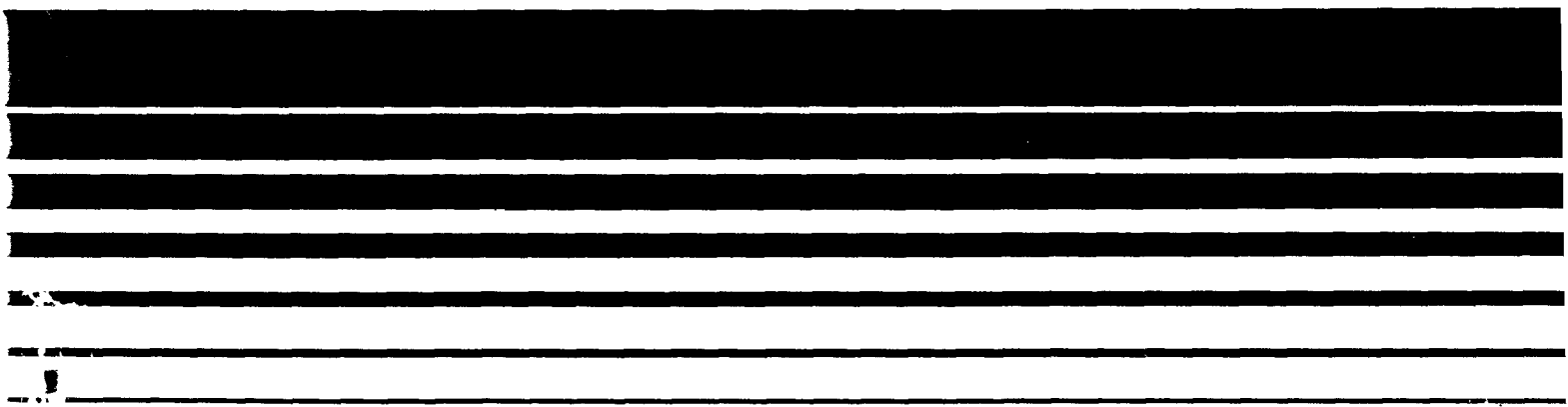




1990 URBAN AIR TOXICS MONITORING PROGRAM CARBONYL RESULTS



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By
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Research Triangle Park, NC 27709

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Office Of Air Quality Planning And Standards
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SYMBOLS AND ABBREVIATIONS

ADL	Analytical detection limit
AIRS	Atmospheric Information Retrieval System
APR	April
AREAL	Atmospheric Research and Exposure Assessment Laboratory
AUG	August
BRLA	Baton Rouge, LA; AIRS No. 22-033-0006
C4IL	Chicago, IL; AIRS No. 17-031-0060
CANJ	Camden, NJ; AIRS No. 34-007-0003
COR	correlation coefficient
COV	covariance
DC	District of Columbia
DEC	December
DIF	Difference; Percent DIF = $(X_2 - X_1)/((X_1 + X_2)/2)*100$
DNPH	2,4-dinitrophenylhydrazine
EPA	U. S. Environmental Protection Agency
F	Friday
FID	Flame ionization detection
FL	Florida
FEB	February
GC/MS	Gas chromatograph/mass spectrometry
GC/MD	Gas chromatograph/multidetector
HITX	Houston, TX; AIRS No. 48-201-1034
Hg	Mercury
HPLC	High pressure liquid chromatography
ID	Radian assigned alphanumeric identification
IL	Illinois
in.	inch
JAN	January
JUL	July
JUN	June
KS	Kansas
L	Liter
LA	Louisiana
LOG	natural logarithm

SYMBOLS AND ABBREVIATIONS (Continued)

M	Monday
MAR	March
min.	minute (60 seconds)
mL	milliliter
N	number of cases, or sample size
NC	North Carolina
NJ	New Jersey
nm	nanometer
NMOC	Nonmethane Organic Compound(s)
NOV	November
OCT	October
OH	Ohio
ORFL	Orlando, FL; AIRS No. 12-095-2002
PEFL	Pensacola, FL; AIRS No. 12-033-0004
PID	Photoionization detection
PNTX	Port Neches, TX; AIRS No. 48-245-4007
ppbv	parts per billion by volume
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QAD	Quality Assurance Division
R	regression coefficient
RTP	Research Triangle Park, NC
SAIL	Sauget, IL; AIRS No. 17-163-1010
SAS®	Statistical Analysis System
SEP	September
Sn	Sunday
St	Saturday
STD	Standard Deviation
T	Tuesday
Th	Thursday
TLOH	Toledo, OH; AIRS No. 39-095-0081
TX	Texas
U. S.	United States of America
UATMP	Urban Air Toxics Monitoring Program
W	Wednesday
W	Shapiro-Wilk W statistic, used in SAS® software to indicate normality of a distribution
WIDC	Washington, DC; AIRS No. 11-001-0025
WIKS	Wichita, KS; AIRS No. 20-173-0010
W2DC	Washington, DC; AIRS No. 11-001-0039

1.0 SUMMARY AND CONCLUSIONS

This report summarizes the results of sampling ambient air for selected carbonyl containing compounds in 12 urban centers in the contiguous United States as part of the Urban Air Toxics Monitoring Program (UATMP). Formaldehyde, acetaldehyde, and acetone concentrations were measured using 2,4-dinitrophenylhydrazine (DNPH)-coated silica cartridges to collect the carbonyls for subsequent analysis. Sampling and analysis followed guidance provided in U.S. Environmental Protection Agency (EPA) compendium method TO-11. Formaldehyde concentrations ranged from 0.42 to 34.5 ppbv with an average concentration for all sites of 4.2 ppbv. Site average formaldehyde concentrations ranged from 1.5 ppbv for Houston, TX (H1TX) to 7.9 for Washington, DC (W2DC). Acetaldehyde concentrations ranged from 0.37 to 9.5 ppbv, averaging 1.7 ppbv over all 1990 UATMP sites. Site average acetaldehyde concentrations ranged from 0.76 ppbv at Houston, TX (H1TX) to 2.5 ppbv at Baton Rouge, LA (BRLA). Acetone concentrations ranged from 0.37 to 10.8 ppbv and averaged 1.8 ppbv over all sites. Site average acetone concentrations ranged from 0.68 ppbv at Houston, TX (H1TX) to 2.9 ppbv at Chicago, IL (C4IL).

The precision as measured by the mean percent difference over all sites was near 12% for formaldehyde, near 13% for acetaldehyde, and near 15% for acetone. At individual sites the mean percent differences ranged roughly from 4 to 30% for formaldehyde, from 7 to 30% for acetaldehyde, and from 8 to 23% for acetone.

Accuracy was measured as bias from audit samples. For formaldehyde, bias ranged from -45.1 to 10.6% and averaged -4.6 percent. For acetaldehyde, bias ranged from -41.7 to 100.0% and averaged -1.2 percent. For acetone, bias ranged from -53.4 to 100.0% and averaged -4.3 percent. The average percent difference and biases reported in this study indicate that the sampling and analytical methodology is repeatable and valid.

Concentration data for formaldehyde, acetaldehyde, and acetone appeared to be distributed approximately lognormal for sites in the 1990 UATMP. Average monthly concentrations differed from month to month over all sites and

from site to site. Lowest average monthly concentrations appeared to be in May while concentrations appeared to peak in the fall months.

Formaldehyde and acetaldehyde concentrations correlate well at all sites. Little correlation exists between acetone and either formaldehyde or acetaldehyde.

2.0 INTRODUCTION

The U.S. EPA developed the UATMP Program to help state and local agencies assess the nature and magnitude of the toxic compounds in the air. The UATMP sampler collects ambient air samples at urban sites in 6-liter (L) SUMMA®-treated stainless steel canisters. At the same time, through a separate heated sample line, ambient air samples for carbonyl compound analysis are drawn in parallel through duplicate cartridges which trap the carbonyl compounds from the ambient air.

The UATMP is a companion program to the Nonmethane Organic Compound (NMOC) Monitoring Program which began in the summer of 1984. The NMOC Monitoring Program measures the total concentration of organic compounds, with the exception of methane, but does not speciate organics. The UATMP speciates 38 toxic compounds listed in Table 2-1, primarily aromatic hydrocarbons and halocarbons. UATMP ambient air samples are collected in 6-L stainless steel canisters.

The carbonyl cartridges collected at the UATMP sites for 1990 were extracted and analyzed by the Atmospheric Research and Exposure Assessment Laboratory (AREAL) of the U.S. EPA at Research Triangle Park, North Carolina, for formaldehyde, acetaldehyde, and acetone. This report presents the data summaries and other data assessments for the carbonyl samples collected during the 1990 UATMP season. The 1990 UATMP season began in March 1990 and ended in February 1991. The air toxics compounds collected in canisters for the 1990 UATMP season are reported separately.^{1,2}

Table 2-1
1990 UATMP Target Compounds

Canister Analytes	Cartridge Analytes
Acetylene	Formaldehyde
Propylene	Acetaldehyde
1,3-Butadiene	Acetone
Vinyl chloride	
Chloromethane	
Chloroethane	
Bromomethane	
Methylene chloride	
trans-1,2-Dichloroethylene	
1,1-Dichloroethane	
Chloroprene	
Bromochloromethane	
Chloroform	
1,1,1-Trichloroethane	
Carbon tetrachloride	
1,2-Dichloroethane	
Benzene	
Trichloroethylene	
1,2-Dichloropropane	
Bromodichloromethane	
trans-1,3-Dichloropropylene	
Toluene	
n-Octane	
cis-1,3-Dichloropropylene	
1,1,2-Trichloroethane	
Tetrachloroethylene	
Dibromochloromethane	
Chlorobenzene	
Ethylbenzene	
m/p-Xylene	
Styrene	
o-Xylene	
Bromoform	
1,1,2,2-Tetrachloroethane	
m-Dichlorobenzene	
p-Dichlorobenzene	
o-Dichlorobenzene	

3.0 UATMP FOR 1990

Brief program descriptions for the air toxics and carbonyl portions of the UATMP are given in this section. Both the air toxics and carbonyl programs collected 24-hour integrated ambient air samples on a once every 12-day schedule beginning the week of March 12, 1990. Sampling for the 1990 UATMP was completed on February 23, 1991.

Whole-air ambient air samples were collected in 6-L SUMMA®-treated stainless steel canisters and on DNPH-treated cartridges at 12 sites shown in Table 3-1. The table also gives Radian site codes, Aerometric Information Retrieval System (AIRS) Numbers, and EPA Regions. Additional description of the sites from the AIRS data base are given in Appendix A.

Carbonyl samples were taken simultaneously with all the UATMP canister samples. Duplicate cartridges were installed in parallel in a separate heated sample probe. Ambient air was drawn through the carbonyl cartridges for 24 hours at a constant flow rate. The flow rate, which is in the range of 600 to 1200 mL/min., is measured at each site by the site operator before and after taking each sample. Carbonyl cartridges are filled with DNPH-coated silica which reacts with carbonyls in ambient air, trapping them in the cartridge.

Ozone was removed from ambient air collected in the 1990 program through the use of an ozone denuder. This ozone denuder was added to the sampling system after the heated probe to eliminate ozone, which is an interferant with the DNPH. The use of an ozone denuder in the sampling system resulted in higher reported formaldehyde concentrations.

The removal efficiency of each ozone denuder was verified prior to, and at the completion of, the field sampling. The removal efficiency of all ozone denuders was measured at > 99.9% using 120 ppb ozone test mixture. In conjunction with the 1990 UATMP program, a comparison of ozone scrubbed and unscrubbed DNPH cartridges was conducted and are reported elsewhere.³

Three laboratories are involved in the carbonyl cartridge preparation, distribution and analysis. An independent EPA contractor prepares carbonyl

Table 3-1
1990 Urban Air Toxics Monitoring Program Sites

EPA Region	City	Radian Site Code	AIRS Number
II	Camden, NJ	CANJ	34-007-0003
III	Washington, DC	WIDC	11-001-0025
	Washington, DC	W2DC	11-001-0039
IV	Orlando, FL	ORFL	12-095-2002
	Pensacola, FL	PEFL	12-033-0004
V	Chicago, IL	C4IL	17-031-0060
	Sauget, IL	SAIL	17-163-1010
	Toledo, OH	TLOH	39-095-0081
VI	Houston, TX	HITX	48-201-1034
	Baton Rouge, LA	BRLA	22-033-0006
	Port Neches, TX	PNTX	48-245-4007
VII	Wichita, KS	WIKS	20-173-0010

sampling cartridges in batches. The Radian RTP laboratory obtained the prepared cartridges for distribution in the shipping boxes containing the canisters that are sent to the UATMP sites, along with the carbonyl field data sheet. Radian coordinates the distribution of the carbonyl sample cartridges, and custody records to the U.S. EPA AREAL for analysis. EPA's AREAL extracts samples from the cartridges and analyzes these extracts for target compounds. Radian Corporation reviews the analytical results, summarizes the data, and is responsible for semi-annual and annual result summaries, which are distributed to EPA and participating agencies. Figure 3-1 shows the carbonyl sample and data flow for the 1990 UATMP.

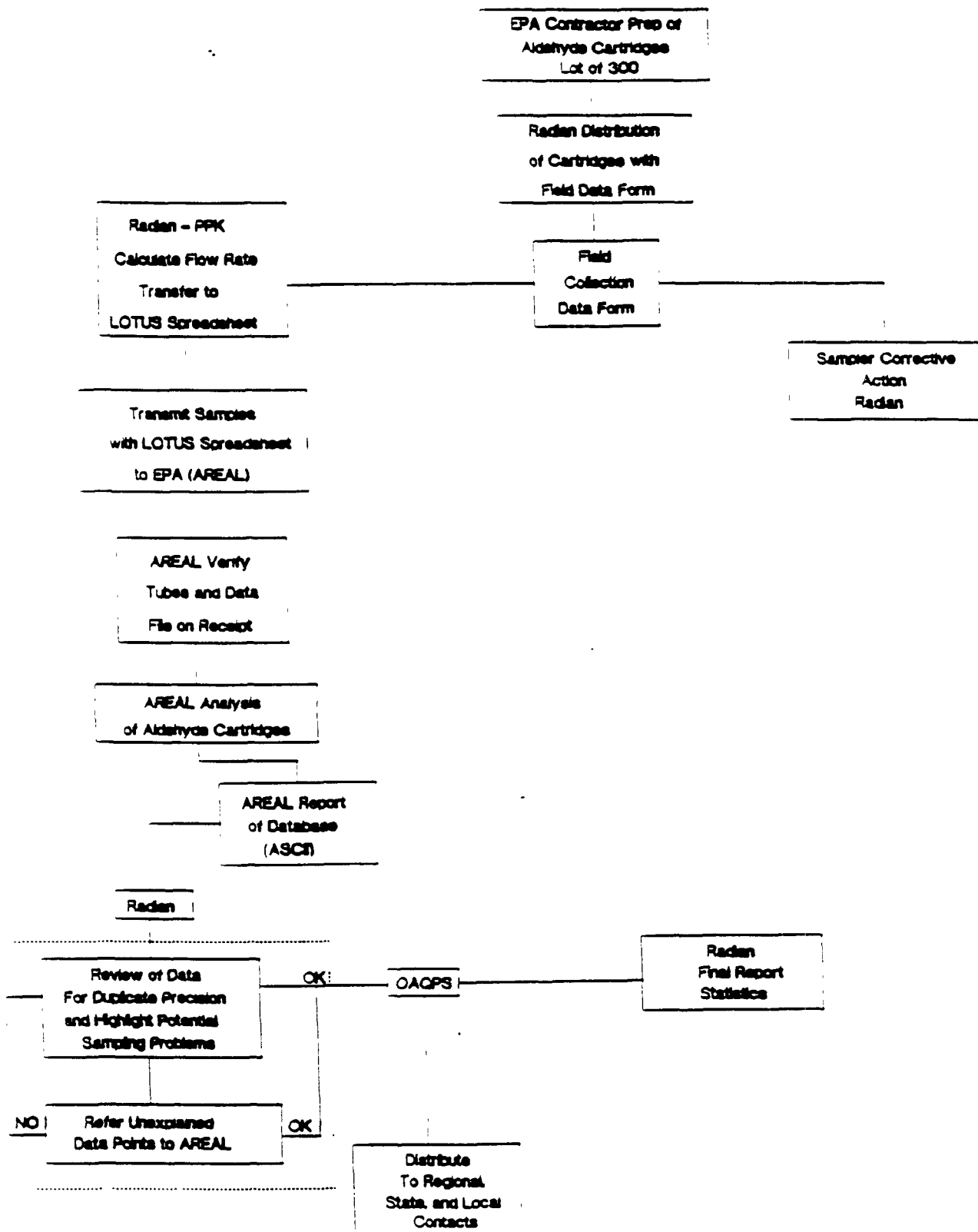


Figure 3-1. 1990 UATMP Carbonyl Data Flow

4.0 SAMPLING, ANALYSIS, AND QUALITY ASSURANCE PROCEDURES

Sampling and analysis procedures for the carbonyl samples, along with the quality assurance procedures used to quantify data quality are described in this section. Implementing the UATMP involved Radian personnel installing the sampling equipment for the canister and the carbonyl samples, training site personnel to operate the equipment properly, observing all the quality assurance procedures necessary to ensure the integrity of the sample, and providing appropriate documentation. The site operators' task involved recognizing problems with sampling equipment and procedures, and notifying Radian personnel at Research Triangle Park so that appropriate corrective action might be taken.

4.1 SAMPLING EQUIPMENT AND PROCEDURES

A schematic diagram of the UATMP sampler is shown in Figure 4-1. The sampler consists of two subsystems, the VOC canister and the carbonyl cartridge. Each subsystem collects a discrete sample through use of a common control system. Each sampler subsystem has separate atmospheric inlet. The ambient air is introduced through an inverted glass funnel and heated stainless steel probe. The heated probe was maintained at 150°F to prevent moisture condensation. The carbonyl cartridges are mounted in parallel, so that the carbonyl samples are collected in duplicate during each sampling episode. The carbonyl cartridge is a commercially available (Waters Co.) silica gel Sep-pak® cartridge which is coated with DNPH. The cartridges are prepared in batches by the laboratory and stored under refrigeration until shipped to the field.

The carbonyl cartridges are installed in the sample line several days ahead of the scheduled sample collection. The collection frequency was planned once every 12 days (30 per year). A 24-hour sample collection period was utilized for both the canister and cartridge samples. The carbonyl probe was purged and heated prior to sample collection period. Each carbonyl cartridge has a unique serial number which is recorded on the custody records. In

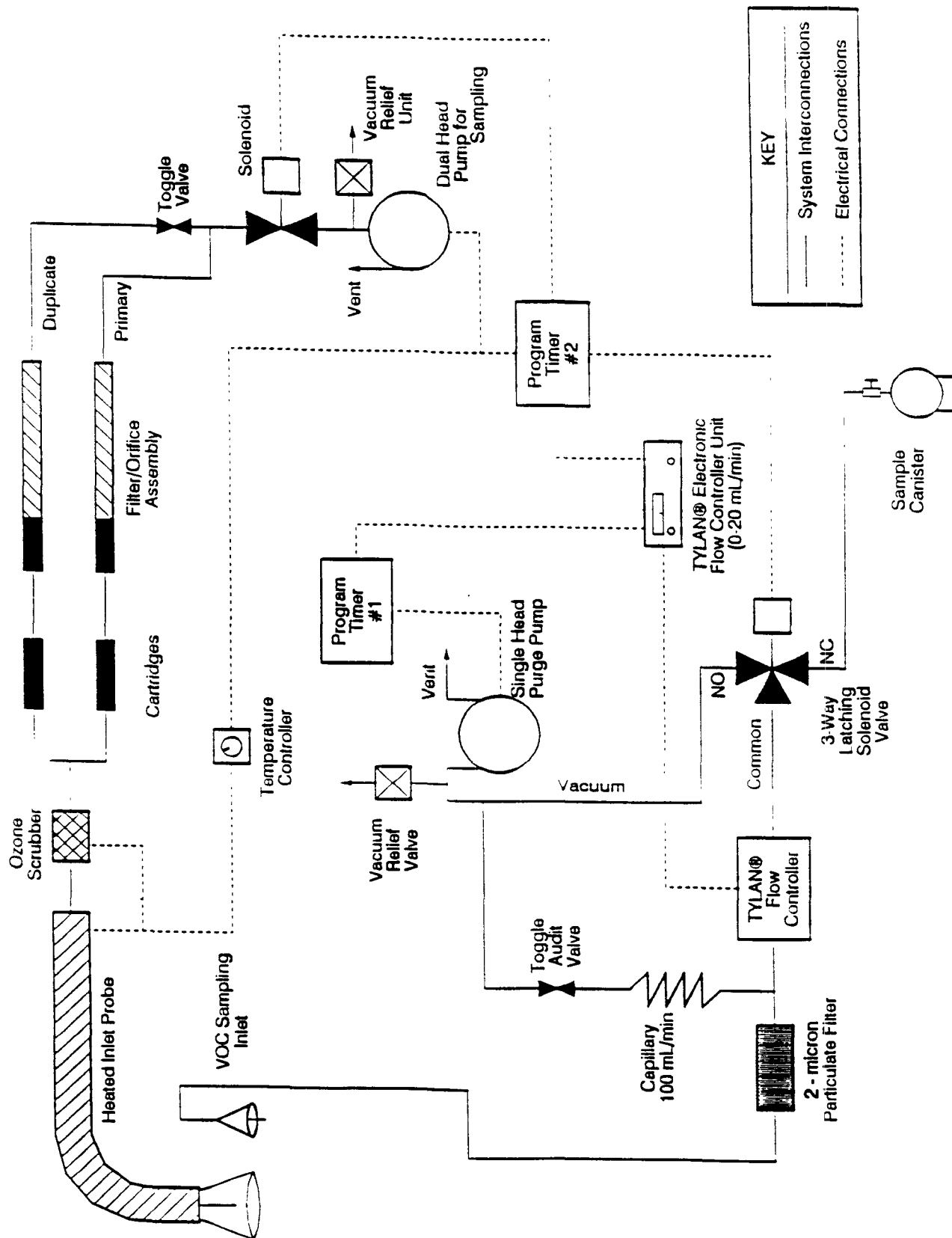


Figure 4-1. Urban Air Toxics Monitoring Program Canister Sampling System

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addition to the carbonyl cartridges installed in the sample line, a third cartridge is sent along in the shipment box as a trip blank. The trip-blank cartridge is not exposed to air at any time during the shipment or sampling periods. The trip-blank cartridges were analyzed for formaldehyde, acetaldehyde, and acetone at the same time the sample cartridges were analyzed. All trip blanks were analyzed and the results were subtracted in those instances where the analytical result was above the analytical detection limit (ADL).

The flow rate through each sample cartridge was measured before and after each collection period by the site operator. The flow rate was measured with a calibrated rotameter and recorded on a preformatted data sheet. The volume of ambient air sampled through each cartridge was calculated in the laboratory based on the field-recorded flow rate measurements.

4.2 ANALYTICAL PROCEDURES

The analytical procedures for carbonyls is given below. Sample preparation and analyses are performed at the AREAL by EPA personnel. A sample cartridge is removed from its shipping vial and attached to the end of a 10-mL polypropylene syringe. Six-milliliters of acetonitrile are added to the syringe and allowed to drain through the cartridge into the graduated centrifuge tube. After the drainage has stopped the volume of extract is made up to 5-mL with acetonitrile and mixed. A portion of this solution is transferred to a 4-mL sample vial fitted with a Teflon®-lined, self-sealing septum and stored in a refrigerator until used. The T0-11 high performance liquid chromatography (HPLC) column and elution solvents used for analysis were modified to decrease analysis time.

The chromatographic separation is done using a 10-cm x 0.46-cm C18 analytical column with 3-micron particle size preceded by a 5-cm x 0.46 cm C18 guard column containing 5-micron particles. Typically, 20-mL samples are injected with an automatic sample injector. The isocratic elution is carried out with an aqueous solution of 50% H₂O, 35% acetonitrile, 15% tetrahydrofuran at 2.5 mL/min. Detector signals from a programmable multiwavelength detector are collected for 10 minutes at 220, 254, 330, and 360 nanometers (nm). Any residual sample is eluted from the column in three minutes with 100% acetonitrile.

The relevant chromatographic peaks determined by acceptable retention times are integrated and the concentrations calculated using calibration

curves from standards analyzed the same day as the samples. The 360-nm signal is used for this purpose. Other wavelengths are used to compute signal purity by comparing the signal at these wavelengths for standards to the signal for each sample. Detection limits are determined by a one-sided tolerance interval around the repeatability of the lowest standard. This procedure was modified based on experience with the samples. The analysis modifications optimized sample throughput for analysis of formaldehyde, acetaldehyde, and acetone. Some other species may coelute with these target compounds using this HPLC column and isocratic elution approach.

The aldehyde species reported are formaldehyde and acetaldehyde. Acetone, a ketone, is also reported. All results were reported to Radian in parts per billion by volume (ppbv) from the EPA AREAL laboratory via floppy disk. All reported analyses were identified by the unique cartridge numbers.

4.3 QUALITY ASSURANCE PROCEDURES

Quality assurance procedures relative to calibration data for acetone, formaldehyde, and acetaldehyde are discussed below. Daily quality control procedures are also discussed. Sampling and analysis precision was determined from the analysis of duplicate field samples. Sample custody records were maintained throughout the program. Figure 4-2 shows the multiple page field data and custody sheet used for the carbonyl cartridges.

4.4. CALIBRATION PROCEDURES

The calibration procedures used for this study followed AREAL standard operating procedures.

4.4.1 Daily Quality Control Procedures

Daily calibration checks were used to ensure that the analytical procedures were in control. Carbonyl samples were analyzed in batches of 75 to 100 cartridges throughout the year. Independently prepared audit samples were analyzed with several batches of field samples. Daily QC checks were performed each day that analyses were conducted.

4.4.2 Duplicate Samples

Duplicate field cartridges were installed in parallel in the sample probe for each sampling episode, as shown in Figure 4-1. The paired average of the analyses of these duplicate cartridges was used as the average sample concentration in this report. If one of the field duplicates was broken or

URBAN TOXICS MONITORING PROGRAM

Aldehyde Data Sheet

City _____ Sample Date _____

SAROAD No. _____ A05 Sampler No. _____

<u>Cartridge</u>	<u>Port A (red)</u>	<u>Port B (green)</u>	<u>(blank)</u>
Tube No. _____	_____	_____	_____
Lot No. _____	_____	_____	_____

Rotameter No. _____

Rotameter Reading¹ _____ / _____ (before)

Flow Rate² LPM

Rotameter Reading¹ _____ / _____ (after)

Before _____

Sampling Time/Duration _____ (hours)

After _____

Sampling Volume³ _____ (liters)

Average _____

Average Ambient Temperature _____ (C° or F°)

Average Barometric Pressure _____ (mm Hg)

Site Operator _____

Comments/Remarks _____

¹ Rotameter reading center of black ball.

² Calculated from calibration curve by the laboratory.

³ Calculated by laboratory.

Sample Control Copy

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Figure 4-2. Carbonyl Field Data Sheet

otherwise declared invalid, the analysis of the remaining cartridge was used as the reported sample concentration. Likewise, if one of the duplicates showed a concentration above the detection limit and the other duplicate reported a concentration below the detection limit, the concentration above the detection limit was reported as the sample concentration.

4.4.3 Trip Blanks

For each pair of carbonyl samples, a trip-blank cartridge was included in the field site shipment. The blank consisted of a regular DNPH-cartridge with caps, identical to the sample cartridges. Each cartridge had a unique serial number for identification purposes. The blank cartridge accompanies the duplicate sample cartridges on the trip to and from the site, without removal of the caps on each end of the cartridge. All trip-blank cartridges were analyzed. If the concentration of an analyte on the sample blank was measured to be above the detection limit, the concentrations of the duplicate samples were corrected for the blank concentration.

4.4.4 Precision

Precision was measured as the average standard deviation of the paired duplicate samples. The relation between precision and mean concentration, and between absolute percent difference and mean concentration were investigated.

4.4.5 Accuracy

Accuracy was determined by analyzing audit samples prepared by the Quality Assurance Division (QAD) of AREAL. The audit samples contained either formaldehyde, acetaldehyde, or acetone, some combination of the compounds, or none of the compounds.

5.0 RESULTS

5.1 ANALYTICAL RESULTS

Analytical results are presented in Appendices B and C. Concentrations of formaldehyde, acetaldehyde, and acetone are reported in ppbv, and are tabulated by site.

Figure 5-1 shows the annual average of the mean concentrations for the three compounds at each site. Figures 5-2 through 5-13 show the mean concentrations for the three compounds by sample period. Each of the figures represents a separate site. For example, Figure 5-2 shows the mean concentrations for each sample collection period at site BRLA. Data for each sampling period are shown with the numerical data in Appendix B and C.

