3-1	25	15	86.2
Mobile 97	3-1	25	30	97.4
Mobile 97	3a-1	25	15	119.9
Mobile 97	3a-1	25	30	115.5
Mobile 97	4-1	25	15	143.0
Mobile 97	4-1	25	30	115.9

Total VOCs (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 97	4-2	25	15	140.3
Mobile 97	4-2	25	30	115.7
Mobile 97	4-3	25	15	254.4
Mobile 97	4-3	25	30	65.7
Mobile 97	5-1	25	15	112.8
Mobile 97	5-1	25	30	21.9

Undecane

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.0
Mobile 94	1	199	50	0.5
Mobile 94	1	199	30	1.8
Mobile 94	1	199	45	0.8
Mobile 94	1	199	75	0.4
Mobile 94	2	231	50	1.0
Mobile 94	2	231	85	0.2
Mobile 94	2	231	30	4.1
Mobile 94	2	231	45	1.1
Mobile 94	2	231	75	0.5
Mobile 94	3	231	30	5.8
Mobile 94	3	231	50	0.9
Mobile 94	3	231	85	0.8
Mobile 94	3	231	45	2.7
Mobile 94	3	231	75	1.6
Mobile 97	1-1	25	15	1.7
Mobile 97	1-1	25	30	1.2
Mobile 97	1-1	25	45	0.7
Mobile 97	2-1	25	15	15.7
Mobile 97	2-1	25	30	5.4
Mobile 97	2-2	25	15	6.1
Mobile 97	2-2	25	30	2.0
Mobile 97	2-3	25	15	19.6
Mobile 97	2-3	25	30	8.8
Mobile 97	3-1	25	15	0.9
Mobile 97	3-1	25	30	1.4
Mobile 97	3a-1	25	15	0.1
Mobile 97	3a-1	25	30	0.5
Mobile 97	4-1	25	15	4.0
Mobile 97	4-1	25	30	1.1
Mobile 97	4-2	25	15	54.6
Mobile 97	4-2	25	30	22.1
Mobile 97	4-3	25	15	41.7
Mobile 97	4-3	25	30	3.2
Mobile 97	5-1	25	15	15.7
Mobile 97	5-1	25	30	1.6

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A3-1 **Emissions Measured at Previous Test Burns: PAHs from Crude** (concentrations in $\mu g/m^3$)

1-Methylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.17
Mobile 92	1	36	23	1.04
Mobile 92	1	36	46	0.13
Mobile 92	1	36	76	0.05
Mobile 92	2	231	23	0.73
Mobile 92	2	231	23	0.86
Mobile 92	3	231	23	0.37
Mobile 92	4	231	23	0.11
Mobile 92	5	231	23	0.34
Mobile 92	5	231	23	0.42
Mobile 92	6	231	23	0.29
Mobile 92	6	231	23	0.12
Mobile 92	2	231	46	0.94
Mobile 92	3	231	46	0.17
Mobile 92	4	231	46	0.09
Mobile 92	5	231	46	0.18
Mobile 92	6	231	46	0.03
Mobile 92	2	231	76	0.38
Mobile 92	3	231	76	0.15
Mobile 92	4	231	76	0.06
Mobile 92	5	231	76	0.01
Mobile 92	6	231	76	0.02
Nobe 93	2	427	75	1.39
Nobe 93	2	427	75	1.88
Nobe 93	2	427	125	3.07
Nobe 93	2	427	125	2.88
Nobe 93	2	427	600	0.58
Nobe 93	2	427	600	0.37
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	1.64
Nobe 93	1	600	75	2.00
Nobe 93	1	600	125	2.10
Nobe 93	1	600	125	2.09
Nobe 93	1	600	900	0.55
Nobe 93	1	600	900	0.39

1-Methylphenanthrene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.09
Mobile 92	1	36	23	0.10
Mobile 92	1	36	46	0.09
Mobile 92	1	36	76	0.05
Mobile 92	2	231	23	0.07
Mobile 92	2	231	23	0.02
Mobile 92	2	231	23	0.01
Mobile 92	3	231	23	0.03
Mobile 92	4	231	23	0.02
Mobile 92	5	500	23	0.08
Mobile 92	5	500	23	0.13
Mobile 92	6	231	23	0.02
Mobile 92	6	231	23	0.03

1-Methylphenanthrene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	2	500	46	0.07
Mobile 92	3	231	46	0.03
Mobile 92	5	300	46	0.05
Mobile 92	6	231	46	0.01
Mobile 92	2	231	76	0.02
Mobile 92	3	231	76	0.02
Nobe 93	2	427	75	0.02
Nobe 93	2	427	75	0.03
Nobe 93	2	427	125	0.01
Nobe 93	2	427	125	0.01
Nobe 93	2	427	600	0.01
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.02
Nobe 93	1	600	75	0.02
Nobe 93	1	600	125	0.01
Nobe 93	1	600	125	0.01
Nobe 93	1	100	125	0.00

2,3,5-Trimethylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.02
Mobile 92	1	36	23	0.09
Mobile 92	1	36	46	0.05
Mobile 92	1	36	76	0.03
Mobile 92	2	231	23	0.14
Mobile 92	2	231	23	0.14
Mobile 92	3	231	23	0.06
Mobile 92	4	231	23	0.05
Mobile 92	5	231	23	0.23
Mobile 92	5	231	23	0.38
Mobile 92	6	231	23	0.07
Mobile 92	6	231	23	0.06
Mobile 92	2	231	46	0.19
Mobile 92	3	231	46	0.04
Mobile 92	4	231	46	0.02
Mobile 92	5	231	46	0.18
Mobile 92	6	231	46	0.02
Mobile 92	2	231	76	0.07
Mobile 92	3	231	76	0.03
Mobile 92	4	231	76	0.01
Mobile 92	5	231	76	0.01
Nobe 93	2	427	75	0.24
Nobe 93	2	427	75	0.32
Nobe 93	2	427	125	0.14
Nobe 93	2	427	125	0.12
Nobe 93	2	427	600	0.04
Nobe 93	2	427	600	0.05
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.21
Nobe 93	1	600	75	0.36

2,3,5-Trimethylnaphthalene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	600	125	0.26
Nobe 93	1	600	125	0.15
Nobe 93	1	600	900	0.03
Nobe 93	1	600	900	0.03

2,6 -Dimethylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.01
Mobile 92	1	36	23	0.34
Mobile 92	1	36	46	0.01
Mobile 92	1	36	76	0.01
Mobile 92	2	231	23	0.04
Mobile 92	2	231	23	0.43
Mobile 92	3	231	23	0.22
Mobile 92	4	231	23	0.14
Mobile 92	5	231	23	0.30
Mobile 92	5	231	23	0.06
Mobile 92	6	231	23	0.15
Mobile 92	6	231	23	0.02
Mobile 92	2	231	46	0.06
Mobile 92	3	231	46	0.11
Mobile 92	4	231	46	0.07
Mobile 92	2	231	76	0.02
Mobile 92	3	231	76	0.11
Mobile 92	4	231	76	0.06
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	2	427	75	0.94
Nobe 93	2	427	75	1.41
Nobe 93	2	427	125	0.93
Nobe 93	2	427	125	0.88
Nobe 93	2	427	600	0.21
Nobe 93	2	427	600	0.16
Nobe 93	1	600	75	0.94
Nobe 93	1	600	75	1.62
Nobe 93	1	600	125	1.00
Nobe 93	1	600	125	0.87
Nobe 93	1	600	900	0.16
Nobe 93	1	600	900	0.12

2-Methylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.17
Mobile 92	1	36	23	0.01
Mobile 92	1	36	23	1.54
Mobile 92	1	36	46	0.12
Mobile 92	1	36	76	0.05
Mobile 92	2	231	23	0.94
Mobile 92	2	231	23	0.01
Mobile 92	2	231	23	1.33
Mobile 92	3	231	23	0.45
Mobile 92	4	231	23	0.14
Mobile 92	5	231	23	0.55

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$, cum = cumulative

Table A3-2 **Emissions Measured at Previous Test Burns: PAHs from Crude** (concentrations in $\mu g/m^3$)

2-Methylnaphthalene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	5	231	23	0.53
Mobile 92	6	231	23	0.44
Mobile 92	6	231	23	0.14
Mobile 92	2	231	46	1.27
Mobile 92	3	231	46	0.22
Mobile 92	4	231	46	0.11
Mobile 92	5	231	46	0.24
Mobile 92	6	231	46	0.04
Mobile 92	2	231	76	0.53
Mobile 92	3	231	76	0.21
Mobile 92	4	231	76	0.08
Mobile 92	5	231	76	0.02
Mobile 92	6	231	76	0.02
Nobe 93	2	427	75	1.97
Nobe 93	2	427	75	1.86
Nobe 93	2	427	125	1.61
Nobe 93	2	427	125	1.56
Nobe 93	2	427	600	0.46
Nobe 93	2	427	600	0.32
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	2.27
Nobe 93	1	600	75	2.75
Nobe 93	1	600	125	1.33
Nobe 93	1	600	125	1.19
Nobe 93	1	600	900	0.28
Nobe 93	1	600	900	0.20

