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LONG-TERM PERFORMANCE OF EPA-CERTIFIED PHASE 2 WOODSTOVES, KLAMATH FALLS AND PORTLAND, OREGON: 1998-1999

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Research Laboratory
Research Triangle Park, NC 27711

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16. ABSTRACT The report gives results of an evaluation of the condition and air emissions from old phase-2-certified wood heaters installed in homes and used regularly for home heating since the 1992/1993 heating season or earlier. (NOTE: Wood stoves have been identified as a major source of particulate and polycyclic organic matter (POM) emissions. For this reason, new source performance standards (NSPS) were promulgated for wood heaters. Wood heaters sold after July 1, 1992, had to be certified for low emissions, meet the most stringent requirements of the NSPS, and are referred to as phase-2 certified. Of concern has been the fact that laboratory and field studies have shown that certified wood heaters can physically degrade with use, commensurately increasing their air emissions.) Sixteen stoves were evaluated in the study, eight each in Klamath Falls and Portland, Oregon. An extensive data base from 43 week-long test runs was developed. The particulate emission factors of the certified phase 2 stoves evaluated in this study appear to have increased with use but, on average, after about 7 years they still have lower emissions than uncertified conventional stoves. In addition, it was clear from the results that the emission rates for phase 2 stove models reported as part of the NSPS certification process do not represent emission levels of the same stove models in homes after extended use.

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Wood	Measurement	Stationary Sources	11L
Combustion		Woodstoves	21B
Emission		Particulate	14G
Particles		Polycyclic Organic Matter	07C
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FOREWORD

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E. Timothy Oppelt, Director
National Risk Management Research Laboratory

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Long - Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland, Oregon: 1998/1999

Prepared by:

Lawrence H. Fisher,
James E. Houck, and
Paul E. Tiegs
OMNI Environmental Services, Inc.
5465 SW Western Avenue, Suite G
Beaverton, OR 97005

and

James McGaughey
Eastern Research Group, Inc.
900 Perimeter Park
Morrisville, NC 27560

EPA Contract 68-D7-0001, WA 2-04

EPA Project Officer: Robert C. McCrillis
National Risk Management Research Laboratory
Research Triangle Park, NC 27711

Prepared for:

U.S. Environmental Protection Agency
Office of Research and Development
Washington, DC 20460

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Executive Summary

Woodstoves have been identified as a major source of particulate and polycyclic organic matter (POM) emissions. For this reason, new source performance standards (NSPS) were promulgated for wood heaters. Wood heaters sold after July 1, 1992, had to be certified for low emissions, meet the most stringent requirements of the NSPS, and are referred to as Phase 2 certified. Of concern has been the fact that laboratory and field studies have shown that certified wood heaters can physically degrade with use and their air emissions commensurately increase.

The objective of this study was to evaluate the condition and air emissions from old phase 2 certified wood heaters installed in homes and used regularly for home heating since the 1992/1993 heating season or earlier. Study stoves were inspected and their conditions were documented. Particulate and POM samples were collected from the stoves during normal in-home use with an automated woodstove emission sampler (AWES). The AWES was developed specifically for the in-home collection of air emission samples from residential wood burning appliances and data developed from its use have previously been used to calculate particulate emission factors published in AP-42. In addition to data obtained from the use of the AWES, ancillary information such as the history of each woodstove, installation characteristics and cordwood properties were compiled for the study.

Sixteen stoves were evaluated in the study, eight in Klamath Falls, Oregon, and eight in Portland, Oregon. All 16 stoves showed the effects of use. However, only six were degraded to the point that it was speculated that their condition would significantly affect air emissions.

An extensive data base from 43 week-long test runs was developed. No direct statistical correlation between emissions and wood moisture, burn rate or the conditions of the stoves could be made due to the number of variables associated with the real-world in-home use of woodstoves. However, the particulate emissions for stoves in homes in Portland were on the average higher than for stoves in homes in Klamath Falls. This result is consistent with the average higher fuel moisture content and burn rate characteristic of the Portland portion of the study as compared to the Klamath Falls portion.

The particulate emission factors of the certified Phase 2 stoves evaluated in this study appear to have increased with use, but on the average, after about seven years they still have lower emissions than uncertified conventional stoves. In addition, it was clear from the results that the emission rates for Phase 2 stove models reported as part of the NSPS certification process do not represent emission levels of same stove models inhomes after extended use.

The data demonstrate that particulate emissions can not be used as a surrogate measurement for POM emissions of woodstoves. Further, POM emission factors, as based on the 7-PAH and 16-PAH values, determined from the in-home use of woodstoves in this study were lower than the POM emission factors previously published in AP-42. This observation is significant because the AP-42 emission factors are the basis for the national emission inventory of POM for which residential wood combustion was identified as the single largest source.

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Section 1.0

Introduction

Residential wood combustion (RWC) has been identified as a major source of particulate matter (PM) and polycyclic organic matter (POM) air emissions. During 1997, RWC contributed an estimated 12% of the sum of the total PM_{10} emissions attributed to all fuel combustion, industrial process, and transportation sources combined (1). RWC was also identified as the largest single source of POM during 1990 (2). Approximately 72% of the cordwood burned annually in the United States in the category of residential wood combustion is in woodstoves (2). (The remaining 28% is mostly burned in fireplaces.) There were an estimated 9.3 million woodstoves in homes during the 1997-1998 heating season (3).

Due to the level of emissions attributed to woodstoves, standards of performance were promulgated for new residential wood heaters (4). All wood heaters sold after July 1, 1992, have to meet the most stringent Phase 2 particulate emission limits of the standards. These standards were 4.1 gram per hour for catalytic stoves and 7.5 grams per hour for non-catalytic stoves. The limits for catalytic stoves were set lower than non-catalytic stoves since the presumed deterioration of the catalyst over time was estimated to result in emissions from catalytic wood heaters over their useful lifetimes approximately equal to non-catalyic wood heaters.

Furthermore, there has been concern about the overall physical deterioration of wood stoves with use and the commensurate increase in air emissions. This concern has been confirmed in both laboratory (5,6) and in-home studies (7-9). Physical degradation coupled with higher PM emissions has been documented for some stoves. Not only are accurate airshed inventories of PM and POM fundamentally important for health and environmental assessments, state and local agencies in areas of PM_{10} nonattainment have been directed to take performance degradation into consideration in their State Implementation Plans (SIPs) when calculating credits from replacing non-certified stoves with certified stoves (10). The replacement of non-certified stoves with Phase 2 certified stoves remains a viable option for reducing airshed pollutant levels and obtaining PM_{10} SIP credits because, as of 1997, more than 80% of the woodstoves in use were still older non-certified units (11). In addition, because over 90% of the PM_{10} emissions from residential wood combustion are also $PM_{2.5}$, emission credits may be very important for possible future $PM_{2.5}$ nonattainment areas.

The primary objective of the study was to select Phase 2 stoves that were installed in homes prior to the fall of 1992 in order to assess the level of long-term degradation and potential

increase in PM and POM air emissions of older Phase 2 certified stoves under actual in-home usage. Woodstoves in homes in both Portland, Oregon, and Klamath Falls, Oregon, were selected because Portland is in U.S. climate zone three and Klamath Falls is in U.S. climate zone two. The average heating degree day (HDD) value for Portland is 4109 and the average HDD for Klamath Falls is 6600. The intent behind the selection of stoves in the two climatologically dissimilar cities was to produce results more widely applicable to woodstove usage in the nation as a whole than if homes in a single city were selected. In addition, nine Phase 2 stoves installed in homes in Klamath Falls were previously studied during the 1989-1990 and 1991-1992 heating seasons (8,12,13). Therefore, a secondary objective of the study was to utilize as many of these homes as possible in the current study to help document phase 2 stove degradation and commensurate emission increase.

Sixteen homes were targeted for study during the 1998-1999 heating season. Two in the study group were homes in Klamath Falls that had phase 2 woodstoves that were part of the earlier studies. Emission samples were collected for three one-week periods from woodstoves in each home using the Automated Woodstove Emission Sampler (AWES) previously developed by OMNI Environmental Services, Inc., for similar studies. Samples collected with the AWES were analyzed for particulate matter and organic compounds. The specific organic compounds analyzed included the seven and sixteen POM compounds needed to calculate the 7-PAH and 16-PAH values, respectively, which are used as surrogate indicators for POM. The PM and POM surrogate emission factors (mass of pollutant emissions per unit mass of fuel) were compared against their emission factors tabulated in AP-42 for woodstoves (14). The PM emission rates (mass of pollutant emissions per time of stove operation) measured under actual in-home use for each woodstove model were compared against their certified emission values listed by the U.S. Environmental Protection Agency (15). The PM emissions from this study and from the previous studies were compared for the stoves in the Klamath Falls homes that were part of earlier studies. Cordwood tree species, cordwood moisture, the amount of cordwood burned, burn rates, ambient temperature during testing, a description of woodstove use in each home, chimney characteristics, and the condition of the stoves were also documented as part of the study. Photographs of each stove's installation and components that showed degradation have been included as Appendix A.

Section 2.0

Methodology

The basis of the study was the use of the AWES for sample and data collection. A description of the AWES is provided in Section 2.1. Woodstove selection and inspection and cordwood characterization are discussed in Section 2.2. Details of the field sampling program, supporting laboratory procedures and data reduction are provided in Section 2.3.

2.1 Automated Woodstove Emission Sampler

The AWES was developed to quantify emissions of particles for residential wood burning appliances while they are in normal in-home use. It is small in size and operates unattended in home settings. Due to the temporal variability in emissions from wood burning appliances, the AWES is also designed to collect long-term integrated samples necessary to provide mean values. Studies conducted with the AWES have provided the majority of the data base used for particulate emission factors development by the U.S. Environmental Protection Agency for residential wood combustion (14). The AWES has been used to quantify emissions from woodstoves, masonry heaters, pellet stoves, and fireplaces (5-8,12,13,16-36). Due to its extensive use, the AWES has undergone U.S. Environmental Protection Agency supported quality assurance evaluations during the period 1986 to 1992 (Appendix B).

A schematic diagram of the AWES is shown in Figure 2-1. Detailed descriptions of its principles of operation, supporting laboratory requirements, calibration, associated data reduction and uncertainty estimates have been published in U.S. Environmental Protection Agency and U.S. Department of Energy reports (16,19) and quality assurance plans (Appendix B).

For sampling purposes, the AWES is placed adjacent to the wood-burning appliance in study homes. For woodstove applications, a stainless steel inlet probe is typically attached to the chimney (stove pipe) 30 cm above the flue collar of the stove. Sample is withdrawn at a rate of approximately one liter per minute. The flow rate is maintained by a calibrated orifice. Particulate samples, including condensible particles, are captured with a heated filter followed by an XAD-2® resin cartridge. All interconnecting tubing, holders and hardware exposed to the sample are made either of stainless steel or Teflon® to maintain sample integrity. After sample collection, the chimney gas is passed through silica gel to protect downstream components from condensate. The oxygen content of the chimney gas is measured with an electrochemical cell.

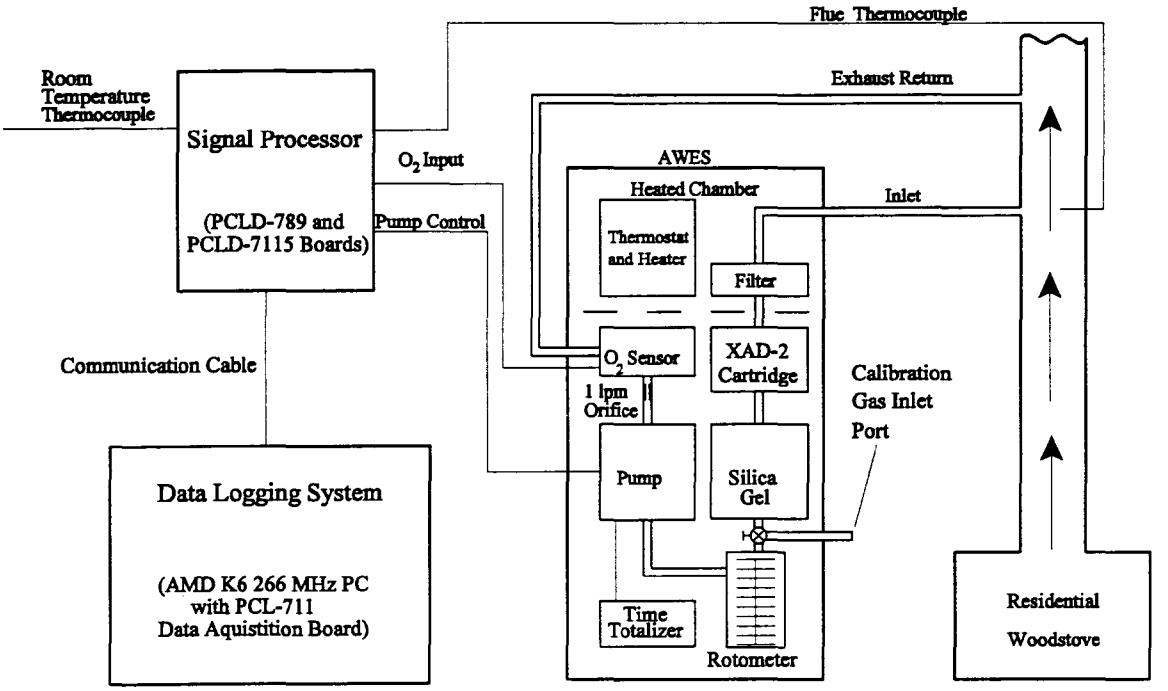

Figure 2-1

Schematic Diagram of the Automated Woodstove Emission Sampler

The sample flow is then returned to the wood-burning appliance chimney above the point where the sample was withdrawn. Room temperature and chimney gas temperature are measured with type K thermocouples. The chimney gas temperature is measured within the chimney at the same location as the sample is withdrawn.

A key component of the AWES is the data logging system. The system records date, time, oxygen content, room temperature, and chimney gas temperature at regular intervals. The oxygen content of the chimney gas, along with the mass of wood burned, allows for the estimation of total chimney gas flow during sampling which is needed for the subsequent calculation of emission rates and emission factors. The record of chimney gas temperatures allows for the total time of appliance operation over the course of the sampling duration to be determined. In addition to data recording, the system is programed to control the sampling frequency, sampling duration and sampling period. For this study, the AWES was programed to sample for two minutes once every 15 minutes for one week. The system is further programed to turn the sampling pump on during the programmed two minute sampling time only if the woodstove is in operation as determined by the chimney temperature in order to avoid collection of sample material when the appliance is not in operation. A threshold chimney temperature of 100°F (38°C) was used as an indicator of woodstove operation.

2.2 Woodstoves, Fuel, and Ambient Temperature

A total of 16 woodstoves, eight in Klamath Falls and eight in Portland, were targeted for study. One home in Klamath Falls was dropped from the study after one week due to a family crisis. An additional home was added to the study in Portland to replace the dropped home. Out of the nine possible phase 2 certified woodstoves that were part of previous studies in Klamath Falls two were included in this study. An attempt was made to include the other seven in the current study but it was not possible either due to stove replacement since the last studies or an unwillingness of the current home occupants to participate in this study. Tables 2-1 and 2-2 list the home codes, woodstove models, and chimney characteristics for all installations. The chimney characteristics were documented because draft and commensurate fire intensity which is affected by chimney height have been implicated in the degradation of woodstove components. A photograph of each stove was taken to illustrate its installation (Appendix A).

Table 2-1

Home Code, Model, and Chimney Characteristics for Klamath Falls Woodstoves

Home Code	Stove Model[a]	Chimney Characteristics
KF01	Quadrafire 2100 Non-Catalytic	8 Foot Vertical Rise Single Story Home
KF02[b]	Pacific Energy Super 27 Non-Catalytic	27 Foot Vertical Rise Two Story A-Frame
KF03[c]	Haughs 171E Non-Catalytic	14 Foot Vertical Rise Two Story Home
KF04	Earthstove 1003C Catalytic	14 Foot Vertical Rise Single Story Home
KF05	Pacific Energy Super 27 Non-Catalytic	18 Foot Vertical Rise Single Story Home
KF06	Waterford 104 MKII Non-Catalytic	21 Foot Vertical Rise Two Story Home
KF07	Earthstove 1400HT Non-Catalytic	14 Foot Vertical Rise Single Story Home
KF08	Country T-Top Non-Catalytic	20 Foot Vertical Rise Two Story A-Frame

[a] All stoves were installed prior to the 1992/1993 heating season.

[b] Stove in home KF02 in this study was referred to as Home 3 or CK03 in the 1990 Energy, Mines and Resources Canada (EMRC) Study[13].

[c] Stove designated as KF03 in this study was referred to as H-5 or WK05 in the 1990 Wood Heating Alliance (WHA) Study[12]. Additionally, this stove was referred to as KF04 in the 1992 Bonneville Power Administration (BPA) study[8].

Table 2-2

Home Code, Model, and Chimney Characteristics for Portland Woodstoves

Home Code	Stove[a]	Chimney/House
P01	Trailblazer Genesis 2000 Catalytic	8 Foot Vertical Rise Single Story Manufactured Home
P02	Lopi Answer Series Non-Catalytic	15 Foot Vertical Rise Single Story Home
P03	Lopi 380-96 Non-Catalytic	11 Foot Vertical Rise Single Story Manufactured Home
P04	Lopi Flush Bay-96[b] Catalytic	22 Foot Vertical Rise Two Story Home
P05	Lopi Flex-95 Catalytic	22 Foot Vertical Rise Two Story Home
P06	Pacific Energy Super 27 Non-Catalytic	10 Foot Vertical Rise Single Story Home
P07	Lopi 520-96 Non-Catalytic	13 Foot Vertical Rise Single Story Home
P08	Vermont Castings Defiant Encored[c] Catalytic	24 Foot Vertical Rise Two Story Home

[a] All stoves were installed prior to the 1992/1993 heating season.

[b] Lopi Flush Bay-96 is now called Freedom.

[c] The Vermont Castings Defiant Encore stove was installed when stove was EPA Phase I certified. Since the installation, the stove has been added to EPA Phase II certification list without changes to the stove's design.

Each stove was inspected and the home occupants were interviewed regarding its historical and current usage. A description was made and photographs were taken of any components that showed degradation (Appendix A).

Participants in the study were either provided with, or reimbursed for the cost of locally available cordwood fuel. Fuel moisture was measured with a Delmhorst moisture meter. If the meter indicated that the wood moisture was greater than 30% (dry basis), the moisture content was determined through drying/gravimetric analysis in the laboratory. Average fuel moisture by week and by home was based on measurements on approximately 10% of the cordwood fuel pieces. Pre-weighed bundles of wood were provided to the occupants of each home prior to each week of sampling. A portable spring scale was used to measure the wood weight. The unused pieces of each bundle were weighed at the end of the sampling week. The amount of wood burned during the week-long tests was calculated by adding the weights of the bundles used (including the weight of wood used in the partly consumed bundles).

Wood Data for Klamath Falls are compiled in Table 2-3. Wood Data for Portland are compiled in Table 2-4. Lodgepole pine, ponderosa pine, juniper and Douglas fir cordwood was used in the Klamath Falls appliances. Douglas fir, maple, alder, oak, birch, lodgepole pine and cherry cordwood was used in the Portland appliances. The mass burned, percentage of the wood burned, and moisture content of cordwood by species in each home during each sampling week are shown in Tables 2-3 and 2-4. The average wood moisture by cordwood tree species ranged from 9.8% to 26.8% on a dry basis (9.0% to 21.1% on a wet basis) for Klamath Falls and from 18.1% to 112.1% on a dry basis (15.3% to 52.8% on a wet basis) for Portland.

The elemental composition (carbon, oxygen, nitrogen and hydrogen) was determined for each species of wood by proximate/ultimate analysis (ASTM D3178). Elemental data were used to calculate the stoichiometric volume of gas produced from a given mass of wood burned during sampling which is, in turn, were used in conjunction with AWES oxygen measurements to estimate the total chimney gas flow.

Average outdoor temperatures were calculated for each sampling week as an indicator of heating demand. The average values were calculated from the daily average temperatures recorded at nearby weather stations for Klamath Falls (37) and Portland (38). The recorded daily average temperatures were simply the average of the daily high and low temperatures in each location.

2.3 Field Measurements, Laboratory Support, and Data Reduction

The principal field and laboratory measurements with associated uncertainties used to calculate the emission and ancillary results are listed in Table 2-5. Fuel measurements as discussed in Section 2.2, infield measurements made by the AWES, laboratory measurements made on the collected samples, and measurements associated with AWES calibration are included in this table.

Table 2-3

Wood Data for Klamath Falls Homes

Home Code	Sampling Week	Mass Burned (Wet lbs)	Species	% Species	Moisture % (Dry Basis)
KF01	A	296.3	Lodgepole	100	20.2
	B	319.4	Lodgepole	100	24.5
	C	170.3	Ponderosa	100	31.4
KF02	A	432.7	Ponderosa	100	20.8
	B	457.3	Ponderosa	100	21.5
	C	313.8	Ponderosa	100	19.6
KF03[a]	B	280.0	Lodgepole	95	14.6
		14.7	Juniper	5	13.2
	C	346.9	Lodgepole	95	18.8
		18.3	Juniper	5	18.3
KF04[a]	A	203.0	Lodgepole	50	21.8
		203.0	Douglas Fir	50	21.4
	B	467.0	Lodgepole	100	19.5
KF05	A	303.2	Juniper	100	10.4
	B	155.7	Juniper	100	9.8
	C	379.3	Juniper	100	11.3
KF06[a]	A	277.5	Lodgepole	100	11.7
KF07	A	349.2	Lodgepole	100	12.6
	B	294.5	Lodgepole	100	11.7
	C	496.5	Lodgepole	100	15.8
KF08	A	525.1	Ponderosa	100	26.8
	B	522.1	Ponderosa	100	25.4
	C	567.6	Ponderosa	100	15.7

[a] There are no data for week A for KF03 and week C for KF04 due to loss of sample and/or laboratory data. There are no data for weeks B and C for KF06 due to death in the family.

Table 2-4

Wood Data for Portland Homes

Home Code	Sampling Week	Mass Burned (Wet lbs)	Species	% Species	Moisture % (Dry Basis)[a]
P01	A	573.1	Douglas Fir	100	24.0
	B	557.1	Douglas Fir	100	21.0
	C	570.3	Douglas Fir	100	22.8
P02	A	51.8	Maple	20	105.3
		13.0	Douglas Fir	5	36.4
		194.3	Alder	75	106.6
	B	227.5	Oak	100	18.5
	C	110.1	Douglas Fir	50	35.4
		110.1	Oak	50	19.1
P03	A	71.6	Douglas Fir	100	18.3
	B	160.4	Douglas Fir	100	18.3
	C	94.0	Douglas Fir	50	19.8
		94.0	Birch	50	27.0
P04	A	184.1	Oak	100	18.3
	B	286.3	Oak	100	18.5
	C	200.7	Oak	100	18.4
P05	A	53.5	Lodgepole	50	20.6
		53.5	Cherry	50	18.1
	B	36.0	Lodgepole	50	19.8
		36.0	Cherry	50	18.2
	C	42.0	Lodgepole	50	19.3
		42.0	Cherry	50	18.8

(Continued)

[a] See equation 6.

Table 2-4 (continued)

Wood Data for Portland Homes

Home Code	Sampling Week	Mass Burned (Wet lbs)	Species	% Species	Moisture % (Dry Basis)[a]
P06	A	181.7	Maple	20	105.3
		48.4	Douglas Fir	5	36.4
		678.4	Alder	75	106.6
	B	164.4	Maple	20	104.2
		41.1	Douglas Fir	5	38
		616.3	Alder	75	112.1
	C	155.0	Maple	20	101.1
		38.7	Douglas Fir	5	35.4
		581.1	Alder	75	107.9
P07	A	214.6	Maple	20	105.3
		53.7	Douglas Fir	5	36.4
		804.9	Alder	75	106.6
	B	227.9	Maple	20	104.2
		57.0	Douglas Fir	5	38
		854.7	Alder	75	112.1
	C	894.4	Douglas Fir	100	24.8
P08[b]	A	46.7	Douglas Fir	10	21.8
		419.9	Oak	90	25.1
	B	16.8	Douglas Fir	10	21.9
		151.1	Oak	90	25.4

[a] See equation 6.

[b] There are no data for week C for P08 due to loss of sample data.

Table 2-5

Principal Field and Laboratory Measurements

Parameters	Units	Method of Determination	Estimated Precision	Estimated Accuracy
1. Wood Fuel Weight	kg	Spring Scale	± 0.1%	± 0.1%
2. Wood Fuel Moisture	% by Mass (Dry Basis)	ASTM D2016 (>30%)	± 10%	± 5%
		Delmhorst Model RC Moisture Meter (<30%)	± 1% Absolute	± 1% Absolute
3. C, O, N, H Composition of Wood	% by Mass	ASTM D3178	± 1% Absolute	± 1% Absolute
4. Mass of Particles Collected on Filter	mg	Analytical Balance	± 0.3%	± 0.3%
5. Mass of Particles Collected in Probe and Connecting Tubing	mg	Removal/Solvent Evaporation/Analytical Balance	± 0.3%	± 0.3%
6. Mass of Semi-Volatiles Collected on XAD-2®	mg	Extraction/Solvent Evaporation/Analytical Balance	± 0.3%	± 0.3%
7. Sample Flow Rate	l/min	Bubble Flow Meter/Digital Timer	± 3%	± 2%

(Continued)

Table 2-5 (continued)

Principal Field and Laboratory Measurements

Parameters	Units	Method of Determination	Estimated Precision	Estimated Accuracy
8. Chimney Gas O_2	% by Volume	AWES/Electrochemical Sensor	± 0.8% absolute	± 0.8% Absolute
9. Mean Barometric Pressure (for Flow Calibration)	in. Hg	Mercury Barometer	± 0.5 mm Hg	± 0.5 mm Hg
10. Duration of Sampling	min	Data Logger Internal Clock	± 0.1%	± 0.1%
11. Temperature (Chimney, Ambient)	°F	Type K Thermocouple	± 4 °F or ± 0.75% (Whichever is Greatest)	± 4 °F or ± 0.75% (Whichever is Greatest)
12. Sampling Period	min	Data Logger Internal Clock	± 0.1%	± 0.1%
13. POM Compounds Contained in Particles	µg	EPA SW-846 Method 8270C	± 20%	± 20%
14. POM Compounds Contained in Vapor Phase	µg	EPA SW-846 Method 8270C	± 20%	± 20%

Laboratory measurements were made on three AWES sample components:

1. The probe and interconnecting tubing;
2. The heated filter; and
3. The XAD-2® resin cartridge.

For this study since both PM and POM surrogates were measured, the sample material was split into two portions for analysis. Figure 2-2 is a flow chart summarizing the analysis procedures. The sample probe and tubing connecting the probe to the heated filter were rinsed with a 50/50 mixture of methylene chloride and methanol. A stainless steel wire brush was used to remove material from the sample probe prior to the 50/50 methylene chloride/methanol mixture rinse. Both the removed material and solvent rinse were collected in a single beaker. One half of the mixture was taken to dryness and weighed to calculate its PM content. One half was combined with the XAD-2® extract and reduced to 5 mL volume for organic compound analysis by gas chromatography/mass spectrometry (SW-846 Method 8270C).

The pre-weighed filter was placed in a desiccator until a constant weight was achieved. The difference between pre-and post-weights allowed for the mass of particles collected on the filter to be determined. The filter was spiked and then extracted with methylene chloride, reduced in volume to 5 mL and analyzed for organic compounds by SW-846 Method 8270C.

Surrogates and matrix spikes were added to the XAD-2® resin cartridge for the POM determination. The resin was then extracted with a Soxhlet extractor using methylene chloride. One half of the extract was evaporated to dryness for mass (PM) determination and one half was added to the probe and interconnecting tubing rinse for organic compound analysis by SW 846 Method 8270C.

The masses of PM and POM surrogates contained in each of the three components were added to obtain the total mass captured with the AWES system.

Table 2-6 lists the intermediate and final parameters derived from the field and laboratory measurements. Except for the POM compound emission factors and rates (items 10 and 11 in Table 2-6), the precision and accuracy uncertainties for the intermediate and final derived parameters were determined from the estimated uncertainties of the principal field and laboratory measurements shown in Table 2.5 following standard propagation of error procedures (16,19). The uncertainties for the POM compound emission factors and rates shown in Table 2-6 were estimated from data from similar studies (23,25,39,40).

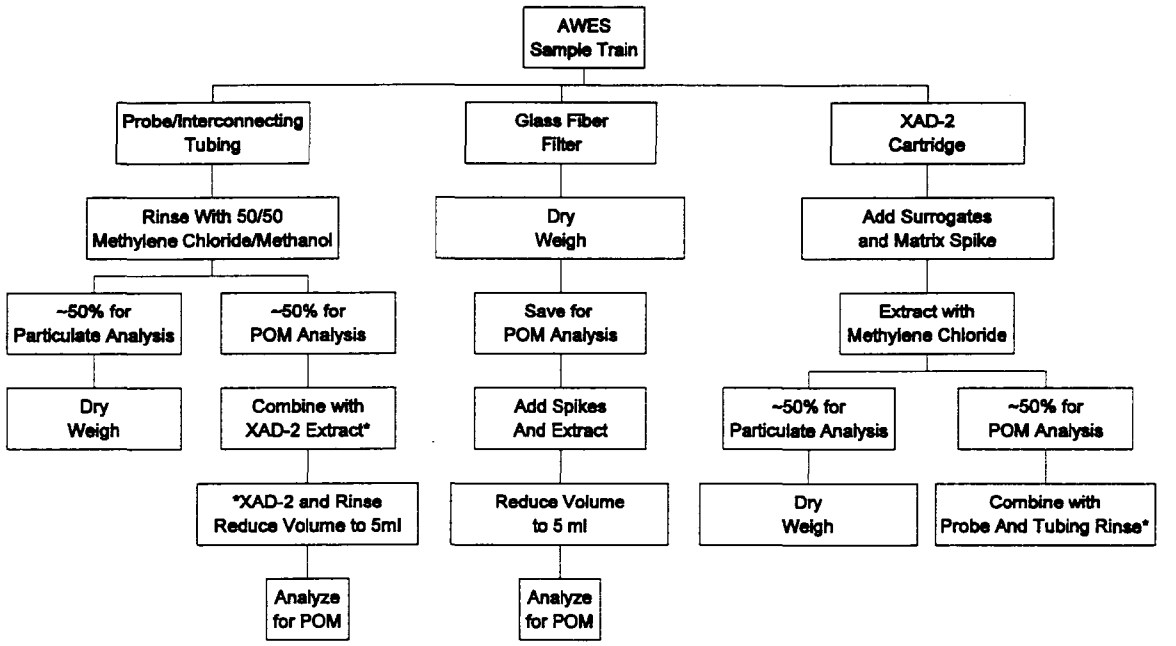

Figure 2-2

Flow Chart Summarizing Analysis Procedures

Table 2-6

Derived Parameters

Parameters	Units	Method of Determination	Estimated Precision	Estimated Accuracy
1. Mass Particles/Volume of Chimney Gas	g/m^3	AWES Data Logger System/Lab Support	± 8%	± 5%
2.Mass Particles/Mass Dry Wood Burned	g/kg (Dry)	AWES Data Logger System/Lab Support	± 16%	± 17%
3. Mass Particles/Time of Stove Operation	g/hr	AWES Data Logger System/Lab Support	± 20%	± 18%
4. Dry Mass of Wood Burned	kg	Fuel Scale	± 0.1%	± 0.1%
5. Percent of Time Stove in Operation	%	Type K Thermocouple/Data Logger	± 3%	± 3%
6. Mean Fuel Moisture by Species	% (Dry Basis)	<30% – Delmhorst Moisture Meter	< ± 2% Absolute	< ± 2% Absolute
		>30% – Gravimetric Analysis	± 4%	± 2%
7. Mean Wood Burn Rate	kg/hr (Dry)	Fuel Scale/Data Logger	± 0.1%	± 0.1%
8. Mean Chimney Gas Oxygen Concentration	% by Volume	Electrochemical Sensor/Data Logger	± 0.3% Absolute	± 0.69% Absolute Uncorrected ± 0.2% Absolute Corrected
9. Mean Chimney Gas Temperature	°F	Type K Thermocouple/Data Logger	± 4 °F or ± 0.75% (Whichever is Greatest)	± 4 °F or ± 0.75% (Whichever is Greatest)
10. Mass of POM Compounds/Mass Dry Wood Burned	µg/kg (Dry)	AWES Data Logging System/ Lab Support	± 50%	± 50%
11. Mass of POM Compounds/Time of Stove Operation	µg/kg (Dry)	AWES Data Logging System/ Lab Support	± 50%	± 50%

The following formulas were used to calculate the derived parameters listed in Table 2-6.

Mass of particles/volume of chimney gas = $\frac{(MP)}{(FR)(SD)}$ (1)

where:

MP = Mass of particles collected by the AWES (sum of the particles collected on the probe and interconnecting tubing, on the filter, and on the XAD-2® resin)
FR = Flow rate of the AWES, and
SD = Sampling duration of the AWES.

Mass of particles/mass dry wood burned = $\frac{(MP)(SV)}{(FR)(SD)\left(1-\left[\%O_2/20.9\%\right]\right)}$ (2)

where:

Mass particulate emissions (MP) = $(MP)\frac{(TF)}{(FR)(SD)}$

Total chimney gas volume (TF) = $\frac{(SV)(MDW)}{\left(1-\frac{\%O_2}{20.9\%}\right)}$

SV = Volume of chimney gas per unit mass of dry wood from the stoichiometric combustion of wood, obtained from proximate/ultimate analysis data and a small correction for carbon monoxide levels characteristic of EPA-certified Phase 2 woodstove emissions,

MDW = Mass of dry wood burned during sampling (see equation 4), and,

$\%O_2$ = Percent of oxygen in chimney gas measured with the AWES.

Mass particulate emissions/time of stove operations =

$$\frac{(MP)(SV)(MDW)(100)}{(FR)(SD)(SP)(WO)\left(1-\left[\%O_2/20.9\%\right]\right)} \quad (3)$$

where:

SP = Sampling period (usually one week), and,

WO = Percent of time stove in operation (see equation 6).

Dry mass of wood burned =

$$\sum_{i=1}^{n} X_i\left(\frac{MWW}{1+MDC_i}\right) \quad (4)$$

where:

i = the wood species,

X_i = the fraction of the total wood of the i^{th} species used,

MDC_i = the mean moisture content (dry basis) of species *i* (see equation 6), and

MWW = Mass of wet wood burned. The wood used for the duration of the testing was pre-weighed. Fuel use was the difference between amount of weighed wood at the start of the test, and the amount of weighed wood remaining at the end of the test. The data were summed over the time periods of interest.

Fraction of time stove was in operation

The woodstove was determined to be in operation whenever chimney gas temperatures exceeded 38° C (100° F). Temperature was determined continuously by a thermocouple and the value was recorded every fifteen minutes. The fraction of time the stove was operating was calculated as follows:

Percent of time woodstove operates (WO) =

$$\frac{\#\text{ of readings where Tf} \geq 100°F}{\text{Total \# of readings}} \text{X } 100\%. \quad (5)$$

Mean fuel moisture by species

Mean fuel moisture was determined each week by successive measurements of fuel stockpiled for immediate burning. The average moisture for each species of fuel wood was determined from at least ten percent or more of the total wood pieces for each species of wood for each sampling week.

$$\text{Average weekly fuel moisture (dry basis) for species } i \text{ } (MDC_i) = \frac{1}{n}\sum_{j=1}^{n} M C_j \quad (6)$$

where:

MC_j = Moisture value of the j^{th} measurement ($n \geq 6$).

When a moisture meter reading exceeded 30 percent moisture (dry basis), a sample was taken and moisture determined by the standard oven drying technique (ASTM D2016) In these cases:

$$MDC_i = \frac{W_{BD} - W_{AD}}{W_{AD}} \quad (6a)$$

where:

MDC_i = Dry basis moisture content of species *i*,

W_{BD} = Weight of sample before drying, and

W_{AD} = Weight of sample after oven drying.

Mean Wood Burn Rate

$$\text{Mean wood burn rate} = \frac{(MDW)(100)}{(SP)(WO)} \quad (7)$$

where:

MDN = Mass of dry wood burned during sampling (see equation 4),

SP = Sampling period, and

WO = Percent of time stove in operation (see equation 6).

Mean Chimney Gas Oxygen Content in Percent

$$\text{Mean chimney gas oxygen content in percent } (\%\ O_2) = \frac{1}{n}\sum_{i=1}^{n} O_{2i} \quad (8)$$

where:

$O_{2,i}$ = oxygen concentration of the chimney gas of the i^{th} reading (%), and

n = total number of valid readings.

Chimney oxygen was recorded every fifteen minutes and averaged over each sampling week or fraction of the sampling week of interest.

Mean Chimney Gas Temperature

$$\text{Mean chimney gas temperature } (T_f) = \frac{1}{n}\sum_{i}^{n} (T_f)_i \quad (9)$$

where:

$(T_f)_i$ = Mean chimney gas temperature for the i^{th} valid reading, and

n = Number of valid readings in the sampling period.

Mass of POM compounds / mass of dry wood burned

The mass of each individual 7-PAH and 16-PAH compound's emissions were summed to get the 7-PAH and 16-PAH POM surrogate mass emission values, respectively. By substituting these values for the particulate mass emission value (MP) in equation 2, the emission factors (mass POM surrogate/ mass of dry wood) for the 7-PAH and 16-PAH POM surrogates were calculated. The seven and 16 individual compounds that make up the 7-PAH and 16-PAH surrogates are listed in Table 2-7 and the calculations conducted according to Equation (10).

Table 2-7

7-PAH and 16-PAH Surrogates for POM

1	Acenaphthene
2	Acenaphthylene
3	Anthracene
4	Benzo(a)anthracene*
5	Benzo(a)pyrene*
6	Benzo(b)fluoranthene*
7	Benzo(g,h,i)perylene
8	Benzo(k)fluoranthene*
9	Chrysene*
10	Dibenzo(a,h)anthracene*
11	Fluoranthene
12	Fluorene
13	Indeno(1,2,3-cd)pyrene*
14	Naphthalene
15	Phenanthrene
16	Pyrene

* 7-PAH Compounds

$$\text{Mass of POM/mass dry wood burned} = \frac{(PAH)(SV)}{(FR)(SD)\left(1-\left[\%O_2/20.9\%\right]\right)} \quad (10)$$

where:

$$\text{Mass of PAH emissions (PAH)} = (PAH)\frac{(TF)}{(FR)(SD)},$$

$$\text{Total chimney gas volume (TF)} = \frac{(SV)(MDW)}{\left(1-\frac{\%O_2}{20.9\%}\right)},$$

SV = Volume of chimney gas per unit mass of dry wood from the stoichiometric combustion of wood, obtained from proximate/ultimate analysis data and a small correction for carbon monoxide levels characteristic of EPA-certified Phase 2 woodstove emissions,

MDW = Mass of dry wood burned during sampling (see equation 4), and

$\%O_2$ = Percent of oxygen in chimney gas measured with the AWES.

Mass of POM compounds/time of stove operation

The 7-PAH and 16-PAH POM surrogate mass emission values were substituted for the particulate mass emission value (MP) in equation 3 to calculate the emission rates (mass POM surrogate/ time of stove operation) for the 7-PAH and 16-PAH surrogates.

Mass particulate emissions/time of stove operations =

$$\frac{(PAH)(SV)(MDW)(100)}{(FR)(SD)(SP)(WO)\left(1-\left[\%O_2/20.9\%\right]\right)} \quad (11)$$

where:

SP = Sampling period (usually one week), and

WO = Percent of time stove in operation (see equation 6).

In the conduct of field measurements, laboratory support and data reduction tasks, the quality assurance procedures that have been developed for previous U.S. EPA studies (see Appendix B) were followed. In addition a project specific quality assurance plan was developed and approved for this study. Two key quality assurance activities were an independent check of 10% of the data reduction and the processing of field blanks.

Section 3.0

Results and Discussion

The results are presented in three sections. The condition of the stoves along with their history and current use and a description the home settings is provided in Section 3.1. Particulate emission results are presented Section 3.2. POM emission results are presented in Section 3.3.

3.1 Condition of Stoves

Table 3-1 lists the home code, stove model, and a summary of the stove condition and usage for homes in Klamath Falls. Photographs of these stoves and degraded components are provided in Appendix A. A narrative description for the stoves in Klamath Falls by home code (home codes KF01 through KF08) follows.

KF01 The QuadraFire 2100 (Appendix A, Photograph 1) was installed September 10, 1991 and has been owned and operated by the same person. It is located in a dusty environment in a ceramic shop with poor insulation. It is in overall good condition except for the ceramic blanket which is pushed up partially blocking the exhaust flow (Appendix A, Photograph 2). The blanket installation was repaired before testing was conducted for this study. The stove is used as the primary heat source for the small business and is usually operated for more than 16 hours per day during the heating season. The chimney is cleaned and inspected once per year. The owners of the business live adjacent to the shop and use an oil furnace as a supplemental heating source when the shop is unoccupied.

The owner typically burns two to three cords of lodgepole pine cordwood a year, and feels that the stove has heated the shop well. However, the owner noted that the stove was difficult to light, and sometimes initially difficult to keep burning. These problems were probably due to the ceramic blanket partially blocking the exhaust flow.

KF02 The Pacific Energy Super 27 (Appendix A, Photograph 3) was provided to the homeowner as part of the 1990 Wood Heating Alliance (WHA) study (12). The home is a two-story A-frame style. The previous owners had the baffle replaced (Appendix A, Photograph 4) approximately six years prior to the study with an identical baffle because the baffle assembly had degraded to the point that the stove would not heat the home adequately. The baffle was replaced by a professional installer. Otherwise, the

Table 3-1

Home Code, Model, and Condition for Klamath Falls Woodstoves

Home Code	Stove Model[a]	Stove Condition and Usage
KF01	Quadrafire 2100 Non-Catalytic	Impaired / Normal Wear[d] Minimal Use during Heating Season
KF02[b]	Pacific Energy Super 27 Non-Catalytic	Impaired / Normal Wear[d] Extensive Use during Heating Season
KF03[c]	Haughs 171E Non-Catalytic	Normal Wear Extensive Use during Heating Season
KF04	Earthstove 1003C Catalytic	Normal Wear Extensive Use during Heating Season
KF05	Pacific Energy Super 27 Non-Catalytic	Impaired Regular Use during Heating Season
KF06	Waterford 104 MKII Non-Catalytic	Impaired Regular Use during Heating Season
KF07	Earthstove 1400HT Non-Catalytic	Normal Wear Extensive Use during Heating Season
KF08	Country T-Top Non-Catalytic	Normal Wear Extensive Use during Heating Season

[a] All stoves were installed prior to the 1992/1993 heating season.

[b] Stove in home KF02 in this study was referred to as Home 3 or CK03 in the 1990 Energy, Mines and Resources Canada (EMRC) Study (13).

[c] Stove designated as KF03 in this study was referred to as H-5 or WK05 in the 1990 Wood Heating Alliance (WHA) Study (12). Additionally, this stove was referred to as KF04 in the 1992 Bonneville Power Administration (BPA) study (8).

[d] The stove was impaired by use but was repaired and in the "normal wear" condition at the time of this study.

installation has not changed since the WHA study. The chimney system is inspected and cleaned once a year.

The owner typically burns five cords of lodgepole pine or ponderosa pine each burning season. The unit is used as the primary heat source and fired 24 hours per day. The owner feels that it heats the home well.

KF03 The Haughs 171E woodstove (Appendix A, Photograph 5) was given to the current owner as part of the 1990 WHA study (12) and was also used in the 1992 Bonneville Administration (BPA) study (19). It is in overall good condition showing only normal wear, with the exception of cracking along the rear level of secondary air ports (Appendix A, Photograph 6). The unit has been operated and maintained by the same home owners that participated in the 1990 and 1992 studies and there have been no changes in the installation of this unit.

They feel that the stove has heated the home well. Approximately five cords of mixed juniper, cedar, and lodgepole pine are burned per heating season.

KF04 The Earthstove model 1003-C (Appendix A, Photograph 7) was installed in early 1992. It is designed for mobile home installation getting its combustion air from outside the home. It is in good overall condition. The owner felt that the catalytic combustor was no longer working and needed replacement. Visual inspection did reveal some thermal wear. However, temperatures observed in the flue and at the installed catalyst temperature indicator during testing showed that the catalyst was in proper working order. The door gasket was in good condition, as were the refractory elements.

The owner felt that the unit heated the home well. It is used as the primary heat source, and fired 24 hours per day. Typically, four to five cords of Douglas fir are burned per heating season.

KF05 The Pacific Energy Super 27 (Appendix A, Photograph 8) was installed November 23, 1991, and has been owned and operated by the same person. It is in overall fair condition with the exception that the front right portion of the baffle area and the ceramic blanket are degraded (Appendix A, Photograph 9). The stove is used as the primary heat source and operated for more than 16 hours per day during the heating season. The chimney is cleaned and inspected once per year.

The owner uses the stove as the primary heat source during the burning season, and feels that it heats the home well. Typically two to three cords of juniper are burned per year.

KF06 The Waterford MKII (Appendix A, Photograph 10) was installed on July 12, 1991, and has been operated by the same owners. The chimney is cleaned and inspected once per year. It is in good operating condition except for the front portion of the baffle which is

in a severely degraded state (Appendix A, Photograph 11). Such degradation is probably either the result of thermal or chemical breakdown of the baffle material. Chemical breakdown such as was seen on the baffle can be caused by burning trash. Thermal breakdown can be caused by intense fire conditions such as can be caused by a strong draft which is in turn can be caused by a tall chimney. It is interesting to note that the chimney in this home is tall (approximately 21 feet total vertical rise).

This stove and a Phase I certified woodstove located in another part of the house are used as the primary heat sources during the burning season. The owner feels that the Waterford stove does a good job of heating the section of house in which it is located. Three to four cords of mixed lodgepole pine and Douglas fir are burned in the stove annually.

KF07 The Earthstove 1400 HT (Appendix A, Photograph 12) insert was installed early 1992, and has been owned and operated by the same person. The stove is fitted with a stainless steel flue collar and stainless steel lined flue. The refractory elements show some wear (Appendix A, Photograph 13). The steel components of the stove are in good condition. However, the secondary inlet tube shows some warping (Appendix A, Photograph 14). The door gasket is in fair condition, with some degradation on the combustion side of the glass seal.

The owner typically burns three to five cords of lodgepole pine per year. The stove is used as the primary source of heat. The owner feels that the unit has done a great job heating the home, and mentioned that it can easily overheat the house.

KF08 The Country T-Top woodstove (Appendix A, Photograph 15) was installed during the 1992/1993 heating season. The stove is the only source of heat for the home and is fired continuously during the burning season. The firebox is in overall good condition. The secondary air tubes show some flaking on their surfaces. The door gasket is in usable but degraded condition.

The stove is used as the primary heat source for the home. The owner burns four to five cords of lodgepole pine per winter, and is satisfied with the performance of the stove.

Table 3-2 lists the home code, stove model, and a summary of the stove condition and usage for homes in Portland. Photographs of these stoves and degraded components are provided in Appendix A. A narrative description for the stoves in Portland by home code (home codes P01 through P08) follows.

Table 3-2

Home Code, Model, and Condition for Portland Woodstoves

Home	Stove[a]	Stove Condition and Usage
P01	Trailblazer Genesis 2000 Catalytic	Impaired Extensive Use All Year Long
P02	Lopi Answer Series Non-Catalytic	Impaired Minimal Use during Heating Season
P03	Lopi 380-96 Non-Catalytic	Normal Wear Minimal Use during Heating Season
P04	Lopi Flush Bay-96[b] Catalytic	Normal Wear Minimal Use during Heating Season.
P05	Lopi Flex-95 Catalytic	Normal Wear Minimal Use during Heating Season
P06	Pacific Energy Super 27 Non-Catalytic	Normal Wear Extensive Use during Heating Season
P07	Lopi 520-96 Non-Catalytic	Normal Wear Extensive Use during Heating Season
P08	Vermont Castings Defiant Encore[c] Catalytic	Normal Wear Regular Use during Heating Season

[a] All stoves were installed prior to the 1992/1993 heating season.

[b] Lopi Flush Bay-96 is now called Freedom.

[c] The Vermont Castings Defiant Encore stove was installed when stove was EPA Phase I certified. Since the installation, the stove has been added to EPA Phase II certification list without changes to the stove's design.

P01 The Genesis 2000 (Appendix A, Photograph 16) was installed on September of 1991. The unit has been used as the primary heat source in the home since installation and is operated 24 hours a day. The unit is in overall fair condition. The baffle (Appendix A, Photograph 17) and catalyst (Appendix A, Photograph 18) are operational but show significant thermal degradation.

The stove is used as the primary source of heat in this home and is actually fired 24 hours per day, all year long. The unit is used all year long not just in the burning season due to the fact that the home is located at higher elevation outside the Portland metropolitan area where the climate is cooler. The homeowner does not like to restart the stove. Hence, even in the summer it is allowed to operate in the "dampered down" mode during the daytime. Approximately twelve cords of wood are burned per year.

P02 The LOPI Answer series (Appendix A, Photograph 19) was installed in 1991 and has been owned and operated by the same person. The baffle refractory is in good condition. The firebox side and rear refractory show some degradation. The door and window gasket are in good condition, as is the front secondary air tube. However, the support for the front secondary air tube has degraded to the point where it has lost structural strength (Appendix A, Photograph 20). The rear secondary air tube is partially blocked by creosote (Appendix A, Photograph 21). The creosote buildup indicates that the unit is typically operated with combustion air restricted (the damper shutdown). The thermal degradation of the front secondary air tube support indicates that the unit receives most of its combustion air though the front of the unit.

The unit is used part time by the owners who feel satisfied about the stove's ability to heat their home. They typically burn one to two cords of mixed oak and Douglas fir per year.

P03 The LOPI 380-96 (Appendix A, Photograph 22) was installed in October of 1992, and owned and operated by the same person. Overall the stove is in excellent condition. It is only used part-time during the burning season. The door and window gaskets are still in excellent condition, as are the fire brick, fire brick hangers, and secondary air tubes.

The primary heat source for the home is a heat pump. The owner is satisfied with the performance of the stove. One to two cords of mixed Douglas fir and birch are burned each year.

P04 The LOPI Flushbay-96 (Appendix A, Photograph 23) was installed in 1992 by the existing owner. It is equipped with a flexible stainless steel flue pipe at the flue collar that leads to a solid vertical stainless steel liner. The unit's door and glass seals are in excellent condition. The firebox refractory is in good condition. However, the secondary air tube shows signs of warping and flaking (Appendix A, Photograph 24), but is still in good functional condition.

The unit is used part time by the owner who feels satisfied about the stove's ability to heat the home. Typically, one to two cords of oak are burned per year.

P05 The LOPI Flex-95 (Appendix A, Photograph 25) was installed in November of 1990, and has been owned and operated by the same person. The baffle refractory and baffle supports, along with the secondary air tube, are all in good condition. The side and rear fire brick show cracks, but no visible sign of thermal degradation. It is likely that the cracks in the fire brick are from physical impact. The catalyst is in good operating condition but shows fly ash accumulation. The Interam seal surrounding the catalyst has been disturbed and dislodged in places (Appendix A, Photograph 26). This is apparently from removing and replacing the catalyst without replacing the Interam seal.

The owner typically burns one to two cords of mixed cherry and lodgepole pine per year. The stove is used part time during the heating season. The owner is satisfied with its performance.

P06 The Pacific Energy Super 27 (Appendix A, Photograph 27) was installed in 1990. After the initial installation, the stove was temporarily removed for floor repair and replaced back into the original installation configuration. The door gasket is in good condition, while the fire brick shows some thermal wear. The unit is in fair operational condition except for a sagging baffle (Appendix A, Photograph 28). Although the baffle sags, there are no visible cracks in it.

At the time of this study, the stove was the home's only source of heat. An oil furnace in the home was not operational. The owner typically burns one to two cords per year. However, three to four cords were burned during the study year due to the oil furnace not being in service. The owner feels that the stove heats the home well.

P07 The LOPI 520-96 (Appendix A, Photograph 29) is in overall good condition. It was installed in October 1992. It is used extensively during the heating season. The stove was the only working source of heat in the home at the time of the study, and was used 24 hours a day. The door gasket and baffle are all in good condition, while the secondary air tube shows signs of flaking (Appendix A, Photograph 30). However, the air tube is still in good operational condition.

The owner typically burns two to three cords per winter, but burned four to five cords during the winter of the current study because an oil furnace which is normally used was not operational during the study period. The owner is satisfied with the heating performance of the stove.

P08 The Vermont Castings Defiant Encore (Appendix A, Photograph 31) is in good working condition, including the door gaskets and refractory elements. It was installed in 1989. The unit has a top vented exhaust rising about four feet where it is connected to a terra

cotta lined masonry chimney. The chimney cap allows rain into the chimney. The water makes its way to the connection where it drips out into the back left corner of the stove.

The unit is used as a secondary heat source for the home. The owners indicated that they are happy with the stove. They typically burn one to two cords of oak per year.

Out of the sixteen stoves inspected, six degraded to the point of probably impairing emission performance. Two of these were repaired by the homeowner prior to conducting emission testing for this study. Consequently, the emission results of this study represent emissions from 12 units in the "normal wear" condition and from four units in a significantly degraded condition. Because there were so many variables (burn rate, cordwood tree species, wood moisture, chimney height, historical burning practices, and stove model) there was no clear cause and effect relationship observed. It was, however, noted by the inspector, that in general, routine stove maintenance had not been done and that this maintenance and/or minor repairs would have kept all stoves in acceptable working condition.

3.2 Particulate Matter Emissions

The results for each of the 43 valid one-week testing runs are summarized in Appendix C and in Tables 3-3 through 3-6. Emissions were determined for a range of normal wood burning practices such as occur in actual home installations. For example, week-long averages of burn rates ranged from 0.6 dry kg of wood per hour to 2.0 dry kg of wood per hour and average wood moisture contents ranged from 9.8% to 105.0% on a dry basis (8.9% to 51.2% on a wet basis). It should be noted that not only are the emission results representative of the range of actual emissions from the in-home use of woodstoves, they also represent credible mean values for each set of conditions since they inherently average the emissions from a considerable mass of wood combusted over numerous burn cycles during each sampling week. The amount of wood burned over the one-week tests ranged from 77.3 kg to 517.4 kg (58.8 kg to 325.4 kg on a dry basis).

Not surprisingly, emission factors and emission rates calculated for the week-long tests were variable. The factors ranged from 1.9 g/ dry kg to 20.8 g/dry kg and the rates ranged from 1.7 g/hr to 40.3 g/hr. There was no clear relationship between the condition of an individual stove and its particulate emissions. In addition, there was no clear statistical relationship (no R^2 values greater than 0.9) between emission factors and either burn rate or fuel moisture for catalytic stoves, non-catalytic stoves or for both categories combined. While it is a generally accepted fact that lower burn rates, wet wood and degraded stoves tend to produce higher emission factors, there were, as previously discussed, so many inherent variables that the effects of individual parameters were unable to be determined.

Average fuel moisture, particulate emissions, burn rate and outdoor temperature are shown in Table 3-7 for Klamath Falls and in Table 3-8 for Portland. A summary of particulate emission results by stove grouping (catalytic, non-catalytic and all stoves) and city are presented

Table 3-3

Individual Test Results for Klamath Falls Stoves KF01 – KF04

Home Code	KF01			KF02			KF03[a]		KF04[a]	
Stove Model	Quadrafire 2100 Non-Catalytic			Pacific Energy Super 27 Non-Catalytic			Haughs 171E Non-Catalytic		Earthstove 1003-C Catalytic	
Week	A	B	C	A	B	C	B	C	A	B
Start Date	11/25/98	12/04/98	12/10/98	11/08/98	12/02/98	12/09/98	11/22/98	12/06/98	11/14/98	12/02/98
End Date	12/02/98	12/10/98	12/16/98	11/15/98	12/09/98	12/16/98	11/29/98	12/13/98	11/21/98	12/09/98
Total Data Collection Hours	168.0	141.0	142.8	168.0	168.0	168.0	168.0	168.0	168.0	167.0
% Time Stove Burned	54.9	66.3	30.3	100.0	97.5	79.6	85.0	95.2	100.0	100.0
Avg. Stack Temp. (°F)	478	493	482	448	412	374	430	475	398	510
Avg. $\%O_2$ (Flue >100 °F)	15.87	15.54	16.29	14.53	14.52	15.15	17.58	16.52	15.42	12.59
Fuel Mass (Wet kg)	134.5	145.0	77.3	196.4	207.6	142.5	133.8	165.8	184.4	212.2
Fuel Moisture (% Dry Basis)	20.2	24.5	31.4	20.8	21.5	19.6	14.5	18.8	21.6	19.5
AWES Flow Rate (l/min)	0.985	0.985	0.985	1.124	1.124	1.124	1.038	1.038	1.042	1.042
Sample Time (min)/Cycle (min)	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15
Indoor Ambient Temp. (°F)	70	62	72	67	57	54	75	71	75	71
Outdoor Ambient Temp. (°F)	37	17	30	33	22	29	38	23	37	2

(Continued)

Table 3-3 (continued)

Individual Test Results for Klamath Falls Stoves KF01 – KF04

Home Code	KF01			KF02			KF03[a]		KF04[a]	
Stove Model	Quadrafire 2100 Non-Catalytic			Pacific Energy Super 27 Non-Catalytic			Haughs 171E Non-Catalytic		Earthstove 1002-C Catalytic	
Week	A	B	C	A	B	C	B	C	A	B
Rinse Particulate (g)	91.2	163.1	39.2	307.2	193.6	250.5	60.4	88.4	461.9	439.7
XAD-2® Particulate (g)	57.0	41.4	6.1	103.0	126.4	42.9	30.4	17.2	448.3	458.8
Filter Particulate (g)	139.0	102.4	29.9	136.3	159.6	87.7	55.0	7.4	386.5	687.7
Total Particulate (g) (Blank Subtracted)	287.2	343.4	75.2	546.5	479.6	381.1	145.8	113.0	1296.7	1586.2
Fuel Mass (Dry kg)	111.9	116.5	58.8	162.6	170.9	119.1	116.8	139.6	151.6	177.6
Burn Rate (kg (Dry)/hr)	1.2	1.2	1.4	1.0	1.0	0.9	0.8	0.9	0.9	1.1
Emission Factor (g/kg (Dry))	7.8	8.7	4.8	5.7	5.1	5.5	3.7	1.9	17.5	14.2
Emission Rate (g/hr)	9.5	10.8	6.5	5.5	5.3	4.9	3.0	1.7	15.8	15.1
Concentration (mg/m^3)	395	466	221	362	326	317	123	85	926	1,139

[a] There are no data for week A for KF03 and week C for KF04 due to loss of sample and/or laboratory data.