5.2 ANALYSIS RESULT STATISTICS

Appendix B gives rudimentary statistics for the carbonyl analyses. Each site is summarized in two tables in Appendix B that correspond to the two data analysis cases discussed in the following section. Tables B-1 and B-2 list statistics for BRLA, for example.

In Table B-1 for BRLA, the first column gives, in compressed format, the date on which the sample was taken. For the first sample taken at BRLA, for example, the sample date is given as "10-JUL-90," which indicates that the sample was taken on July 10, 1990. The second column in the table shows the day of the week for the sample date. Weekday Sn, refers to Sunday; M to Monday; T to Tuesday; etc. ID Numbers listed in the tables of Appendix B refer to the Radian ID Numbers for the UATMP samples collected on the sample date. The ID Numbers carrying a "D" after the first four digits refers to a UATMP sample that was taken in duplicate.

Overall averages are given for each mean concentration, percent difference, and standard deviation column in the tables of Appendix B. These overall averages may be considered to be annual averages, since the time interval of the study was approximately one year.

Carbonyl Concentrations-All Sites 1990 UATMP

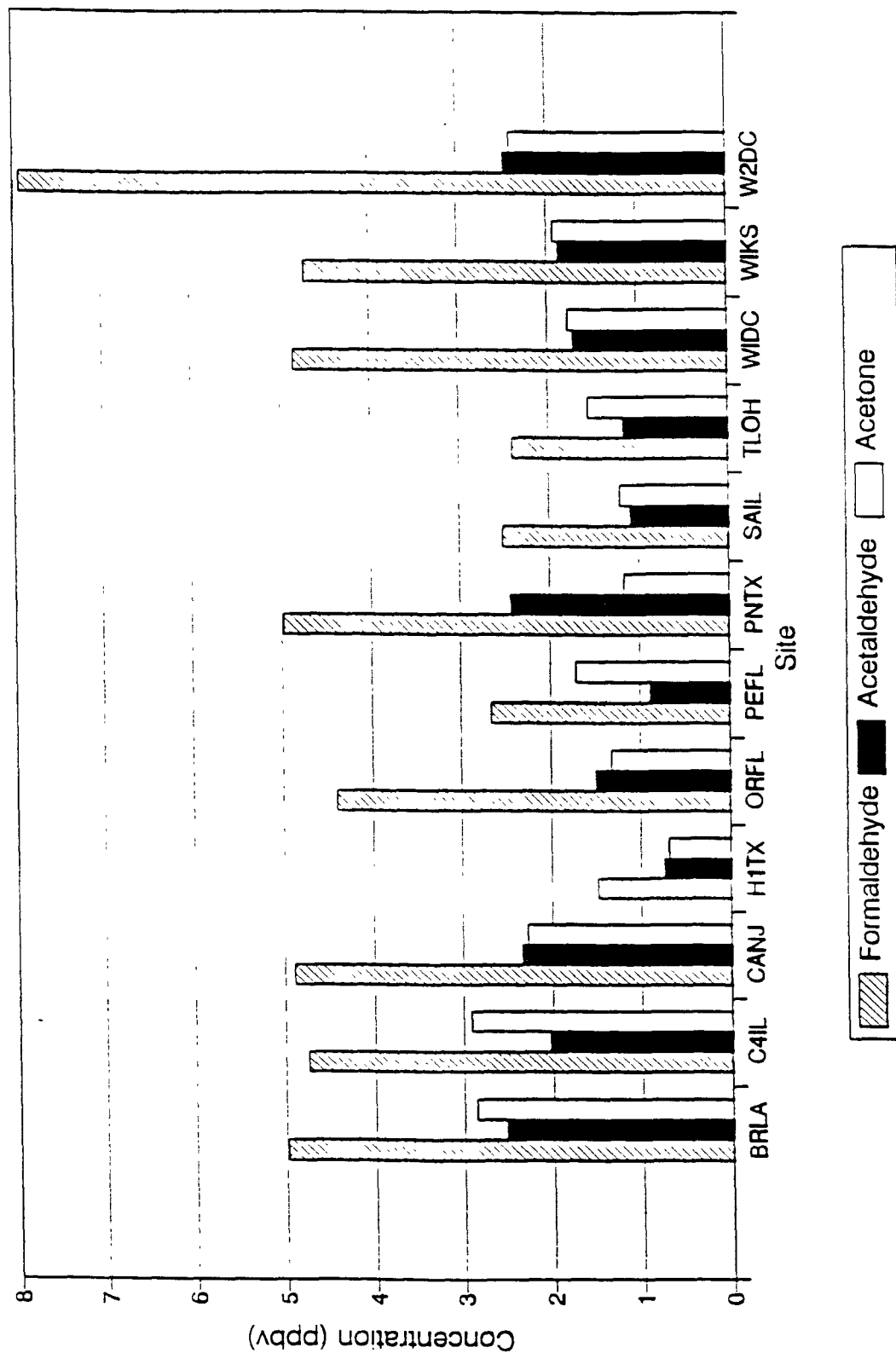


Figure 5-1. Average Carbonyl Concentrations - All Sites

BRLA Carbonyl Concentrations 1990 UATMP

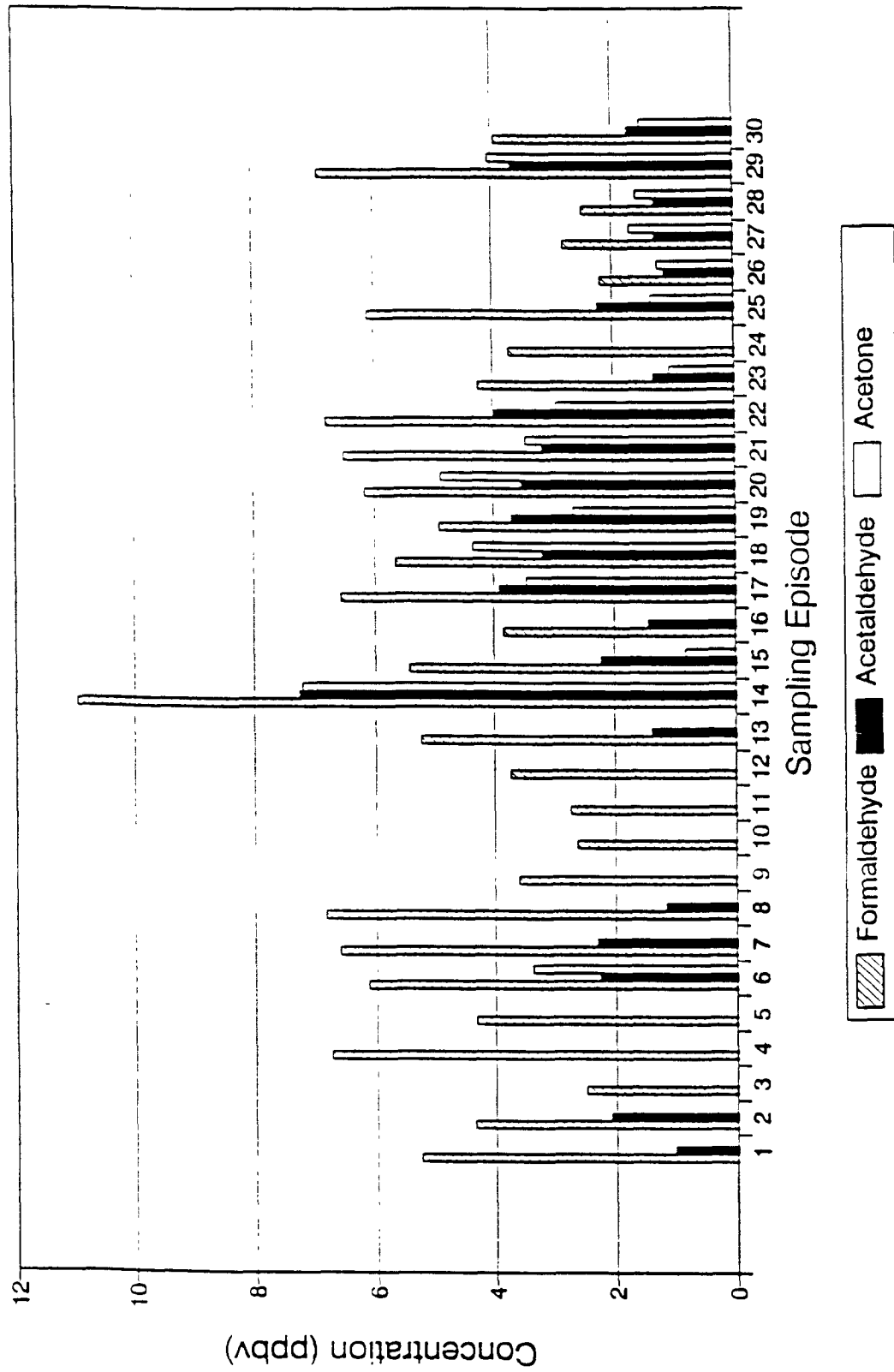


Figure 5-2. Carbonyl Concentration for Baton Rouge, Louisiana

C4IL Carbonyl Concentrations 1990 UATMP

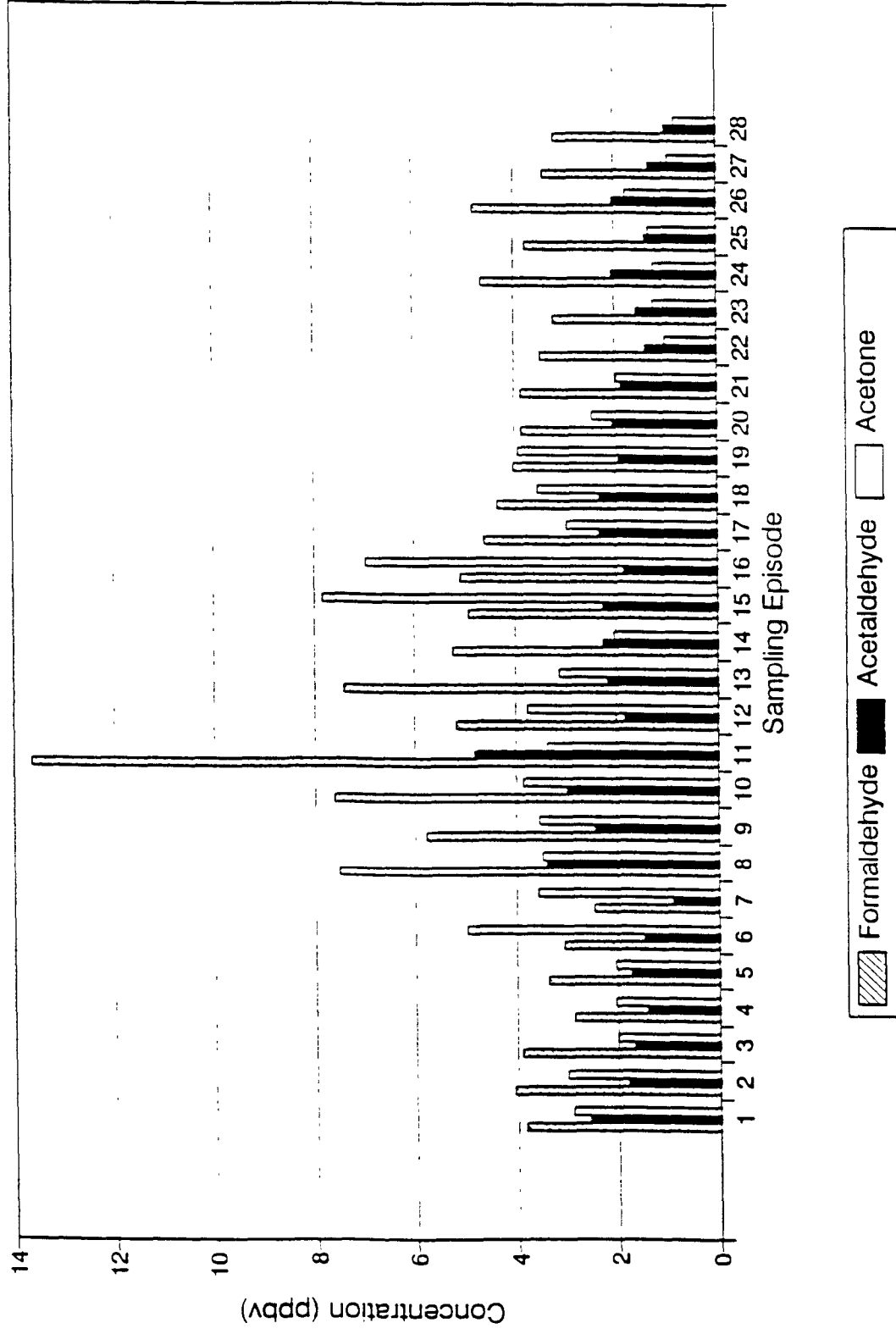


Table 5-3. Carbonyl Concentration for Chicago, Illinois

CANJ Carbonyl Concentrations 1990 UATMP

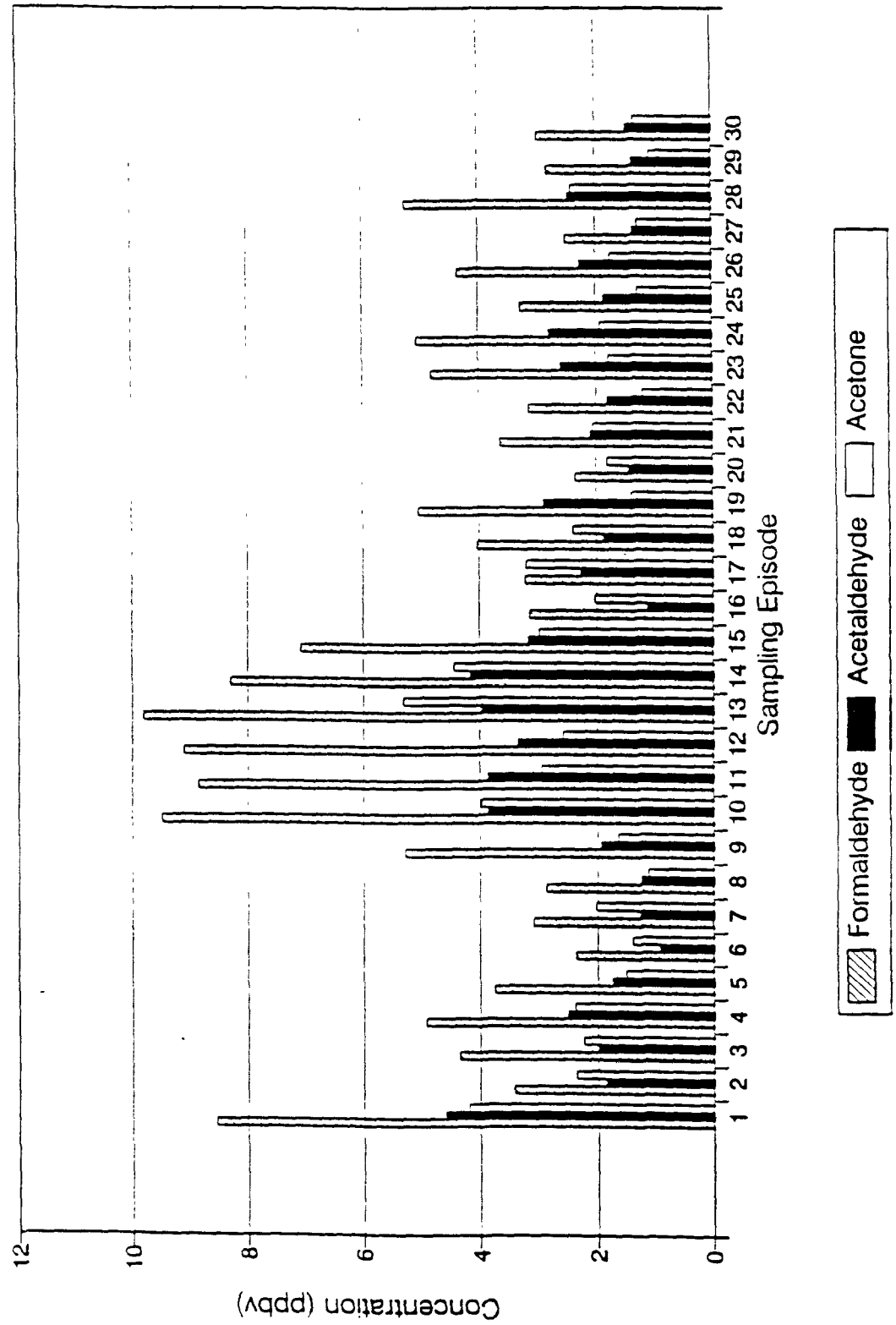


Figure 5-4. Carbonyl Concentration for Camden, New Jersey

H1TX Carbonyl Concentrations 1990 UATMP

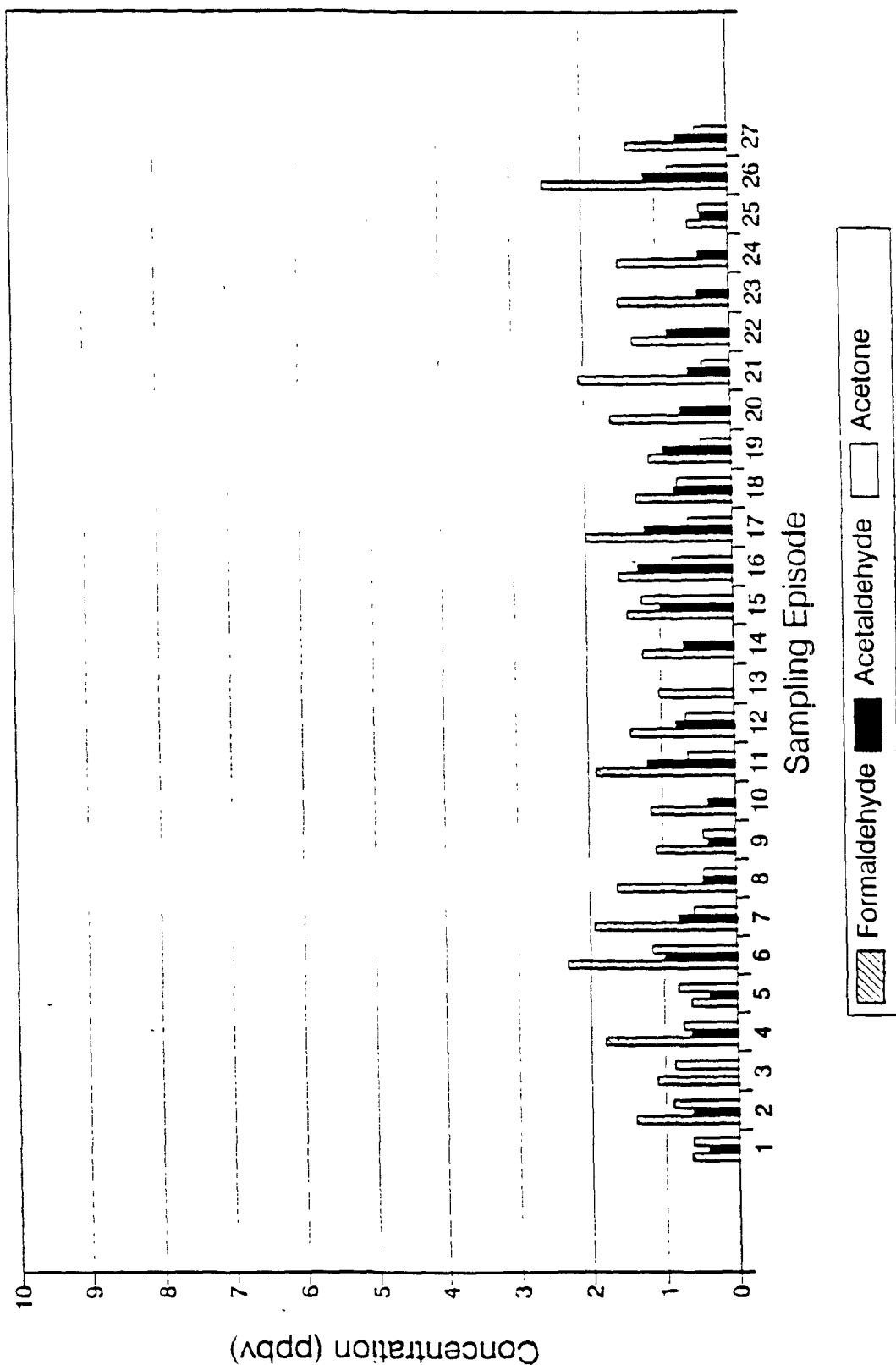


Figure 5-5. Carbonyl Concentration for Houston, Texas

ORFL Carbonyl Concentrations 1990 UATMP

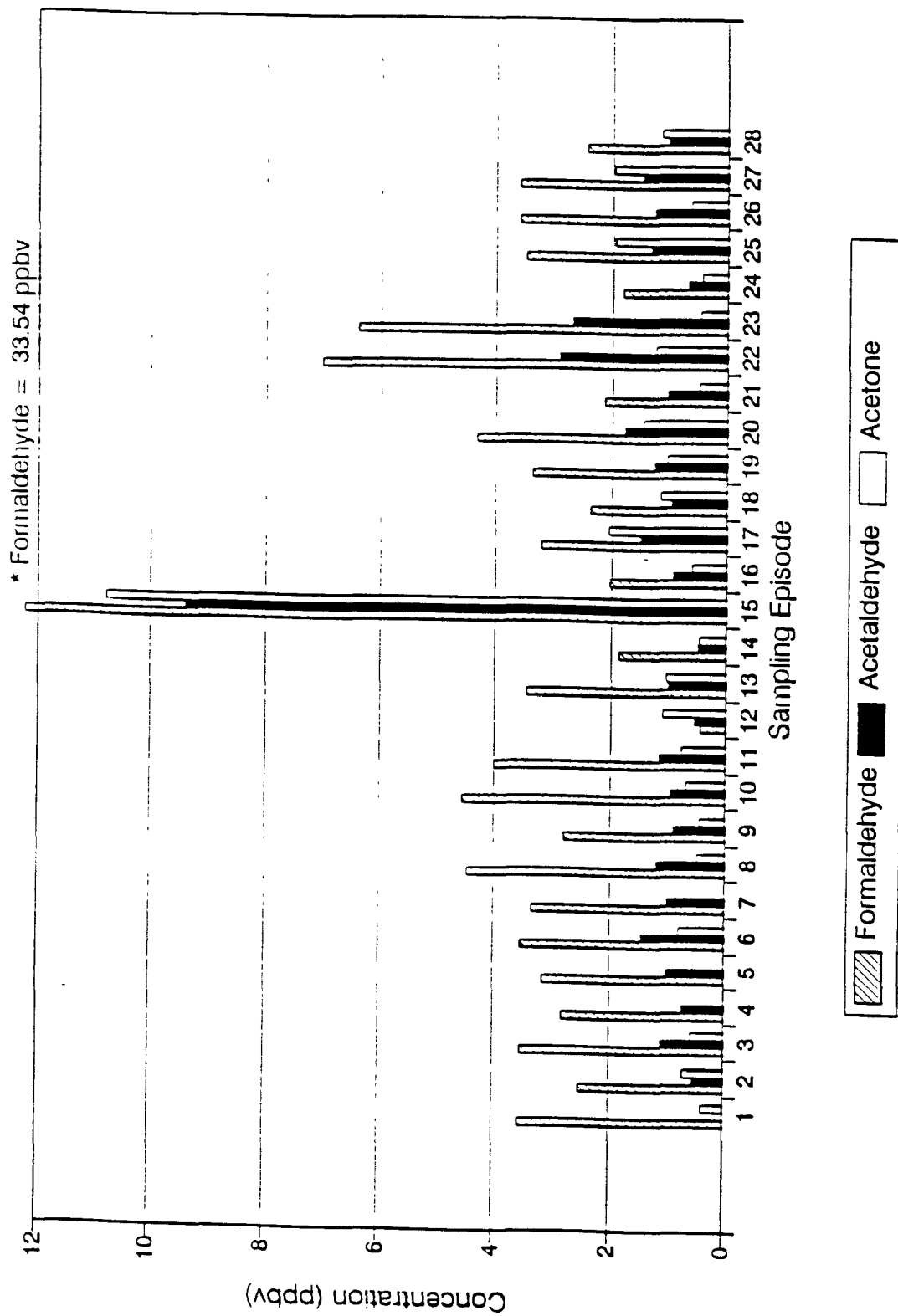


Figure 5-6. Carbonyl Concentration for Orlando, Florida

PEFL Carbonyl Concentrations 1990 UATMP

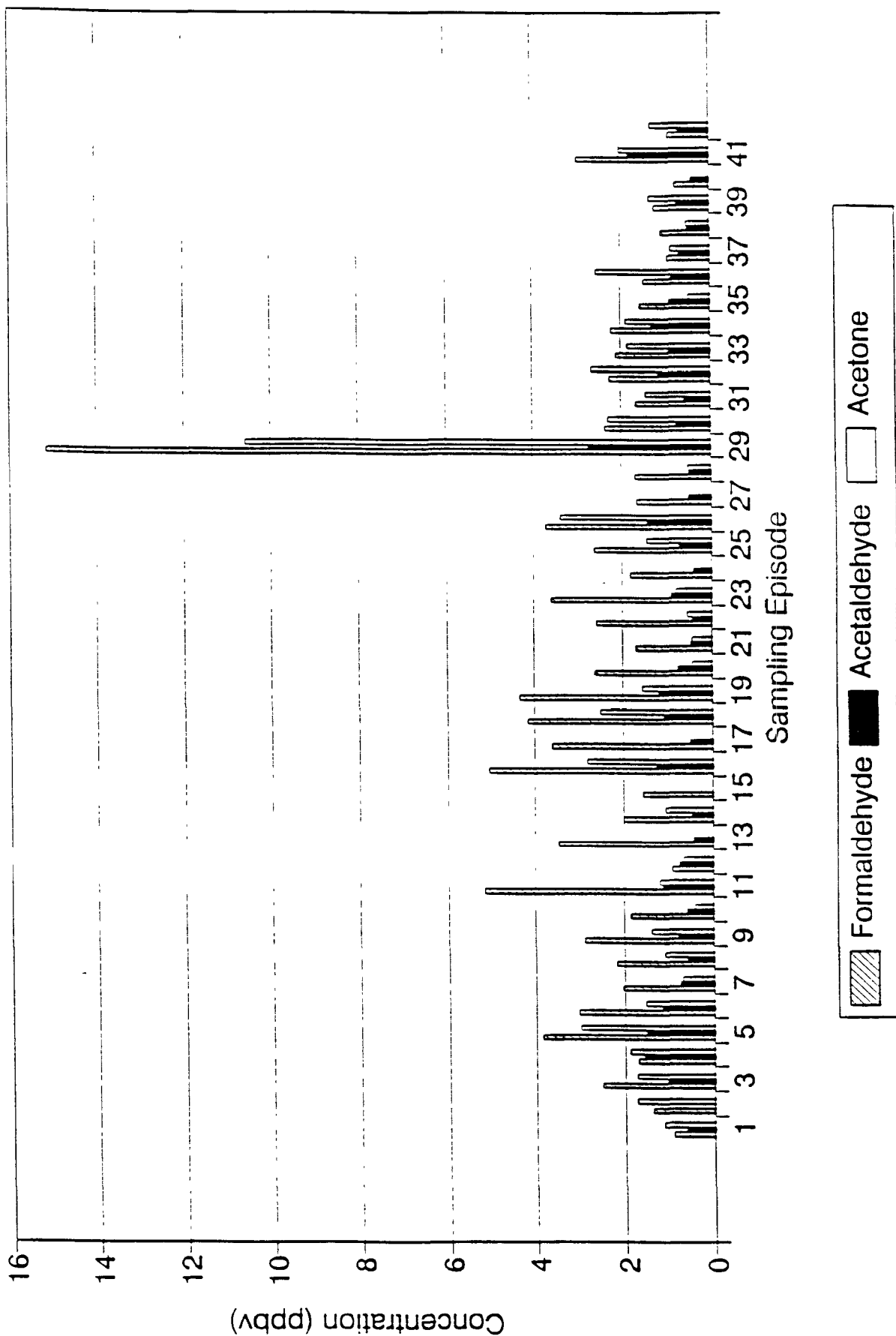


Figure 5-7. Carbonyl Concentration for Pensacola, Florida

PNTX Carbonyl Concentrations 1990 UATMP

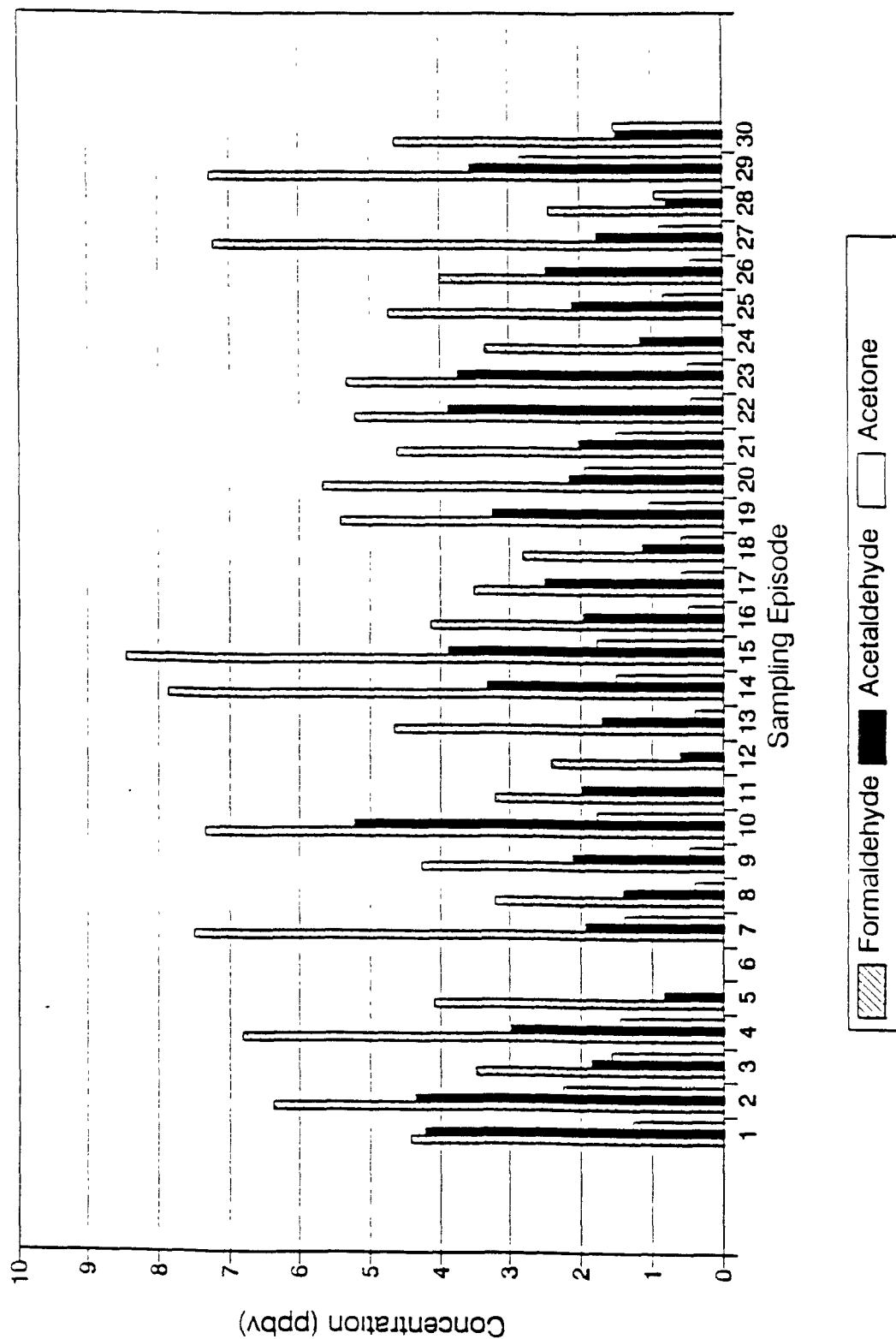


Figure 5-8. Carbonyl Concentration for Port Neches, Texas

SAIL Carbonyl Concentrations 1990 UATMP

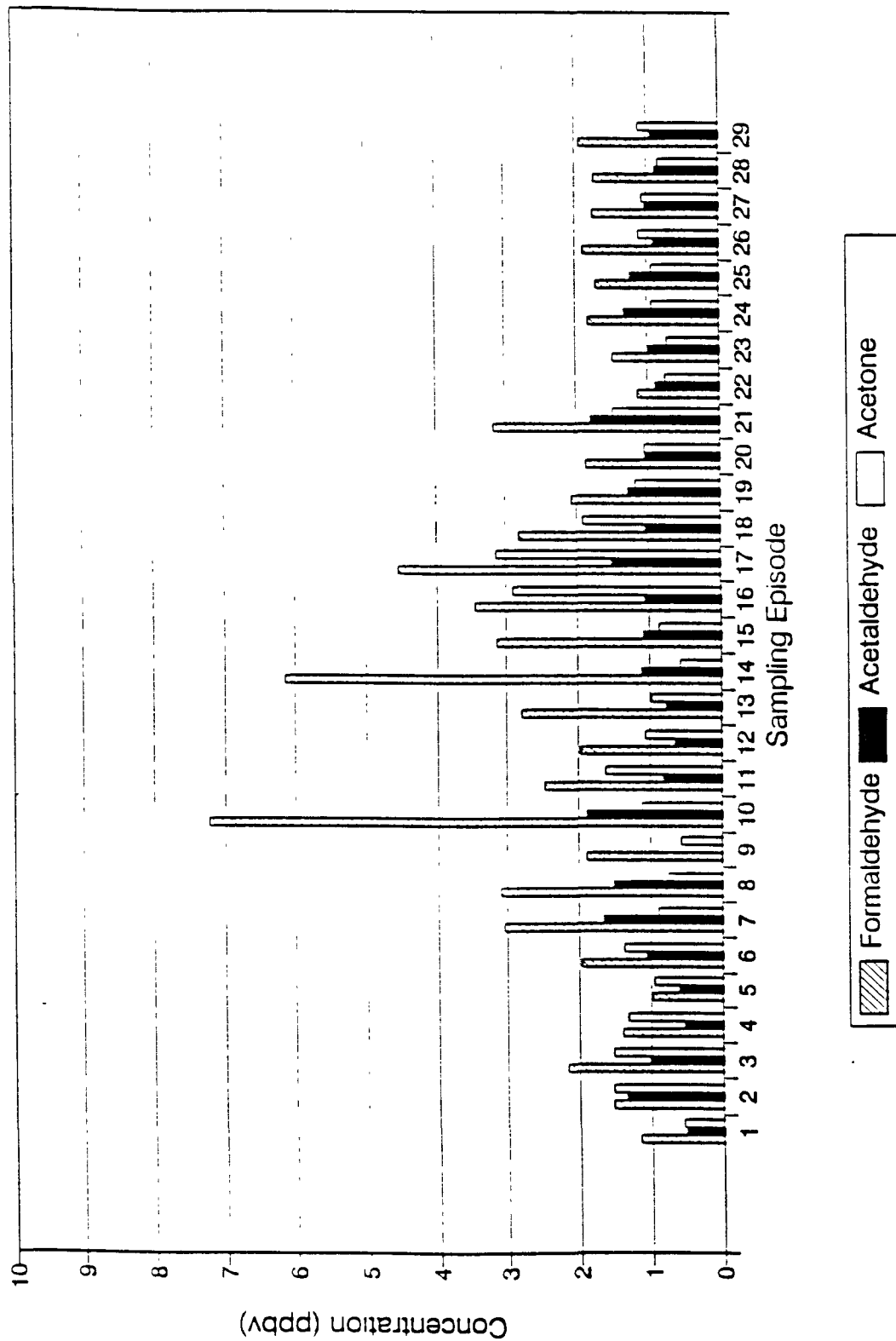


Figure 5-9. Carbonyl Concentration for Sauget, Illinois

TLOH Carbonyl Concentrations 1990 UATMP

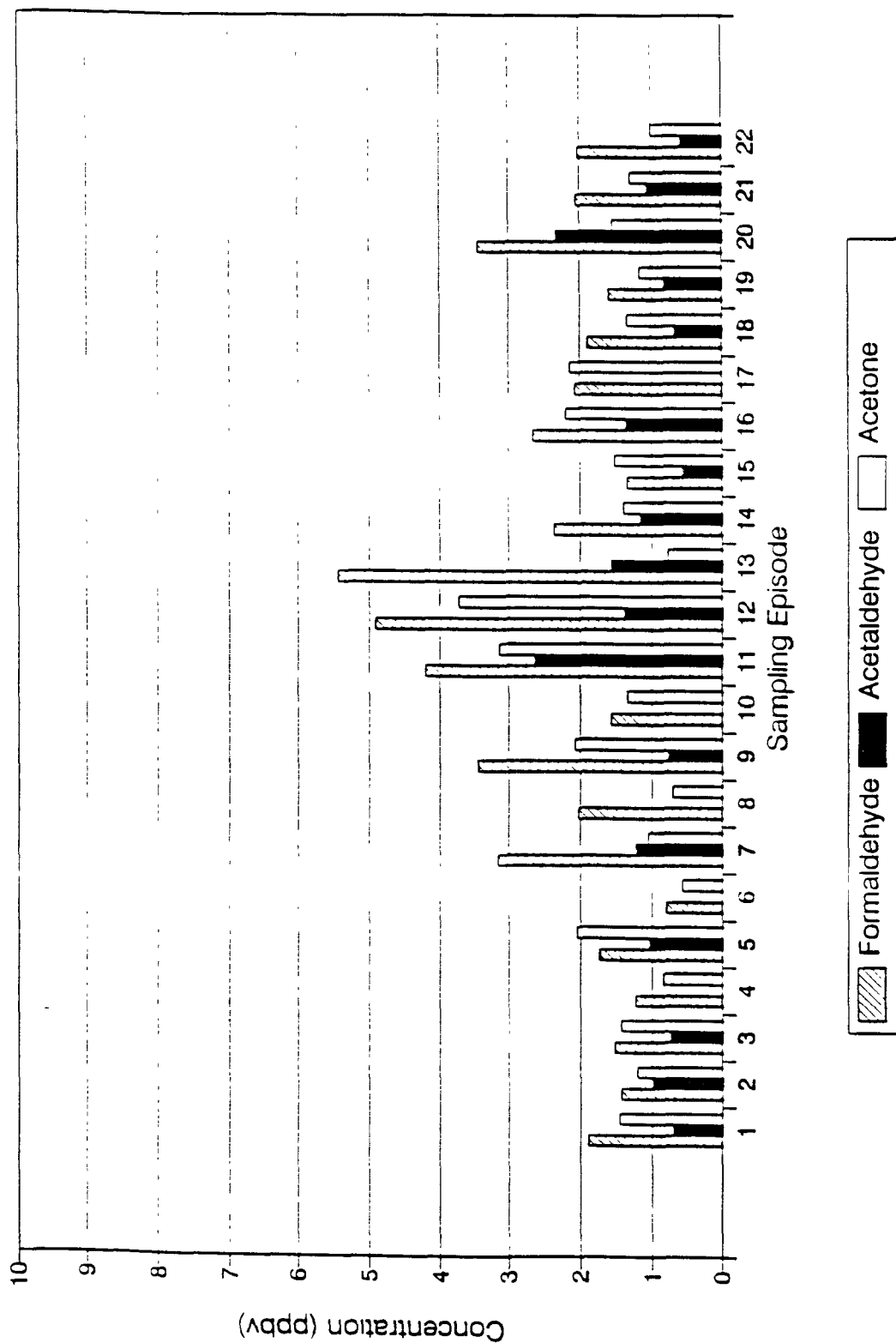


Figure 5-10. Carbonyl Concentration for Toledo, Ohio

W1DC Carbonyl Concentrations 1990 UATMP

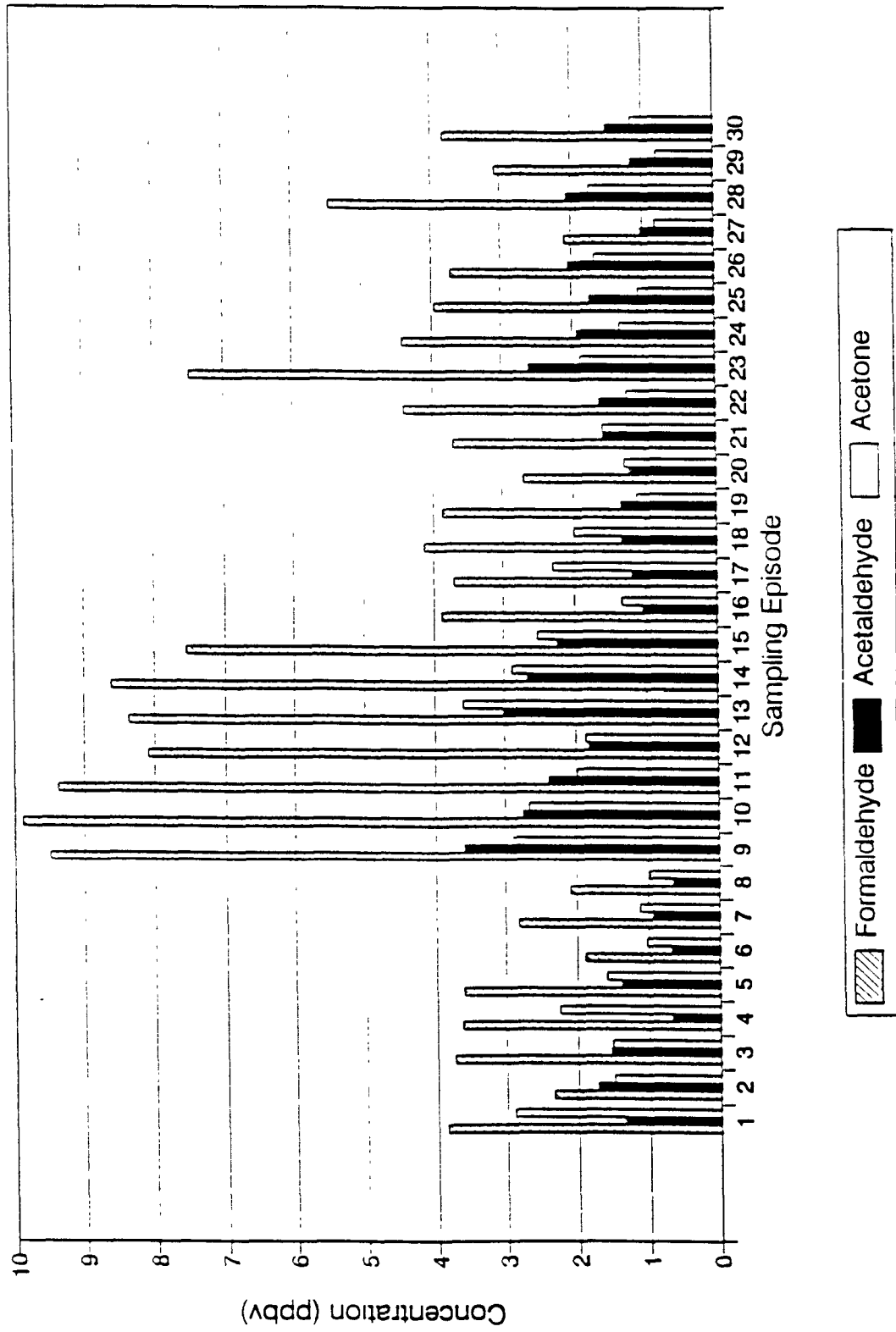


Figure 5-11. Carbonyl Concentration for Washington, D.C. - Site 1

W1KS Carbonyl Concentrations 1990 UATMP

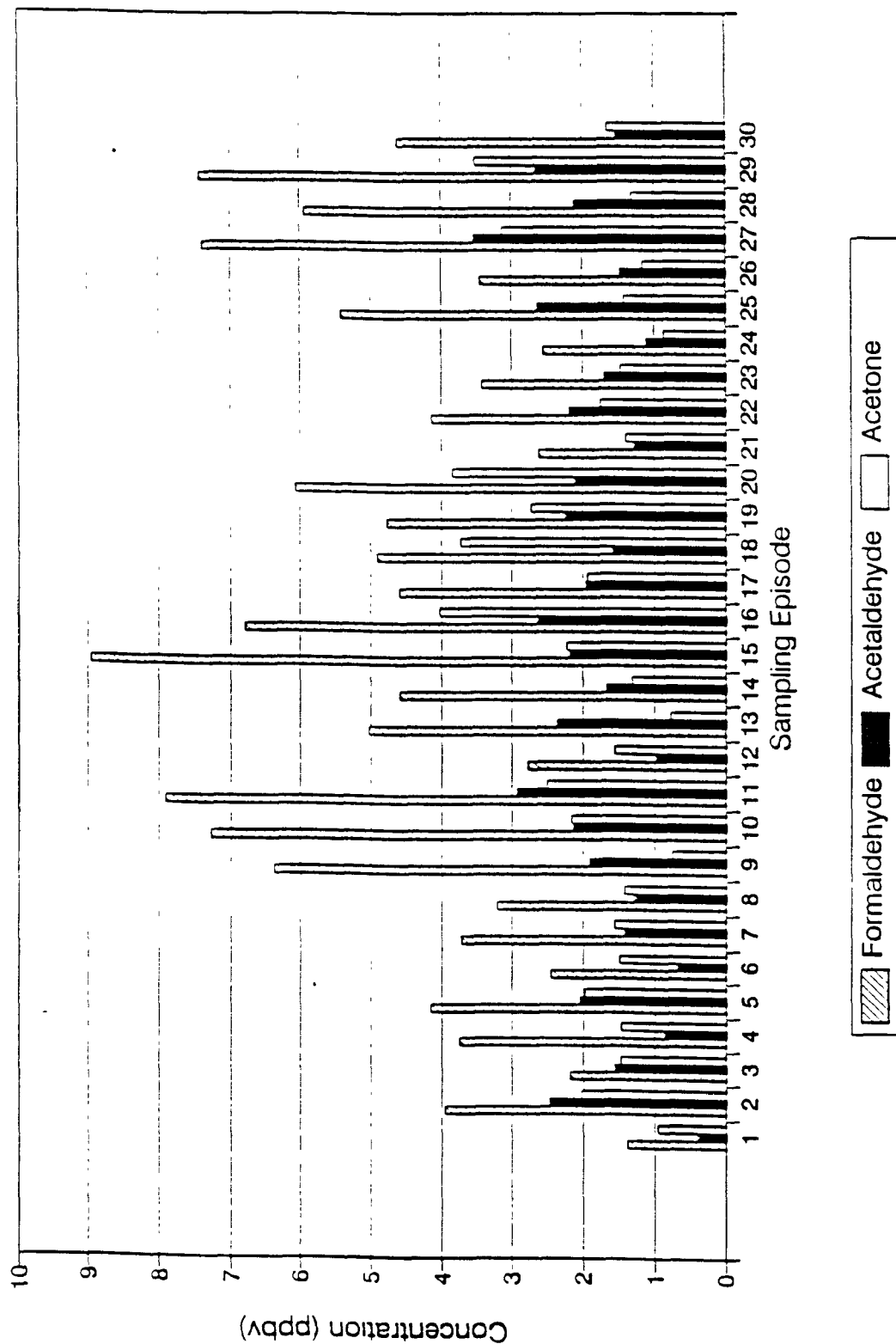


Figure 5-12. Carbonyl Concentration for Wichita, Kansas

W2DC Carbonyl Concentrations 1990 UATMP

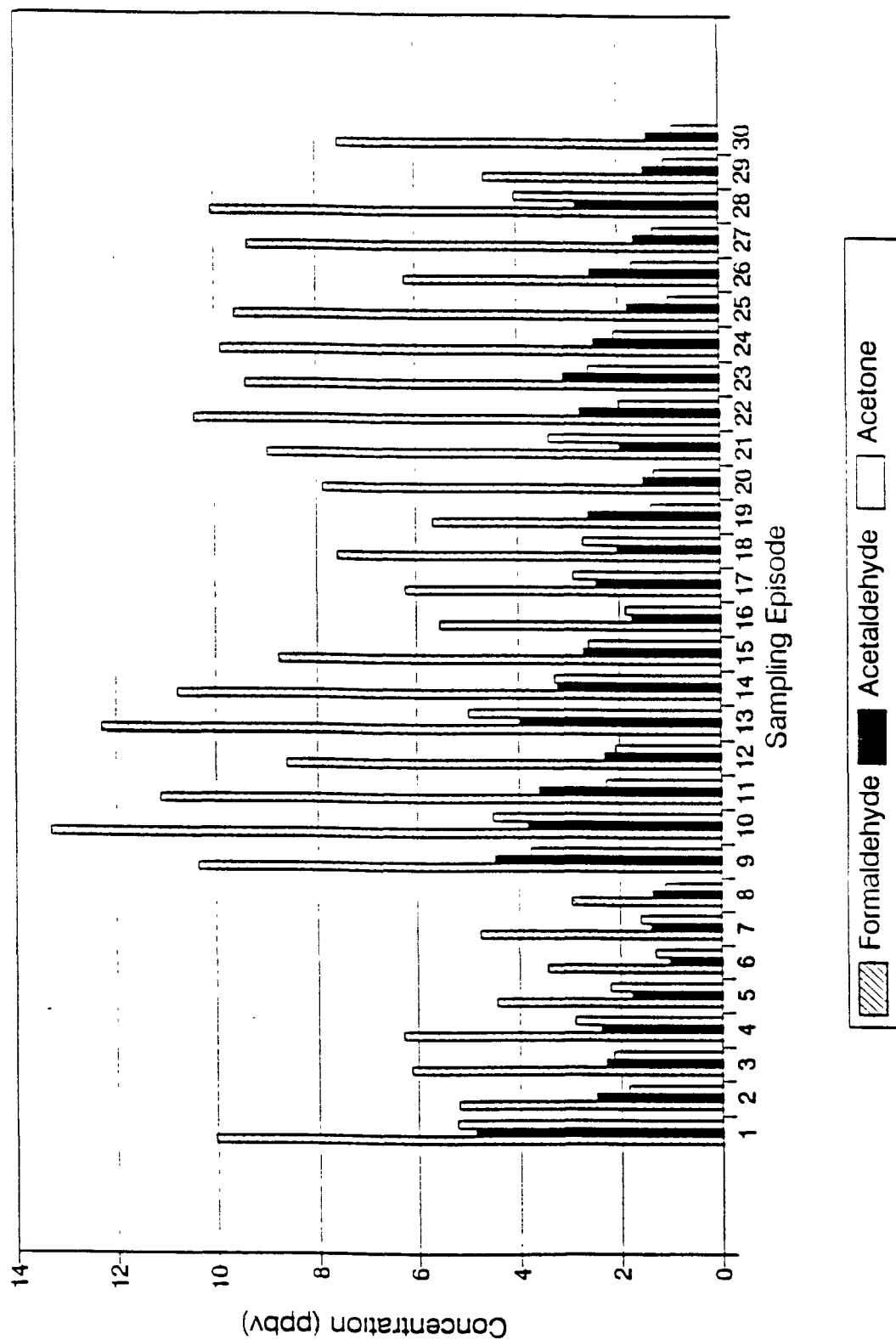


Figure 5-13. Carbonyl Concentration for Washington, D.C. - Site 2

5.3 ANALYTICAL RESULTS DATA

Appendix C lists all of the analytical data received from the EPA laboratory. In addition to sample date, week day, and ID NO., the tables show "Lot," which identifies the lot number of the carbonyl cartridge used in obtaining the sample. The carbonyl cartridges were fabricated in lots of about 300 cartridges per lot, and each lot was given a Lot Number in order to identify it uniquely.

Each table in Appendix C contains the analytical results from the indicated site. Concentration and purity data are listed for (duplicate) cartridge 1, and (duplicate) cartridge 2. The choice of which duplicate was designated as cartridge 1, and which was cartridge 2, was completely arbitrary.

6.0 DATA ANALYSIS

6.1 INTRODUCTION

The UATMP carbonyl data summaries were prepared for two separate, parallel cases to illustrate how summary statistics and analysis results may differ according to the method by which mean concentrations are determined. Cartridge concentrations listed as zero were set to missing and excluded from further calculations in both cases. When both cartridge concentrations were reported by the analytical laboratory below the analytical detection limit (ADL), the mean concentration was set to missing in both cases. In the first case, hereafter referred to as Case 1, a mean concentration was calculated from the two cartridge concentrations only when both concentrations were above the ADL. When one cartridge concentration was above the ADL and the other cartridge concentration was below the ADL, zero, or missing, the cartridge concentration above the ADL was reported as the mean concentration. For Case 2, a mean concentration was calculated similar to Case 1, however, when one cartridge concentration was above the ADL and the other cartridge concentration was below the ADL, a value of one-half the ADL was substituted for the cartridge concentration below the ADL, and a mean was then calculated from the two cartridge concentrations. If the other cartridge concentration was zero or missing, the cartridge concentration above the ADL was reported as the mean concentration. These two cases were applied to all three compounds. The ADL chosen for these two cases were the same for formaldehyde, acetaldehyde, and acetone--0.36 ppbv.