Acenaphthene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.05
Mobile 92	1	36	23	0.09
Mobile 92	1	36	46	0.07
Mobile 92	1	36	76	0.03
Mobile 92	2	231	23	0.03
Mobile 92	2	231	23	0.03
Mobile 92	3	231	23	0.03
Mobile 92	4	231	23	0.02
Mobile 92	5	231	23	0.03
Mobile 92	5	231	23	0.06
Mobile 92	6	231	23	0.01
Mobile 92	6	231	23	0.03
Mobile 92	2	231	46	0.04
Mobile 92	3	231	46	0.02
Mobile 92	5	231	46	0.02
Mobile 92	6	231	46	0.01
Mobile 92	2	231	76	0.03
Mobile 92	3	231	76	0.02
Mobile 92	5	231	76	0.01
Nobe 93	2	427	75	0.01
Nobe 93	2	427	75	0.07
Nobe 93	2	427	125	0.03

Acenaphthene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	427	125	0.03
Nobe 93	2	427	600	0.01
Nobe 93	2	427	600	0.01
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.01
Nobe 93	1	600	75	0.08
Nobe 93	1	600	125	0.05
Nobe 93	1	600	125	0.05
Nobe 93	1	600	900	0.01
Nobe 93	1	600	900	0.01
Mobile 91	cum	1071	30	0.06

Acenaphthylene

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	427	75	0.71
Nobe 93	2	427	75	1.24
Nobe 93	2	427	125	0.14
Nobe 93	2	427	125	0.14
Nobe 93	2	427	600	0.05
Nobe 93	2	427	600	0.04
Nobe 93	1	600	75	0.14
Nobe 93	1	600	75	0.71
Nobe 93	1	600	125	0.29
Nobe 93	1	600	125	0.24
Nobe 93	1	600	900	0.03
Nobe 93	1	600	900	0.02
Mobile 92	1	600	23	2.63
Mobile 92	1	36	23	1.15
Mobile 92	1	36	46	3.50
Mobile 92	1	36	76	1.20
Mobile 91	30	114	30	1.20
Mobile 91	30	114	60	3.30
Mobile 92	2	231	23	1.21
Mobile 92	2	231	23	0.83
Mobile 92	3	231	23	0.78
Mobile 92	4	231	23	0.53
Mobile 92	5	231	23	0.14
Mobile 92	5	231	23	0.34
Mobile 92	6	231	23	0.22
Mobile 92	6	231	23	0.47
Mobile 91	5	231	30	0.63
Mobile 92	2	231	46	1.15
Mobile 92	3	231	46	0.23
Mobile 92	4	231	46	0.12
Mobile 92	5	231	46	0.15
Mobile 92	6	231	46	0.08
Mobile 91	5	231	60	0.36
Mobile 92	2	231	76	0.28
Mobile 92	3	231	76	0.21
Mobile 92	4	231	76	0.05
Mobile 92	6	231	76	0.02

Acenaphthylene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Mobile 91	cum	1071	30	0.55
Mobile 91	cum	1071	60	0.16

Anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.49
Mobile 92	1	36	23	0.01
Mobile 92	1	36	23	0.66
Mobile 92	1	500	46	0.50
Mobile 92	1	36	76	0.17
Mobile 91	30	600	60	0.79
Mobile 92	2	231	23	0.10
Mobile 92	2	231	23	0.01
Mobile 92	2	231	23	0.07
Mobile 92	3	231	23	0.09
Mobile 92	4	231	23	0.08
Mobile 92	5	231	23	0.03
Mobile 92	5	231	23	0.04
Mobile 92	6	231	23	0.03
Mobile 92	6	231	23	0.05
Mobile 92	2	231	46	0.09
Mobile 92	3	231	46	0.03
Mobile 92	4	231	46	0.02
Mobile 92	5	231	46	0.02
Mobile 92	6	231	46	0.01
Mobile 92	2	231	76	0.03
Mobile 92	3	231	76	0.02
Nobe 93	2	427	75	0.08
Nobe 93	2	427	75	0.11
Nobe 93	2	427	125	0.01
Nobe 93	2	427	125	0.11
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.02
Nobe 93	1	600	75	0.04
Nobe 93	1	600	125	0.12
Nobe 93	1	600	125	0.02
Nobe 93	1	600	900	0.00
Nobe 93	1	600	900	0.00

Benz(a)anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.41
Mobile 92	1	600	23	0.58
Mobile 92	1	500	46	0.38
Mobile 92	1	36	76	0.10
Mobile 92	2	231	23	0.05
Mobile 92	2	231	23	0.06
Mobile 92	3	231	23	0.06
Mobile 92	4	231	23	0.06
Mobile 92	5	231	23	0.01

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$, cum = cumulative

Table A3-3 **Emissions Measured at Previous Test Burns: PAHs from Crude** (concentrations in $\mu g/m^3$)

Benz(a)anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	6	231	23	0.03
Mobile 92	2	231	46	0.05
Mobile 92	3	231	46	0.02
Mobile 92	4	231	46	0.01
Mobile 92	2	231	76	0.01
Mobile 92	3	231	76	0.02
Nobe 93	2	427	75	0.05
Nobe 93	2	427	75	0.06
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.01
Nobe 93	1	600	75	0.01

Benzo(a)pyrene

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	427	75	0.07
Nobe 93	2	427	75	0.08
Nobe 93	1	600	75	0.01
Nobe 93	1	600	75	0.01
Mobile 92	1	600	23	0.60
Mobile 92	1	600	23	0.62
Mobile 92	1	500	46	0.43
Mobile 92	1	36	76	0.10
Mobile 91	29	37.2	30	0.07
Mobile 91	29	37.2	60	0.04
Mobile 91	28	72.8	30	0.75
Mobile 92	2	231	23	0.08
Mobile 92	2	231	23	0.10
Mobile 92	3	231	23	0.07
Mobile 92	2	231	46	0.08
Mobile 92	3	231	46	0.02
Mobile 92	4	231	46	0.02
Mobile 92	2	231	76	0.02
Mobile 92	3	231	76	0.02
Mobile 92	4	231	76	0.05
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00

Benzo(b,k) fluoranthene

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	427	75	0.15
Nobe 93	2	427	75	0.20
Nobe 93	2	427	125	0.01
Nobe 93	2	427	125	0.01
Mobile 92	1	36	23	0.08
Mobile 92	1	600	23	1.18
Mobile 92	1	36	46	0.08
Mobile 92	1	36	76	0.02
Mobile 92	2	231	23	0.15
Mobile 92	2	231	23	0.19
Mobile 92	3	231	23	0.14
Mobile 92	4	231	23	0.15
Mobile 92	5	231	23	0.01

Benzo(b,k) fluoranthene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	6	231	23	0.06
Mobile 92	2	231	46	0.13
Mobile 92	3	231	46	0.04
Mobile 92	4	231	46	0.03
Mobile 92	6	231	46	0.01
Mobile 92	2	231	76	0.03
Mobile 92	3	231	76	0.04
Mobile 92	4	231	76	0.01
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	2	427	75	0.01
Nobe 93	2	427	75	0.01
Nobe 93	2	427	125	0.01
Nobe 93	1	600	75	0.02

Benzo(e)pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.04
Mobile 92	1	36	23	0.04
Mobile 92	1	36	46	0.03
Mobile 92	1	36	76	0.09
Mobile 92	2	231	23	0.05
Mobile 92	2	231	23	0.06
Mobile 92	3	231	23	0.04
Mobile 92	2	231	46	0.06
Mobile 92	3	231	46	0.01
Mobile 92	4	231	46	0.01
Mobile 92	2	231	76	0.01
Mobile 92	3	231	76	0.01
Mobile 92	4	600	76	0.25
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	2	427	75	0.04
Nobe 93	2	427	75	0.06
Nobe 93	1	600	75	0.01
Nobe 93	1	600	75	0.01

Benzo(g,h,i)perylene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.04
Mobile 92	1	600	23	0.49
Mobile 92	1	36	46	0.03
Mobile 92	1	36	76	0.09
Mobile 92	2	231	23	0.11
Mobile 92	2	231	23	0.14
Mobile 92	3	231	23	0.09
Mobile 92	4	231	23	0.09
Mobile 92	5	231	23	0.01
Mobile 92	6	231	23	0.03
Mobile 92	2	231	46	0.09
Mobile 92	3	231	46	0.03
Mobile 92	4	231	46	0.02
Mobile 92	2	231	76	0.02

Benzo(g,h,i)perylene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	3	231	76	0.03
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Mobile 91	cum	1071	30	0.04
Nobe 93	2	427	75	0.06
Nobe 93	2	427	75	0.10
Nobe 93	1	600	75	0.01
Nobe 93	1	600	75	0.01

Biphenyl

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.30
Mobile 92	1	36	23	0.04
Mobile 92	1	36	23	0.72
Mobile 92	1	36	46	0.40
Mobile 92	1	36	76	0.18
Mobile 92	2	231	23	0.58
Mobile 92	2	231	23	0.04
Mobile 92	2	231	23	0.28
Mobile 92	3	231	23	0.28
Mobile 92	4	231	23	0.19
Mobile 92	5	231	23	0.30
Mobile 92	5	231	23	0.26
Mobile 92	6	231	23	0.23
Mobile 92	6	231	23	0.28
Mobile 92	2	231	46	0.62
Mobile 92	3	231	46	0.11
Mobile 92	4	231	46	0.06
Mobile 92	5	231	46	0.16
Mobile 92	6	231	46	0.19
Mobile 92	2	231	76	0.28
Mobile 92	3	231	76	0.11
Mobile 92	4	231	76	0.04
Mobile 92	5	231	76	0.09
Mobile 92	6	231	76	0.06
Nobe 93	2	427	75	0.15
Nobe 93	2	427	75	0.18
Nobe 93	2	427	125	0.17
Nobe 93	2	427	125	0.20
Nobe 93	2	427	600	0.15
Nobe 93	2	427	600	0.04
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.17
Nobe 93	1	600	75	0.14
Nobe 93	1	600	125	0.30
Nobe 93	1	600	125	0.30
Nobe 93	1	600	900	0.03
Nobe 93	1	600	900	0.03