Table 3-4

Individual Test Results for Klamath Falls Stoves KF05 – KF08

Home Code	KF05			KF06	KF07			KF08		
Stove Model	Pacific Energy Super 27 Non-Catalytic			Waterford 104.MKII Non-Catalytic	Earthstove 1400HT Non-Catalytic			Country T-Top Non-Catalytic		
Week	A	B	C	A[a]	A	B	C	A	B	C
Start Date	11/08/98	11/22/98	12/08/98	11/10/98	11/08/98	11/22/98	12/06/98	11/08/98	11/22/98	12/05/98
End Date	11/15/98	11/25/98	12/15/98	11/17/98	11/16/98	11/29/98	12/13/98	11/15/98	11/30/98	12/13/98
Total Data Collection Hours	168.0	78.5	168.0	168.0	168.3	168.0	168.0	168.0	172.8	171.0
% Time Stove Burned	89.7	96.2	91.1	100.0	99.7	95.4	98.7	100.0	98.3	99.7
Avg. Stack Temp. (°F)	446	404	470	431	424	457	484	384	428	446
Avg. $\%O_2$ (Flue >100 °F)	16.28	16.73	15.71	16.00	16.72	16.83	15.64	16.47	17.48	16.08
Fuel Mass (Wet kg)	137.7	70.7	172.2	126.0	158.5	133.7	225.4	238.4	237.1	257.7
Fuel Moisture (% Dry Basis)	10.4	9.8	11.3	11.7	12.6	11.7	15.8	26.8	25.4	25.7
AWES Flow Rate (l/min)	1.069	1.069	1.069	1.145	1.109	1.109	1.109	1.058	1.058	1.058
Sample Time (min)/Cycle (min)	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15
Indoor Ambient Temp. (°F)	75	74	63	77	75	70	74	79	75	74
Outdoor Ambient Temp. (°F)	33	40	28	35	33	38	23	33	38	21

(Continued)

Table 3-4 (continued)

Individual Test Results for Klamath Falls Stoves KF05 – KF08

Home Code	KF05			KF06	KF07			KF08		
Stove Model	Pacific Energy Super 27 Non-Catalytic			Waterford 104.MKII Non-Catalytic	Earthstove 1400HT Non-Catalytic			Country T-Top Non-Catalytic		
Week	A	B	C	A[a]	A	B	C	A	B	C
Rinse Particulate (g)	147.4	128.1	74.0	214.0	265.6	202.2	313.1	313.5	236.4	212.0
XAD-2® Particulate (g)	92.4	24.6	49.6	83.1	123.0	103.7	93.1	95.3	26.2	65.5
Filter Particulate (g)	69.0	41.3	68.7	157.6	233.3	154.0	232.5	153.2	342.0	89.0
Total Particulate (g) (Blank Subtracted)	308.8	194.0	192.3	454.6	621.9	459.9	638.7	561.9	604.5	366.5
Fuel Mass (Dry kg)	124.7	64.4	154.7	112.8	140.8	119.7	194.7	188.0	189.0	205.0
Burn Rate (kg (Dry)/hr)	0.8	0.9	1.0	0.7	0.8	0.7	1.2	1.1	1.1	1.2
Emission Factor (g/kg (Dry))	5.2	7.2	2.8	6.0	9.9	7.9	8.2	8.9	12.3	5.2
Emission Rate (g/hr)	4.3	6.1	2.8	4.0	8.3	5.9	9.7	9.9	13.6	6.3
Concentration (mg/m^3)	240	300	147	295	418	324	434	395	421	254

[a] There are no data for weeks B and C for KF06 due to death in the family.

Table 3-5

Individual Test Results for Portland Stoves P01 – P04

Home Code	P01			P02			P03			P04		
Stove Model	HES Trailblazer 2000-C Catalytic			LOPI Answer Series Non-Catalytic			LOPI 380-96 Non-Catalytic			LOPI Flushbay-96 Catalytic		
Week	A	B	C	A	B	C	A	B	C	A	B	C
Start Date	01/11/99	01/19/99	01/26/99	01/13/99	01/20/99	01/27/99	01/12/99	01/19/99	01/26/99	01/13/99	01/20/99	01/27/99
End Date	01/19/99	01/26/99	02/02/99	01/20/99	01/27/99	02/03/99	01/19/99	01/26/99	02/02/99	01/20/99	01/27/99	02/03/99
Total Data Collection Hours	171.3	168.3	168.0	168.0	166.8	168.0	168.8	168.8	168.0	168.3	168.0	168.0
% Time Stove Burned	100.0	100.0	100.0	54.9	68.8	65.2	20.1	35.1	40.9	56.6	69.6	69.5
Avg. Stack Temp. (°F)	413	443	457	311	339	324	356	370	367	285	327	279
Avg. $\%O_2$ (Flue >100 °F)	14.66	14.44	13.90	18.13	16.50	17.00	17.65	17.89	17.76	17.16	16.70	17.62
Fuel Mass (Wet kg)	260.2	252.9	258.9	117.6	103.3	99.9	32.5	72.8	85.4	83.6	130.0	91.1
Fuel Moisture (% Dry Basis)	24.0	21.0	22.8	101.2	18.5	26.7	18.3	18.3	23.3	18.3	18.5	18.4
AWES Flow Rate (l/min)	1.058	1.058	1.058	1.124	1.124	1.124	1.069	1.069	1.069	1.145	1.145	1.145
Sample Time (min)/Cycle (min)	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15
Indoor Ambient Temp. (°F)	80	71	72	76	78	71	80	74	74	77	75	75
Outdoor Ambient Temp. (°F)	47	42	45	48	41	45	48	42	45	48	41	45

(Continued)

Table 3-5 (continued)

Individual Test Results for Portland Stoves P01 – P04

Home Code	P01			P02			P03			P04		
Stove Model	HES Trailblazer 2000-C Catalytic			LOPI Answer Series Non-Catalytic			LOPI 380-96 Non-Catalytic			LOPI Flushbay-96 Catalytic		
Week	A	B	C	A	B	C	A	B	C	A	B	C
Rinse Particulate (g)	428.5	376.7	682.1	201.4	272.5	271.8	49.0	81.0	85.9	97.4	118.2	133.7
XAD-2® Particulate (g)	262.2	260.2	230.9	75.3	232.4	96.1	11.9	14.6	23.2	34.5	39.3	27.4
Filter Particulate (g)	625.3	506.5	385.5	182.2	335.2	199.9	(5.0)	13.5	1.3	47.9	71.2	50.7
Total Particulate (g) (Blank Subtracted)	1,316.0	1,143.4	1,298.5	458.9	840.1	567.8	55.8	109.1	110.4	179.8	228.7	211.8
Fuel Mass (Dry kg)	209.8	209.0	210.9	58.5	87.2	78.9	27.5	61.5	69.2	70.7	109.7	77.0
Burn Rate (kg (Dry)/hr)	1.2	1.2	1.3	0.6	0.8	0.7	0.8	1.0	1.0	0.7	0.9	0.7
Emission Factor (g/kg (Dry))	15.0	12.9	13.5	19.4	17.5	14.3	5.9	7.1	5.8	5.4	5.0	5.9
Emission Rate (g/hr)	18.4	16.0	16.9	12.3	13.3	10.3	4.7	7.4	5.8	4.0	4.7	3.9
Concentration (mg/m^3)	908	803	913	553	814	577	192	215	188	206	213	198

Table 3-6

Individual Test Results for Portland Stoves P05 – P08

Home Code	P05			P06			P07			P08[a]	
Stove Model	LOPI Flex-95 Catalytic			Pacific Energy Super 27 Non-Catalytic			LOPI 520/96 Non-Catalytic			Vermont Castings Defiant Encore Catalytic	
Week	A	B	C	A	B	C	A	B	C	A	B
Start Date	01/14/99	01/22/99	01/30/99	01/23/99	01/30/99	02/07/99	01/20/99	01/27/99	02/03/99	01/22/99	01/29/99
End Date	01/21/99	01/29/99	02/06/99	01/30/99	02/06/99	02/14/99	01/27/99	02/03/99	02/10/99	01/29/99	02/05/99
Total Data Collection Hours	167.3	168.0	168.0	168.0	168.0	166.8	168.0	168.0	168.0	133.3	97.8
% Time Stove Burned	12.0	19.9	20.1	82.7	84.5	91.6	100.0	100.0	100.0	98.3	38.4
Avg. Stack Temp. (°F)	334	403	372	475	464	485	348	327	342	343	383
Avg. $\%O_2$ (Flue >100 °F)	18.50	18.12	18.32	15.52	15.55	14.07	15.14	15.14	14.13	16.93	16.72
Fuel Mass (Wet kg)	48.6	32.7	38.1	412.5	373.1	351.7	487.2	517.4	406.1	211.8	76.2
Fuel Moisture (% Dry Basis)	19.3	19.0	19.0	100.8	105.0	101.2	101.2	105.0	24.8	24.8	25.0
AWES Flow Rate (l/min)	1.038	1.038	1.038	1.042	1.042	1.042	1.109	1.109	1.109	1.078	1.078
Sample Time (min)/Cycle (min)	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15	2/15
Indoor Ambient Temp. (°F)	73	72	70	71	69	72	69	69	71	71	74
Outdoor Ambient Temp. (°F)	48	42	44	42	44	41	41	45	41	42	44

(Continued)

Table 3-6 (continued)

Individual Test Results for Portland Stoves P05 – P08

Home Code	P05			P06			P07			P08[a]	
Stove	LOPI Flex-95 Catalytic			Pacific Energy Super 27 Non-Catalytic			LOPI 520/96 Non-Catalytic			Vermont Castings Defiant Encore Catalytic	
Week	A	B	C	A	B	C	A	B	C	A	B
Rinse Particulate (g)	37.6	51.8	19.2	233.0	284.5	313.0	334.2	407.6	503.1	370.8	105.0
XAD-2® Particulate (g)	6.0	3.9	6.4	69.2	355.7	109.3	326.3	313.1	367.9	182.7	33.9
Filter Particulate (g)	-15.5	-5.7	6.4	286.2	322.6	362.8	974.1	916.5	1238.7	252.9	73.4
Total Particulate (g) (Blank Subtracted)	28.1	50.0	32.0	588.3	962.8	785.1	1634.6	1637.2	2109.7	806.4	212.3
Fuel Mass (Dry kg)	40.7	27.5	32.0	205.4	182.0	174.9	242.2	252.4	325.4	169.8	61.0
Burn Rate (kg (Dry)/hr)	2.0	0.8	0.9	1.5	1.3	1.1	1.4	1.5	1.9	1.3	1.6
Emission Factor (g/kg (Dry))	7.0	6.4	4.4	9.1	14.7	8.7	18.4	18.5	20.8	17.7	15.5
Emission Rate (g/hr)	14.3	5.3	4.2	13.5	18.9	10.0	26.6	27.7	40.3	23.0	25.2
Concentration (mg/m^3)	169	180	114	508	813	616	1,097	1,099	1,416	714	657

[a] There are no data for week C for P08 due to loss of sample data.

Table 3-7

Average Fuel Moisture, Particulate Emissions, Burn Rate, and Outdoor Temperature for Stoves in Klamath Falls

Home Code	Number of Runs	Fuel Moisture % (Dry Basis)	Average			
			Burn Rate kg (Dry)/hr	Emission Factor g/kg (Dry)	Emission Rate g/hr	Outdoor[b] Temperature °F
KF01	3	25.37 ± 4.61	1.27 ± 0.09	7.10 ± 1.67	8.93 ± 1.80	28 ± 4 n=22
KF02	3	20.63 ± 0.78	0.97 ± 0.05	5.43 ± 0.25	5.23 ± 0.25	28 ± 7 n=24
KF03	2	16.55	0.85	2.80	2.35	31 ± 5 n=16
KF04[a]	2	20.55	1.00	15.85	15.45	30 ± 7 n=16
KF05	3	10.55 ± 0.62	0.90 ± 0.08	5.07 ± 1.80	4.40 ± 1.35	34 ± 4 n=20
KF06	1	11.70	0.70	6.00	4.00	35 ± 5 n=8
KF07	3	13.37 ± 1.76	0.90 ± 0.22	8.67 ± 0.88	7.97 ± 1.57	31 ± 5 n=25
KF08	3	25.97 ± 0.60	1.13 ± 0.05	8.80 ± 2.90	9.93 ± 2.98	31 ± 4 n=24
All Stoves	20	18.68 ± 6.09	1.00 ± 0.19	7.43 ± 3.73	7.45 ± 3.94	31 ± 2 n=155
Catalytic Stoves	2	20.55	1.0	15.9	15.5	30 ± 3 n=16
Non-Catalytic Stoves	18	18.47 ± 6.38	0.99 ± 0.19	6.49 ± 2.53	6.56 ± 3.06	31 ± 2 n=139

[a] Catalytic Stove

[b] The outdoor temperature is the average of the high and low for each day over the sample period. The value "n" is the number of days averaged over the sample period. Values are followed by "± Standard Deviation".

Table 3-8

Average Fuel Moisture, Particulate Emissions, Burn Rate, and Outdoor Temperature for Stoves in Portland

Home Code	Number of Runs	Fuel Moisture % (Dry Basis)	Average			
			Burn Rate kg (Dry)/hr	Emission Factor g/kg (Dry)	Emission Rate g/hr	Outdoor[b] Temperature °F
P01[a]	3	22.60 ± 1.23	1.23 ± 0.05	13.80 ± 0.88	17.10 ± 0.99	45 ± 4 n=25
P02	3	48.80 ± 37.20	0.70 ± 0.08	17.07 ± 2.10	11.97 ± 1.25	45 ± 4 n=24
P03	3	19.97 ± 2.36	0.93 ± 0.09	6.27 ± 0.59	5.97 ± 1.11	45 ± 4 n=24
P04[a]	3	18.40 ± 0.08	0.77± 0.09	5.43 ± 0.37	4.20 ± 0.36	45 ± 4 n=24
P05[a]	3	19.10 ± 0.14	1.23 ± 0.54	5.93 ± 1.11	7.93 ± 4.52	44 ± 4 n=24
P06	3	102.33 ± 1.89	1.30 ± 0.16	10.83 ± 2.74	14.13 ± 3.66	42 ± 3 n=24
P07	3	77.00 ± 36.94	1.60 ± 0.22	19.23 ± 1.11	31.53 ± 6.22	43 ± 3 n=24
P08[a]	2	24.90	1.45	16.60	24.10	43 ± 4 n=16
All Stoves	23	42.37 ± 35.77	1.14 ± 0.38	11.69 ±5.42	14.20 ± 9.30	44 ± 1 n=185
Catalytic Stoves	11	20.92 ± 2.59	1.15 ± 0.38	9.88 ± 4.78	12.35 ± 7.80	44 ± 1 n=89
Non-Catalytic Stoves	12	62.03 ± 40.47	1.13 ± 0.37	13.35 ± 5.44	15.90 ± 10.20	44 ± 1 n=96

[a] Catalytic Stove

[b] The outdoor temperature is the average of the high and low for each day over the sample period. The value "n" is the number of days averaged over the sample period. Values are followed by "± Standard Deviation".

in Table 3-9. One significant result of this study is the difference in average emissions between stoves tested in Portland and Klamath Falls. On the average, emission factors and emission rates for stoves in Portland (11.69 g/kg and 14.20 g/hr, respectively) were considerably higher than for stoves in Klamath Falls (7.43 g/kg and 7.45 g/hr, respectively). This observation is consistent with the fact that the moisture was more than two times higher, on the average, for wood burned in Portland than for wood burned in Klamath Falls. In addition, the differences are consistent with the fact that the burn rates for woodstoves in Portland were, on the average, slightly higher than for woodstoves in Klamath Falls. The increased burn rate would tend to make the differences between emission rates relatively higher than emission factors for the two cities as seen in the values of the two cities. (Higher burn rates tend to decrease emission factors but increase emission rates.)

A comparison of average particulate emission factors for study stoves with U.S. EPA emission factor values tabulated in AP-42 (14) is provided in Table 3-10. A key finding of this study is illustrated in the table. The average emission factors for the old catalytic and non-catalytic stoves (10.8 g/kg and 9.23 g/kg) evaluated in this study were higher than the respective emission factors (8.1 g/kg and 7.3 g/kg) for newer units of both types listed in AP-42, but were lower than the emission factor listed in AP-42 for conventional uncertified stoves (15.3 g/kg). In other words, particulate emissions of the certified stoves evaluated in this study appear to have become higher with use, but after about seven years they still on the average have lower emissions than uncertified conventional stoves.

A comparison of current and past emission factors for the two stoves in Klamath Falls that were part of earlier studies is provided in Table 3-11. Fuel type, fuel moisture, burn rates and the number of week-long tests used to calculate the mean emission factors for current and past studies are also included in the table for comparison purposes. As can be seen, the emission performance of the stove in home KF02 degraded with time. The emission performance of the stove in home KF03 in the current study remained about the same as reported in the 1991/1992 heating season study. However, the emission factor for the same stove in the 1989/1990 heating season study was higher than for either of the two later studies. The higher emission factor in the 1989/1990 study cannot be readily explained. However, it is probably simply a reflection of the variability often seen in woodstove emissions when different fuels are burned and different burning patterns are used.

A comparison between average emission rates based on multiple week-long tests for each stove and the U.S. EPA certification value for each model is provided in Table 3-12. Another key finding of this study is that there is no correlation between actual emission rates of older stoves and their original certification value, that is, emission rates reported in the certification process do not represent emission levels of stoves in homes after extended use.

Table 3-9

Summary of Particulate Emission Results

	Stove Group	Average				
		Fuel Moisture[a] % (Dry Basis)	Burn Rate kg (Dry)/hr	Emission Factor g/kg (Dry)	Emission Rate g/hr	Outdoor Temperature °F
Klamath Falls	All Stoves (8 Stoves, 20 Runs)	18.68 ± 6.09	1.00 ± 0.19	7.43 ± 3.73	7.45 ± 3.94	31 ± 2 n=155
	Catalytic Stoves (1 Stove, 2 Runs)	20.55	1.0	15.9	15.5	30 ± 3 n=16
	Non-Catalytic Stoves (7 Stoves, 18 Runs)	18.47 ± 6.38	0.99 ± 0.19	6.49 ± 2.53	6.56 ± 3.06	31 ± 2 n=139
Portland	All Stoves (8 Stoves, 23 Runs)	42.37 ± 35.77	1.14 ± 0.38	11.69 ±5.42	14.20 ± 9.30	44 ± 1 n=185
	Catalytic Stoves (4 Stoves, 11 Runs)	20.92 ± 2.59	1.15 ± 0.38	9.88 ± 4.78	12.35 ± 7.80	44 ± 1 n=89
	Non-Catalytic Stoves (4 Stoves, 12 Runs)	62.03 ± 40.47	1.13 ± 0.37	13.35 ± 5.44	15.90 ± 10.20	44 ± 1 n=96
Overall Study	All Stoves (16 Stoves, 43 Runs)	31.35 ± 29.00	1.07 ± 0.31	9.71 ± 5.17	11.06 ± 8.05	37 ± 8 n=340
	Catalytic Stoves (5 Stoves, 13 Runs)	20.86 ± 2.42	1.12 ± 0.36	10.80± 4.94	12.83 ± 7.26	41 ± 6 n=105
	Non-Catalytic Stoves (11 Stoves, 30 Runs)	35.89 ± 33.69	1.05 ± 0.29	9.23 ± 5.20	10.30 ± 8.26	36 ± 8 n=235

[a] Values are followed by "± Standard Deviation".

Table 3-10

Comparison of Average Particulate Emission Factors (5H Adjusted) to AP-42 Values

	Stove Group	Measurement Technique	Method 5H Equivalent Emission Factor[a] g/kg (Dry)
Study	**All Stoves (16 Stoves, 43 Runs)**	AWES Sampler	9.71
	Catalytic Stoves (5 Stoves, 13 Runs)	AWES Sampler	10.80
	Non-Catalytic Stoves 11 Stoves, 30 Runs)	AWES Sampler	9.23
AP-42	**Catalytic**	AWES and VPI Sampler[b]	8.1
	Non-Catalytic	AWES and VPI Sampler[b]	7.3
	Conventional	AWES and VPI Sampler[b]	15.3

[a] Reference 14.

[b] The VPI sampler is a sampling train consisting of: a condensate trap, dual filter pack, DrieRite dessicant trap, and evacuated canister developed by Jaasma, et al., at the Virgina Polytechnic Institute and State University.

Table 3-11

Comparison of Particulate Emission Factors of Stoves in Current Study to Particulate Emission Factors for the Same Stoves from Previous Studies

Home Code/ Stove Model	Study	Heating Season	Fuel	Fuel Moisture % (Dry Basis)[d]	Burn Rate kg (Dry)/hr	Emission Factor g/kg (Dry)
KF02 Pacific Energy Super 27 Non-Catalytic	Current	1998/1999	Ponderosa	20.63 ± 0.78	0.97 ± 0.05	5.43 ± 0.25 (n=3)
	EMRC[a]	1989/1990	Red Fir	16.9 ± 0.63	1.21 ± 0.24	2.78 ± 0.10 (n=4)
KF03 Haughs 171E Non-Catalytic	Current	1998/1999	95% Lodgepole 5% Juniper	16.55	0.85	2.80 (n=2)
	BPA[b]	1991/1992	Douglas Fir Lodgepole	13.9	1.15	2.77 (n=1)
	WHA[c]	1989/1990	Juniper	16.3	0.88	7.0 (n=2)

[a] Reference 13.

[b] Reference 8.

[c] Reference 12.

[d] Values are followed by "± Standard Deviation".

Table 3-12

Comparison of Stove Particulate Emission Rates to U.S. EPA Certification Values[a]

Home Code	Stove Model	Catalytic	Number of Runs	Emission Rate (g/hr)	
				Study Average[d]	Certification Value
KF01	Quadrafire 2100	No	3	8.93 ± 1.80	3.6
KF02	Pacific Energy Super 27	No	3	5.23 ± 0.25	3.4
KF03	Haughs 171E	No	2	2.35	4.5
KF04	Earthstove 1003-C	Yes	2	15.45	3.7
KF05	Pacific Energy Super 27	No	3	4.40 ± 1.35	3.4
KF06	Waterford 104.MKII	No	1	4.00	2.9
KF07	Earthstove 1400HT	No	3	7.97 ± 1.57	6.6
KF08	Country T-Top	No	3	9.93 ± 2.98	5.7
P01	HES Trailblazer 2000-C	Yes	3	17.10 ± 0.99	3.1
P02	LOPI Answer Series	No	3	11.97 ± 1.25	3.3
P03	LOPI 380-96	No	3	5.97 ± 1.11	1.9
P04	LOPE Flushbay-96[b]	Yes	3	4.20 ± 0.36	5.2
P05	LOPI Flex-95	Yes	3	7.93 ± 4.52	4.1
P06	Pacific Energy Super 27	No	3	14.13 ± 3.66	3.4
P07	LOPI 520/96	No	3	31.53 ± 6.22	7.4
P08	Vermont Castings Defiant Encore[c]	Yes	2	24.10	1.6

[a] The certification threshold for phase 2 certified catalytic stoves is 4.1 g/hr and for non-catalytic stoves is 7.5 g/hr.

[b] Lopi Flush Bay-96 is now called Freedom. The certification value shown in the table is for the Freedom.

[c] The Vermont Castings Defiant Encore stove was installed when stove was EPA Phase I certified. Since the installation, the stove has been added to EPA Phase II certification list without changes to the stove's design.

[d] Values are followed by "± Standard Deviation".

3.3 Polycyclic Organic Matter Emissions

The analytical results for 40 individual organic compounds and compound categories are provided in Appendix D. The average emission factors and rates for these compounds and compound categories by stove type (catalytic, non-catalytic and both combined) for Klamath Falls stoves, for Portland stoves and for the overall study are provided in Tables 3-13, 3-14, and 3-15, respectively. Among the 40 compounds and compound categories are the seven and 16 polycyclic aromatic hydrocarbons (PAH) that make up the 7-PAH and 16-PAH POM surrogates. The seven and 16 PAH compounds' emissions are summed and their total emissions used as surrogates of POM. The average emission factors and rates for these two surrogates are included in Tables 3-13, 3-14 and 3-15.

A key finding of this study is that total particulate emissions cannot be used as a surrogate measurement for woodstove POM emissions. In comparing the average 7-PAH and 16-PAH values between Klamath Falls and Portland shown in Tables 3-13 and 3-14, it is clear that the POM emissions, as indicated by the surrogates, were higher for the Klamath Falls stoves than for the Portland stoves even though the particulate emissions were higher for the Portland stoves. This finding is significant because it has been suggested that total particulate emissions can be used as a surrogate measurement for POM emissions, and for the New Source Performance Standards (NSPS) for wood heaters it is noted that the same control techniques used to reduce particulate emission are known to reduce POM emissions[4]. A possible explanation of the lack of correlation between particulate and POM emissions is that conifer cordwood was burned exclusively in Klamath Falls whereas a mixture of conifer and deciduous cordwood was burned in Portland. Cordwood from conifers has a higher resin content than cordwood from deciduous trees. Resin is chemically comprised of condensed aromatic rings, hence it is closer in structure to POM compounds then cellulose or lignin. It is generally believed that, if all else is equal, the higher the aromatic compound content in a fuel the more POM emissions will be produced upon its combustion. In any event, this study finds that total particulate emissions cannot be used as a surrogate for POM emissions in woodstoves although control techniques for PM may, in fact, reduce POM.

A comparison of overall average emission factors measured in this study for the 7-PAH and 16-PAH surrogates emitted from catalytic and non-catalytic stoves with the 7-PAH and 16-PAH emission factors listed for them in AP-42 (14) is provided in Table 3-16. The 7-PAH and 16-PAH data for catalytic and non-catalytic stoves in AP-42 are based on laboratory (not inhome) tests with a limited number of stoves. The AP-42 7-PAH and 16-PAH values for catalytic stoves are based on laboratory tests on seven stoves of which only one became a phase 2 certified model. The AP-42 values for non-catalytic stoves are based on laboratory tests on five stoves none of which became phase 2 certified. (The AP-42 7-PAH and 16-PAH values for conventional stoves, shown in Table 3-16 for completeness, were based on laboratory tests on one stove [40].) Residential wood combustion has been identified, based on the AP-42 emission factors, as the single, largest source of POM nationwide (2). As can be seen in Table 3-16, the

Table 3-13

Organic Compound Emission Factors and Rates For Stoves in Klamath Falls Homes

	All Stoves Average Emission Rate 8 Stoves 20 Runs µg/hr	All Stoves Average Emission Factor 8 Stoves 20 Runs µg/kg (Dry)	Non-Catalytic Average Emission Rate 7 Stoves 18 Runs µg/hr	Non-Catalytic Average Emission Factor 7 Stoves 18 Runs µg/kg (Dry)	Catalytic Average Emission Rate 1 Stove 2 Runs µg/hr	Catalytic Average Emission Factor 1 Stove 2 Runs µg/kg (Dry)
Toluene	159,922	158,134	146,381	144,568	281,792	280,228
m,p-Xylene	28,460	28,394	23,284	23,134	75,044	75,735
o-Xylene	9,702	9,613	7,761	7,680	27,175	27,014
Phenol	170,260	168,964	160,703	158,889	256,278	259,643
Benzofuran	37,900	37,708	34,891	34,597	64,987	65,710
C3-alkylbenzenes	42,070	41,994	33,527	33,537	118,957	118,102
Decane	164	120	182	134	0	0
o-Cresol	45,957	46,396	36,579	36,852	130,353	132,295
m,p-Cresol	80,541	81,517	68,023	68,792	193,204	196,043
C4-alkylbenzenes	161,273	156,220	121,448	116,622	519,699	512,599
Undecane	0	0	0	0	0	0
2-Ethylphenol	2,987	3,017	2,545	2,558	6,967	7,155
2,3-Dimethylphenol	4,970	5,039	4,271	4,306	11,267	11,628
Naphthalene †	81,892	80,967	81,767	80,769	83,021	82,750
2-Methylnaphthalene	13,813	13,763	11,540	11,523	34,266	33,918
1-Methylnaphthalene	10,739	10,722	9,703	9,691	20,066	20,001
Biphenyl	6,292	6,259	5,757	5,720	11,104	11,110
Tetradecane	13,441	13,403	12,070	12,030	25,775	25,760
C2-alkylnaphthalenes	11,825	11,819	9,417	9,449	33,498	33,152
Acenaphthylene †	21,069	21,160	20,895	21,028	22,634	22,347
Pentadecane	0	0	0	0	0	0
Acenaphthene †	1,216	1,219	1,022	1,027	2,969	2,944
Dibenzofuran	9,535	9,521	8,626	8,602	17,710	17,793
C3-alkylnaphthalenes	6,153	6,334	6,836	7,038	0	0
Fluorene †	6,011	6,049	5,703	5,755	8,778	8,695
Heptadecane	0	0	0	0	0	0
Octadecane	0	0	0	0	0	0

(Continued)

Table 3-13

(Continued)

	All Stoves Average Emission Rate 8 Stoves 20 Runs µg/hr	All Stoves Average Emission Factor 8 Stoves 20 Runs µg/kg (Dry)	Non-Catalytic Average Emission Rate 7 Stoves 18 Runs µg/hr	Non-Catalytic Average Emission Factor 7 Stoves 18 Runs µg/kg (Dry)	Catalytic Average Emission Rate 1 Stove 2 Runs µg/hr	Catalytic Average Emission Factor 1 Stove 2 Runs µg/kg (Dry)
Phenanthrene †	26,201	26,466	26,086	26,413	27,227	26,940
Anthracene †	4,648	4,744	4,532	4,649	5,692	5,595
Carbazole	0	0	0	0	0	0
Fluoranthene †	9,185	9,339	9,357	9,533	7,643	7,588
Pyrene †	6,482	6,608	6,534	6,675	6,015	6,006
Benzo(a)anthracene*†	1,592	1,624	1,685	1,723	753	736
Chrysene*†	1,739	1,783	1,832	1,884	897	877
Benzo(b)fluoranthene*†	977	1,028	974	1,030	1,004	1,013
Benzo(k)fluoranthene*†	142	153	141	154	152	143
Benzo(a)pyrene*†	432	460	440	474	361	340
Indeno(1,2,3-cd)pyrene*†	0	0	0	0	0	0
Dibenzo(a,h)anthracene*†	0	0	0	0	0	0
Benzo(g,h,i)perylene †	0	0	0	0	0	0
7-PAH	4,882	5,049	5,073	5,264	3,168	3,109
16-PAH	161,587	161,600	160,969	161,115	167,148	165,973

* 7-PAH
† 16-PAH

Table 3-14

Organic Compound Emission Factors and Rates for Stoves in Portland Homes

	All Stoves Average Emission Rate 8 Stoves 23 Runs µg/hr	All Stoves Average Emission Factor 8 Stoves 23 Runs µg/kg (Dry)	Non-Catalytic Average Emission Rate 4 Stoves 12 Runs µg/hr	Non-Catalytic Average Emission Factor 4 Stoves 12 Runs µg/kg (Dry)	Catalytic Average Emission Rate 4 Stoves 11 Runs µg/hr	Catalytic Average Emission Factor 4 Stoves 11 Runs µg/kg (Dry)
Toluene	161,197	129,649	153,252	130,978	169,864	128,199
m,p-Xylene	43,433	33,818	42,412	34,146	44,547	33,460
o-Xylene	15,008	11,813	14,463	11,933	15,602	11,681
Phenol	288,925	228,837	246,889	209,798	334,783	249,607
Benzofuran	58,355	46,327	55,553	46,037	61,413	46,644
C3-alkylbenzenes	36,454	26,559	42,873	34,265	29,452	18,152
Decane	0	0	0	0	0	0
o-Cresol	100,976	79,142	93,721	77,008	108,890	81,469
m,p-Cresol	148,328	116,373	134,439	111,970	163,480	121,177
C4-alkylbenzenes	42,786	28,971	61,377	42,469	22,505	14,245
Undecane	0	0	0	0	0	0
2-Ethylphenol	5,948	4,575	6,515	5,298	5,329	3,786
2,3-Dimethylphenol	7,749	6,068	7,969	6,584	7,509	5,504
Naphthalene †	92,300	76,911	83,124	75,044	102,310	78,947
2-Methylnaphthalene	16,167	12,566	17,788	14,619	14,398	10,327
1-Methylnaphthalene	10,446	8,625	10,770	9,322	10,092	7,865
Biphenyl	7,340	6,043	7,332	6,408	7,349	5,646
Tetradecane	14,066	11,449	12,659	11,057	15,602	11,875
C2-alkylnaphthalenes	7,225	5,433	8,793	7,143	5,515	3,568
Acenaphthylene †	17,432	14,950	16,577	15,233	18,365	14,643
Pentadecane	0	0	0	0	0	0
Acenaphthene †	541	423	215	146	896	725
Dibenzofuran	11,553	9,348	11,317	9,775	11,810	8,882
C3-alkylnaphthalenes	2,333	1,545	1,854	1,358	2,855	1,748
Fluorene †	5,520	4,433	5,053	4,379	6,030	4,492
Heptadecane	0	0	0	0	0	0
Octadecane	0	0	0	0	0	0
Phenanthrene †	16,323	13,556	15,219	13,378	17,528	13,751

(Continued)

Table 3-14

(Continued)

	All Stoves Average Emission Rate 8 Stoves 23 Runs µg/hr	All Stoves Average Emission Factor 8 Stoves 23 Runs µg/kg (Dry)	Non-Catalytic Average Emission Rate 4 Stoves 12 Runs µg/hr	Non-Catalytic Average Emission Factor 4 Stoves 12 Runs µg/kg (Dry)	Catalytic Average Emission Rate 4 Stoves 11 Runs µg/hr	Catalytic Average Emission Factor 4 Stoves 11 Runs µg/kg (Dry)
Anthracene †	3,201	2,563	2,903	2,494	3,526	2,639
Carbazole	0	0	0	0	0	0
Fluoranthene †	5,752	4,693	5,530	4,904	5,993	4,463
Pyrene †	5,230	4,321	5,159	4,602	5,307	4,015
Benzo(a)anthracene*†	599	480	553	438	648	525
Chrysene*†	659	520	606	465	717	580
Benzo(b)fluoranthene*†	839	677	999	805	665	536
Benzo(k)fluoranthene*†	166	136	168	138	165	133
Benzo(a)pyrene*†	384	335	395	367	373	300
Indeno(1,2,3-cd)pyrene*†	0	0	0	0	0	0
Dibenzo(a,h)anthracene*†	0	0	0	0	0	0
Benzo(g,h,i)perylene †	0	0	0	0	0	0
7-PAH	2,648	2,148	2,722	2,214	2,567	2,075
16-PAH	148,946	123,998	136,501	122,393	162,523	125,750

* 7-PAH
† 16-PAH

Table 3-15

Organic Compound Emission Factors and Rates for Overall Study

	All Stoves Average Emission Rate 16 Stoves 43 Runs µg/hr	All Stoves Average Emission Factor 16 Stoves 43 Runs µg/kg (Dry)	Non-Catalytic Average Emission Rate 11 Stoves 30 Runs µg/hr	Non-Catalytic Average Emission Factor 11 Stoves 30 Runs µg/kg (Dry)	Catalytic Average Emission Rate 5 Stoves 13 Runs µg/hr	Catalytic Average Emission Factor 5 Stoves 13 Runs µg/kg (Dry)
Toluene	160,559	143,891	149,816	137,773	225,828	204,213
m,p-Xylene	35,946	31,106	32,848	28,640	59,796	54,598
o-Xylene	12,355	10,713	11,112	9,807	21,389	19,347
Phenol	229,593	198,901	203,796	184,343	295,530	254,625
Benzofuran	48,128	42,018	45,222	40,317	63,200	56,177
C3-alkylbenzenes	39,262	34,276	38,200	33,901	74,205	68,127
Decane	82	60	91	67	0	0
p-Cresol	73,466	62,769	65,150	56,930	119,622	106,882
m,p-Cresol	114,435	98,945	101,231	90,381	178,342	158,610
C4-alkylbenzenes	102,030	92,595	91,413	79,545	271,102	263,422
Undecane	0	0	0	0	0	0
2-Ethylphenol	4,468	3,796	4,530	3,928	6,148	5,471
2,3-Dimethylphenol	6,360	5,553	6,120	5,445	9,388	8,566
Naphthalene †	87,096	78,939	82,445	77,907	92,666	80,849
2-Methylnaphthalene	14,990	13,165	14,664	13,071	24,332	22,123
1-Methylnaphthalene	10,593	9,673	10,237	9,506	15,079	13,933
Biphenyl	6,816	6,151	6,544	6,064	9,227	8,378
Tetradecane	13,754	12,426	12,364	11,544	20,689	18,818
C2-alkylnaphthalenes	9,525	8,626	9,105	8,296	19,507	18,360
Acenaphthylene †	19,251	18,055	18,736	18,130	20,500	18,495
Pentadecane	0	0	0	0	0	0
Acenaphthene †	879	821	618	587	1,933	1,834
Dibenzofuran	10,544	9,435	9,972	9,189	14,760	13,338
C3-alkylnaphthalenes	4,243	3,939	4,345	4,198	1,428	874
Fluorene †	5,766	5,241	5,378	5,067	7,404	6,594
Heptadecane	0	0	0	0	0	0
Octadecane	0	0	0	0	0	0
Phenanthrene †	21,262	20,011	20,653	19,895	22,378	20,345

(Continued)

Table 3-15

(Continued)

	All Stoves Average Emission Rate 16 Stoves 43 Runs µg/hr	All Stoves Average Emission Factor 16 Stoves 43 Runs µg/kg (Dry)	Non-Catalytic Average Emission Rate 11 Stoves 30 Runs µg/hr	Non-Catalytic Average Emission Factor 11 Stoves 30 Runs µg/kg (Dry)	Catalytic Average Emission Rate 5 Stoves 13 Runs µg/hr	Catalytic Average Emission Factor 5 Stoves 13 Runs µg/kg (Dry)
Anthracene †	3,924	3,654	3,717	3,572	4,609	4,117
Carbazole	0	0	0	0	0	0
Fluoranthene †	7,468	7,016	7,443	7,218	6,818	6,025
Pyrene †	5,856	5,465	5,847	5,639	5,661	5,010
Benzo(a)anthracene*†	1,095	1,052	1,119	1,080	701	631
Chrysene*†	1,199	1,152	1,219	1,175	807	729
Benzo(b)fluoranthene*†	908	852	987	918	835	774
Benzo(k)fluoranthene*†	154	144	155	146	158	138
Benzo(a)pyrene*†	408	398	418	421	367	320
Indeno(1,2,3-cd)pyrene*†	0	0	0	0	0	0
Dibenzo(a,h)anthracene*†	0	0	0	0	0	0
Benzo(g,h,i)perylene †	0	0	0	0	0	0
7-PAH	3,765	3,598	3,897	3,739	2,868	2,592
16-PAH	155,267	142,799	148,735	141,754	164,835	145,861

* 7-PAH
† 16-PAH

Table 3-16

Comparison of POM Emission Factors for Stoves in Current Study to AP-42 POM Emission Factors

PAH Compound	Catalytic Stoves		Non-Catalytic Stoves		Conventional Stoves	
	Current Study g/kg (Dry)	AP-42 g/kg (Dry)	Current Study g/kg (Dry)	AP-42 g/kg (Dry)	Current Study g/kg (Dry)	AP-42 g/kg (Dry)
Acenaphthene	0.002	0.003	0.001	0.005	nd	0.005
Acenaphthylene	0.018	0.034	0.018	0.016	nd	0.106
Anthracene	0.004	0.004	0.004	0.004	nd	0.007
Benzo(a)anthracene*	0.001	0.012	0.001	<0.001	nd	0.010
Benzo(a)pyrene*	0.000	0.002	0.000	0.003	nd	0.002
Benzo(b)fluoranthene*	0.001	0.002	0.001	0.002	nd	0.003
Benzo(g,h,i)perylene	0.000	0.001	0.000	0.010	nd	0.002
Benzo(k)fluoranthene*	0.000	0.001	0.000	<0.001	nd	0.001
Chrysene*	0.001	0.005	0.001	0.005	nd	0.006
Dibenzo(a,h)anthracene*	0.000	0.001	0.000	0.002	nd	0.000
Fluoranthene	0.006	0.006	0.007	0.004	nd	0.010
Fluorene	0.007	0.007	0.005	0.007	nd	0.012
Indeno(1,2,3-cd)pyrene*	0.000	0.002	0.000	0.010	nd	0.000
Naphthalene	0.081	0.093	0.078	0.072	nd	0.144
Phenanthrene	0.020	0.024	0.020	0.059	nd	0.039
Pyrene	0.005	0.005	0.006	0.004	nd	0.012
7-PAH Total	0.003	0.025	0.003	0.024	nd	0.022
16-PAH Total	0.146	0.202	0.142	0.205	nd	0.359

nd – No Data

* 7-PAH Subset Compounds

average 7-PAH and 16-PAH emission factors for a total of 16 older phase 2 certified stoves tested for a total of approximately 43 weeks under actual in-home usage were lower than corresponding AP-42 values. This suggests that estimates of national emissions of 7-PAH and 16-PAH from woodstoves are too high and new emission factors for AP-42 should be developed.

Section 4.0

Conclusions

Out of the 16 stoves inspected all showed the effects of use. However, only six were degraded to the point that it was speculated that their condition would significantly affect air emissions. Routine maintenance or minor repairs could have kept all units in good operating condition if they had been done.

An extensive data base was developed from the 43 week-long test runs on 16 homes in the two cities of Klamath Falls and Portland. No direct statistical correlation between emissions and wood moisture, burn rate or stove condition could be made due to the number of variables associated with real-world in-home use of woodstoves.

The particulate emissions for stoves in Portland homes were on the average higher than for stoves in Klamath Falls homes. This result is consistent with the average higher fuel moisture content and burn rate characteristics of the Portland portion of the study as compared with the Klamath Falls portion of the study.

The particulate emission factors of the certified phase 2 stoves evaluated in this study appear to have become higher with use, but after about seven years, on the average, they still have lower emissions than uncertified conventional stoves.

The emission rates for phase 2 stove models reported as part of the NSPS certification process do not represent emission levels of the same stove models in-homes after extended use.

Particulate emissions can not be used as a surrogate measure of POM emissions for woodstoves. POM emission factors, as based on the 7-PAH and 16-PAH surrogates, determined from the in-home use of woodstoves in this study, were lower than the POM emission factors tabulated in AP-42.

Section 5.0

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Section 6.0

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Appendix A
Photographs of Woodstoves

Contents of Appendix A

Each stove involved in the study was inspected and photographed to document the stove's condition and installation. A photograph of each stove is presented in this appendix. For those stoves that showed degradation or had replacement parts, additional photographs documenting the stove's condition have been included.

Klamath Falls Photographs

Photograph

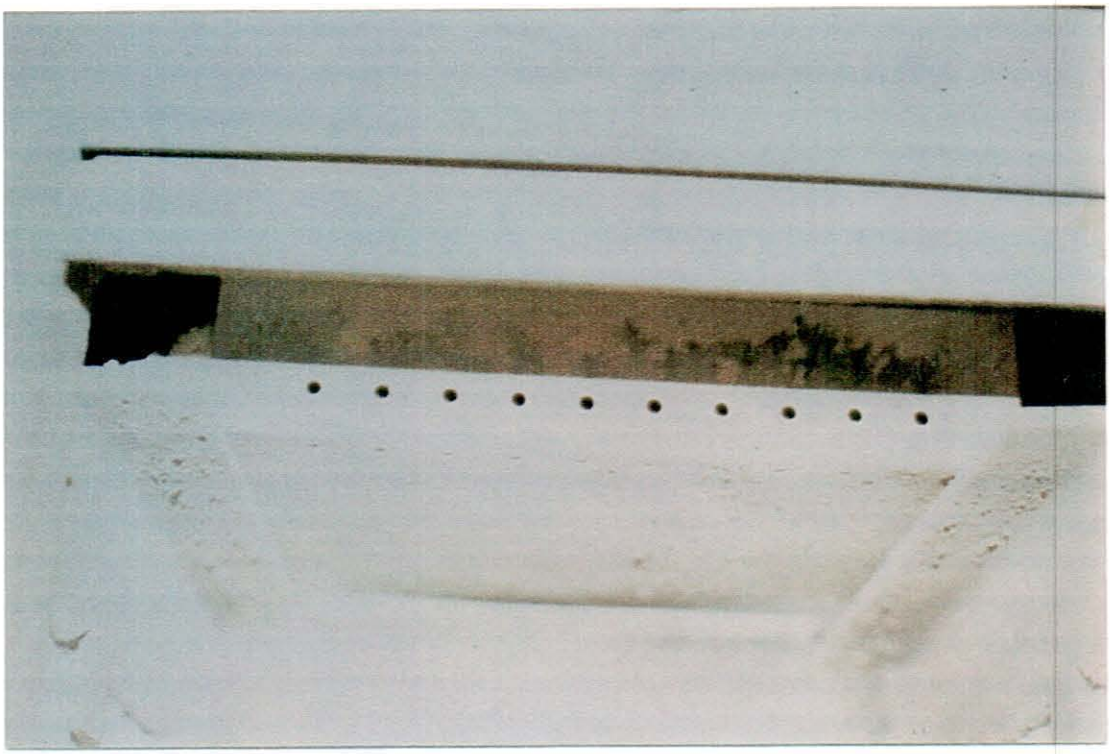
Portland Photographs

Photograph

Photograph 1
KFO1. Non-Catalytic Quadrafire 2100.

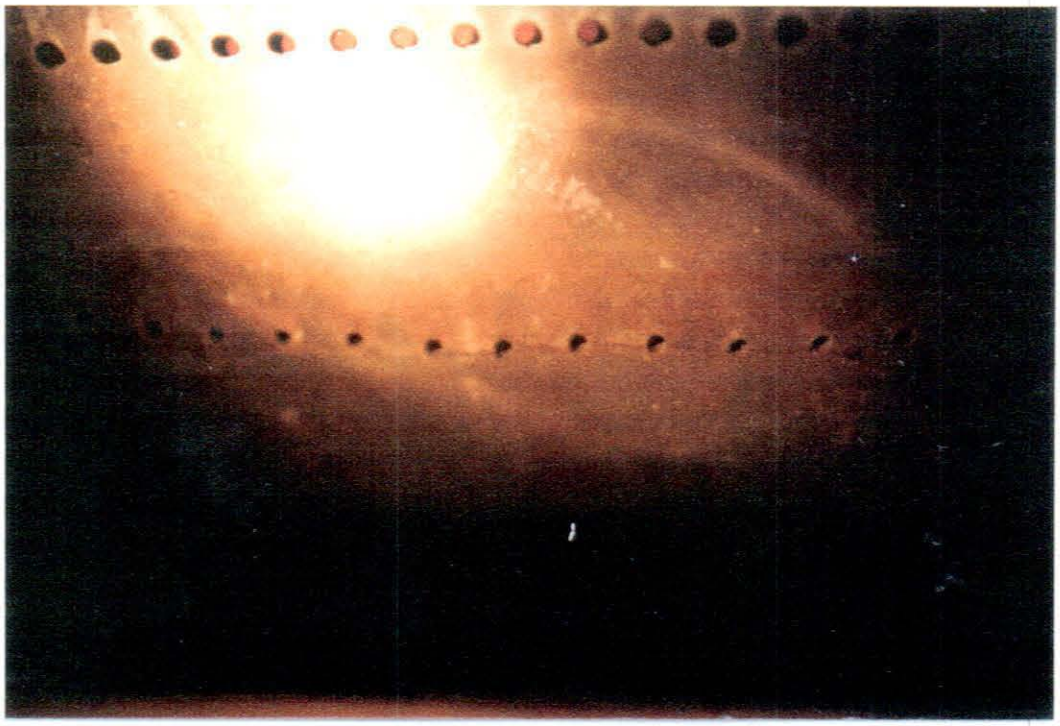
Photograph 2
KF01. Displaced Ceramic Blanket in the Non-Catalytic Quadrafire 2100

Photograph 3
KF02. Non-Catalytic Pacific Energy Super 27.



Photograph 4
KF02. Replaced Smoke Baffle in the Non-Catalytic Pacific Energy Super 27.

Photograph 5
KF03. Non-catalytic Haughs 171E.



Photograph 6
KF03. Cracks in the rear secondary air ports in the non-catalytic Haughs 171E.

Photograph 7
KF04. Catalytic Earthstove 1003C.

Photograph 8
KF05. Non-catalytic Pacific Energy Super 27.

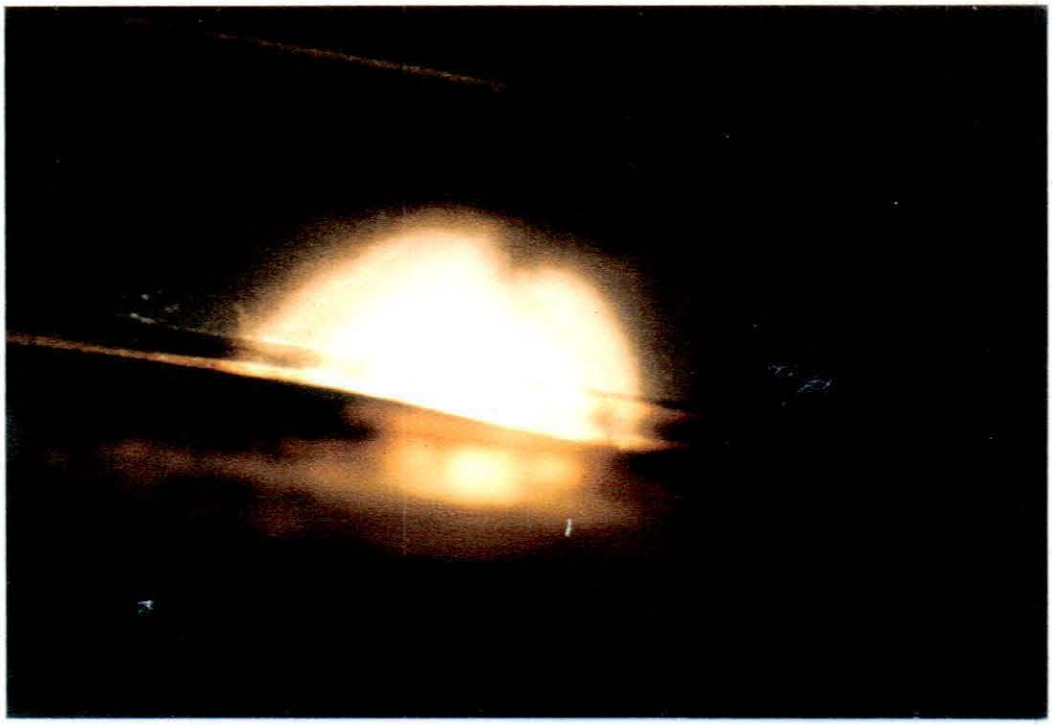
Photograph 9
KF05. Degraded baffle and ceramic blanket in the non-catalytic Pacific Energy Super 27.

Photograph 10
KF06. Non-catalytic Waterford MKII.

Photograph 11
KF06. Degraded baffle in the non-catalytic Waterford MKII.

Photograph 12
KF07. Non-catalytic Earthstove 1400HT.

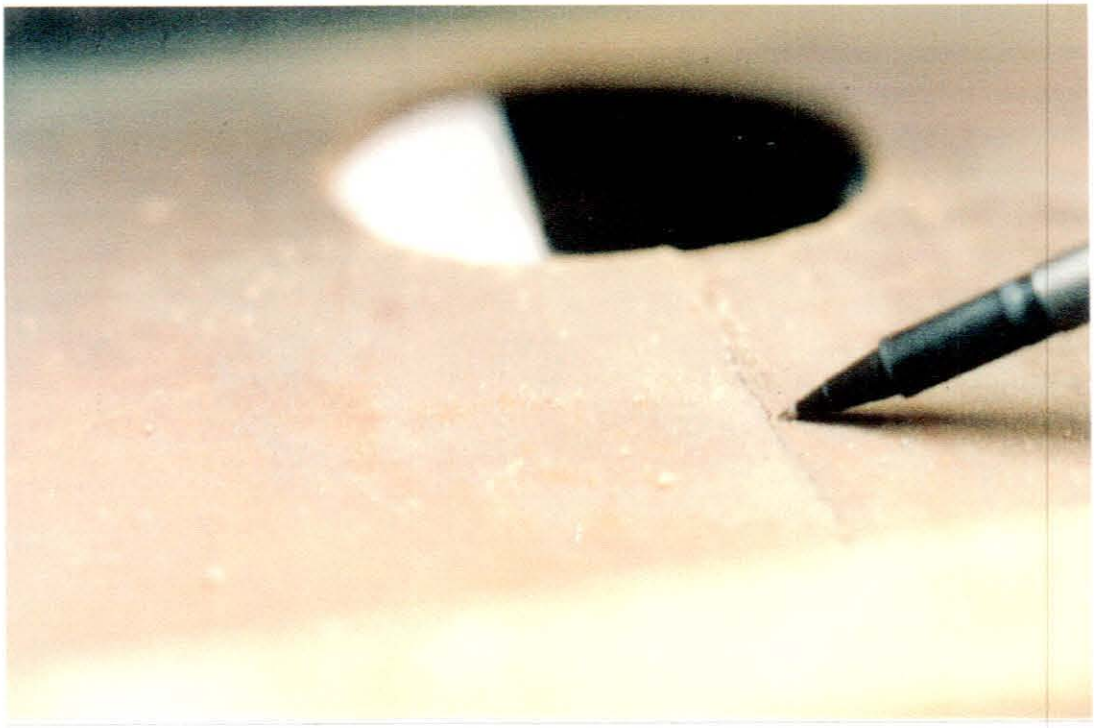
Photograph 13
KF07. Worn refractory elements in the non-catalytic Earthstove 1400HT.



Photograph 14
KF07. Warped secondary inlet tube in the non-catalytic Earthstove 1400HT.

Photograph 15
KF08. Non-catalytic Country T-Top.

Photograph 16
P01. Catalytic Trailblazer Genesis 2000.



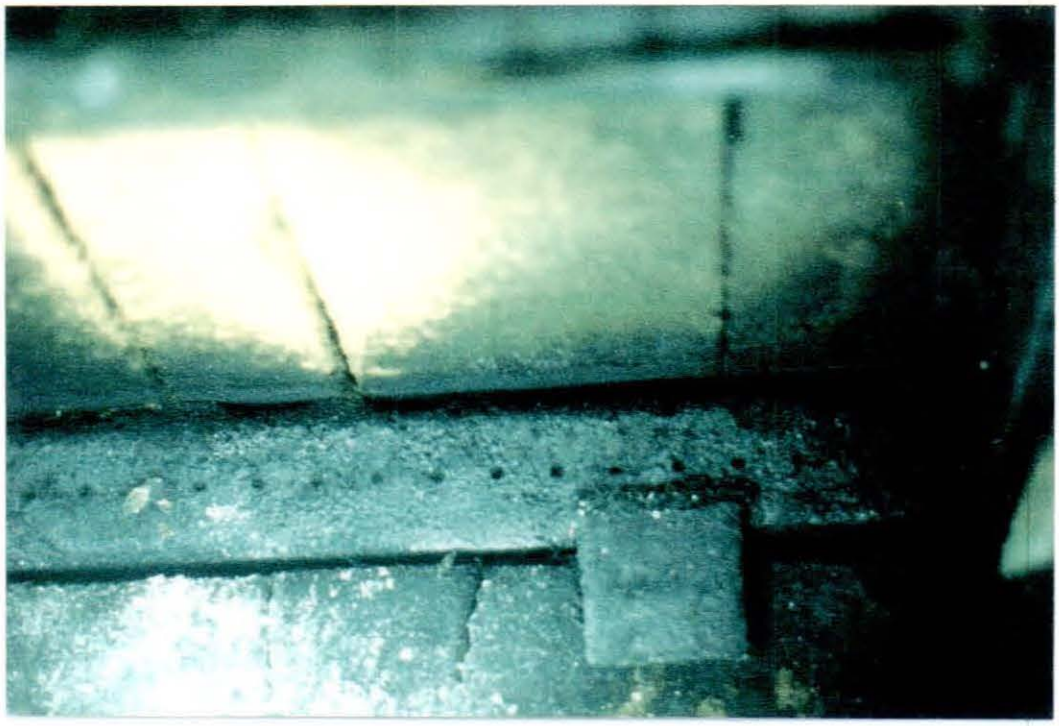
Photograph 17
P01. Cracked baffle in the Catalytic Trailblazer Genesis 2000.

Photograph 18
P01. Degraded catalyst in the Catalytic Trailblazer Genesis 2000.

Photograph 19
P02. Non-catalytic Lopi Answer Series.

Photograph 20

P02. Degraded support for the front secondary air tube in the non-catalytic Lopi Answer Series.

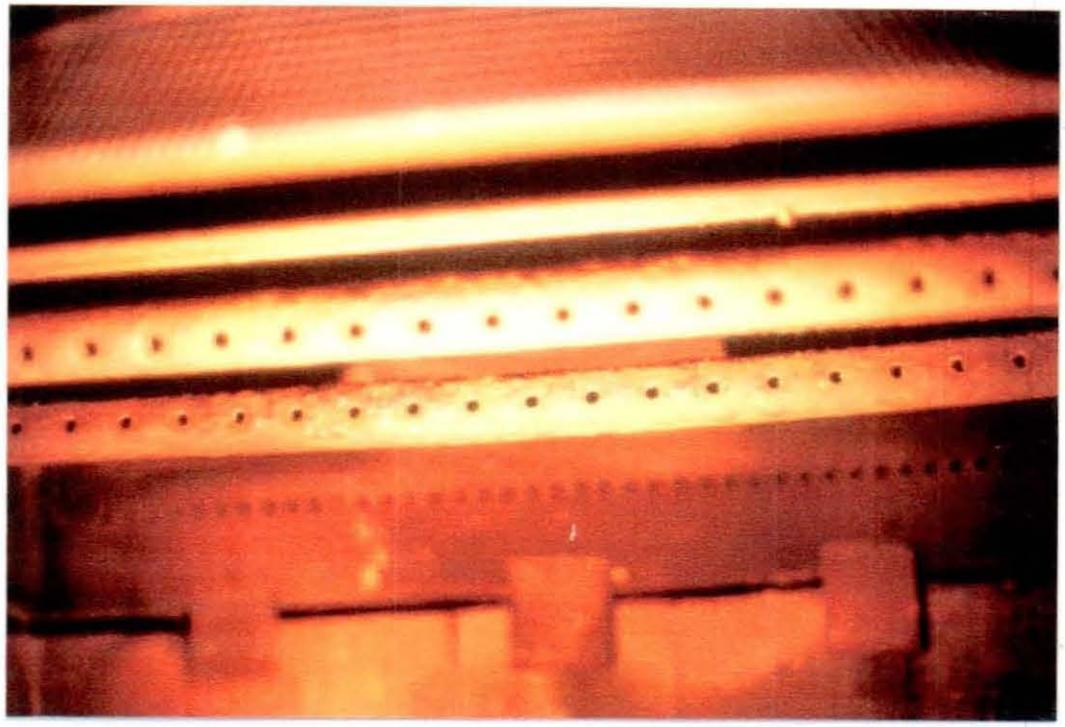


Photograph 21

P02. Creosote deposits on the secondary air tube in the non-catalytic Lopi Answer Series.