Several statistical summaries and plots were generated to characterize the carbonyl data. Summary statistics, including the means and standard deviations of the normal and lognormal distributions; percentiles; and confidence intervals were calculated by site and over all sites. Box plots were constructed to visually represent the data distributions. The question of seasonality in the carbonyl data was addressed by plotting monthly averages by site to enable a visual determination of potential monthly periodicity of the concentration data. Intercarbonyl correlations and covariances were calculated to demonstrate the relationship of the compound concentrations. A measure of variability and a measure of precision were calculated for each

cartridge pair when both cartridge concentrations were above the ADL. Finally, audit sample results were summarized.

6.2 SUMMARY STATISTICS

Summary statistics were calculated by site and compound, as well as over all sites for each compound, for both the mean concentrations and for the natural logarithms of the mean concentrations. The natural logarithms were considered because air quality data are often more closely lognormally distributed than normally distributed. These two sets of summary statistics were calculated for both Case 1 and Case 2, resulting in a total of four sets of summary statistics for each compound.

The summary statistics were calculated and stored for use in summary tables by the Statistical Analysis System (SAS®) univariate procedure. This procedure provides a test statistic and corresponding probability for the null hypothesis that the data examined are normally distributed. For sample sizes (N) less than or equal to 2000, which is the case for all samples in this report, SAS provides the Shapiro-Wilk statistic, W, against which to test the null hypothesis. For testing at the 95 percent confidence level, the null hypothesis is accepted when the probability of a smaller W is larger than 0.05.

Table 6-1 lists the probabilities for a smaller W for the distributions of the mean concentrations and for the distributions of the natural logarithms of the mean concentrations, by compound, for Case 1 and Case 2. The site code "ALL" refers to the summary over all 1990 field sites. The sample sizes for the other sites are still only minimally sufficient to provide meaningful probability distribution characterizations. The probabilities listed in Table 6-1 support the postulate that the data are more nearly lognormally distributed than normally distributed. The null hypothesis (normally distributed data) is accepted for the distributions of the mean concentrations only 14 times out of 39 for Case 1 and only 16 times out of 39 for Case 2. On the other hand, the null hypothesis is accepted 31 and 32 out of 39 times for both Case 1 and Case 2, respectively, for the distributions of the logarithms of the mean concentrations, i.e., supporting the postulate that the data are lognormally distributed.

Table 6-1. Probabilities for a Smaller W Statistic for Distributions of the Mean Concentrations and Logs of the Mean Concentrations

Site Code	N	Prob < W for the Formaldehyde Distribution				Prob < W for the Acetaldehyde Distribution				Prob < W for the Acetone Distribution			
		Mean Conc		Log of		Mean Conc		Log of		Mean Conc		Log of	
		Case 1	Case 2	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2	Case 1	Case 2
ATI	354	0.0000	0.0000	0.9576*	0.9828*	0.0000	0.0000	0.1016*	0.2330*	0.0000	0.0000	0.0156	0.0067
URIA	30	0.0319	0.0319	0.1614*	0.1614*	0.0034	0.0034	0.1755*	0.7032*	0.0694*	0.0694*	0.7306*	0.7306*
C41L	28	0.0001	0.0001	0.0375	0.0375	0.0013	0.0013	0.6841*	0.6841*	0.0036	0.0036	0.3790*	0.3790*
CANJ	30	0.0002	0.0002	0.0223	0.0223	0.0399	0.0399	0.6223*	0.6223*	0.0017	0.0017	0.3846*	0.3846*
HITX	26	0.8252*	0.8252*	0.0971*	0.0971*	0.1431*	0.4308*	0.1196*	0.1882*	0.3022*	0.3022*	0.2914*	0.3247*
ORFL	28	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0036	0.0147	0.0001	0.0001	0.0017	0.2291*
PEFI	42	0.0001	0.0003	0.2844*	0.8608*	0.0001	0.0234*	0.3452*	0.5201*	0.0013	0.0013	0.1685*	0.2808*
PNIX	29	0.1113*	0.1113*	0.3764*	0.3764*	0.1979*	0.1979*	0.3782*	0.3782*	0.1242*	0.1242*	0.0573*	0.2428*
SAIL	29	0.0001	0.0001	0.2259*	0.2259*	0.3153*	0.1681*	0.5510*	0.6110*	0.0001	0.0001	0.2131*	0.4123*
TIOH	22	0.0082	0.0082	0.6743*	0.6743*	0.0061	0.0445*	0.4475*	0.6067*	0.0073	0.0073	0.8677*	0.8677*
WIDC	30	0.0002	0.0002	0.0202	0.0202	0.2036*	0.2036*	0.6793*	0.6793*	0.0515*	0.0515*	0.6579*	0.6579*
WIKS	30	0.5485*	0.5485*	0.6479*	0.6479*	0.9952*	0.9985*	0.0227	0.0022	0.0031	0.0031	0.2590*	0.2072*
W2DC	30	0.5493*	0.5493*	0.1134*	0.1134*	0.0919*	0.0919*	0.8959*	0.8959*	0.0222	0.0222	0.5444*	0.5444*

* Indicates acceptance of normal distribution hypothesis at the 95% confidence level (probability larger than 0.05)

N Refers to the number of observations from which the probabilities were calculated

Case 1 Mean concentrations are calculated using detectable cartridge concentrations only

Case 2 Mean concentrations are calculated using 1/2 analytical detection limit (ADL) for cartridge concentrations below ADL.