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$, cum = cumulative

Table A3-4 **Emissions Measured at Previous Test Burns: PAHs from Crude** (concentrations in $\mu g/m^3$)

Chrysene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.04
Mobile 92	1	36	23	0.06
Mobile 92	1	36	46	0.04
Mobile 92	1	600	76	0.12
Mobile 92	2	231	23	0.06
Mobile 92	2	231	23	0.07
Mobile 92	3	231	23	0.07
Mobile 92	4	231	23	0.08
Mobile 92	5	231	23	0.02
Mobile 92	6	231	23	0.04
Mobile 92	2	231	46	0.06
Mobile 92	3	231	46	0.02
Mobile 92	4	231	46	0.01
Mobile 92	5	231	46	0.01
Mobile 92	6	231	46	0.01
Mobile 92	2	231	76	0.02
Mobile 92	3	231	76	0.02
Nobe 93	2	427	75	0.00
Nobe 93	2	427	75	0.06
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.06

Dibenz(a,h)anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.01
Mobile 92	1	36	23	0.01
Mobile 92	1	36	46	0.01
Mobile 92	1	36	76	0.02
Mobile 92	2	231	23	0.01
Mobile 92	2	231	23	0.01
Mobile 92	6	231	23	0.01
Nobe 93	2	600	46	0.01
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	2	427	75	0.01
Nobe 93	2	427	75	0.01

Dimethynaphthalenes

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	427	75	2.38
Nobe 93	2	427	75	1.47
Nobe 93	2	427	125	1.88
Nobe 93	2	427	125	1.74
Nobe 93	2	427	600	0.59
Nobe 93	2	427	600	0.46
Nobe 93	1	600	75	2.25
Nobe 93	1	600	75	0.77
Nobe 93	1	600	125	2.95
Nobe 93	1	600	125	2.52
Nobe 93	1	600	900	0.48
Nobe 93	1	600	900	0.34
Nobe 93	2	427	75	0.03

Dimethynaphthalenes

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	427	75	0.06
Nobe 93	2	427	125	0.02
Nobe 93	2	427	125	0.02
Nobe 93	2	427	600	0.02
Nobe 93	1	600	75	0.01
Nobe 93	1	600	75	0.04
Nobe 93	1	600	125	0.02
Nobe 93	1	600	125	0.03

Fluoranthene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	1000	23	1.15
Mobile 92	1	500	23	0.57
Mobile 92	1	100	23	1.34
Mobile 92	1	36	46	1.11
Mobile 92	1	36	76	0.39
Mobile 91	30	114	30	0.71
Mobile 92	2	231	23	0.32
Mobile 92	2	231	23	0.24
Mobile 92	2	231	23	0.12
Mobile 92	3	231	23	0.31
Mobile 92	4	231	23	0.42
Mobile 92	5	231	23	0.04
Mobile 92	5	231	23	0.07
Mobile 92	6	231	23	0.05
Mobile 92	6	231	23	0.12
Mobile 92	2	231	46	0.29
Mobile 92	3	231	46	0.10
Mobile 92	4	231	46	0.09
Mobile 92	5	231	46	0.03
Mobile 92	6	231	46	0.03
Mobile 92	2	231	76	0.08
Mobile 92	3	231	76	0.10
Mobile 92	4	231	76	0.05
Mobile 92	6	231	76	0.01
Nobe 93	2	427	75	0.23
Nobe 93	2	427	75	0.31
Nobe 93	2	427	125	0.03
Nobe 93	2	427	125	0.04
Nobe 93	2	427	600	0.01
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.04
Nobe 93	1	600	75	0.05
Nobe 93	1	600	125	0.02
Nobe 93	1	600	125	0.04
Mobile 91	cum	1071	30	0.11

Fluorene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.05
Mobile 92	1	1000	23	0.88
Mobile 92	1	36	46	0.06

Fluorene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	76	0.02
Mobile 91	30	114	30	0.06
Mobile 91	23	181	30	0.08
Mobile 91	23	181	60	0.07
Mobile 92	2	231	23	0.20
Mobile 92	2	231	23	0.15
Mobile 92	3	231	23	0.15
Mobile 92	4	231	23	0.12
Mobile 92	5	231	23	0.17
Mobile 92	5	231	23	0.19
Mobile 92	6	231	23	0.06
Mobile 92	6	231	23	0.12
Mobile 92	2	231	46	0.20
Mobile 92	3	231	46	0.07
Mobile 92	4	231	46	0.03
Mobile 92	5	231	46	0.09
Mobile 92	6	231	46	0.02
Mobile 92	2	231	76	0.07
Mobile 92	3	231	76	0.05
Mobile 92	4	231	76	0.02
Mobile 92	5	231	76	0.01
Mobile 92	6	231	76	0.01
Nobe 93	2	427	75	0.20
Nobe 93	2	427	75	0.28
Nobe 93	2	427	125	0.08
Nobe 93	2	427	125	0.07
Nobe 93	2	427	600	0.00
Nobe 93	2	427	600	0.00
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.14
Nobe 93	1	600	75	0.21
Nobe 93	1	600	125	0.12
Nobe 93	1	600	125	0.14
Nobe 93	1	600	900	0.02
Nobe 93	1	600	900	0.02
Mobile 91	cum	1071	30	0.15
Mobile 91	cum	1071	60	0.04

Indeno(123-cd)pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 91	cum	1071	30	0.20
Nobe 93	2	427	75	0.10
Nobe 93	2	427	75	0.15
Nobe 93	1	600	75	0.02
Mobile 92	1	36	23	0.04
Mobile 92	1	1071	23	0.26
Mobile 92	1	36	46	0.03
Mobile 92	1	36	76	0.08
Mobile 92	2	231	23	0.01
Mobile 92	2	231	23	0.01
Mobile 92	3	231	23	0.07

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$, cum = cumulative

Table A3-5 **Emissions Measured at Previous Test Burns: PAHs from Crude** (concentrations in $\mu g/m^3$)

Indeno(123-cd)pyrene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	4	231	23	0.07
Mobile 92	6	231	23	0.03
Mobile 92	2	231	46	0.06
Mobile 92	3	231	46	0.02
Mobile 92	4	231	46	0.01
Mobile 92	2	231	76	0.02
Mobile 92	3	231	76	0.02
Nobe 93	1	1071	500	0.00
Nobe 93	2	500	500	0.00

Methylphenanthrenes

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.30
Mobile 92	1	36	23	0.03
Mobile 92	1	36	23	0.03
Mobile 92	1	36	46	0.02
Mobile 92	1	36	76	0.01
Mobile 92	2	231	23	0.08
Mobile 92	2	231	23	0.08
Mobile 92	2	231	23	0.07
Mobile 92	3	231	23	0.11
Mobile 92	4	231	23	0.10
Mobile 92	5	231	23	0.30
Mobile 92	5	231	23	0.40
Mobile 92	6	231	23	0.06
Mobile 92	6	231	23	0.10
Mobile 92	2	231	46	0.15
Mobile 92	3	231	46	0.06
Mobile 92	4	231	46	0.04
Mobile 92	5	231	46	0.18
Mobile 92	6	231	46	0.02
Mobile 92	2	231	76	0.07
Mobile 92	3	231	76	0.04
Mobile 92	4	231	76	0.03
Mobile 92	5	231	76	0.01
Mobile 92	6	231	76	0.02
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00

Naphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.09
Mobile 92	1	36	23	0.02
Mobile 92	1	36	23	7.22
Mobile 92	1	36	46	0.08
Mobile 92	1	36	76	0.05
Mobile 92	2	231	23	0.72
Mobile 92	2	231	23	0.03
Mobile 92	2	231	23	3.17
Mobile 92	3	231	23	0.55
Mobile 92	4	231	23	0.10
Mobile 92	5	231	23	0.90
Mobile 92	5	231	23	0.24

Naphthalene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	6	231	23	1.31
Mobile 92	6	231	23	0.10
Mobile 92	2	231	46	1.04
Mobile 92	3	231	46	0.23
Mobile 92	4	231	46	0.04
Mobile 92	5	231	46	0.16
Mobile 92	6	231	46	0.05
Mobile 92	2	231	76	0.43
Mobile 92	3	231	76	0.36
Mobile 92	4	231	76	0.03
Mobile 92	5	231	76	0.02
Mobile 92	6	231	76	0.03
Nobe 93	2	427	75	1.91
Nobe 93	2	427	75	1.74
Nobe 93	2	427	125	2.55
Nobe 93	2	427	125	2.77
Nobe 93	2	427	600	1.42
Nobe 93	2	427	600	0.24
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	1.41
Nobe 93	1	600	75	1.11
Nobe 93	1	600	125	2.07
Nobe 93	1	600	125	2.26
Nobe 93	1	600	900	0.12
Nobe 93	1	600	900	0.31