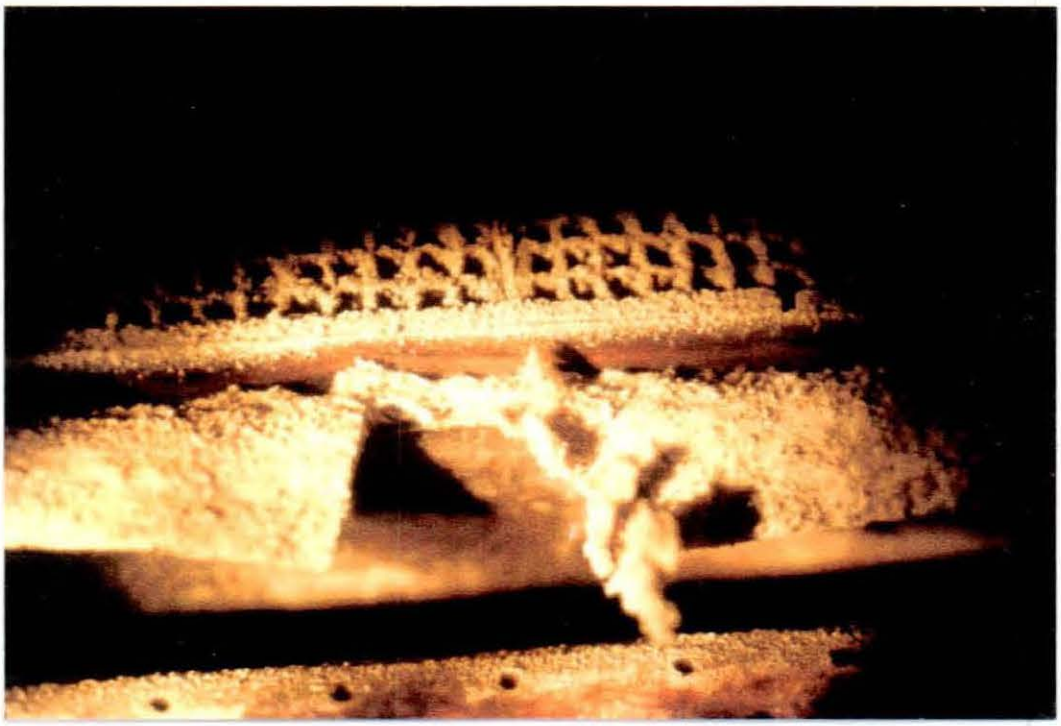
Photograph 22
P03. Non-catalytic Lopi 380-96.

Photograph 23
P04. Catalytic Flush Bay-96 (now Freedom).



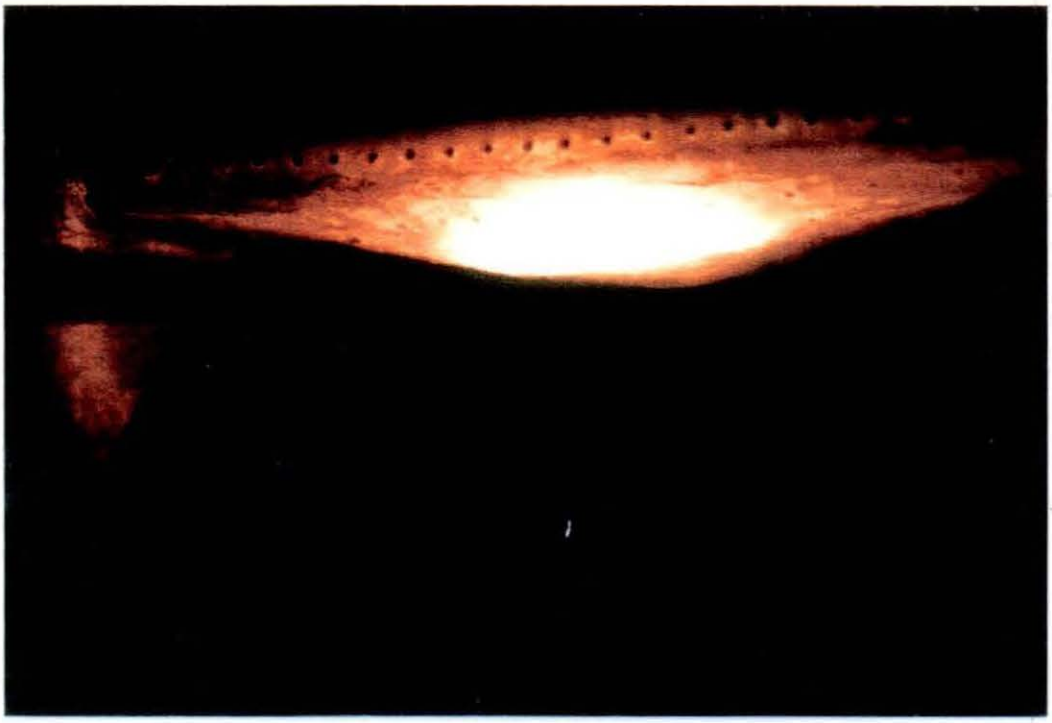
Photograph 24
P04. Warped and flaking secondary air tube in the Catalytic Flush Bay-96.

Photograph 25
P05. Catalytic Lopi Flex-95.



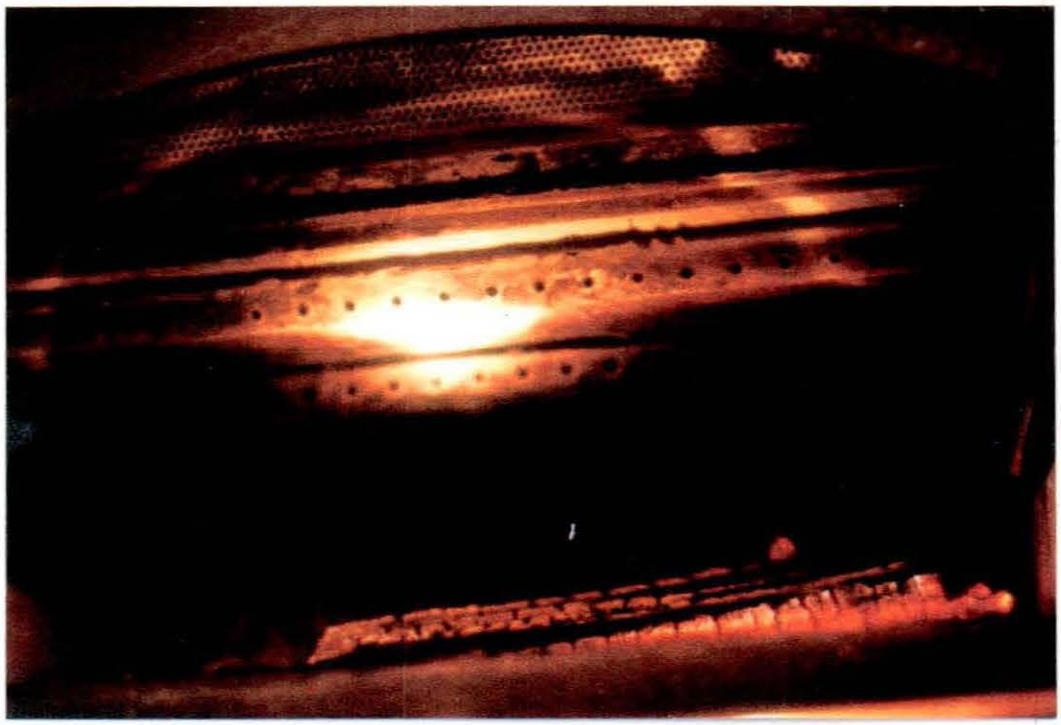
Photograph 26
P05. Disturbed catalyst interam seal in the Catalytic Flex-95.

Photograph 27
P06. Non-catalytic Pacific Energy Super 27.



Photograph 28
P06. Sagging baffle in the non-catalytic Pacific Energy Super 27

Photograph 29
P07. Non-catalytic Lopi 520-96.



Photograph 30
P07. Flaking secondary air tube in the non-catalytic Lopi 520-96.

Photograph 31
P08. Catalytic Vermont Castings Defiant Encore.

Appendix B
Quality Assurance History — Automated Woodstove Emission Sampler

Appendix B
Quality Assurance History — Automated Woodstove Emission Sampler

1. Quality Assurance Plan for: The Northeast Cooperative Woodstove Study, Vol. II, EPA/600/7-87-026b (NTIS PB88-140777), November 1987.

   - RTI[1] Review and Acceptance of Quality Assurance Plan, February 1986
   - RTI Interim Audit of Data Quality, December 1986
   - RTI Final Technical System and Performance Evaluation Audit, April 1987
   - RTI Final Audit of Data Quality, November 1987

2. Quality Assurance Plan for: Field Performance of Advanced Technology Woodstoves in Glens Falls, New York, 1988-1989, Vol. II, EPA/600/7-90-019b (NTIS PB91-125658), October 1990.

   - RTI Review and Acceptance of Quality Assurance Plan, December 1988
   - RTI Technical Systems and Performance Evaluation Audit, February 1989
   - RTI Second Performance Audit, May 1989
   - RTI Interim Audit of Data Quality, November 1989

3. Quality Assurance Plan for: Woodstove Emission Sampling Methods Comparability Analysis and In-situ Evaluation of New Technology Woodstoves, EPA/600/7-89-002 (NTIS DE89-001551), January 1989.

   - RTI Review and Acceptance of Quality Assurance Plan, March 1987
   - RTI Final Audit Report, April 1987

4. Technical system and performance evaluation audits were conducted by RTI on automated emission sampler protocols and data for masonry heaters. Final audit reports were completed April 1992. The audits were conducted to support the inclusion of masonry heater data in section 1.10 of AP-42.

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[1] Research Triangle Institute (RTI) was under contract with the U.S. EPA to provide independent third party quality assurance audits.

Appendix C
Summary of Automated Emissions Sampler Data by Test

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 12/04/98 05:47:00 PM
Test Period End Date/Time: 12/10/98 02:32:00 PM
Stove Model Tested: **KF01: Quadrafire 2100 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	141.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	93.5	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	66.3%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	493	Degrees F	256	Degrees C
Test Facility Ambient Temperature	62	Degrees F	17	Degrees C

ESS Settings

ESS Sampling Rate	0.985	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	8.7	G/Kg
Emission Rate	10.8	G/Hour
Concentration	466	Mg/M3

Fuel

Total Fuel Used	145.0	KG With Moisture
Average Fuel Moisture	24.5%	Percent Dry Basis
Total Fuel Burned	116.5	KG Dry
Average Burn Rate During Stove Operation	1.2	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	47.5%
XAD-2	12.1%
Filter	40.5%
Total	100%

Average Flue-Gas Concentrations

Oxygen (AWES)	15.54	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)

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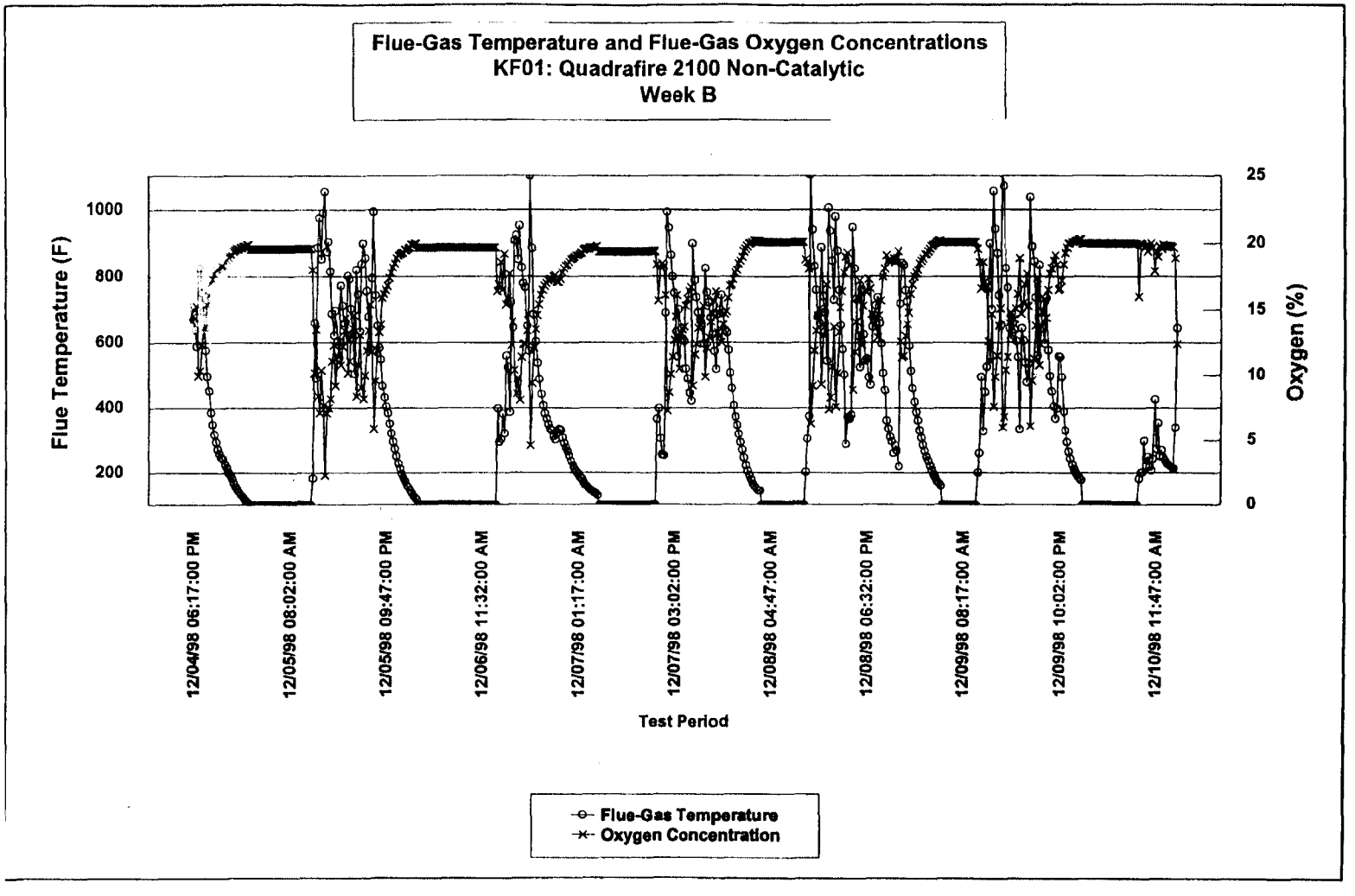

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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 12/04/98 05:47:00 PM
Test Period End Date/Time: 12/10/98 02:32:00 PM
Stove Model Tested: **KF01: Quadrafire 2100 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	141.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	93.5	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	66.3%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	493	Degrees F	256	Degrees C
Test Facility Ambient Temperature	62	Degrees F	17	Degrees C

ESS Settings

ESS Sampling Rate	0.985	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	8.7	G/Kg
Emission Rate	10.8	G/Hour
Concentration	466	Mg/M3

Fuel

Total Fuel Used	145.0	KG With Moisture
Average Fuel Moisture	24.5%	Percent Dry Basis
Total Fuel Burned	116.5	KG Dry
Average Burn Rate During Stove Operation	1.2	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	47.5%
XAD-2	12.1%
Filter	40.5%
Total	100%

Average Flue-Gas Concentrations

Oxygen (AWES)	15.54	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)

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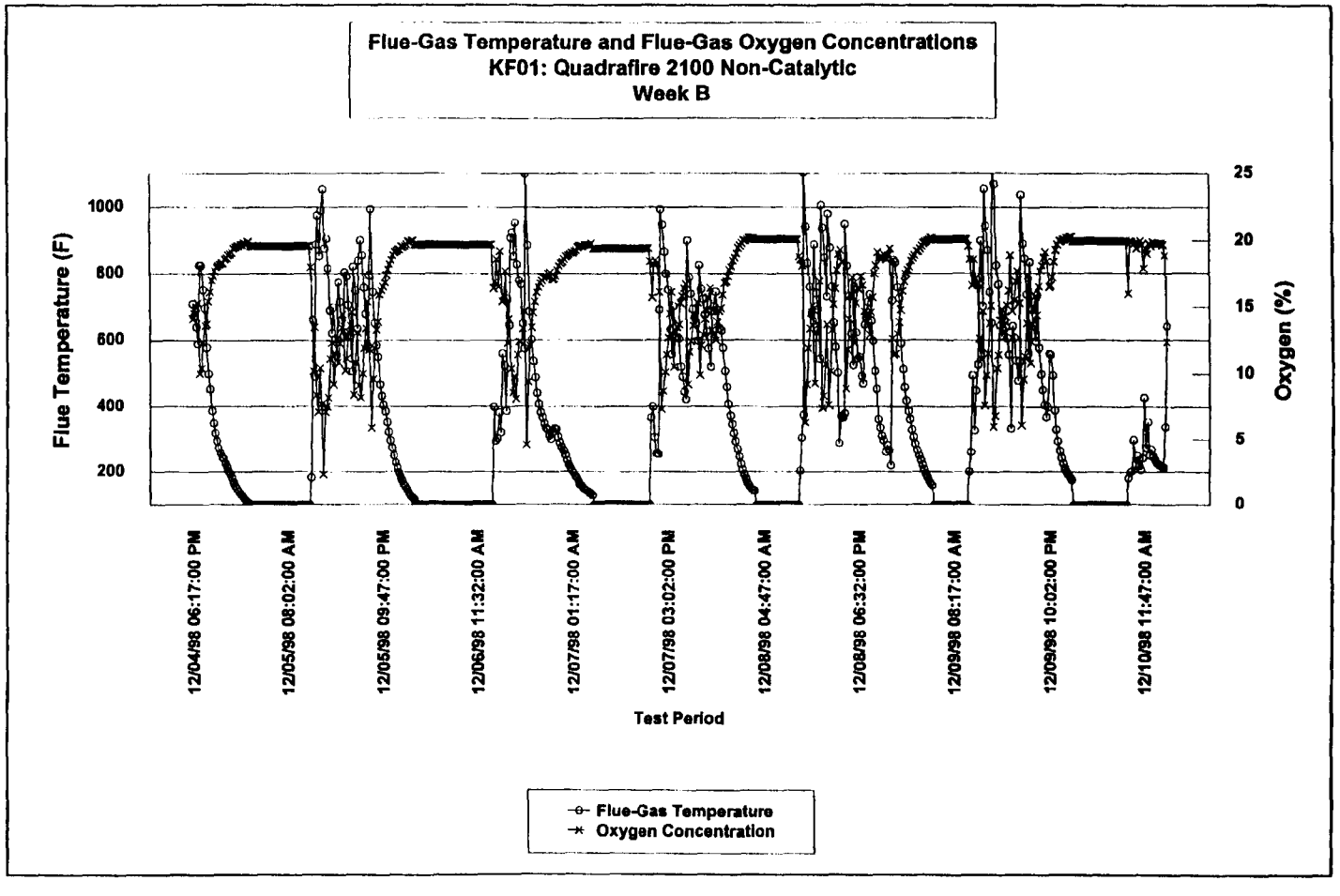

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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 12/10/98 04:02:00 PM
Test Period End Date/Time: 12/16/98 02:32:00 PM
Stove Model Tested: **KF01: Quadrafire 2100 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	142.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	43.25	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	30.3%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	482	Degrees F	250	Degrees C
Test Facility Ambient Temperature	72	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	0.885	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	4.8	G/Kg
Emission Rate	6.5	G/Hour
Concentration	221	Mg/M3

Fuel

Total Fuel Used	77.3	KG With Moisture
Average Fuel Moisture	31.4%	Percent Dry Basis
Total Fuel Burned	58.8	KG Dry
Average Burn Rate During Stove Operation	1.4	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	52.1%
XAD-2	8.1%
Filter	39.8%
Total	100%

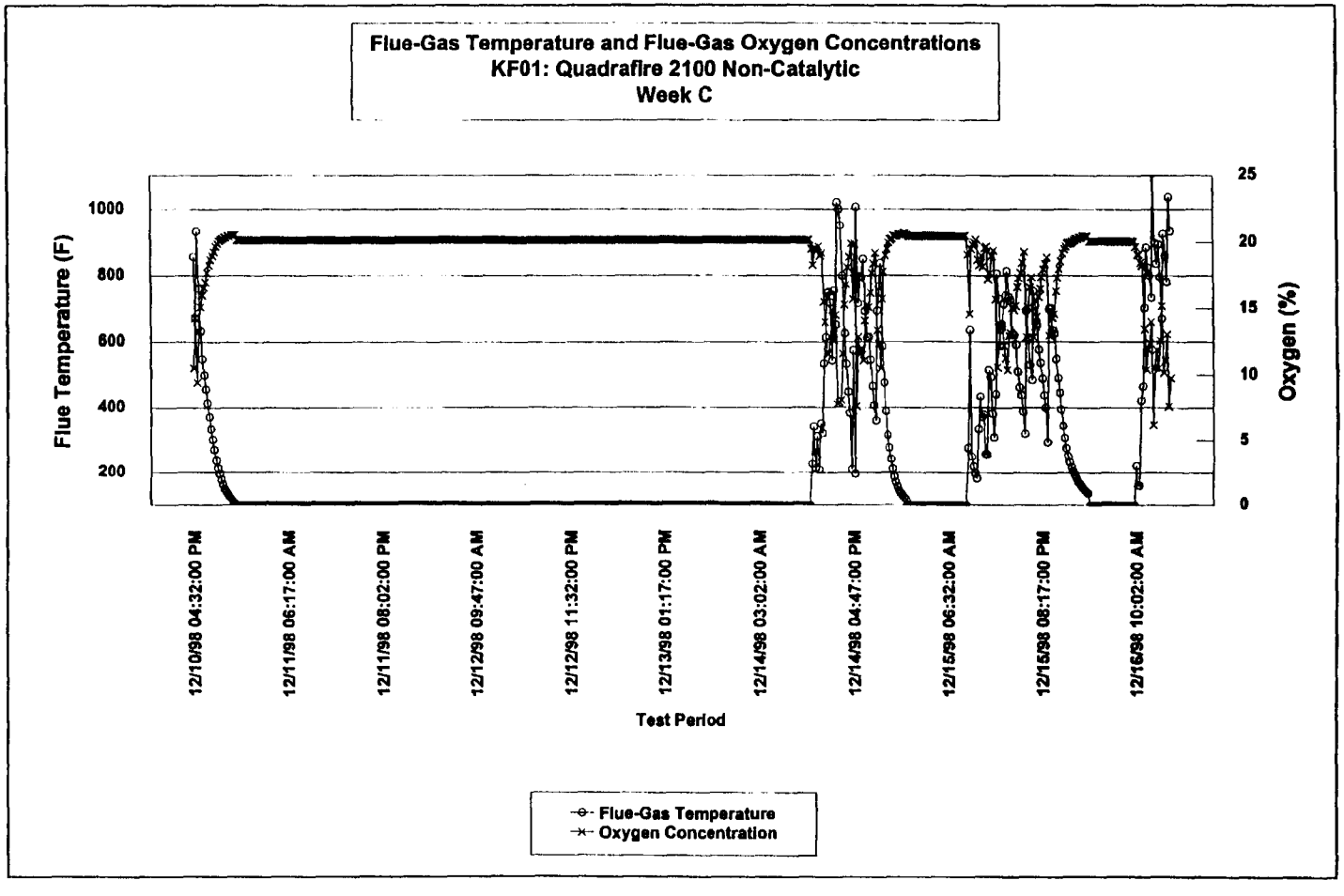
Average Flue-Gas Concentrations

Oxygen (AWES)	16.29	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 11/08/98 12:01:54 PM
Test Period End Date/Time: 11/15/98 11:47:00 AM
Stove Model Tested: **KF02: Pacific Energy Standard 27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	448	Degrees F	231	Degrees C
Test Facility Ambient Temperature	67	Degrees F	19	Degrees C

ESS Settings

ESS Sampling Rate	1.124	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.7	G/Kg
Emission Rate	5.5	G/Hour
Concentration	362	Mg/M3

Fuel

Total Fuel Used	196.4	KG With Moisture
Average Fuel Moisture	20.8%	Percent Dry Basis
Total Fuel Burned	162.6	KG Dry
Average Burn Rate During Stove Operation	1.0	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	56.2%
XAD-2	18.8%
Filter	24.9%
Total	100%

Average Flue-Gas Concentrations

Oxygen (AWES)	14.53	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)

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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week B**
Test Period Start Date/Time:	12/02/98 09:47:00 AM
Test Period End Date/Time:	12/09/98 09:32:00 AM
Stove Model Tested:	**KF02: Pacific Energy Standard 27 Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	163.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	97.5%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	412	Degrees F	211	Degrees C
Test Facility Ambient Temperature	57	Degrees F	14	Degrees C

ESS Settings

ESS Sampling Rate	1.124	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.1	G/Kg
Emission Rate	5.3	G/Hour
Concentration	326	Mg/M3

Fuel

Total Fuel Used	207.6	KG With Moisture
Average Fuel Moisture	21.5%	Percent Dry Basis
Total Fuel Burned	170.9	KG Dry
Average Burn Rate During Stove Operation	1.0	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	40.4%
XAD-2	26.4%
Filter	33.3%
Total	100%

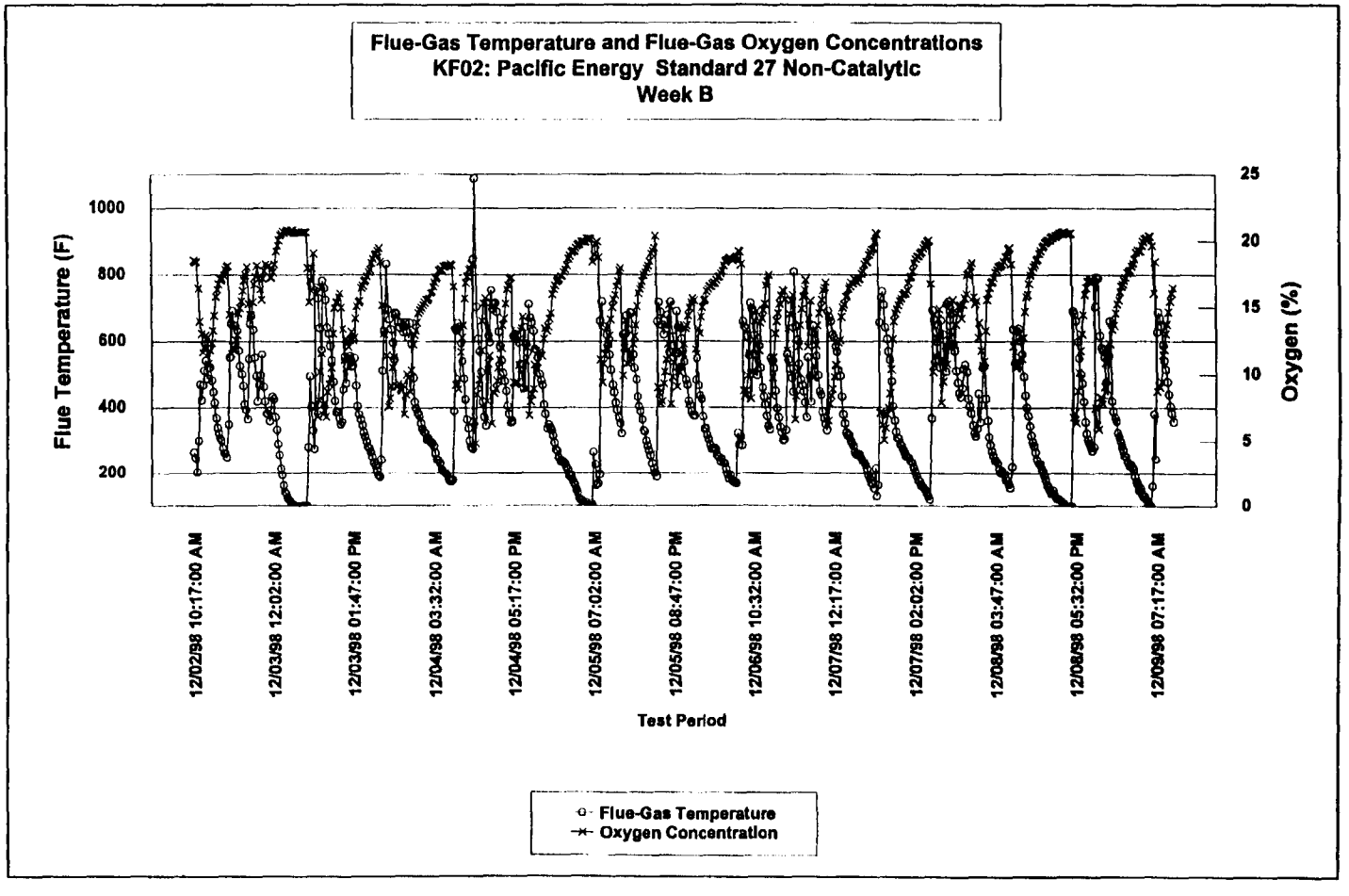
Average Flue-Gas Concentrations

Oxygen (AWES)	14.52	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week C**
Test Period Start Date/Time:	12/09/98 11:02:01 AM
Test Period End Date/Time:	12/16/98 10:45:00 AM
Stove Model Tested:	**KF02: Pacific Energy Standard 27 Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie. Flue-Gas Temperature Over 100 Degrees F)	133.75	Hours
Stove Operating Time During Test Period (ie. Flue-Gas Temperature Over 100 Degrees F)	79.6%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	374	Degrees F	190	Degrees C
Test Facility Ambient Temperature	54	Degrees F	12	Degrees C

ESS Settings

ESS Sampling Rate	1.124	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.5	G/Kg
Emission Rate	4.9	G/Hour
Concentration	317	Mg/M3

Fuel

Total Fuel Used	142.5	KG With Moisture
Average Fuel Moisture	19.6%	Percent Dry Basis
Total Fuel Burned	119.1	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	65.7%
XAD-2	11.3%
Filter	23.0%
Total	100%

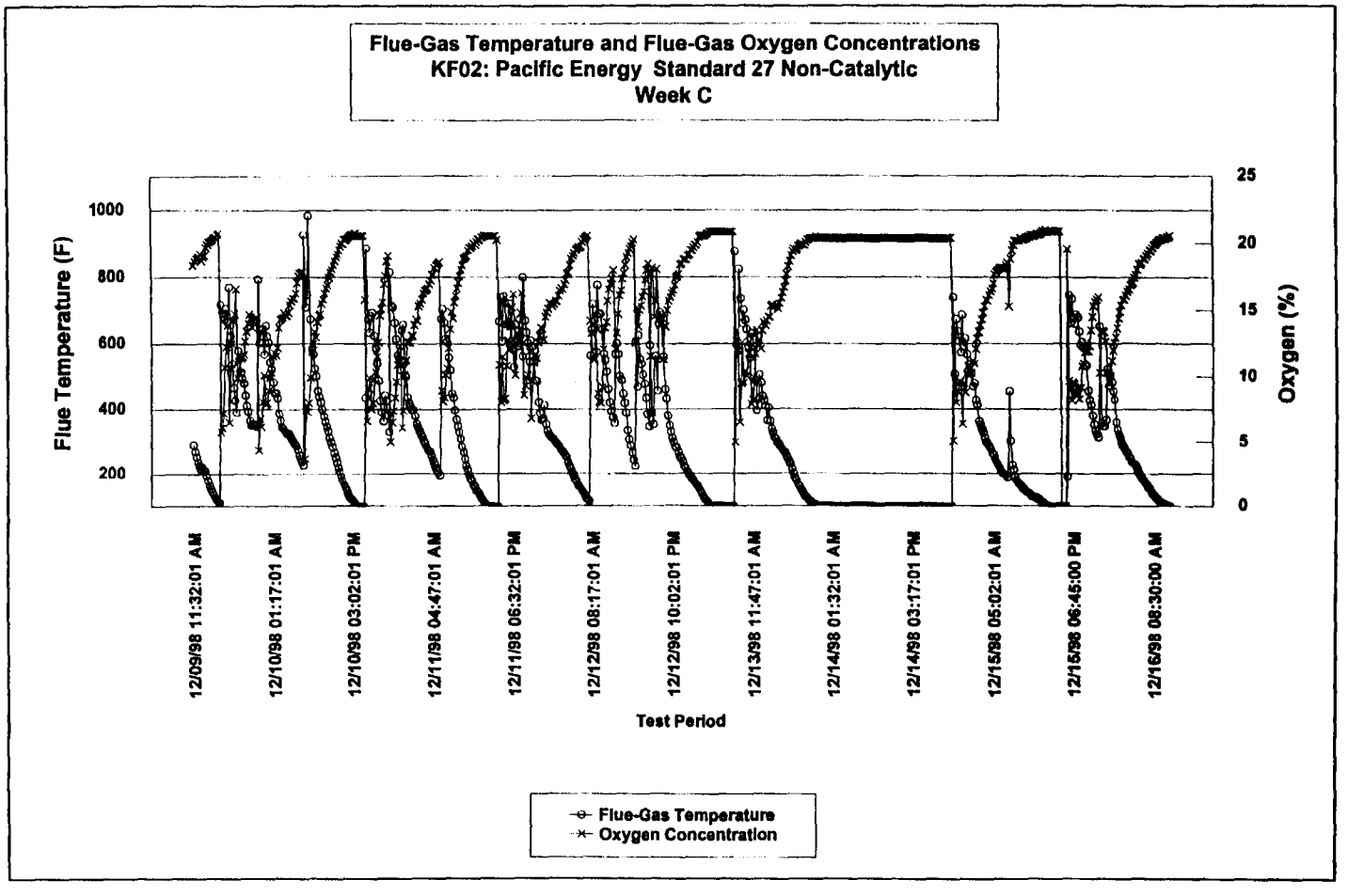
Average Flue-Gas Concentrations

Oxygen (AWES)	15.15	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: Kf02-c3.123 Printed: 07/26/99 at 02:54:15 PM

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 11/22/98 12:01:56 PM
Test Period End Date/Time: 11/29/98 11:46:56 AM
Stove Model Tested: **KF03: Haughs 171E Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	188.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	142.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	85.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	430	Degrees F	221	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	3.7	G/Kg
Emission Rate	3.0	G/Hour
Concentration	123	Mg/M3

Fuel

Total Fuel Used	133.8	KG With Moisture
Average Fuel Moisture	14.5%	Percent Dry Basis
Total Fuel Burned	116.8	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	41.4%
XAD-2	20.9%
Filter	37.7%
Total	100%

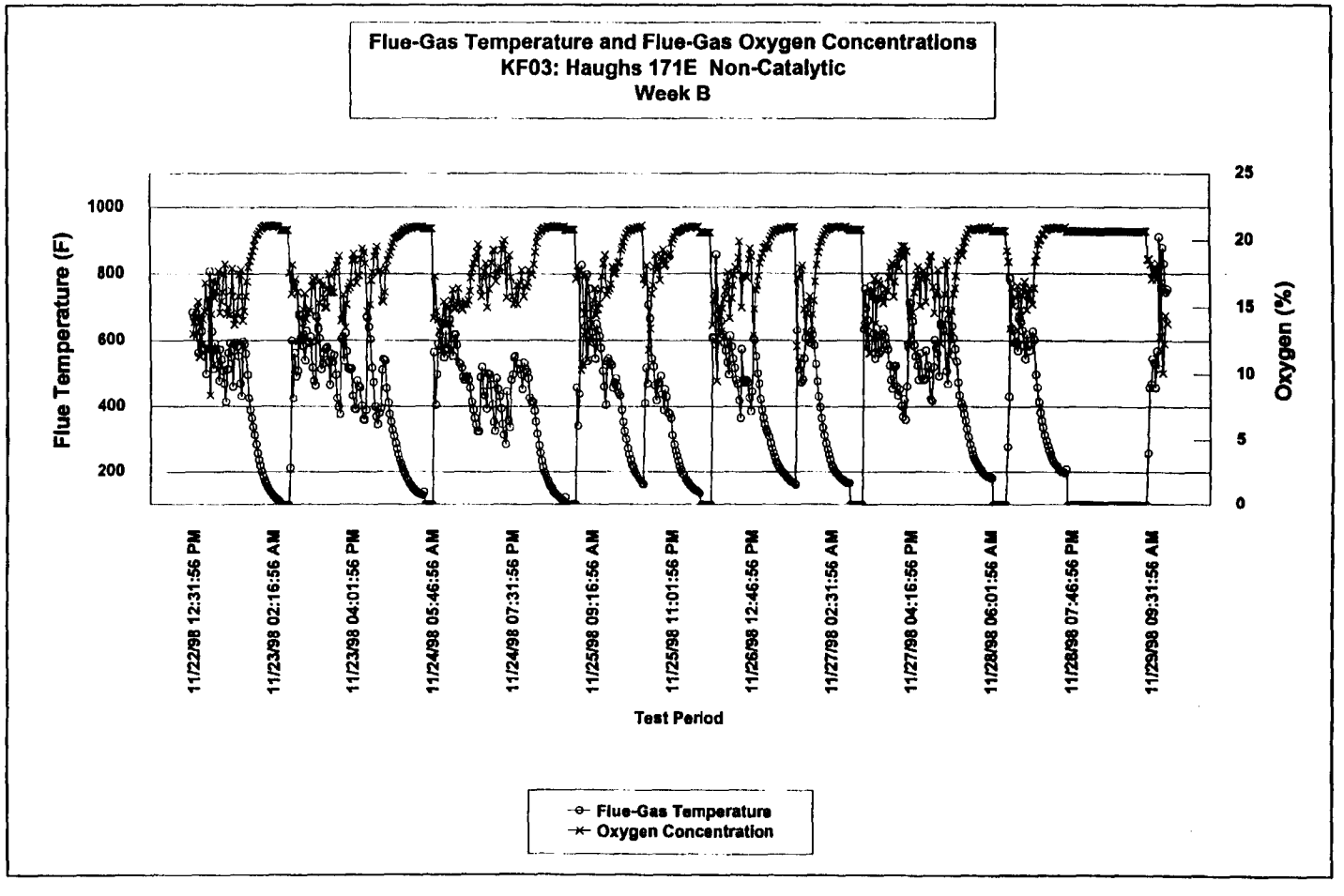
Average Flue-Gas Concentrations

Oxygen (AWES)	17.58	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week C**
Test Period Start Date/Time:	12/06/98 12:17:02 PM
Test Period End Date/Time:	12/13/98 12:02:02 PM
Stove Model Tested:	**KF03: Haughs 171E Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	160	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	95.2%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	475	Degrees F	246	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	1.9	G/Kg
Emission Rate	1.7	G/Hour
Concentration	85	Mg/M3

Fuel

Total Fuel Used	165.8	KG With Moisture
Average Fuel Moisture	18.8%	Percent Dry Basis
Total Fuel Burned	139.6	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	78.2%
XAD-2	15.2%
Filter	6.5%
Total	**100%**

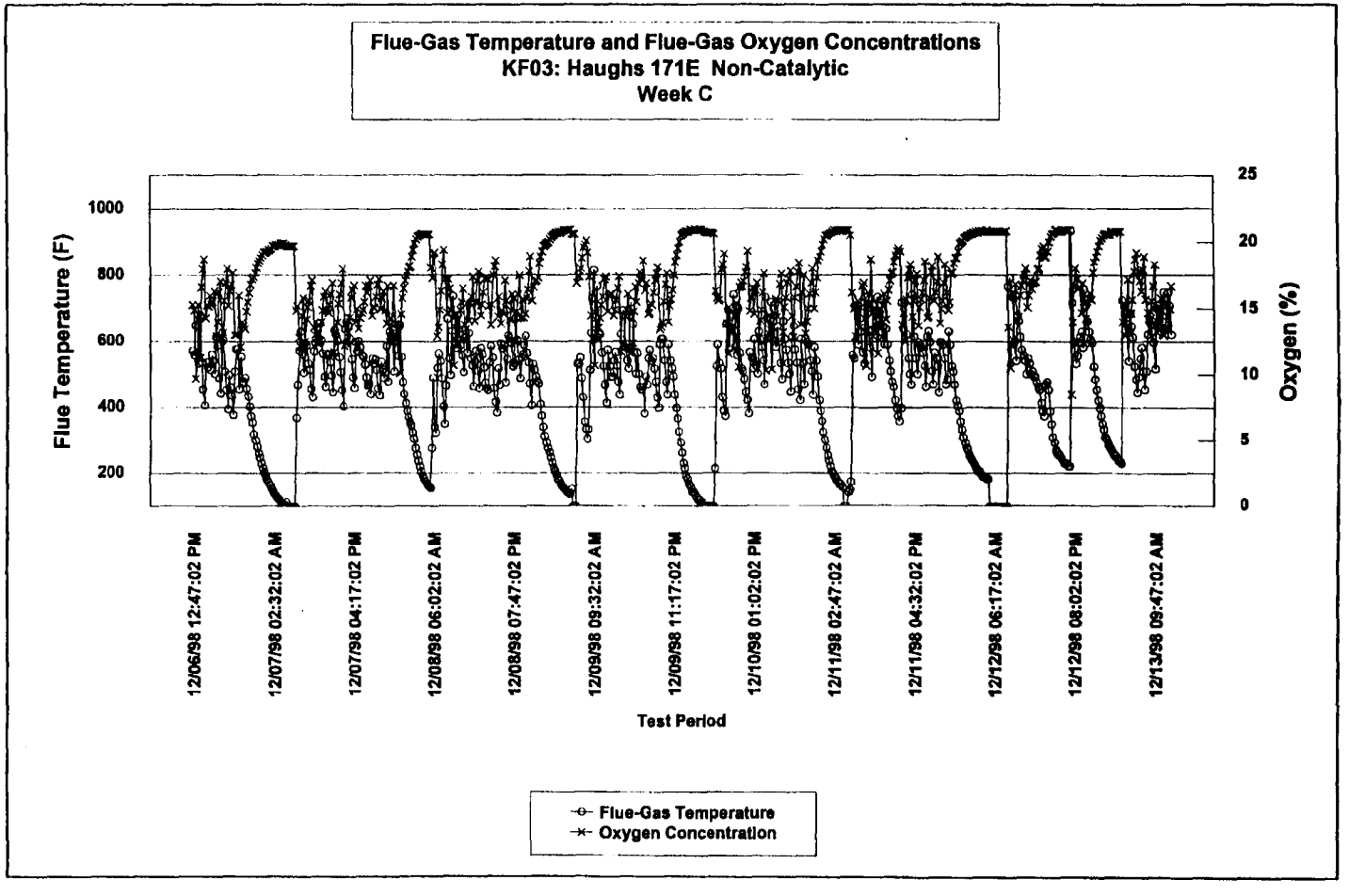
Average Flue-Gas Concentrations

Oxygen (AWES)	16.52	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week A**
Test Period Start Date/Time:	11/14/98 12:32:01 PM
Test Period End Date/Time:	11/21/98 12:17:01 PM
Stove Model Tested:	**KF04: Earthstove 1003-C**
Stove Type:	Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	398	Degrees F	203	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.042	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	17.5	G/Kg
Emission Rate	15.8	G/Hour
Concentration	926	Mg/M3

Fuel

Total Fuel Used	184.4	KG With Moisture
Average Fuel Moisture	21.6%	Percent Dry Basis
Total Fuel Burned	151.6	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	35.6%
XAD-2	34.6%
Filter	29.8%
Total	100%

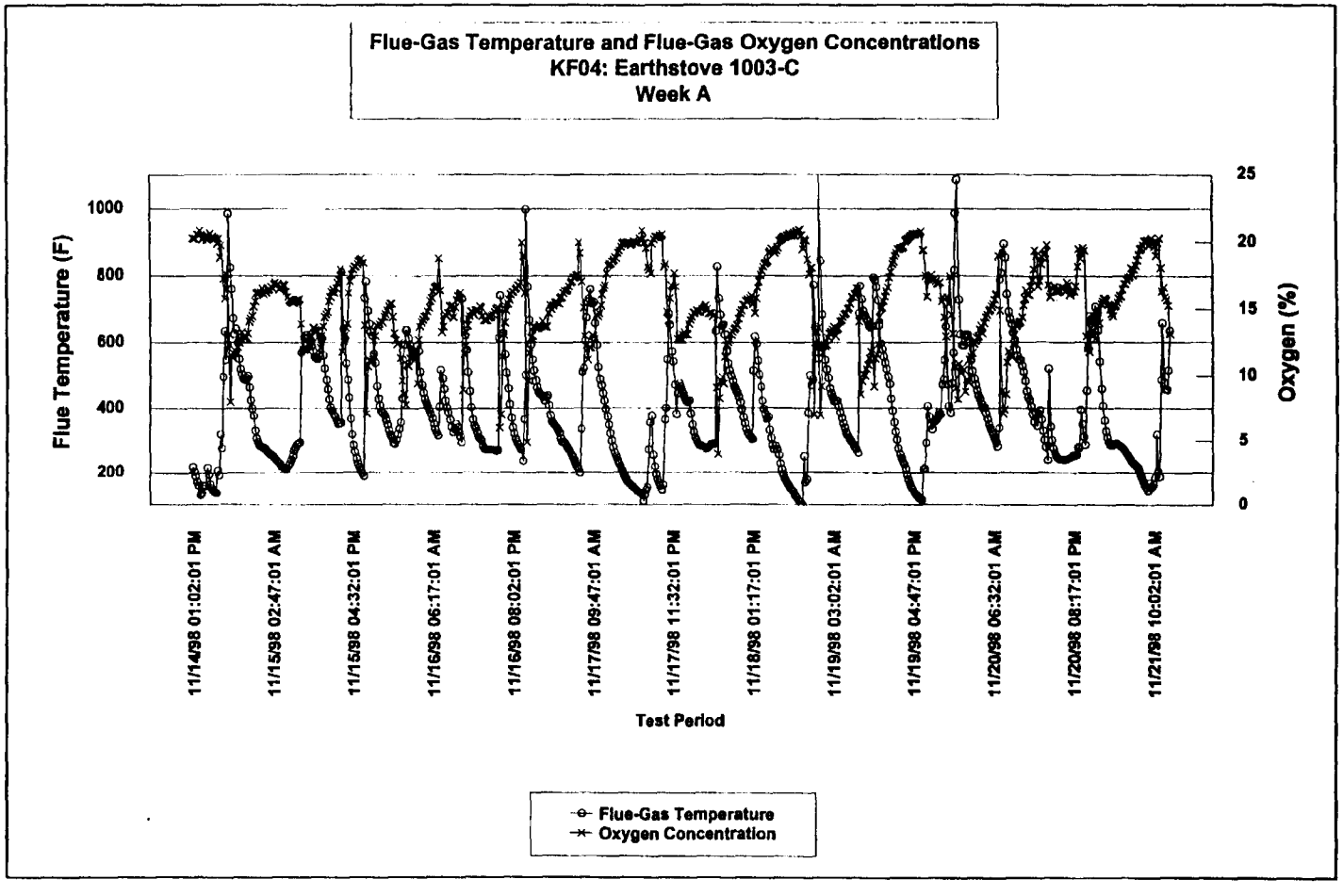
Average Flue-Gas Concentrations

Oxygen (AWES)	15.42	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week B**
Test Period Start Date/Time:	12/02/98 12:47:00 PM
Test Period End Date/Time:	12/09/98 11:32:00 AM
Stove Model Tested:	**KF04: Earthstove 1003-C**
Stove Type:	Catalytic

Time

Total Test Period	167.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	167	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	510	Degrees F	266	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.042	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	14.2	G/Kg
Emission Rate	15.1	G/Hour
Concentration	1139	Mg/M3

Fuel

Total Fuel Used	212.2	KG With Moisture
Average Fuel Moisture	19.5%	Percent Dry Basis
Total Fuel Burned	177.6	KG Dry
Average Burn Rate During Stove Operation	1.1	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	27.7%
XAD-2	28.9%
Filter	43.4%
Total	100%

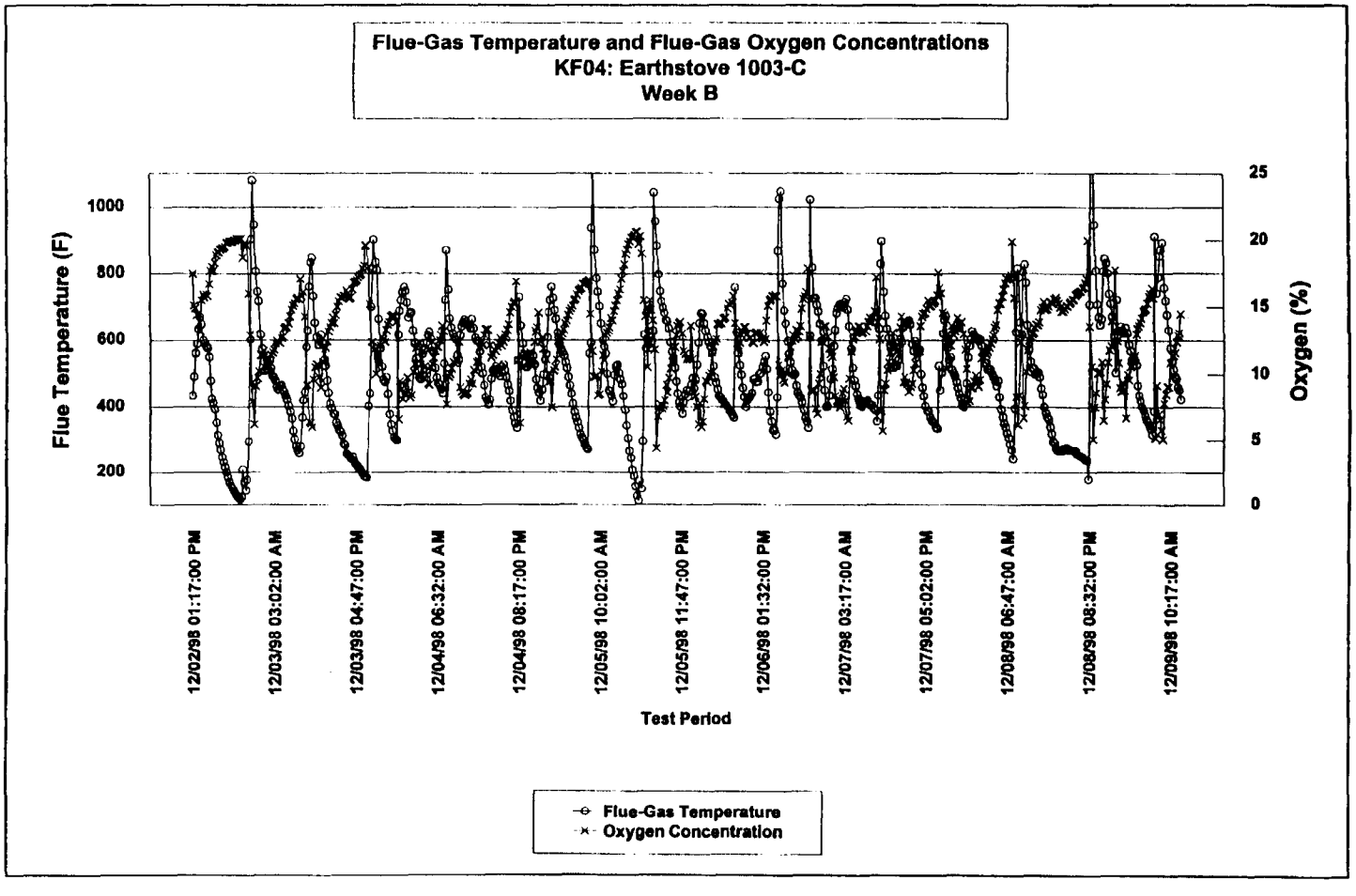
Average Flue-Gas Concentrations

Oxygen (AWES)	12.59	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week A**
Test Period Start Date/Time:	11/08/98 12:01:54 PM
Test Period End Date/Time:	11/15/98 11:46:54 AM
Stove Model Tested:	**KF05: Pacific Energy Super Series-27 Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	150.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	89.7%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	446	Degrees F	230	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.059	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.2	G/Kg
Emission Rate	4.3	G/Hour
Concentration	240	Mg/M3

Fuel

Total Fuel Used	137.7	KG With Moisture
Average Fuel Moisture	10.4%	Percent Dry Basis
Total Fuel Burned	124.7	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	47.7%
XAD-2	29.9%
Filter	22.3%
Total	100%

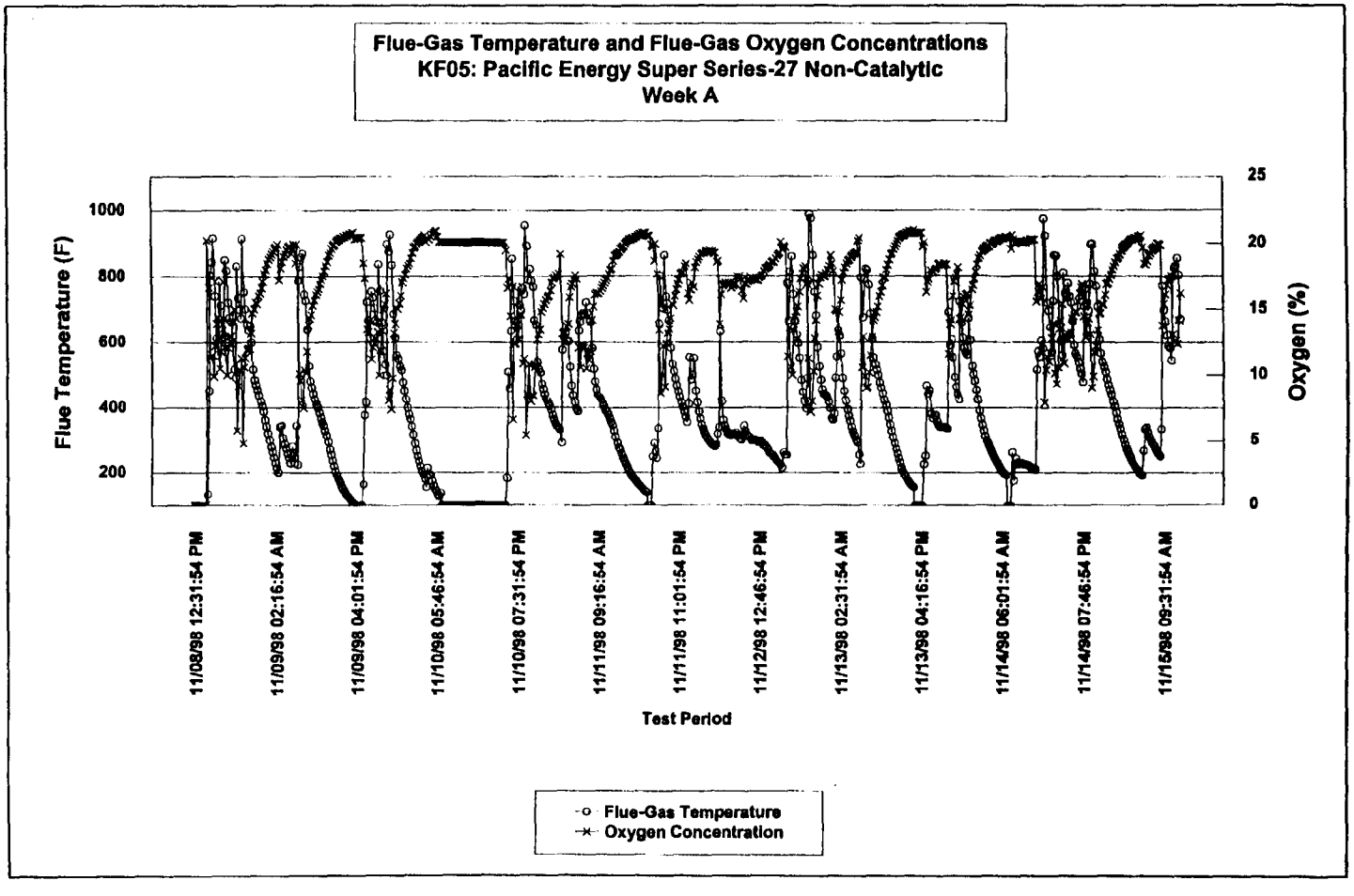
Average Flue-Gas Concentrations

Oxygen (AWES)	16.26	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 11/22/98 12:01:55 PM
Test Period End Date/Time: 11/25/98 06:16:55 PM
Stove Model Tested: **KF05: Pacific Energy Super Series-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	78.50	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	75.5	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	96.2%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	404	Degrees F	207	Degrees C
Test Facility Ambient Temperature	74	Degrees F	23	Degrees C

ESS Settings

ESS Sampling Rate	1.069	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	7.2	G/Kg
Emission Rate	6.1	G/Hour
Concentration	300	Mg/M3

Fuel

Total Fuel Used	70.7	KG With Moisture
Average Fuel Moisture	9.8%	Percent Dry Basis
Total Fuel Burned	64.4	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	66.0%
XAD-2	12.7%
Filter	21.3%
Total	100%