Tables 6-2, 6-3, 6-4, 6-5, 6-6, and 6-7 list the summary statistics by compound and site. The mean and standard deviation of the normal distributions are compared to the mean and standard deviation of the lognormal distribution.⁵ Some percentiles are also listed to depict the distribution of the data.

6.3 BOX PLOTS

Box plots were constructed to compare, visually, data distributions between sites. The box plots for the logarithms of the mean concentrations at each site for Case 1 are shown in Figures 6-1, 6-2, and 6-3 for formaldehyde, acetaldehyde, and acetone, respectively. Box plots of the natural logarithms of the mean concentrations are shown, because, as demonstrated in Table 6-1, the logarithms of the concentrations are normally distributed.

The top and bottom of the box are called hinges, and are located such that the lower hinge represents the 25th percentile and the upper hinge represents the 75th percentile. The median is represented by a line that splits the box into two pieces (not necessarily in the middle of the box) and the mean is indicated by a plus (+). The F-spread is defined as the difference between the 75th and 25th percentiles. "Whiskers" extend on either side of the box where data exist to a distance of up to 1.5 times the F-spread. Data located between 1.5 and 3 times the F-spread are indicated by a circle, while data values more extreme than 3 times the F-spread are indicated by an asterisk (*).

The box plots appear approximately symmetrical which further supports the postulate that the data are lognormally distributed.

6.4 SEASONALITY

Only a crude analysis can be made of carbonyl seasonality for this report because several years' data are needed for an accurate representation, and the carbonyl data set contains just one year's worth of data. However, by plotting monthly arithmetic mean concentrations by site and over all sites, and by examining the results from several analysis of variance (ANOVA) models, the 1990 carbonyl data may be generally characterized.

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Table 6-2. Summary Arithmetic and Lognormal Statistics
 for Mean Formaldehyde Concentrations:^a Case 1^b

Site Code	N	<u>Normal Distribution</u>		<u>Lognormal Distribution</u>		Percentiles			
		Mean	STD	Mean	STD	(Min) 0th	25th	(Median) 50th	(Max) 100th
ALL	354	4.2296	2.9849	1.2437	0.6385	0.4200	2.1800	3.5950	5.2500
BRLA	30	4.9920	1.9110	1.5360	0.3921	2.1800	3.7200	4.9000	6.5100
C41L	28	4.7529	2.1996	1.4871	0.3586	2.4450	3.4250	4.0100	5.0850
CANJ	30	4.8963	2.3524	1.4883	0.4447	2.3500	3.1500	4.0300	5.2900
H1TX	26	1.4875	0.4667	0.3437	0.3494	0.5550	1.1450	1.4200	1.8000
ORFL	28	4.3971	5.8602	1.1873	0.6787	0.4200	2.4400	3.3650	3.5950
PEFL	42	2.6468	2.2739	0.7808	0.5816	0.7350	1.5650	2.1050	3.0100
PNTX	29	4.9807	1.7248	1.5466	0.3531	2.4250	3.5050	4.6400	6.3700
SAIL	29	2.4945	1.4173	0.7963	0.4702	0.9650	1.7200	1.9650	3.0450
TLOH	22	2.3968	1.2176	0.7636	0.4754	0.7900	1.5600	2.0150	3.1650
WIDC	30	4.8577	2.4545	1.4661	0.4806	1.8950	3.6050	3.8450	7.4750
WIKS	30	4.7253	1.8956	1.4681	0.4347	1.3800	3.4200	4.5800	6.0750
W2DC	30	7.9193	2.6820	2.0054	0.3799	2.9500	5.7000	7.8550	10.0350
									13.3150

^aUnits of ppbv.

^bIn Case 1, mean concentrations are calculated using detectable cartridge concentrations only.

Table 6-3. Summary Arithmetic and Lognormal Statistics
for Mean Formaldehyde Concentrations:^a Case 2^b

Site Code	N	Normal Distribution		Lognormal Distribution		Percentiles				
		Mean	STD	Mean	STD	(Min) 0th	25th	(Median) 50th	75th	(Max) 100th
ALL	354	4.2081	2.9338	1.2408	0.6385	0.3000	2.1800	3.5950	5.2500	33.5400
BRLA	30	4.9920	1.9110	1.5360	0.3921	2.1800	3.7200	4.9000	6.5100	10.9750
C41L	28	4.7529	2.1996	1.4871	0.3586	2.4450	3.4250	4.0100	5.0850	13.6400
CANJ	30	4.8963	2.3524	1.4883	0.4447	2.3500	3.1500	4.0300	5.2900	9.8100
H1TX	26	1.4875	0.4667	0.3437	0.3494	0.5550	1.1450	1.4200	1.8000	2.5450
ORFL	28	4.3929	5.8633	1.1753	0.7182	0.3000	2.4400	3.3650	5.3590	33.5400
PEFL	42	2.4686	1.3926	0.7646	0.5338	0.7350	1.5650	2.1050	3.0100	7.6650
PNTX	29	4.9807	1.7248	1.5466	0.3531	2.4250	3.5050	4.6400	6.3700	8.4600
SAIL	29	2.4945	1.4173	0.7963	0.4702	0.9650	1.7200	1.9650	3.0450	7.2250
TLOH	22	2.3968	1.2176	0.7636	0.4754	0.7900	1.5600	2.0150	3.1650	5.4250
W1DC	30	4.8577	2.4545	1.4661	0.4806	1.8950	3.6050	3.8450	7.4750	9.8800
W1KS	30	4.7253	1.8956	1.4681	0.4347	1.3800	3.4200	4.5800	6.0750	8.9500
W2DC	30	7.9193	2.6820	2.0054	0.3799	2.9500	5.7000	7.8550	10.0350	13.3150

^aUnits of ppbv.

^bIn Case 2, mean concentrations are calculated using 1/2 analytical detection limits (ADL) for cartridge concentrations below ADL.

Table 6-4. Summary Arithmetic and Lognormal Statistics
for Mean Acetaldehyde Concentrations:^a Case 1^b

Site Code	N	Normal Distribution		Lognormal Distribution		(Min) 0th	Percentiles			
		Mean	STD	Mean	STD		25th	(Median) 50th	75th	(Max) 100th
ALL	332	1.7319	1.1067	0.3700	0.6055	0.3700	0.9700	1.4500	2.2500	9.4050
BRLA	22	2.5170	1.4067	0.7860	0.5247	1.0300	1.3300	2.2200	3.5400	7.2400
C4IL	28	2.0377	0.7756	0.6523	0.3450	0.9250	1.4950	1.8850	2.2650	4.8300
CANJ	30	2.3388	0.9989	0.7631	0.4245	0.9300	1.4800	1.9800	2.9050	4.5900
H1TX	23	0.7550	0.2897	-0.6561	0.4043	0.3700	0.4400	0.7000	1.0050	1.2850
ORFL	25	1.5250	1.7395	0.1681	0.6126	0.4850	0.9250	1.0900	1.4500	9.4050
PEFL	40	0.8824	0.4688	-0.2374	0.4656	0.3800	0.5050	0.7450	1.1150	2.7300
PNTX	29	2.4305	1.1927	0.7587	0.5419	0.6100	1.7100	2.1150	3.3400	5.2200
SAIL	28	1.0877	0.3568	0.0309	0.3375	0.5150	0.8700	1.0400	1.2750	1.8900
TLOH	17	1.1565	0.5889	0.0433	0.4502	0.5500	0.7450	1.0500	1.3600	2.6500
W1DC	30	1.6998	0.7281	0.4400	0.4416	0.6550	1.2100	1.5350	2.0700	3.5700
W1KS	30	1.8590	0.7015	0.5328	0.4628	0.4000	1.4200	1.9200	2.2600	3.5300
W2DC	30	2.4747	0.9532	0.8367	0.3798	1.0350	1.7550	2.3850	2.8500	4.8850

^aUnits of ppbv.

^bIn Case 1, mean concentrations are calculated using detectable cartridge concentrations only.

Table 6-5. Summary Arithmetic and Lognormal Statistics
for Mean Acetaldehyde Concentrations:^a Case 2_b

Site Code	N	Normal Distribution		Lognormal Distribution		(Min) 0th	Percentiles			
		Mean	STD	Mean	STD		25th	(Median) 50th	75th	(Max) 100th
ALL	332	1.7196	1.1131	0.3534	0.6288	0.2750	0.9500	1.4400	2.2450	9.4050
BRLA	22	2.4943	1.4856	0.7610	0.5672	0.6800	1.3300	2.2200	3.5400	7.2400
C4IL	28	2.0377	0.7756	0.6523	0.3450	0.9250	1.4950	1.8850	2.2650	4.8300
CANJ	30	2.3388	0.9989	0.7631	0.4245	0.9300	1.4800	1.9800	2.9050	4.5900
HITX	23	0.7465	0.3024	-0.3822	0.4529	0.2750	0.4400	0.7000	1.0050	1.2850
ORFL	25	1.5180	1.7440	0.1520	0.6391	0.3550	0.9250	1.0900	1.4500	9.4050
PEFL	40	0.8376	0.3856	-0.2814	0.4682	0.2800	0.4950	0.7350	1.1150	1.8050
PNTX	29	2.4305	1.9269	0.7587	0.5419	0.6100	1.7100	2.1150	3.3400	5.2200
SAIL	28	1.0636	0.3485	0.0101	0.3302	0.5150	0.8550	1.0250	1.2350	1.8900
TLOH	17	1.1188	0.6304	-0.0329	0.5652	0.3650	0.7450	1.0500	1.3600	2.6500
WIDC	30	1.6998	0.7281	0.4400	0.4416	0.6550	1.2100	1.5350	2.0700	3.5700
WIKS	30	1.8553	0.7096	0.5220	0.4998	0.2900	1.4200	1.9200	2.2600	3.5300
W2DC	30	2.4747	0.9532	0.8367	0.3798	1.0350	1.7550	2.3850	2.8200	4.8850

^aUnits of ppbv.

^bIn Case 2, mean concentrations are calculated using 1/2 analytical detection limits (ADL) for cartridge concentrations below ADL.

Table 6-6. Summary Arithmetic and Lognormal Statistics
for Mean Acetone Concentrations:^a Case 1^b

Site Code	N	Normal Distribution		Lognormal Distribution		Percentiles				
		Mean	STD	Mean	STD	(Min) 0th	25th	(Median) 50th	75th	(Max) 100th
ALL	319	1.8099	1.3598	0.3765	0.6550	0.3700	0.9550	1.4600	2.2400	10.7900
BRLA	15	2.7750	1.7526	0.8389	0.6305	0.8200	1.3550	2.6850	3.4550	7.1950
C4IL	28	2.9138	1.6642	0.9176	0.5728	0.8300	1.7650	2.9150	3.5250	7.8200
CANJ	30	2.2593	1.0655	0.7215	0.4293	1.0450	1.4000	2.0100	2.5600	5.3050
HITX	20	0.6808	0.2427	-0.4435	0.3522	0.3800	0.4300	0.6350	0.8150	1.2400
ORFL	25	1.3010	2.0390	-0.1323	0.7346	0.3700	0.4900	0.7650	1.1300	10.7900
PEFL	36	1.7067	1.7200	0.2557	0.7245	0.3950	0.6600	1.3700	1.8900	10.5600
PNTX	24	1.1804	0.6607	0.0019	0.6043	0.4100	0.4900	1.0450	1.5150	2.8600
SAIL	29	1.1928	0.6088	0.0794	0.4286	0.5350	0.8550	1.0550	1.3550	3.1500
TLOH	22	1.5389	0.7729	0.3242	0.4690	0.5500	1.0350	1.3500	2.0400	3.7250
WIDC	30	1.7547	0.7197	0.7838	0.4025	0.7950	1.1450	1.5900	2.2550	3.5900
WIKS	30	1.9208	0.9167	0.5508	0.4564	0.7450	1.4050	1.5650	2.2250	4.0050
W2DC	30	2.3912	1.9234	0.7544	0.4961	0.9100	1.3600	2.0650	2.9000	5.2350

^aUnits of ppbv.

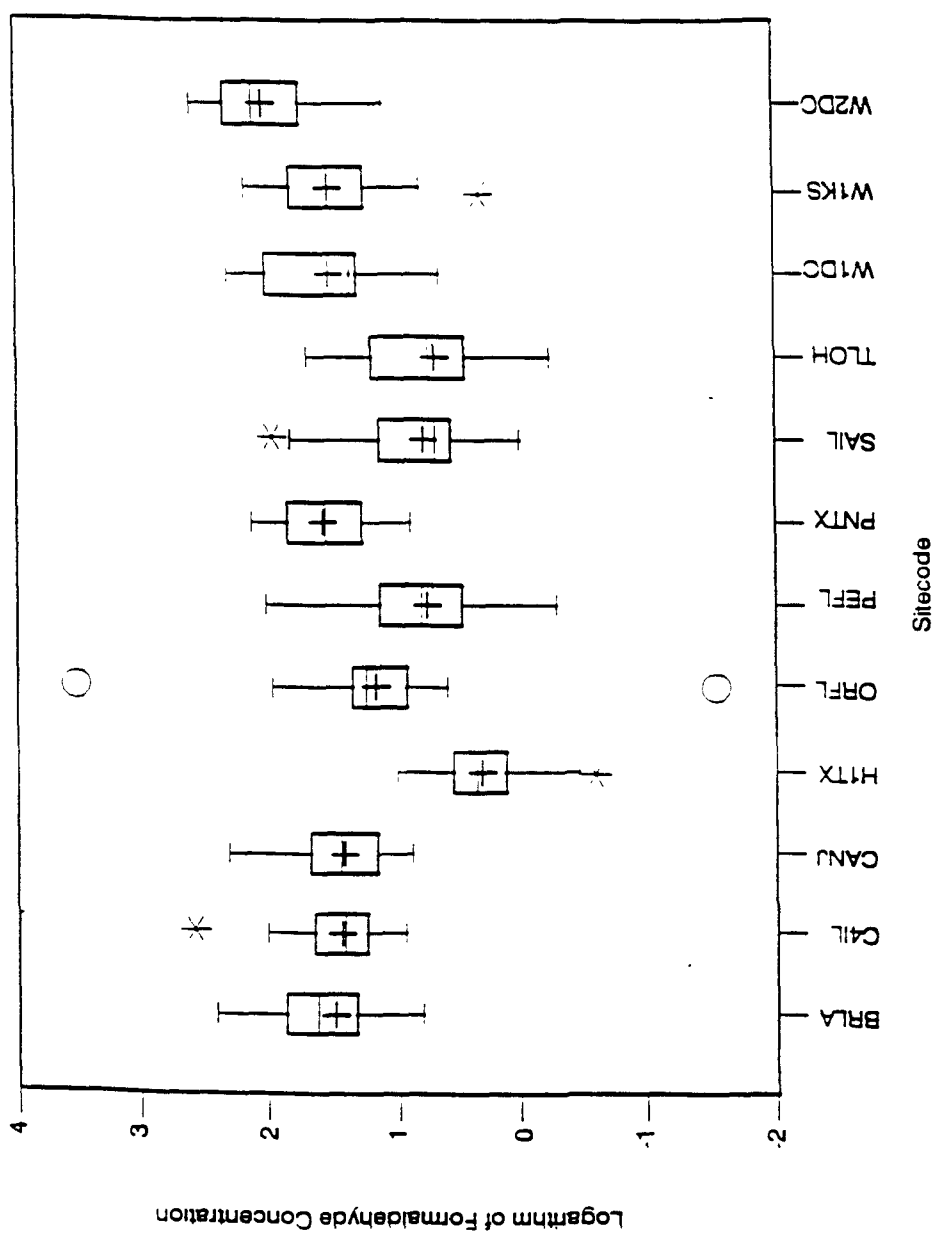
^bIn Case 1, mean concentrations are calculated using detectable cartridge concentrations only.

Table 6-7. Summary Arithmetic and Lognormal Statistics
 for Mean Acetone Concentrations:^a Case 2^b

Site Code	N	Normal Distribution		Lognormal Distribution		Percentiles				
		Mean	STD	Mean	STD	(Min) 0th	25th	(Median) 50th	75th	(Max) 100th
ALL	319	1.7643	1.2097	0.3495	0.6802	0.2750	0.9250	1.4550	2.2400	7.8200
BRLA	15	2.7750	1.7526	0.8389	0.6305	0.8200	1.3550	2.6850	3.4550	7.1950
C4IL	28	2.9138	1.6642	0.9176	0.5728	0.8300	1.7650	2.9150	3.5250	7.8200
CANJ	30	2.2593	1.0655	0.7215	0.4293	1.0450	1.4000	2.0100	2.5600	5.3050
H1TX	20	0.6533	0.2715	-0.5135	0.4412	0.2800	0.4150	0.6350	0.8150	1.2400
ORFL	25	1.0388	1.0664	-0.2558	0.7210	0.2750	0.4400	0.6650	1.1300	5.4850
PEFL	36	1.5531	1.0499	0.2155	0.7096	0.2950	0.6600	1.3700	1.8900	5.3700
PNTX	24	1.1360	0.6800	-0.0664	0.6670	0.2950	0.4900	0.9400	1.5150	2.8600
SAIL	29	1.1831	0.6184	0.0630	0.4521	0.4600	0.8550	1.0550	1.3550	3.1500
TLOH	22	1.5389	0.7729	0.3242	0.4690	0.5500	1.0350	1.3500	2.0400	3.7250
W1DC	30	1.7547	0.7197	0.4838	0.4025	0.7950	1.1450	1.5900	2.2550	3.5900
W1KS	30	1.9020	0.9353	0.5319	0.4794	0.7450	1.4050	1.5650	2.2250	4.0050
W2DC	30	2.3912	1.1923	0.7544	0.4961	0.9100	1.3600	2.0650	2.9000	5.2350

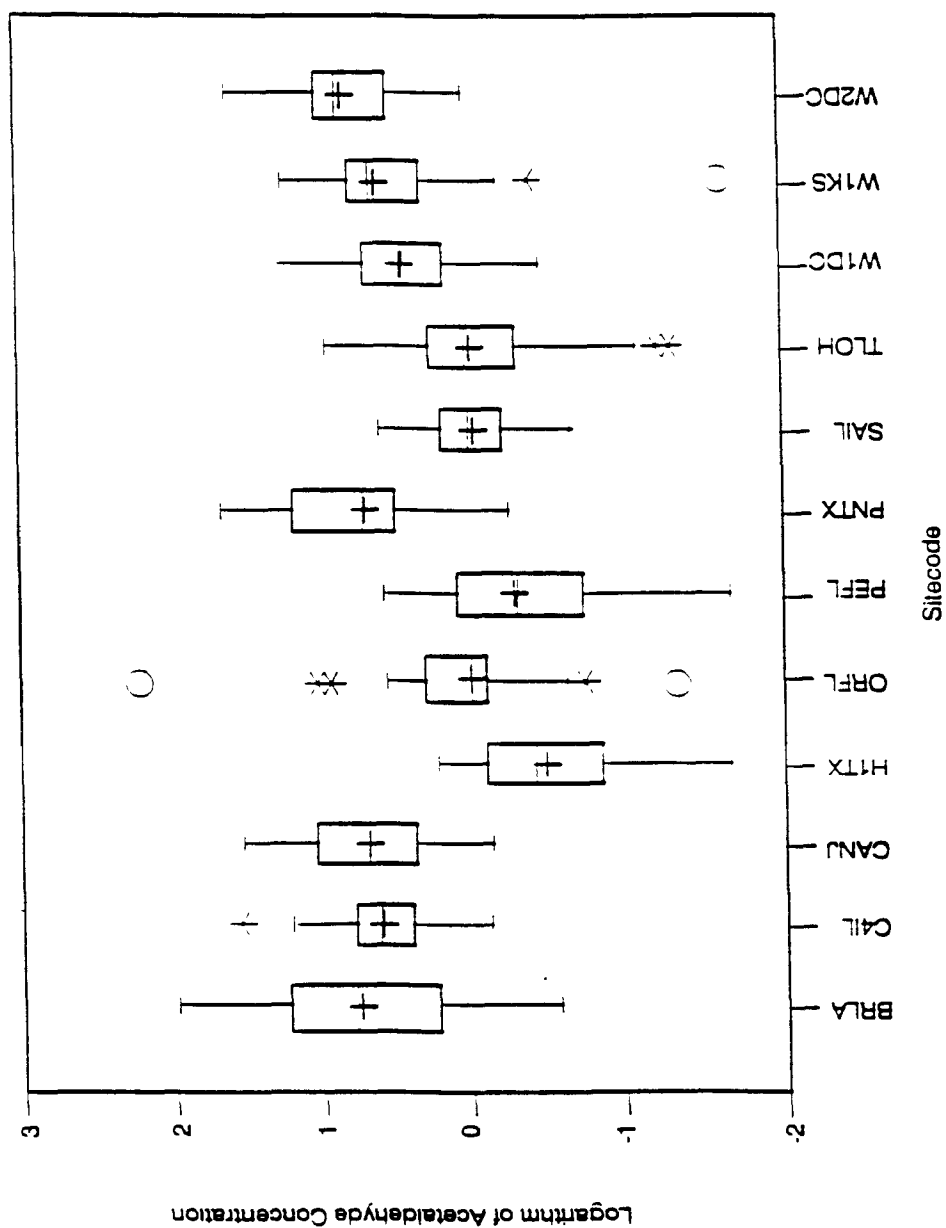
^aUnits of ppbv.

^bIn Case 2, mean concentrations are calculated using 1/2 analytical detection limits (ADL) for cartridge concentrations below ADL.



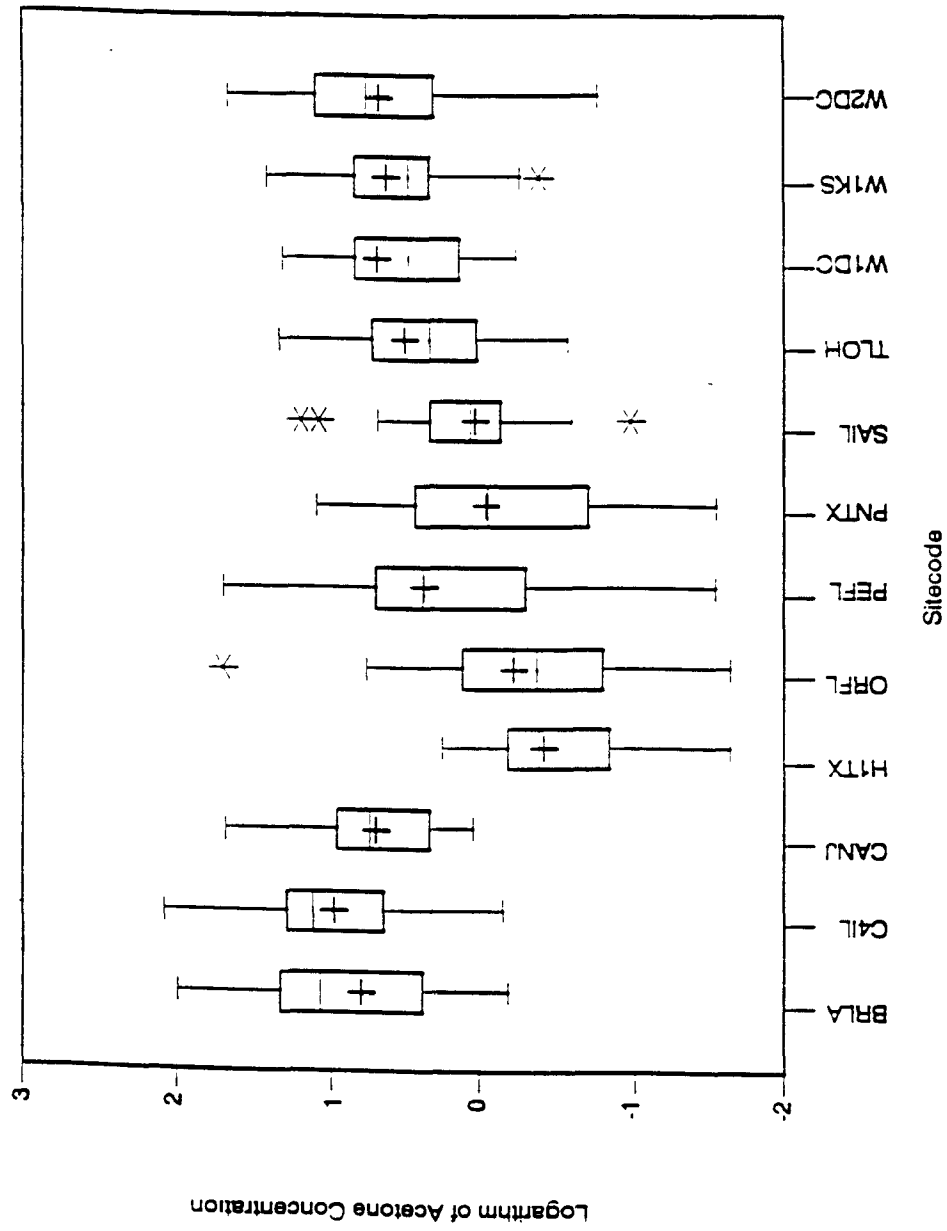
¹In Case 1, mean concentrations are calculated using detectable tube concentrations only

Figure 6-1. Formaldehyde Box Plots for Case 1¹



¹In Case 1, mean concentrations are calculated using detectable tube concentrations only

Figure 6-2. Acetaldehyde Box Plots for Case 1¹



¹In Case 1, mean concentrations are calculated using detectable tube concentrations only

Figure 6-3. Acetone Box Plots for Case 1¹

Figure 6-4 shows monthly overall average concentrations for formaldehyde, acetaldehyde, and acetone at all sites in the 1990 UATMP. Figures 6-5, 6-6, and 6-7 display the monthly arithmetic means by site for the formaldehyde data. Since there is considerable scatter in the total data set, three plots are needed to minimize overlap between individual sites. The overall monthly means are shown on all three plots (Figures 6-5, 6-6, and 6-7) and are displayed using the box symbol.

The formaldehyde plots show a considerable variability between sites; however, some patterns do emerge. For instance, most sites show a local minimum concentration in May, and a local maximum concentration in October. In most cases these are absolute minima and maxima as well. Most sites also tend to reach another local minima in September.

Since one pair of sites is located in the same city, some additional comments about Figure 6-7 may be made. The two Washington, DC sites, W1DC and W2DC, track rather closely throughout the year, although some months show some separation. Thus, a measure of verification is provided for this city.

Figures 6-8, 6-9, and 6-10 display the monthly arithmetic means by site for the acetaldehyde data. The acetaldehyde plots show a bit more variability between sites than the formaldehyde data. However, there is a tendency for local minima in May and local maxima in August. As with formaldehyde, these are usually absolute minima and maxima as well. Other local maxima and minima occur more frequently and sporadically than with the formaldehyde data. The two Washington sites track closely from month-to-month.

Figures 6-11, 6-12, and 6-13 display the monthly arithmetic means by site for the acetone data. Acetone maxima and minima usually occur in different months. One difference between acetone and the other two compounds is for a local, and usually absolute, maximum concentration in October. The local maximum found in March for acetone is similar to the local maxima found in May for acetaldehyde.

The trends generalized from monthly plots of arithmetic means may or may not be representative of a typical year. However, it does appear that the time of year as described by month plays a fairly important role in influencing carbonyl concentrations, as shown by the differences in the monthly means in the plots. Also, carbonyl concentrations appear to be site specific as demonstrated by the differences between sites in the plots.