Perylene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.09
Mobile 92	1	1000	23	0.11
Mobile 92	1	36	46	0.01
Mobile 92	1	36	76	0.01
Mobile 92	2	231	23	0.02
Mobile 92	2	231	23	0.03
Mobile 92	3	231	23	0.02
Mobile 92	4	231	23	0.02
Mobile 92	5	231	23	0.01
Mobile 92	6	231	23	0.01
Mobile 92	2	231	46	0.02
Mobile 92	5	231	46	0.01
Mobile 92	4	231	76	0.08
Nobe 93	2	427	75	0.01
Nobe 93	2	427	75	0.05
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.05

Phenanthrene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1000	23	0.72	
Mobile 92	1	36	23	0.05
Mobile 92	1	36	23	0.30

Phenanthrene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	46	0.22
Mobile 92	1	36	76	0.82
Mobile 91	30	1071	30	1.14
Mobile 91	23	181	30	0.72
Mobile 91	23	181	60	0.47
Mobile 92	2	231	23	0.63
Mobile 92	2	231	23	0.05
Mobile 92	2	231	23	0.48
Mobile 92	3	231	23	0.57
Mobile 92	4	231	23	0.65
Mobile 92	5	231	23	0.29
Mobile 92	5	231	23	0.38
Mobile 92	6	231	23	0.16
Mobile 92	6	231	23	0.32
Mobile 92	2	231	46	0.60
Mobile 92	3	231	46	0.24
Mobile 92	4	231	46	0.16
Mobile 92	5	231	46	0.17
Mobile 92	6	231	46	0.07
Mobile 92	2	231	76	0.19
Nobe 93	2	427	75	0.00
Nobe 93	2	427	75	0.06
Nobe 93	2	427	125	0.08
Nobe 93	2	427	125	0.10
Nobe 93	2	427	600	0.06
Nobe 93	2	427	600	0.07
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	0.06
Nobe 93	1	600	125	0.12
Nobe 93	1	600	125	0.19
Nobe 93	1	600	900	0.03
Nobe 93	1	600	900	0.02
Mobile 91	cum	1071	30	0.50
Mobile 91	cum	1071	60	0.13

Pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	1000	23	1.10
Mobile 92	1	36	23	0.07
Mobile 92	1	36	23	0.12
Mobile 92	1	36	46	0.11
Mobile 92	1	36	76	0.04
Mobile 91	30	114	30	0.79
Mobile 92	2	231	23	0.33
Mobile 92	2	231	23	0.29
Mobile 92	2	231	23	0.09
Mobile 92	3	231	23	0.32
Mobile 92	4	231	23	0.43
Mobile 92	5	231	23	0.03
Mobile 92	5	231	23	0.06
Mobile 92	6	231	23	0.05

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A3-6 **Emissions Measured at Previous Test Burns: PAHs from Crude** (concentrations in $\mu g/m^3$)

Pyrene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	6	231	23	0.12
Mobile 92	2	231	46	0.30
Mobile 92	3	231	46	0.09
Mobile 92	4	231	46	0.09
Mobile 92	5	231	46	0.02
Mobile 92	6	231	46	0.02
Mobile 92	2	231	76	0.07
Mobile 92	3	231	76	0.10
Mobile 92	4	231	76	0.04
Mobile 92	6	231	76	0.01
Nobe 93	2	427	75	0.23
Nobe 93	2	427	75	0.31
Nobe 93	2	427	125	0.03
Nobe 93	2	427	125	0.03
Nobe 93	2	427	600	0.01
Nobe 93	1	500	500	1E-05
Nobe 93	2	500	500	1E-05
Nobe 93	1	600	75	0.04
Nobe 93	1	600	75	0.05
Nobe 93	1	600	125	0.02
Nobe 93	1	600	125	0.03
Mobile 91	cum	1071	30	0.12
Mobile 91	cum	1071	60	0.04

Total

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	231	23	15.07
Mobile 92	1	231	23	11.23
Mobile 92	1	100	23	23.56
Mobile 92	1	231	46	13.52
Mobile 92	1	36	76	4.67
Mobile 91	30	114	30	9.44
Mobile 91	30	114	60	2.08
Mobile 91	23	181	30	1.95
Mobile 91	23	181	60	0.55
Mobile 92	2	231	23	10.10
Mobile 92	2	231	23	1.55
Mobile 92	2	231	23	9.23
Mobile 92	3	231	23	6.02
Mobile 92	4	231	23	4.18
Mobile 92	5	231	23	5.08
Mobile 92	5	231	23	4.99
Mobile 92	6	231	23	3.61
Mobile 92	6	231	23	2.67
Mobile 92	2	231	46	8.29
Mobile 92	3	231	46	2.50
Mobile 92	4	231	46	1.35
Mobile 92	5	231	46	2.32
Mobile 92	6	231	46	0.71
Mobile 92	2	231	76	2.95
Mobile 92	3	231	76	2.10
Mobile 92	4	231	76	1.04

Total (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 92	5	231	76	0.23
Mobile 92	6	231	76	0.27
Nobe 93	2	427	75	11.59
Nobe 93	2	427	75	13.12
Nobe 93	2	427	125	6.39
Nobe 93	2	427	125	6.05
Nobe 93	1	500	500	0.00
Nobe 93	2	500	500	0.00
Nobe 93	1	600	75	10.07
Nobe 93	1	600	75	12.04
Nobe 93	1	600	125	2.92
Nobe 93	1	600	125	2.77
Mobile 91	cum	1071	30	8.56
Mobile 91	cum	1071	60	8.37
Mobile 91	cum	1071	500	0.001

Trimethylnaphthalenes

Burn	Num.	Area	Dist.	Conc.
Mobile 92	1	36	23	0.17
Mobile 92	1	36	23	0.15
Mobile 92	1	36	46	0.14
Mobile 92	1	36	76	0.07
Mobile 92	2	231	23	0.44
Mobile 92	2	231	23	0.28
Mobile 92	3	231	23	0.29
Mobile 92	4	231	23	0.2
Mobile 92	5	231	23	0.38
Mobile 92	5	231	23	1.21
Mobile 92	6	231	23	0.13
Mobile 92	6	231	23	0.34
Mobile 92	2	231	46	0.61
Mobile 92	3	231	46	0.19
Mobile 92	4	231	46	0.08
Mobile 92	5	231	46	0.55
Mobile 92	6	231	46	0.07
Mobile 92	2	231	76	0.23
Mobile 92	3	231	76	0.13
Mobile 92	4	231	76	0.06
Mobile 92	5	231	76	0.05
Mobile 92	6	231	76	0.05
Nobe 93	1	500	500	1E-04
Nobe 93	2	500	500	1E-04

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A4-1 **Emissions Measured at Previous Test Burns: PAHs from Diesel** (concentrations in $\mu g/m^3$)

1-Methylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.039
Mobile 97	2	25	30	0.002
Mobile 97	2	25	45	0.006
Mobile 94	1	199	30	0.234
Mobile 94	1	199	30	0.493
Mobile 94	1	199	50	0.143
Mobile 94	1	199	50	0.185
Mobile 94	1	199	75	0.141
Mobile 94	1	199	85	0.061
Mobile 94	1	199	85	0.042
Mobile 94	2	231	30	1.475
Mobile 94	3	231	30	1.03
Mobile 94	2	231	45	0.62
Mobile 94	3	231	45	0.607
Mobile 94	2	231	75	0.38
Mobile 94	3	231	75	0.254
Mobile 94	2	231	85	0.028
Mobile 94	3	231	85	0.129

1-Methylphenanthrene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.008
Mobile 97	2	25	45	0.002
Mobile 94	1	199	30	0.044
Mobile 94	1	199	30	0.131
Mobile 94	1	199	50	0.032
Mobile 94	1	199	50	0.056
Mobile 94	1	199	75	0.025
Mobile 94	1	199	85	0.015
Mobile 94	1	199	85	0.009
Mobile 94	2	231	30	0.687
Mobile 94	3	231	30	0.378
Mobile 94	2	231	45	0.314
Mobile 94	3	231	45	0.123
Mobile 94	2	231	75	0.161
Mobile 94	3	231	75	0.041
Mobile 94	2	231	85	0.009
Mobile 94	3	231	85	0.029

2,3,5-Trimethylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.275
Mobile 97	2	25	30	0.075
Mobile 97	2	25	45	0.038
Mobile 94	1	199	30	1.33
Mobile 94	1	199	30	3.34
Mobile 94	1	199	50	0.93
Mobile 94	1	199	50	1.67
Mobile 94	1	199	75	0.89
Mobile 94	1	199	85	0.29
Mobile 94	1	199	85	0.29
Mobile 94	2	231	30	7.26
Mobile 94	3	231	30	5.08

2,3,5-Trimethylnaphthalene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	45	3.12
Mobile 94	3	231	45	2.64
Mobile 94	2	231	75	1.85
Mobile 94	3	231	75	0.9
Mobile 94	2	231	85	0.16
Mobile 94	3	231	85	0.56

2,6-Dimethylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.094
Mobile 97	2	25	30	0.02
Mobile 97	2	25	45	0.01
Mobile 94	1	199	30	0.368
Mobile 94	1	199	30	0.999
Mobile 94	1	199	50	0.251
Mobile 94	1	199	50	0.426
Mobile 94	1	199	75	0.277
Mobile 94	1	199	85	0.085
Mobile 94	1	199	85	0.067
Mobile 94	2	231	30	2.149
Mobile 94	3	231	30	1.645
Mobile 94	2	231	45	0.835
Mobile 94	3	231	45	0.832
Mobile 94	2	231	75	0.535
Mobile 94	3	231	75	0.323
Mobile 94	2	231	85	0.048
Mobile 94	3	231	85	0.186