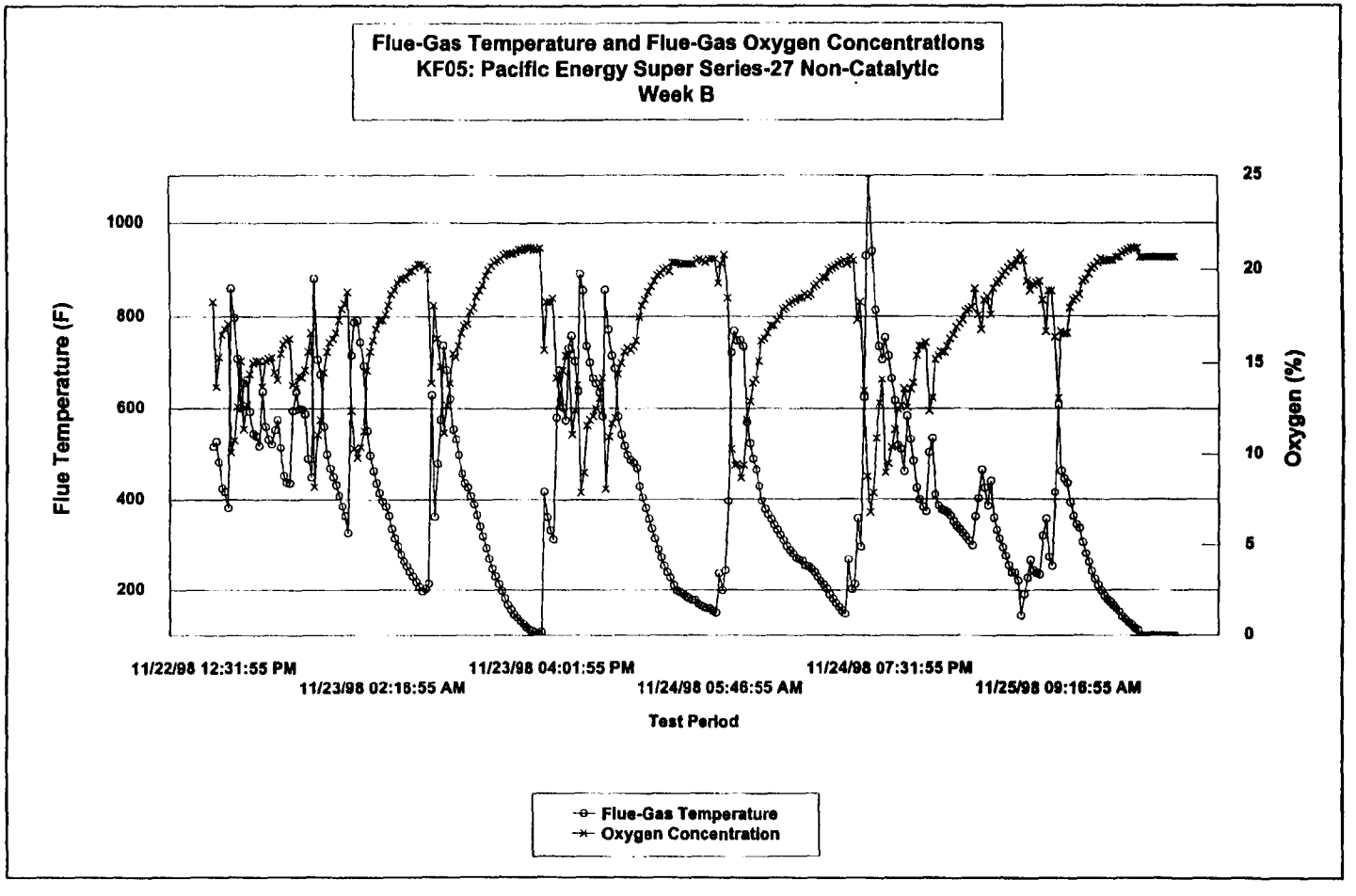
Average Flue-Gas Concentrations

Oxygen (AWES)	16.73	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 12/08/98 12:17:01 PM
Test Period End Date/Time: 12/15/98 12:02:01 PM
Stove Model Tested: **KF05: Pacific Energy Super Series-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	153	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	91.1%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	470	Degrees F	243	Degrees C
Test Facility Ambient Temperature	63	Degrees F	17	Degrees C

ESS Settings

ESS Sampling Rate	1.069	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	2.8	G/Kg
Emission Rate	2.8	G/Hour
Concentration	147	Mg/M3

Fuel

Total Fuel Used	172.2	KG With Moisture
Average Fuel Moisture	11.3%	Percent Dry Basis
Total Fuel Burned	154.7	KG Dry
Average Burn Rate During Stove Operation	1.0	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	36.5%
XAD-2	25.8%
Filter	35.7%
Total	100%

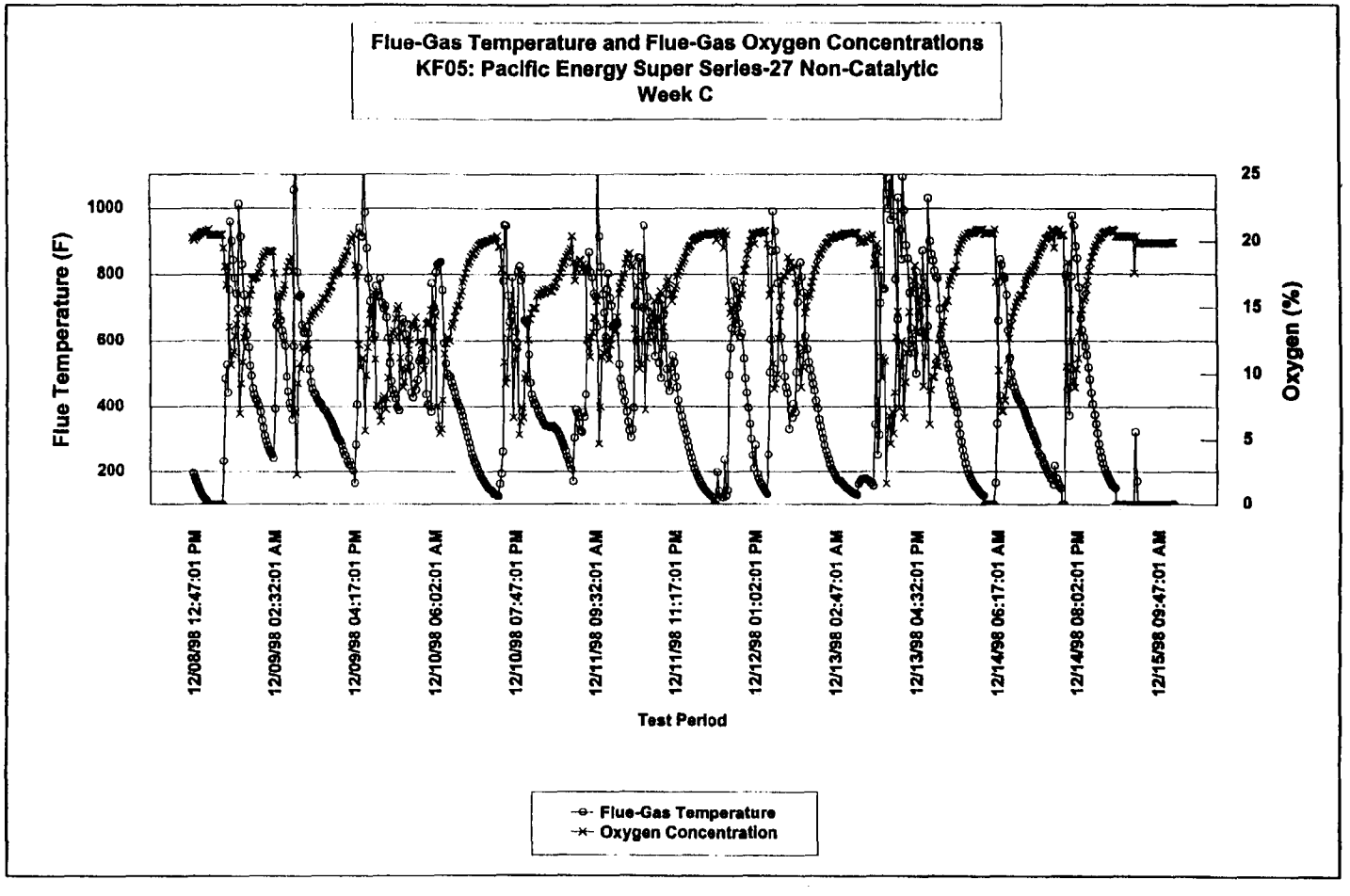
Average Flue-Gas Concentrations

Oxygen (AWES)	15.71	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week A**
Test Period Start Date/Time:	11/10/98 12:17:00 PM
Test Period End Date/Time:	11/17/98 12:02:00 PM
Stove Model Tested:	**KF06: Waterford 104.MKII**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	431	Degrees F	222	Degrees C
Test Facility Ambient Temperature	77	Degrees F	25	Degrees C

ESS Settings

ESS Sampling Rate	1.145	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	6.0	G/Kg
Emission Rate	4.0	G/Hour
Concentration	295	Mg/M3

Fuel

Total Fuel Used	126.0	KG With Moisture
Average Fuel Moisture	11.7%	Percent Dry Basis
Total Fuel Burned	112.8	KG Dry
Average Burn Rate During Stove Operation	0.7	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	47.1%
XAD-2	18.3%
Filter	34.7%
Total	100%

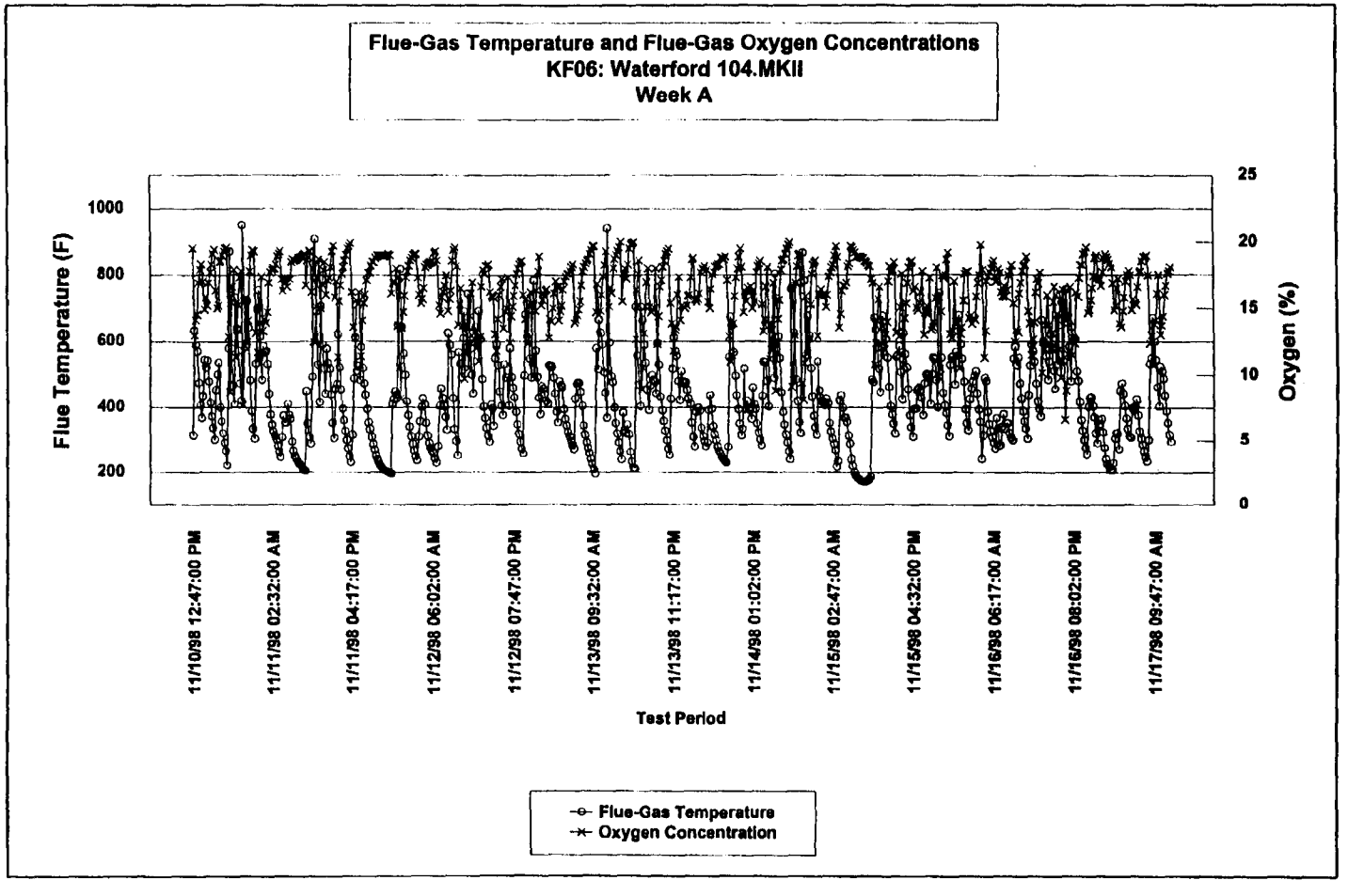
Average Flue-Gas Concentrations

Oxygen (AWES)	16.00	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: Kf06-a3.123 Printed: 07/26/99 at 03:09:27 PM

Manufacturer: Aladdin Hearth Products
Model: DV40-Step
Date: 6/11/98
LP Gas

Alcove height 56 inch Alcove Depth 36 inches
2 foot vertical to 1 foot horizontal
3inches to switch box - 8 inches to pipe
12 inches to Alcove 6 inches to Res. wall

Technician Bruce Lewis
Supervisor Richard Sparwasser
Project No 061-S-04-5

Safety Thermal Testing

Location	TC#	Interval 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		09:45 AM	10:15 AM	10:45 AM												
Ambient		75	75	76												
Panel A: Floor																
	0	NA	NA	NA												
	1	104	109	112												
	2	112	128	134												
	3	NA	NA	NA												
	4	101	114	122												
	5	108	107	110												
	6	69	72	75												
	7	69	71	72												
	8	70	71	72												
	9	70	75	72												
	10	70	71	72												
	11	65	69	70												
	12	69	70	72												
	13	70	71	72												
	14	70	71	72												
	15	69	71	72												
Panel B: Rear Wall / Ceiling																
	33	144	152	151												
	34	219	224	225												
	35	158	162	163												
	36	131	135	136												
	37	217	218	219												
	38	161	161	161												
Panel C: Side Wall																
	46	72	73	74												
	47	74	75	76												
	48	75	77	78												
	49	NA	NA	NA												
	50	112	117	119												
	51	127	132	135												
	52	106	110	112												
	53	113	114	115												
	54	97	99	101												
	55	89	92	94												
	56	129	134	136												
	57	158	164	166												
	58	191	196	199												
	59	134	135	140												
	60	123	124	125												
	61	92	94	96												
	62	90	92	94												
	63	108	123	126												
	64	137	141	142												
	65	193	197	200												
	66	133	137	139												
	67	125	126	125												
	68	90	93	95												
	69	90	93	95												
	70	123	127	129												
	71	145	149	151												
	72	166	170	172												
	73	132	135	137												
	74	114	113	115												
	75	107	110	111												
	76	98	100	101												
	77	108	111	113												
	78	117	119	120												
	79	124	127	128												
	80	145	147	148												
Miscellaneous																
Ceiling	81	86	92	91												
Wire Ambie	2	228	230	229												
Top Switch	3	189	190	190												
Chase Top	4	100	102	104												
Chase Top	5	86	88	90												
Chase Top	6	92	94	95												
Chase Side	7	86	87	88												
Door Handl	8	118	121	120												
Flue	9	558	557	558												
Ceiling	10	145	148	148												
Ceiling	11	88	92	91												
Valve Body	20	136	136	138												

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 11/08/98 12:01:54 PM
Test Period End Date/Time: 11/16/98 02:32:01 PM
Stove Model Tested: **KF07: Earthstove 1400HT Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	167.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	99.7%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	424	Degrees F	218	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.109	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	9.9	G/Kg
Emission Rate	6.3	G/Hour
Concentration	418	Mg/M3

Fuel

Total Fuel Used	158.5	KG With Moisture
Average Fuel Moisture	12.6%	Percent Dry Basis
Total Fuel Burned	140.8	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	42.7%
XAD-2	19.8%
Filter	37.5%
Total	100%

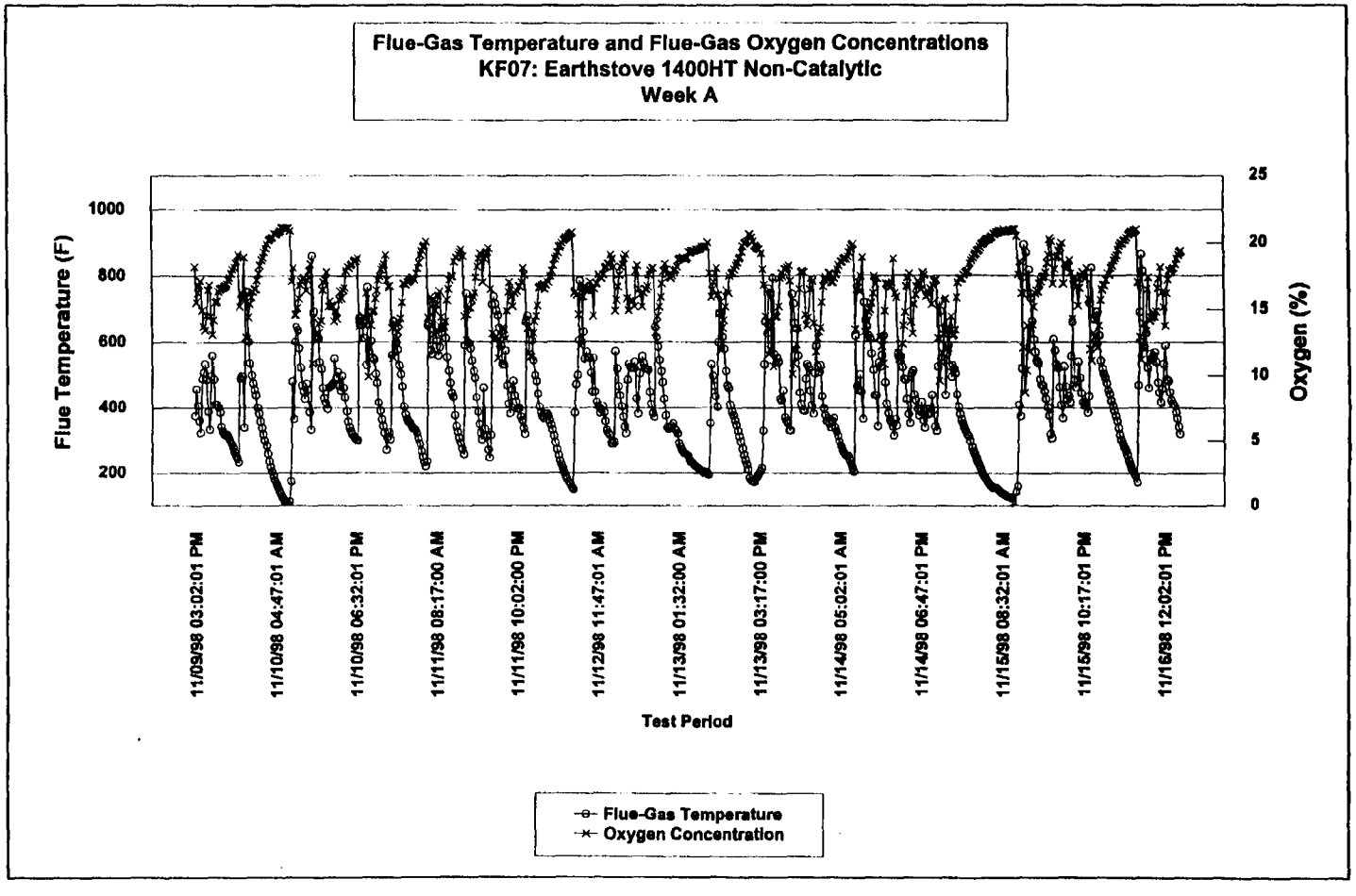
Average Flue-Gas Concentrations

Oxygen (AWES)	16.72	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.8% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week B**
Test Period Start Date/Time:	11/22/98 12:01:54 PM
Test Period End Date/Time:	11/29/98 11:46:54 AM
Stove Model Tested:	**KF07: Earthstove 1400HT Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie. Flue-Gas Temperature Over 100 Degrees F)	160.25	Hours
Stove Operating Time During Test Period (ie. Flue-Gas Temperature Over 100 Degrees F)	95.4%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	457	Degrees F	236	Degrees C
Test Facility Ambient Temperature	70	Degrees F	21	Degrees C

ESS Settings

ESS Sampling Rate	1.109	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	7.9	G/Kg
Emission Rate	5.9	G/Hour
Concentration	324	Mg/M3

Fuel

Total Fuel Used	133.7	KG With Moisture
Average Fuel Moisture	11.7%	Percent Dry Basis
Total Fuel Burned	119.7	KG Dry
Average Burn Rate During Stove Operation	0.7	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	44.0%
XAD-2	22.5%
Filter	33.5%
Total	100%

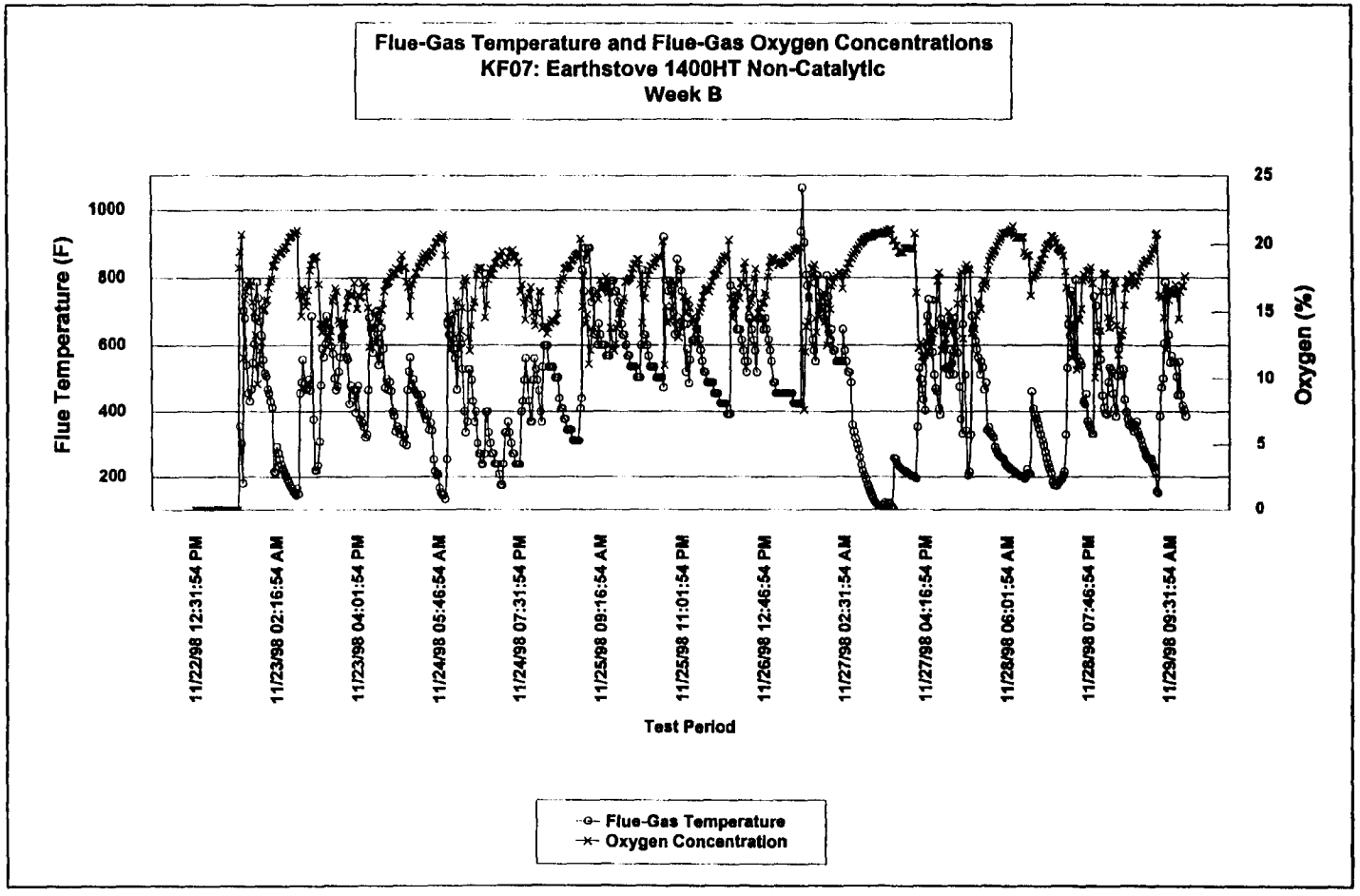
Average Flue-Gas Concentrations

Oxygen (AWES)	16.83	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week C**
Test Period Start Date/Time:	12/06/98 12:01:54 PM
Test Period End Date/Time:	12/13/98 11:47:28 AM
Stove Model Tested:	**KF07: Earthstove 1400HT Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	165.75	Hours
Stove Operating Time Durng Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	98.7%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	484	Degrees F	251	Degrees C
Test Facility Ambient Temperature	74	Degrees F	23	Degrees C

ESS Settings

ESS Sampling Rate	1.109	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	8.2	G/Kg
Emission Rate	9.7	G/Hour
Concentration	434	Mg/M3

Fuel

Total Fuel Used	225.4	KG With Moisture
Average Fuel Moisture	15.8%	Percent Dry Basis
Total Fuel Burned	194.7	KG Dry
Average Burn Rate Durng Stove Operation	1.2	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	49.0%
XAD-2	14.6%
Filter	36.4%
Total	100%

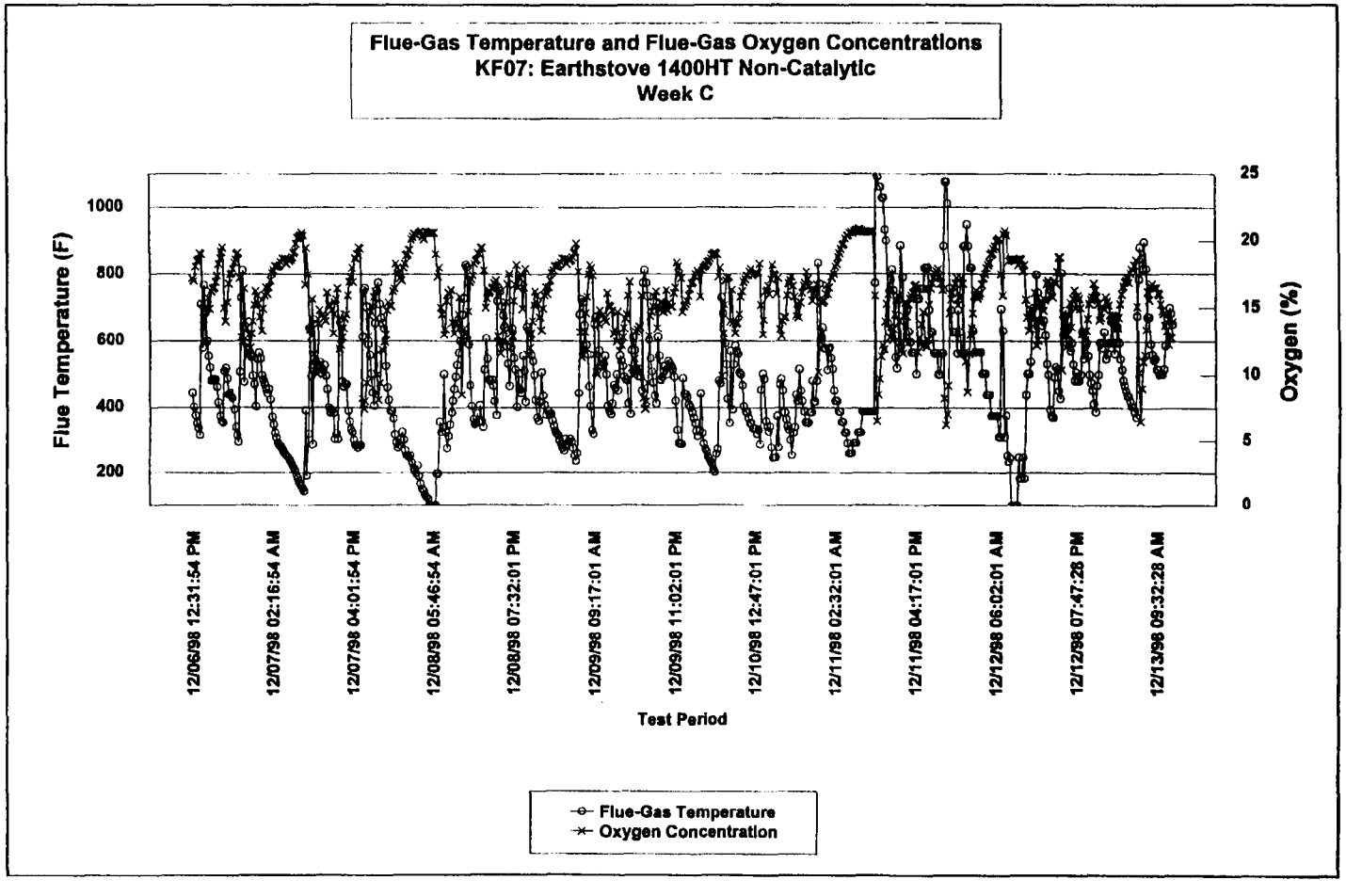
Average Flue-Gas Concentrations

Oxygen (AWES)	15.64	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week A**
Test Period Start Date/Time:	11/08/98 12:01:54 PM
Test Period End Date/Time:	11/15/98 11:46:54 AM
Stove Model Tested:	**KF08: Country T-Top Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie. Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie. Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	384	Degrees F	195	Degrees C
Test Facility Ambient Temperature	79	Degrees F	26	Degrees C

ESS Settings

ESS Sampling Rate	1.058	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	8.9	G/Kg
Emission Rate	9.8	G/Hour
Concentration	395	Mg/M3

Fuel

Total Fuel Used	238.4	KG With Moisture
Average Fuel Moisture	26.6%	Percent Dry Basis
Total Fuel Burned	188.0	KG Dry
Average Burn Rate During Stove Operation	1.1	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	55.8%
XAD-2	17.0%
Filter	27.3%
Total	**100%**

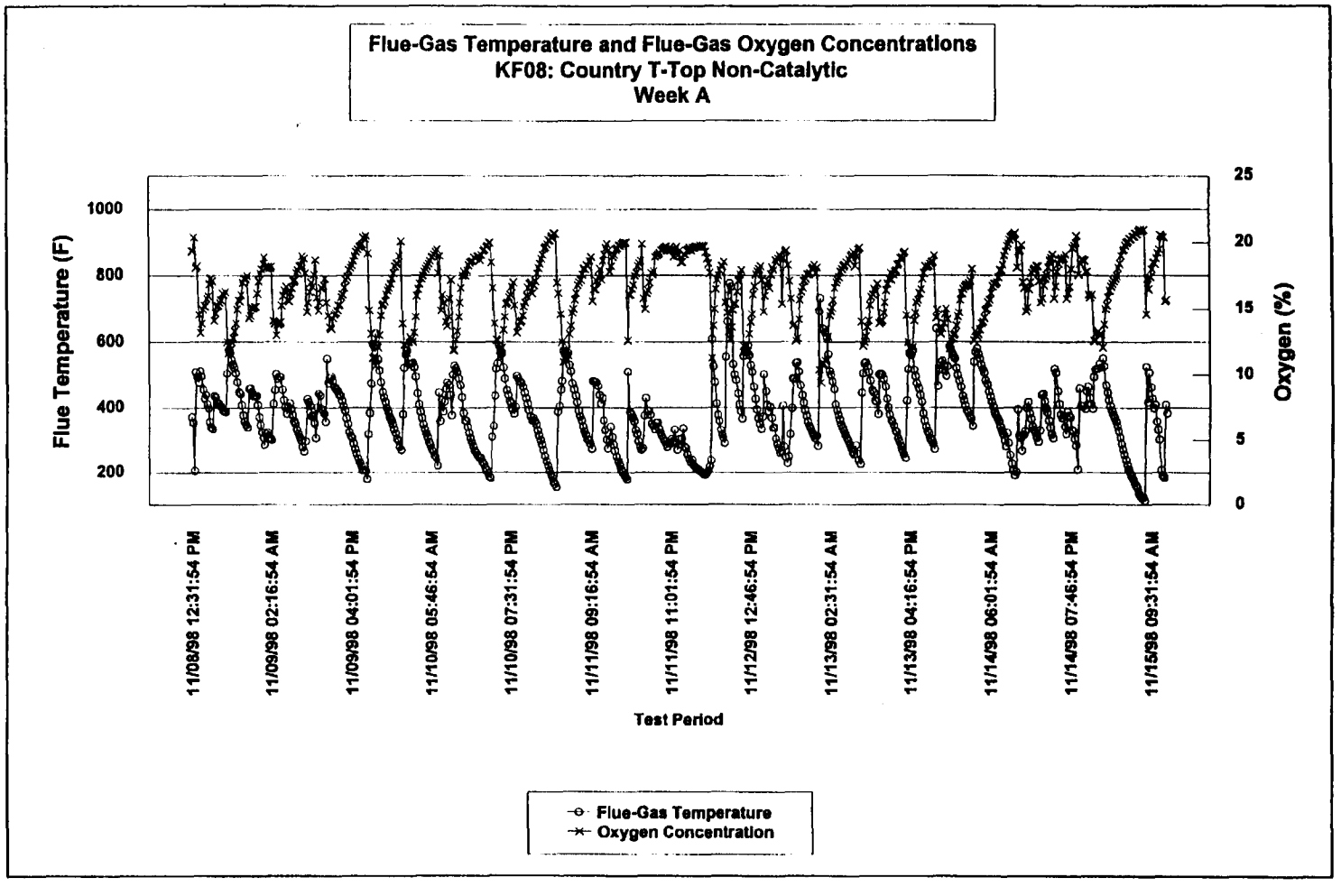
Average Flue-Gas Concentrations

Oxygen (AWES)	16.47	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Klamath Falls, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 11/22/98 12:01:53 PM
Test Period End Date/Time: 11/30/98 06:06:43 PM
Stove Model Tested: **KF08: Country T-Top Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	172.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	169.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	98.3%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	428	Degrees F	220	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.058	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	12.3	G/Kg
Emission Rate	13.6	G/Hour
Concentration	421	Mg/M3

Fuel

Total Fuel Used	237.1	KG With Moisture
Average Fuel Moisture	25.4%	Percent Dry Basis
Total Fuel Burned	189.0	KG Dry
Average Burn Rate During Stove Operation	1.1	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	39.1%
XAD-2	4.3%
Filter	56.6%
Total	100%

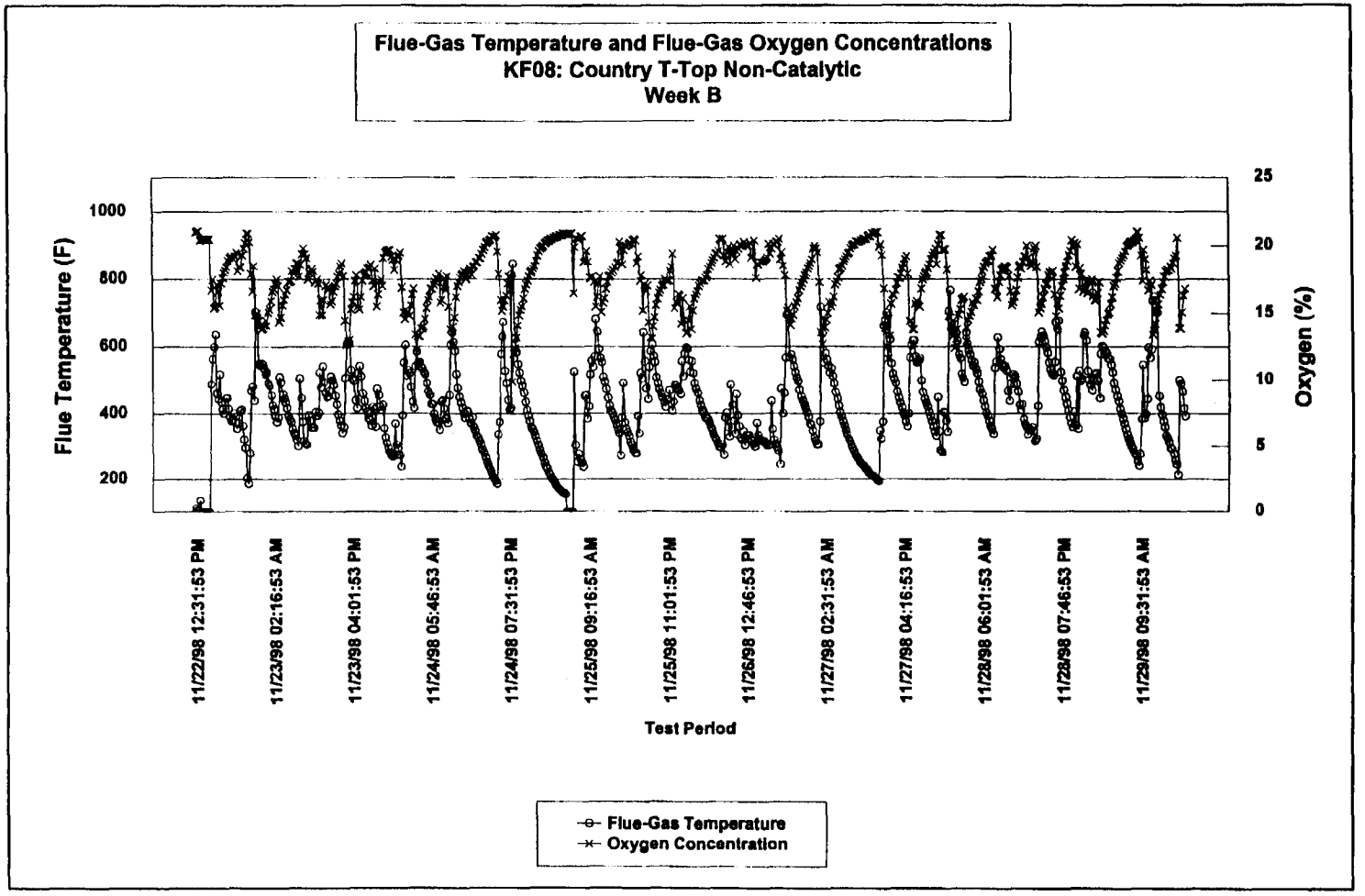
Average Flue-Gas Concentrations

Oxygen (AWES)	17.48	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Klamath Falls, Oregon USA
Test Run Number:	**Week C**
Test Period Start Date/Time:	12/05/98 07:24:15 PM
Test Period End Date/Time:	12/13/98 11:55:09 AM
Stove Model Tested:	**KF08: Country T-Top Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	171.00	Hours
Stove Operating Time (ie. Flue-Gas Temperature Over 100 Degrees F)	170.5	Hours
Stove Operating Time During Test Period (ie. Flue-Gas Temperature Over 100 Degrees F)	99.7%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	446	Degrees F	230	Degrees C
Test Facility Ambient Temperature	74	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.058	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.2	G/Kg
Emission Rate	6.3	G/Hour
Concentration	254	Mg/M3

Fuel

Total Fuel Used	257.7	KG With Moisture
Average Fuel Moisture	25.7%	Percent Dry Basis
Total Fuel Burned	205.0	KG Dry
Average Burn Rate During Stove Operation	1.2	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	57.8%
XAD-2	17.9%
Filter	24.3%
Total	100%

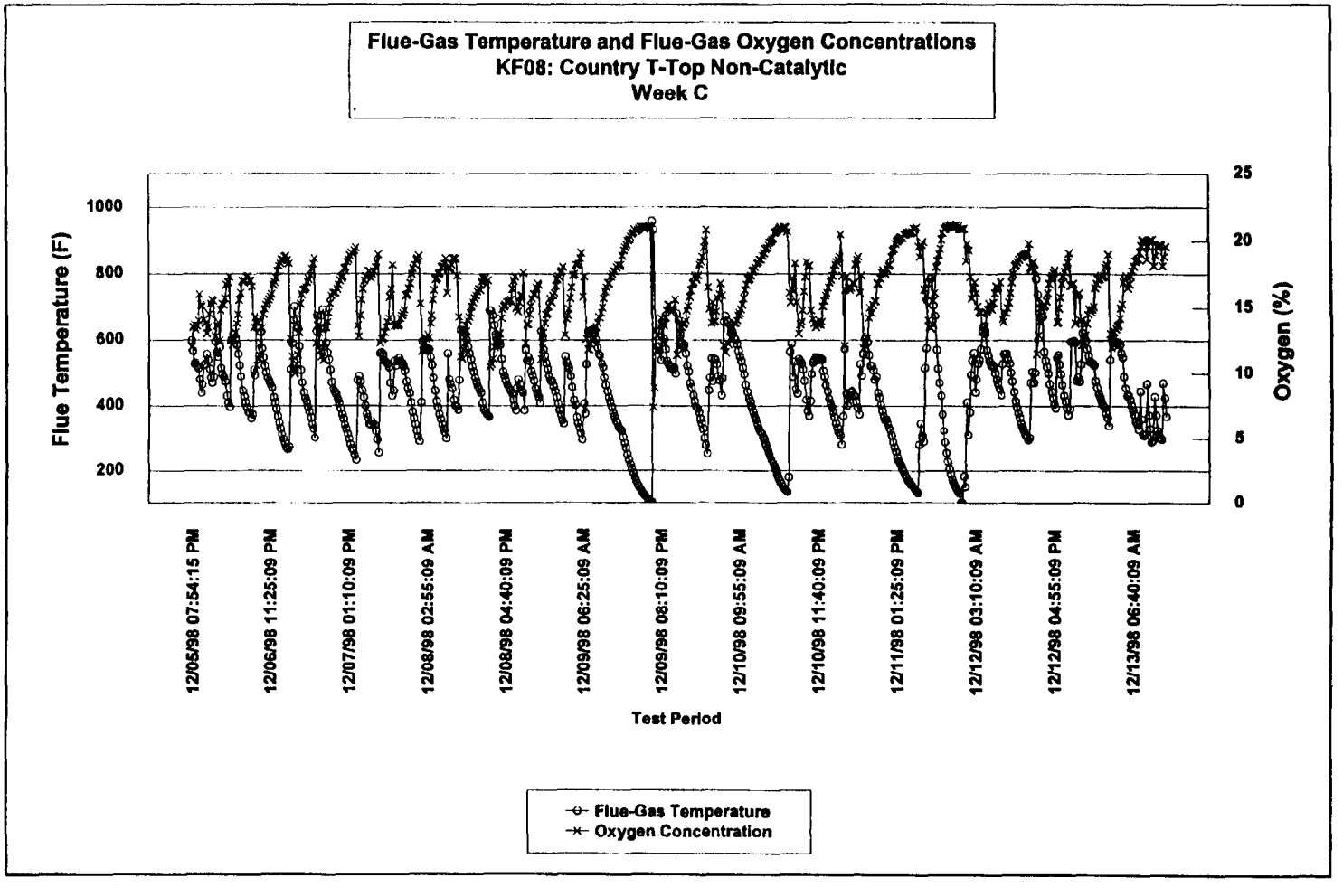
Average Flue-Gas Concentrations

Oxygen (AWES)	16.08	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/11/99 08:42:00 AM
Test Period End Date/Time: 01/19/99 12:17:58 PM
Stove Model Tested: **P01: HES Trailblazer 2000-C**
Stove Type: Catalytic

Time

Total Test Period	171.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	171.25	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	413	Degrees F	212	Degrees C
Test Facility Ambient Temperature	80	Degrees F	27	Degrees C

ESS Settings

ESS Sampling Rate	1.058	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	15.0	G/Kg
Emission Rate	18.4	G/Hour
Concentration	908	Mg/M3

Fuel

Total Fuel Used	260.2	KG With Moisture
Average Fuel Moisture	24.0%	Percent Dry Basis
Total Fuel Burned	209.8	KG Dry
Average Burn Rate During Stove Operation	1.2	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	32.6%
XAD-2	19.9%
Filter	47.5%
Total	100%

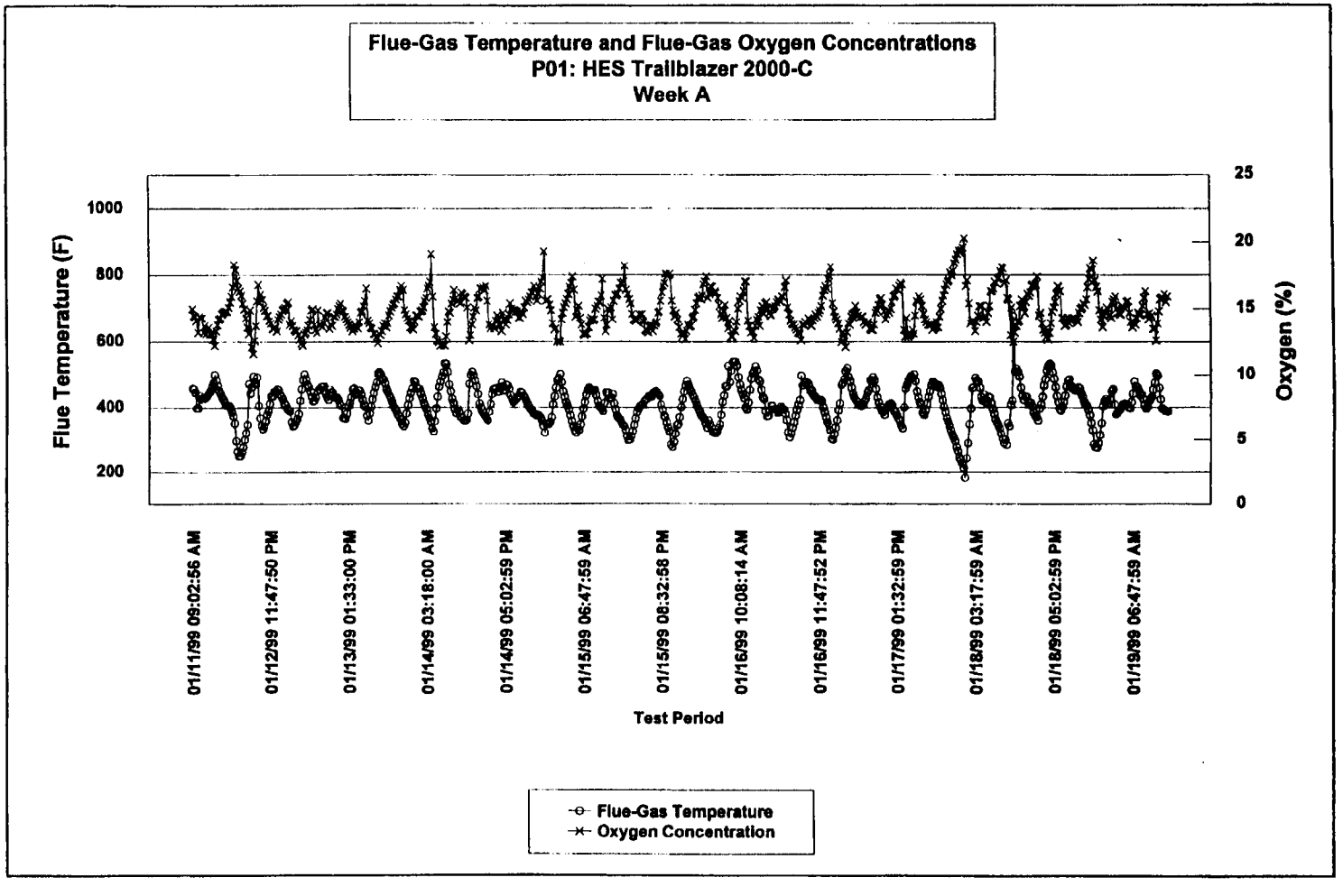
Average Flue-Gas Concentrations

Oxygen (AWES)	14.66	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/19/99 01:32:01 PM
Test Period End Date/Time: 01/26/99 01:32:57 PM
Stove Model Tested: **P01: HES Trailblazer 2000-C**
Stove Type: Catalytic

Time

Total Test Period	168.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168.25	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	443	Degrees F	229	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.058	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	12.9	G/Kg
Emission Rate	16.0	G/Hour
Concentration	803	Mg/M3

Fuel

Total Fuel Used	252.9	KG With Moisture
Average Fuel Moisture	21.0%	Percent Dry Basis
Total Fuel Burned	209.0	KG Dry
Average Burn Rate During Stove Operation	1.2	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	32.9%
XAD-2	22.8%
Filter	44.3%
Total	100%

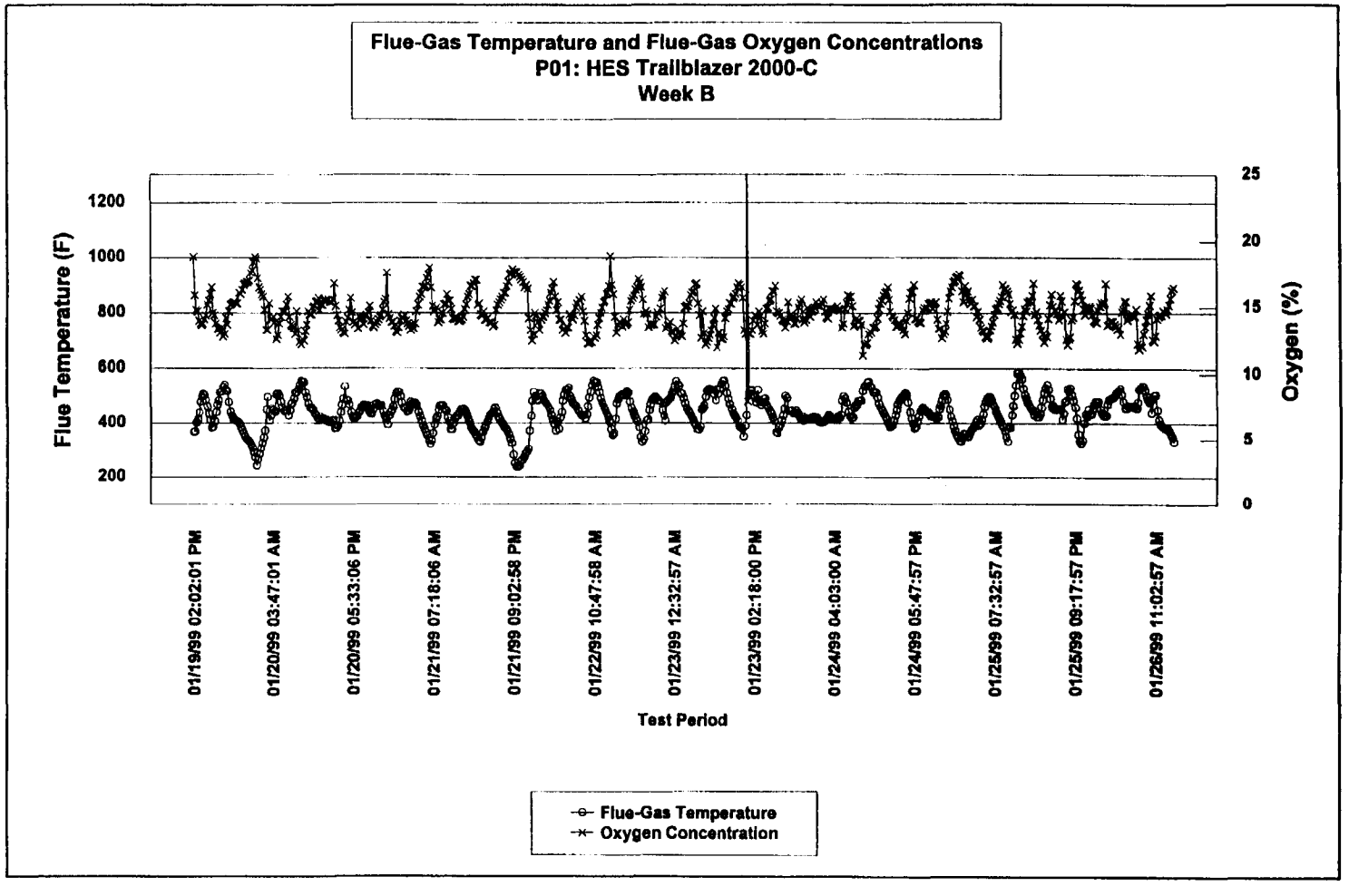
Average Flue-Gas Concentrations

Oxygen (AWES)	14.44	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Portland, Oregon USA
Test Run Number:	**Week C**
Test Period Start Date/Time:	01/26/99 02:47:01 PM
Test Period End Date/Time:	02/02/99 02:32:57 PM
Stove Model Tested:	**P01: HES Trailblazer 2000-C**
Stove Type:	Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	457	Degrees F	236	Degrees C
Test Facility Ambient Temperature	72	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.058	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	13.5	G/Kg
Emission Rate	16.9	G/Hour
Concentration	913	Mg/M3

Fuel

Total Fuel Used	258.9	KG With Moisture
Average Fuel Moisture	22.8%	Percent Dry Basis
Total Fuel Burned	210.9	KG Dry
Average Burn Rate During Stove Operation	1.3	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	52.5%
XAD-2	17.8%
Filter	29.7%
Total	100%

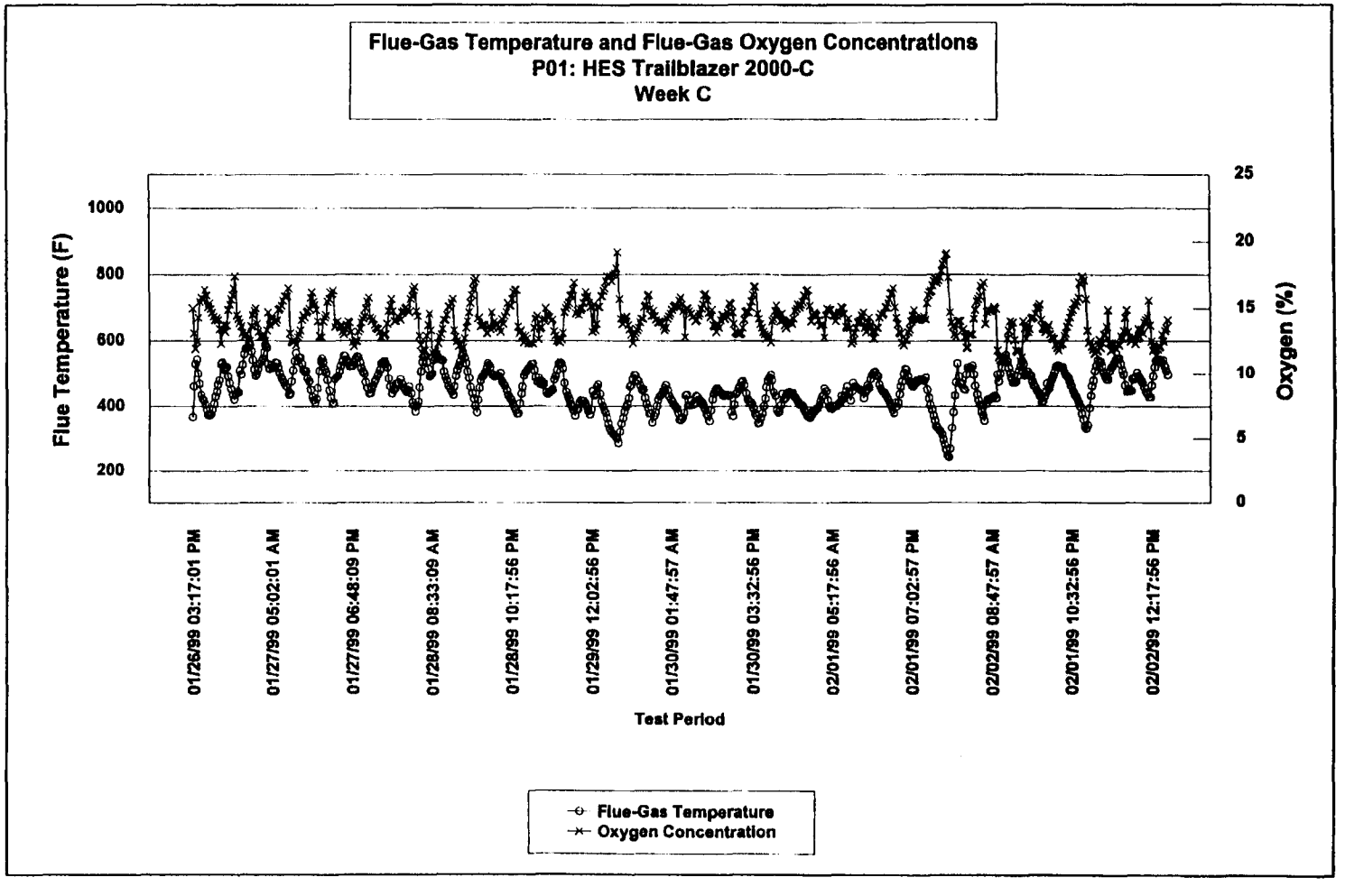
Average Flue-Gas Concentrations

Oxygen (AWES)	13.90	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Portland, Oregon USA
Test Run Number:	**Week A**
Test Period Start Date/Time:	01/13/99 02:02:45 PM
Test Period End Date/Time:	01/20/99 01:47:50 PM
Stove Model Tested:	**P02: Lopi Answer Series**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	92.25	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	54.9%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	311	Degrees F	155	Degrees C
Test Facility Ambient Temperature	76	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.124	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	19.4	G/Kg
Emission Rate	12.3	G/Hour
Concentration	553	Mg/M3

Fuel

Total Fuel Used	117.6	KG With Moisture
Average Fuel Moisture	101.2%	Percent Dry Basis
Total Fuel Burned	58.5	KG Dry
Average Burn Rate During Stove Operation	0.6	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	43.9%
XAD-2	16.4%
Filter	39.7%
Total	100%