Selected Carbonyl Monthly Variation 1990 UATMP

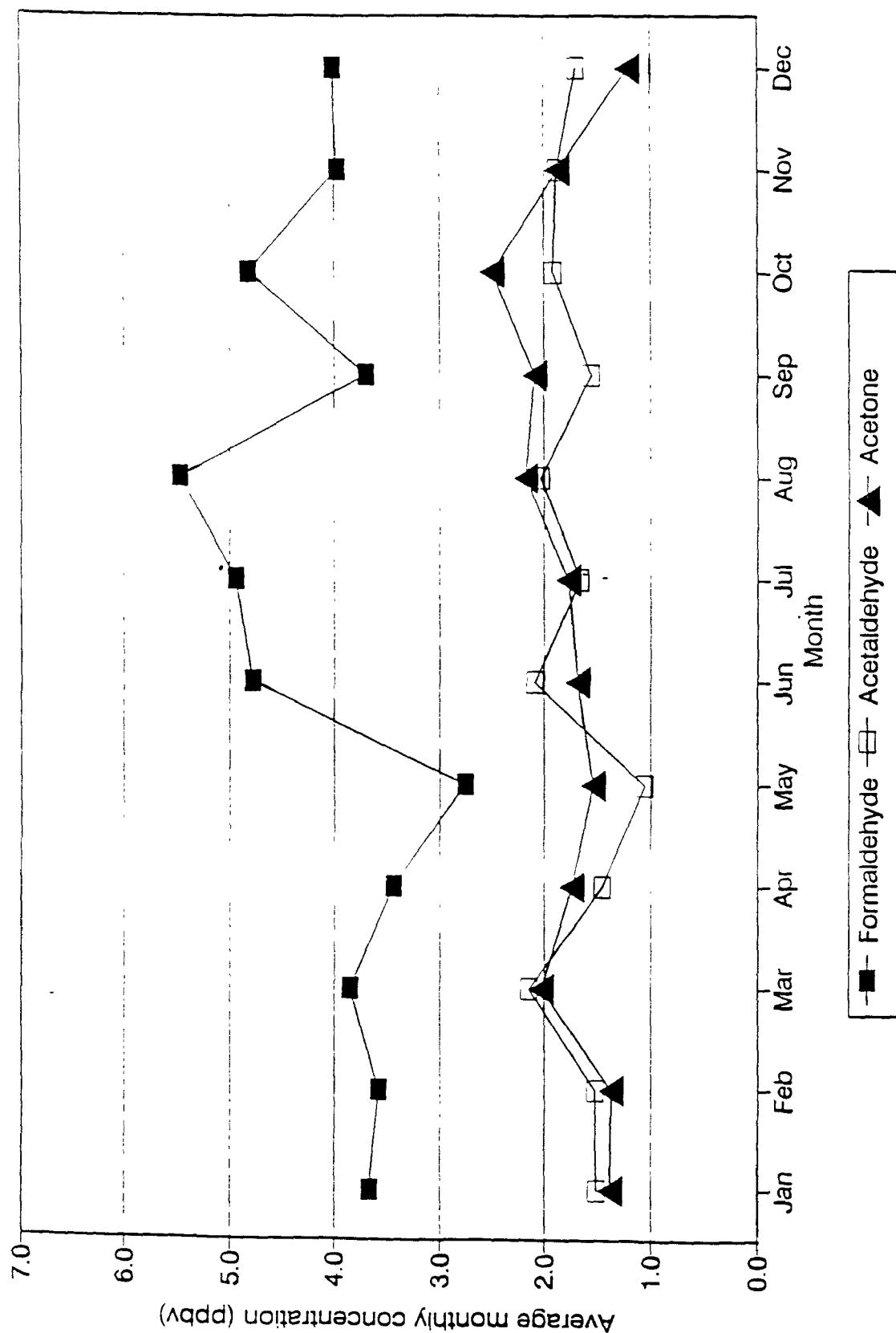


Figure 6-4. Formaldehyde, Acetaldehyde, and Acetone Monthly Concentrations - All Sites

Formaldehyde Monthly Variation 1990 UATMP

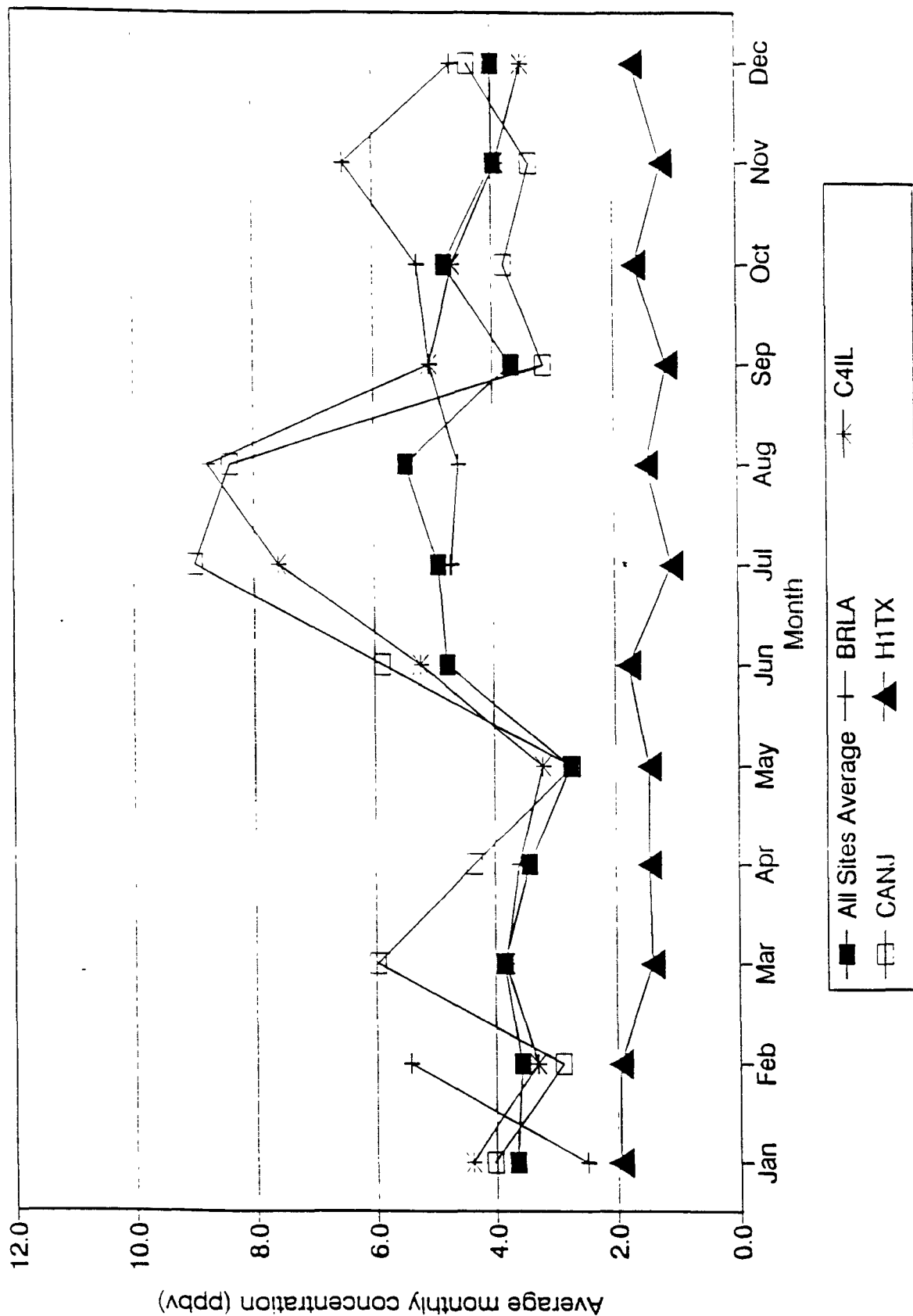


Figure 6-5. Formaldehyde Concentration Monthly Variation for 1990 for Selected Sites - Group 1

Formaldehyde Monthly Variation 1990 UATMP

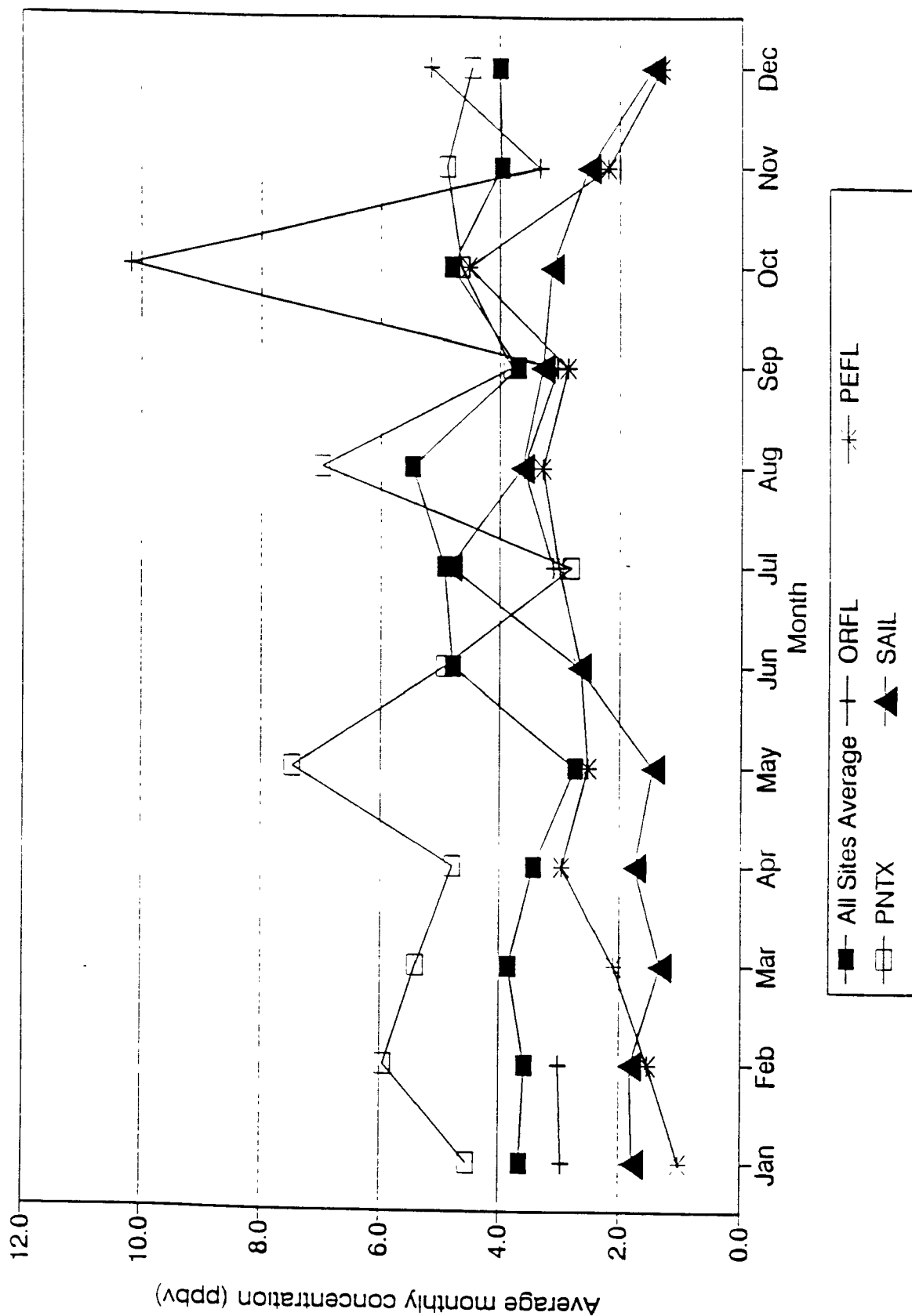


Figure 6-6. Formaldehyde Concentration Monthly Variation for 1990 for Selected Sites - Group 2

Formaldehyde Monthly Variation 1990 UATMP

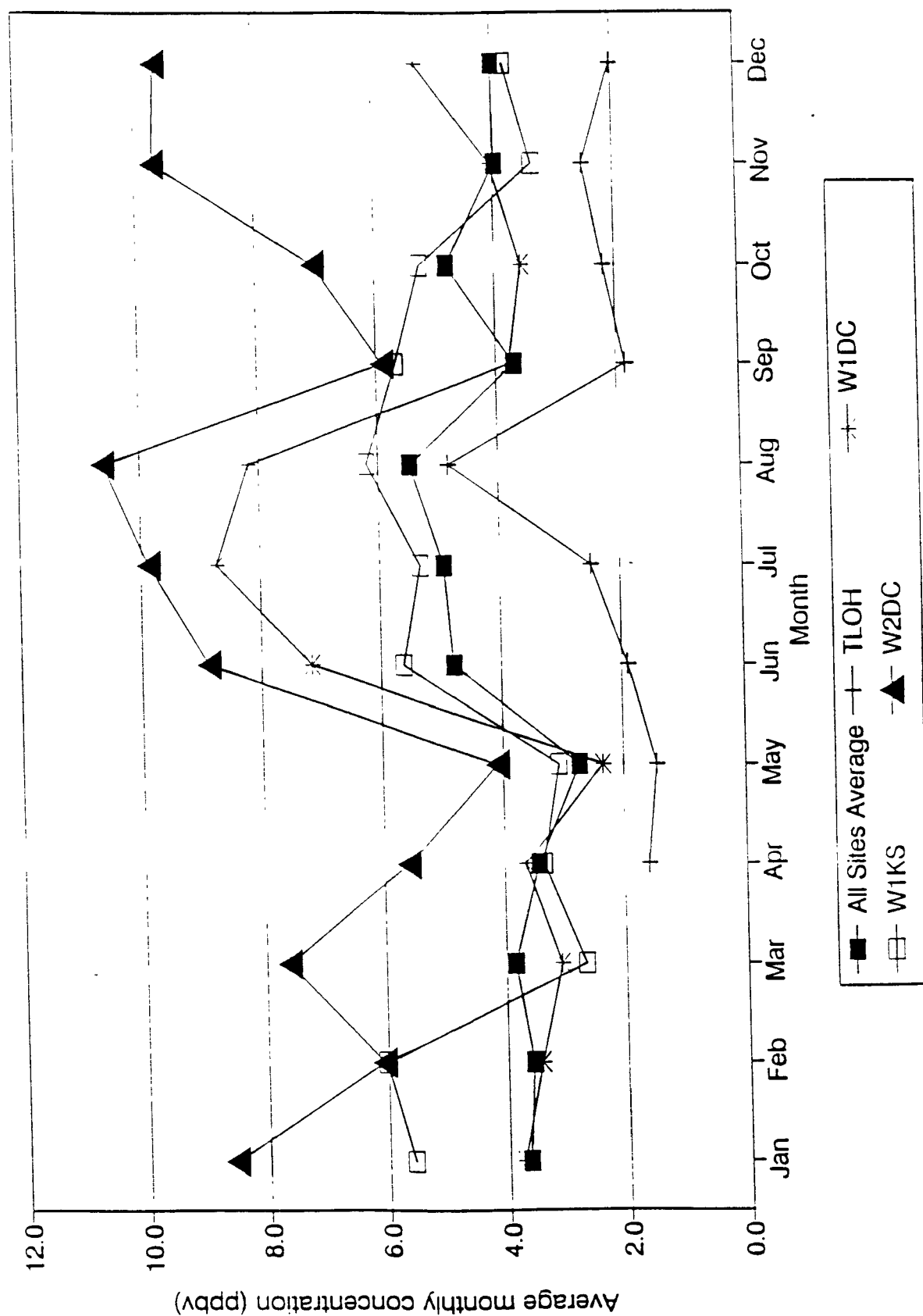


Figure 6-7. Formaldehyde Concentration Monthly Variation for 1990 for Selected Sites - Group 3

Acetaldehyde Monthly Variation 1990 UATMP

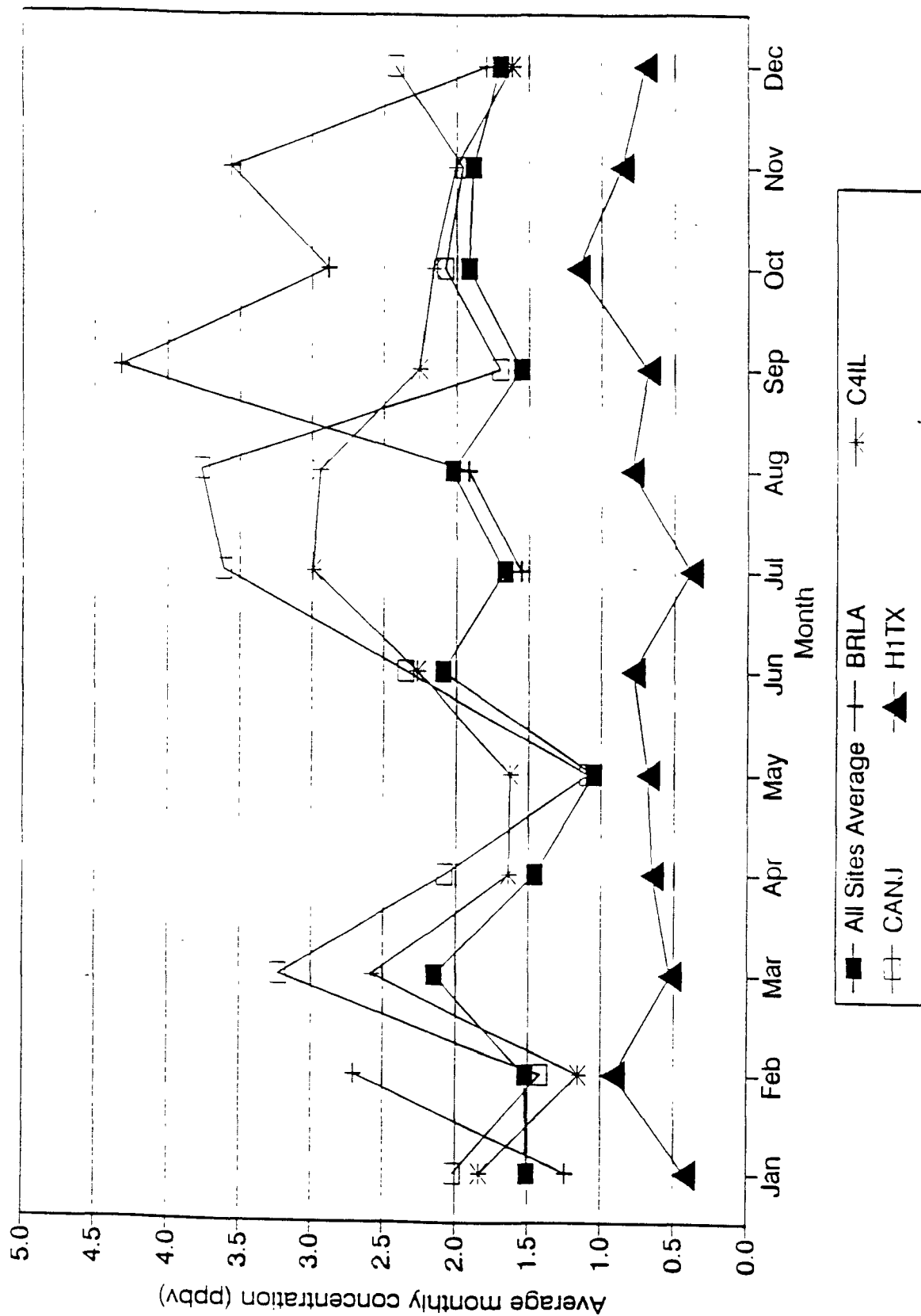


Figure 6-8. Acetaldehyde Concentration Monthly Variation for 1990 for Selected Sites - Group 1

Acetaldehyde Monthly Variation 1990 UATMP

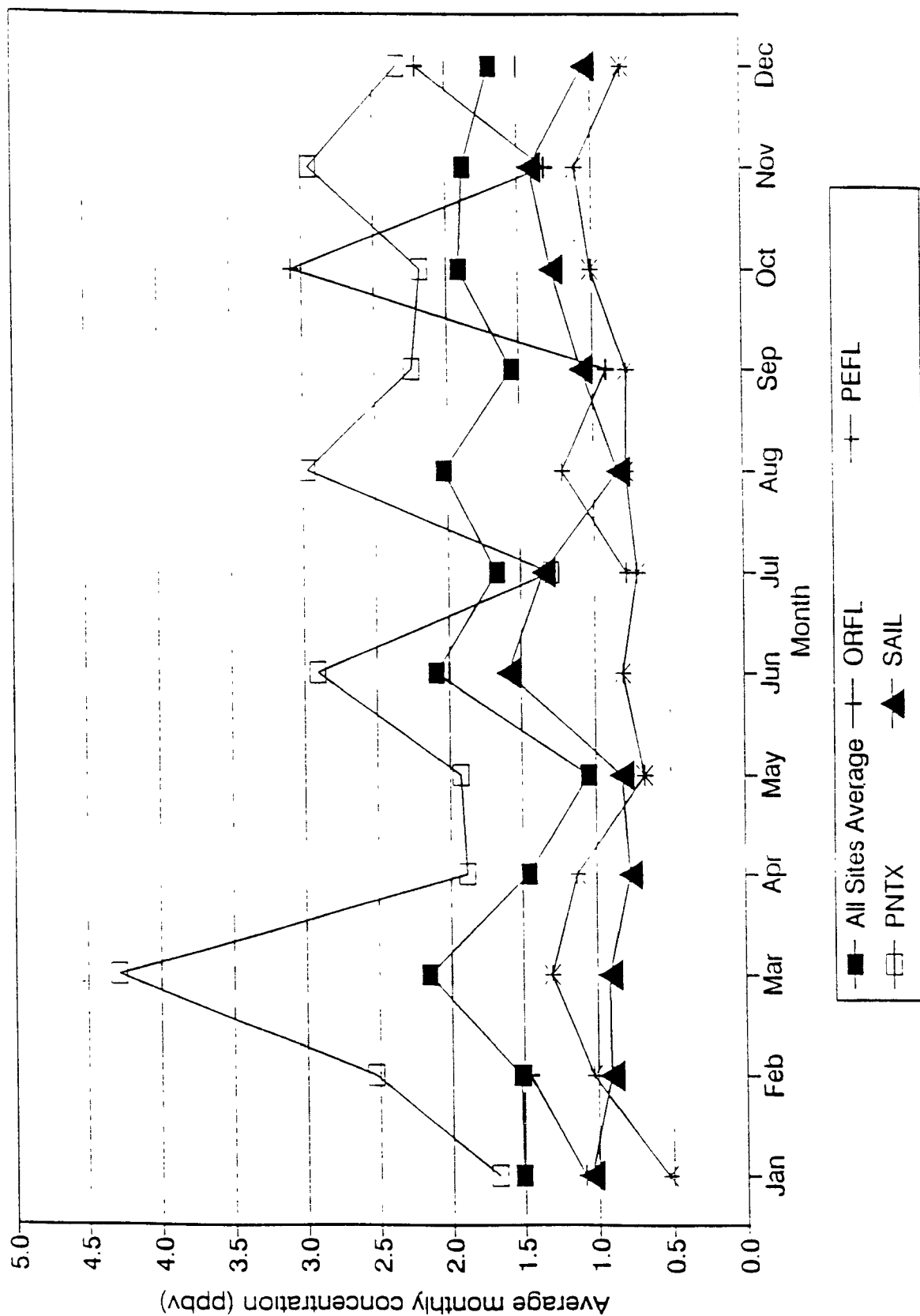


Figure 6-9. Acetaldehyde Concentration Monthly Variation for 1990 for Selected Sites - Group 2

Acetaldehyde Monthly Variation 1990 UATMP

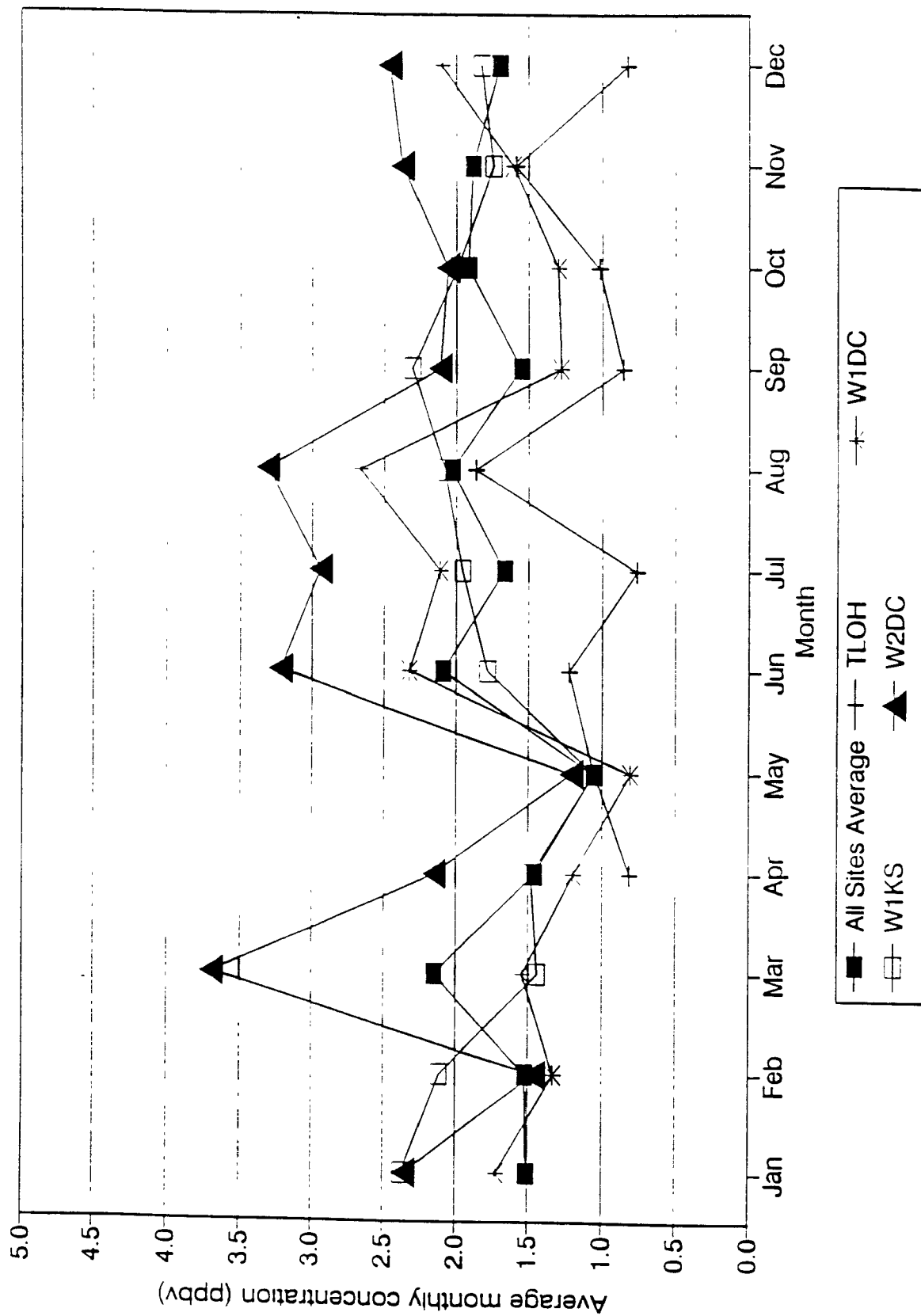


Figure 6-10. Acetaldehyde Concentration Monthly Variation for 1990 for Selected Sites - Group 3

Acetone Monthly Variation 1990 UATMP

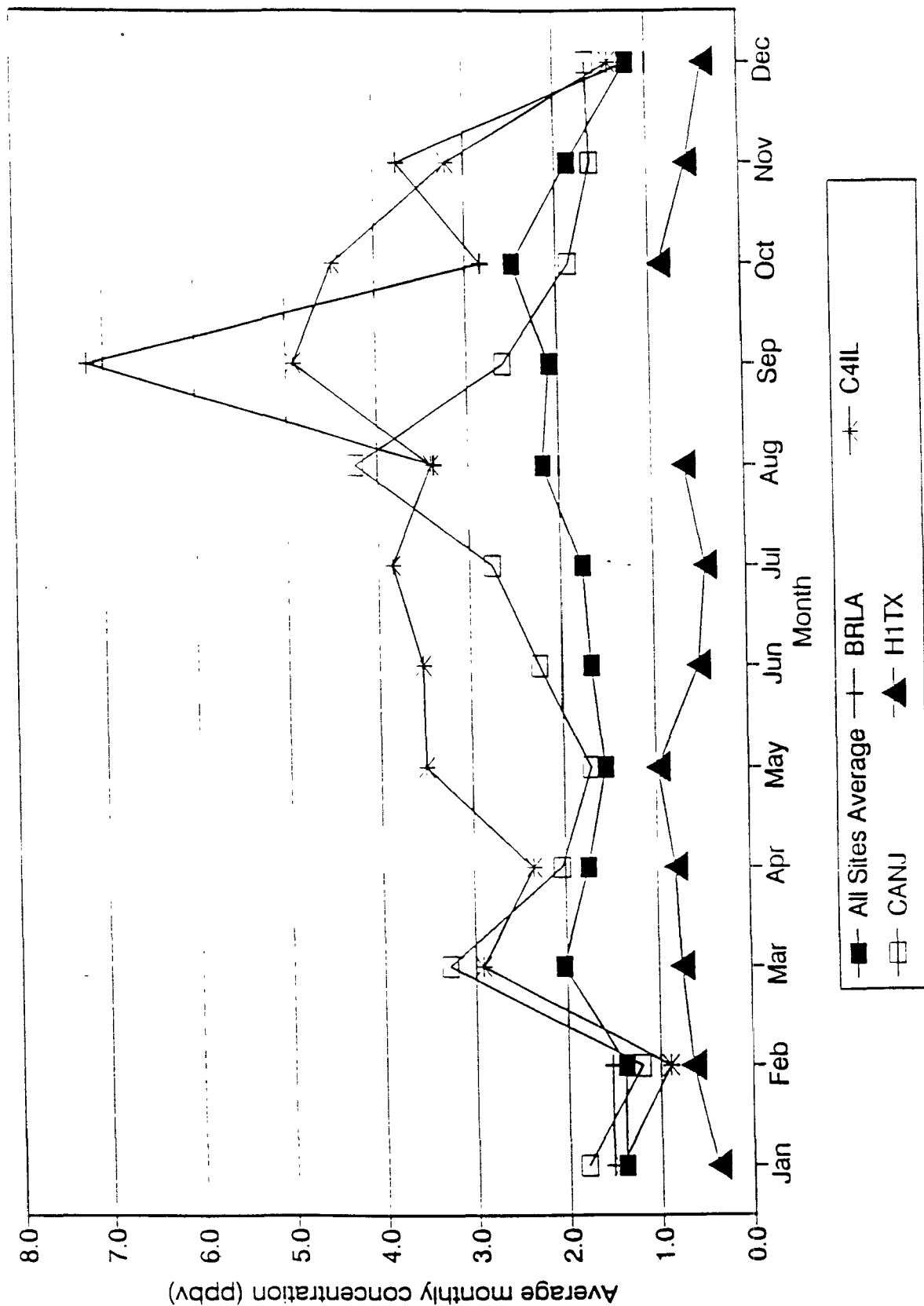


Figure 6-11. Acetone Concentration Monthly Variation for 1990 for Selected Sites - Group 1.