2-Methylnaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.053
Mobile 97	2	25	30	0.012
Mobile 97	2	25	45	0.009
Mobile 94	1	199	30	0.247
Mobile 94	1	199	30	0.551
Mobile 94	1	199	50	0.203
Mobile 94	1	199	50	0.22
Mobile 94	1	199	75	0.211
Mobile 94	1	199	85	0.089
Mobile 94	1	199	85	0.06
Mobile 94	2	231	30	1.96
Mobile 94	3	231	30	1.537
Mobile 94	2	231	45	0.709
Mobile 94	3	231	45	0.743
Mobile 94	2	231	75	0.432
Mobile 94	3	231	75	0.311
Mobile 94	2	231	85	0.043
Mobile 94	3	231	85	0.155

Acenaphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.263
Mobile 97	2	25	30	0.02
Mobile 97	2	25	45	0.013

Acenaphthalene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	1.07
Mobile 94	1	199	30	2.61
Mobile 94	1	199	50	0.7
Mobile 94	1	199	50	1.21
Mobile 94	1	199	75	0.71
Mobile 94	1	199	85	0.25
Mobile 94	1	199	85	0.19
Mobile 94	2	231	30	6.24
Mobile 94	3	231	30	9.89
Mobile 94	2	231	45	2.37
Mobile 94	3	231	45	2.36
Mobile 94	2	231	75	1.47
Mobile 94	3	231	75	0.87
Mobile 94	2	231	85	0.12
Mobile 94	3	231	85	0.51

Acenaphthene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.042
Mobile 97	2	25	30	0.007
Mobile 97	2	25	45	0.004
Mobile 94	1	199	30	0.306
Mobile 94	1	199	30	0.629
Mobile 94	1	199	50	0.159
Mobile 94	1	199	50	0.235
Mobile 94	1	199	75	0.128
Mobile 94	1	199	85	0.058
Mobile 94	1	199	85	0.038
Mobile 94	2	231	30	5.252
Mobile 94	3	231	30	3.561
Mobile 94	2	231	45	1.847
Mobile 94	3	231	45	1.139
Mobile 94	2	231	75	1.034
Mobile 94	3	231	75	0.388
Mobile 94	2	231	85	0.039
Mobile 94	3	231	85	0.242

Anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.07
Mobile 97	2	25	30	0.021
Mobile 97	2	25	45	0.013
Mobile 94	1	199	30	0.389
Mobile 94	1	199	30	0.622
Mobile 94	1	199	50	0.179
Mobile 94	1	199	50	0.334
Mobile 94	1	199	75	0.233
Mobile 94	1	199	85	0.121
Mobile 94	1	199	85	0.066
Mobile 94	2	231	30	3.943
Mobile 94	3	231	30	2.492
Mobile 94	2	231	45	1.713
Mobile 94	3	231	45	0.859

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A4-2 **Emissions Measured at Previous Test Burns: PAHs from Diesel** (concentrations in $\mu g/m^3$)

Benz(a)anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.001
Mobile 97	2	25	30	4E-04
Mobile 97	2	25	45	2E-04
Mobile 94	1	199	30	0.014
Mobile 94	1	199	30	0.026
Mobile 94	1	199	50	0.006
Mobile 94	1	199	50	0.009
Mobile 94	1	199	75	0.003
Mobile 94	1	199	85	0.002
Mobile 94	1	199	85	0.001
Mobile 94	2	231	30	0.288
Mobile 94	3	231	30	0.185
Mobile 94	2	231	45	0.178
Mobile 94	3	231	45	0.058
Mobile 94	2	231	75	0.066
Mobile 94	3	231	75	0.013
Mobile 94	2	231	85	0.001
Mobile 94	3	231	85	0.012

Benz(a)pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	9E-04
Mobile 97	2	25	30	2E-05
Mobile 94	1	199	30	0.004
Mobile 94	1	199	30	0.013
Mobile 94	1	199	50	0.004
Mobile 94	1	199	50	0.006
Mobile 94	1	199	75	0.001
Mobile 94	1	199	85	0.001
Mobile 94	1	199	85	0.001
Mobile 94	2	231	30	0.367
Mobile 94	3	231	30	0.202
Mobile 94	2	231	45	0.194
Mobile 94	3	231	45	0.048
Mobile 94	2	231	75	0.056
Mobile 94	3	231	75	0.012
Mobile 94	2	231	85	7E-04
Mobile 94	3	231	85	0.012

Benzo(b)fluoranthene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.003
Mobile 97	2	25	30	9E-04
Mobile 97	2	25	45	4E-04
Mobile 94	1	199	30	0.034
Mobile 94	1	199	30	0.048
Mobile 94	1	199	50	0.014
Mobile 94	1	199	50	0.016
Mobile 94	1	199	75	0.006
Mobile 94	1	199	85	0.005
Mobile 94	1	199	85	0.002
Mobile 94	2	231	30	0.431
Mobile 94	3	231	30	0.37

Benzo(b)fluoranthene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	45	0.285
Mobile 94	3	231	45	0.104
Mobile 94	2	231	75	0.096
Mobile 94	3	231	75	0.032
Mobile 94	2	231	85	0.003
Mobile 94	3	231	85	0.028

Benz(e)pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.001
Mobile 97	2	25	30	0
Mobile 94	1	199	30	0.012
Mobile 94	1	199	30	0.016
Mobile 94	1	199	50	3E-04
Mobile 94	1	199	50	2E-04
Mobile 94	1	199	75	0.002
Mobile 94	1	199	85	4E-04
Mobile 94	1	199	85	0.001
Mobile 94	2	231	30	0.183
Mobile 94	3	231	30	0.132
Mobile 94	2	231	45	0.098
Mobile 94	3	231	45	0.037
Mobile 94	2	231	75	0.035
Mobile 94	3	231	75	0.012
Mobile 94	2	231	85	0.002
Mobile 94	3	231	85	0.011

Benz(ghi)peryiene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.003
Mobile 97	2	25	30	6E-04
Mobile 97	2	25	45	1E-04
Mobile 94	1	199	30	0.017
Mobile 94	1	199	30	0.022
Mobile 94	1	199	50	0.008
Mobile 94	1	199	50	0.01
Mobile 94	1	199	75	0.004
Mobile 94	1	199	85	0.003
Mobile 94	2	231	30	0.178
Mobile 94	3	231	30	0.309
Mobile 94	2	231	45	0.195
Mobile 94	3	231	45	0.084
Mobile 94	2	231	75	0.056
Mobile 94	3	231	75	0.025
Mobile 94	2	231	85	8E-04
Mobile 94	3	231	85	0.023

Benz(k)fluoranthene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	2E-04
Mobile 97	2	25	30	8E-04
Mobile 97	2	25	45	5E-06
Mobile 94	1	199	30	0

Benz(k)fluoranthene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	199	30	0.003
Mobile 94	1	199	50	0.012
Mobile 94	1	199	50	0.014
Mobile 94	1	199	75	3E-04
Mobile 94	1	199	85	0.004
Mobile 94	1	199	85	8E-04
Mobile 94	2	231	30	0
Mobile 94	3	231	30	0.029
Mobile 94	2	231	45	0
Mobile 94	3	231	45	0.008
Mobile 94	2	231	75	0.011
Mobile 94	2	231	75	0.002
Mobile 94	2	231	85	0.001
Mobile 94	3	231	85	0.002

Biphenyl

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.063
Mobile 97	2	25	30	0.009
Mobile 97	2	25	45	0.005
Mobile 94	1	199	30	0.189
Mobile 94	1	199	30	0.46
Mobile 94	1	199	50	0.13
Mobile 94	1	199	50	0.21
Mobile 94	1	199	75	0.143
Mobile 94	1	199	85	0.048
Mobile 94	1	199	85	0.038
Mobile 94	2	231	30	1.449
Mobile 94	3	231	30	1.198
Mobile 94	2	231	45	0.551
Mobile 94	3	231	45	0.575
Mobile 94	2	231	75	0.36
Mobile 94	3	231	75	0.234
Mobile 94	2	231	85	0.023
Mobile 94	3	231	85	0.131

Chrysene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.002
Mobile 97	2	25	30	8E-04
Mobile 97	2	25	45	3E-04
Mobile 94	1	199	30	0.02
Mobile 94	1	199	30	0.028
Mobile 94	1	199	50	0.008
Mobile 94	1	199	50	0.01
Mobile 94	1	199	75	0.004
Mobile 94	1	199	85	0.003
Mobile 94	1	199	85	0.002
Mobile 94	2	231	30	0.294
Mobile 94	3	231	30	0.207
Mobile 94	2	231	45	0.148
Mobile 94	3	231	45	0.061
Mobile 94	2	231	75	0.071

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A4-3 **Emissions Measured at Previous Test Burns: PAHs from Diesel** (concentrations in $\mu g/m^3$)

Dibenz(ah)anthracene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.000
Mobile 97	2	25	30	0.003
Mobile 97	2	25	45	0.000
Mobile 94	1	199	30	0.025
Mobile 94	1	199	30	0.002
Mobile 94	1	199	50	0.001
Mobile 94	1	199	50	0.005
Mobile 94	1	199	75	0.000
Mobile 94	1	199	85	0.000
Mobile 94	1	199	85	0.000
Mobile 94	2	231	30	0.025
Mobile 94	3	231	30	0.015
Mobile 94	2	231	45	0.014
Mobile 94	3	231	45	0.004
Mobile 94	2	231	75	0.008
Mobile 94	3	231	75	0.006
Mobile 94	2	231	85	0.000
Mobile 94	3	231	85	0.001