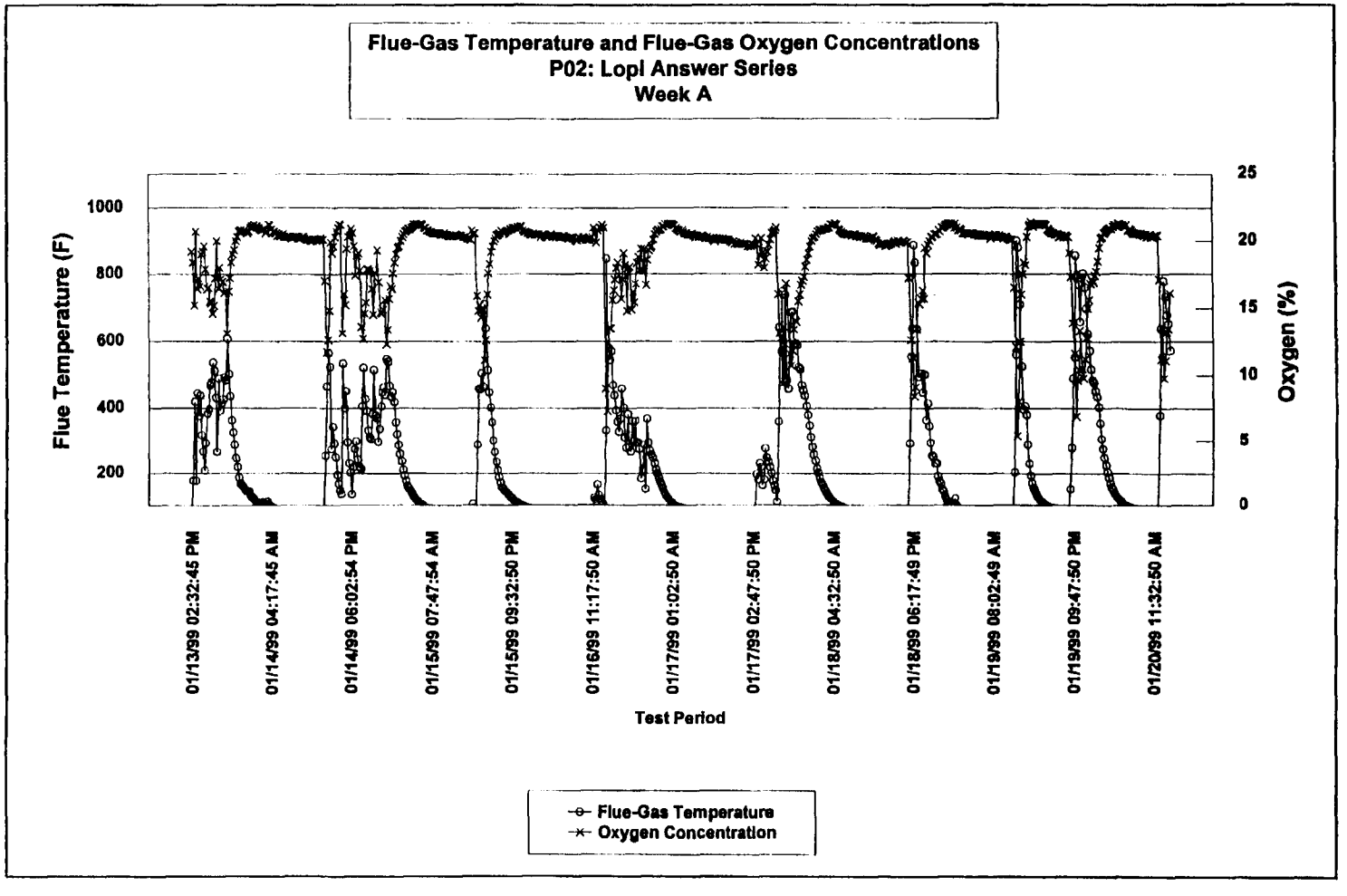
Average Flue-Gas Concentrations

Oxygen (AWES)	18.13	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/20/99 02:48:21 PM
Test Period End Date/Time: 01/27/99 02:32:52 PM
Stove Model Tested: **P02: Lopi Answer Series**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	166.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	114.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	68.8%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	339	Degrees F	170	Degrees C
Test Facilty Ambient Temperature	78	Degrees F	25	Degrees C

ESS Settings

ESS Sampling Rate	1.124	L/Minute
Sample Cycle Duration	10.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	17.5	G/Kg
Emission Rate	13.3	G/Hour
Concentration	814	Mg/M3

Fuel

Total Fuel Used	103.3	KG With Moisture
Average Fuel Moisture	16.5%	Percent Dry Basis
Total Fuel Burned	87.2	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	32.4%
XAD-2	27.7%
Filter	39.9%
Total	100%

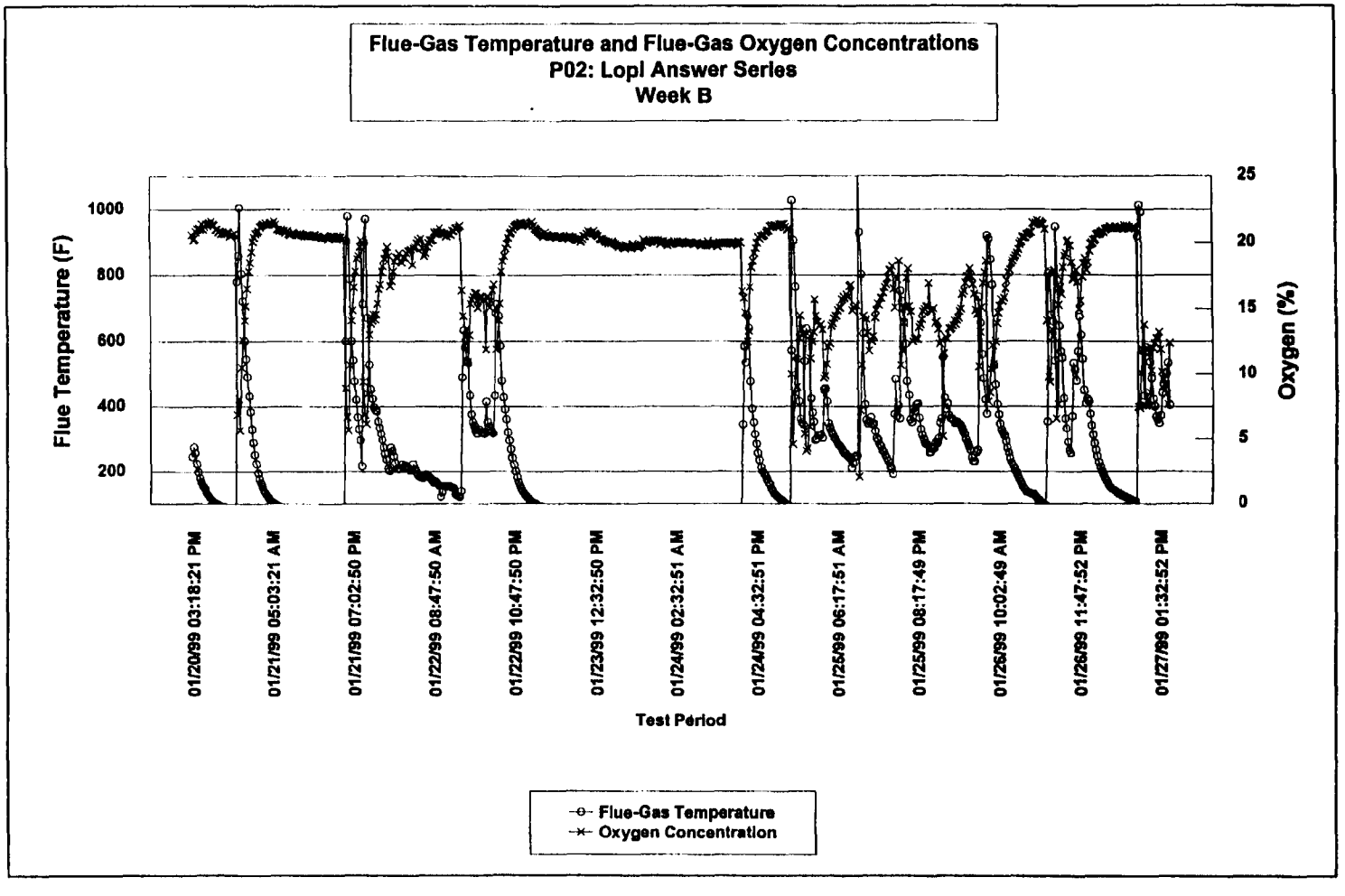
Average Flue-Gas Concentrations

Oxygen (AWES)	16.50	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 01/27/99 03:47:00 PM
Test Period End Date/Time: 02/03/99 03:32:51 PM
Stove Model Tested: **P02: Lopi Answer Series**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	109.5	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	65.2%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	324	Degrees F	162	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.124	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	14.3	G/Kg
Emission Rate	10.3	G/Hour
Concentration	577	Mg/M3

Fuel

Total Fuel Used	99.9	KG With Moisture
Average Fuel Moisture	26.7%	Percent Dry Basis
Total Fuel Burned	78.9	KG Dry
Average Burn Rate During Stove Operation	0.7	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	47.9%
XAD-2	16.9%
Filter	35.2%
Total	100%

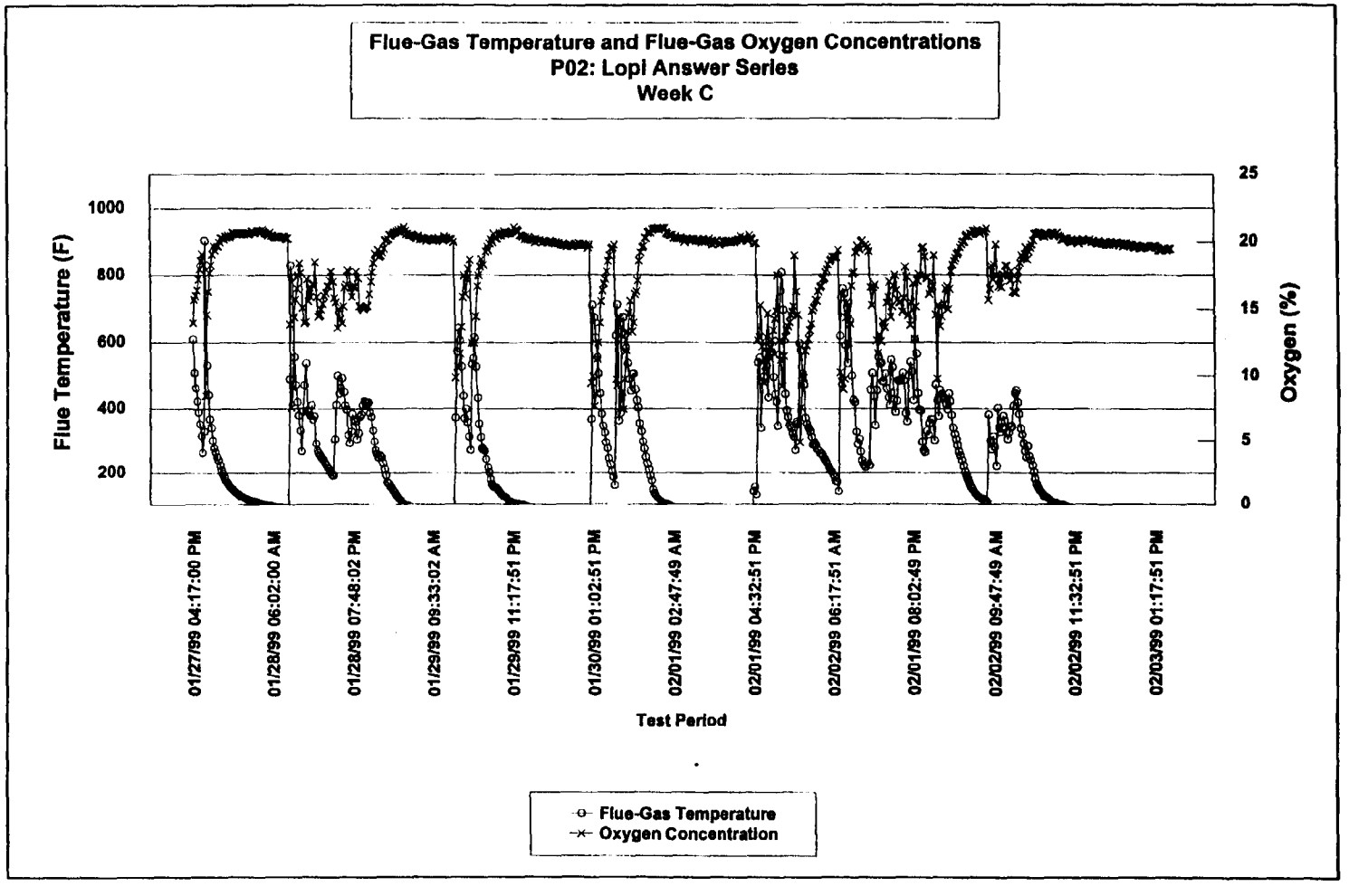
Average Flue-Gas Concentrations

Oxygen (AWES)	17.00	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/12/99 09:17:01 AM
Test Period End Date/Time: 01/19/99 09:48:01 AM
Stove Model Tested: P03: Lopi 380-96 Non-Catalytic
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	34	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	20.1%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	356	Degrees F	180	Degrees C
Test Facility Ambient Temperature	80	Degrees F	26	Degrees C

ESS Settings

ESS Sampling Rate	1.069	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.9	G/Kg
Emission Rate	4.7	G/Hour
Concentration	192	Mg/M3

Fuel

Total Fuel Used	32.5	KG With Moisture
Average Fuel Moisture	18.3%	Percent Dry Basis
Total Fuel Burned	27.5	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	87.8%
XAD-2	21.1%
Filter	-9.0%
Total	**100%**

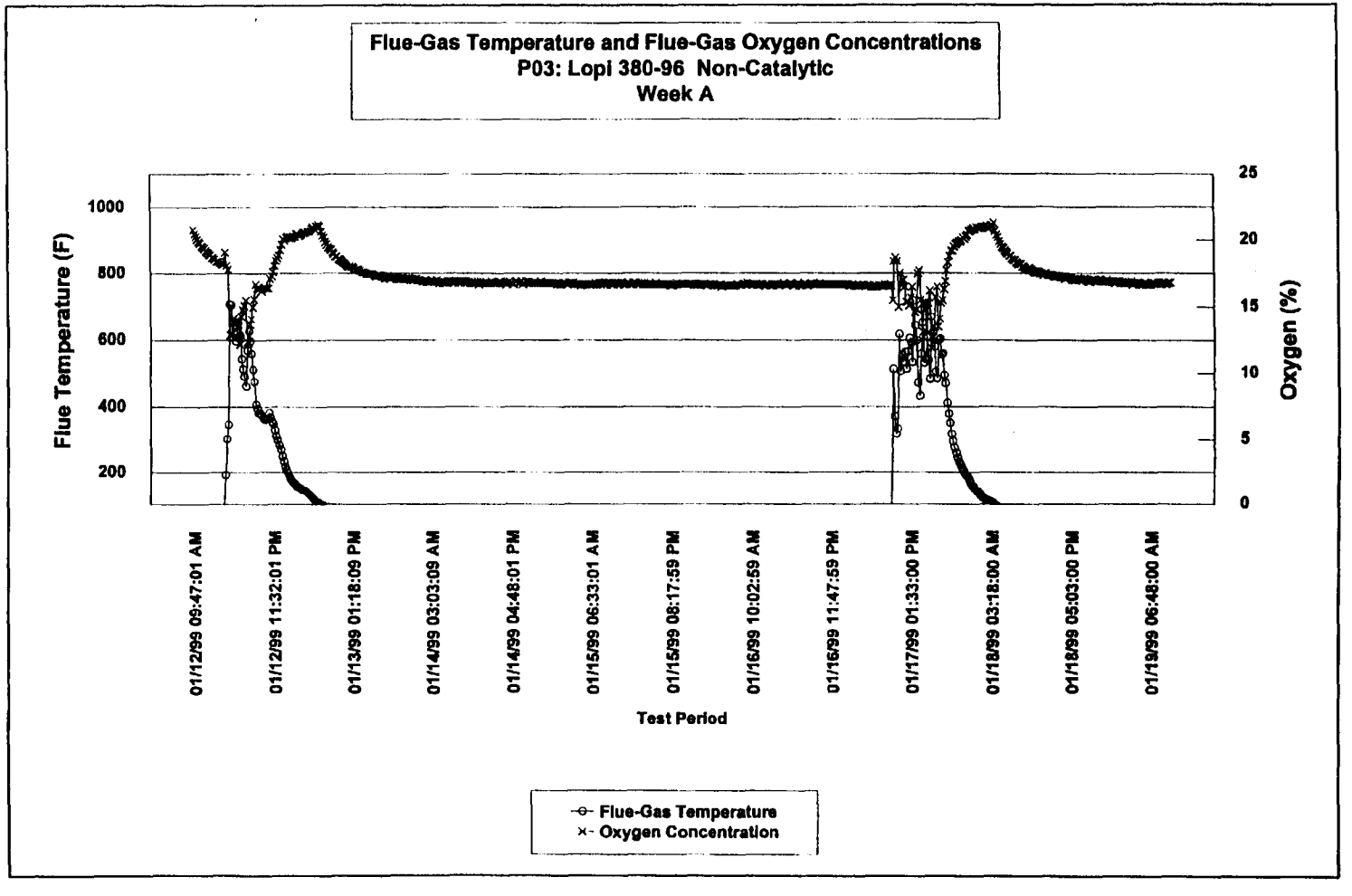
Average Flue-Gas Concentrations

Oxygen (AWES)	17.65	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Portland, Oregon USA
Test Run Number:	**Week B**
Test Period Start Date/Time:	01/19/99 11:17:10 AM
Test Period End Date/Time:	01/26/99 11:48:00 AM
Stove Model Tested:	**P03: Lopi 380-96 Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	166.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	59.25	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	35.1%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	370	Degrees F	188	Degrees C
Test Facility Ambient Temperature	74	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.069	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	7.1	G/Kg
Emission Rate	7.4	G/Hour
Concentration	215	Mg/M3

Fuel

Total Fuel Used	72.8	KG With Moisture
Average Fuel Moisture	18.3%	Percent Dry Basis
Total Fuel Burned	61.5	KG Dry
Average Burn Rate During Stove Operation	1.0	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	74.2%
XAD-2	13.4%
Filter	12.4%
Total	100%

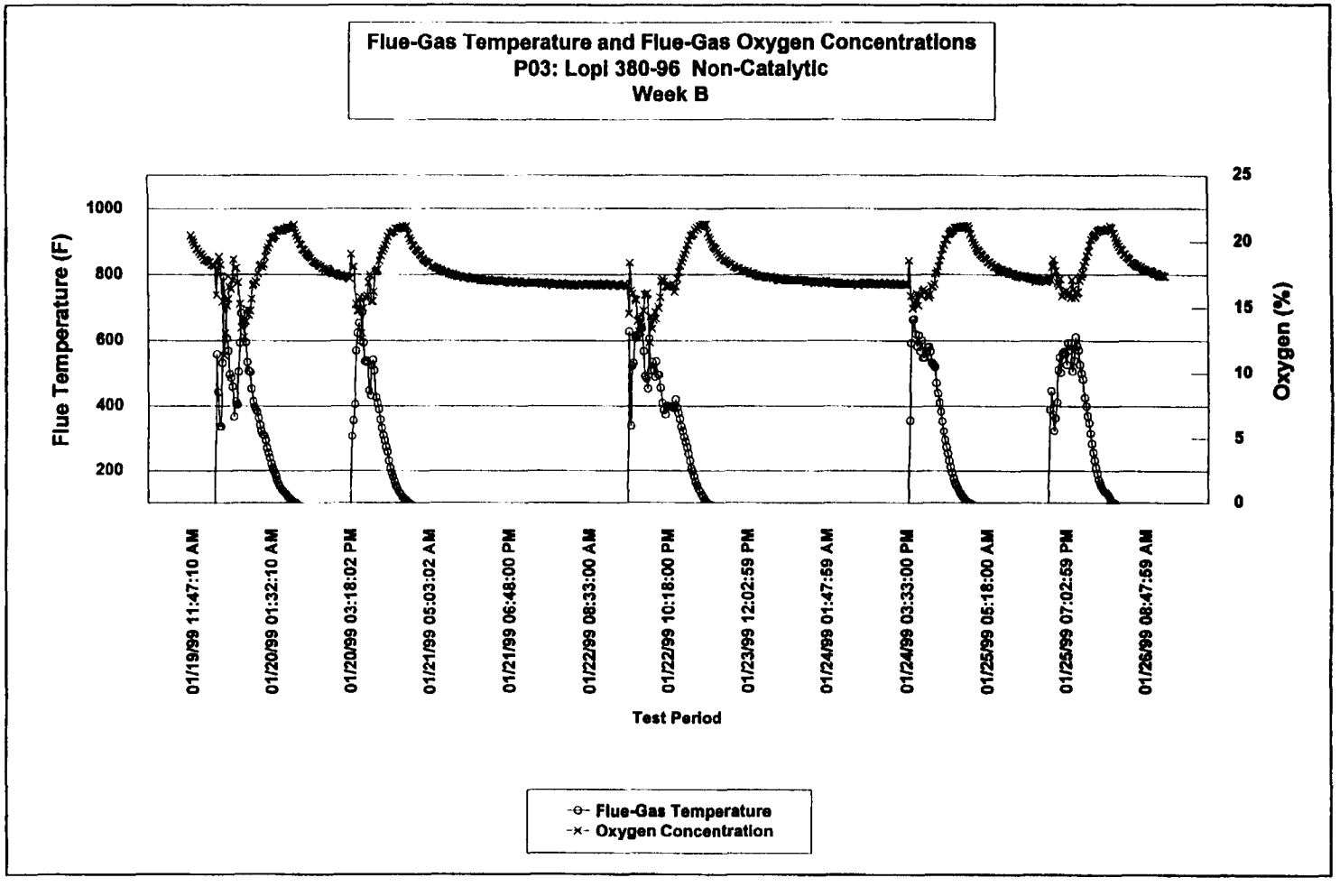
Average Flue-Gas Concentrations

Oxygen (AWES)	17.89	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: P03-b3.123 Printed: 07/26/99 at 03:55:38 PM

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location:	Portland, Oregon USA
Test Run Number:	**Week C**
Test Period Start Date/Time:	01/26/99 12:32:01 PM
Test Period End Date/Time:	02/02/99 12:17:58 PM
Stove Model Tested:	**P03: Lopi 380-96 Non-Catalytic**
Stove Type:	New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	68.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	40.9%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	367	Degrees F	186	Degrees C
Test Facility Ambient Temperature	74	Degrees F	23	Degrees C

ESS Settings

ESS Sampling Rate	1.069	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.8	G/Kg
Emission Rate	5.8	G/Hour
Concentration	188	Mg/M3

Fuel

Total Fuel Used	85.4	KG With Moisture
Average Fuel Moisture	23.3%	Percent Dry Basis
Total Fuel Burned	69.2	KG Dry
Average Burn Rate During Stove Operation	1.0	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	77.8%
XAD-2	21.0%
Filter	1.2%
Total	100%

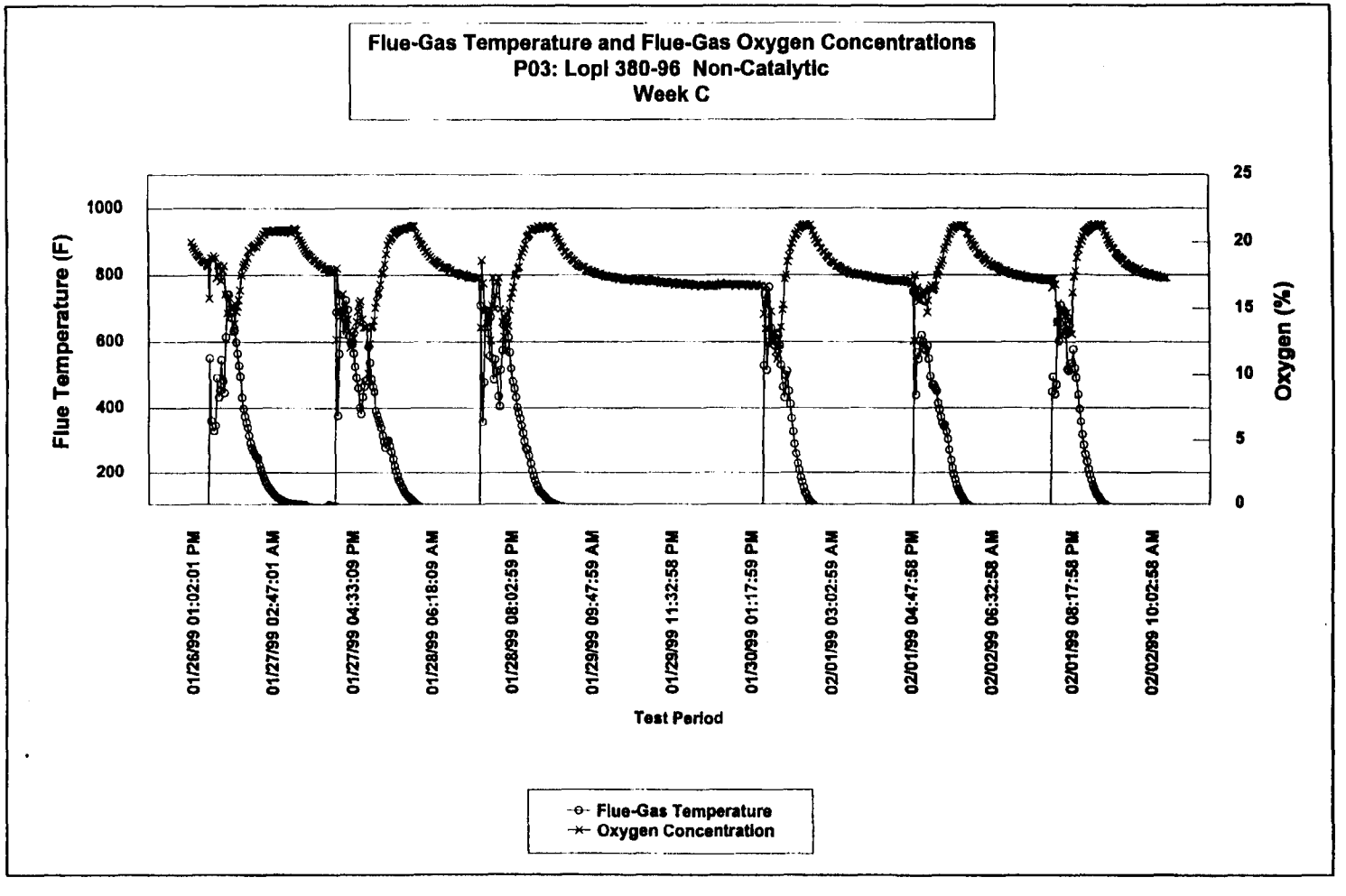
Average Flue-Gas Concentrations

Oxygen (AWES)	17.78	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/13/99 11:02:01 AM
Test Period End Date/Time: 01/20/99 11:02:58 AM
Stove Model Tested: **P04: Lopi Flushbay-96 Catalytic**
Stove Type: Catalytic

Time

Total Test Period	168.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	95.25	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	56.6%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	285	Degrees F	141	Degrees C
Test Facility Ambient Temperature	77	Degrees F	25	Degrees C

ESS Settings

ESS Sampling Rate	1.145	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.4	G/Kg
Emission Rate	4.0	G/Hour
Concentration	206	Mg/M3

Fuel

Total Fuel Used	83.6	KG With Moisture
Average Fuel Moisture	18.3%	Percent Dry Basis
Total Fuel Burned	70.7	KG Dry
Average Burn Rate During Stove Operation	0.7	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	54.2%
XAD-2	19.2%
Filter	26.6%
Total	100%

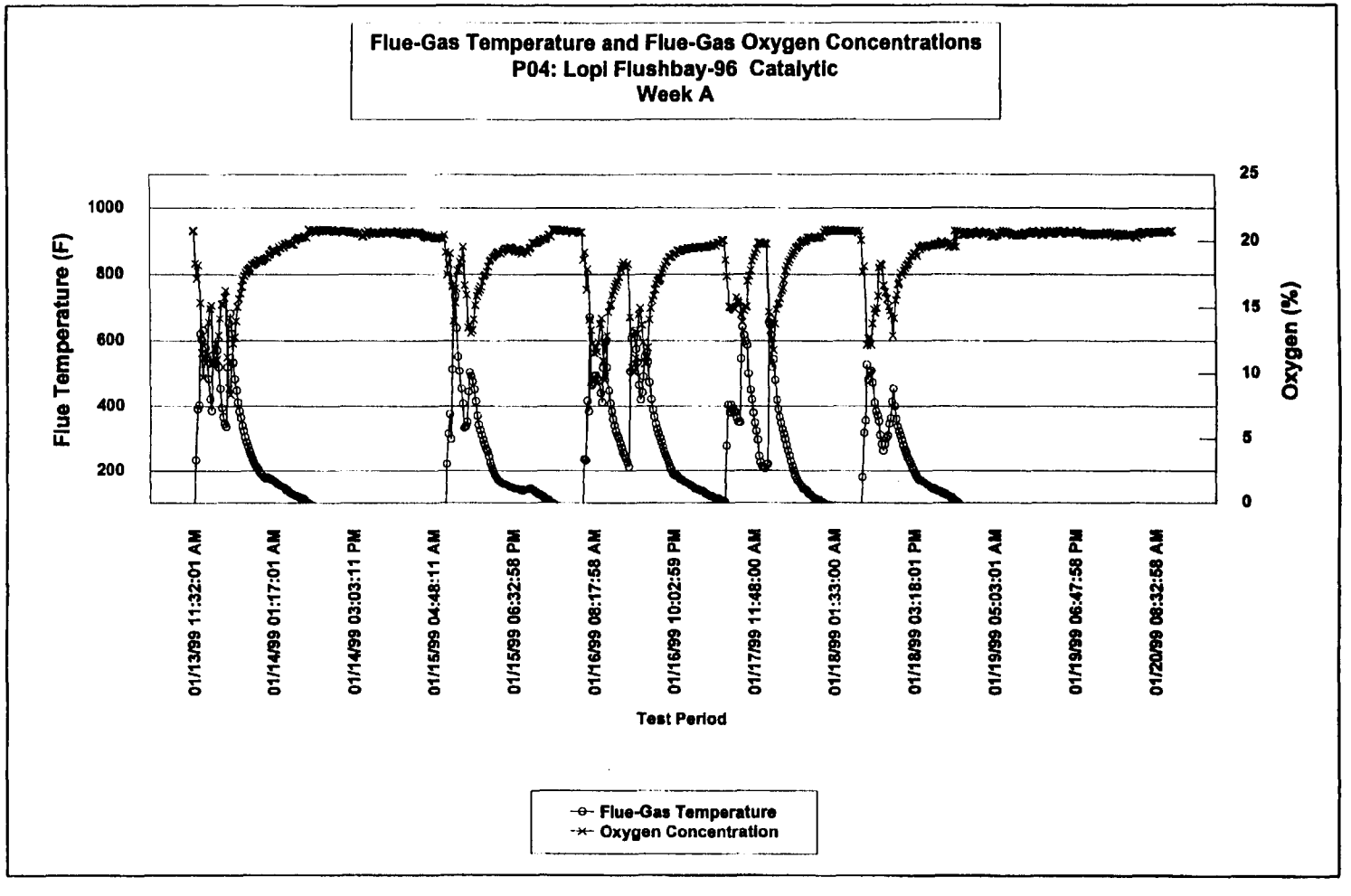
Average Flue-Gas Concentrations

Oxygen (AWES)	17.16	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/20/99 01:17:00 PM
Test Period End Date/Time: 01/27/99 01:02:58 PM
Stove Model Tested: **P04: Lopi Flushbay-96 Catalytic**
Stove Type: Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	117	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	69.6%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	327	Degrees F	164	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.145	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	5.0	G/Kg
Emission Rate	4.7	G/Hour
Concentration	213	Mg/M3

Fuel

Total Fuel Used	130.0	KG With Moisture
Average Fuel Moisture	18.5%	Percent Dry Basis
Total Fuel Burned	109.7	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	51.7%
XAD-2	17.2%
Filter	31.1%
Total	100%

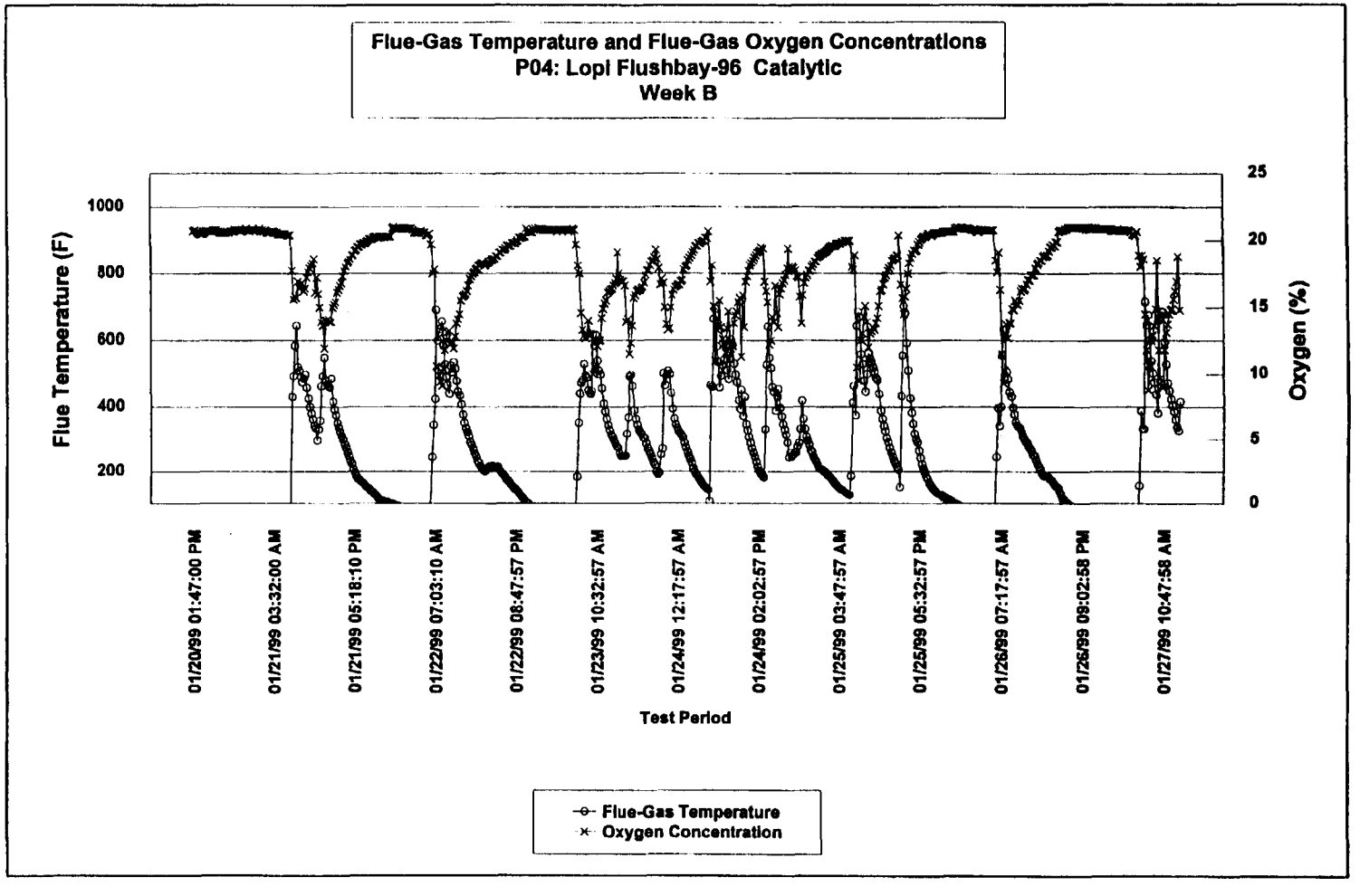
Average Flue-Gas Concentrations

Oxygen (AWES)	16.70	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 01/27/99 02:32:00 PM
Test Period End Date/Time: 02/03/99 02:17:58 PM
Stove Model Tested: **P04: Lopi Flushbay-96 Catalytic**
Stove Type: Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	116.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	69.5%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	279	Degrees F	137	Degrees C
Test Facility Ambient Temperature	75	Degrees F	24	Degrees C

ESS Settings

ESS Sampling Rate	1.145	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	6.8	G/Kg
Emission Rate	3.8	G/Hour
Concentration	188	Mg/M3

Fuel

Total Fuel Used	81.1	KG With Moisture
Average Fuel Moisture	18.4%	Percent Dry Basis
Total Fuel Burned	77.0	KG Dry
Average Burn Rate During Stove Operation	0.7	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	63.1%
XAD-2	12.9%
Filter	23.9%
Total	100%

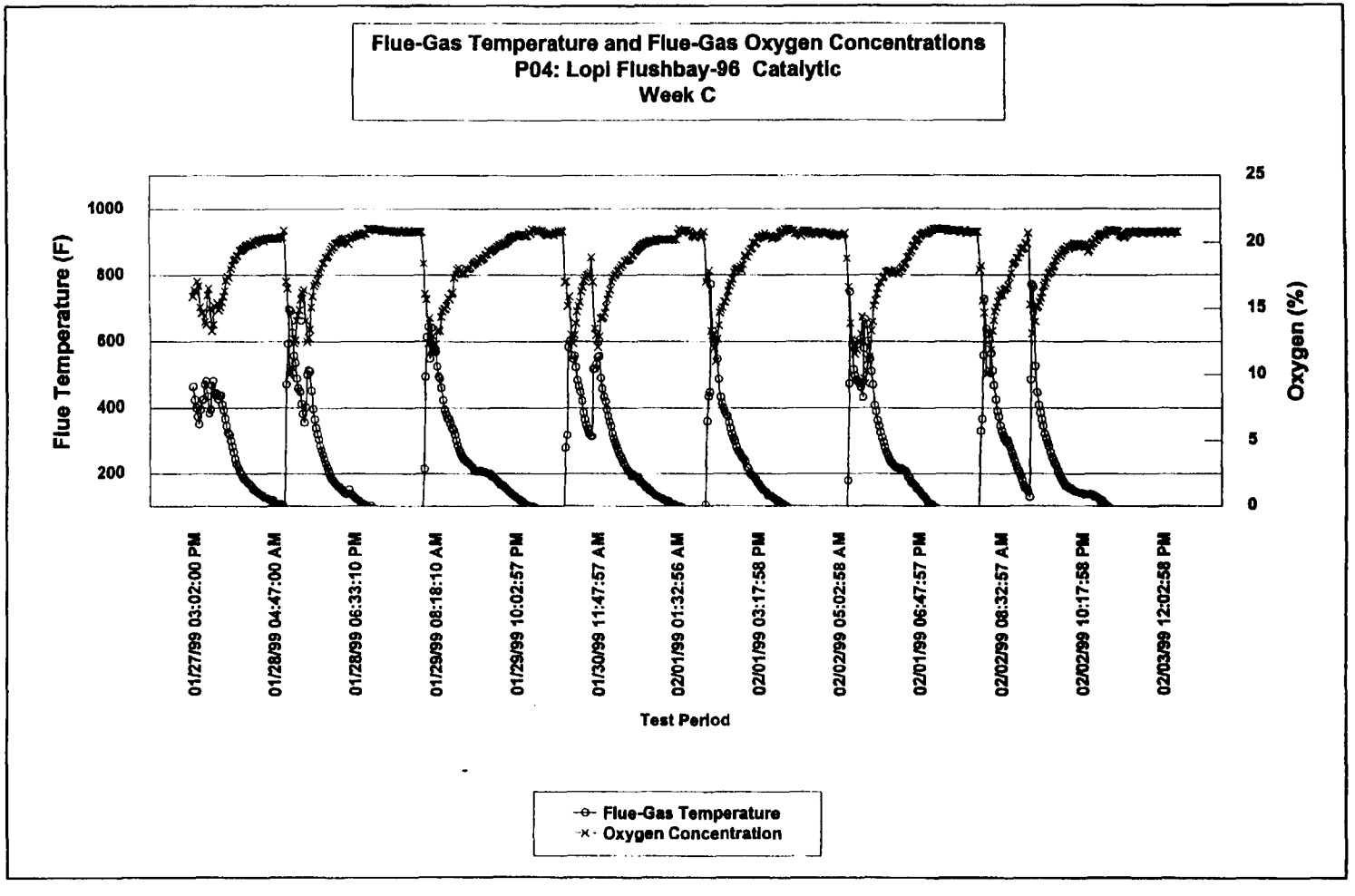
Average Flue-Gas Concentrations

Oxygen (AWES)	17.62	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: P04-c3.123 Printed: 07/26/99 at 03:57:01 PM

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/14/99 09:33:02 AM
Test Period End Date/Time: 01/21/99 08:32:58 AM
Stove Model Tested: P05: Lopi Flex-95 Catalytic
Stove Type: Catalytic

Time

Total Test Period	167.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	20	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	12.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	334	Degrees F	168	Degrees C
Test Facility Ambient Temperature	73	Degrees F	23	Degrees C

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	7.0	G/Kg
Emission Rate	14.3	G/Hour
Concentration	169	Mg/M3

Fuel

Total Fuel Used	48.6	KG With Moisture
Average Fuel Moisture	19.3%	Percent Dry Basis
Total Fuel Burned	40.7	KG Dry
Average Burn Rate During Stove Operation	2.0	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	133.8%
XAD-2	21.4%
Filter	-55.2%
Total	100%

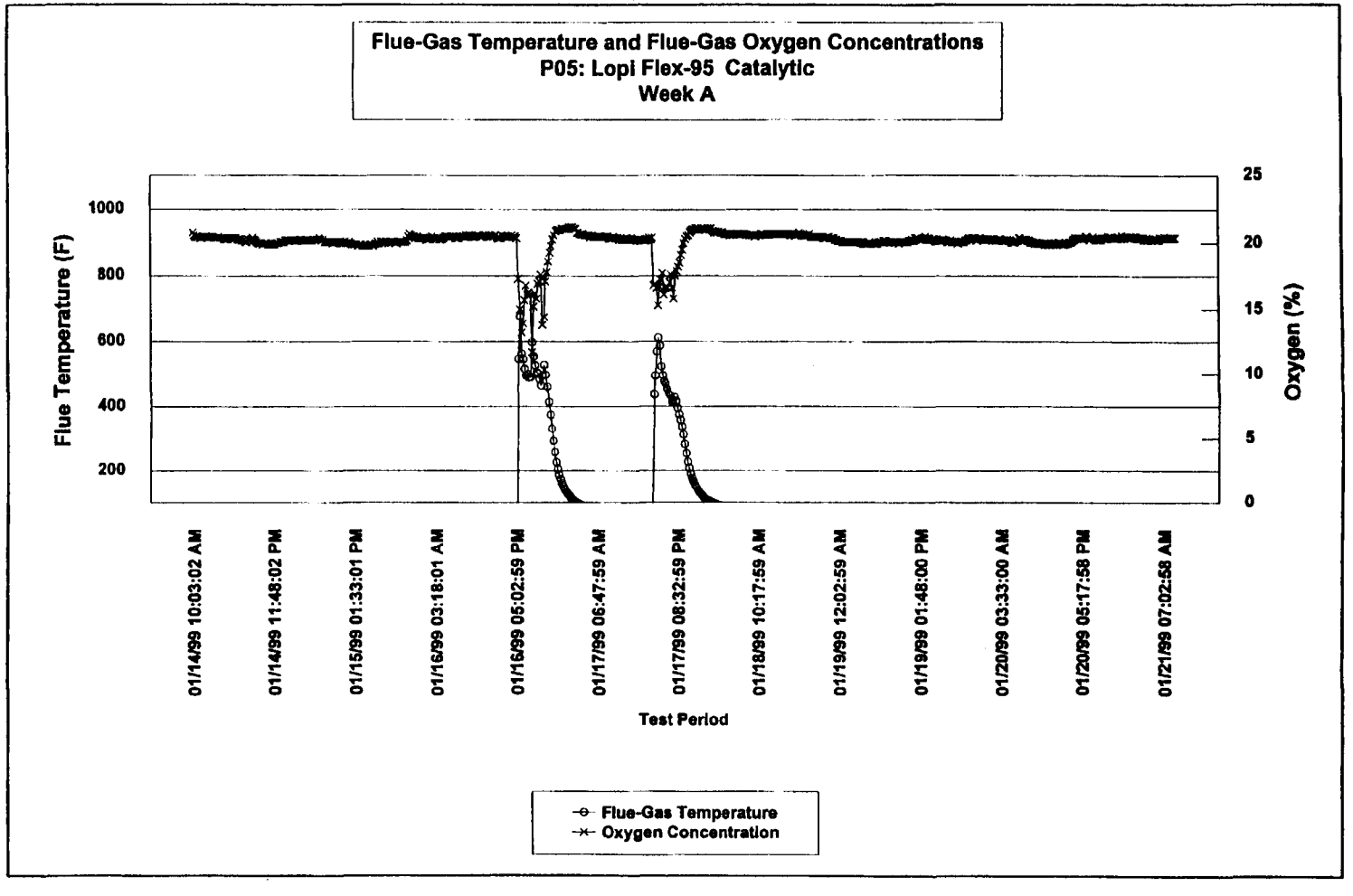
Average Flue-Gas Concentrations

Oxygen (AWES)	18.50	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: P05-a3.123 Printed: 07/26/99 at 03:57:22 PM

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/22/99 03:32:02 PM
Test Period End Date/Time: 01/29/99 03:17:54 PM
Stove Model Tested: P05: Lopi Flex-95 Catalytic
Stove Type: Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie. Flue-Gas Temperature Over 100 Degrees F)	33.5	Hours
Stove Operating Time During Test Period (ie. Flue-Gas Temperature Over 100 Degrees F)	19.9%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	403	Degrees F	206	Degrees C
Test Facility Ambient Temperature	72	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	6.4	G/Kg
Emission Rate	5.3	G/Hour
Concentration	180	Mg/M3

Fuel

Total Fuel Used	32.7	KG With Moisture
Average Fuel Moisture	19.0%	Percent Dry Basis
Total Fuel Burned	27.5	KG Dry
Average Burn Rate During Stove Operation	0.8	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	103.6%
XAD-2	7.8%
Filter	-11.4%
Total	100%

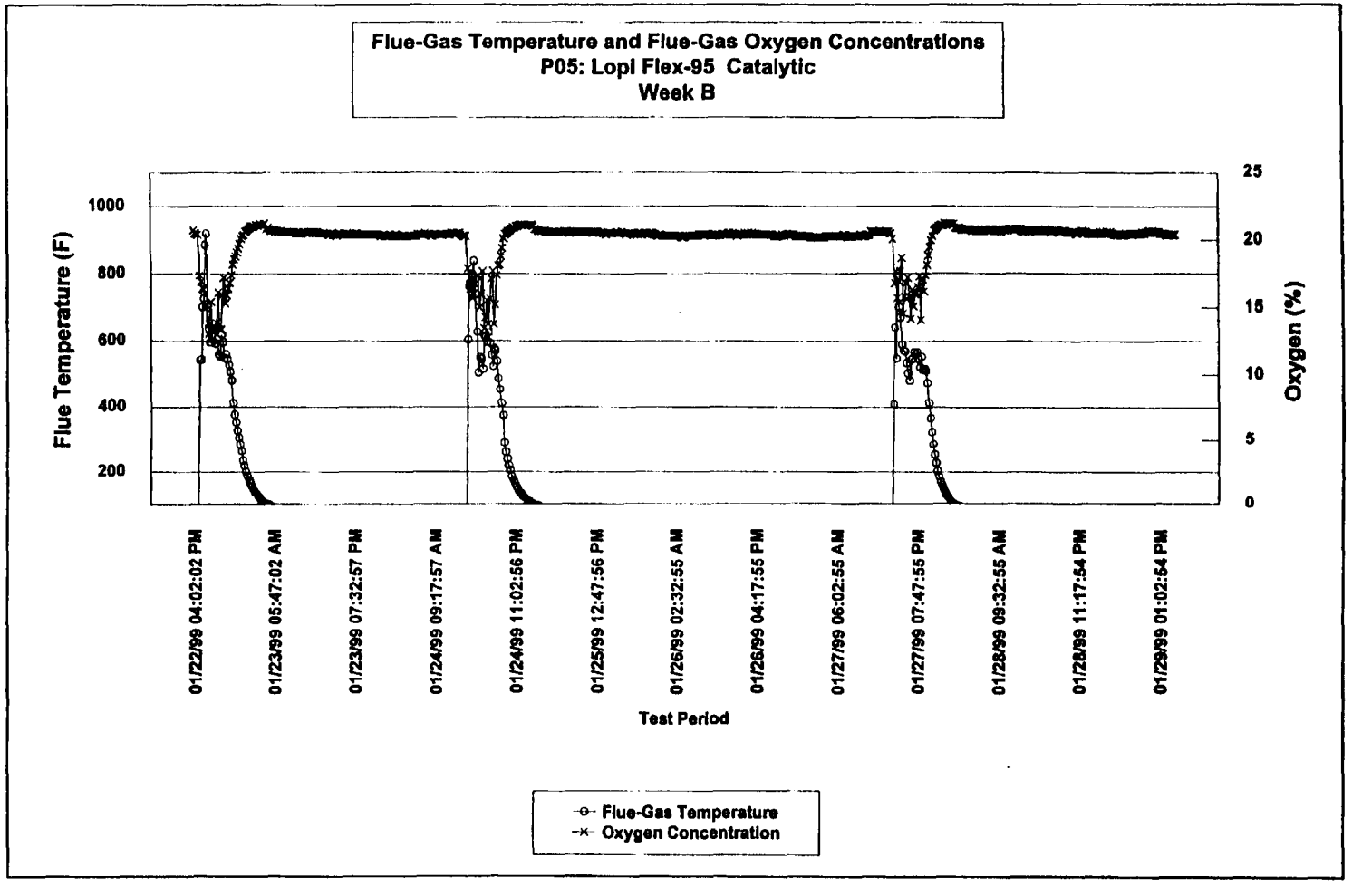
Average Flue-Gas Concentrations

Oxygen (AWES)	18.12	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: P05-b3.123 Printed: 07/26/99 at 03:57:42 PM

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 01/30/99 11:02:01 AM
Test Period End Date/Time: 02/06/99 10:48:00 AM
Stove Model Tested: **P05: Lopi Flex-95 Catalytic**
Stove Type: Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	33.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	20.1%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	372	Degrees F	189	Degrees C
Test Facility Ambient Temperature	70	Degrees F	21	Degrees C

ESS Settings

ESS Sampling Rate	1.038	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	4.4	G/Kg
Emission Rate	4.2	G/Hour
Concentration	114	Mg/M3

Fuel

Total Fuel Used	38.1	KG With Moisture
Average Fuel Moisture	19.0%	Percent Dry Basis
Total Fuel Burned	32.0	KG Dry
Average Burn Rate During Stove Operation	0.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	60.0%
XAD-2	20.0%
Filter	20.0%
Total	100%

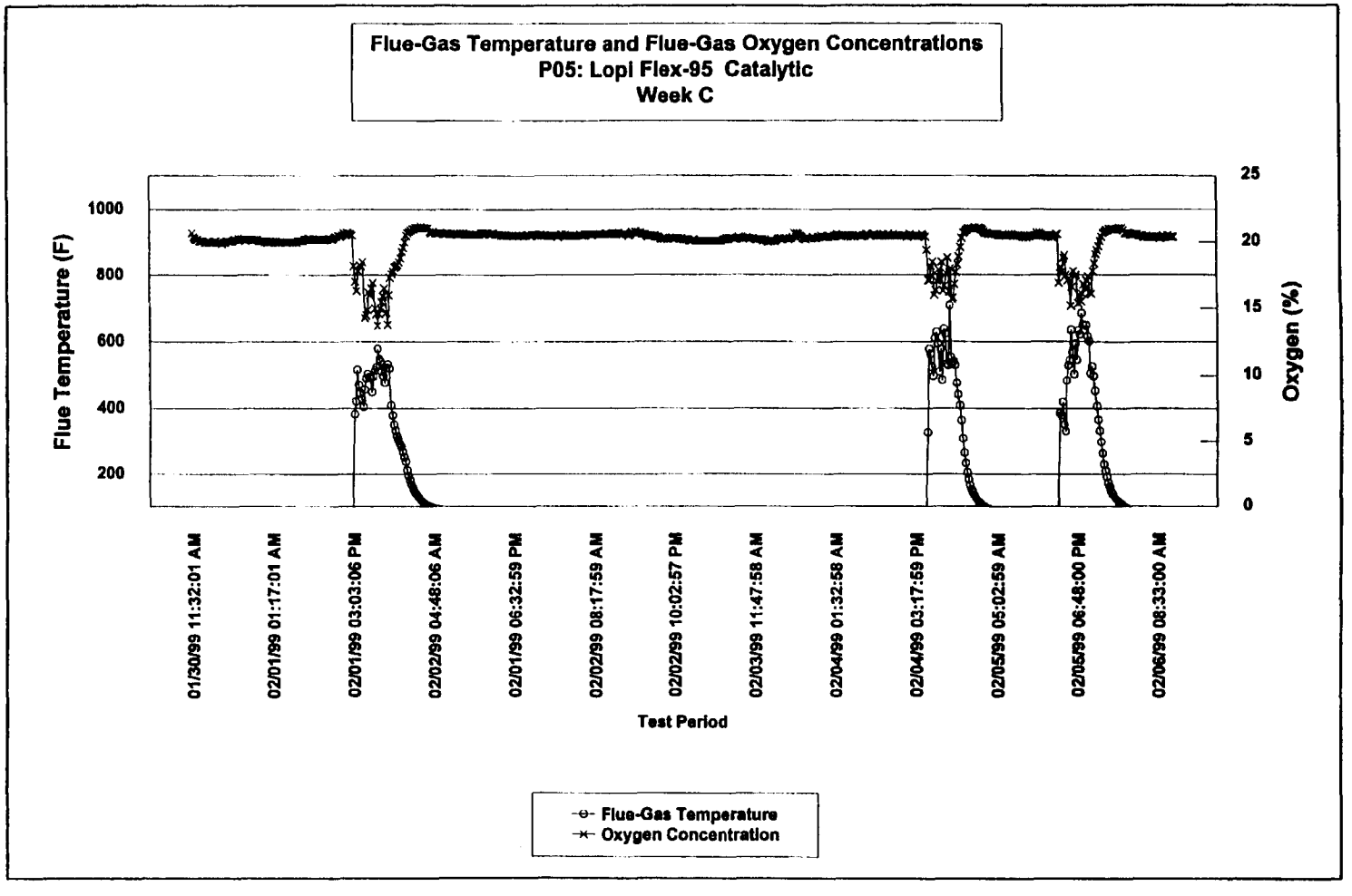
Average Flue-Gas Concentrations

Oxygen (AWES)	18.32	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/23/99 10:47:01 AM
Test Period End Date/Time: 01/30/99 10:32:59 AM
Stove Model Tested: **P06: Pacific Energy Super-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	139	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	82.7%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	475	Degrees F	246	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.042	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	9.1	G/Kg
Emission Rate	13.5	G/Hour
Concentration	508	Mg/M3

Fuel

Total Fuel Used	412.5	KG With Moisture
Average Fuel Moisture	100.8%	Percent Dry Basis
Total Fuel Burned	205.4	KG Dry
Average Burn Rate During Stove Operation	1.5	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	39.6%
XAD-2	11.7%
Filter	48.8%
Total	100%

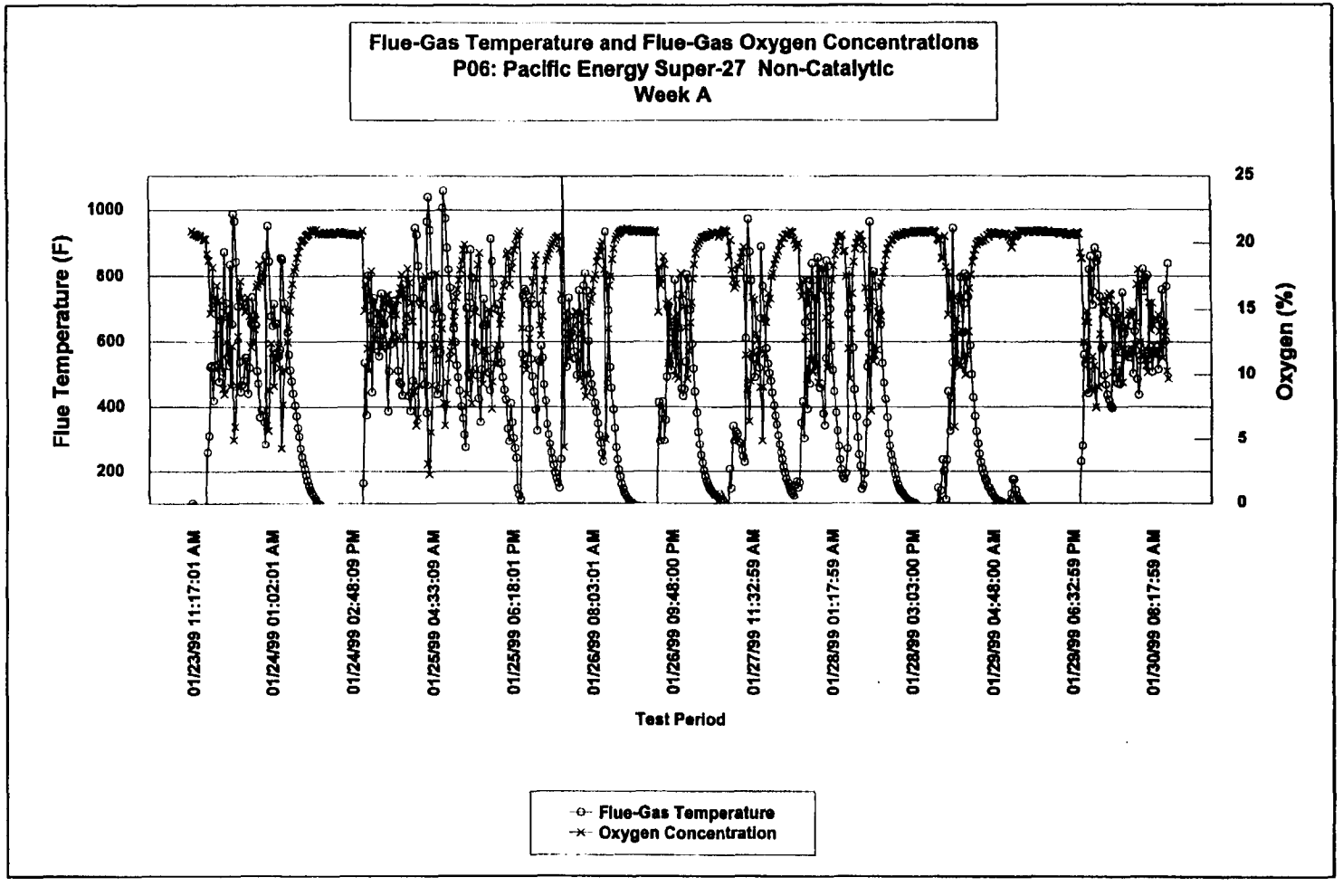
Average Flue-Gas Concentrations

Oxygen (AWES)	15.52	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/30/99 04:17:00 PM
Test Period End Date/Time: 02/06/99 04:02:57 PM
Stove Model Tested: **P06: Pacific Energy Super-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	142	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	84.5%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	464	Degrees F	240	Degrees C
Test Facility Ambient Temperature	69	Degrees F	21	Degrees C