Acetone Monthly Variation 1990 UATMP

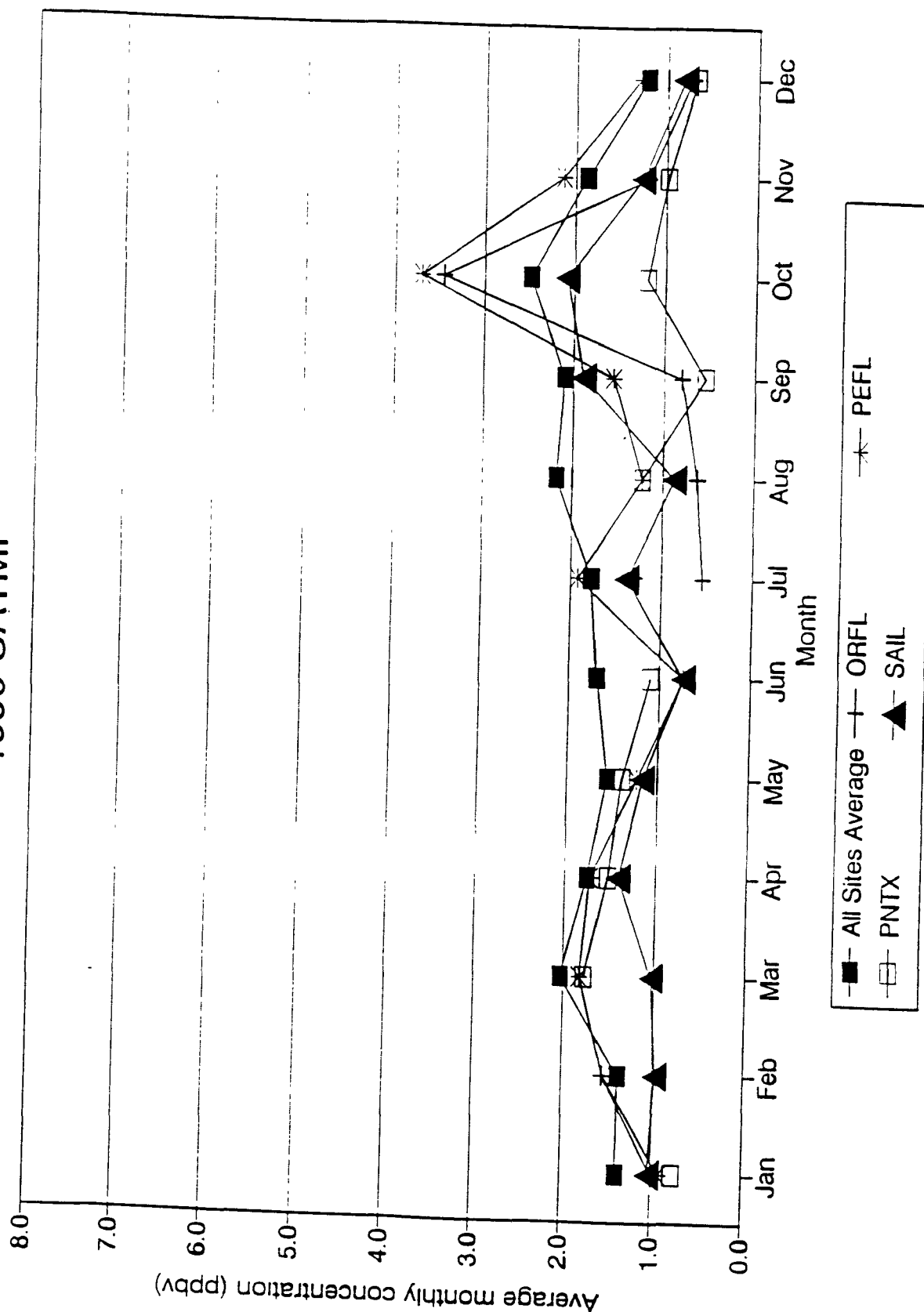


Figure 6-12. Acetone Concentration Monthly Variation for 1990 for Selected Sites - Group 2.

Acetone Monthly Variation 1990 UATMP

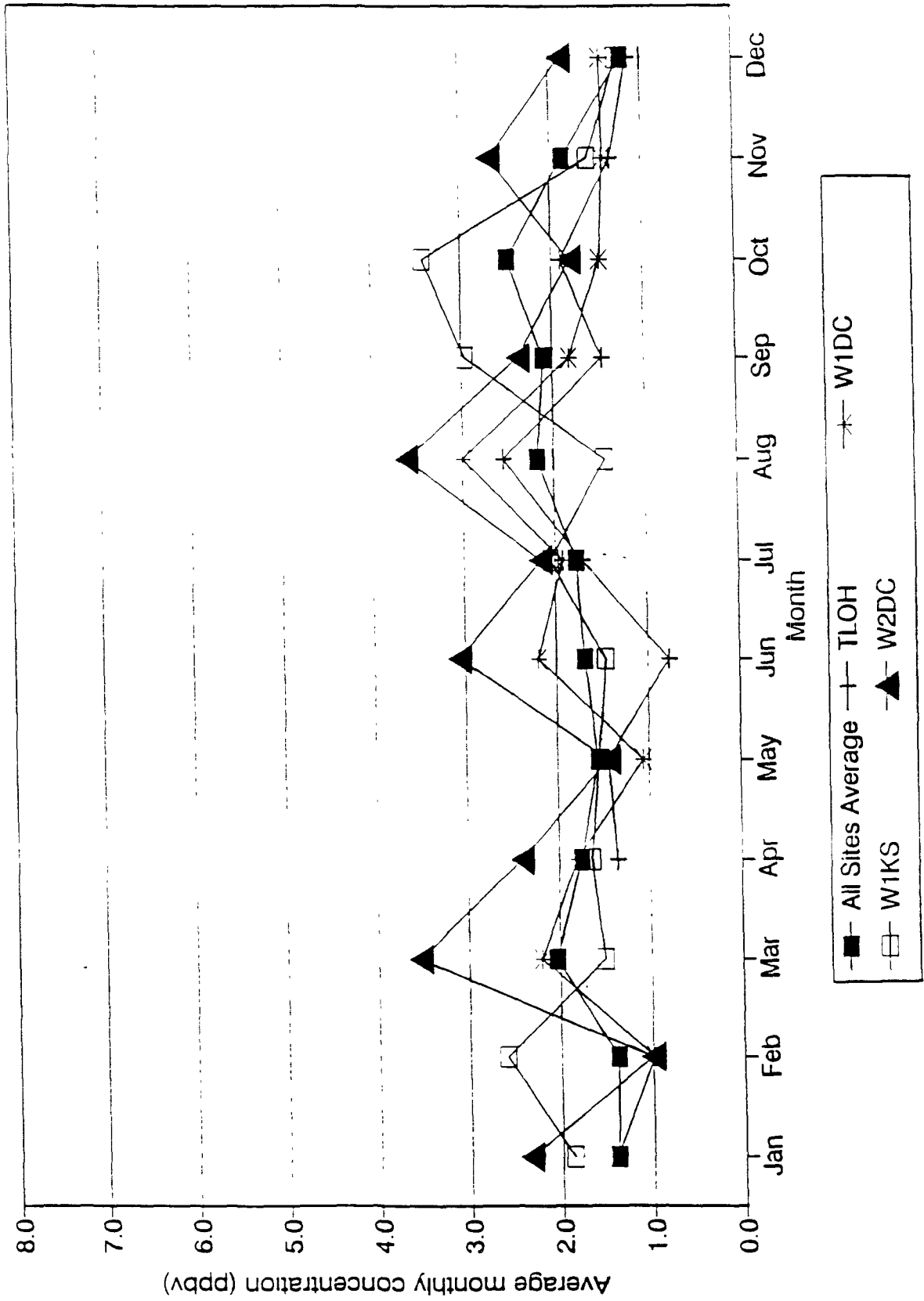


Figure 6-13. Acetone Concentration Monthly Variation for 1990 for Selected Sites - Group 3.

6.5 INTERCARBONYL CORRELATIONS

Table 6-8 lists the product-moment correlations and the covariances between the mean concentrations of formaldehyde, acetaldehyde, and acetone for each site and over all sites for Case 1. Differences between Case 1 and Case 2 were minimal, so only Case 1 results are shown. Formaldehyde and acetaldehyde appear more highly correlated than either formaldehyde and acetone or acetaldehyde and acetone.

Figure 6-14 shows the correlation between formaldehyde and acetaldehyde concentrations, while Figure 6-15 shows the correlation between formaldehyde and acetone concentrations. Figure 6-16 shows the acetaldehyde-acetone concentration correlation. The correlation coefficient for the formaldehyde-acetaldehyde concentration data is 0.8026, whereas for the formaldehyde-acetone data the correlation coefficient is 0.6154. The correlation coefficient for acetaldehyde-acetone is 0.6262. The line drawn in each graph locates the regression line. The data used for Figures 6-14 and 6-15 include each analysis, i.e., for Cartridge 1 and Cartridge 2, for each sampling episode in which the paired data was available.

6.6 PRECISION AND PERCENT DIFFERENCES

Tables 6-9, 6-10, and 6-11 list the summary statistics by site and over all sites for the absolute percent difference of the cartridge concentration data. Since the absolute percent difference was calculated only when both cartridge concentrations were above the ADL, only results from Case 1 are shown. The absolute percent DIF, a measure of variability, is defined as the absolute value of the difference between the two cartridge concentrations, divided by the arithmetic average of the two cartridge concentrations, times 100:

$$\text{Absolute percent DIF} = \text{ABS} (X_2 - X_1) / ((X_2 + X_1) / 2) \times 100$$

where: ABS indicates the absolute value;
 X_1 = concentration from cartridge 1; and
 X_2 = concentration from cartridge 2.

Precision was estimated from absolute percent difference of duplicate sample analysis. For formaldehyde the absolute percent difference averaged 11.5; for acetaldehyde 13.4; and for acetone 15.1.

The maximum of any of the percent differences derived from the pairs of cartridge concentrations was 50% or less for six formaldehyde sites, five acetaldehyde sites, and five acetone sites. The maximum percent difference

Table 6-8. Correlations and Covariances between the Mean Concentrations of Formaldehyde, Acetaldehyde, and Acetone: Case 1

Site Code	N	Formaldehyde Versus Acetaldehyde		Formaldehyde Versus Acetone		Acetaldehyde Versus Acetone	
		COR	COV	COR	COV	COR	COV
ALL	306	0.82638	2.83654	0.66230	2.80683	0.63277	0.96399
BRLA	15	0.91412	3.16649	0.79995	3.05467	0.87969	2.45119
C4IL	28	0.90786	1.54879	0.23300	* 0.85293	0.26732	* 0.34504
CANJ	30	0.93666	2.20095	0.80866	2.02693	0.81455	0.86696
H1TX	16	0.55268	0.07880	0.15675	* 0.01942	0.30547	* 0.02188
ORLF	23	0.98519	11.46774	0.95185	13.01520	0.93896	3.59100
PEFL	35	0.77771	0.88420	0.88159	3.74795	0.83395	0.67919
PNTX	24	0.58494	1.15936	0.57568	0.65079	0.39901	* 0.30536
SAIL	28	0.60528	0.31060	0.22698	* 0.19817	0.20666	* 0.04476
TLOH	17	0.64832	0.47822	0.42833	* 0.41705	0.42720	* 0.19560
W1DC	30	0.87136	1.55719	0.71960	1.27112	0.67158	0.35190
W1KS	30	0.78469	1.04340	0.55066	0.95689	0.52521	0.33775
W2DC	30	0.70878	1.81203	0.63309	2.02454	0.81927	0.93115

*Indicates correlation not significant at the 95% confidence level.

Formaldehyde/Acetaldehyde Correlation 1990 UATMP

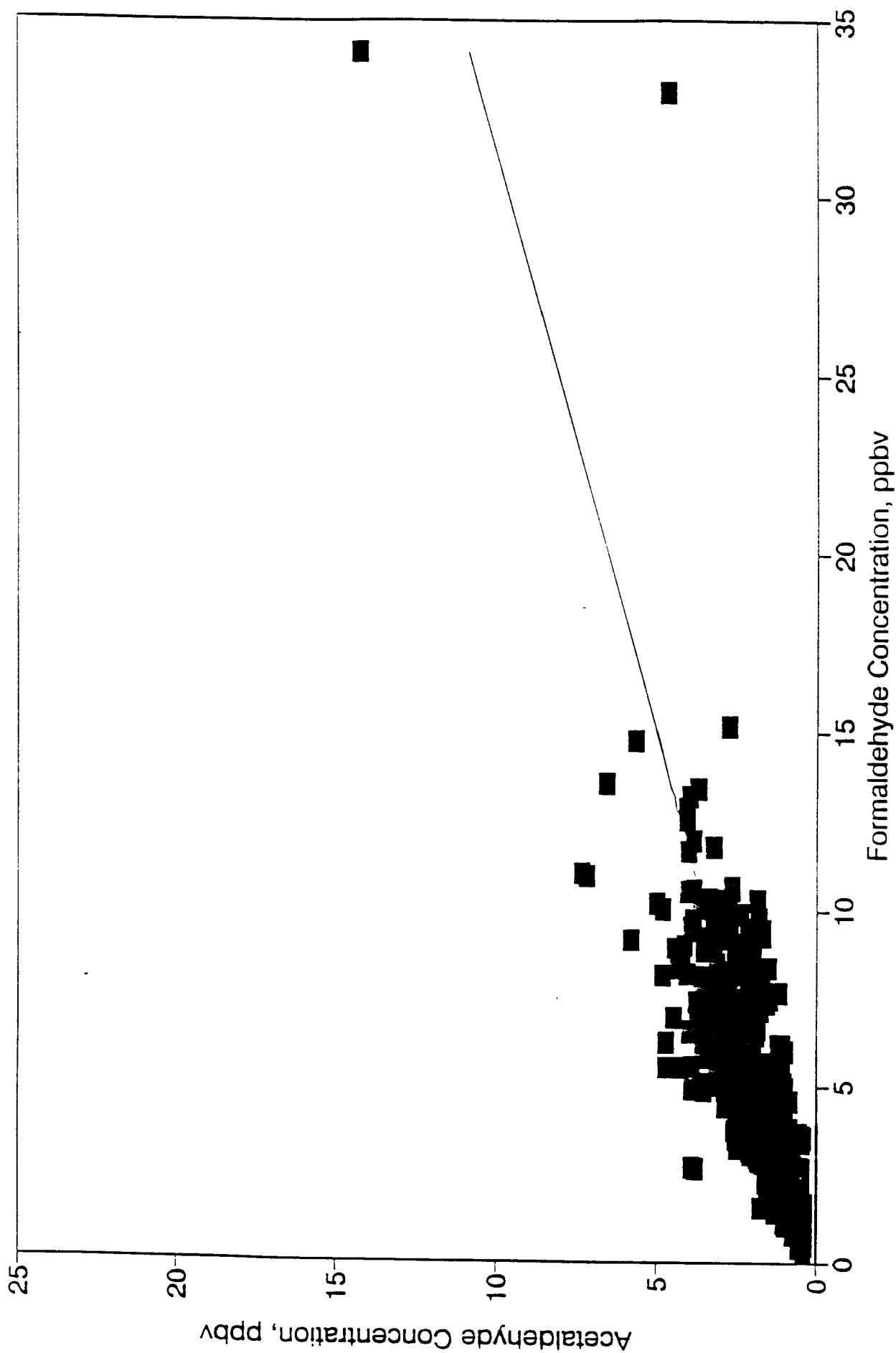


Figure 6-14 Formaldehyde/Acetaldehyde Correlation

Formaldehyde/Acetone Correlation 1990 UATMP

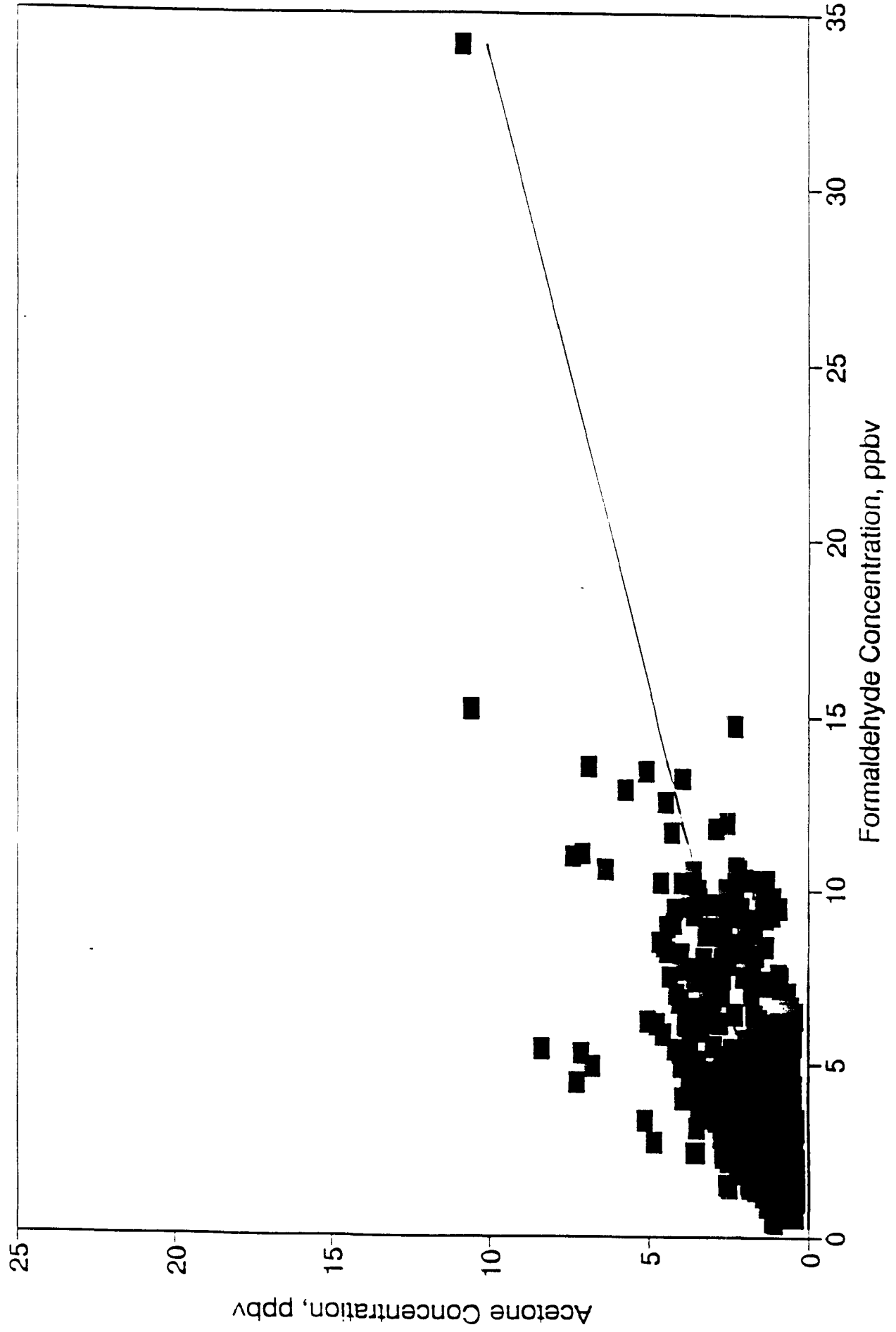


Figure 6 15. Formaldehyde/Acetone Correlation

Acetaldehyde/Acetone Correlation 1990 UATMP

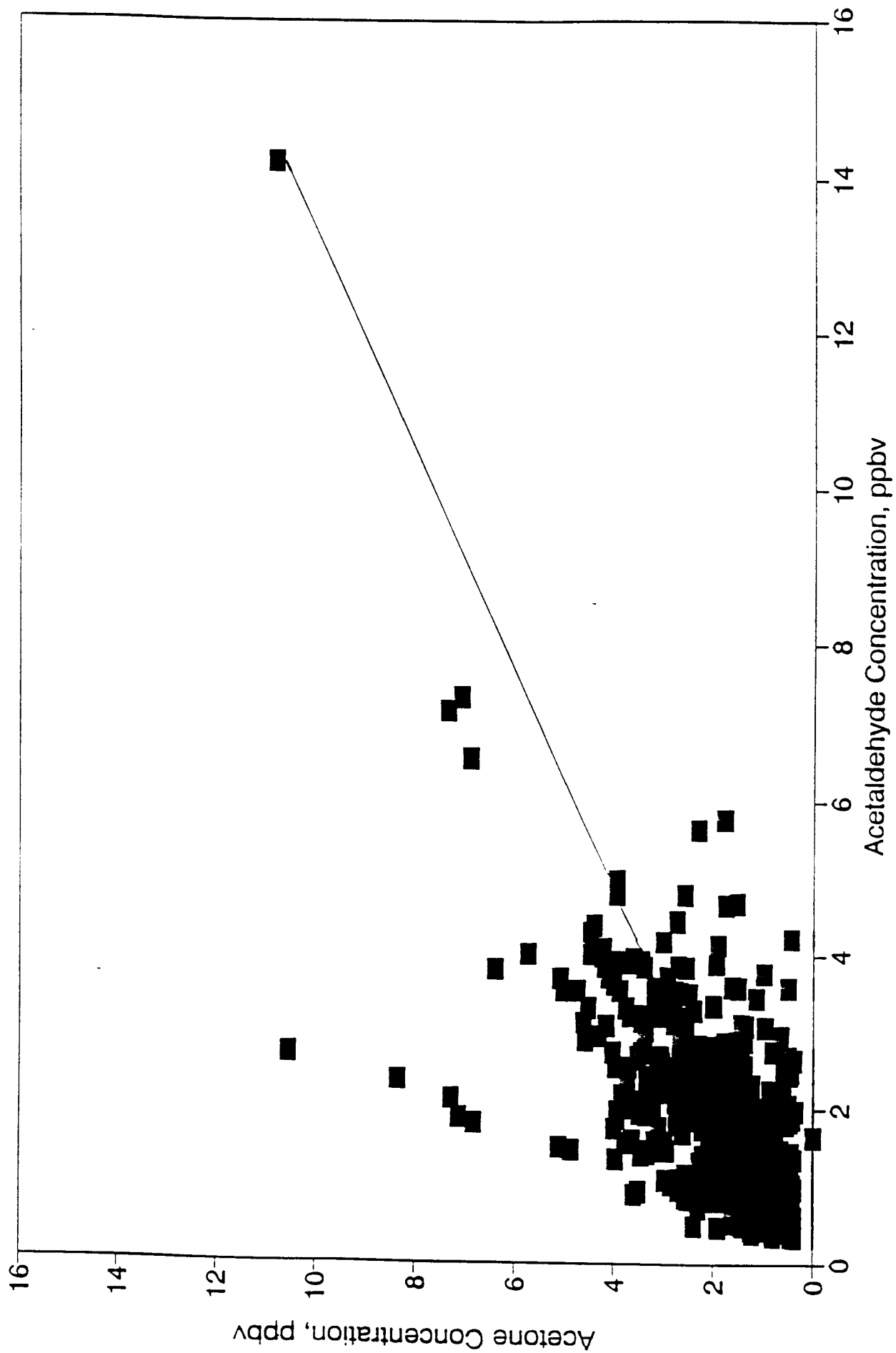


Figure 6-16. Acetaldehyde/Acetone Correlation

Table 6-9. Summary of Formaldehyde Precision Statistics^a

Site	Variable	N	Absolute Percent Difference, ppbv			
			Mean	Std Dev	Minimum	Maximum
BRLA	Formaldehyde	30	9.086	12.033	0.152	55.200
C4IL	Formaldehyde	28	8.334	7.333	0.409	31.606
CANJ	Formaldehyde	30	4.584	5.268	0.000	24.633
H1TX	Formaldehyde	26	8.499	7.714	0.608	34.043
ORFL	Formaldehyde	27	5.669	8.662	0.426	46.099
PEFL	Formaldehyde	41	8.295	9.331	0.000	43.956
PNTX	Formaldehyde	29	30.746	33.318	0.530	115.542
SAIL	Formaldehyde	29	15.991	32.788	0.138	150.127
TLOH	Formaldehyde	22	12.011	14.372	0.289	66.035
W1DC	Formaldehyde	30	14.491	19.549	0.000	70.185
W1KS	Formaldehyde	30	4.570	4.673	0.137	21.074
W2DC	Formaldehyde	30	16.576	19.848	0.900	69.457

^aIn Case 1, mean concentrations are calculated using detectable cartridge concentrations only.

Table 6-10. Summary of Acetaldehyde Precision Statistics^a

Site	Variable	N	Absolute Percent Difference, ppbv			
			Mean	Std Dev	Minimum	Maximum
ALL	Acetaldehyde	319	13.437	16.683	0.000	101.967
BRLA	Acetaldehyde	21	12.031	12.049	0.000	42.105
C4IL	Acetaldehyde	28	11.260	15.539	0.000	54.035
CANJ	Acetaldehyde	30	6.603	5.009	0.344	18.911
HITX	Acetaldehyde	21	14.961	18.307	0.000	61.538
ORFL	Acetaldehyde	24	15.040	24.044	0.743	101.967
PEFL	Acetaldehyde	36	11.867	10.313	0.000	48.819
PNTX	Acetaldehyde	29	12.148	9.319	0.000	38.095
SAIL	Acetaldehyde	27	11.957	12.285	0.000	38.760
TLOH	Acetaldehyde	14	30.348	28.454	1.905	75.918
W1DC	Acetaldehyde	30	15.797	18.520	0.000	62.774
W1KS	Acetaldehyde	29	10.864	12.231	0.374	61.176
W2DC	Acetaldehyde	30	17.635	24.101	0.000	84.569

^aIn Case 1, mean concentrations are calculated using detectable cartridge concentrations only.