Dimethynaphthalenes

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.042
Mobile 97	2	25	30	0.013
Mobile 97	2	25	45	0.004
Mobile 94	1	199	30	0.240
Mobile 94	1	199	30	0.594
Mobile 94	1	199	50	0.148
Mobile 94	1	199	50	0.288
Mobile 94	1	199	75	0.146
Mobile 94	1	199	85	0.053
Mobile 94	1	199	85	0.054
Mobile 94	2	231	30	1.239
Mobile 94	3	231	30	0.840
Mobile 94	2	231	45	0.550
Mobile 94	3	231	45	0.408
Mobile 94	2	231	75	0.326
Mobile 94	3	231	75	0.135
Mobile 94	2	231	85	0.028
Mobile 94	3	231	85	0.086

Fluoranthene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.024
Mobile 97	2	25	30	0.007
Mobile 97	2	25	45	0.004
Mobile 94	1	199	30	0.119
Mobile 94	1	199	30	0.165
Mobile 94	1	199	50	0.052
Mobile 94	1	199	50	0.094
Mobile 94	1	199	75	0.063
Mobile 94	1	199	85	0.033
Mobile 94	1	199	85	0.017
Mobile 94	2	231	30	1.758

Fluoranthene

Burn	Num.	Area	Dist.	Conc.
Mobile 94	3	231	30	1.311
Mobile 94	2	231	45	0.780
Mobile 94	3	231	45	0.366
Mobile 94	2	231	75	0.390
Mobile 94	3	231	75	0.115
Mobile 94	2	231	85	0.020
Mobile 94	3	231	85	0.102

Fluorene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	30	0.002
Mobile 97	2	25	45	0.001
Mobile 94	1	199	30	0.067
Mobile 94	2	231	45	0.013
Mobile 94	2	231	200	0.000

Indeno(123-cd)pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.002
Mobile 97	2	25	30	0.000
Mobile 97	2	25	45	0.000
Mobile 94	1	199	30	0.012
Mobile 94	1	199	30	0.018
Mobile 94	1	199	50	0.006
Mobile 94	1	199	50	0.008
Mobile 94	1	199	75	0.003
Mobile 94	1	199	85	0.002
Mobile 94	1	199	85	0.000
Mobile 94	2	231	30	0.176
Mobile 94	3	231	30	0.213
Mobile 94	2	231	45	0.154
Mobile 94	3	231	45	0.057
Mobile 94	2	231	75	0.039
Mobile 94	3	231	75	0.018
Mobile 94	2	231	85	0.001
Mobile 94	3	231	85	0.015

Methylphenanthrenes

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.005
Mobile 97	2	25	30	0.003
Mobile 97	2	25	45	0.003
Mobile 94	1	199	30	0.100
Mobile 94	1	199	30	0.040
Mobile 94	1	199	50	0.010
Mobile 94	1	199	50	0.020
Mobile 94	1	199	75	0.020
Mobile 94	1	199	85	0.015
Mobile 94	1	199	85	0.010
Mobile 94	2	231	30	0.340
Mobile 94	3	231	30	0.100
Mobile 94	2	231	45	0.130
Mobile 94	3	231	45	0.070
Mobile 94	2	231	75	0.200

Naphthalene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.057
Mobile 97	2	25	30	0.000
Mobile 97	2	25	45	0.009
Mobile 94	1	199	30	0.099
Mobile 94	1	199	30	0.169
Mobile 94	1	199	50	0.090
Mobile 94	1	199	50	0.080
Mobile 94	1	199	75	0.117
Mobile 94	1	199	85	0.101
Mobile 94	1	199	85	0.099
Mobile 94	2	231	30	1.486
Mobile 94	3	231	30	2.031
Mobile 94	2	231	45	0.649
Mobile 94	3	231	45	0.890
Mobile 94	2	231	75	0.316
Mobile 94	3	231	75	0.592
Mobile 94	2	231	85	0.061
Mobile 94	3	231	85	0.256

Perylene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.000
Mobile 97	2	25	30	0.000
Mobile 97	2	25	45	0.000
Mobile 94	1	199	30	0.000
Mobile 94	1	199	30	0.002
Mobile 94	1	199	50	0.001
Mobile 94	1	199	50	0.005
Mobile 94	1	199	75	0.000
Mobile 94	1	199	85	0.000
Mobile 94	1	199	85	0.000
Mobile 94	2	231	30	0.043
Mobile 94	3	231	30	0.034
Mobile 94	2	231	45	0.023
Mobile 94	3	231	45	0.009
Mobile 94	2	231	75	0.010
Mobile 94	3	231	75	0.000
Mobile 94	2	231	85	0.000
Mobile 94	3	231	85	0.002

Phenanthrene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.020
Mobile 97	2	25	30	0.007
Mobile 97	2	25	45	0.004
Mobile 94	1	199	30	0.303
Mobile 94	1	199	30	0.420
Mobile 94	1	199	50	0.117
Mobile 94	1	199	50	0.216
Mobile 94	1	199	75	0.147
Mobile 94	1	199	85	0.050
Mobile 94	1	199	85	0.043
Mobile 94	2	231	30	1.471

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A4-4 **Emissions Measured at Previous Test Burns: PAHs from Diesel** (concentratior

Phenanthrene (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	3	231	30	0.74
Mobile 94	2	231	45	0.57
Mobile 94	3	231	45	0.33
Mobile 94	2	231	75	0.32
Mobile 94	3	231	75	0.11
Mobile 94	2	231	85	0.04
Mobile 94	3	231	85	0.07

Pyrene

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.02
Mobile 97	2	25	30	0.01
Mobile 97	2	25	45	0.00
Mobile 94	1	199	30	0.11
Mobile 94	1	199	30	0.17
Mobile 94	1	199	50	0.05
Mobile 94	1	199	50	0.07
Mobile 94	1	199	75	0.04
Mobile 94	1	199	85	0.02
Mobile 94	1	199	85	0.01
Mobile 94	2	231	30	1.83
Mobile 94	3	231	30	1.27
Mobile 94	2	231	45	0.78
Mobile 94	3	231	45	0.34
Mobile 94	2	231	75	0.36
Mobile 94	3	231	75	0.10
Mobile 94	2	231	85	0.02
Mobile 94	3	231	85	0.09

Total PAHs

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	1.10
Mobile 97	2	25	30	0.22
Mobile 97	2	25	45	0.13
Mobile 94	1	199	30	5.59
Mobile 94	1	199	30	11.77
Mobile 94	1	199	50	3.28
Mobile 94	1	199	50	5.45
Mobile 94	1	199	75	3.47
Mobile 94	1	199	85	1.34
Mobile 94	1	199	85	1.08
Mobile 94	2	231	30	41.50
Mobile 94	3	231	30	35.14
Mobile 94	2	231	45	17.32
Mobile 94	3	231	45	12.95
Mobile 94	2	231	75	10.30
Mobile 94	3	231	75	4.89
Mobile 94	2	231	85	3.74
Mobile 94	3	231	85	2.96

Trimethynaphthalenes

Burn	Num.	Area	Dist.	Conc.
Mobile 97	2	25	15	0.02
Mobile 97	2	25	30	0.01
Mobile 97	2	25	45	0.01
Mobile 94	1	199	30	0.30
Mobile 94	1	199	30	0.13
Mobile 94	1	199	50	0.03
Mobile 94	1	199	50	0.05
Mobile 94	1	199	75	0.15
Mobile 94	1	199	85	0.03
Mobile 94	1	199	85	0.03
Mobile 94	2	231	30	1.02
Mobile 94	3	231	30	0.34
Mobile 94	2	231	45	0.42
Mobile 94	3	231	45	0.19
Mobile 94	2	231	75	0.72
Mobile 94	3	231	75	0.06
Mobile 94	2	231	85	0.03
Mobile 94	3	231	85	0.06

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$

Table A5-1 **Emissions Measured at Previous Test Burns: Carbonyls and Gases** (concentrations in $\mu g/m^3$, or ppm)

Acetaldehyde from Crude

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	600	75	12.8
Nobe 93	1	600	125	60.3
Nobe 93	1	600	75	12.8
Nobe 93	1	600	125	60.3
Nobe 93	1	600	125	31.7
Mobile 92	1	110	15	1.7
Mobile 92	1	231	30	5
Nobe 93	1	600	600	0.001
Nobe 93	1	600	900	0.001
Nobe 93	5-1	25	15	0.3

Acetone from Crude

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	400	75	31.7
Nobe 93	1	400	125	1.7
Nobe 93	1	900	75	31.7
Nobe 93	1	900	125	1.7
Mobile 92	1	110	15	1.7
Mobile 92	1	231	30	5
Nobe 93	1	600	600	0.001
Nobe 93	1	600	900	0.001

Formaldehyde from Crude

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	600	75	40.8
Nobe 93	1	600	125	26.8
Nobe 93	2	427	75	32
Nobe 93	2	427	125	7.6
Mobile 92	1	36	15	2
Nobe 93	1	600	125	0.01

Carbon Monoxide from Crude (ppm)