ESS Settings

ESS Sampling Rate	1.042	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	14.7	G/Kg
Emission Rate	18.9	G/Hour
Concentration	813	Mg/M3

Fuel

Total Fuel Used	373.1	KG With Moisture
Average Fuel Moisture	105.0%	Percent Dry Basis
Total Fuel Burned	182.0	KG Dry
Average Burn Rate During Stove Operation	1.3	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	29.5%
XAD-2	36.9%
Filter	33.5%
Total	100%

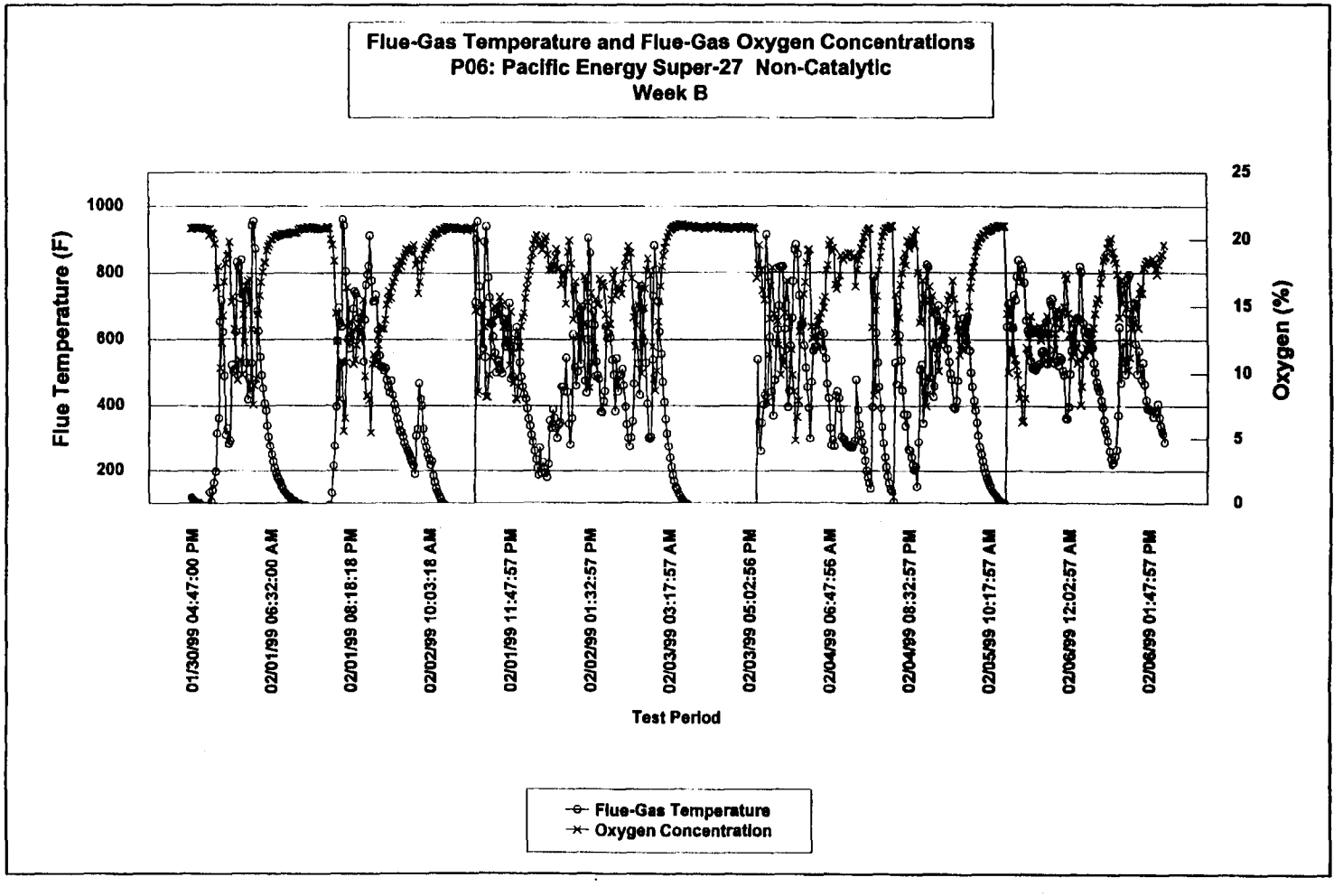
Average Flue-Gas Concentrations

Oxygen (AWES)	15.55	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



File: P06-b3.123 Printed: 07/26/99 at 03:59:00 PM

AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 02/07/99 12:47:00 PM
Test Period End Date/Time: 02/14/99 11:17:58 AM
Stove Model Tested: **P06: Pacific Energy Super-27 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	166.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	152.75	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	91.6%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	485	Degrees F	252	Degrees C
Test Facility Ambient Temperature	72	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.042	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	8.7	G/Kg
Emission Rate	10.9	G/Hour
Concentration	616	Mg/M3

Fuel

Total Fuel Used	351.7	KG With Moisture
Average Fuel Moisture	101.2%	Percent Dry Basis
Total Fuel Burned	174.9	KG Dry
Average Burn Rate During Stove Operation	1.1	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	39.9%
XAD-2	13.9%
Filter	46.2%
Total	100%

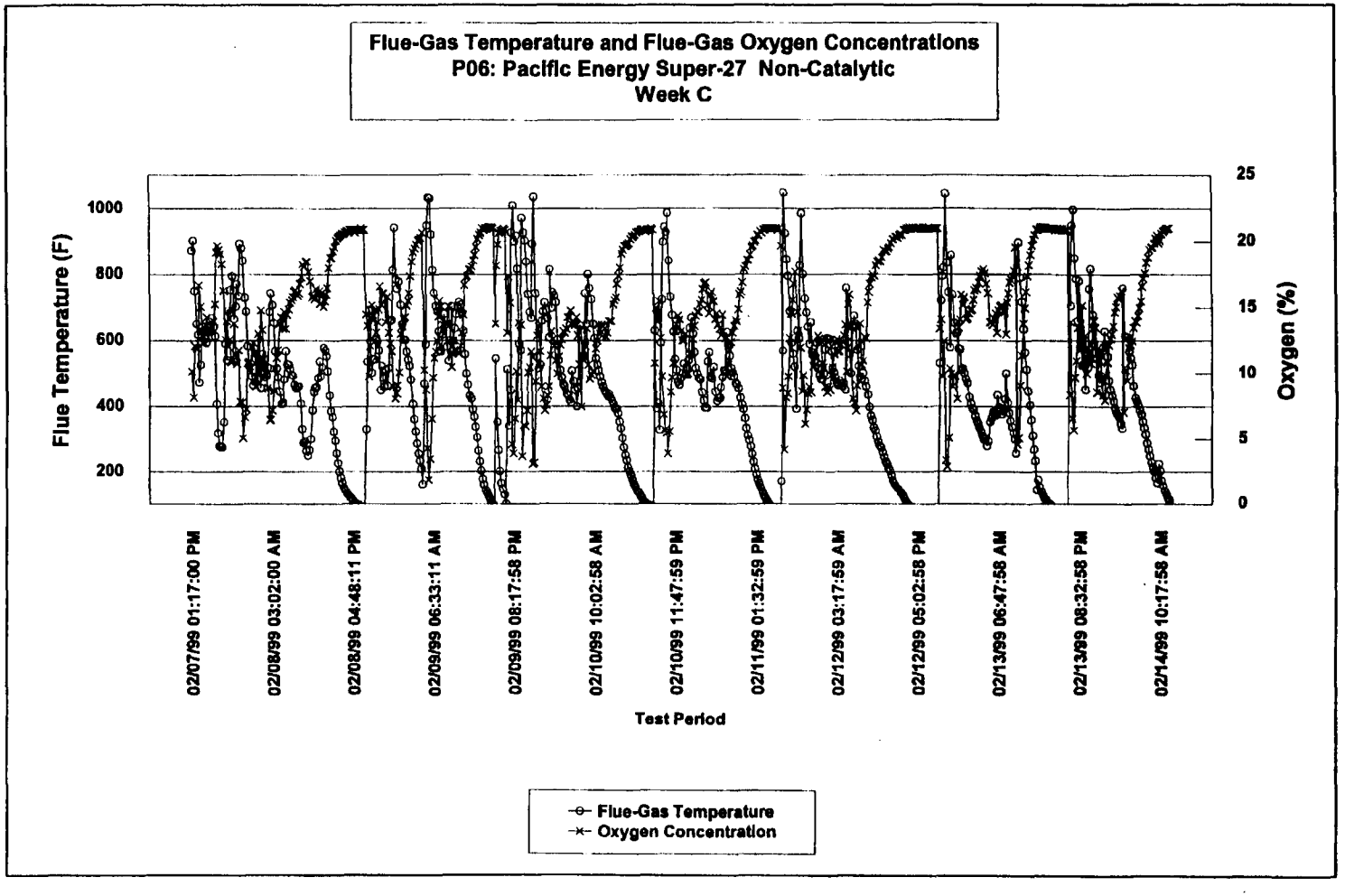
Average Flue-Gas Concentrations

Oxygen (AWES)	14.07	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/20/99 09:17:00 AM
Test Period End Date/Time: 01/27/99 09:02:58 AM
Stove Model Tested: **P07: Lopi 520/96 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	348	Degrees F	176	Degrees C
Test Facility Ambient Temperature	69	Degrees F	21	Degrees C

ESS Settings

ESS Sampling Rate	1.109	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	18.4	G/Kg
Emission Rate	26.6	G/Hour
Concentration	1097	Mg/M3

Fuel

Total Fuel Used	487.2	KG With Moisture
Average Fuel Moisture	101.2%	Percent Dry Basis
Total Fuel Burned	242.2	KG Dry
Average Burn Rate During Stove Operation	1.4	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	20.4%
XAD-2	20.0%
Filter	59.6%
Total	100%

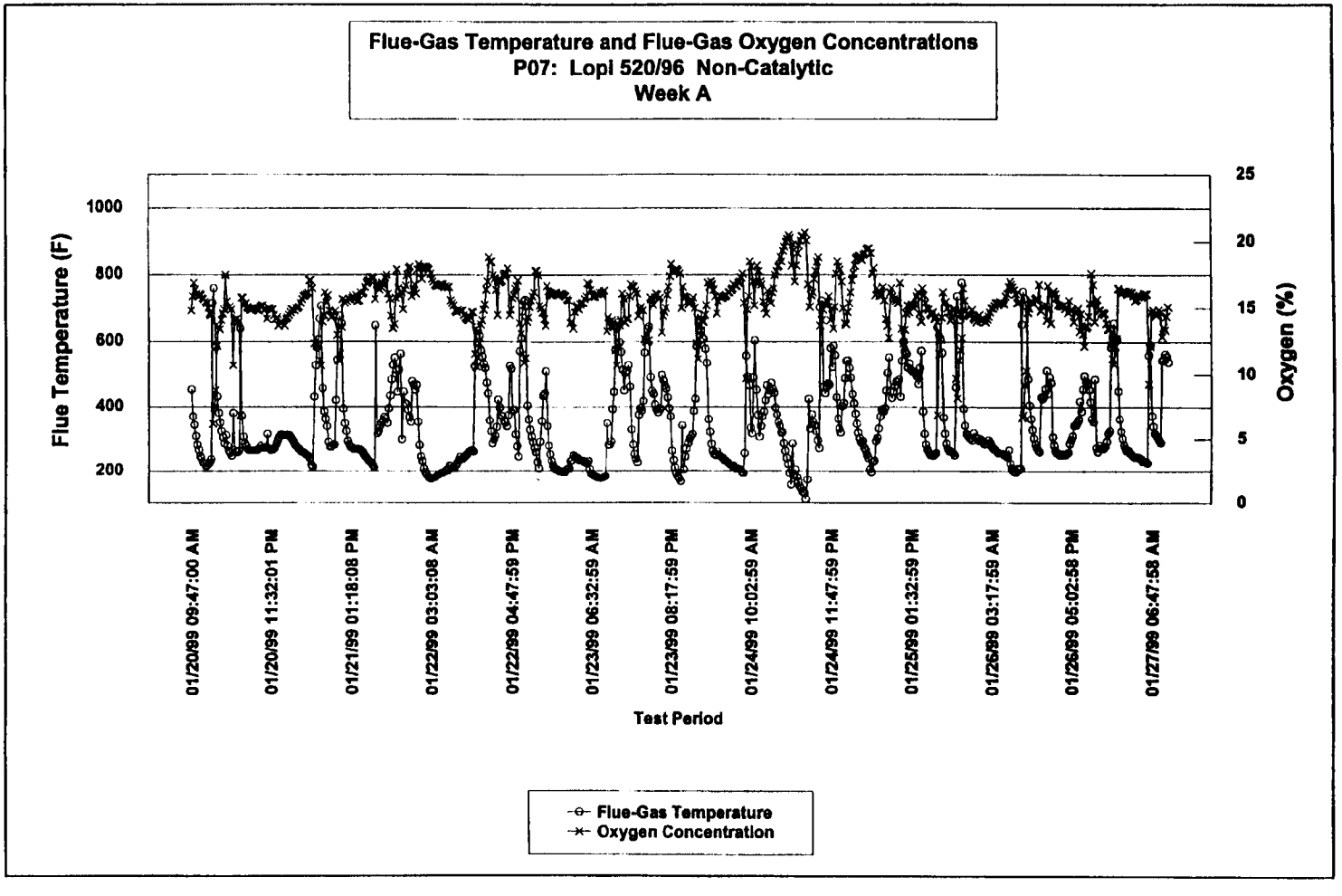
Average Flue-Gas Concentrations

Oxygen (AWES)	15.14	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/27/99 11:32:01 AM
Test Period End Date/Time: 02/03/99 11:17:59 AM
Stove Model Tested: **P07: Lopi 520/96 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	327	Degrees F	164	Degrees C
Test Facility Ambient Temperature	69	Degrees F	21	Degrees C

ESS Settings

ESS Sampling Rate	1.109	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	18.5	G/Kg
Emission Rate	27.7	G/Hour
Concentration	1099	Mg/M3

Fuel

Total Fuel Used	517.4	KG With Moisture
Average Fuel Moisture	105.0%	Percent Dry Basis
Total Fuel Burned	252.4	KG Dry
Average Burn Rate During Stove Operation	1.5	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	24.9%
XAD-2	19.1%
Filter	56.0%
Total	100%

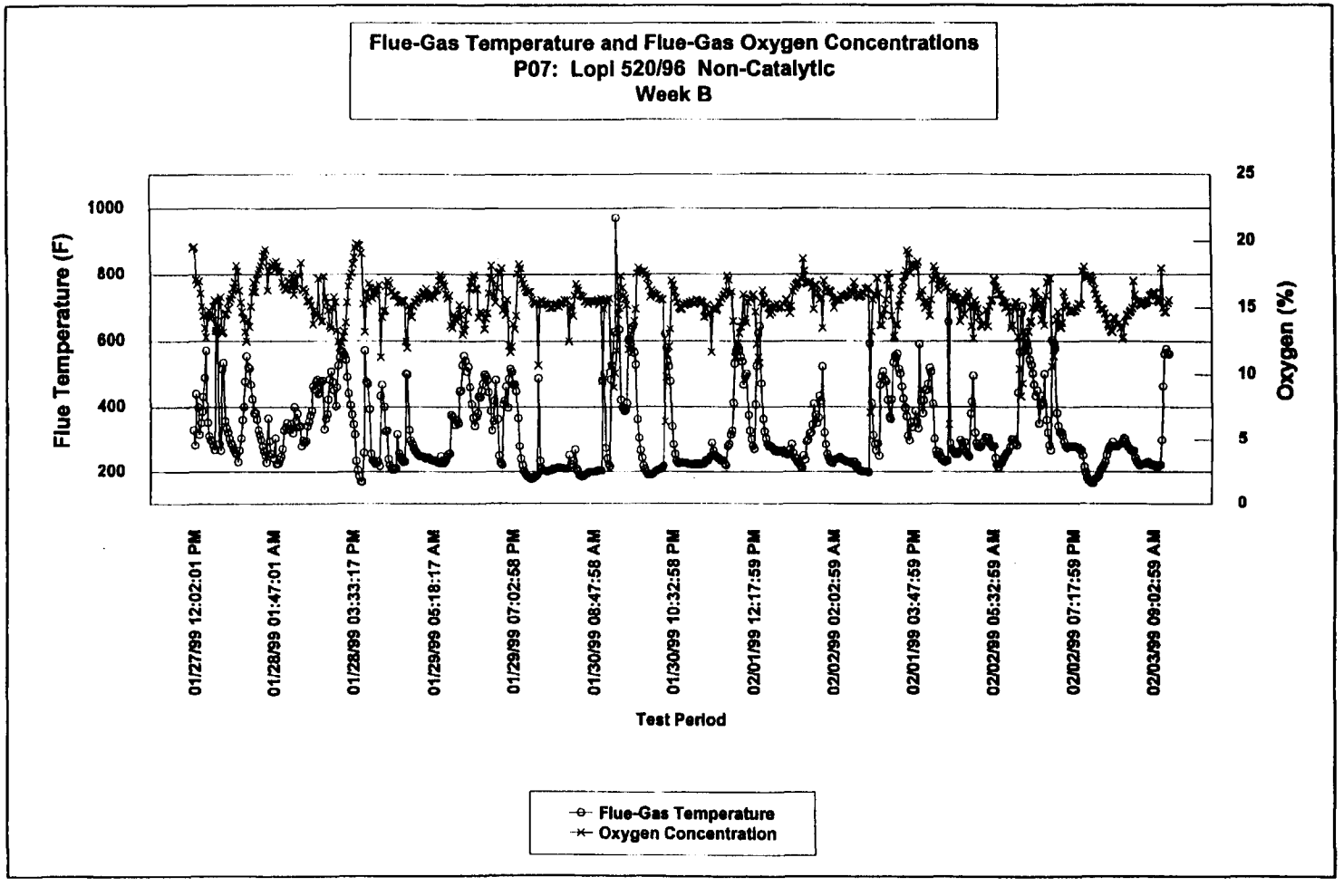
Average Flue-Gas Concentrations

Oxygen (AWES)	15.14	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week C
Test Period Start Date/Time: 02/03/99 12:32:01 PM
Test Period End Date/Time: 02/10/99 12:17:57 PM
Stove Model Tested: **P07: Lopi 520/96 Non-Catalytic**
Stove Type: New Tech/Non-Catalytic

Time

Total Test Period	168.00	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	168	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	100.0%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	342	Degrees F	172	Degrees C
Test Facility Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.109	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	20.8	G/Kg
Emission Rate	40.3	G/Hour
Concentration	1418	Mg/M3

Fuel

Total Fuel Used	406.1	KG With Moisture
Average Fuel Moisture	24.8%	Percent Dry Basis
Total Fuel Burned	325.4	KG Dry
Average Burn Rate During Stove Operation	1.9	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	23.8%
XAD-2	17.4%
Filter	58.7%
Total	100%

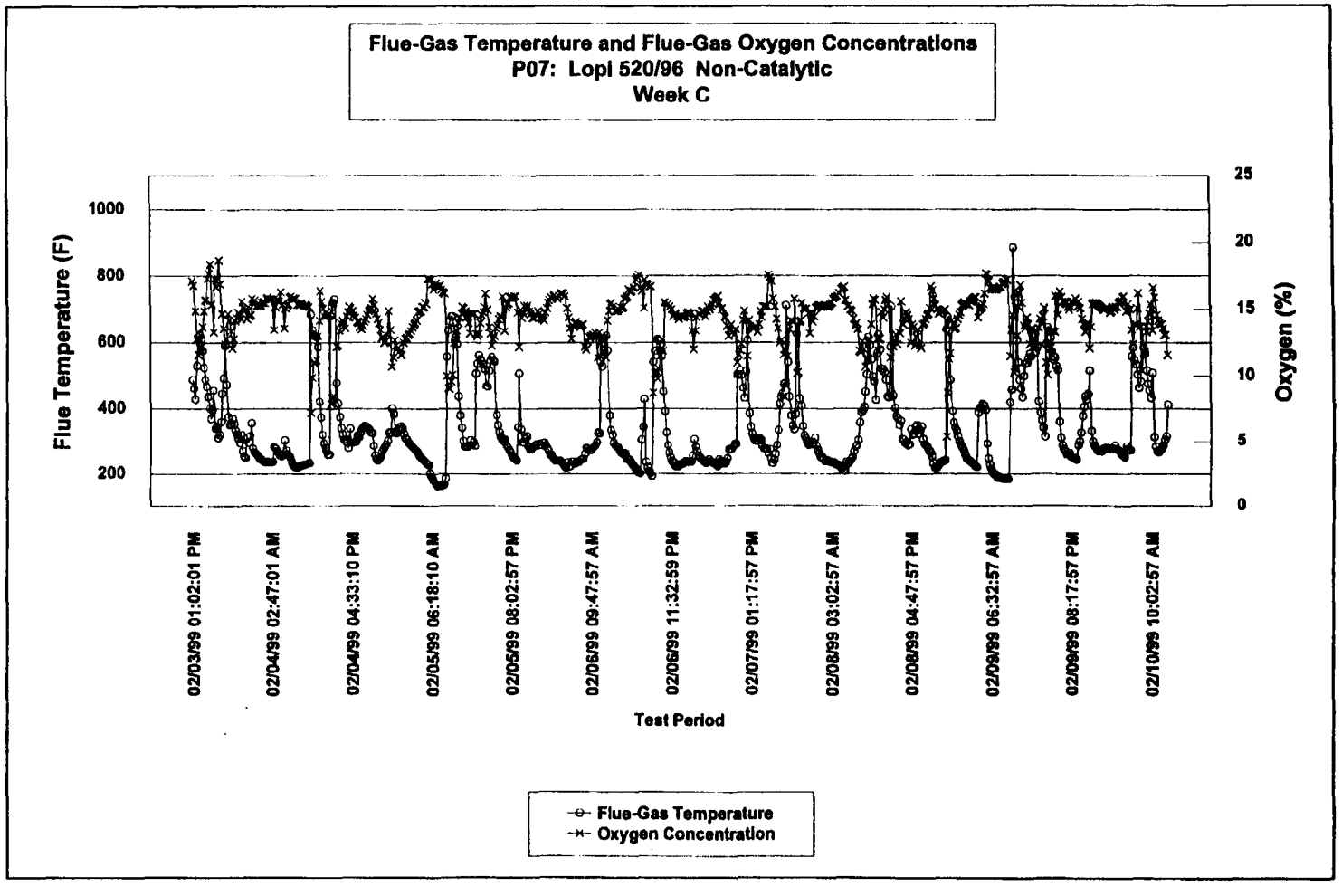
Average Flue-Gas Concentrations

Oxygen (AWES)	14.13	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume is Based on 11.5% of Fuel Carbon Generating Carbon Monoxide and 88.5% of Fuel Carbon Generating Cabon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week A
Test Period Start Date/Time: 01/22/99 10:47:02 AM
Test Period End Date/Time: 01/29/99 11:02:56 AM
Stove Model Tested: **P08: Vermont Castings Defiant Encore Catalytic**
Stove Type: Catalytic

Time

Total Test Period	133.25	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	131	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	98.3%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	343	Degrees F	173	Degrees C
Test Facilty Ambient Temperature	71	Degrees F	22	Degrees C

ESS Settings

ESS Sampling Rate	1.078	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	17.7	G/Kg
Emission Rate	23.0	G/Hour
Concentration	714	Mg/M3

Fuel

Total Fuel Used	211.8	KG With Moisture
Average Fuel Moisture	24.8%	Percent Dry Basis
Total Fuel Burned	169.8	KG Dry
Average Burn Rate During Stove Operation	1.3	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	46.0%
XAD-2	22.7%
Filter	31.4%
Total	100%

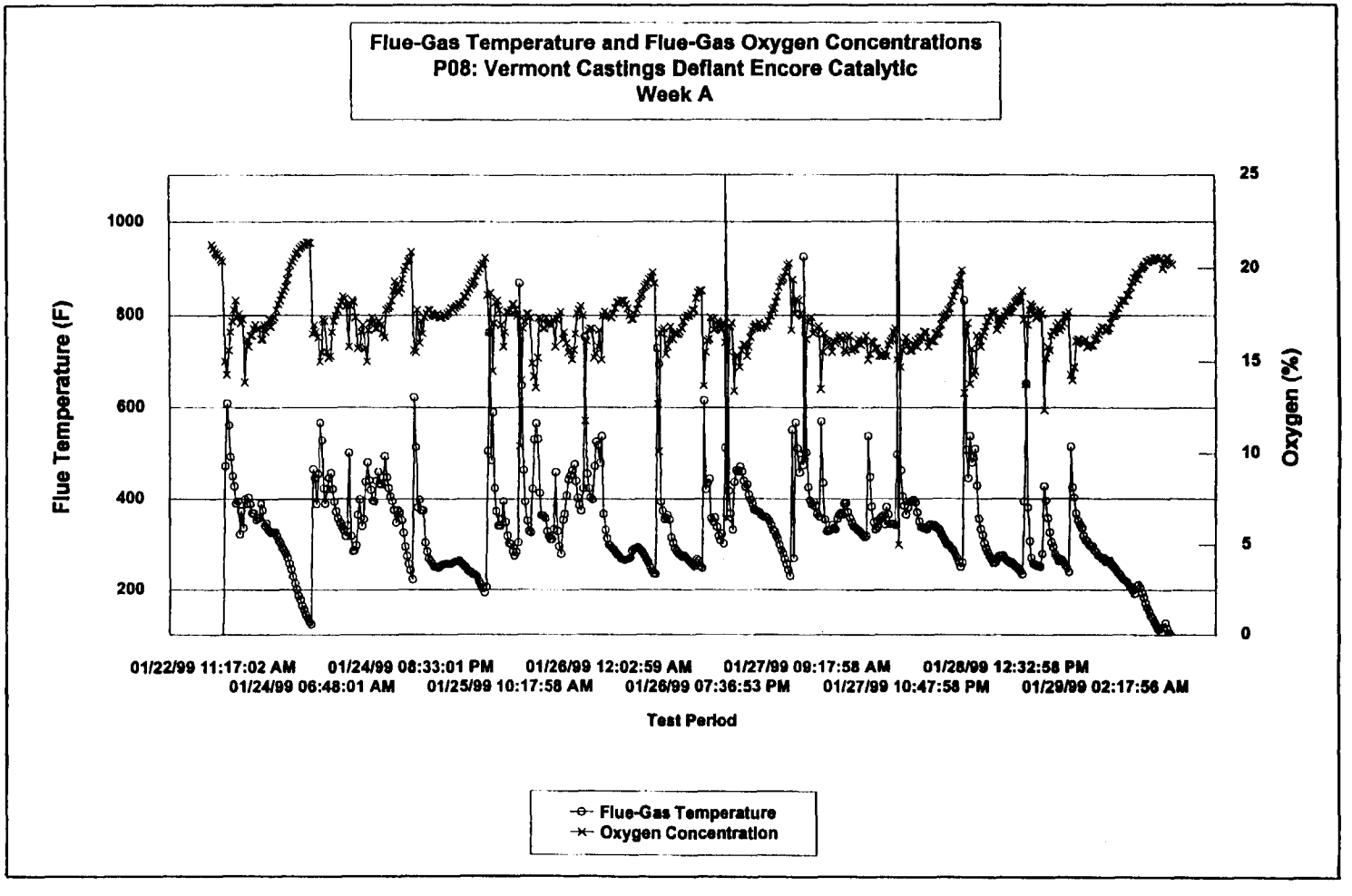
Average Flue-Gas Concentrations

Oxygen (AWES)	16.93	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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AWES-Emissions Results

Project Name: ERG/EPA

Residence Location: Portland, Oregon USA
Test Run Number: Week B
Test Period Start Date/Time: 01/29/99 01:17:01 PM
Test Period End Date/Time: 02/05/99 02:14:37 PM
Stove Model Tested: **P08: Vermont Castings Defiant Encore Catalytic**
Stove Type: Catalytic

Time

Total Test Period	97.75	Hours
Stove Operating Time (ie, Flue-Gas Temperature Over 100 Degrees F)	37.5	Hours
Stove Operating Time During Test Period (ie, Flue-Gas Temperature Over 100 Degrees F)	38.4%	

Average Temperatures

Flue-Gas Temperature (at 1 foot above flue collar)	383	Degrees F	195	Degrees C
Test Facility Ambient Temperature	74	Degrees F	23	Degrees C

ESS Settings

ESS Sampling Rate	1.078	L/Minute
Sample Cycle Duration	15.00	Minutes
Sample Time Per Sample Cycle	120	Seconds

Particulate Emissions

Emission Factor	15.5	G/Kg
Emission Rate	25.2	G/Hour
Concentration	657	Mg/M3

Fuel

Total Fuel Used	76.2	KG With Moisture
Average Fuel Moisture	25.0%	Percent Dry Basis
Total Fuel Burned	61.0	KG Dry
Average Burn Rate During Stove Operation	1.6	KG/Hour (dry)

Breakdown of Particulate Sample

Rinse	49.5%
XAD-2	16.0%
Filter	34.6%
Total	100%

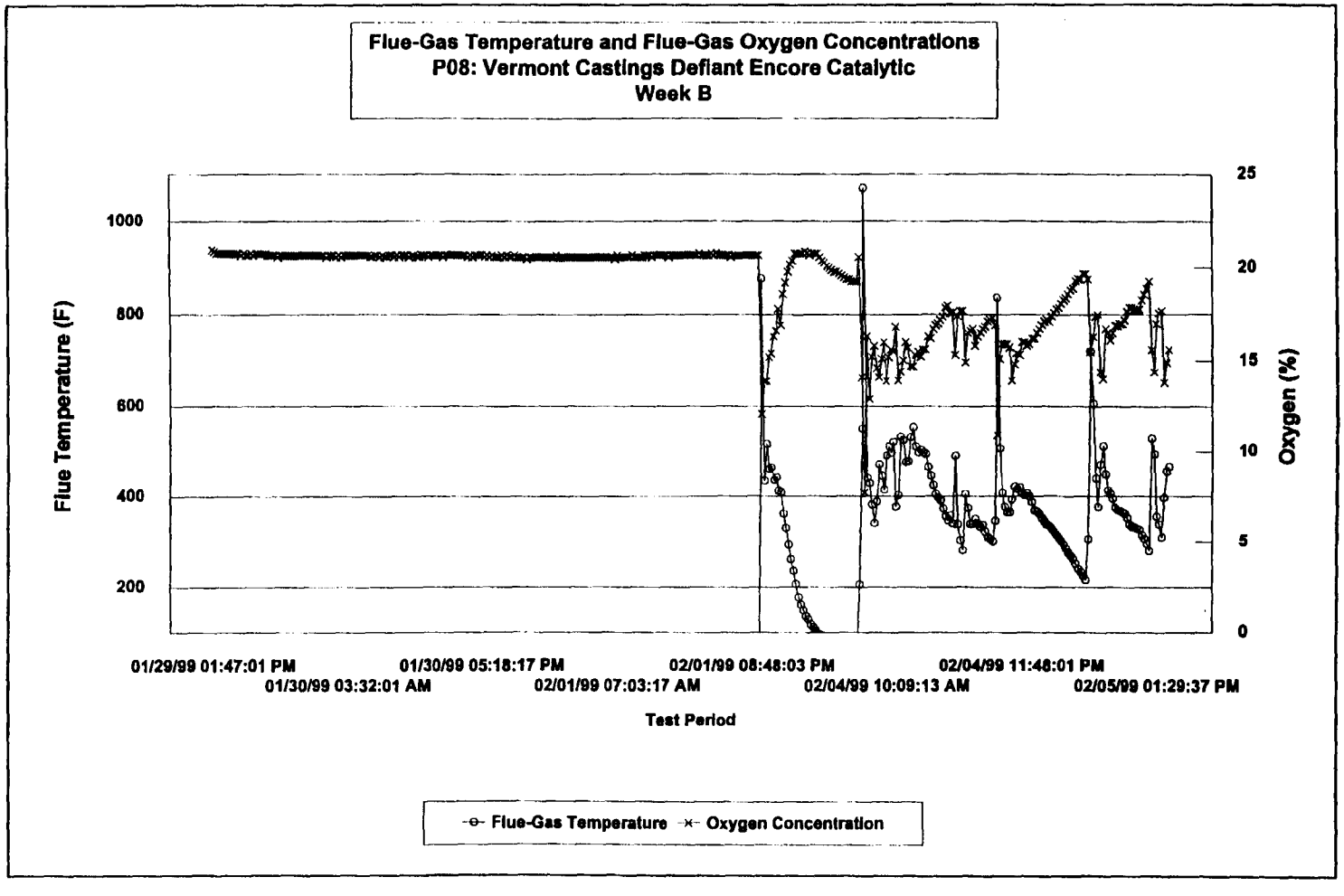
Average Flue-Gas Concentrations

Oxygen (AWES)	16.72	Percent

Test Notes:

Test Note Number 1: Stoichiometric Volume For This Test Is Based on 2.0% of Fuel Carbon Generating Carbon Monoxide and 98.0% of Fuel Carbon Generating Carbon Dioxide

Test Note Number 2: STP for this test is: 1.00 Atmosphere and 68 Degrees F (20 Degrees C)



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Appendix D
Organic Compound Analysis Data

Contents of Appendix D

Organic Compound Analysis Data by Test - Klamath Falls

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF01-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1091.D**	**ENG1113.D**	
Analysis Date:	**01/27/99**	**01/29/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	107.99	120.69
Phenol-d6	130.63	115.39
Nitrobenzene-d5	92.26	87.61
2-Fluorobiphenyl	103.73	85.99
2,4,6-Tribromophenol	126.50	93.38
p-Terphenyl-d14	103.61	94.91

Lab Surrogate Compounds

		% Recovery
Toluene-d8	102.39	115.50
Biphenyl-d10	102.98	90.42
Fluorene-d10	97.21	91.04
Anthracene-d10	114.19	95.14
Pyrene-d10	102.88	92.72

Target Compounds

Hours= 168 Dry Fuel (kg)=111.9

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	5751	0	5751	5738	189138.053	156070.637
m,p-Xylene	864	0	864	860	28347.634	23391.556
o-Xylene	306	0	306	306	10086.484	8323.042
Phenol	6651	16	6667	6647	219100.844	180794.967
Benzofuran	1296	0	1296	1287	42422.564	35005.735
C3-alkylbenzenes	0	0	0	0	0.000	0.000
Decane	0	0	0	0	0.000	0.000
o-Cresol	1470	0	1470	1456	47993.204	39602.448
m,p-Cresol	2341	0	2341	2313	76241.951	62912.405
C4-alkylbenzenes	4238	0	4238	4238	139694.505	115271.411
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	100	0	100	100	3296.237	2719.948
2,3-Dimethylphenol	195	0	195	195	6427.661	5303.899
Naphthalene	2296	0	2296	2296	75681.591	62450.014
2-Methylnaphthalene	343	0	343	318	10482.032	8649.436
1-Methylnaphthalene	277	0	277	272	8965.763	7398.260
Biphenyl	188	0	188	185	6098.038	5031.904
Tetradecane	343	0	343	343	11306.091	9329.423
C2-alkylnaphthalenes	311	0	311	306	10086.484	8323.042
Acenaphthylene	517	0	517	517	17041.543	14062.133
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	295	0	295	295	9723.898	8023.848
C3-alkylnaphthalenes	52	0	52	52	1714.043	1414.373
Fluorene	145	0	145	145	4779.543	3943.925
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	629	0	629	629	20733.328	17108.475
Anthracene	94	0	94	94	3098.462	2556.751
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	193	0	193	193	6361.737	5249.500
Pyrene	136	0	136	136	4482.882	3699.130
Benzo(a)anthracene	0	0	0	0	0.000	0.000
Chrysene	0	0	0	0	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF01-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1092.D**	**ENG1114.D**	
Analysis Date:	**01/27/99**	**01/29/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	85.34	120.43
Phenol-d6	91.92	111.96
Nitrobenzene-d5	94.63	111.66
2-Fluorobiphenyl	89.95	93.70
2,4,6-Tribromophenol	113.67	103.52
p-Terphenyl-d14	97.99	82.55

Lab Surrogate Compounds

		% Recovery
Toluene-d8	79.16	124.46
Biphenyl-d10	91.61	97.75
Fluorene-d10	86.03	95.74
Anthracene-d10	104.20	92.36
Pyrene-d10	99.45	84.07

Target Compounds

Hours= 141 Dry Fuel (kg)=116.5

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	4734	0	4734	4721	148062.987	118973.313
m,p-Xylene	704	0	704	700	21953.843	17640.610
o-Xylene	237	0	237	237	7432.944	5972.606
Phenol	4510	0	4510	4490	140818.219	113151.911
Benzofuran	905	0	905	896	28100.918	22579.981
C3-alkylbenzenes	1051	0	1051	1051	32962.126	26486.116
Decane	0	0	0	0	0.000	0.000
o-Cresol	925	0	925	912	28602.721	22983.194
m,p-Cresol	1674	0	1674	1647	51654.255	41505.835
C4-alkylbenzenes	8129	0	8129	8129	254946.837	204857.882
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	76	0	76	76	2383.560	1915.266
2,3-Dimethylphenol	113	0	113	113	3543.977	2847.698
Naphthalene	1834	0	1834	1834	57519.067	46218.398
2-Methylnaphthalene	255	0	255	230	7213.405	5796.200
1-Methylnaphthalene	224	0	224	219	6868.416	5518.991
Biphenyl	152	0	152	149	4673.032	3754.930
Tetradecane	255	0	255	255	7997.471	6426.222
C2-alkylnaphthalenes	279	0	279	274	8593.361	6905.039
Acenaphthylene	389	0	389	389	12200.064	9803.139
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	245	0	245	245	7683.845	6174.213
C3-alkylnaphthalenes	274	0	274	274	8593.361	6905.039
Fluorene	118	0	118	118	3700.791	2973.703
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	532	7	540	540	16935.821	13608.470
Anthracene	85	0	85	85	2665.824	2142.074
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	164	12	176	176	5519.823	4435.353
Pyrene	112	11	123	123	3857.604	3099.707
Benzo(a)anthracene	0	13	13	13	407.714	327.611
Chrysene	0	15	15	15	470.439	378.013
Benzo(b)fluoranthene	0	19	19	19	595.890	478.817
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	8	8	8	250.901	201.607
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-C

Sample Name:		**KF01-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1090.D**	**ENG1115.D**	
Analysis Date:	**01/27/99**	**01/29/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	105.74	110.83
Phenol-d6	101.92	103.47
Nitrobenzene-d5	92.81	93.36
2-Fluorobiphenyl	88.40	88.56
2,4,6-Tribromophenol	94.09	94.14
p-Terphenyl-d14	78.21	84.75

Lab Surrogate Compounds

		% Recovery
Toluene-d8	99.12	114.52
Biphenyl-d10	88.35	90.45
Fluorene-d10	77.70	92.11
Anthracene-d10	86.16	88.90
Pyrene-d10	77.75	83.41

Target Compounds

Hours= 142.75Dry Fuel (kg)=58.80

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	1599	0	1599	1586	136593.044	100484.648
m,p-Xylene	223	0	223	219	18861.208	13875.245
o-Xylene	76	0	76	76	6545.442	4815.153
Phenol	1404	0	1404	1383	119109.823	87623.120
Benzofuran	369	0	369	360	31004.726	22808.621
C3-alkylbenzenes	297	0	297	297	25578.899	18817.113
Decane	38	0	38	38	3272.721	2407.577
o-Cresol	302	0	302	289	24889.905	18310.254
m,p-Cresol	447	0	447	420	36172.181	26610.058
C4-alkylbenzenes	898	0	898	898	77339.567	56894.838
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	24	0	24	24	2066.982	1520.575
2,3-Dimethylphenol	38	0	38	38	3272.721	2407.577
Naphthalene	966	0	966	966	83196.016	61203.134
2-Methylnaphthalene	121	0	121	96	8267.927	6082.299
1-Methylnaphthalene	95	0	95	90	7751.182	5702.155
Biphenyl	92	0	92	89	7665.057	5638.798
Tetradecane	121	0	121	121	10421.033	7666.231
C2-alkylnaphthalenes	88	0	88	83	7148.312	5258.654
Acenaphthylene	189	0	189	189	16277.481	11974.526
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	15	0	15	15	1291.864	950.359
Dibenzofuran	98	0	98	98	8440.175	6209.014
C3-alkylnaphthalenes	76	0	76	76	6545.442	4815.153
Fluorene	62	0	62	62	5339.703	3928.151
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	244	0	244	244	21014.314	15459.177
Anthracene	45	0	45	45	3875.591	2851.078
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	104	3	108	108	9301.418	6842.586
Pyrene	68	0	68	68	5856.448	4308.295
Benzo(a)anthracene	12	6	18	18	1550.236	1140.431
Chrysene	13	7	20	20	1722.485	1267.146
Benzo(b)fluoranthene	0	0	0	0	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF02-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1059.D**	**ENG1076.D**	
Analysis Date:	**01/14/99**	**01/18/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	117.01	117.76
Phenol-d6	132.23	124.69
Nitrobenzene-d5	110.02	116.04
2-Fluorobiphenyl	112.90	93.58
2,4,6-Tribromophenol	127.11	104.13
p-Terphenyl-d14	119.33	96.22

Lab Surrogate Compounds

		% Recovery
Toluene-d8	127.85	113.07
Biphenyl-d10	108.23	100.82
Fluorene-d10	103.41	102.72
Anthracene-d10	116.83	112.83
Pyrene-d10	116.59	93.10

Target Compounds

Hours= 168 Dry Fuel (kg)=162.6

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	15862	9	15871	15858	158681.609	164080.041
m,p-Xylene	2268	0	2268	2264	22654.506	23425.225
o-Xylene	812	0	812	812	8125.203	8401.627
Phenol	18496	0	18496	18476	184878.383	191168.044
Benzofuran	4304	0	4304	4295	42977.520	44439.638
C3-alkylbenzenes	0	0	0	0	0.000	0.000
Decane	0	0	0	0	0.000	0.000
o-Cresol	3719	0	3719	3705	37073.739	38335.008
m,p-Cresol	6062	0	6062	6035	60388.669	62443.123
C4-alkylbenzenes	6781	0	6781	6781	67853.449	70161.859
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	223	0	223	223	2231.429	2307.343
2,3-Dimethylphenol	349	0	349	349	3492.236	3611.044
Naphthalene	11748	0	11748	11748	117555.274	121554.567
2-Methylnaphthalene	1700	0	1700	1675	16760.732	17330.941
1-Methylnaphthalene	1377	0	1377	1372	13728.791	14195.852
Biphenyl	794	0	794	791	7915.068	8184.343
Tetradecane	1700	0	1700	1700	17010.893	17589.612
C2-alkylnaphthalenes	1001	0	1001	996	9966.382	10305.443
Acenaphthylene	2894	0	2894	2894	28958.543	29943.728
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	187	0	187	187	1871.198	1934.857
Dibenzofuran	1214	0	1214	1214	12147.779	12561.052
C3-alkylnaphthalenes	0	0	0	0	0.000	0.000
Fluorene	718	0	718	718	7184.601	7429.024
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	3109	4	3113	3113	31149.946	32209.684
Anthracene	461	0	461	461	4612.954	4769.889
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	995	7	1001	1001	10016.414	10357.178
Pyrene	785	8	793	793	7935.081	8205.037
Benzo(a)anthracene	204	16	220	220	2201.410	2276.303
Chrysene	182	19	201	201	2011.288	2079.713
Benzo(b)fluoranthene	0	61	61	61	610.391	631.157
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	32	32	32	320.205	331.099
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF02-B2**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1096.D**	**ENG1116.D**	
Analysis Date:	**01/28/99**	**01/29/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	74.56	110.00
Phenol-d6	90.54	106.96
Nitrobenzene-d5	85.50	89.54
2-Fluorobiphenyl	87.74	88.58
2,4,6-Tribromophenol	99.39	102.57
p-Terphenyl-d14	95.59	74.88

Lab Surrogate Compounds

		% Recovery
Toluene-d8	74.77	106.81
Biphenyl-d10	87.76	98.23
Fluorene-d10	78.61	92.31
Anthracene-d10	102.98	88.03
Pyrene-d10	93.67	77.39

Target Compounds

Hours= 168 Dry Fuel (kg)=170.9

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	17956	0	17956	17943	198158.266	190059.195
m,p-Xylene	2566	0	2566	2562	28294.125	27137.695
o-Xylene	802	0	802	802	8857.099	8495.094
Phenol	13920	0	13920	13900	153508.327	147234.176
Benzofuran	4791	0	4791	4782	52811.282	50652.793
C3-alkylbenzenes	4578	0	4578	4578	50558.354	48491.946
Decane	0	0	0	0	0.000	0.000
o-Cresol	2618	0	2618	2605	28769.007	27593.167
m,p-Cresol	5539	0	5539	5512	60873.230	58385.236
C4-alkylbenzenes	13491	0	13491	13491	148991.427	142901.889
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	178	0	178	178	1965.790	1885.445
2,3-Dimethylphenol	266	0	266	266	2937.641	2817.575
Naphthalene	13793	0	13793	13793	152326.644	146100.790
2-Methylnaphthalene	2116	0	2116	2091	23092.512	22148.681
1-Methylnaphthalene	1777	0	1777	1773	19580.594	18780.302
Biphenyl	897	0	897	894	9873.125	9469.594
Tetradecane	2116	0	2116	2116	23368.606	22413.490
C2-alkylnaphthalenes	1409	0	1409	1404	15505.445	14871.711
Acenaphthylene	4347	0	4347	4347	48007.244	46045.105
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	322	0	322	322	3556.092	3410.749
Dibenzofuran	1235	0	1235	1235	13639.049	13081.598
C3-alkylnaphthalenes	1123	0	1123	1123	12402.148	11895.250
Fluorene	986	0	986	986	10889.152	10444.093
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	4798	10	4808	4808	53098.420	50928.195
Anthracene	790	2	793	793	8757.705	8399.763
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	1566	14	1580	1580	17449.148	16735.971
Pyrene	1022	13	1035	1035	11430.296	10963.120
Benzo(a)anthracene	293	50	344	344	3799.055	3643.781
Chrysene	340	62	401	401	4428.550	4247.547
Benzo(b)fluoranthene	0	134	134	134	1479.864	1419.380
Benzo(k)fluoranthene	0	33	33	33	364.444	349.549
Benzo(a)pyrene	0	87	87	87	960.808	921.538
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-C

Sample Name:		**KF02-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1097.D**	**ENG1117.D**	
Analysis Date:	**01/28/99**	**01/29/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	79.28	112.09
Phenol-d6	90.32	116.35
Nitrobenzene-d5	73.06	106.12
2-Fluorobiphenyl	81.82	101.23
2,4,6-Tribromophenol	91.17	121.01
p-Terphenyl-d14	89.38	97.83

Lab Surrogate Compounds

		% Recovery
Toluene-d8	83.15	99.13
Biphenyl-d10	83.35	108.02
Fluorene-d10	74.89	106.60
Anthracene-d10	102.04	106.17
Pyrene-d10	87.54	98.78

Target Compounds

Hours= 168 Dry Fuel (kg)=119.10

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	20489	0	20489	20477	262383.544	294865.926
m,p-Xylene	2738	0	2738	2734	35032.310	39369.216
o-Xylene	864	0	864	864	11070.927	12441.479
Phenol	14714	4	14719	14699	188346.717	211663.537
Benzofuran	5144	0	5144	5135	65797.700	73943.279
C3-alkylbenzenes	4025	0	4025	4025	51574.633	57959.435
Decane	0	0	0	0	0.000	0.000
o-Cresol	2387	0	2387	2373	30406.610	34170.867
m,p-Cresol	5005	0	5005	4978	63785.969	71682.501
C4-alkylbenzenes	6663	0	6663	6663	85376.840	95946.265
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	149	0	149	149	1909.222	2145.579
2,3-Dimethylphenol	218	0	218	218	2793.359	3139.169
Naphthalene	15368	0	15368	15368	196918.997	221297.043
2-Methylnaphthalene	2550	0	2550	2526	32367.087	36374.045
1-Methylnaphthalene	2112	0	2112	2107	26998.199	30340.504
Biphenyl	1044	0	1044	1041	13338.930	14990.254
Tetradecane	2550	0	2550	2550	32674.612	36719.642
C2-alkylnaphthalenes	1520	0	1520	1515	19412.564	21815.787
Acenaphthylene	6062	0	6062	6062	77675.882	87291.949
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	397	0	397	397	5086.989	5716.744
Dibenzofuran	1273	0	1273	1273	16311.679	18331.021
C3-alkylnaphthalenes	1281	0	1281	1281	16414.188	18446.220
Fluorene	1317	0	1317	1317	16875.476	18964.615
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	6902	4	6906	6906	88490.538	99445.431
Anthracene	1217	0	1217	1217	15594.119	17524.629
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	2338	6	2344	2344	30035.016	33753.271
Pyrene	1551	8	1559	1559	19976.361	22449.381
Benzo(a)anthracene	446	59	505	505	6470.855	7271.929
Chrysene	531	76	608	608	7790.653	8755.115
Benzo(b)fluoranthene	0	195	195	195	2498.647	2807.973
Benzo(k)fluoranthene	0	63	63	63	807.255	907.191
Benzo(a)pyrene	0	145	145	145	1857.968	2087.980
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF03-A**	
Sample Type:	**XAD only***	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1072.D**	**ENG1077.D**	
Analysis Date:	**01/15/99**	**01/18/99**	
	*** - DCM/MeOH sample void**		

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	89.74	118.97
Phenol-d6	96.72	124.90
Nitrobenzene-d5	98.11	106.17
2-Fluorobiphenyl	90.86	99.53
2,4,6-Tribromophenol	96.58	110.30
p-Terphenyl-d14	107.06	102.23

Lab Surrogate Compounds

		% Recovery
Toluene-d8	99.33	124.12
Biphenyl-d10	97.46	104.86
Fluorene-d10	80.79	105.73
Anthracene-d10	98.87	113.29
Pyrene-d10	109.04	103.87

Target Compounds

	XAD	Filter	TOTAL	Total - Blank
	µg	µg	µg	µg
Toluene	1734	0	1734	OMNI
m,p-Xylene	426	0	426	Sample Lost.
o-Xylene	114	0	114	
Phenol	2759	0	2759	
Benzofuran	689	0	689	
C3-alkylbenzenes	481	0	481	
Decane	0	0	0	
o-Cresol	578	0	578	
m,p-Cresol	1015	0	1015	
C4-alkylbenzenes	655	0	655	
Undecane	0	0	0	
2-Ethylphenol	25	0	25	
2,3-Dimethylphenol	40	0	40	
Naphthalene	2000	0	2000	
2-Methylnaphthalene	275	0	275	
1-Methylnaphthalene	217	0	217	
Biphenyl	128	0	128	
Tetradecane	275	0	275	
C2-alkylnaphthalenes	103	0	103	
Acenaphthylene	439	0	439	
Pentadecane	0	0	0	
Acenaphthene	0	0	0	
Dibenzofuran	169	0	169	
C3-alkylnaphthalenes	0	0	0	
Fluorene	78	0	78	
Heptadecane	0	0	0	
Octadecane	0	0	0	
Phenanthrene	281	0	281	
Anthracene	38	0	38	
Carbazole	0	0	0	
Fluoranthene	29	0	29	
Pyrene	33	0	33	
Benzo(a)anthracene	0	0	0	
Chrysene	0	0	0	
Benzo(b)fluoranthene	0	0	0	
Benzo(k)fluoranthene	0	0	0	
Benzo(a)pyrene	0	0	0	
Indeno(1,2,3-cd)pyrene	0	0	0	
Dibenz(a,h)anthracene	0	0	0	
Benzo(g,h,i)perylene	0	0	0	

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF03-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1099.D**	**ENG1131.D**	
Analysis Date:	**01/28/99**	**02/02/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	93.77	141.25
Phenol-d6	100.35	138.59
Nitrobenzene-d5	75.36	130.90
2-Fluorobiphenyl	93.34	115.12
2,4,6-Tribromophenol	105.71	119.20
p-Terphenyl-d14	94.64	105.42

Lab Surrogate Compounds

		% Recovery
Toluene-d8	69.52	135.93
Biphenyl-d10	101.79	125.48
Fluorene-d10	86.93	119.07
Anthracene-d10	110.51	132.36
Pyrene-d10	95.20	102.99

Target Compounds

Hours= 168 Dry Fuel (kg)=116.8

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	1951	0	1951	1938	40078.262	49019.134
m,p-Xylene	459	0	459	455	9409.499	11508.620
o-Xylene	115	0	115	115	2378.225	2908.772
Phenol	2994	0	2994	2974	61502.968	75223.377
Benzofuran	592	0	592	583	12056.567	14746.210
C3-alkylbenzenes	565	0	565	565	11684.323	14290.924
Decane	0	0	0	0	0.000	0.000
o-Cresol	577	0	577	563	11642.963	14240.337
m,p-Cresol	1369	0	1369	1341	27732.172	33918.812
C4-alkylbenzenes	442	0	442	442	9140.656	11179.802
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	39	0	39	39	806.529	986.453
2,3-Dimethylphenol	56	0	56	56	1158.092	1416.446
Naphthalene	1871	0	1871	1871	38692.688	47324.458
2-Methylnaphthalene	240	0	240	215	4446.247	5438.139
1-Methylnaphthalene	194	0	194	189	3908.561	4780.504
Biphenyl	160	0	160	157	3246.794	3971.106
Tetradecane	240	0	240	240	4963.252	6070.481
C2-alkylnaphthalenes	198	0	198	193	3991.282	4881.678
Acenaphthylene	636	0	636	636	13152.619	16086.775
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	34	0	34	34	703.127	859.985
Dibenzofuran	173	0	173	173	3577.678	4375.805
C3-alkylnaphthalenes	181	0	181	181	3743.119	4578.154
Fluorene	168	0	168	168	3474.277	4249.337
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	509	0	509	509	10526.231	12874.478
Anthracene	103	0	103	103	2130.062	2605.248
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	202	15	217	217	4487.607	5488.727
Pyrene	181	12	194	194	4011.962	4906.972
Benzo(a)anthracene	34	21	54	54	1116.732	1365.858
Chrysene	40	24	64	64	1323.534	1618.795
Benzo(b)fluoranthene	0	52	52	52	1075.371	1315.271
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	17	17	17	351.564	429.992
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-C

Sample Name:		**KF03-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1100.D**	**ENG1125.D**	
Analysis Date:	**01/28/99**	**02/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	102.41	122.34
Phenol-d6	111.92	118.32
Nitrobenzene-d5	74.77	103.72
2-Fluorobiphenyl	85.53	98.58
2,4,6-Tribromophenol	103.28	112.03
p-Terphenyl-d14	99.24	103.66

Lab Surrogate Compounds

		% Recovery
Toluene-d8	78.46	112.88
Biphenyl-d10	92.69	101.47
Fluorene-d10	79.19	107.34
Anthracene-d10	108.05	108.62
Pyrene-d10	95.48	109.12

Target Compounds

Hours= 168 Dry Fuel (kg)=139.60

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	1694	0	1694	1681	25056.599	28746.019
m,p-Xylene	306	0	306	302	4501.542	5164.365
o-Xylene	85	0	85	85	1266.990	1453.546
Phenol	2731	0	2731	2711	40409.542	46359.581
Benzofuran	533	0	533	524	7810.623	8960.686
C3-alkylbenzenes	601	0	601	601	8958.368	10277.428
Decane	0	0	0	0	0.000	0.000
o-Cresol	391	0	391	377	5619.475	6446.906
m,p-Cresol	747	0	747	720	10732.154	12312.393
C4-alkylbenzenes	378	0	378	378	5634.381	6464.007
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	22	0	22	22	327.927	376.212
2,3-Dimethylphenol	34	0	34	34	506.796	581.419
Naphthalene	1850	0	1850	1850	27575.674	31636.011
2-Methylnaphthalene	202	0	202	178	2653.227	3043.897
1-Methylnaphthalene	165	0	165	161	2399.829	2753.188
Biphenyl	136	0	136	133	1982.467	2274.373
Tetradecane	202	0	202	202	3010.965	3454.310
C2-alkylnaphthalenes	128	0	128	123	1833.410	2103.367
Acenaphthylene	368	0	368	368	5485.323	6293.001
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	26	0	26	26	387.550	444.614
Dibenzofuran	170	0	170	170	2533.981	2907.093
C3-alkylnaphthalenes	95	0	95	95	1416.048	1624.552
Fluorene	94	0	94	94	1401.142	1607.451
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	437	0	437	437	6513.821	7472.939
Anthracene	88	0	88	88	1311.708	1504.848
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	158	0	158	158	2355.112	2701.886
Pyrene	134	0	134	134	1997.373	2291.473
Benzo(a)anthracene	26	0	26	26	387.550	444.614
Chrysene	28	0	28	28	417.362	478.815
Benzo(b)fluoranthene	0	0	0	0	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF04-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1072.D**	**ENG1078.D**	
Analysis Date:	**01/14/99**	**01/18/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	89.09	116.48
Phenol-d6	114.80	111.83
Nitrobenzene-d5	119.59	114.39
2-Fluorobiphenyl	114.11	93.52
2,4,6-Tribromophenol	109.74	93.67
p-Terphenyl-d14	120.63	97.51

Lab Surrogate Compounds

		% Recovery
Toluene-d8	95.41	108.38
Biphenyl-d10	117.35	96.37
Fluorene-d10	83.97	89.94
Anthracene-d10	121.33	103.51
Pyrene-d10	119.81	104.41