Table 6-11. Summary of Acetone Precision Statistics^a

Site	Variable	N	Absolute Percent Difference, ppbv			
			Mean	Std Dev	Minimum	Maximum
ALL	Acetone	298	15.133	16.469	0.000	99.728
BRLA	Acetone	15	8.903	9.503	0.289	36.190
C4IL	Acetone	28	13.793	16.788	0.000	69.630
CANJ	Acetone	30	9.058	8.755	0.000	40.528
H1TX	Acetone	16	23.399	15.585	1.575	48.837
ORFL	Acetone	18	21.043	20.031	4.831	93.878
PEFL	Acetone	33	13.453	16.152	0.000	70.487
PNTX	Acetone	20	11.393	10.915	1.690	43.478
SAIL	Acetone	28	11.368	11.869	0.000	35.514
TLOH	Acetone	22	12.236	13.908	0.468	68.599
W1DC	Acetone	30	21.966	17.461	1.000	65.185
W1KS	Acetone	29	13.056	18.194	0.000	55.556
W2DC	Acetone	29	23.036	22.876	0.000	99.728

^aIn Case 1, mean concentrations are calculated using detectable cartridge concentrations only.

was larger than 100% for only two formaldehyde sites and two acetaldehyde sites. The largest percent difference for any of the acetone sites was less than 100 percent. These results show good precision, and speak well for the sampling and analytical procedures. These results are in agreement with the 1989 results, indicating consistency between the two years in terms of precision.

6.7 AUDIT SAMPLES

Table 6-12 displays the results from the audit samples for formaldehyde, acetaldehyde, and acetone. Figures 6-17 and 6-18 display bar charts for the percent differences between the spiked and reported samples for formaldehyde, acetaldehyde, and acetone. An overall negative bias is evident for all three compounds in both Table 6-12 and Figures 6-17 and 6-18. This overall negative bias was over four times as much for acetaldehyde as it was for formaldehyde. The bias for acetone was about the same as it was for formaldehyde.

There was an evident trend in the audit results. The audit results are illustrated graphically in two separate graphs. Figure 6-17 presents audit data analyzed prior to instrument system maintenance. After the analytical system maintenance, the audit results improved as indicated in Figure 6-18. The audit results over the course of the program indicate that the analytical system was in control and the analytical results valid.

**Table 6-12. Spiked Quality Assurance Cartridge Results
for 1990 UATMP Monitoring**

Sample Number	Formaldehyde			Acetaldehyde			Acetone		
	Spiked (ppbv)	Reported (ppbv)	Percent Difference	Spiked (ppbv)	Reported (ppbv)	Percent Difference	Spiked (ppbv)	Reported (ppbv)	Percent Difference
A4	1.01	1.13	10.62	0	-999	0.00	3.02	2.55	-18.43
A7	1.01	0.87	-16.09	1.02	-999	100.00	3.02	4.04	25.25
A12	1.01	0.85	-18.82	1.02	1.27	19.69	3.02	2.35	-28.51
A15	1.01	0.85	-18.82	1.02	0.72	-41.67	3.02	2.54	-18.90
A16	1.01	0.80	-26.25	1.02	0.94	-8.51	3.02	2.54	-18.90
B7	2.01	1.79	-12.29	2.00	1.73	-15.61	4.02	3.84	-4.69
B11	2.01	1.82	-10.44	2.00	1.99	-0.50	4.02	4.64	13.36
B14	2.01	1.75	-14.86	2.00	1.62	-23.46	4.02	3.69	-8.94
C7	2.97	2.60	-14.23	2.00	1.53	-30.72	3.02	2.71	-11.44
C14	2.97	2.52	-17.86	2.00	1.57	-27.39	3.02	2.78	-8.63
C16	2.97	3.04	2.30	2.00	2.00	0.00	3.02	2.47	-22.27
C20	2.97	2.69	-10.41	2.00	1.58	-26.58	3.02	-999	100.00
D3	4.02	4.20	4.29	0	-999	0.00	2.00	2.06	2.91
D7	4.02	3.56	-12.92	3.96	3.78	-4.76	2.00	1.48	-35.14
D15	4.02	3.83	-4.96	3.96	3.92	-1.02	2.00	1.42	-40.85
D17	0	-999	0.00	3.96	3.66	-8.20	2.00	2.04	1.96
D19	0	-999	0.00	3.96	4.03	1.74	2.00	1.60	-25.00
A3	1.01	0.96	-5.21	0	-999	0.00	3.02	3.01	-0.33
A9	1.01	0.88	-14.77	1.02	0.88	-15.91	3.02	2.61	-15.71
A17	1.01	0.94	-7.45	1.02	0.84	-21.43	0	-999	0.00
B3	0	-999	0.00	2.00	1.50	-33.33	4.02	2.62	-53.44
B9	2.01	1.72	-16.86	2.00	2.06	2.91	4.02	4.89	17.79
B15	2.01	2.04	1.47	2.00	1.89	-5.82	4.02	3.56	-12.92
B16	2.01	1.89	-6.35	2.00	1.75	-14.29	4.02	4.26	5.63
C3	2.97	2.64	-12.50	0	-999	0.00	3.02	2.62	-15.27
C10	2.97	2.94	-1.02	2.00	2.00	0.00	3.02	2.35	-28.51
C15	2.97	2.92	-1.71	2.00	1.79	-11.73	3.02	2.69	-12.27
C24	0	-999	0.00	0	-999	0.00	0	-999	0.00
D9	4.02	4.00	-0.50	3.96	3.66	-8.20	2.00	1.71	-16.96
D16	4.02	2.77	-45.13	3.96	3.40	-16.47	2.00	1.55	-29.03
D20	0	-999	0.00	3.96	3.76	-5.32	2.00	1.75	-14.29
A8	1.01	0.95	-6.32	1.02	1.00	-2.00	3.02	2.90	-4.14
A11	1.01	1.02	0.98	1.02	1.31	22.14	3.02	3.14	3.82
A18	1.01	1.02	0.98	1.02	1.17	12.82	0	-999	0.00
A19	1.01	0.97	-4.12	1.02	1.14	10.53	0	-999	0.00
B10	2.01	1.90	-5.79	2.00	2.20	9.09	4.02	3.97	-1.26
B17	2.01	2.03	0.99	2.00	2.19	8.68	0	-999	0.00
B20	2.01	2.01	0.00	2.00	2.08	3.85	0	-999	0.00
C9	2.97	3.08	3.57	2.00	2.14	6.54	3.02	3.34	9.58
C12	2.97	2.92	-1.71	2.00	2.14	6.54	3.02	3.06	1.31
C13	2.97	2.87	-3.48	2.00	2.03	1.48	3.02	3.05	0.98

Table 6-12. Spiked Quality Assurance Cartridge Results
for 1990 UATMP Monitoring

Sample Number	Formaldehyde			Acetaldehyde			Acetone		
	Spiked (ppbv)	Reported (ppbv)	Percent Difference	Spiked (ppbv)	Reported (ppbv)	Percent Difference	Spiked (ppbv)	Reported (ppbv)	Percent Difference
C18	2.97	2.90	-2.41	2.00	2.11	5.21	0	-999	0.00
C23	0	-999	0.00	0	-999	0.00	0	-999	0.00
D18	0	-999	0.00	3.96	4.12	3.88	2.00	1.92	-4.17
D23	0	-999	0.00	0	-999	0.00	0	-999	0.00
A10	1.01	0.99	-2.02	1.02	1.16	12.07	3.02	3.04	0.66
A13	1.01	0.92	-9.78	1.02	0.96	-6.25	3.02	2.96	-2.03
A14	1.01	0.97	-4.12	1.02	1.09	6.42	3.02	2.90	-4.14
A20	1.01	1.00	-1.00	1.02	0.97	-5.15	0	-999	0.00
A24	0	-999	0.00	0	-999	0.00	0	-999	0.00
B4	0	-999	0.00	2.00	2.03	1.48	4.02	4.04	0.50
B8	2.01	2.01	0.00	2.00	2.03	1.48	4.02	3.96	-1.52
B12	2.01	2.08	3.37	2.00	2.10	4.76	4.02	4.02	0.00
B13	2.01	1.96	-2.55	2.00	2.10	4.76	4.02	3.97	-1.26
B18	2.01	2.11	4.74	2.00	2.07	3.38	0	-999	0.00
B19	2.01	1.94	-3.61	2.00	1.91	-4.71	0	-999	0.00
C4	2.97	2.93	-1.37	0	-999	0.00	3.02	2.99	-1.00
C8	2.97	3.05	2.62	2.00	1.92	-4.17	3.02	2.89	-4.50
C11	2.97	2.96	-0.34	2.00	2.00	0.00	3.02	3.04	0.66
C17	2.97	2.95	-0.68	2.00	2.13	6.10	0	-999	0.00
C19	2.97	2.97	0.00	2.00	2.01	0.50	0	-999	0.00
D4	4.02	3.97	-1.26	0	-999	0.00	2.00	1.94	-3.09
D8	4.02	4.03	0.25	3.96	4.08	2.94	2.00	1.98	-1.01
D10	4.02	4.06	0.99	3.96	4.00	1.00	2.00	1.97	-1.52
D11	4.02	3.76	-6.91	3.96	4.00	1.00	2.00	1.92	-4.17
D12	4.02	3.92	-2.55	3.96	3.95	-0.25	2.00	1.94	-3.09
D13	4.02	4.09	1.71	3.96	4.01	1.25	2.00	2.02	0.99
D14	4.02	3.87	-3.88	3.96	3.95	-0.25	2.00	1.96	-2.04
Average			-4.62			-1.20			-4.32

"-999" indicates concentration below analytical detection limit (ADL).

Quality Assurance - Audit Results 1990 UATMP

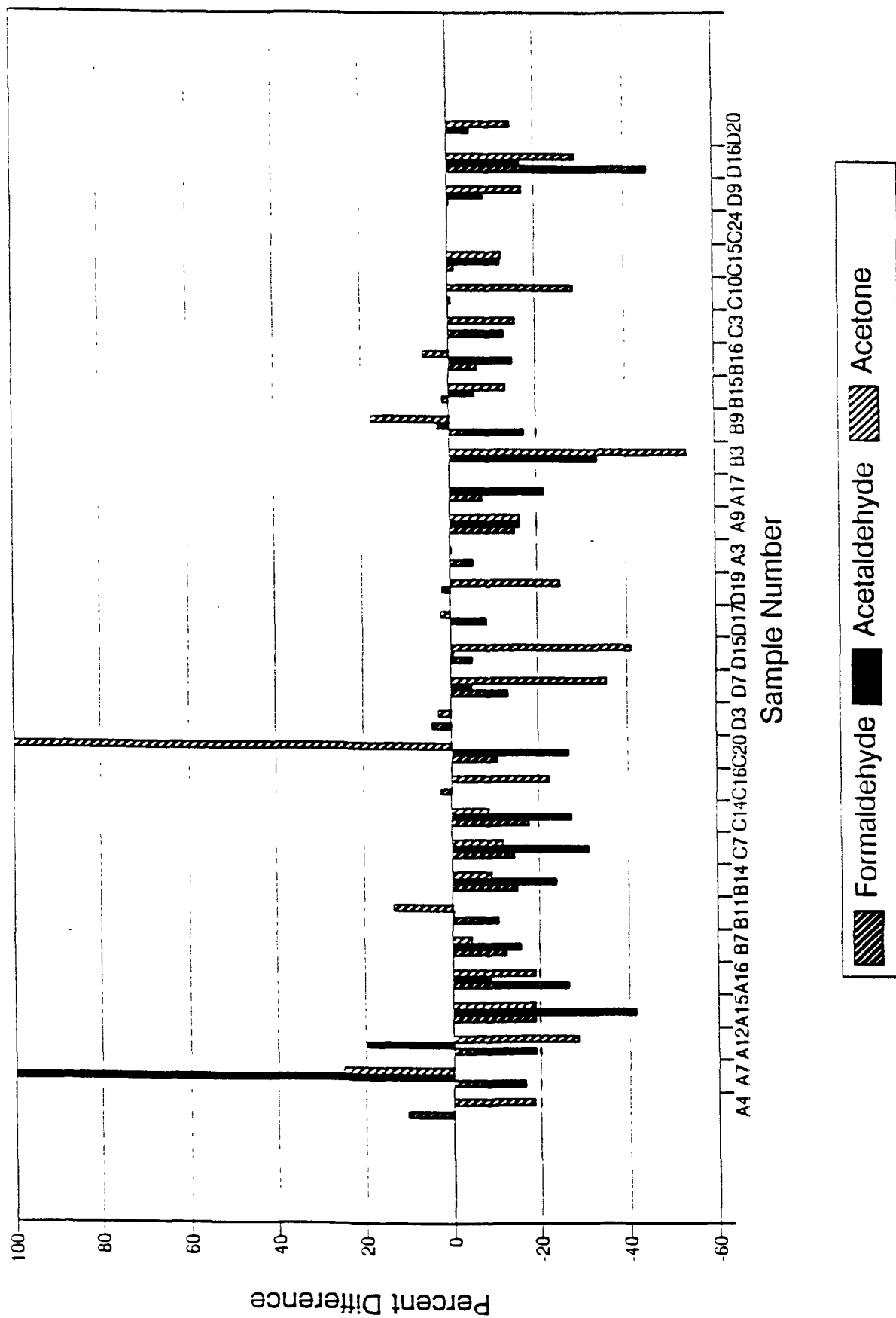


Figure 6-17. Quality Assurance - Audit Results, July 23, 1990 - Jan. 31, 1991

Quality Assurance - Audit Results 1990 UATMP

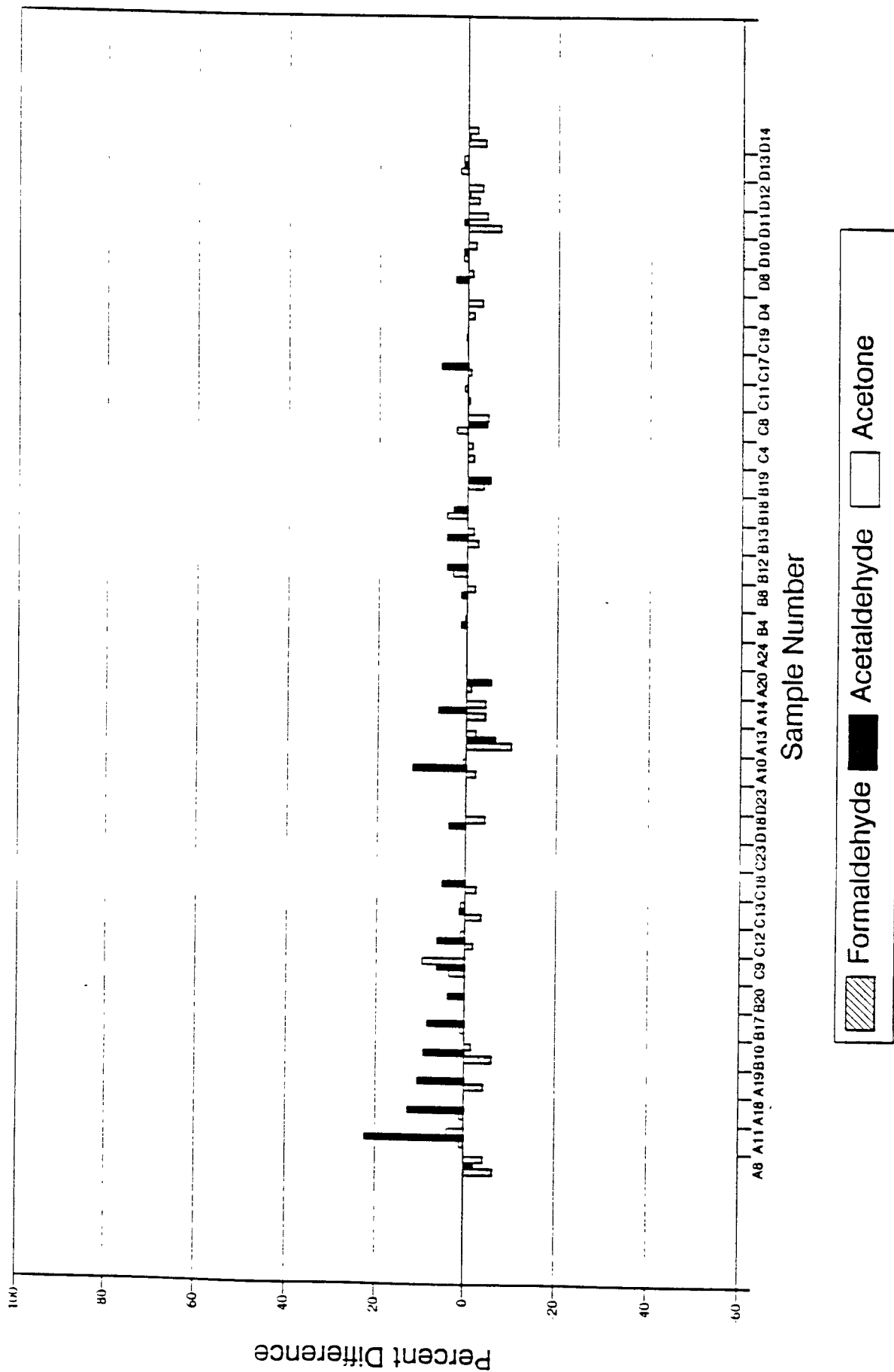


Figure 6-18. Quality Assurance - Audit Results, Mar. 31, 1991 - Apr. 24, 1991

7.0 CONCLUSIONS

Based on the discussion in the data analysis section, the following conclusions were reached:

- 1) The mean concentration data for all three compounds are more nearly lognormally than normally distributed.
- 2) Mean concentrations varied from month-to-month for all three compounds, but the variation of acetone concentrations was somewhat different than the variation of formaldehyde or acetaldehyde concentrations. This variation did not appear to be represented by regular cycles. In addition, the monthly concentrations also appeared to be site specific, particularly for acetaldehyde. Analysis of variance results indicated that both site and month played a role in influencing mean concentrations for all three compounds; however, other unknown factors appear to have an even greater influence.
- 3) Formaldehyde concentrations were fairly highly correlated with acetaldehyde concentrations at all sites. However, neither formaldehyde nor acetaldehyde concentrations were well correlated with acetone concentrations. In fact, the correlation coefficients of formaldehyde and acetaldehyde concentrations with acetone concentrations were non-significant at some sites.
- 4) Absolute percent differences and audit samples biases revealed that the sampling and analytical methodology employed is repeatable and valid.
- 5) The use of a denuder in the sample collection system was determined to remove > 99.9% of the ozone. Therefore, the formaldehyde results reported here are not negatively biased by the ozone present in ambient air.

8.0 REFERENCES

1. McAllister, Robert A., Emily G. Bowles, Judith DeGarmo, Joann Rice, Robert F. Jongleux, Raymond G. Merrill, Jr. and Joan Bursey, "1990 Urban Air Toxics Monitoring Program" Draft Final Report prepared for Neil J. Berg, Jr., U.S. Environmental Protection Agency, Research Triangle Park, NC, Radian Corporation DCN: 91-262-045-55, Research Triangle Park, NC, June 1991.
2. McAllister, Robert A., Phyllis L. O'Hara, Dave-Paul Dayton, John E. Robbins, Robert F. Jongleux, Raymond G. Merrill, Jr., Joann Rice, and Joan T. Bursey, "1990 Nonmethane Organic Compound and Three-Hour Air Toxics Monitoring Program," Final Report, prepared for Neil J. Berg, Jr.; U.S. Environmental Protection Agency, Research Triangle Park, NC, Radian Corporation DCN: 91-262-045-04, Research Triangle Park, NC, January 16, 1991.
3. Merrill, Jr., Raymond G., Dave-Paul Dayton, Phyllis L. O'Hara, and R. F. Jongleux, "Effects of Ozone Removal on the Measurement of Carbonyl Compounds in Ambient Air," 84th Annual Meeting and Exhibition. Air & Waste Management Association, Vancouver, British Columbia, Canada, June 16-21, 1991.
4. SAS® Institute Inc., "SAS® Procedures Guide, Release 6.03 Edition," Cary, NC (1988).
5. Aitchinson, J. and J. A. C. Brown, "The Lognormal Distribution," Cambridge at the University Press (1957).

Appendix A - Site Information from AIRS

Table A-1
1990 Urban Air Toxics Monitoring Program Sites

EPA Region	City	Radian Site Code	AIRS Number
II	Camden, NJ	CANJ	34-007-0003
III	Washington, DC	W1DC	11-001-0025
	Washington, DC	W2DC	11-001-0039
IV	Orlando, FL	ORFL	12-095-2002
	Pensacola, FL	PEFL	12-033-0004
V	Chicago, IL	C4IL	17-031-0060
	Sauget, IL	SAIL	17-163-1010
	Toledo, OH	TLOH	39-095-0081
VI	Houston, TX	H1TX	48-201-1034
	Baton Rouge, LA	BRLA	22-033-0006
	Port Neches, TX	PNTX	48-245-4007
VII	Wichita, KS	W1KS	20-173-0010

LPA ALHOMERIC INFORMATION RETRIEVAL SYSTEM (AIRS)
AIR QUALITY SUBSYSTEM
SITE DESCRIPTION INVENTORY

STATE (48): TEXAS

UATMP SITE CODE PNTX

SITE ID	48-254-4007	CITY (58940)	PORT NECHES	LATITUDE	29.59.12 N	UTM EASTING	408198
CITY POPULATION	13,944	COUNTY (245)	JEFFERSON CO	LONGITUDE	93 57 06 W	DIFF GMI	
AQCH POPULATION	3,921,566	AQCH (106)	SOUTHERN LOUISIANA	UTM ZONE	15	ELEVATION ABOVE MSL	12 M
DATE ESTABLISHED		LAND USE (1)	RESIDENTIAL	UTM NORTHING	3317509	RECORD LAST UPDATED	
DATE TERMINATED		LOCATION SETTING (2)	SUBURBAN	HQ EVAL DATE		LAST REQ EVAL	
SITE ADDRESS			PORT NECHES - GROVES HIGH SCHOOL, 1225 MERRIMAN, PORT NECHES, TX	DISTANCE CITY		COMPASS SECTOR	
URBAN AREA (1)				HC IND		MET DATA	
SUPPORTING AGENCY			TEXAS AIR CONTROL BOARD	MSA (0840)	BEAUMONT - PORT ARTHUR, TX		

COMMENTS

STATE (12). FLORIDA

SITE ID	12 033.0004	CITY (10/22/25)	CANTONMENTS	LATITUDE	30.32:00 N	UTM EASTING	4808114
CITY POPULATION	23,389	COUNTY (03/3)	ESCAMBIA CO	LONGITUDE	87.12:00 W	DIFF GMI	06
AQCR POPULATION	2,512,539	AQCR (00/5)	MOBILE-PENSACOLA-PANAMA CITY - S	UTM ZONE	16	ELEVATION ABOVE MSI	35 M
DATE ESTABLISHED	75/01/01	LAND USE (3)	INDUSTRIAL	UTM NORTHING	3377716	RECORD LAST UPDATED	89/11/22
DATE TERMINATED		LOCATION SETTING (2)	SUBURBAN	HQ EVAL DATE		LAST REQ EVAL	88/01/20
SITE ADDRESS	ELLYSON INDUSTRIAL PARK - COPTER ROAD			DISTANCE CITY	008	COMPASS SECTOR	N
URBAN AREA (6080)	PENSACOLA, FL			HC IND	Y	MET DATA	Y
SUPPORTING AGENCY	FLORIDA DEPT ENVIRONMENTAL REGULATION, NORTHWEST DISTRICT			MSA (6080)	PENSACOLA, FL		

COMMENTS	ADD NOX INSTRUMENT	DELETE CO INSTRUMENT

EPA AEROMETRIC INFORMATION RETRIEVAL SYSTEM (AIRS)
AIR QUALITY SUBSYSTEM
SITE DESCRIPTION INVENTORY

STATE (11): DISTRICT OF COLUMBIA

WATMP SITE CODE: W1DC

SITE ID	11 001-0025	CITY (00000)	NOT IN A CITY	LATITUDE	38 58 31 N	UTM EASTING	324771
CITY POPULATION	1	COUNTY (001)	WASHINGTON	LONGITUDE	77.01.22 W	DIFF GMI	05
AQCR POPULATION	2,956,793	AQCR (047)	NATIONAL CAPITAL	UTM ZONE	18	ELEVATION ABOVE MSL	91 M
DATE ESTABLISHED		LAND USE (2)	COMMERCIAL	UTM NORTHING	4315771	RECORD LAST UPDATED	89/11/22
DATE TERMINATED		LOCATION SETTING (1)	URBAN AND CENTER CITY	HQ EVAL DATE		LAST REQ EVAL	82/08/31
SITE ADDRESS	TAKOMA SC PINEY BRANCH ROAD & DAPHNIA ST N			DISTANCE CITY	008	COMPASS SECTOR	NW
URBAN AREA (8840)	WASHINGTON, DC-MD-VA			HC IND		MET DATA	N
SUPPORTING AGENCY (001)	ENVIRONMENTAL CONTROL DIV, D C DCRA			MSA (8841)			
COMMENTS	TSP ON ROOF OF GYMNASIUM BLDG. 03 MONITOR IN BOILER ROOM OF GYM						
SITE USER INFO	NASIUM BUILDING (FIRST FLOOR), START DATE 03 01 80						

Cat 211f
AIDS Case Code Information

EPA AECHMETRIC INFORMATION RETRIEVAL SYSTEM (AIRS)
AIR QUALITY SUBSYSTEM
SITE DESCRIPTION INVENTORY

STATE (34): NEW JERSEY

UATMP SITE CODE CANJ

SITE ID	34-007-0003	CITY (10000)	CAMDEN	LATITUDE	39.55 23 N	UTM EASTING	491692
CITY POPULATION	84,910	COUNTY (007)	CAMDEN CO	LONGITUDE	75.05.50 W	DIFF GMI	05
AQCR POPULATION	5,487,472	AQCR (045)	METROPOLITAN PHILADELPHIA	UTM ZONE	18	ELEVATION ABOVE MSL	6 M
DATE ESTABLISHED		LAND USE (1)	RESIDENTIAL	UTM NORTHING	4419012	RECORD LAST UPDATED	89/11/22
DATE TERMINATED		LOCATION SETTING (2)	SUBURBAN	HQ EVAL DATE	81/09/16	LAST REQ EVAL	80/02/25
SITE ADDRESS	CAMDEN TRAILER, CUPEWOOD AND DAVIS STREET			DISTANCE CITY	007	COMPASS SECTOR	SE
URBAN AREA (0100)	PHILADELPHIA, PA NJ			HC IND	Y	MET DATA	Y
SUPPORTING AGENCY	NEW JERSEY STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION			MSA (6100)	PHILADELPHIA, PA-NJ		
COMMENTS	NJ #04081, START 502.03, 1/1/68, NJ #058 (TSP) START 9/3/83, S04 10/83						
SITE USER INFO	START IP #2 10/83, SSI, SLAMS TSP, CU 10/1/84, TSP DISC 12/31/86						

EPA ALHOMETRIC INFORMATION RETRIEVAL SYSTEM (AIRIS)
AIR QUALITY SUBSYSTEM
SITE DESCRIPTION INVENTORY

STATE (17) ILLINOIS

UATMP SITE CODE C4IL

SITE ID	17-031-0060	CITY (14000)	CHICAGO	LATITUDE	41 39 08 N	UTM EASTING	449860
CITY POPULATION	3,005,072	COUNTY (031)	COOK CO	LONGITUDE	87 36 08 W	DIFF GMI	06
AQCR POPULATION	7,917,109	AQCR (067)	METROPOLITAN CHICAGO	UTM ZONE	16	ELEVATION ABOVE MSL	177 M
DATE ESTABLISHED	87/10/30	LAND USE (1)	RESIDENTIAL	UTM NORTHING	4611156	RECORD LAST UPDATED	90/01/04
DATE TERMINATED		LOCATION SETTING (2)	SUBURBAN	HQ EVAL DATE		LAST REQ EVAL	
SITE ADDRESS	13100 S DOTY			DISTANCE CITY		COMPASS SECTOR	
URBAN AREA (1601)	CHICAGO, IL - NORTHWESTERN IN			HC IND	N	MET DATA	N
SUPPORTING AGENCY	ILLINOIS ENVIRONMENTAL PROTECTION AGENCY			MSA (1600)	CHICAGO, IL		
(001)							
COMMENTS							
SITE USER ID	CARVERHS						

LPA AEROMETRIC INFORMATION RETRIEVAL SYSTEM (AIRIS)