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	600	75	0.5
Nobe 93	1	600	125	0.1
Nobe 93	2	427	75	0.1
Nobe 93	2	427	125	0.7
Mobile 92	1	36	23	2.5
Mobile 92	1	36	46	1.7
Mobile 92	1	36	76	1.3
Mobile 92	2	231	23	1.7
Mobile 92	2	231	46	0.2
Mobile 92	2	231	76	1.3
Mobile 92	4	231	23	3.4
Mobile 92	4	231	46	0.01
Mobile 92	4	231	76	1.7
Mobile 92	5	231	23	7.2
Mobile 92	5	231	46	0.01
Mobile 92	5	231	76	3.7
Mobile 92	6	231	23	2
Mobile 92	6	231	46	3.8
Mobile 92	6	231	76	1.7
Nobe 93	1	600	75	4.5
Mobile 92	2-2	25	15	0.3

Carbon Dioxide from Crude (ppm)

Burn	Num.	Area	Dist.	Conc.
Nobe 93	1	600	75	799
Nobe 93	1	600	125	552
Nobe 93	1	600	900	17
Nobe 93	2	427	75	629
Nobe 93	2	427	125	543
Nobe 93	2	427	900	25
Mobile 91	16	37	30	238
Mobile 91	16	37	60	278
Mobile 91	23	181	30	147
Mobile 91	23	181	60	352
Mobile 91	23	181	30	188
Mobile 91	23	181	60	392
Mobile 91	24	170	30	257
Mobile 91	24	170	60	275
Mobile 91	28	73	30	369
Mobile 91	28	73	60	317
Mobile 91	30	114	30	206
Mobile 91	30	114	60	212
Mobile 91	31	114	30	272
Mobile 91	31	114	60	191
Mobile 91	3	114	30	304
Mobile 91	3	114	60	185
Mobile 91	4	114	30	301
Mobile 91	4	114	60	217
Mobile 91	5	231	30	437
Mobile 91	5	231	60	353
Mobile 92	1	36	23	449
Mobile 92	1	36	46	388
Mobile 92	1	36	76	378
Mobile 92	2	200	23	393
Mobile 92	2	200	46	419
Mobile 92	2	200	76	405
Mobile 92	3	200	23	398
Mobile 92	3	200	46	412
Mobile 92	3	200	76	369
Mobile 92	4	200	23	272
Mobile 92	4	200	46	433
Mobile 92	4	200	76	402
Mobile 92	5	200	23	238
Mobile 92	5	200	46	328
Mobile 92	5	200	76	273
Mobile 92	6	200	23	319
Mobile 92	6	200	46	399
Mobile 92	6	200	76	375
Mobile 92	1	36	23	345
Mobile 92	1	36	46	211
Mobile 92	1	36	76	160
Mobile 92	3	231	23	180
Mobile 92	3	231	46	160
Mobile 92	3	231	76	100
Mobile 92	4	231	23	270

Carbon Dioxide from Crude (ctd. - ppm))

Burn	Num.	Area	Dist.	Conc.
Mobile 92	4	231	46	240
Mobile 92	4	231	76	240
Mobile 92	5	231	23	180
Mobile 92	5	231	46	140
Mobile 92	5	231	76	100

Sulphur Dioxide from crude (ppm)

Burn	Num.	Area	Dist.	Conc.
Nobe 93	2	600	75	13.4
Nobe 93	2	600	125	12.9
Nobe 93	2	600	600	5.4
Nobe 93	2	600	600	0.01
Nobe 93	2	600	600	0.001
Nobe 93	2	600	75	8
Nobe 93	1	600	75	10
Nobe 93	1	600	125	11
Nobe 93	1	600	600	6
Nobe 93	1	600	600	0.01
Nobe 93	1	600	600	0.001
Mobile 92	1	231	23	14.2
Mobile 92	1	231	46	5
Mobile 92	1	231	76	0.4
Mobile 92	2	231	46	4
Mobile 92	2	231	76	2
Mobile 92	3	231	23	14.2
Mobile 92	3	231	46	5.1
Mobile 92	3	231	76	6
Mobile 92	4	231	23	11
Mobile 92	4	231	46	7
Mobile 92	4	231	76	0.3
Mobile 92	5	231	23	9.5
Mobile 92	5	231	46	6
Mobile 92	5	231	76	0.001
Mobile 92	6	231	23	4.5
Mobile 92	6	231	46	4
Mobile 92	6	231	76	0.001
Mobile 92	1	36	23	1
Mobile 92	1	36	46	0.2
Mobile 92	1	36	76	1E-04

Acetaldehyde from Diesel

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	231	30	53.4
Mobile 94	1	231	50	42.6
Mobile 94	1	231	85	36.2
Mobile 94	2	231	30	31.6
Mobile 94	2	231	50	24
Mobile 94	2	231	85	21.5
Mobile 94	3	231	30	39.4
Mobile 94	3	231	50	31.9
Mobile 94	3	231	85	25.2
Mobile 97	3	25	15	10
Mobile 97	3	25	30	5

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$ or ppm

Table A5-2 **Emissions Measured at Previous Test Burns: Carbonyls and Gases** (concentrations in $\mu g/m^3$, or ppm)

Acetone from Diesel

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	231	30	17.7
Mobile 94	1	231	50	15.9
Mobile 94	1	231	85	12.1
Mobile 94	2	231	30	11.7
Mobile 94	2	231	50	6
Mobile 94	2	231	85	5.4
Mobile 94	3	231	30	19.5
Mobile 94	3	231	50	15.1
Mobile 94	3	231	85	12.1
Mobile 97	3	25	15	4
Mobile 97	3	25	30	2
Mobile 97	3	25	75	1
Mobile 97	3	25	85	0.2

Butryadehydes from Diesel

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	231	30	14
Mobile 94	1	231	50	12
Mobile 94	1	231	85	4
Mobile 94	2	231	30	9.9
Mobile 94	2	231	50	8
Mobile 94	2	231	85	4
Mobile 94	3	231	30	13.3
Mobile 94	3	231	50	8.6
Mobile 94	3	231	85	0.01
Mobile 97	3	25	15	5
Mobile 97	3	25	30	3
Mobile 97	3	25	75	1
Mobile 97	3	25	85	0.01

Formaldehyde from Diesel

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	231	30	29.9
Mobile 94	1	231	50	17.5
Mobile 94	1	231	85	24
Mobile 94	2	231	30	44
Mobile 94	2	231	50	18
Mobile 94	2	231	85	16.5
Mobile 94	3	231	30	31.6
Mobile 94	3	231	50	21.5
Mobile 94	3	231	85	15.6
Mobile 97	3	25	15	8
Mobile 97	3	25	30	5
Mobile 97	3	25	75	2
Mobile 97	3	25	85	1

Propionaldehyde from Diesel

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	231	30	15.3
Mobile 94	1	231	50	12.7
Mobile 94	1	231	85	9.5
Mobile 94	2	231	30	9
Mobile 94	2	231	50	5.7
Mobile 94	2	231	85	2

Propionaldehyde from Diesel (ctd.)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	3	231	30	12.8
Mobile 94	3	231	50	11.7
Mobile 94	3	231	85	4
Mobile 97	3	25	15	6
Mobile 97	3	25	30	3
Mobile 97	3	25	75	1
Mobile 97	3	25	85	0.1

Carbon Monoxide from Diesel (ppm)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	3
Mobile 94	2	231	45	2
Mobile 94	2	231	75	0.01
Mobile 94	3	231	30	1
Mobile 94	3	231	45	1
Mobile 94	3	231	75	0.01
Mobile 94	1	199	30	1
Mobile 94	1	199	45	0.01
Mobile 94	1	199	75	0.001
Mobile 94	2	231	30	3
Mobile 94	2	231	45	1
Mobile 94	2	231	75	0.01
Mobile 94	3	231	30	1
Mobile 94	3	231	45	1
Mobile 94	3	231	75	0.1

Carbon Dioxide from Diesel (ppm)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	2	231	30	132
Mobile 94	2	231	45	71
Mobile 94	2	231	75	23
Mobile 94	3	231	30	72
Mobile 94	3	231	45	34
Mobile 94	3	231	75	19
Mobile 97	Burn 2-1	25	15	21
Mobile 97	Burn 2-2	25	15	21
Mobile 97	Burn 2-3	25	15	21
Mobile 97	Burn 5-1	25	15	17
Mobile 97	Burn 2-1	25	30	5
Mobile 97	Burn 3-1	25	30	21
Mobile 97	Burn 3a-	25	30	56
Mobile 97	Burn 4-1	25	30	19
Mobile 97	Burn 4-3	25	30	2
Mobile 97	Burn 5-1	25	30	1
Mobile 97	Burn 2-1	25	72	19
Mobile 97	Burn 2-2	25	72	11
Mobile 97	Burn 2-3	25	72	1

Sulphur Dioxide (ppm)

Burn	Num.	Area	Dist.	Conc.
Mobile 94	1	231	39	0.1
Mobile 94	1	231	58	0.01
Mobile 94	1	231	72	0.001
Mobile 94	1	231	39	0.3
Mobile 94	1	231	58	0.1
Mobile 94	1	231	72	0.001
Mobile 94	1	231	39	0.2
Mobile 94	1	231	58	0.05
Mobile 94	1	231	72	0.001
Mobile 97	1	25	15	0.02
Mobile 97	1	25	30	0.001
Mobile 97	1	25	15	0.08
Mobile 97	1	25	30	0.001
Mobile 97	1	25	15	0.04
Mobile 97	1	25	30	0.001