Target Compounds

Hours= 168 Dry Fuel (kg)=151.6

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	14749	0	14749	14736	179154.602	198670.956
m,p-Xylene	5015	0	5015	5010	60909.647	67544.889
o-Xylene	1411	0	1411	1411	17154.394	19023.122
Phenol	17952	164	18115	18095	219992.028	243957.041
Benzofuran	4470	0	4470	4461	54235.117	60143.264
C3-alkylbenzenes	6030	0	6030	6030	73310.413	81296.544
Decane	0	0	0	0	0.000	0.000
o-Cresol	9414	29	9443	9429	114634.144	127121.909
m,p-Cresol	13869	96	13965	13937	169440.668	187898.827
C4-alkylbenzenes	23047	0	23047	23047	280196.533	310719.973
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	586	0	586	586	7124.362	7900.460
2,3-Dimethylphenol	1005	0	1005	1005	12218.402	13549.424
Naphthalene	4527	0	4527	4527	55037.519	61033.077
2-Methylnaphthalene	1662	0	1662	1637	19902.014	22070.057
1-Methylnaphthalene	1099	0	1099	1094	13300.430	14749.323
Biphenyl	650	0	650	647	7865.976	8722.863
Tetradecane	1473	0	1473	1473	17908.166	19859.006
C2-alkylnaphthalenes	1662	0	1599	1595	19391.395	21503.812
Acenaphthylene	1025	0	1025	1025	12461.554	13819.064
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	147	0	147	147	1787.169	1981.856
Dibenzofuran	1104	0	1104	1104	13422.006	14884.143
C3-alkylnaphthalenes	1599	0	0	0	0.000	0.000
Fluorene	426	0	426	426	5179.144	5743.338
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	1270	20	1290	1290	15683.322	17391.798
Anthracene	228	6	234	234	2844.882	3154.791
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	366	21	387	387	4704.997	5217.539
Pyrene	314	24	338	338	4109.274	4556.921
Benzo(a)anthracene	0	27	27	27	328.256	364.014
Chrysene	0	32	32	32	389.044	431.424
Benzo(b)fluoranthene	0	66	66	66	802.403	889.813
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF04-B2**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1099.D**	**ENG1139.D**	
Analysis Date:	**02/01/99**	**02/03/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	86.79	138.58
Phenol-d6	99.05	131.78
Nitrobenzene-d5	89.05	113.54
2-Fluorobiphenyl	153.34	97.78
2,4,6-Tribromophenol	158.40	110.39
p-Terphenyl-d14	129.50	123.34

Lab Surrogate Compounds

		% Recovery
Toluene-d8	87.90	141.60
Biphenyl-d10	159.57	111.71
Fluorene-d10	121.04	109.56
Anthracene-d10	159.44	114.25
Pyrene-d10	134.05	124.46

Target Compounds

Hours= 167 Dry Fuel (kg)=177.6

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	40487	0	40487	40474	384430.139	361784.530
m,p-Xylene	9393	0	9393	9389	89178.598	83925.358
o-Xylene	3916	0	3916	3916	37194.950	35003.909
Phenol	30789	34	30822	30802	292563.550	275329.523
Benzofuran	7982	0	7982	7974	75738.645	71277.112
C3-alkylbenzenes	17330	0	17330	17330	164603.803	154907.494
Decane	0	0	0	0	0.000	0.000
o-Cresol	15383	9	15392	15379	146072.815	137468.110
m,p-Cresol	22843	27	22870	22843	216967.378	204186.491
C4-alkylbenzenes	79931	0	79931	79931	759200.609	714478.413
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	717	0	717	717	6810.209	6409.041
2,3-Dimethylphenol	1086	0	1086	1086	10315.045	9707.417
Naphthalene	11687	0	11687	11687	111005.461	104466.468
2-Methylnaphthalene	5144	0	5144	5120	48630.783	45766.092
1-Methylnaphthalene	2830	0	2830	2825	26832.414	25251.799
Biphenyl	1514	0	1514	1510	14342.282	13497.422
Tetradecane	3542	0	3542	3542	33642.624	31660.839
C2-alkylnaphthalenes	5144	0	5017	5012	47604.977	44800.713
Acenaphthylene	3454	0	3454	3454	32806.782	30874.235
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	437	0	437	437	4150.713	3906.207
Dibenzofuran	2316	0	2316	2316	21997.831	20702.006
C3-alkylnaphthalenes	5017	0	0	0	0.000	0.000
Fluorene	1303	0	1303	1303	12376.154	11647.113
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	3825	257	4082	4082	38771.652	36487.732
Anthracene	847	52	899	899	8538.882	8035.882
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	912	201	1114	1114	10580.995	9957.700
Pyrene	595	239	834	834	7921.499	7454.867
Benzo(a)anthracene	0	124	124	124	1177.777	1108.398
Chrysene	0	148	148	148	1405.734	1322.926
Benzo(b)fluoranthene	0	127	127	127	1206.271	1135.214
Benzo(k)fluoranthene	0	32	32	32	303.942	286.038
Benzo(a)pyrene	0	76	76	76	721.863	679.340
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF05-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1073.D**	**ENG1079.D**	
Analysis Date:	**01/15/99**	**01/18/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	98.16	96.76
Phenol-d6	110.15	93.83
Nitrobenzene-d5	100.25	110.34
2-Fluorobiphenyl	94.88	96.08
2,4,6-Tribromophenol	130.45	111.77
p-Terphenyl-d14	110.91	96.17

Lab Surrogate Compounds

		% Recovery
Toluene-d8	101.84	104.54
Biphenyl-d10	92.27	100.55
Fluorene-d10	77.67	106.00
Anthracene-d10	117.22	106.40
Pyrene-d10	109.81	97.61

Target Compounds

Hours= 168 Dry Fuel (kg)=124.7

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	4108	0	4108	4095	56584.390	68475.934
m,p-Xylene	1293	0	1293	1289	17811.301	21554.452
o-Xylene	422	0	422	422	5831.163	7056.616
Phenol	6532	0	6532	6511	89968.490	108875.899
Benzofuran	1512	0	1512	1503	20768.337	25132.925
C3-alkylbenzenes	2425	0	2425	2425	33508.461	40550.462
Decane	0	0	0	0	0.000	0.000
o-Cresol	2314	0	2314	2300	31781.221	38460.232
m,p-Cresol	4951	0	4951	4924	68039.448	82338.339
C4-alkylbenzenes	4038	0	4038	4038	55796.769	67522.789
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	171	0	171	171	2362.865	2859.435
2,3-Dimethylphenol	292	0	292	292	4034.833	4882.777
Naphthalene	1957	0	1957	1957	27041.673	32724.641
2-Methylnaphthalene	391	0	391	367	5071.177	6136.915
1-Methylnaphthalene	359	0	359	354	4891.544	5919.531
Biphenyl	129	0	129	126	1741.058	2106.952
Tetradecane	391	0	391	391	5402.807	6538.239
C2-alkylnaphthalenes	629	0	629	624	8622.383	10434.428
Acenaphthylene	221	0	221	221	3053.761	3695.527
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	245	0	245	245	3385.391	4096.851
C3-alkylnaphthalenes	561	0	561	561	7751.854	9380.952
Fluorene	97	0	97	97	1340.338	1622.018
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	298	0	298	298	4117.741	4983.108
Anthracene	56	0	56	56	773.804	936.423
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	89	0	89	89	1229.795	1488.244
Pyrene	74	0	74	74	1022.526	1237.416
Benzo(a)anthracene	0	0	0	0	0.000	0.000
Chrysene	0	0	0	0	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF05-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1124.D**	**ENG1126.D**	
Analysis Date:	**02/01/99**	**02/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	124.80	138.88
Phenol-d6	120.95	140.86
Nitrobenzene-d5	80.96	112.58
2-Fluorobiphenyl	115.59	105.69
2,4,6-Tribromophenol	124.11	121.04
p-Terphenyl-d14	107.66	113.65

Lab Surrogate Compounds

		% Recovery
Toluene-d8	90.32	138.91
Biphenyl-d10	116.69	111.35
Fluorene-d10	99.50	104.25
Anthracene-d10	120.27	118.40
Pyrene-d10	103.99	113.14

Target Compounds

Hours= 78.5 Dry Fuel (kg)=64.4

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	2423	0	2423	2410	75919.615	89119.424
m,p-Xylene	600	0	600	596	18775.141	22039.492
o-Xylene	192	0	192	192	6048.368	7099.971
Phenol	3921	0	3921	3901	122888.970	144255.134
Benzofuran	836	0	836	827	26052.084	30581.645
C3-alkylbenzenes	1402	0	1402	1402	44165.685	51844.578
Decane	0	0	0	0	0.000	0.000
o-Cresol	1349	0	1349	1335	42055.056	49366.984
m,p-Cresol	2625	0	2625	2598	81841.975	96071.479
C4-alkylbenzenes	2695	0	2695	2695	84897.660	99658.443
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	83	0	83	83	2614.659	3069.258
2,3-Dimethylphenol	134	0	134	134	4221.257	4955.188
Naphthalene	1368	0	1368	1368	43094.619	50587.291
2-Methylnaphthalene	266	0	266	242	7623.463	8948.921
1-Methylnaphthalene	220	0	220	215	6772.912	7950.488
Biphenyl	166	0	166	163	5134.812	6027.579
Tetradecane	266	0	266	266	8379.509	9836.418
C2-alkylnaphthalenes	422	0	422	417	13136.298	15420.249
Acenaphthylene	526	0	526	526	16570.007	19450.961
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	43	0	43	43	1354.582	1590.098
Dibenzofuran	365	0	365	365	11498.199	13497.340
C3-alkylnaphthalenes	625	0	625	625	19688.697	23111.884
Fluorene	305	0	305	305	9608.084	11278.599
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	1846	0	1846	1846	58152.535	68263.260
Anthracene	442	0	442	442	13923.846	16344.724
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	897	0	897	897	28257.218	33170.176
Pyrene	568	0	568	568	17893.088	21004.080
Benzo(a)anthracene	181	0	181	181	5701.847	6693.202
Chrysene	197	0	197	197	6205.877	7284.866
Benzo(b)fluoranthene	135	0	135	135	4252.759	4992.167
Benzo(k)fluoranthene	34	0	34	34	1071.065	1257.286
Benzo(a)pyrene	70	0	70	70	2205.134	2588.531
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-C

Sample Name:		**KF05-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1132.D**	**ENG1127.D**	
Analysis Date:	**02/02/99**	**02/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	104.13	101.63
Phenol-d6	132.62	128.05
Nitrobenzene-d5	85.27	100.15
2-Fluorobiphenyl	92.06	111.96
2,4,6-Tribromophenol	134.17	128.06
p-Terphenyl-d14	118.57	102.86

Lab Surrogate Compounds

		% Recovery
Toluene-d8	101.46	89.47
Biphenyl-d10	113.89	120.72
Fluorene-d10	84.74	122.94
Anthracene-d10	130.49	108.45
Pyrene-d10	118.70	109.89

Target Compounds

Hours= 168 Dry Fuel (kg)=154.70

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	4102	0	4102	4089	60505.749	59885.096
m,p-Xylene	820	0	820	816	12074.515	11950.657
o-Xylene	255	0	255	255	3773.286	3734.580
Phenol	6099	0	6099	6079	89952.176	89029.468
Benzofuran	1275	0	1275	1266	18733.255	18541.093
C3-alkylbenzenes	1016	0	1016	1016	15033.955	14879.740
Decane	0	0	0	0	0.000	0.000
o-Cresol	985	0	985	971	14368.081	14220.696
m,p-Cresol	1932	0	1932	1904	28173.868	27884.867
C4-alkylbenzenes	509	0	509	509	7531.775	7454.515
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	71	0	71	71	1050.601	1039.824
2,3-Dimethylphenol	103	0	103	103	1524.112	1508.478
Naphthalene	2834	0	2834	2834	41935.264	41505.102
2-Methylnaphthalene	404	0	404	380	5622.936	5565.257
1-Methylnaphthalene	313	0	313	308	4557.537	4510.787
Biphenyl	230	0	230	226	3344.167	3309.863
Tetradecane	404	0	404	404	5978.069	5916.747
C2-alkylnaphthalenes	424	0	424	419	6200.027	6136.428
Acenaphthylene	536	0	536	536	7931.299	7849.942
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	45	0	45	45	665.874	659.044
Dibenzofuran	272	0	272	272	4024.838	3983.552
C3-alkylnaphthalenes	348	0	348	348	5149.425	5096.604
Fluorene	133	0	133	133	1968.028	1947.840
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	518	0	518	518	7664.949	7586.324
Anthracene	102	0	102	102	1509.314	1493.832
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	172	0	172	172	2545.118	2519.011
Pyrene	151	0	151	151	2234.377	2211.457
Benzo(a)anthracene	0	0	0	0	0.000	0.000
Chrysene	0	0	0	0	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF06-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1063.D**	**ENG1080.D**	
Analysis Date:	**01/14/99**	**01/18/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	104.39	94.27
Phenol-d6	107.00	95.29
Nitrobenzene-d5	89.55	93.60
2-Fluorobiphenyl	108.53	95.98
2,4,6-Tribromophenol	114.40	101.02
p-Terphenyl-d14	103.90	84.01

Lab Surrogate Compounds

		% Recovery
Toluene-d8	99.06	98.81
Biphenyl-d10	107.34	101.97
Fluorene-d10	91.65	98.87
Anthracene-d10	100.31	108.24
Pyrene-d10	98.32	83.47

Target Compounds

Hours= 168 Dry Fuel (kg)=112.8

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	10425	0	10425	10412	92263.808	137550.016
m,p-Xylene	1282	0	1282	1278	11324.736	16883.300
o-Xylene	448	0	448	448	3969.860	5918.403
Phenol	7227	0	7227	7207	63863.356	95209.659
Benzofuran	1751	0	1751	1742	15436.377	23013.074
C3-alkylbenzenes	1175	0	1175	1175	10412.022	15522.596
Decane	0	0	0	0	0.000	0.000
o-Cresol	2488	0	2488	2475	21931.706	32696.532
m,p-Cresol	3918	0	3918	3891	34479.301	51402.911
C4-alkylbenzenes	7260	0	7260	7260	64333.005	95909.827
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	188	0	188	188	1665.924	2483.615
2,3-Dimethylphenol	353	0	353	353	3128.037	4663.384
Naphthalene	3907	0	3907	3907	34621.081	51614.283
2-Methylnaphthalene	550	0	550	526	4661.041	6948.839
1-Methylnaphthalene	429	0	429	425	3766.051	5614.556
Biphenyl	320	0	320	317	2809.031	4187.798
Tetradecane	550	0	550	550	4873.712	7265.896
C2-alkylnaphthalenes	256	0	256	251	2224.185	3315.891
Acenaphthylene	1012	0	1012	1012	8967.631	13369.249
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	446	0	446	446	3952.138	5891.981
C3-alkylnaphthalenes	195	0	195	195	1727.953	2576.090
Fluorene	249	0	249	249	2206.463	3289.469
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	892	0	892	892	7904.276	11783.962
Anthracene	150	0	150	150	1329.194	1981.608
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	297	3	300	300	2658.389	3963.216
Pyrene	230	4	234	234	2073.543	3091.308
Benzo(a)anthracene	0	9	9	9	79.752	118.896
Chrysene	0	10	10	10	88.613	132.107
Benzo(b)fluoranthene	0	25	25	25	221.532	330.268
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	11	11	11	97.474	145.318
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF07-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1056.D**	**ENG1081.D**	
Analysis Date:	**01/13/99**	**01/18/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	106.28	93.18
Phenol-d6	116.57	99.94
Nitrobenzene-d5	106.51	95.44
2-Fluorobiphenyl	100.49	84.57
2,4,6-Tribromophenol	112.42	91.81
p-Terphenyl-d14	112.78	86.27

Lab Surrogate Compounds

		% Recovery
Toluene-d8	104.42	104.21
Biphenyl-d10	104.35	93.25
Fluorene-d10	88.27	89.59
Anthracene-d10	111.82	100.20
Pyrene-d10	110.00	87.32

Target Compounds

Hours= 168.25 Dry Fuel (kg)=140.8

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	11732	0	11732	11719	157190.252	187453.923
m,p-Xylene	2003	0	2003	1999	26813.151	31975.458
o-Xylene	659	0	659	659	8839.353	10541.184
Phenol	16277	0	16277	16257	218059.725	260042.531
Benzofuran	2769	0	2769	2761	37034.072	44164.202
C3-alkylbenzenes	3431	0	3431	3431	46020.970	54881.339
Decane	0	0	0	0	0.000	0.000
o-Cresol	4206	0	4206	4192	56228.478	67054.087
m,p-Cresol	8800	0	8800	8772	117661.310	140314.516
C4-alkylbenzenes	9251	0	9251	9251	124086.272	147976.469
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	311	0	311	311	4171.531	4974.671
2,3-Dimethylphenol	492	0	492	492	6599.335	7869.898
Naphthalene	4608	0	4608	4608	61808.403	73708.309
2-Methylnaphthalene	794	0	794	769	10314.814	12300.714
1-Methylnaphthalene	618	0	618	613	8222.342	9805.381
Biphenyl	349	0	349	345	4627.582	5518.526
Tetradecane	794	0	794	794	10650.146	12700.607
C2-alkylnaphthalenes	686	0	686	681	9134.445	10893.090
Acenaphthylene	926	0	926	926	12420.699	14812.043
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	568	0	568	568	7618.744	9085.573
C3-alkylnaphthalenes	586	0	586	586	7860.183	9373.496
Fluorene	285	0	285	285	3822.785	4558.782
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	1090	11	1101	1101	14768.023	17611.295
Anthracene	162	3	165	165	2213.192	2639.295
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	323	26	349	349	4681.235	5582.509
Pyrene	233	23	255	255	3420.387	4078.910
Benzo(a)anthracene	0	28	28	28	375.572	447.880
Chrysene	0	32	32	32	429.225	511.863
Benzo(b)fluoranthene	0	68	68	68	912.103	1087.709
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	23	23	23	308.505	367.902
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF07-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1133.D**	**ENG1131.D**	
Analysis Date:	**02/02/99**	**02/02/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	92.46	141.25
Phenol-d6	100.91	138.59
Nitrobenzene-d5	77.25	130.90
2-Fluorobiphenyl	84.52	115.12
2,4,6-Tribromophenol	98.01	119.20
p-Terphenyl-d14	114.32	105.42

Lab Surrogate Compounds

		% Recovery
Toluene-d8	89.74	135.93
Biphenyl-d10	86.21	125.48
Fluorene-d10	81.88	119.07
Anthracene-d10	101.74	132.36
Pyrene-d10	109.16	102.99

Target Compounds

Hours= 168 Dry Fuel (kg)=119.7

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	8914	0	8914	8901	114212.167	153041.102
m,p-Xylene	1248	0	1248	1244	15962.244	21388.960
o-Xylene	407	0	407	407	5222.374	6997.835
Phenol	10504	0	10504	10484	134524.251	180258.726
Benzofuran	1668	0	1668	1659	21287.269	28524.344
C3-alkylbenzenes	1542	0	1542	1542	19785.997	26512.682
Decane	0	0	0	0	0.000	0.000
o-Cresol	2942	0	2942	2929	37583.130	50360.340
m,p-Cresol	4725	0	4725	4697	60269.020	80758.798
C4-alkylbenzenes	6682	0	6682	6682	85739.321	114888.287
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	192	0	192	192	2463.626	3301.190
2,3-Dimethylphenol	399	0	399	399	5119.723	6860.285
Naphthalene	3249	0	3249	3249	41689.173	55862.324
2-Methylnaphthalene	420	0	420	396	5081.229	6808.704
1-Methylnaphthalene	352	0	352	347	4452.491	5966.213
Biphenyl	226	0	226	222	2848.568	3817.001
Tetradecane	420	0	420	420	5389.182	7221.353
C2-alkylnaphthalenes	414	0	414	409	5248.037	7032.222
Acenaphthylene	575	0	575	575	7378.047	9886.376
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	388	0	388	388	4978.578	6671.155
C3-alkylnaphthalenes	208	0	208	208	2668.928	3576.289
Fluorene	185	0	185	185	2373.806	3180.834
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	750	0	750	750	9623.539	12895.273
Anthracene	123	0	123	123	1578.260	2114.825
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	238	15	254	254	3259.172	4367.199
Pyrene	208	12	220	220	2822.905	3782.613
Benzo(a)anthracene	0	21	21	21	269.459	361.068
Chrysene	0	24	24	24	307.953	412.649
Benzo(b)fluoranthene	0	52	52	52	667.232	894.072
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	17	17	17	218.134	292.293
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-C

Sample Name:		**KF07-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1134.D**	**ENG1140.D**	
Analysis Date:	**02/02/99**	**02/03/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	84.57	116.80
Phenol-d6	104.07	118.43
Nitrobenzene-d5	91.75	121.48
2-Fluorobiphenyl	86.76	95.61
2,4,6-Tribromophenol	95.12	107.59
p-Terphenyl-d14	99.98	106.34

Lab Surrogate Compounds

		% Recovery
Toluene-d8	84.91	128.41
Biphenyl-d10	83.81	98.07
Fluorene-d10	78.09	101.18
Anthracene-d10	100.40	108.57
Pyrene-d10	96.43	104.97

Target Compounds

Hours= 168 Dry Fuel (kg)=197.70

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	11561	0	11561	11548	174521.555	148737.926
m,p-Xylene	1666	0	1666	1662	25117.321	21406.515
o-Xylene	548	0	548	548	8281.764	7058.225
Phenol	15789	7	15796	15776	238418.085	203194.451
Benzofuran	2621	0	2621	2612	39474.394	33642.489
C3-alkylbenzenes	2295	0	2295	2295	34683.665	29559.538
Decane	0	0	0	0	0.000	0.000
o-Cresol	3826	0	3826	3813	57624.757	49111.336
m,p-Cresol	8713	0	8713	8686	131268.984	111875.444
C4-alkylbenzenes	6533	0	6533	6533	98731.323	84144.862
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	260	0	260	260	3929.304	3348.793
2,3-Dimethylphenol	488	0	488	488	7375.002	6285.427
Naphthalene	5939	0	5939	5939	89754.374	76494.158
2-Methylnaphthalene	789	0	789	764	11546.109	9840.299
1-Methylnaphthalene	632	0	632	627	9475.668	8075.743
Biphenyl	312	0	312	309	4669.827	3979.912
Tetradecane	789	0	789	789	11923.927	10162.299
C2-alkylnaphthalenes	611	0	611	606	9158.301	7805.264
Acenaphthylene	1091	0	1091	1091	16487.965	14052.050
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	115	0	115	115	1737.961	1481.197
Dibenzofuran	524	0	524	524	7919.059	6749.106
C3-alkylnaphthalenes	409	0	409	409	6181.098	5267.909
Fluorene	319	0	319	319	4820.954	4108.711
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	1475	40	1515	1515	22895.753	19513.159
Anthracene	236	9	245	245	3702.614	3155.593
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	426	66	492	492	7435.452	6336.947
Pyrene	307	55	361	361	5455.688	4649.670
Benzo(a)anthracene	0	51	51	51	770.748	656.879
Chrysene	0	55	55	55	831.199	708.399
Benzo(b)fluoranthene	0	101	101	101	1526.384	1300.877
Benzo(k)fluoranthene	0	20	20	20	302.254	257.599
Benzo(a)pyrene	0	41	41	41	619.621	528.079
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-A

Sample Name:		**KF08-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**11/15/98**	**11/15/98**	
File Name:	**ENG1066.D**	**ENG1082.D**	
Analysis Date:	**01/15/99**	**01/18/99**	

8270 Surrogate Compounds

	% Recovery	
2-Fluorophenol	99.80	97.21
Phenol-d6	115.80	102.18
Nitrobenzene-d5	103.21	104.05
2-Fluorobiphenyl	98.71	87.87
2,4,6-Tribromophenol	113.94	99.63
p-Terphenyl-d14	102.30	85.72

Lab Surrogate Compounds

	% Recovery	
Toluene-d8	106.08	102.79
Biphenyl-d10	100.46	96.87
Fluorene-d10	94.16	95.66
Anthracene-d10	110.55	100.30
Pyrene-d10	103.81	90.44

Target Compounds

Hours= 168 Dry Fuel (kg)=188

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	14591	0	14591	14579	257767.402	230525.782
m,p-Xylene	2417	0	2417	2413	42663.608	38154.792
o-Xylene	842	0	842	842	14887.177	13313.856
Phenol	15830	0	15830	15810	279532.384	249990.576
Benzofuran	3594	0	3594	3585	63385.427	56686.668
C3-alkylbenzenes	5071	0	5071	5071	89658.996	80183.568
Decane	0	0	0	0	0.000	0.000
o-Cresol	3858	0	3858	3844	67964.736	60782.022
m,p-Cresol	6672	0	6672	6644	117470.788	105056.128
C4-alkylbenzenes	20980	0	20980	20980	370941.772	331739.550
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	309	0	309	309	5463.346	4885.964
2,3-Dimethylphenol	449	0	449	449	7938.649	7099.669
Naphthalene	7836	0	7836	7836	138546.221	123904.247
2-Methylnaphthalene	1277	0	1277	1253	22153.958	19812.662
1-Methylnaphthalene	1076	0	1076	1071	18936.065	16934.845
Biphenyl	578	0	578	575	10166.421	9092.004
Tetradecane	1277	0	1277	1277	22578.296	20192.155
C2-alkylnaphthalenes	1055	0	1055	1050	18564.769	16602.790
Acenaphthylene	2002	0	2002	2002	35396.827	31655.986
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	846	0	846	846	14957.900	13377.105
C3-alkylnaphthalenes	892	0	892	892	15771.214	14104.465
Fluorene	523	0	523	523	9247.023	8269.770
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	2142	3	2145	2145	37925.172	33917.127
Anthracene	329	0	329	329	5816.961	5202.207
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	679	3	682	682	12058.260	10783.907
Pyrene	472	4	476	476	8416.029	7526.598
Benzo(a)anthracene	151	9	160	160	2828.917	2529.949
Chrysene	133	12	145	145	2563.706	2292.766
Benzo(b)fluoranthene	0	47	47	47	830.994	743.172
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	23	23	23	406.657	363.680
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-B

Sample Name:		**KF08-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1135.D**	**ENG1141.D**	
Analysis Date:	**02/02/99**	**02/03/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	97.61	124.10
Phenol-d6	114.80	121.06
Nitrobenzene-d5	86.69	161.55
2-Fluorobiphenyl	88.53	88.21
2,4,6-Tribromophenol	96.59	113.81
p-Terphenyl-d14	109.19	113.18

Lab Surrogate Compounds

		% Recovery
Toluene-d8	99.99	121.58
Biphenyl-d10	96.85	92.15
Fluorene-d10	89.72	101.63
Anthracene-d10	104.31	123.16
Pyrene-d10	111.02	113.41

Target Compounds

Hours= 172.75 Dry Fuel (kg)=189

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	12776	0	12776	12764	287951.093	258807.708
m,p-Xylene	2249	0	2249	2245	50646.365	45520.472
o-Xylene	782	0	782	782	17641.629	15856.129
Phenol	13084	252	13336	13316	300404.008	270000.270
Benzofuran	2468	0	2468	2460	55496.685	49879.894
C3-alkylbenzenes	4079	0	4079	4079	92020.723	82707.352
Decane	0	0	0	0	0.000	0.000
o-Cresol	3132	77	3209	3195	72078.012	64783.033
m,p-Cresol	4946	608	5553	5526	124664.505	112047.273
C4-alkylbenzenes	17248	0	17248	17248	389108.466	349726.994
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	194	14	208	208	4692.403	4217.487
2,3-Dimethylphenol	332	74	406	406	9159.209	8232.210
Naphthalene	4456	0	4456	4456	100525.703	90351.547
2-Methylnaphthalene	636	0	636	612	13806.492	12409.144
1-Methylnaphthalene	487	0	487	482	10873.741	9773.215
Biphenyl	257	0	257	253	5707.586	5129.924
Tetradecane	636	0	636	636	14347.923	12895.777
C2-alkylnaphthalenes	512	0	512	507	11437.731	10280.124
Acenaphthylene	705	197	902	902	20348.785	18289.294
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	0	0	0	0	0.000	0.000
Dibenzofuran	261	253	514	514	11595.649	10422.059
C3-alkylnaphthalenes	0	0	0	0	0.000	0.000
Fluorene	136	159	295	295	6655.090	5981.532
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	329	643	972	972	21927.959	19708.641
Anthracene	0	158	158	158	3564.421	3203.668
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	106	251	357	357	8053.787	7238.667
Pyrene	86	176	262	262	5910.623	5312.411
Benzo(a)anthracene	0	64	64	64	1443.816	1297.688
Chrysene	0	62	62	62	1398.697	1257.136
Benzo(b)fluoranthene	0	99	99	99	2233.403	2007.362
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	0	0	0	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Omni - SVOC Compounds
Episode KF-C

Sample Name:		**KF08-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**12/15/98**	**12/15/98**	
File Name:	**ENG1138.D**	**ENG1142.D**	
Analysis Date:	**02/03/99**	**02/03/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	93.76	108.59
Phenol-d6	104.36	107.40
Nitrobenzene-d5	86.76	110.15
2-Fluorobiphenyl	85.43	97.85
2,4,6-Tribromophenol	92.75	118.73
p-Terphenyl-d14	104.96	106.37

Lab Surrogate Compounds

		% Recovery
Toluene-d8	84.97	92.61
Biphenyl-d10	93.20	98.61
Fluorene-d10	76.58	109.85
Anthracene-d10	98.71	107.76
Pyrene-d10	102.96	105.66

Target Compounds

Hours= 171 Dry Fuel (kg)= 205.00

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	11642	0	11642	11629	199790.811	166323.338
m,p-Xylene	1684	0	1684	1680	28863.063	24028.137
o-Xylene	549	0	549	549	9432.037	7852.052
Phenol	14419	0	14419	14398	247363.324	205926.857
Benzofuran	2767	0	2767	2758	47383.529	39446.192
C3-alkylbenzenes	2147	0	2147	2147	36886.308	30707.387
Decane	0	0	0	0	0.000	0.000
o-Cresol	2448	0	2448	2434	41817.081	34812.194
m,p-Cresol	4274	0	4274	4247	72965.137	60742.559
C4-alkylbenzenes	6747	0	6747	6747	115916.123	96498.716
Undecane	0	0	0	0	0.000	0.000
2-Ethylphenol	140	0	140	140	2405.255	2002.345
2,3-Dimethylphenol	212	0	212	212	3642.244	3032.122
Naphthalene	8342	0	8342	8342	143318.853	119311.143
2-Methylnaphthalene	989	0	989	964	16561.901	13787.574
1-Methylnaphthalene	732	0	732	728	12507.327	10412.193
Biphenyl	457	0	457	453	7782.719	6479.016
Tetradecane	989	0	989	989	16991.410	14145.136
C2-alkylnaphthalenes	542	0	542	538	9243.052	7694.725
Acenaphthylene	1674	0	1674	1674	28759.981	23942.322
Pentadecane	0	0	0	0	0.000	0.000
Acenaphthene	101	0	101	101	1735.220	1444.549
Dibenzofuran	657	0	657	657	11287.519	9396.718
C3-alkylnaphthalenes	316	0	316	316	5429.005	4519.578
Fluorene	406	0	406	406	6975.240	5806.800
Heptadecane	0	0	0	0	0.000	0.000
Octadecane	0	0	0	0	0.000	0.000
Phenanthrene	2102	0	2102	2102	36113.190	30063.776
Anthracene	298	0	298	298	5119.758	4262.134
Carbazole	0	0	0	0	0.000	0.000
Fluoranthene	740	0	740	740	12713.492	10583.822
Pyrene	513	0	513	513	8813.543	7337.163
Benzo(a)anthracene	163	7	170	170	2920.667	2431.419
Chrysene	166	8	174	174	2989.389	2488.629
Benzo(b)fluoranthene	0	37	37	37	635.675	529.191
Benzo(k)fluoranthene	0	0	0	0	0.000	0.000
Benzo(a)pyrene	0	19	19	19	326.428	271.747
Indeno(1,2,3-cd)pyrene	0	0	0	0	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0	0.000	0.000

Blank Data - Klamath Falls

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**XAD Cleaning Blk (190mL)**
Sample Type:	**Blank**
Sample Date:	**12/07/99**
File Name:	**ENG1067.D**
Analysis Date:	**1/15/1999**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	4.56
m,p-Xylene	0.00
o-Xylene	0.00
Phenol	0.00
Benzofuran	0.00
1,2,4-Trimethylbenzene	0.00
Decane	0.00
o-Cresol	0.00
m,p-Cresol	0.00
1,4-Diethylbenzene	0.00
U0ecane	0.00
2-Ethylphenol	0.00
1,2,4,5-Tetramethylbenzene	0.00
2,3-Dimethylphenol	0.00
Naphthalene	0.00
2-Methylnaphthalene	0.00
1-Methylnaphthalene	0.00
Biphenyl	0.00
Tetradecane	0.00
1-Ethylnaphthalene	0.00
2,6-Dimethylnaphthalene	0.00
Acenaphthylene	0.00
Pentadecane	0.00
Acenaphthene	0.00
Dibenzofuran	0.00
2,3,5-Trimethylnaphthalene	0.00
Fluorene	0.00
Heptadecane	0.00
Octadecane	0.00
Phenanthrene	0.00
Anthracene	0.00
Carbazole	0.00
Fluoranthene	0.00
Pyrene	0.00
Benzo(a)anthracene	0.00
Chrysene	0.00
Benzo(b)fluoranthene	0.00
Benzo(k)fluoranthene	0.00
Benzo(a)pyrene	0.00
I0eno(1,2,3-cd)pyrene	0.00

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**XAD Cleaning Blk (200mL)**
Sample Type:	**Blank**
Sample Date:	**12/07/99**
File Name:	**ENG1068.D**
Analysis Date:	**01/15/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	7.66
m,p-Xylene	0.00
o-Xylene	0.00
Phenol	0.00
Benzofuran	0.00
1,2,4-Trimethylbenzene	0.00
Decane	0.00
o-Cresol	0.00
m,p-Cresol	0.00
1,4-Diethylbenzene	0.00
U0ecane	0.00
2-Ethylphenol	0.00
1,2,4,5-Tetramethylbenzene	0.00
2,3-Dimethylphenol	0.00
Naphthalene	0.00
2-Methylnaphthalene	0.00
1-Methylnaphthalene	0.00
Biphenyl	0.00
Tetradecane	0.00
1-Ethylnaphthalene	0.00
2,6-Dimethylnaphthalene	0.00
Acenaphthylene	0.00
Pentadecane	0.00
Acenaphthene	0.00
Dibenzofuran	0.00
2,3,5-Trimethylnaphthalene	0.00
Fluorene	0.00
Heptadecane	0.00
Octadecane	0.00
Phenanthrene	0.00
Anthracene	0.00
Carbazole	0.00
Fluoranthene	0.00
Pyrene	0.00
Benzo(a)anthracene	0.00
Chrysene	0.00
Benzo(b)fluoranthene	0.00
Benzo(k)fluoranthene	0.00
Benzo(a)pyrene	0.00
I0eno(1,2,3-cd)pyrene	0.00

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KF-RB-MeOH**
Sample Type:	**Blank**
Sample Date:	**12/04/99**
File Name:	**ENG1069.D**
Analysis Date:	**1/15/1999**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	0.00
m,p-Xylene	0.00
o-Xylene	0.00
Phenol	0.00
Benzofuran	0.00
1,2,4-Trimethylbenzene	0.00
Decane	0.00
o-Cresol	0.00
m,p-Cresol	0.00
1,4-Diethylbenzene	0.00
U0ecane	0.00
2-Ethylphenol	0.00
1,2,4,5-Tetramethylbenzene	0.00
2,3-Dimethylphenol	0.00
Naphthalene	0.00
2-Methylnaphthalene	0.00
1-Methylnaphthalene	0.00
Biphenyl	0.00
Tetradecane	0.00
1-Ethylnaphthalene	0.00
2,6-Dimethylnaphthalene	0.00
Acenaphthylene	0.00
Pentadecane	0.00
Acenaphthene	0.00
Dibenzofuran	0.00
2,3,5-Trimethylnaphthalene	0.00
Fluorene	0.00
Heptadecane	0.00
Octadecane	0.00
Phenanthrene	0.00
Anthracene	0.00
Carbazole	0.00
Fluoranthene	0.00
Pyrene	0.00
Benzo(a)anthracene	0.00
Chrysene	0.00
Benzo(b)fluoranthene	0.00
Benzo(k)fluoranthene	0.00
Benzo(a)pyrene	0.00
I0eno(1,2,3-cd)pyrene	0.00

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KF-RB-MeCl2**
Sample Type:	**Blank**
Sample Date:	**12/04/99**
File Name:	**ENG1070.D**
Analysis Date:	**01/15/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Filter
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFB1-B Filter**
Sample Type:	**Filter**
Sample Date:	**12/15/98**
File Name:	**ENG1111.D**
Analysis Date:	**01/29/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	107.03
Phenol-d6	108.58
Nitrobenzene-d5	81.20
2-Fluorobiphenyl	82.41
2,4,6-Tribromophenol	90.61
p-Terphenyl-d14	95.65
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	115.40
Biphenyl-d10	88.02
Fluorene-d10	91.18
Anthracene-d10	96.27
Pyrene-d10	101.85
	Target Compounds
	Filter
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFB-B MeOH/MeCl2**
Sample Type:	**Rinse**
Sample Date:	**12/21/98**
File Name:	**ENG1086.D**
Analysis Date:	**01/27/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Rinse
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFB-B-XAD**
Sample Type:	**XAD**
Sample Date:	**12/28/98**
File Name:	**ENG1093.D**
Analysis Date:	**01/27/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	XAD
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFB1-C-F**
Sample Type:	**Filter**
Sample Date:	**12/28/98**
File Name:	**ENG1112.D**
Analysis Date:	**01/29/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	101.74
Phenol-d6	111.77
Nitrobenzene-d5	84.98
2-Fluorobiphenyl	94.40
2,4,6-Tribromophenol	93.66
p-Terphenyl-d14	103.76
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	105.30
Biphenyl-d10	93.78
Fluorene-d10	92.51
Anthracene-d10	107.40
Pyrene-d10	110.22
	Target Compounds
	Filter
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFB-C MeCl2/MeOH**
Sample Type:	**Rinse**
Sample Date:	**12/30/98**
File Name:	**ENG1102.D**
Analysis Date:	**01/28/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Rinse
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFB-C XAD**
Sample Type:	**XAD**
Sample Date:	**12/28/98**
File Name:	**ENG1106.D**
Analysis Date:	**01/29/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	XAD
	µg
Toluene	13
m,p-Xylene	4
o-Xylene	0
Phenol	20
Benzofuran	9
1,2,4-Trimethylbenzene	0
Decane	0
o-Cresol	14
m,p-Cresol	27
1,4-Diethylbenzene	0
U0ecane	0
2-Ethylphenol	0
1,2,4,5-Tetramethylbenzene	0
2,3-Dimethylphenol	0
Naphthalene	24
2-Methylnaphthalene	5
1-Methylnaphthalene	3
Biphenyl	0
Tetradecane	5
1-Ethylnaphthalene	0
2,6-Dimethylnaphthalene	0
Acenaphthylene	0
Pentadecane	0
Acenaphthene	0
Dibenzofuran	0
2,3,5-Trimethylnaphthalene	0
Fluorene	0
Heptadecane	0
Octadecane	0
Phenanthrene	0
Anthracene	0
Carbazole	0
Fluoranthene	0
Pyrene	0
Benzo(a)anthracene	0
Chrysene	0
Benzo(b)fluoranthene	0
Benzo(k)fluoranthene	0
Benzo(a)pyrene	0
I0eno(1,2,3-cd)pyrene	0

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFLB-BC Filter**
Sample Type:	**Filter**
Sample Date:	**12/15/98**
File Name:	**ENG1107.D**
Analysis Date:	**01/29/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	111.58
Phenol-d6	107.33
Nitrobenzene-d5	92.53
2-Fluorobiphenyl	89.54
2,4,6-Tribromophenol	100.76
p-Terphenyl-d14	105.03
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	120.33
Biphenyl-d10	99.40
Fluorene-d10	99.13
Anthracene-d10	104.85
Pyrene-d10	106.93
	Target Compounds
	Rinse
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**KFRB-BC MeCl2 BLK**
Sample Type:	**Blank**
Sample Date:	
File Name:	**ENG1101.D**
Analysis Date:	**01/28/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	0.000
m,p-Xylene	0.000
o-Xylene	0.000
Phenol	0.000
Benzofuran	0.000
1,2,4-Trimethylbenzene	0.000
Decane	0.000
o-Cresol	0.000
m,p-Cresol	0.000
1,4-Diethylbenzene	0.000
U0ecane	0.000
2-Ethylphenol	0.000
1,2,4,5-Tetramethylbenzene	0.000
2,3-Dimethylphenol	0.000
Naphthalene	0.000
2-Methylnaphthalene	0.000
1-Methylnaphthalene	0.000
Biphenyl	0.000
Tetradecane	0.000
1-Ethylnaphthalene	0.000
2,6-Dimethylnaphthalene	0.000
Acenaphthylene	0.000
Pentadecane	0.000
Acenaphthene	0.000
Dibenzofuran	0.000
2,3,5-Trimethylnaphthalene	0.000
Fluorene	0.000
Heptadecane	0.000
Octadecane	0.000
Phenanthrene	0.000
Anthracene	0.000
Carbazole	0.000
Fluoranthene	0.000
Pyrene	0.000
Benzo(a)anthracene	0.000
Chrysene	0.000
Benzo(b)fluoranthene	0.000
Benzo(k)fluoranthene	0.000
Benzo(a)pyrene	0.000
I0eno(1,2,3-cd)pyrene	0.000

Omni - Blanks
Episode A, B, and C of KF

Sample Name:	**Omni: KF-A-LB-F**
Sample Type:	**Filter**
Sample Date:	
File Name:	**ENG1083.D**
Analysis Date:	**01/18/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	94.66
Phenol-d6	92.25
Nitrobenzene-d5	111.54
2-Fluorobiphenyl	92.71
2,4,6-Tribromophenol	102.41
p-Terphenyl-d14	97.32
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	104.21
Biphenyl-d10	93.01
Fluorene-d10	95.95
Anthracene-d10	103.58
Pyrene-d10	95.29
	Target Compounds
	Blank
	µg
Toluene	7.16
m,p-Xylene	0.00
o-Xylene	0.00
Phenol	0.00
Benzofuran	0.00
1,2,4-Trimethylbenzene	0.00
Decane	0.00
o-Cresol	0.00
m,p-Cresol	0.00
1,4-Diethylbenzene	0.00
U0ecane	0.00
2-Ethylphenol	0.00
1,2,4,5-Tetramethylbenzene	0.00
2,3-Dimethylphenol	0.00
Naphthalene	0.00
2-Methylnaphthalene	0.00
1-Methylnaphthalene	0.00
Biphenyl	0.00
Tetradecane	0.00
1-Ethylnaphthalene	0.00
2,6-Dimethylnaphthalene	0.00
Acenaphthylene	0.00
Pentadecane	0.00
Acenaphthene	0.00
Dibenzofuran	0.00
2,3,5-Trimethylnaphthalene	0.00
Fluorene	0.00
Heptadecane	0.00
Octadecane	0.00
Phenanthrene	0.00
Anthracene	0.00
Carbazole	0.00
Fluoranthene	0.00
Pyrene	0.00
Benzo(a)anthracene	0.00
Chrysene	0.00
Benzo(b)fluoranthene	0.00
Benzo(k)fluoranthene	0.00
Benzo(a)pyrene	0.00
I0eno(1,2,3-cd)pyrene	0.00

Organic Compound Analysis Data by Test - Portland

Omni - SVOC Compounds
Episode A

Sample Name:		**P01-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1200.D**	**ENG1191.D**	
Analysis Date:	**03/29/99**	**03/26/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	105.07	100.50
Phenol-d6	106.46	97.11
Nitrobenzene-d5	110.56	119.27
2-Fluorobiphenyl	100.07	93.99
2,4,6-Tribromophenol	112.89	111.83
p-Terphenyl-d14	94.49	102.69

Lab Surrogate Compounds

		% Recovery
Toluene-d8	117.09	101.50
Biphenyl-d10	109.60	98.16
Fluorene-d10	97.72	97.23
Anthracene-d10	104.47	104.77
Pyrene-d10	93.36	101.44

Target Compounds

Hours= 171.25 Dry Fuel (kg)=209.8

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	23005	0	23005	22987.81	321762.469	262825.864
m,p-Xylene	6819	0	6819	6818.55	95439.865	77958.331
o-Xylene	2339	0	2339	2338.87	32737.376	26740.935
Phenol	46533	173	46707	46679.77	653380.990	533702.467
Benzofuran	10421	0	10421	10420.90	145862.286	119144.975
C3-alkylbenzenes	972	0	972	971.71	13601.113	11109.824
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	18323	31	18354	18345.42	256782.514	209748.161
m,p-Cresol	26016	86	26102	26081.68	365067.649	298198.919
C4-alkylbenzenes	778	0	778	777.77	10886.517	8892.455
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	1163	0	1163	1163.22	16281.696	13299.410
2,3-Dimethylphenol	1331	0	1331	1331.14	18632.088	15219.285
Naphthalene	13352	0	13352	13346.77	186815.955	152597.240
2-Methylnaphthalene	2500	0	2500	2500.36	34997.767	28587.294
1-Methylnaphthalene	1782	0	1782	1782.48	24949.535	20379.577
Biphenyl	1212	0	1212	1211.76	16961.115	13854.381
Tetradecane	2500	0	2500	2500.36	34997.767	28587.294
C2-alkylnaphthalenes	209	0	209	208.70	2921.193	2386.124
Acenaphthylene	3188	0	3188	3188.44	44628.885	36454.299
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	308	0	308	307.60	4305.505	3516.874
Dibenzofuran	1918	0	1918	1917.97	26846.001	21928.671
C3-alkylnaphthalenes	145	0	145	145.20	2032.378	1660.111
Fluorene	1183	0	1183	1182.86	16556.599	13523.959
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	2564	15	2579	2576.29	36060.566	29455.422
Anthracene	619	6	625	625.43	8754.201	7150.711
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	896	32	929	928.76	12999.938	10618.765
Pyrene	712	38	749	749.47	10490.400	8568.894
Benzo(a)anthracene	176	64	240	239.94	3358.462	2743.299
Chrysene	185	71	256	256.32	3587.734	2930.576
Benzo(b)fluoranthene	0	158	158	157.83	2209.161	1804.513
Benzo(k)fluoranthene	0	46	46	46.40	649.465	530.504
Benzo(a)pyrene	0	87	87	86.87	1215.927	993.208
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P01-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1237.D**	**ENG1223.D**	
Analysis Date:	**04/01/99**	**03/31/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	83.03	94.35
Phenol-d6	89.68	89.48
Nitrobenzene-d5	95.09	96.60
2-Fluorobiphenyl	78.25	90.93
2,4,6-Tribromophenol	94.63	122.35
p-Terphenyl-d14	76.34	103.04

Lab Surrogate Compounds

		% Recovery
Toluene-d8	94.30	85.44
Biphenyl-d10	85.49	91.25
Fluorene-d10	75.20	93.85
Anthracene-d10	80.78	101.01
Pyrene-d10	72.54	97.74

Target Compounds

Hours= 168.25 Dry Fuel (kg)=209

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	19902	0	19902	19884.81	277623.588	223652.605
m,p-Xylene	4897	0	4897	4897.22	68372.984	55081.040
o-Xylene	1697	0	1697	1696.90	23691.424	19085.730
Phenol	37781	15	37796	37768.83	527312.964	424801.506
Benzofuran	7657	0	7657	7656.88	106902.228	86120.067
C3-alkylbenzenes	1286	0	1286	1285.78	17951.535	14461.694
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	13559	0	13559	13550.49	189186.402	152407.913
m,p-Cresol	17160	10	17170	17149.16	239429.561	192883.629
C4-alkylbenzenes	2992	0	2992	2992.28	41776.990	33655.399
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	889	0	889	889.22	12414.926	10001.422
2,3-Dimethylphenol	1245	0	1245	1245.45	17388.464	14008.086
Naphthalene	12125	0	12125	12119.78	169211.414	136316.131
2-Methylnaphthalene	1908	0	1908	1908.39	26644.161	21464.444
1-Methylnaphthalene	1453	0	1453	1452.85	20284.098	16340.799
Biphenyl	925	0	925	925.40	12920.056	10408.353
Tetradecane	1908	0	1908	1908.39	26644.161	21464.444
C2-alkylnaphthalenes	567	0	567	566.69	7911.894	6373.795
Acenaphthylene	2537	0	2537	2537.03	35420.976	28535.016
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	210	0	210	210.24	2935.285	2364.655
Dibenzofuran	1618	0	1618	1617.77	22586.643	18195.722
C3-alkylnaphthalenes	189	0	189	189.05	2639.439	2126.323
Fluorene	945	0	945	944.56	13187.561	10623.853
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	2412	10	2422	2419.11	33774.625	27208.721
Anthracene	509	6	514	514.22	7179.329	5783.643
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	827	37	864	863.56	12056.672	9712.813
Pyrene	743	44	787	786.85	10985.678	8850.024
Benzo(a)anthracene	155	60	215	215.19	3004.395	2420.330
Chrysene	173	70	244	243.54	3400.206	2739.194
Benzo(b)fluoranthene	0	180	180	180.34	2517.833	2028.358
Benzo(k)fluoranthene	0	42	42	42.16	588.621	474.191
Benzo(a)pyrene	0	102	102	102.10	1425.478	1148.361
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:			**P01-C**
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1273.D**	**ENG1242.D**	
Analysis Date:	**04/06/99**	**04/01/99**	

8270 Surrogate Compounds

	% Recovery
2-Fluorophenol	92.06
Phenol-d6	97.33
Nitrobenzene-d5	92.04
2-Fluorobiphenyl	95.19
2,4,6-Tribromophenol	124.12
p-Terphenyl-d14	108.85

Lab Surrogate Compounds

	% Recovery
Toluene-d8	97.44
Biphenyl-d10	90.96
Fluorene-d10	96.71
Anthracene-d10	102.62
Pyrene-d10	102.31

Target Compounds

Hours= 168 Dry Fuel (kg)=210.9

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	23179	0	23179	23162.24	302037.174	240871.035
m,p-Xylene	5384	0	5384	5383.62	70202.768	55985.868
o-Xylene	1837	0	1837	1836.55	23948.736	19098.831
Phenol	54925	41	54966	54939.30	716412.182	571330.149
Benzofuran	8312	0	8312	8312.09	108390.215	86439.900
C3-alkylbenzenes	5081	0	5081	5081.38	66261.538	52842.785
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	15101	0	15101	15092.30	196804.611	156949.324
m,p-Cresol	23531	26	23557	23536.09	306912.203	244758.812
C4-alkylbenzenes	2408	0	2408	2407.73	31396.962	25038.702
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	909	0	909	909.34	11857.855	9456.498
2,3-Dimethylphenol	1179	0	1179	1179.13	15375.935	12262.124
Naphthalene	13918	0	13918	13913.59	181434.153	144691.568
2-Methylnaphthalene	1873	0	1873	1873.02	24424.307	19478.093
1-Methylnaphthalene	1368	0	1368	1367.69	17834.770	14223.016
Biphenyl	1006	0	1006	1006.02	13118.569	10461.902
Tetradecane	1873	0	1873	1873.02	24424.307	19478.093
C2-alkylnaphthalenes	1226	0	1226	1226.45	15992.991	12754.219
Acenaphthylene	2710	0	2710	2709.89	35337.149	28180.953
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	201	0	201	200.81	2618.576	2088.283
Dibenzofuran	1484	0	1484	1484.35	19356.024	15436.198
C3-alkylnaphthalenes	573	0	573	573.21	7474.697	5960.982
Fluorene	843	0	843	842.54	10986.778	8761.824
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	2552	13	2564	2561.29	33399.395	26635.618
Anthracene	514	6	520	520.08	6781.878	5408.467
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	737	36	774	773.61	10087.927	8045.001
Pyrene	778	38	816	815.94	10639.913	8485.203
Benzo(a)anthracene	0	59	59	58.91	768.190	612.623
Chrysene	0	69	69	68.58	894.288	713.184
Benzo(b)fluoranthene	0	198	198	198.32	2586.106	2062.389
Benzo(k)fluoranthene	0	44	44	44.12	575.328	458.817
Benzo(a)pyrene	0	112	112	111.84	1458.401	1163.057
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:			**P02-A**
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1206.D**	**ENG1192.D**	
Analysis Date:	**03/30/99**	**03/26/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	94.34	98.50
Phenol-d6	89.65	96.42
Nitrobenzene-d5	94.51	106.45
2-Fluorobiphenyl	85.84	98.29
2,4,6-Tribromophenol	92.04	114.04
p-Terphenyl-d14	91.25	98.08

Lab Surrogate Compounds

		% Recovery
Toluene-d8	101.43	86.92
Biphenyl-d10	89.97	108.78
Fluorene-d10	77.44	104.81
Anthracene-d10	89.38	105.57
Pyrene-d10	84.58	96.27

Target Compounds

Hours= 168 Dry Fuel (kg)=58.5

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	4897	0	4897	4879.75	130335.462	205882.325
m,p-Xylene	1012	0	1012	1011.83	27025.428	42690.284
o-Xylene	379	0	379	379.49	10135.971	16011.124
Phenol	8058	70	8128	8101.08	216375.431	341793.982
Benzofuran	1594	0	1594	1593.93	42573.001	67249.759
C3-alkylbenzenes	1262	0	1262	1262.28	33714.811	53257.060
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	2665	7	2672	2663.14	71131.018	112360.972
m,p-Cresol	3819	24	3842	3821.80	102078.195	161246.184
C4-alkylbenzenes	514	0	514	514.25	13735.337	21696.805
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	184	0	184	184.37	4924.422	7778.785
2,3-Dimethylphenol	265	0	265	265.00	7078.006	11180.658
Naphthalene	3606	0	3606	3600.97	96179.946	151929.110
2-Methylnaphthalene	420	0	420	419.57	11206.486	17702.146
1-Methylnaphthalene	346	0	346	345.93	9239.602	14595.189
Biphenyl	256	0	256	255.69	6829.341	10787.858
Tetradecane	420	0	420	419.57	11206.486	17702.146
C2-alkylnaphthalenes	268	0	268	267.98	7157.600	11306.388
Acenaphthylene	813	0	813	813.48	21727.607	34321.667
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	347	0	347	346.53	9255.627	14620.504
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	221	0	221	220.78	5896.913	9314.965
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	532	4	536	533.28	14243.618	22499.703
Anthracene	117	0	117	116.51	3111.919	4915.692
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	209	10	219	218.54	5837.084	9220.457
Pyrene	193	11	204	204.02	5449.263	8607.841
Benzo(a)anthracene	0	12	12	11.97	319.712	505.028
Chrysene	0	13	13	12.57	335.738	530.343
Benzo(b)fluoranthene	0	25	25	24.87	664.264	1049.294
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	17	17	16.63	444.178	701.639
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P02-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1241.D**	**ENG1227.D**	
Analysis Date:	**04/01/99**	**03/31/99**	

8270 Surrogate Compounds

	% Recovery
2-Fluorophenol	95.19
Phenol-d6	90.49
Nitrobenzene-d5	103.50
2-Fluorobiphenyl	82.53
2,4,6-Tribromophenol	111.91
p-Terphenyl-d14	97.72

Lab Surrogate Compounds

	% Recovery
Toluene-d8	95.84
Biphenyl-d10	84.47
Fluorene-d10	87.72
Anthracene-d10	102.82
Pyrene-d10	93.77

Target Compounds

Hours= 166.75 Dry Fuel (kg)=87.2

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	9788	0	9788	9770.38	154353.667	203393.185
m,p-Xylene	2269	0	2269	2268.61	35839.780	47226.394
o-Xylene	902	0	902	901.50	14242.008	18766.819
Phenol	15958	20	15979	15951.58	252005.026	332069.241
Benzofuran	2981	0	2981	2981.01	47094.363	62056.657
C3-alkylbenzenes	1329	0	1329	1328.66	20990.334	27659.148
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	5953	0	5953	5943.95	93903.254	123737.145
m,p-Cresol	9154	14	9168	9147.42	144512.068	190424.824
C4-alkylbenzenes	3092	0	3092	3092.08	48849.061	64368.837
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	516	0	516	515.65	8146.302	10734.454
2,3-Dimethylphenol	712	0	712	711.59	11241.786	14813.401
Naphthalene	5141	0	5141	5135.69	81134.263	106911.333
2-Methylnaphthalene	812	0	812	811.74	12823.969	16898.256
1-Methylnaphthalene	663	0	663	662.85	10471.786	13798.765
Biphenyl	463	0	463	462.94	7313.583	9637.173
Tetradecane	812	0	812	811.74	12823.969	16898.256
C2-alkylnaphthalenes	586	0	586	585.59	9251.223	12190.418
Acenaphthylene	1080	8	1088	1088.21	17191.676	22653.622
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	677	4	681	680.79	10755.204	14172.227
C3-alkylnaphthalenes	195	0	195	195.36	3086.321	4066.873
Fluorene	384	0	384	383.95	6065.689	7992.812
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	903	38	941	937.73	14814.374	19521.031
Anthracene	204	10	214	213.54	3373.531	4445.332
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	300	41	341	340.98	5386.844	7098.292
Pyrene	296	39	335	335.31	5297.269	6980.258
Benzo(a)anthracene	0	27	27	26.68	421.494	555.406
Chrysene	0	30	30	30.37	479.789	632.222
Benzo(b)fluoranthene	0	56	56	55.90	883.115	1163.689
Benzo(k)fluoranthene	0	17	17	16.95	267.778	352.854
Benzo(a)pyrene	0	32	32	32.30	510.279	672.400
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:			**P02-C**
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1261.D**	**ENG1243.D**	
Analysis Date:	**04/02/99**	**04/01/99**	

8270 Surrogate Compounds

	% Recovery	
2-Fluorophenol	75.86	85.53
Phenol-d6	77.52	77.70
Nitrobenzene-d5	68.62	79.07
2-Fluorobiphenyl	74.05	84.11
2,4,6-Tribromophenol	78.34	104.55
p-Terphenyl-d14	65.84	90.76

Lab Surrogate Compounds

	% Recovery	
Toluene-d8	87.92	87.28
Biphenyl-d10	70.02	87.21
Fluorene-d10	63.05	81.24
Anthracene-d10	71.94	89.43
Pyrene-d10	68.59	87.42

Target Compounds

Hours= 168 Dry Fuel (kg)=78.9

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	5068	0	5068	5050.26	91657.870	127384.606
m,p-Xylene	1243	0	1243	1243.07	22560.650	31354.422
o-Xylene	454	0	454	453.60	8232.449	11441.323
Phenol	7015	0	7015	6988.43	126833.986	176271.796
Benzofuran	1786	0	1786	1786.11	32416.358	45051.724
C3-alkylbenzenes	1093	0	1093	1093.47	19845.539	27581.005
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	2604	0	2604	2595.59	47107.723	65469.542
m,p-Cresol	3813	0	3813	3792.52	68830.972	95660.157
C4-alkylbenzenes	0	0	0	0.00	0.000	0.000
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	3557	0	3557	3551.82	64462.474	89588.891
2-Methylnaphthalene	552	0	552	551.57	10010.520	13912.457
1-Methylnaphthalene	421	0	421	421.28	7645.869	10626.104
Biphenyl	249	0	249	248.63	4512.420	6271.288
Tetradecane	552	0	552	551.57	10010.520	13912.457
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	721	0	721	721.28	13090.611	18193.116
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	331	0	331	331.25	6011.902	8355.243
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	0	0	0	0.00	0.000	0.000
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	540	0	540	536.57	9738.283	13534.107
Anthracene	0	0	0	0.00	0.000	0.000
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	205	0	205	204.63	3713.858	5161.459
Pyrene	211	0	211	210.60	3822.209	5312.043
Benzo(a)anthracene	0	8	8	8.06	146.282	203.300
Chrysene	0	9	9	9.06	164.431	228.524
Benzo(b)fluoranthene	0	32	32	31.75	576.235	800.842
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	19	19	19.10	346.649	481.766
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:		**P03-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1208.D**	**ENG1193.D**	
Analysis Date:	**03/30/99**	**03/26/99**	

8270 Surrogate Compounds

	% Recovery	
2-Fluorophenol	97.03	98.12
Phenol-d6	100.35	97.69
Nitrobenzene-d5	88.73	94.79
2-Fluorobiphenyl	96.67	96.15
2,4,6-Tribromophenol	109.91	108.50
p-Terphenyl-d14	101.89	101.18

Lab Surrogate Compounds

	% Recovery	
Toluene-d8	96.67	94.92
Biphenyl-d10	94.40	97.24
Fluorene-d10	83.23	99.58
Anthracene-d10	100.92	101.32
Pyrene-d10	104.16	101.20

Target Compounds

Hours= 168.75 Dry Fuel (kg)=27.5

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	495	0	495	477.65	40612.355	50279.043
m,p-Xylene	132	0	132	131.63	11191.886	13855.816
o-Xylene	43	0	43	42.52	3615.278	4475.798
Phenol	1043	0	1043	1016.22	86404.453	106970.729
Benzofuran	156	0	156	155.93	13258.002	16413.715
C3-alkylbenzenes	175	0	175	174.92	14872.633	18412.667
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	324	0	324	315.58	26832.298	33219.010
m,p-Cresol	538	0	538	517.06	43963.204	54427.472
C4-alkylbenzenes	127	0	127	127.06	10803.320	13374.762
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	25	0	25	25.39	2158.793	2672.637
2,3-Dimethylphenol	38	0	38	37.84	3217.359	3983.165
Naphthalene	339	0	339	334.11	28407.817	35169.540
2-Methylnaphthalene	47	0	47	46.54	3957.079	4898.957
1-Methylnaphthalene	38	0	38	37.75	3209.707	3973.692
Biphenyl	29	0	29	29.28	2489.542	3082.111
Tetradecane	47	0	47	46.54	3957.079	4898.957
C2-alkylnaphthalenes	34	0	34	34.04	2894.263	3583.165
Acenaphthylene	68	0	68	67.78	5763.018	7134.750
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	55	0	55	54.92	4669.592	5781.064
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	26	0	26	26.09	2218.311	2746.321
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	66	0	66	62.84	5342.993	6614.749
Anthracene	12	0	12	12.32	1047.512	1296.845
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	20	0	20	19.70	1674.999	2073.688
Pyrene	23	0	23	22.55	1917.321	2373.689
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P03-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1211.D**	**ENG1228.D**	
Analysis Date:	**03/30/99**	**03/31/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	83.73	80.84
Phenol-d6	78.89	78.53
Nitrobenzene-d5	90.66	91.45
2-Fluorobiphenyl	84.28	85.81
2,4,6-Tribromophenol	105.59	103.32
p-Terphenyl-d14	101.71	92.58

Lab Surrogate Compounds

		% Recovery
Toluene-d8	81.05	77.90
Biphenyl-d10	90.57	90.50
Fluorene-d10	76.14	89.56
Anthracene-d10	98.17	95.41
Pyrene-d10	95.98	93.08

Target Compounds

Hours= 168.75 Dry Fuel (kg)=61.5

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	197	0	197	179.37	12166.849	11723.151
m,p-Xylene	43	0	43	43.10	2923.517	2816.903
o-Xylene	10	0	10	9.85	668.136	643.770
Phenol	235	0	235	207.89	14101.390	13587.143
Benzofuran	51	0	51	51.12	3467.522	3341.069
C3-alkylbenzenes	16	0	16	16.39	1111.750	1071.207
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	53	0	53	44.15	2994.739	2885.528
m,p-Cresol	95	0	95	74.91	5081.221	4895.920
C4-alkylbenzenes	59	0	59	58.72	3983.037	3837.785
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	172	0	172	166.78	11312.857	10900.302
2-Methylnaphthalene	21	0	21	20.52	1391.892	1341.133
1-Methylnaphthalene	17	0	17	17.45	1183.651	1140.486
Biphenyl	16	0	16	15.82	1073.087	1033.954
Tetradecane	21	0	21	20.52	1391.892	1341.133
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	52	0	52	51.68	3505.507	3377.669
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	24	0	24	24.33	1650.329	1590.145
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	0	0	0	0.00	0.000	0.000
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	44	0	44	40.57	2751.904	2651.548
Anthracene	8	0	8	8.13	551.466	531.355
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	15	0	15	15.21	1031.710	994.086
Pyrene	15	0	15	14.57	988.298	952.257
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:			**P03-C**
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1265.D**	**ENG1247.D**	
Analysis Date:	**04/06/99**	**04/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	82.28	82.81
Phenol-d6	82.56	74.85
Nitrobenzene-d5	75.50	81.76
2-Fluorobiphenyl	68.64	79.50
2,4,6-Tribromophenol	77.78	99.64
p-Terphenyl-d14	71.11	99.45

Lab Surrogate Compounds

		% Recovery
Toluene-d8	74.33	84.25
Biphenyl-d10	72.40	86.41
Fluorene-d10	60.46	83.84
Anthracene-d10	64.39	83.25
Pyrene-d10	66.07	93.35

Target Compounds

Hours= 168 Dry Fuel (kg)=69.2

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	1382	0	1382	1364.56	71869.072	71438.458
m,p-Xylene	251	0	251	250.81	13209.739	13130.591
o-Xylene	90	0	90	89.64	4721.188	4692.900
Phenol	2026	0	2026	1999.04	105286.063	104655.226
Benzofuran	322	0	322	322.02	16960.250	16858.630
C3-alkylbenzenes	222	0	222	221.60	11671.298	11601.368
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	488	0	488	479.69	25264.463	25113.087
m,p-Cresol	909	0	909	888.73	46807.909	46527.453
C4-alkylbenzenes	223	0	223	222.57	11722.386	11652.150
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	34	0	34	33.74	1777.029	1766.382
2,3-Dimethylphenol	46	0	46	45.94	2419.582	2405.085
Naphthalene	660	0	660	655.65	34531.979	34325.076
2-Methylnaphthalene	76	0	76	75.64	3983.831	3959.961
1-Methylnaphthalene	61	0	61	61.08	3216.981	3197.706
Biphenyl	51	0	51	51.19	2696.091	2679.937
Tetradecane	76	0	76	75.64	3983.831	3959.961
C2-alkylnaphthalenes	47	0	47	46.64	2456.450	2441.732
Acenaphthylene	90	0	90	90.33	4757.529	4729.023
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	80	0	80	79.71	4198.191	4173.037
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	29	0	29	28.50	1501.047	1492.053
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	92	0	92	88.83	4678.526	4650.494
Anthracene	16	0	16	16.25	855.860	850.732
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	33	0	33	32.56	1714.880	1704.605
Pyrene	33	0	33	33.40	1759.122	1748.582
Benzo(a)anthracene	8	0	8	8.19	431.353	428.769
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:		**P04-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1208.D**	**ENG1194.D**	
Analysis Date:	**03/31/99**	**03/26/99**	

8270 Surrogate Compounds

	% Recovery
2-Fluorophenol	108.68
Phenol-d6	99.63
Nitrobenzene-d5	121.40
2-Fluorobiphenyl	114.96
2,4,6-Tribromophenol	124.83
p-Terphenyl-d14	119.48

Lab Surrogate Compounds

	% Recovery
Toluene-d8	98.40
Biphenyl-d10	114.74
Fluorene-d10	111.33
Anthracene-d10	127.64
Pyrene-d10	114.54

Target Compounds

Hours= 168.25 Dry Fuel (kg)=70.7

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	2776	0	2776	2758.62	61517.869	82998.082
m,p-Xylene	750	0	750	750.23	16730.304	22572.029
o-Xylene	272	0	272	271.97	6064.994	8182.710
Phenol	4448	0	4448	4420.86	98586.209	133009.585
Benzofuran	886	0	886	885.52	19747.302	26642.474
C3-alkylbenzenes	0	0	0	0.00	0.000	0.000
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	1340	0	1340	1331.14	29684.732	40049.759
m,p-Cresol	2140	0	2140	2119.43	47263.783	63766.892
C4-alkylbenzenes	0	0	0	0.00	0.000	0.000
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	1509	0	1509	1504.54	33551.593	45266.812
2-Methylnaphthalene	0	0	0	0.00	0.000	0.000
1-Methylnaphthalene	155	0	155	155.38	3465.010	4674.889
Biphenyl	126	0	126	126.29	2816.296	3799.664
Tetradecane	241	0	241	240.71	5367.889	7242.197
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	198	0	198	198.40	4424.366	5969.224
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	0	0	0	0.00	0.000	0.000
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	0	0	0	0.00	0.000	0.000
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	227	0	227	224.01	4995.475	6739.747
Anthracene	0	0	0	0.00	0.000	0.000
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	0	0	0	0.00	0.000	0.000
Pyrene	0	0	0	0.00	0.000	0.000
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P04-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1211.D**	**ENG1229.D**	
Analysis Date:	**04/02/99**	**04/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	88.66	86.57
Phenol-d6	79.26	80.24
Nitrobenzene-d5	69.84	92.32
2-Fluorobiphenyl	79.69	87.04
2,4,6-Tribromophenol	84.36	105.94
p-Terphenyl-d14	75.30	94.13

Lab Surrogate Compounds

		% Recovery
Toluene-d8	89.43	84.26
Biphenyl-d10	79.31	85.08
Fluorene-d10	68.61	92.16
Anthracene-d10	80.40	95.74
Pyrene-d10	76.89	96.64

Target Compounds

Hours= 168 Dry Fuel (kg)=109.7

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	3059	0	3059	3041.59	62170.137	66385.058
m,p-Xylene	701	0	701	701.34	14335.398	15307.289
o-Xylene	250	0	250	249.66	5103.053	5449.023
Phenol	4769	0	4769	4741.90	96924.494	103495.641
Benzofuran	932	0	932	931.88	19047.639	20339.003
C3-alkylbenzenes	0	0	0	0.00	0.000	0.000
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	1574	0	1574	1564.82	31984.940	34153.409
m,p-Cresol	2399	0	2399	2378.34	48613.298	51909.113
C4-alkylbenzenes	0	0	0	0.00	0.000	0.000
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	1556	0	1556	1551.53	31713.292	33863.344
2-Methylnaphthalene	0	0	0	0.00	0.000	0.000
1-Methylnaphthalene	154	0	154	153.63	3140.199	3353.094
Biphenyl	0	0	0	0.00	0.000	0.000
Tetradecane	236	0	236	235.65	4816.689	5143.244
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	274	0	274	274.18	5604.243	5984.191
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	243	0	243	242.94	4965.697	5302.354
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	0	0	0	0.00	0.000	0.000
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	296	0	296	293.15	5991.990	6398.226
Anthracene	0	0	0	0.00	0.000	0.000
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	0	0	0	0.00	0.000	0.000
Pyrene	0	0	0	0.00	0.000	0.000
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:		**P04-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1265.D**	**ENG1248.D**	
Analysis Date:	**04/06/99**	**04/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	69.07	87.54
Phenol-d6	77.78	79.22
Nitrobenzene-d5	57.18	80.23
2-Fluorobiphenyl	56.45	87.89
2,4,6-Tribromophenol	57.39	106.04
p-Terphenyl-d14	53.33	95.62

Lab Surrogate Compounds

		% Recovery
Toluene-d8	71.16	88.79
Biphenyl-d10	58.26	94.85
Fluorene-d10	47.74	88.07
Anthracene-d10	56.96	91.63
Pyrene-d10	55.04	88.73

Target Compounds

Hours= 168 Dry Fuel (kg)=77

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	2523	0	2523	2505.44	46168.404	70107.075
m,p-Xylene	766	0	766	765.99	14115.100	21433.887
o-Xylene	262	0	262	261.86	4825.363	7327.351
Phenol	4235	0	4235	4208.06	77543.031	117749.688
Benzofuran	760	0	760	759.51	13995.691	21252.564
C3-alkylbenzenes	340	0	340	340.41	6272.825	9525.333
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	1470	0	1470	1460.88	26920.021	40878.258
m,p-Cresol	2260	0	2260	2239.14	41261.223	62655.484
C4-alkylbenzenes	0	0	0	0.00	0.000	0.000
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	196	0	196	195.87	3609.348	5480.823
Naphthalene	1100	0	1100	1095.58	20188.542	30656.455
2-Methylnaphthalene	0	0	0	0.00	0.000	0.000
1-Methylnaphthalene	130	0	130	129.54	2387.068	3624.781
Biphenyl	87	0	87	86.82	1599.855	2429.392
Tetradecane	166	0	166	165.93	3057.636	4643.044
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	133	0	133	133.47	2459.487	3734.750
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	148	0	148	147.56	2719.127	4129.015
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	0	0	0	0.00	0.000	0.000
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	166	0	166	163.29	3008.988	4569.171
Anthracene	0	0	0	0.00	0.000	0.000
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	0	0	0	0.00	0.000	0.000
Pyrene	0	0	0	0.00	0.000	0.000
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:		**P05-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1209.D**	**ENG1195.D**	
Analysis Date:	**03/30/99**	**03/26/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	88.19	98.87
Phenol-d6	90.09	93.32
Nitrobenzene-d5	97.37	99.22
2-Fluorobiphenyl	88.69	98.26
2,4,6-Tribromophenol	110.81	102.92
p-Terphenyl-d14	103.07	100.31

Lab Surrogate Compounds

		% Recovery
Toluene-d8	87.55	96.34
Biphenyl-d10	95.84	101.61
Fluorene-d10	73.96	101.18
Anthracene-d10	105.18	98.65
Pyrene-d10	94.92	102.80

Target Compounds

Hours= 167.25 Dry Fuel (kg)=40.7

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	960	0	960	943.20	480336.452	236208.950
m,p-Xylene	254	0	254	253.74	129220.284	63545.016
o-Xylene	88	0	88	88.06	44845.662	22053.181
Phenol	1919	0	1919	1892.35	963703.017	473907.980
Benzofuran	300	0	300	299.79	152671.825	75077.482
C3-alkylbenzenes	419	0	419	418.98	213370.830	104926.660
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	557	0	557	548.09	279121.720	137260.139
m,p-Cresol	954	0	954	933.15	475218.364	233692.093
C4-alkylbenzenes	290	0	290	290.26	147818.552	72690.850
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	35	0	35	35.43	18043.173	8872.862
2,3-Dimethylphenol	54	0	54	54.11	27556.197	13550.961
Naphthalene	599	0	599	594.12	302563.076	148787.597
2-Methylnaphthalene	80	0	80	80.16	40822.487	20074.756
1-Methylnaphthalene	62	0	62	61.99	31569.186	15524.377
Biphenyl	51	0	51	51.18	26064.058	12817.190
Tetradecane	80	0	80	80.16	40822.487	20074.756
C2-alkylnaphthalenes	63	0	63	63.46	32317.802	15892.515
Acenaphthylene	98	0	98	97.78	49795.694	24487.395
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	85	0	85	85.46	43521.579	21402.054
C3-alkylnaphthalenes	38	0	38	37.79	19245.032	9463.885
Fluorene	38	0	38	38.40	19555.683	9616.649
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	112	0	112	109.11	55565.639	27324.808
Anthracene	23	0	23	23.09	11758.873	5782.511
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	44	0	44	43.60	22203.848	10918.904
Pyrene	35	0	35	35.39	18022.802	8862.844
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P05-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1212.D**	**ENG1230.D**	
Analysis Date:	**03/30/99**	**04/01/99**	

8270 Surrogate Compounds

	% Recovery
2-Fluorophenol	92.53
Phenol-d6	85.80
Nitrobenzene-d5	96.90
2-Fluorobiphenyl	93.19
2,4,6-Tribromophenol	113.63
p-Terphenyl-d14	107.93

Lab Surrogate Compounds

	% Recovery
Toluene-d8	96.76
Biphenyl-d10	97.64
Fluorene-d10	94.23
Anthracene-d10	102.56
Pyrene-d10	109.58

Target Compounds

Hours= 168 Dry Fuel (kg)=27.5

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	289	0	289	272.18	28741.624	35081.709
m,p-Xylene	51	0	51	51.19	5405.554	6597.960
o-Xylene	16	0	16	16.01	1690.622	2063.554
Phenol	438	0	438	411.06	43407.053	52982.171
Benzofuran	96	0	96	95.88	10124.722	12358.124
C3-alkylbenzenes	0	0	0	0.00	0.000	0.000
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	94	0	94	84.92	8967.370	10945.473
m,p-Cresol	172	0	172	151.73	16022.362	19556.719
C4-alkylbenzenes	0	0	0	0.00	0.000	0.000
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	481	0	481	475.84	50247.682	61331.768
2-Methylnaphthalene	42	0	42	41.63	4396.039	5365.756
1-Methylnaphthalene	35	0	35	34.93	3688.533	4502.183
Biphenyl	33	0	33	33.09	3494.233	4265.022
Tetradecane	42	0	42	41.63	4396.039	5365.756
C2-alkylnaphthalenes	14	0	14	14.00	1478.370	1804.482
Acenaphthylene	118	0	118	117.61	12419.363	15158.938
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	49	0	49	49.07	5181.687	6324.710
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	29	0	29	29.40	3104.577	3789.412
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	99	0	99	95.52	10086.707	12311.723
Anthracene	21	0	21	20.72	2187.988	2670.633
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	43	0	43	43.13	4554.435	5559.094
Pyrene	40	0	40	40.05	4229.194	5162.108
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:			**P05-C**
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1213.D**	**ENG1249.D**	
Analysis Date:	**03/30/99**	**04/01/99**	

8270 Surrogate Compounds

	% Recovery	
2-Fluorophenol	80.23	82.19
Phenol-d6	82.24	76.03
Nitrobenzene-d5	86.20	82.64
2-Fluorobiphenyl	88.77	82.84
2,4,6-Tribromophenol	105.14	104.57
p-Terphenyl-d14	109.92	103.04

Lab Surrogate Compounds

	% Recovery	
Toluene-d8	74.12	82.75
Biphenyl-d10	89.05	90.24
Fluorene-d10	79.31	90.36
Anthracene-d10	93.09	89.97
Pyrene-d10	102.75	102.18

Target Compounds

Hours= 168 Dry Fuel (kg)=32

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	270	0	270	252.85	33114.559	34919.720
m,p-Xylene	46	0	46	45.79	5996.898	6323.804
o-Xylene	14	0	14	13.91	1821.726	1921.033
Phenol	434	0	434	407.37	53351.306	56259.625
Benzofuran	84	0	84	84.11	11015.486	11615.968
C3-alkylbenzenes	48	0	48	47.80	6260.138	6601.395
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	77	0	77	68.02	8908.255	9393.867
m,p-Cresol	130	0	130	109.27	14310.571	15090.677
C4-alkylbenzenes	117	0	117	116.62	15273.165	16105.745
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	400	0	400	394.97	51727.337	54547.130
2-Methylnaphthalene	34	0	34	33.72	4416.148	4656.883
1-Methylnaphthalene	28	0	28	27.98	3664.407	3864.164
Biphenyl	29	0	29	29.31	3838.591	4047.843
Tetradecane	34	0	34	33.72	4416.148	4656.883
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	91	0	91	90.74	11883.785	12531.601
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	36	0	36	35.88	4699.032	4955.189
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	22	0	22	22.34	2925.763	3085.254
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	82	0	82	78.40	10267.674	10827.392
Anthracene	16	0	16	16.15	2115.088	2230.387
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	31	0	31	30.69	4019.323	4238.427
Pyrene	31	0	31	30.65	4014.084	4232.903
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:		**P06-A**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1217.D**	**ENG1196.D**	
Analysis Date:	**03/31/99**	**03/26/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	83.78	95.94
Phenol-d6	77.14	93.60
Nitrobenzene-d5	75.58	110.00
2-Fluorobiphenyl	81.30	93.56
2,4,6-Tribromophenol	85.40	116.98
p-Terphenyl-d14	79.07	108.48

Lab Surrogate Compounds

		% Recovery
Toluene-d8	92.80	97.62
Biphenyl-d10	86.52	99.50
Fluorene-d10	75.04	99.67
Anthracene-d10	81.20	108.51
Pyrene-d10	78.43	104.41

Target Compounds

Hours= 168 Dry Fuel (kg)=205.4

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	9477	0	9477	9459.94	217070.822	147039.490
m,p-Xylene	1743	0	1743	1742.76	39989.931	27088.390
o-Xylene	658	0	658	658.22	15103.728	10230.967
Phenol	13136	85	13221	13193.59	302744.354	205073.049
Benzofuran	3209	0	3209	3209.25	73640.481	49882.608
C3-alkylbenzenes	1008	0	1008	1008.16	23133.563	15670.219
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	3885	10	3895	3886.44	89179.501	60408.433
m,p-Cresol	5364	31	5395	5374.81	123332.117	83542.741
C4-alkylbenzenes	853	0	853	853.36	19581.473	13264.103
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	305	0	305	305.15	7002.070	4743.064
2,3-Dimethylphenol	311	0	311	310.54	7125.751	4826.843
Naphthalene	6925	0	6925	6920.65	158803.458	107570.328
2-Methylnaphthalene	844	0	844	843.90	19364.400	13117.063
1-Methylnaphthalene	722	0	722	722.48	16578.258	11229.785
Biphenyl	484	0	484	484.27	11112.215	7527.195
Tetradecane	844	0	844	843.90	19364.400	13117.063
C2-alkylnaphthalenes	325	0	325	325.22	7462.603	5055.020
Acenaphthylene	1360	0	1360	1359.98	31206.538	21138.693
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	113	0	113	112.59	2583.526	1750.030
Dibenzofuran	872	0	872	871.82	20005.062	13551.034
C3-alkylnaphthalenes	0	9	9	9.39	215.466	145.952
Fluorene	381	0	381	381.20	8747.138	5925.138
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	1074	35	1110	1106.45	25388.957	17197.978
Anthracene	200	7	207	207.33	4757.461	3222.610
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	361	47	408	408.05	9363.246	6342.478
Pyrene	331	50	382	381.85	8762.053	5935.242
Benzo(a)anthracene	0	40	40	40.44	927.949	628.574
Chrysene	0	45	45	45.42	1042.222	705.981
Benzo(b)fluoranthene	0	71	71	71.49	1640.433	1111.197
Benzo(k)fluoranthene	0	21	21	20.52	470.859	318.950
Benzo(a)pyrene	0	39	39	38.72	888.482	601.840
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P06-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1257.D**	**ENG1231.D**	
Analysis Date:	**04/02/99**	**04/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	90.29	93.52
Phenol-d6	83.33	87.09
Nitrobenzene-d5	85.38	89.17
2-Fluorobiphenyl	76.36	87.37
2,4,6-Tribromophenol	89.73	118.21
p-Terphenyl-d14	79.24	97.44

Lab Surrogate Compounds

		% Recovery
Toluene-d8	85.84	85.95
Biphenyl-d10	82.81	94.43
Fluorene-d10	72.23	96.33
Anthracene-d10	96.06	92.42
Pyrene-d10	74.90	100.40

Target Compounds

Hours= 168 Dry Fuel (kg)=182

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	9025	0	9025	9007.47	176415.014	137780.463
m,p-Xylene	2169	0	2169	2169.15	42483.697	33179.849
o-Xylene	836	0	836	835.85	16370.467	12785.366
Phenol	15194	7	15201	15173.85	297186.109	232102.920
Benzofuran	3578	0	3578	3578.36	70083.656	54735.469
C3-alkylbenzenes	2738	0	2738	2738.28	53630.343	41885.400
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	4756	0	4756	4747.15	92974.890	72613.567
m,p-Cresol	7122	0	7122	7101.72	139090.114	108629.645
C4-alkylbenzenes	1033	0	1033	1032.54	20222.722	15793.984
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	383	0	383	383.09	7502.976	5859.838
2,3-Dimethylphenol	473	0	473	473.28	9269.384	7239.407
Naphthalene	6539	0	6539	6534.66	127984.010	99955.757
2-Methylnaphthalene	1016	0	1016	1016.42	19907.005	15547.409
1-Methylnaphthalene	838	0	838	838.41	16420.606	12824.524
Biphenyl	520	0	520	519.81	10180.693	7951.141
Tetradecane	1016	0	1016	1016.42	19907.005	15547.409
C2-alkylnaphthalenes	605	0	605	604.55	11840.361	9247.345
Acenaphthylene	1186	0	1186	1185.74	23223.207	18137.369
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	822	0	822	821.75	16094.313	12569.689
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	391	0	391	391.03	7658.484	5981.290
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	1148	16	1164	1161.21	22742.777	17762.152
Anthracene	242	5	248	247.92	4855.615	3792.245
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	404	44	448	448.14	8777.007	6854.859
Pyrene	334	45	379	379.40	7430.705	5803.395
Benzo(a)anthracene	0	34	34	33.53	656.699	512.883
Chrysene	0	39	39	39.12	766.181	598.389
Benzo(b)fluoranthene	0	70	70	70.06	1372.154	1071.655
Benzo(k)fluoranthene	0	18	18	17.63	345.291	269.673
Benzo(a)pyrene	0	38	38	37.86	741.504	579.116
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:		**P06-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1267.D**	**ENG1250.D**	
Analysis Date:	**04/06/99**	**04/01/99**	

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	72.15	91.47
Phenol-d6	83.46	88.30
Nitrobenzene-d5	59.85	83.78
2-Fluorobiphenyl	56.61	84.80
2,4,6-Tribromophenol	53.80	120.48
p-Terphenyl-d14	48.41	97.78

Lab Surrogate Compounds

		% Recovery
Toluene-d8	77.56	89.54
Biphenyl-d10	57.07	90.00
Fluorene-d10	47.92	92.05
Anthracene-d10	53.58	97.60
Pyrene-d10	47.00	93.46

Target Compounds

Hours= 166.75 Dry Fuel (kg)=174.9

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	13516	0	13516	13498.92	171853.028	150257.121
m,p-Xylene	3023	0	3023	3023.23	38488.355	33651.717
o-Xylene	1060	0	1060	1059.64	13490.142	11794.903
Phenol	20752	0	20752	20725.20	263849.877	230693.187
Benzofuran	4580	0	4580	4579.94	58306.632	50979.530
C3-alkylbenzenes	2994	0	2994	2994.39	38121.197	33330.698
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	6644	0	6644	6635.07	84470.230	73855.280
m,p-Cresol	9952	0	9952	9931.47	126436.277	110547.665
C4-alkylbenzenes	2456	0	2456	2456.36	31271.606	27341.860
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	415	0	415	415.15	5285.222	4621.054
2,3-Dimethylphenol	541	0	541	541.24	6890.457	6024.568
Naphthalene	7925	0	7925	7920.52	100835.129	88163.685
2-Methylnaphthalene	918	0	918	917.96	11686.432	10217.856
1-Methylnaphthalene	690	0	690	689.70	8780.483	7677.084
Biphenyl	502	0	502	502.04	6391.407	5588.231
Tetradecane	918	0	918	917.96	11686.432	10217.856
C2-alkylnaphthalenes	636	0	636	635.53	8090.851	7074.115
Acenaphthylene	1264	0	1264	1264.37	16096.533	14073.763
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	880	0	880	880.27	11206.605	9798.327
C3-alkylnaphthalenes	320	0	320	319.78	4071.078	3559.486
Fluorene	363	0	363	362.81	4618.888	4038.455
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	1311	13	1323	1320.17	16806.916	14694.875
Anthracene	199	0	199	198.99	2533.316	2214.967
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	362	41	403	402.96	5130.032	4485.367
Pyrene	277	42	319	318.65	4056.692	3546.908
Benzo(a)anthracene	0	45	45	45.09	574.035	501.899
Chrysene	0	50	50	49.90	635.271	555.439
Benzo(b)fluoranthene	0	91	91	91.05	1159.146	1013.482
Benzo(k)fluoranthene	0	29	29	29.12	370.723	324.136
Benzo(a)pyrene	0	50	50	49.83	634.379	554.660
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:			**P07-A**
Sample Type:	**XAD only***	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1219.D**	**ENG1197.D**	
Analysis Date:	**03/31/99**	**03/26/99**	

***Rinse was combined with P08-A XAD**

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	89.24	110.12
Phenol-d6	98.75	107.67
Nitrobenzene-d5	92.68	116.80
2-Fluorobiphenyl	87.52	75.74
2,4,6-Tribromophenol	94.54	110.01
p-Terphenyl-d14	83.99	121.18

Lab Surrogate Compounds

		% Recovery
Toluene-d8	99.53	96.91
Biphenyl-d10	91.51	74.80
Fluorene-d10	81.04	89.58
Anthracene-d10	92.71	109.61
Pyrene-d10	84.59	117.09

Target Compounds

Hours= 168 Dry Fuel (kg)=242.2

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	8728	0	8728	8711.03	141556.370	98276.987
m,p-Xylene	2681	0	2681	2680.77	43563.169	30244.184
o-Xylene	1037	0	1037	1036.83	16848.741	11697.414
Phenol	17405	138	17543	17516.00	284639.289	197613.795
Benzofuran	2992	0	2992	2991.71	48616.020	33752.179
C3-alkylbenzenes	4443	0	4443	4442.85	72197.400	50123.798
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	7126	42	7168	7159.46	116342.978	80772.326
m,p-Cresol	10570	81	10652	10631.09	172757.816	119938.916
C4-alkylbenzenes	6924	0	6924	6924.10	112518.320	78117.018
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	614	0	614	613.69	9972.613	6923.590
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	904	0	904	898.70	14604.095	10139.045
2-Methylnaphthalene	4240	0	4240	4239.66	68895.513	47831.429
1-Methylnaphthalene	901	0	901	901.10	14643.096	10166.122
Biphenyl	655	0	655	655.22	10647.485	7392.128
Tetradecane	452	0	452	451.75	7341.048	5096.599
C2-alkylnaphthalenes	721	0	721	721.18	11719.352	8136.282
Acenaphthylene	909	0	909	908.51	14763.510	10249.721
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	774	0	774	774.31	12582.727	8735.690
C3-alkylnaphthalenes	292	0	292	292.47	4752.709	3299.618
Fluorene	388	0	388	387.69	6300.057	4373.881
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	984	120	1104	1101.04	17892.170	12421.825
Anthracene	213	23	236	236.23	3838.795	2665.124
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	340	151	491	491.01	7979.033	5539.527
Pyrene	300	165	465	465.09	7557.826	5247.100
Benzo(a)anthracene	0	82	82	81.51	1324.557	919.588
Chrysene	0	99	99	98.99	1608.612	1116.795
Benzo(b)fluoranthene	0	149	149	148.51	2413.324	1675.475
Benzo(k)fluoranthene	0	35	35	34.51	560.796	389.338
Benzo(a)pyrene	0	72	72	72.44	1177.168	817.261
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:		**P07-B**	
Sample Type:	**XAD/ Rinse**	**Filter***	**TOTAL**
Sample Date:	**01/28/99**	**01/28/99**	
File Name:	**ENG1259.D**	**ENG1232.D**	
Analysis Date:	**04/02/99**	**04/01/99**	

*** - This sample evaporated almost 75% faster than the rest of the other samples. There is a possibility that the sample surrogate recoveries are off due to premature loss of sample.**

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	75.99	29.43
Phenol-d6	86.01	27.98
Nitrobenzene-d5	67.48	29.23
2-Fluorobiphenyl	75.65	27.52
2,4,6-Tribromophenol	67.30	34.68
p-Terphenyl-d14	70.57	30.31

Lab Surrogate Compounds

		% Recovery
Toluene-d8	97.62	30.73
Biphenyl-d10	86.58	26.80
Fluorene-d10	72.04	27.84
Anthracene-d10	92.47	28.86
Pyrene-d10	67.64	28.96

Target Compounds

Hours= 168 Dry Fuel (kg)=252.4

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	16662	0	16662	16644.44	281710.782	187706.512
m,p-Xylene	5848	0	5848	5848.39	98985.278	65954.811
o-Xylene	1747	0	1747	1746.81	29565.141	19699.528
Phenol	20973	43	21016	20989.25	355247.640	236704.804
Benzofuran	6975	0	6975	6974.69	118048.151	78656.580
C3-alkylbenzenes	5618	0	5618	5617.81	95082.661	63354.461
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	11242	16	11258	11249.11	190393.643	126861.054
m,p-Cresol	14554	32	14586	14565.85	246530.192	164265.358
C4-alkylbenzenes	8090	0	8090	8090.32	136930.433	91238.020
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	886	0	886	885.59	14988.804	9987.179
2,3-Dimethylphenol	1397	0	1397	1396.61	23637.929	15750.172
Naphthalene	8529	0	8529	8524.11	144272.423	96130.056
2-Methylnaphthalene	1596	0	1596	1595.82	27009.602	17996.749
1-Methylnaphthalene	1213	0	1213	1213.45	20537.906	13684.598
Biphenyl	855	0	855	854.80	14467.677	9639.947
Tetradecane	1596	0	1596	1595.82	27009.602	17996.749
C2-alkylnaphthalenes	1428	0	1428	1427.86	24166.842	16102.592
Acenaphthylene	1653	0	1653	1652.71	27972.478	18638.322
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	1426	0	1426	1425.79	24131.807	16079.247
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	623	0	623	622.97	10543.903	7025.501
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	1585	24	1609	1606.04	27182.578	18112.004
Anthracene	338	6	345	344.85	5836.662	3889.022
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	449	37	485	485.13	8210.931	5471.020
Pyrene	373	36	409	409.18	6925.461	4614.499
Benzo(a)anthracene	0	20	20	20.43	345.782	230.398
Chrysene	0	24	24	24.01	406.374	270.771
Benzo(b)fluoranthene	0	33	33	33.37	564.795	376.328
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:		**P07-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1268.D**	**ENG1251.D**	
Analysis Date:	**04/06/99**	**04/02/99**	

8270 Surrogate Compounds

	% Recovery	
2-Fluorophenol	77.62	85.97
Phenol-d6	89.45	85.10
Nitrobenzene-d5	47.64	91.94
2-Fluorobiphenyl	53.66	82.43
2,4,6-Tribromophenol	46.02	140.18
p-Terphenyl-d14	52.56	127.89

Lab Surrogate Compounds

	% Recovery	
Toluene-d8	91.22	81.62
Biphenyl-d10	60.06	86.80
Fluorene-d10	51.76	95.98
Anthracene-d10	52.69	90.95
Pyrene-d10	57.04	125.83

Target Compounds

Hours= 168 Dry Fuel (kg)=325.4

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	18321	0	18321	18303.56	349421.313	180573.003
m,p-Xylene	6950	0	6950	6949.93	132676.576	68564.243
o-Xylene	2124	0	2124	2124.49	40557.251	20959.067
Phenol	34148	347	34495	34467.62	657998.829	340038.858
Benzofuran	7447	0	7447	7447.20	142169.633	73470.039
C3-alkylbenzenes	6815	0	6815	6814.92	130099.188	67232.307
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	14790	99	14889	14879.91	284062.646	146797.127
m,p-Cresol	20427	224	20651	20630.68	393846.842	203531.107
C4-alkylbenzenes	17124	0	17124	17124.48	326912.267	168940.838
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	860	0	860	860.35	16424.380	8487.747
2,3-Dimethylphenol	1296	0	1296	1296.23	24745.481	12787.903
Naphthalene	7065	10	7074	7069.26	134954.627	69741.488
2-Methylnaphthalene	1216	0	1216	1216.34	23220.353	11999.751
1-Methylnaphthalene	907	0	907	907.07	17316.281	8948.661
Biphenyl	538	0	538	537.72	10265.261	5304.854
Tetradecane	1216	0	1216	1216.34	23220.353	11999.751
C2-alkylnaphthalenes	1072	0	1072	1072.44	20473.252	10580.112
Acenaphthylene	1028	0	1028	1028.13	19627.359	10142.973
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	798	0	798	798.37	15241.160	7876.286
C3-alkylnaphthalenes	530	0	530	530.09	10119.602	5229.581
Fluorene	371	0	371	370.95	7081.564	3659.592
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	965	140	1105	1102.13	21040.044	10873.017
Anthracene	185	28	213	213.10	4068.153	2102.329
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	242	154	395	395.20	7544.505	3898.829
Pyrene	222	194	416	416.14	7944.257	4105.412
Benzo(a)anthracene	0	78	78	78.21	1493.056	771.577
Chrysene	0	96	96	95.98	1832.292	946.887
Benzo(b)fluoranthene	0	142	142	142.31	2716.747	1403.953
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode A

Sample Name:		**P08-A**	
Sample Type:	**XAD / Rinse***	**Filter**	**TOTAL**
Sample Date:	**01/22/99**	**01/22/99**	
File Name:	**ENG1220.D**	**ENG1222.D**	
Analysis Date:	**03/31/99**	**03/31/99**	

***P07-A Rinse was combined with P08-A XAD: P08-A Rinse was combined with PB1-A XAD, see sample PB1-A**

8270 Surrogate Compounds

		% Recovery
2-Fluorophenol	87.83	96.16
Phenol-d6	90.79	87.59
Nitrobenzene-d5	78.05	103.81
2-Fluorobiphenyl	82.91	85.30
2,4,6-Tribromophenol	84.98	108.95
p-Terphenyl-d14	80.00	97.11

Lab Surrogate Compounds

		% Recovery
Toluene-d8	109.88	90.59
Biphenyl-d10	97.32	93.47
Fluorene-d10	80.78	91.11
Anthracene-d10	86.10	95.87
Pyrene-d10	86.24	92.94

Target Compounds

Hours= 133.25 Dry Fuel (kg)=169.8

	XAD	Filter	TOTAL	Total - Blank		
	µg	µg	µg	µg	µg/hr	µg/kg (Dry)
Toluene	22683	0	22683	22.67	645.992	498.952
m,p-Xylene	6549	0	6549	6.55	186.645	144.161
o-Xylene	2177	0	2177	2.18	62.120	47.980
Phenol	25887	0	25887	25.86	736.893	569.162
Benzofuran	7958	0	7958	7.96	226.824	175.195
C3-alkylbenzenes	9102	0	9102	9.10	259.309	200.285
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	11613	0	11613	11.60	330.547	255.309
m,p-Cresol	15831	0	15831	15.81	450.513	347.968
C4-alkylbenzenes	14186	0	14186	14.19	404.351	312.313
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	859	0	859	0.86	24.506	18.928
2,3-Dimethylphenol	1243	0	1243	1.24	35.334	27.292
Naphthalene	9949	0	9949	9.94	283.245	218.773
2-Methylnaphthalene	1570	0	1570	1.57	44.738	34.555
1-Methylnaphthalene	1175	0	1175	1.17	33.340	25.751
Biphenyl	896	0	896	0.90	25.646	19.808
Tetradecane	1570	0	1570	1.57	44.738	34.555
C2-alkylnaphthalenes	1478	0	1478	1.48	42.173	32.574
Acenaphthylene	1495	0	1495	1.49	42.458	32.794
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	1300	0	1300	1.30	37.044	28.612
C3-alkylnaphthalenes	599	0	599	0.60	17.097	13.206
Fluorene	540	0	540	0.54	15.388	11.885
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	1039	0	1039	1.04	29.635	22.890
Anthracene	195	0	195	0.19	5.414	4.182
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	0	4	4	0.00	0.000	0.000
Pyrene	0	7	7	0.01	0.285	0.220
Benzo(a)anthracene	0	13	13	0.01	0.285	0.220
Chrysene	0	17	17	0.02	0.570	0.440
Benzo(b)fluoranthene	0	33	33	0.03	0.855	0.660
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	21	21	0.02	0.570	0.440
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode B

Sample Name:			**P08-B**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**	
Sample Date:	**01/28/99**	**01/28/99**		
File Name:	**ENG1260.D**	**ENG1233.D**		
Analysis Date:	**04/02/99**	**04/01/99**		
		8270 Surrogate Compounds		
		% Recovery		
2-Fluorophenol	79.75	93.94		
Phenol-d6	75.61	89.76		
Nitrobenzene-d5	65.03	90.34		
2-Fluorobiphenyl	77.65	93.92		
2,4,6-Tribromophenol	74.69	123.56		
p-Terphenyl-d14	74.05	94.53		
		Lab Surrogate Compounds		
		% Recovery		
Toluene-d8	86.49	89.21		
Biphenyl-d10	78.13	94.44		
Fluorene-d10	68.51	98.94		
Anthracene-d10	75.09	89.67		
Pyrene-d10	73.20	92.59		

Target Compounds

Hours= 97.75 Dry Fuel (kg)=61

	XAD µg	Filter µg	TOTAL µg	Total - Blank µg	µg/hr	µg/kg (Dry)
Toluene	2160	0	2160	2143.05	254382.642	156639.688
m,p-Xylene	590	0	590	589.83	70013.538	43111.821
o-Xylene	226	0	226	226.07	26834.784	16523.896
Phenol	3829	0	3829	3801.60	451254.544	277866.330
Benzofuran	738	0	738	737.62	87556.391	53914.079
C3-alkylbenzenes	0	0	0	0.00	0.000	0.000
Decane	0	0	0	0.00	0.000	0.000
o-Cresol	1433	0	1433	1424.54	169094.631	104122.396
m,p-Cresol	2074	0	2074	2053.35	243735.143	150083.341
C4-alkylbenzenes	0	0	0	0.00	0.000	0.000
Undecane	0	0	0	0.00	0.000	0.000
2-Ethylphenol	0	0	0	0.00	0.000	0.000
2,3-Dimethylphenol	0	0	0	0.00	0.000	0.000
Naphthalene	828	0	828	822.87	97675.670	60145.167
2-Methylnaphthalene	191	0	191	190.71	22637.509	13939.364
1-Methylnaphthalene	0	0	0	0.00	0.000	0.000
Biphenyl	0	0	0	0.00	0.000	0.000
Tetradecane	191	0	191	190.71	22637.509	13939.364
C2-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Acenaphthylene	0	0	0	0.00	0.000	0.000
Pentadecane	0	0	0	0.00	0.000	0.000
Acenaphthene	0	0	0	0.00	0.000	0.000
Dibenzofuran	0	0	0	0.00	0.000	0.000
C3-alkylnaphthalenes	0	0	0	0.00	0.000	0.000
Fluorene	0	0	0	0.00	0.000	0.000
Heptadecane	0	0	0	0.00	0.000	0.000
Octadecane	0	0	0	0.00	0.000	0.000
Phenanthrene	0	0	0	-3.18	-377.470	-232.432
Anthracene	0	0	0	0.00	0.000	0.000
Carbazole	0	0	0	0.00	0.000	0.000
Fluoranthene	0	0	0	0.00	0.000	0.000
Pyrene	0	0	0	0.00	0.000	0.000
Benzo(a)anthracene	0	0	0	0.00	0.000	0.000
Chrysene	0	0	0	0.00	0.000	0.000
Benzo(b)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(k)fluoranthene	0	0	0	0.00	0.000	0.000
Benzo(a)pyrene	0	0	0	0.00	0.000	0.000
Indeno(1,2,3-cd)pyrene	0	0	0	0.00	0.000	0.000
Dibenz(a,h)anthracene	0	0	0	0.00	0.000	0.000
Benzo(g,h,i)perylene	0	0	0	0.00	0.000	0.000

Omni - SVOC Compounds
Episode C

Sample Name:		**P08-C**	
Sample Type:	**XAD / Rinse**	**Filter**	**TOTAL**
Sample Date:	**02/19/99**	**02/19/99**	
File Name:	**ENG1271.D**	**ENG1252.D**	
Analysis Date:	**04/06/99**	**04/02/99**	
		8270 Surrogate Compounds	
		% Recovery	
2-Fluorophenol	82.43	87.83	
Phenol-d6	99.89	82.84	
Nitrobenzene-d5	76.23	88.62	
2-Fluorobiphenyl	60.90	78.33	
2,4,6-Tribromophenol	68.65	119.35	
p-Terphenyl-d14	53.20	91.81	
		Lab Surrogate Compounds	
		% Recovery	
Toluene-d8	90.15	80.99	
Biphenyl-d10	62.79	84.00	
Fluorene-d10	58.61	86.63	
Anthracene-d10	55.57	88.86	
Pyrene-d10	54.09	83.42	
		Target Compounds	
	XAD	**Filter**	**TOTAL**
	µg	**µg**	**µg**
Toluene	7073	0	7073
m,p-Xylene	2439	0	2439
o-Xylene	912	0	912
Phenol	13715	0	13715
Benzofuran	2144	0	2144
C3-alkylbenzenes	1437	0	1437
Decane	0	0	0
o-Cresol	5024	0	5024
m,p-Cresol	7133	0	7133
C4-alkylbenzenes	1119	0	1119
Undecane	0	0	0
2-Ethylphenol	402	0	402
2,3-Dimethylphenol	604	0	604
Naphthalene	2239	0	2239
2-Methylnaphthalene	498	0	498
1-Methylnaphthalene	354	0	354
Biphenyl	245	0	245
Tetradecane	498	0	498
C2-alkylnaphthalenes	611	0	611
Acenaphthylene	308	0	308
Pentadecane	0	0	0
Acenaphthene	0	0	0
Dibenzofuran	310	0	310
C3-alkylnaphthalenes	988	0	988
Fluorene	0	0	0
Heptadecane	0	0	0
Octadecane	0	0	0
Phenanthrene	299	0	299
Anthracene	62	0	62
Carbazole	0	0	0
Fluoranthene	75	0	75
Pyrene	73	0	73
Benzo(a)anthracene	0	6	6
Chrysene	0	7	7
Benzo(b)fluoranthene	0	0	0
Benzo(k)fluoranthene	0	0	0
Benzo(a)pyrene	0	0	0
Indeno(1,2,3-cd)pyrene	0	0	0
Dibenz(a,h)anthracene	0	0	0
Benzo(g,h,i)perylene	0	0	0

Total - Blank
µg
Lost Sample

Blank Data - Portland

Omni - Blanks
Episode A, B, and C of P

Sample Name:	**DCM 076 MeCl2 Blank**
Sample Type:	**Blank**
Sample Date:	**02/22/99**
File Name:	**ENG1185.D**
Analysis Date:	**03/26/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	0
m,p-Xylene	0
o-Xylene	0
Phenol	0
Benzofuran	0
C3-alkylbenzene	0
Decane	0
o-Cresol	0
m,p-Cresol	0
C4-alkylbenzene	0
Undecane	0
2-Ethylphenol	0
2,3-Dimethylphenol	0
Naphthalene	0
2-Methylnaphthalene	0
1-Methylnaphthalene	0
Biphenyl	0
Tetradecane	0
C2-alkylnaphthalene	0
Acenaphthylene	0
Pentadecane	0
Acenaphthene	0
Dibenzofuran	0
C3-alkylnaphthalene	0
Fluorene	0
Heptadecane	0
Octadecane	0
Phenanthrene	0
Anthracene	0
Carbazole	0
Fluoranthene	0
Pyrene	0
Benzo(a)anthracene	0
Chrysene	0
Benzo(b)fluoranthene	0
Benzo(k)fluoranthene	0
Benzo(a)pyrene	0
Indeno(1,2,3-cd)pyrene	0
Dibenz(a,h)anthracene	0
Benzo(g,h,i)perylene	0

Omni - Blanks
Episode A, B, and C of P

Sample Name:	**SDM 026 MeOH/MeCl2 Blank**
Sample Type:	**Blank**
Sample Date:	**02/09/99**
File Name:	**ENG1189.D**
Analysis Date:	**03/26/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	0
m,p-Xylene	0
o-Xylene	0
Phenol	0
Benzofuran	0
C3-alkylbenzene	0
Decane	0
o-Cresol	0
m,p-Cresol	0
C4-alkylbenzene	0
Undecane	0
2-Ethylphenol	0
2,3-Dimethylphenol	0
Naphthalene	0
2-Methylnaphthalene	0
1-Methylnaphthalene	0
Biphenyl	0
Tetradecane	0
C2-alkylnaphthalene	0
Acenaphthylene	0
Pentadecane	0
Acenaphthene	0
Dibenzofuran	0
C3-alkylnaphthalene	0
Fluorene	0
Heptadecane	0
Octadecane	0
Phenanthrene	0
Anthracene	0
Carbazole	0
Fluoranthene	0
Pyrene	0
Benzo(a)anthracene	0
Chrysene	0
Benzo(b)fluoranthene	0
Benzo(k)fluoranthene	0
Benzo(a)pyrene	0
Indeno(1,2,3-cd)pyrene	0
Dibenz(a,h)anthracene	0
Benzo(g,h,i)perylene	0

Sample Name:	**SDM 028 MeOH/MeCl2 Blank**
Sample Type:	**Blank**
Sample Date:	**02/22/99**
File Name:	**ENG1190.D**
Analysis Date:	**03/26/99**
	8270 Surrogate Compounds
	% Recovery
2-Fluorophenol	NA
Phenol-d6	NA
Nitrobenzene-d5	NA
2-Fluorobiphenyl	NA
2,4,6-Tribromophenol	NA
p-Terphenyl-d14	NA
	Lab Surrogate Compounds
	% Recovery
Toluene-d8	NA
Biphenyl-d10	NA
Fluorene-d10	NA
Anthracene-d10	NA
Pyrene-d10	NA
	Target Compounds
	Blank
	µg
Toluene	0
m,p-Xylene	0
o-Xylene	0
Phenol	0
Benzofuran	0
C3-alkylbenzene	0
Decane	0
o-Cresol	0
m,p-Cresol	0
C4-alkylbenzene	0
Undecane	0
2-Ethylphenol	0
2,3-Dimethylphenol	0
Naphthalene	0
2-Methylnaphthalene	0
1-Methylnaphthalene	0
Biphenyl	0
Tetradecane	0
C2-alkylnaphthalene	0
Acenaphthylene	0
Pentadecane	0
Acenaphthene	0
Dibenzofuran	0
C3-alkylnaphthalene	0
Fluorene	0
Heptadecane	0
Octadecane	0
Phenanthrene	0
Anthracene	0
Carbazole	0
Fluoranthene	0
Pyrene	0
Benzo(a)anthracene	0
Chrysene	0
Benzo(b)fluoranthene	0
Benzo(k)fluoranthene	0
Benzo(a)pyrene	0
Indeno(1,2,3-cd)pyrene	0
Dibenz(a,h)anthracene	0
Benzo(g,h,i)perylene	0

Not used due to analytical error.

Sample Name:		**PB1-A**		
Sample Type:	**Rinse**	**XAD/Rinse***	**Filter**	**TOTAL**
Sample Date:				
File Name:	**ENG1179.D**	**ENG1253.D**	**ENG1182.D**	
Analysis Date:	**03/25/99**	**04/02/99**	**03/25/99**	

***PB1-B XAD combined with P08-A Rinse**

8270 Surrogate Compounds

	% Recovery	% Recovery	% Recovery
2-Fluorophenol	0.00	77.17	89.32
Phenol-d6	0.00	75.69	88.18
Nitrobenzene-d5	0.00	83.37	104.02
2-Fluorobiphenyl	0.00	70.38	101.12
2,4,6-Tribromophenol	0.00	96.01	109.70
p-Terphenyl-d14	0.00	81.73	116.52

Lab Surrogate Compounds

	% Recovery	% Recovery	% Recovery
Toluene-d8	0.00	77.93	86.81
Biphenyl-d10	0.00	76.93	108.88
Fluorene-d10	0.00	67.11	101.67
Anthracene-d10	0.00	81.35	114.56
Pyrene-d10	0.00	77.03	111.62

Target Compounds

	Rinse	XAD/Rinse	Filter	
	µg	µg	µg	µg
Toluene	0	18	0	18
m,p-Xylene	0	0	0	0
o-Xylene	0	0	0	0
Phenol	0	931	0	931
Benzofuran	0	0	0	0
C3-alkylbenzene	0	0	0	0
Decane	0	0	0	0
o-Cresol	0	357	0	357
m,p-Cresol	0	967	0	967
C4-alkylbenzene	0	249	0	249
Undecane	0	0	0	0
2-Ethylphenol	0	46	0	46
2,3-Dimethylphenol	0	123	0	123
Naphthalene	0	0	0	0
2-Methylnaphthalene	0	0	0	0
1-Methylnaphthalene	0	0	0	0
Biphenyl	0	0	0	0
Tetradecane	0	0	0	0
C2-alkylnaphthalene	0	249	0	249
Acenaphthylene	0	0	0	0
Pentadecane	0	0	0	0
Acenaphthene	0	0	0	0
Dibenzofuran	0	0	0	0
C3-alkylnaphthalene	0	203	0	203
Fluorene	0	83	0	83
Heptadecane	0	0	0	0
Octadecane	0	0	0	0
Phenanthrene	0	376	0	376
Anthracene	0	77	0	77
Carbazole	0	0	0	0
Fluoranthene	0	175	0	175
Pyrene	0	156	0	156
Benzo(a)anthracene	0	30	0	30
Chrysene	0	33	0	33
Benzo(b)fluoranthene	0	0	0	0
Benzo(k)fluoranthene	0	0	0	0
Benzo(a)pyrene	0	0	0	0
Indeno(1,2,3-cd)pyrene	0	0	0	0
Dibenz(a,h)anthracene	0	0	0	0
Benzo(g,h,i)perylene	0	0	0	0

Omni - Blanks
Episode A, B, and C of P

Sample Name:	**PB2-B**		
Sample Type:	**XAD/Rinse**	**Filter**	**TOTAL**
Sample Date:			
File Name:	**ENG1180.D**	**ENG1183.D**	
Analysis Date:	**03/25/99**	**03/25/99**	
	8270 Surrogate Compounds		
	% Recovery	**% Recovery**	
2-Fluorophenol	85.88	87.15	
Phenol-d6	84.84	83.04	
Nitrobenzene-d5	98.14	105.85	
2-Fluorobiphenyl	94.14	103.41	
2,4,6-Tribromophenol	103.12	107.22	
p-Terphenyl-d14	100.76	113.94	
	Lab Surrogate Compounds		
	% Recovery	**% Recovery**	
Toluene-d8	84.74	86.74	
Biphenyl-d10	101.37	107.01	
Fluorene-d10	82.16	102.79	
Anthracene-d10	97.26	103.48	
Pyrene-d10	94.99	106.65	
	Target Compounds		
	XAD/Rinse	**Filter**	
	µg	**µg**	**µg**
Toluene	35	0	35
m,p-Xylene	0	0	0
o-Xylene	0	0	0
Phenol	54	0	54
Benzofuran	0	0	0
C3-alkylbenzene	0	0	0
Decane	0	0	0
o-Cresol	18	0	18
m,p-Cresol	41	0	41
C4-alkylbenzene	0	0	0
Undecane	0	0	0
2-Ethylphenol	0	0	0
2,3-Dimethylphenol	0	0	0
Naphthalene	10	0	10
2-Methylnaphthalene	0	0	0
1-Methylnaphthalene	0	0	0
Biphenyl	0	0	0
Tetradecane	0	0	0
C2-alkylnaphthalene	0	0	0
Acenaphthylene	0	0	0
Pentadecane	0	0	0
Acenaphthene	0	0	0
Dibenzofuran	0	0	0
C3-alkylnaphthalene	0	0	0
Fluorene	0	0	0
Heptadecane	0	0	0
Octadecane	0	0	0
Phenanthrene	0	0	0
Anthracene	0	0	0
Carbazole	0	0	0
Fluoranthene	0	0	0
Pyrene	0	0	0
Benzo(a)anthracene	0	0	0
Chrysene	0	0	0
Benzo(b)fluoranthene	0	0	0
Benzo(k)fluoranthene	0	0	0
Benzo(a)pyrene	0	0	0
Indeno(1,2,3-cd)pyrene	0	0	0
Dibenz(a,h)anthracene	0	0	0
Benzo(g,h,i)perylene	0	0	0

Omni - Blanks
Episode A, B, and C of P

Sample Name:		PB1-C	
Sample Type:	XAD/Rinse	Filter	TOTAL
Sample Date:			
File Name:	ENG1181.D	ENG1184.D	
Analysis Date:	03/25/99	03/25/99	
	% Recovery	% Recovery	
2-Fluorophenol	80.58	92.61	
Phenol-d6	78.66	90.81	
Nitrobenzene-d5	97.43	99.61	
2-Fluorobiphenyl	90.29	102.87	
2,4,6-Tribromophenol	104.87	106.30	
p-Terphenyl-d14	97.96	116.30	
	% Recovery	% Recovery	
Toluene-d8	78.24	94.74	
Biphenyl-d10	92.07	106.66	
Fluorene-d10	78.92	99.81	
Anthracene-d10	93.84	109.90	
Pyrene-d10	96.83	114.26	
	XAD/Rinse	Filter	
	µg	µg	µg
Toluene	0	0	0
m,p-Xylene	0	0	0
o-Xylene	0	0	0
Phenol	0	0	0
Benzofuran	0	0	0
C3-alkylbenzene	0	0	0
Decane	0	0	0
o-Cresol	0	0	0
m,p-Cresol	0	0	0
C4-alkylbenzene	0	0	0
Undecane	0	0	0
2-Ethylphenol	0	0	0
2,3-Dimethylphenol	0	0	0
Naphthalene	0	0	0
2-Methylnaphthalene	0	0	0
1-Methylnaphthalene	0	0	0
Biphenyl	0	0	0
Tetradecane	0	0	0
C2-alkylnaphthalene	0	0	0
Acenaphthylene	0	0	0
Pentadecane	0	0	0
Acenaphthene	0	0	0
Dibenzofuran	0	0	0
C3-alkylnaphthalene	0	0	0
Fluorene	0	0	0
Heptadecane	0	0	0
Octadecane	0	0	0
Phenanthrene	6	0	6
Anthracene	0	0	0
Carbazole	0	0	0
Fluoranthene	0	0	0
Pyrene	0	0	0
Benzo(a)anthracene	0	0	0
Chrysene	0	0	0
Benzo(b)fluoranthene	0	0	0
Benzo(k)fluoranthene	0	0	0
Benzo(a)pyrene	0	0	0
Indeno(1,2,3-cd)pyrene	0	0	0
Dibenz(a,h)anthracene	0	0	0
Benzo(g,h,i)perylene	0	0	0