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in $\mu g/m^3$ or ppm

Table A6-1 **Emissions Measured at Previous Test Burns: Particulates** (concentrations in mg/m^3)

TSP from crude					TSP from Diesel Burns					TSP from Diesel Burns				
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 91	1	231	30	7.4	Mobile 94	3	231	30	2.972	Mobile 97	4-1&2	25	30	0.02
Mobile 91	1	231	30	4.1	Mobile 94	3	231	45	0.884	Mobile 97	4-1&2	25	15	0.34
Mobile 91	1	231	30	0.5	Mobile 94	3	231	75	0.198	Mobile 97	4-1&2	25	30	0.14
Nobe 93	1	600	75	15.05	Mobile 94	3	231	30	2.206	Mobile 97	4-1&2	25	30	0.09
Nobe 93	1	600	125	14.29	Mobile 94	3	231	45	0.636	Mobile 97	4-3	25	30	0.07
Nobe 93	1	600	900	0.01	Mobile 94	3	231	75	0.267	Mobile 97	4-3	25	15	0.35
Nobe 93	1	600	900	0.01	Mobile 94	3	231	30	2.577	Mobile 97	4-3	25	30	0.17
Nobe 93	1	600	900	0.01	Mobile 94	3	231	50	1.111	Mobile 97	4-3	25	30	0.53
Mobile 91	2	231	23	5	Mobile 94	3	231	85	0.383	Mobile 97	4-3	25	15	0.35
Mobile 91	2	231	46	3	Mobile 97	2-1	25	30	0.15	Mobile 97	4-3	25	30	0.23
Mobile 91	2	231	76	1.3	Mobile 97	2-1	25	15	0.33	Mobile 97	4-3	25	30	0.92
Nobe 93	2	600	75	14.4	Mobile 97	2-1	25	30	0.07	Mobile 97	5-1	25	30	0.09
Nobe 93	2	600	125	17.15	Mobile 97	2-1	25	30	0.09	Mobile 97	5-1	25	15	0.12
Nobe 93	2	600	550	0.01	Mobile 97	2-1	25	30	0.10	Mobile 97	5-1	25	30	0.14
Nobe 93	2	600	550	0.01	Mobile 97	2-1	25	15	0.43	Mobile 97	5-1	25	30	0.11
Mobile 92	3	231	23	3.4	Mobile 97	2-1	25	30	0.21	Mobile 97	5-1	25	15	0.33
Mobile 92	3	231	46	2	Mobile 97	2-1	25	30	0.15	Mobile 97	5-1	25	30	0.16
Mobile 92	3	231	76	1.5	Mobile 97	2-1	25	30	0.08	Mobile 97	5-1	25	30	0.03
Mobile 92	4	231	23	4.1	Mobile 97	2-1	25	15	0.24					
Mobile 92	4	231	46	1.8	Mobile 97	2-1	25	30	0.14					
Mobile 92	4	231	76	2.1	Mobile 97	2-1	25	30	0.11					
Mobile 91	5	231	30	0.5	Mobile 97	2-2	25	30	0.04					
Mobile 91	5	231	30	0.2	Mobile 97	2-2	25	15	0.07					
Mobile 92	5	231	23	1	Mobile 97	2-2	25	30	0.06					
Mobile 92	5	231	46	0.5	Mobile 97	2-2	25	30	0.04					
Mobile 92	5	231	76	0.2	Mobile 97	2-2	25	15	0.11					
Mobile 92	6	231	46	0.3	Mobile 97	2-2	25	30	0.04					
Mobile 92	6	231	76	0.1	Mobile 97	2-2	25	30	0.05					
Mobile 91	16	37.2	30	0.5	Mobile 97	2-2	25	15	0.09					
Mobile 91	22	114	30	1.1	Mobile 97	2-2	25	30	0.03					
Mobile 91	22	114	30	1.5	Mobile 97	2-2	25	30	0.10					
Mobile 91	23	181	30	3.9	Mobile 97	2-3	25	15	0.08					
Mobile 91	23	181	60	0.4	Mobile 97	2-3	25	30	0.08					
Mobile 91	24	170	30	0.1	Mobile 97	2-3	25	30	0.02					
Mobile 91	30	114	30	2.7	Mobile 97	2-3	25	30	0.02					
Mobile 91	30	114	60	0.5	Mobile 97	2-3	25	15	0.16					
Mobile 91	31	114	30	0.5	Mobile 97	2-3	25	30	0.12					
Mobile 91	31	114	60	0.1	Mobile 97	2-3	25	30	0.02					
TSP from Diesel Burns					Mobile 97	2-3	25	30	0.02					
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	Mobile 97	2-3	25	15	0.07					
Mobile 94	2	231	30	1.019	Mobile 97	2-3	25	30	0.10					
Mobile 94	2	231	30	5.361	Mobile 97	2-3	25	30	0.01					
Mobile 94	2	231	45	2.145	Mobile 97	3-1	25	30	0.06					
Mobile 94	2	231	75	0.912	Mobile 97	3-1	25	15	0.11					
Mobile 94	2	231	30	1.282	Mobile 97	3a-1	25	30	0.01					
Mobile 94	2	231	45	0.566	Mobile 97	3a-1	25	15	0.01					
Mobile 94	2	231	75	0.176	Mobile 97	3a-1	25	30	0.05					
Mobile 94	2	231	30	2.274	Mobile 97	4-1&2	25	30	0.01					
Mobile 94	2	231	50	1.274	Mobile 97	4-1&2	25	15	0.03					
Mobile 94	2	231	85	0.187	Mobile 97	4-1&2	25	30	0.02					
Mobile 94	3	231	30	2.188	Mobile 97	4-1&2	25	30	0.02					

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration in mg/m^3

Table A6-2 **Emissions Measured at Previous Test Burns: Particulates** (concentrations in mg

PM-10 from Diesel					PM-2.5 from Diesel				
Burn	**Num.**	**Area**	**Dist.**	**Conc.**	**Burn**	**Num.**	**Area**	**Dist.**	**Conc.**
Mobile 94	2	231	30	1.52	Mobile 97	2-1	25	30	0.03
Mobile 94	2	231	45	0.457	Mobile 97	2-1	25	15	0.11
Mobile 94	2	231	75	0.63	Mobile 97	2-1	25	30	0.04
Mobile 94	3	231	30	2.432	Mobile 97	2-1	25	30	0.54
Mobile 94	3	231	45	0.712	Mobile 97	2-2	25	15	0.07
Mobile 94	3	231	75	0.161	Mobile 97	2-2	25	30	0.01
Mobile 97	2-1	25	15	0.27	Mobile 97	2-2	25	30	0.15
Mobile 97	2-1	25	30	0.15	Mobile 97	2-3	25	30	0.11
Mobile 97	2-1	25	30	0.13	Mobile 97	2-3	25	15	0.08
Mobile 97	2-2	25	15	0.06	Mobile 97	2-3	25	30	0.18
Mobile 97	2-3	25	30	0.06	Mobile 97	2-3	25	30	0.04
Mobile 97	2-3	25	15	0.08	Mobile 97	4-1&2	25	30	0.03
Mobile 97	2-3	25	30	0.09	Mobile 97	4-1&2	25	15	0.18
Mobile 97	2-3	25	30	0.04	Mobile 97	4-1&2	25	30	0.09
Mobile 97	3-1	25	30	0.06	Mobile 97	4-1&2	25	30	0.26
Mobile 97	3-1	25	15	0.11	Mobile 97	4-3	25	30	0.03
Mobile 97	3-1	25	30	0.07	Mobile 97	4-3	25	15	0.03
Mobile 97	3-1	25	30	0.07	Mobile 97	4-3	25	30	0.05
Mobile 97	3a-1	25	30	0.01	Mobile 97	4-3	25	30	0.47
Mobile 97	3a-1	25	15	0.14	Mobile 97	4-3	25	15	0.13
Mobile 97	3a-1	25	30	0.02	Mobile 97	4-3	25	30	0.15
Mobile 97	3a-1	25	30	0.04	Mobile 97	4-3	25	30	0.58
Mobile 97	4-1&2	25	30	0.01	Mobile 97	5-1	25	30	0.03
Mobile 97	4-1&2	25	15	0.17	Mobile 97	5-1	25	15	0.35
Mobile 97	4-1&2	25	30	0.07	Mobile 97	5-1	25	30	0.16
Mobile 97	4-1&2	25	30	0.05	Mobile 97	5-1	25	30	0.1
Mobile 97	4-3	25	30	0.08	Mobile 97	5-1	25	15	0.15
Mobile 97	4-3	25	15	0.39	Mobile 97	5-1	25	30	0.12
Mobile 97	4-3	25	30	0.18	Mobile 97	5-1	25	30	0.02
Mobile 97	4-3	25	30	0.77	Mobile 94	2	231	30	2.361
Mobile 97	5-1	25	30	0.15	Mobile 94	2	231	45	1.145
Mobile 97	5-1	25	15	0.23	Mobile 94	2	231	75	0.111
Mobile 97	5-1	25	30	0.20	Mobile 94	2	231	75	0.176
Mobile 97	5-1	25	30	0.03	Mobile 94	2	231	30	1.274
					Mobile 94	2	231	50	0.674

Num. = experiment number, Area = area in m^2, dist. =distance in m, Conc. = concentration