AIR QUALITY SUBSYSTEM

SITE DESCRIPTION INVENTORY

STATE (17): ILLINOIS

QUALIMP SITE CODE. SAIL

SITE ID	17-163 1010	CITY (00000)	NOT IN A CITY	LATITUDE	38 35 31 N	UTM EASTING	747037
CITY POPULATION	1	COUNTY (163)	ST CLAIR CO	LONGITUDE	90.09 49 W	DIFF GMI	06
ADCH POPULATION	2,423,778	ADCH (070)	METROPOLITAN ST LOUIS	UTM ZONE	15	ELEVATION ABOVE MSL	198 M
DATE ESTABLISHED		LAND USE (3)	INDUSTRIAL	UTM NORTHING	4275122	RECORD LAST UPDATED	85/11/22
DATE TERMINATED		LOCATION SETTLING (2)	SUBURBAN	HQ EVAL DATE		LAST REQ EVAL	
SITE ADDRESS	IEPA TRAILER; LITTLE AVENUE			DISTANCE CITY		COMPASS SECTOR	
URBAN AREA (7040)	ST. LOUIS, MO IL			HC IND		MET DATA	
SUPPORTING AGENCY (001)	ILLINOIS ENVIRONMENTAL PROTECTION AGENCY			MSA (7040)	ST LOUIS, MO-IL		
COMMENTS							
SITE USER INFO							

STATE (20). KANSAS

SITE-USER-INFO : AT CITY-COUNTY HEALTH BLDG ACTIVE 1/1/73

MSA (9/1/11)

EPA AEROMETRIC INFORMATION RETRIEVAL SYSTEM (AIRS)
AIR QUALITY SUBSYSTEM
SITE DESCRIPTION INVENTORY

STATE (12): FLORIDA

UATMP SITE CODE: ORFL

SITE ID	12 095 2002	CITY (78300)	WINTER PARK	LATITUDE	28 35 58 N	UTM EASTING	464502
CITY POPULATION	22,339	COUNTY (095)	ORANGE CO	LONGITUDE	81.21.47 W	DIFF GMI	05
AQCR POPULATION	1,336,646	AQCR (048)	CENTRAL FLORIDA	UTM ZONE	17	ELEVATION ABOVE MSL	27 M
DATE ESTABLISHED		LAND USE (2)	COMMERCIAL	UTM NORTHING	3163450	RECORD LAST UPDATED	91/06/26
DATE TERMINATED		LOCATION SETTING (1)	URBAN AND CENTER CITY	HQ EVAL DATE	82/06/18	LAST REQ EVAL	
SITE ADDRESS	MORRIS BLVD			DISTANCE CITY	006	COMPASS SET TOR	NE
URBAN AREA (5360)	ORLANDO, FL			HC IND	Y	MET DATA	Y
SUPPORTING AGENCY (001)	ORANGE COUNTY HEALTH DEPARTMENT			MSA (5360)	ORLANDO, FL		
COMMENTS	BETWEEN MORRIS BLVD & FAIRBLANKS AVE						
SITE-USER INFO	BETWEEN MORRIS BLVD & FAIRBLANKS AVE						

EPA AEROMETRIC INFORMATION RETRIEVAL SYSTEM (AIRS)
AIR QUALITY SUBSYSTEM
SITE DESCRIPTION INVENTORY

STATE (39) OHIO

HIAIMP SITE CODE: TLOH

SITE ID	39-095 0081	CITY (77000)	TOLEDO	LATITUDE	41 43 05 N	UTM EASTING	294042
CITY POPULATION	354,635	COUNTY (095)	LUCAS CO	LONGITUDE	83:28:33 W	DIFF GMI	05
AQCR POPULATION	713,772	AQCR (124)	METROPOLITAN TOLEDO	UTM ZONE	17	ELEVATION ABOVE MSL	183 M
DATE ESTABLISHED	7/106/01	LAND USE (1)	RESIDENTIAL	UTM NORTHING	4621222	RECORD LAST UPDATED	91/07/03
DATE TERMINATED		LOCATION SLITTING (2)	SUBURBAN	HQ EVAL DATE		LAST REQ EVAL	
SITE ADDRESS	FRIENDSHIP PK SHELTER HOUSE 2930 131ST ST			DISTANCE CITY		COMPASS SECTOR	
URBAN AREA (0400)	TOLEDO, OH MI			HC IND		MET DATA	
SUPPORTING AGENCY (015)	CITY OF TOLEDO, ENVIRONMENTAL SERVICES DIVISION			MSA (0400)	TOLEDO, OH		
COMMENTS	ENVIRONMENTAL SERVICES DIVISION, CITY OF TOLEDO						
SITE USER INFO	S02 BUBBLER 3/74 NO2 BUBBLER 7/74						

STATE (22). LOUISIANA

SITE-USER-INFO

Appendix B - Summary Statistics for Cases 1 and 2 for All Sites

TABLE B-1. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Baton Rouge, LA (BRLA)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
10-Jul-90	T	1297	5.26	11.41	0.42	1.03	7.77	0.06	-	*	*
16-Jul-90	M	1303	4.34	3.23	0.10	2.08	29.40	0.43	-	*	*
22-Jul-90	Sn	1304	2.50	55.20	0.98	-	*	*	-	*	*
28-Jul-90	St	1317	6.74	12.76	0.61	-	*	*	-	*	*
03-Aug-90	F	1321	4.33	18.73	0.57	-	*	*	-	*	*
09-Aug-90	Th	1331	6.13	2.12	0.09	2.28	14.91	0.24	3.38	5.92	0.14
15-Aug-90	W	1338	6.59	0.15	0.01	2.30	4.79	0.08	-	*	*
21-Aug-90	T	1347	6.83	24.01	1.16	1.18	*	*	-	*	*
27-Aug-90	M	1358	3.60	21.67	0.55	-	*	*	-	*	*
02-Sep-90	Sn	1365	2.62	8.80	0.16	-	*	*	-	*	*
08-Sep-90	St	1380	2.74	32.54	0.63	-	*	*	-	*	*
14-Sep-90	F	1382	3.72	8.06	0.21	-	*	*	-	*	*
20-Sep-90	Th	1394	5.25	1.72	0.06	1.40	15.05	0.15	-	*	*
26-Sep-90	W	1396	10.98	0.82	0.06	7.24	2.21	0.11	7.20	4.03	0.21
02-Oct-90	T	1409	5.43	2.21	0.08	2.22	2.70	0.04	0.82	14.63	0.08
08-Oct-90	M	1417	3.84	0.78	0.02	1.43	5.59	0.06	-	*	*
14-Oct-90	Sn	1427	6.54	0.31	0.01	3.92	0.51	0.01	3.46	0.29	0.01
20-Oct-90	St	1433D	5.63	7.46	0.30	3.20	7.50	0.17	4.35	8.98	0.28
26-Oct-90	F	1445	4.90	0.41	0.01	3.70	8.93	0.23	2.69	1.12	0.02
01-Nov-90	Th	1447	6.16	0.81	0.04	3.54	0.00	0.00	4.88	5.95	0.21
07-Nov-90	W	1453	6.51	1.84	0.08	3.18	2.52	0.06	3.45	1.16	0.03
19-Nov-90	M	1476D	6.79	4.27	0.21	3.96	24.75	0.69	2.95	15.59	0.33
01-Dec-90	St	1493	4.24	4.49	0.13	1.33	42.11	0.40	1.05	36.19	0.27
13-Dec-90	Th	1497D	3.72	6.45	0.17	-	*	*	-	*	*
25-Dec-90	T	1512	6.10	0.98	0.04	2.26	5.76	0.09	1.36	8.12	0.08
06-Jan-91	Sn	1534	2.18	16.51	0.25	1.15	25.33	0.21	1.24	9.68	0.08
18-Jan-91	F	1556	2.80	1.43	0.03	1.30	10.77	0.10	1.70	1.18	0.01
30-Jan-91	W	1562D	2.50	16.43	0.29	1.30	33.85	0.31	1.60	18.75	0.21
12-Feb-91	F	1584D	6.91	2.17	0.11	3.67	2.46	0.06	4.06	2.71	0.08
23-Feb-91	T	1594	3.95	4.82	0.13	1.74	5.75	0.07	1.53	1.97	0.02
Average			4.99	9.09	0.25	2.52	12.03	0.17	2.86	8.52	0.13

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-2. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Baton Rouge, LA (BRLA)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
10-Jul-90	T	1297	5.26	11.41	0.42	1.03	7.77	0.06	0.18	0.00	0.00
16-Jul-90	M	1303	4.34	3.23	0.10	2.08	29.40	0.43	0.18	0.00	0.00
22-Jul-90	Sn	1304	2.50	55.20	0.98	0.18	0.00	0.00	0.18	0.00	0.00
28-Jul-90	St	1317	6.74	12.76	0.61	0.18	0.00	0.00	0.18	0.00	0.00
03-Aug-90	F	1321	4.33	18.73	0.57	0.18	0.00	0.00	0.18	0.00	0.00
09-Aug-90	Th	1331	6.13	2.12	0.09	2.28	14.91	0.24	3.38	5.92	0.14
15-Aug-90	W	1338	6.59	0.15	0.01	2.30	4.79	0.08	0.18	0.00	0.00
21-Aug-90	T	1347	6.83	24.01	1.16	0.68	147.06	0.71	0.18	0.00	0.00
27-Aug-90	M	1358	3.60	21.67	0.55	0.18	0.00	0.00	0.18	0.00	0.00
02-Sep-90	Sn	1365	2.62	8.80	0.16	0.18	0.00	0.00	0.18	0.00	0.00
08-Sep-90	St	1380	2.74	32.54	0.63	0.18	0.00	0.00	0.18	0.00	0.00
14-Sep-90	F	1382	3.72	8.06	0.21	0.18	0.00	0.00	0.18	0.00	0.00
20-Sep-90	Th	1394	5.25	1.72	0.06	1.40	15.05	0.15	0.18	0.00	0.00
26-Sep-90	W	1396	10.98	0.82	0.06	7.24	2.21	0.11	7.20	4.03	0.21
02-Oct-90	T	1409	5.43	2.21	0.08	2.22	2.70	0.04	0.82	14.63	0.08
08-Oct-90	M	1417	3.84	0.78	0.02	1.43	5.59	0.06	0.18	0.00	0.00
14-Oct-90	Sn	1427	6.54	0.31	0.01	3.92	0.51	0.01	3.46	0.29	0.01
20-Oct-90	St	1433D	5.63	7.46	0.30	3.20	7.50	0.17	4.35	8.98	0.28
26-Oct-90	F	1445	4.90	0.41	0.01	3.70	8.93	0.23	2.69	1.12	0.02
01-Nov-90	Th	1447	6.16	0.81	0.04	3.54	0.00	0.00	4.88	5.95	0.21
07-Nov-90	W	1453	6.51	1.84	0.08	3.18	2.52	0.06	3.45	1.16	0.03
19-Nov-90	M	1476D	6.79	4.27	0.21	3.96	24.75	0.69	2.95	15.59	0.33
01-Dec-90	St	1493	4.24	4.49	0.13	1.33	42.11	0.40	1.05	36.19	0.27
13-Dec-90	Th	1497D	3.72	6.45	0.17	0.18	0.00	0.00	0.18	0.00	0.00
25-Dec-90	T	1512	6.10	0.98	0.04	2.26	5.76	0.09	1.36	8.12	0.08
06-Jan-91	Sn	1534	2.18	16.51	0.25	1.15	25.33	0.21	1.24	9.68	0.08
18-Jan-91	F	1556	2.80	1.43	0.03	1.30	10.77	0.10	1.70	1.18	0.01
30-Jan-91	W	1562D	2.50	16.43	0.29	1.30	33.85	0.31	1.60	18.75	0.21
12-Feb-91	F	1584D	6.91	2.17	0.11	3.67	2.46	0.06	4.06	2.71	0.08
23-Feb-91	T	1594	3.95	4.82	0.13	1.74	5.75	0.07	1.53	1.97	0.02
Average			4.99	9.09	0.25	1.88	13.32	0.14	1.61	4.54	0.07

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-3. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Chicago, IL (C4IL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
24-Mar-90	St	1175	3.84	6.25	0.17	2.59	1.93	0.04	2.92	7.89	0.16
05-Apr-90	Th	1196	4.05	12.11	0.35	1.82	11.57	0.15	2.99	26.09	0.55
17-Apr-90	T	1207	3.89	9.01	0.25	1.68	17.31	0.21	2.00	2.51	0.04
29-Apr-90	Sn	1219	2.87	0.70	0.01	1.43	54.04	0.54	2.03	69.63	1.00
11-May-90	F	1228	3.38	6.81	0.16	1.76	0.57	0.01	2.03	18.27	0.26
23-May-90	W	1244	3.05	20.33	0.44	1.50	2.01	0.02	4.98	5.03	0.18
04-Jun-90	M	1261	2.45	0.41	0.01	0.93	3.24	0.02	3.56	2.25	0.06
16-Jun-90	St	1268	7.50	5.87	0.31	3.40	8.24	0.20	3.49	23.50	0.58
28-Jun-90	Th	1285	5.79	5.53	0.23	2.47	6.90	0.12	3.53	10.50	0.26
22-Jul-90	Sn	1314	7.60	3.29	0.18	3.00	2.34	0.05	3.85	24.71	0.67
03-Aug-90	F	1324	13.64	16.28	1.57	4.83	33.54	1.15	3.37	64.09	1.53
16-Aug-90	Th	1343	5.18	4.83	0.18	1.85	10.30	0.13	3.76	13.58	0.36
27-Aug-90	M	1352	7.43	15.88	0.83	2.16	11.11	0.17	3.13	8.00	0.18
08-Sep-90	St	1375	5.25	4.95	0.18	2.25	2.67	0.04	2.03	9.38	0.13
20-Sep-90	Th	1391	4.92	19.11	0.66	2.27	11.04	0.18	7.82	14.07	0.78
02-Oct-90	T	1407	5.09	6.88	0.25	1.86	4.85	0.06	6.96	4.60	0.23
14-Oct-90	Sn	1421	4.59	8.71	0.28	2.33	7.73	0.13	2.96	0.34	0.01
26-Oct-90	F	1436	4.34	3.46	0.11	2.31	0.00	0.00	3.53	12.20	0.30
08-Nov-90	Th	1452	4.01	1.50	0.04	1.94	4.12	0.06	3.94	0.00	0.00
19-Nov-90	M	1475	3.88	13.68	0.37	2.07	15.98	0.23	2.47	15.01	0.26
01-Dec-90	St	1483	3.86	31.61	0.86	1.89	52.52	0.70	1.98	12.12	0.17
13-Dec-91	Th	1504	3.48	5.17	0.13	1.40	44.29	0.44	1.00	3.02	0.02
28-Dec-90	F	1525	3.23	1.24	0.03	1.58	0.63	0.01	1.23	8.13	0.07
04-Jan-91	F	1537D	4.62	1.95	0.06	2.08	0.96	0.01	1.24	0.00	0.00
18-Jan-91	F	1547	3.78	3.70	0.10	1.40	2.15	0.02	1.32	19.70	0.18
30-Jan-91	W	1557	4.81	16.02	0.54	2.03	1.48	0.02	1.77	2.83	0.04
11-Feb-91	M	1577	3.43	5.55	0.13	1.32	0.76	0.01	0.94	6.38	0.04
23-Feb-91	St	1593	3.18	2.52	0.06	1.00	3.02	0.02	0.83	2.41	0.01
Average			4.75	8.33	0.30	2.04	11.26	0.17	2.91	13.79	0.29

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-4. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Chicago, IL (C4IL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
24-Mar-90	St	1175	3.84	6.25	0.17	2.59	1.93	0.04	2.92	7.89	0.16
05-Apr-90	Th	1196	4.05	12.11	0.35	1.82	11.57	0.15	2.99	26.09	0.55
17-Apr-90	T	1207	3.89	9.01	0.25	1.68	17.31	0.21	2.00	2.51	0.04
29-Apr-90	Sn	1219	2.87	0.70	0.01	1.43	54.04	0.54	2.03	69.63	1.00
11-May-90	F	1228	3.38	6.81	0.16	1.76	0.57	0.01	2.03	18.27	0.26
23-May-90	W	1244	3.05	20.33	0.44	1.50	2.01	0.02	4.98	5.03	0.18
04-Jun-90	M	1261	2.45	0.41	0.01	0.93	3.24	0.02	3.56	2.25	0.06
16-Jun-90	St	1268	7.50	5.87	0.31	3.40	8.24	0.20	3.49	23.50	0.58
28-Jun-90	Th	1285	5.79	5.53	0.23	2.47	6.90	0.12	3.53	10.50	0.26
22-Jul-90	Sn	1314	7.60	3.29	0.18	3.00	2.34	0.05	3.85	24.71	0.67
03-Aug-90	F	1324	13.64	16.28	1.57	4.83	33.54	1.15	3.37	64.09	1.53
16-Aug-90	Th	1343	5.18	4.83	0.18	1.85	10.30	0.13	3.76	13.58	0.36
27-Aug-90	M	1352	7.43	15.88	0.83	2.16	11.11	0.17	3.13	8.00	0.18
08-Sep-90	St	1375	5.25	4.95	0.18	2.25	2.67	0.04	2.03	9.38	0.13
20-Sep-90	Th	1391	4.92	19.11	0.66	2.27	11.04	0.18	7.82	14.07	0.78
02-Oct-90	T	1407	5.09	6.88	0.25	1.86	4.85	0.06	6.96	4.60	0.23
14-Oct-90	Sn	1421	4.59	8.71	0.28	2.33	7.73	0.13	2.96	0.34	0.01
26-Oct-90	F	1436	4.34	3.46	0.11	2.31	0.00	0.00	3.53	12.20	0.30
08-Nov-90	Th	1452	4.01	1.50	0.04	1.94	4.12	0.06	3.94	0.00	0.00
19-Nov-90	M	1475	3.88	13.68	0.37	2.07	15.98	0.23	2.47	15.01	0.26
01-Dec-90	St	1483	3.86	31.61	0.86	1.89	52.52	0.70	1.98	12.12	0.17
13-Dec-91	Th	1504	3.48	5.17	0.13	1.40	44.29	0.44	1.00	3.02	0.02
28-Dec-90	F	1525	3.23	1.24	0.03	1.58	0.63	0.01	1.23	8.13	0.07
04-Jan-91	F	1537D	4.62	1.95	0.06	2.08	0.96	0.01	1.24	0.00	0.00
18-Jan-91	F	1547	3.78	3.70	0.10	1.40	2.15	0.02	1.32	19.70	0.18
30-Jan-91	W	1557	4.81	16.02	0.54	2.03	1.48	0.02	1.77	2.83	0.04
11-Feb-91	M	1577	3.43	5.55	0.13	1.32	0.76	0.01	0.94	6.38	0.04
23-Feb-91	St	1593	3.18	2.52	0.06	1.00	3.02	0.02	0.83	2.41	0.01
Average			4.75	8.33	0.30	2.04	11.26	0.17	2.91	13.79	0.29

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-5. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Camden, NJ (CANJ)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
12-Mar-90	M	1166	8.56	9.35	0.57	4.59	8.71	0.28	4.19	10.75	0.32
24-Mar-90	St	1178	3.41	24.63	0.59	1.87	0.54	0.01	2.36	22.88	0.38
05-Apr-90	Th	1190D	4.34	0.00	0.00	1.98	5.05	0.07	2.24	11.61	0.18
17-Apr-90	T	1200	4.94	3.85	0.13	2.53	6.73	0.12	2.38	0.42	0.01
29-Apr-90	Sn	1215	3.74	5.35	0.14	1.75	18.91	0.23	1.49	10.10	0.11
11-May-90	F	1232	2.36	10.17	0.17	0.93	17.20	0.11	1.40	17.14	0.17
23-May-90	W	1242	3.08	0.65	0.01	1.27	5.53	0.05	2.01	23.88	0.34
04-Jun-90	M	1260	2.86	2.80	0.06	1.24	9.68	0.08	1.13	11.56	0.09
16-Jun-90	St	1270	5.29	1.13	0.04	1.94	8.79	0.12	1.63	6.13	0.07
28-Jun-90	Th	1282	9.48	0.84	0.06	3.87	1.55	0.04	3.97	11.08	0.31
10-Jul-90	T	1288	8.85	0.57	0.04	3.86	17.38	0.47	2.96	3.72	0.08
22-Jul-90	Sn	1310	9.12	3.18	0.21	3.36	8.93	0.21	2.56	5.47	0.10
03-Aug-90	F	1319	9.81	15.49	1.07	3.96	7.33	0.21	5.31	40.53	1.52
15-Aug-90	W	1337	8.30	2.05	0.12	4.17	6.48	0.19	4.44	2.03	0.06
27-Aug-90	M	1361	7.07	4.53	0.23	3.18	2.83	0.06	2.98	13.11	0.28
08-Sep-90	St	1369	3.16	4.75	0.11	1.14	9.69	0.08	2.01	6.97	0.10
20-Sep-90	Th	1384	3.24	6.79	0.16	2.27	14.57	0.23	3.21	19.31	0.44
02-Oct-90	T	1403	4.03	0.00	0.00	1.89	1.06	0.01	2.41	0.42	0.01
14-Oct-90	Sn	1422	5.05	0.20	0.01	2.91	0.34	0.01	1.40	2.86	0.03
26-Oct-90	F	1438	2.35	2.55	0.04	1.44	2.78	0.03	1.79	0.00	0.00
07-Nov-90	W	1463D	3.63	0.83	0.02	2.11	2.84	0.04	2.04	7.37	0.11
19-Nov-90	M	1472	3.15	1.90	0.04	1.81	6.63	0.08	1.19	5.04	0.04
01-Dec-90	St	1494	4.82	0.21	0.01	2.60	5.01	0.09	1.78	7.32	0.09
13-Dec-90	Th	1505	5.08	4.93	0.18	2.80	1.79	0.04	1.90	7.37	0.10
25-Dec-90	T	1513D	3.30	5.16	0.12	1.87	4.83	0.06	1.27	10.28	0.09
06-Jan-91	Sn	1531	4.36	3.44	0.11	2.26	3.10	0.05	1.75	2.29	0.03
18-Jan-91	F	1548	2.52	9.52	0.17	1.36	5.88	0.06	1.27	4.72	0.04
30-Jan-91	W	1570D	5.25	5.91	0.22	2.45	2.86	0.05	2.40	0.42	0.01
11-Feb-91	M	1586D	2.82	0.36	0.01	1.36	2.94	0.03	1.05	0.96	0.01
23-Feb-91	St	1597	2.99	6.37	0.13	1.48	8.11	0.08	1.33	6.02	0.06
Average			4.90	4.58	0.16	2.34	6.60	0.11	2.26	9.06	0.17

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-6. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Camden, NJ (CANJ)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
12-Mar-90	M	1166	8.56	9.35	0.57	4.59	8.71	0.28	4.19	10.75	0.32
24-Mar-90	St	1178	3.41	24.63	0.59	1.87	0.54	0.01	2.36	22.88	0.38
05-Apr-90	Th	1190D	4.34	0.00	0.00	1.98	5.05	0.07	2.24	11.61	0.18
17-Apr-90	T	1200	4.94	3.85	0.13	2.53	6.73	0.12	2.38	0.42	0.01
29-Apr-90	Sn	1215	3.74	5.35	0.14	1.75	18.91	0.23	1.49	10.10	0.11
11-May-90	F	1232	2.36	10.17	0.17	0.93	17.20	0.11	1.40	17.14	0.17
23-May-90	W	1242	3.08	0.65	0.01	1.27	5.53	0.05	2.01	23.88	0.34
04-Jun-90	M	1260	2.86	2.80	0.06	1.24	9.68	0.08	1.13	11.56	0.09
16-Jun-90	St	1270	5.29	1.13	0.04	1.94	8.79	0.12	1.63	6.13	0.07
28-Jun-90	Th	1282	9.48	0.84	0.06	3.87	1.55	0.04	3.97	11.08	0.31
10-Jul-90	T	1288	8.85	0.57	0.04	3.86	17.38	0.47	2.96	3.72	0.08
22-Jul-90	Sn	1310	9.12	3.18	0.21	3.36	8.93	0.21	2.56	5.47	0.10
03-Aug-90	F	1319	9.81	15.49	1.07	3.96	7.33	0.21	5.31	40.53	1.52
15-Aug-90	W	1337	8.30	2.05	0.12	4.17	6.48	0.19	4.44	2.03	0.06
27-Aug-90	M	1361	7.07	4.53	0.23	3.18	2.83	0.06	2.98	13.11	0.28
08-Sep-90	St	1369	3.16	4.75	0.11	1.14	9.69	0.08	2.01	6.97	0.10
20-Sep-90	Th	1384	3.24	6.79	0.16	2.27	14.57	0.23	3.21	19.31	0.44
02-Oct-90	T	1403	4.03	0.00	0.00	1.89	1.06	0.01	2.41	0.42	0.01
14-Oct-90	Sn	1422	5.05	0.20	0.01	2.91	0.34	0.01	1.40	2.86	0.03
26-Oct-90	F	1438	2.35	2.55	0.04	1.44	2.78	0.03	1.79	0.00	0.00
07-Nov-90	W	1463D	3.63	0.83	0.02	2.11	2.84	0.04	2.04	7.37	0.11
19-Nov-90	M	1472	3.15	1.90	0.04	1.81	6.63	0.08	1.19	5.04	0.04
01-Dec-90	St	1494	4.82	0.21	0.01	2.60	5.01	0.09	1.78	7.32	0.09
13-Dec-90	Th	1505	5.08	4.93	0.18	2.80	1.79	0.04	1.90	7.37	0.10
25-Dec-90	T	1513D	3.30	5.16	0.12	1.87	4.83	0.06	1.27	10.28	0.09
06-Jan-91	Sn	1531	4.36	3.44	0.11	2.26	3.10	0.05	1.75	2.29	0.03
18-Jan-91	F	1548	2.52	9.52	0.17	1.36	5.88	0.06	1.27	4.72	0.04
30-Jan-91	W	1570D	5.25	5.91	0.22	2.45	2.86	0.05	2.40	0.42	0.01
11-Feb-91	M	1586D	2.82	0.36	0.01	1.36	2.94	0.03	1.05	0.96	0.01
23-Feb-91	St	1597	2.99	6.37	0.13	1.48	8.11	0.08	1.33	6.02	0.06
Average			4.90	4.58	0.16	2.34	6.60	0.11	2.26	9.06	0.17

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-7. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Houston, TX (H1TX)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
12-Mar-90	M	1170D	0.65	89.23	0.41	0.43	11.76	0.04	0.62	100.00	0.00
24-Mar-90	St	1184	1.41	34.04	0.34	0.64	61.42	0.28	0.88	37.71	0.23
05-Apr-90	Th	1187	1.12	7.14	0.06	-	*	*	0.86	48.84	0.30
17-Apr-90	T	1210	1.80	12.22	0.16	0.65	61.54	0.28	0.74	31.29	0.16
11-May-90	F	1230D	0.63	4.80	0.02	0.37	100.00	0.00	0.80	2.50	0.01
23-May-90	W	1245	2.32	17.71	0.29	1.01	34.83	0.25	1.16	37.23	0.30
04-Jun-90	M	1255	1.94	7.75	0.11	0.79	25.32	0.14	0.58	15.65	0.06
16-Jun-90	St	1267	1.62	0.62	0.01	0.46	41.76	0.13	0.45	29.21	0.09
22-Jul-90	Sn	1308	1.08	11.11	0.08	0.38	0.00	0.00	0.43	100.00	0.00
03-Aug-90	F	1323	1.15	2.62	0.02	0.38	100.00	0.00	-	*	*
15-Aug-90	W	1334	1.91	4.72	0.06	1.21	11.57	0.10	0.64	1.57	0.01
27-Aug-90	M	1357	1.42	15.49	0.16	0.80	1.26	0.01	0.66	33.33	0.16
08-Sep-90	St	1373D	1.03	1.94	0.01	-	*	*	-	*	*
20-Sep-90	Th	1390	1.25	6.40	0.06	0.68	0.00	0.00	-	*	*
02-Oct-90	T	1413	1.45	18.69	0.19	1.01	12.94	0.09	1.24	19.35	0.17
14-Oct-90	Sn	1426	1.55	6.45	0.07	1.29	11.67	0.11	0.82	6.13	0.04
26-Oct-90	F	1435	2.01	1.99	0.03	1.21	29.75	0.25	0.59	44.07	0.18
07-Nov-90	W	1451	1.31	3.83	0.04	0.80	7.50	0.04	0.74	10.81	0.06
19-Nov-90	M	1474	1.14	12.28	0.10	0.93	8.60	0.06	0.42	16.87	0.05
01-Dec-90	St	1488	1.65	0.61	0.01	0.68	2.94	0.01	-	*	*
13-Dec-90	Th	1502	2.08	19.23	0.28	0.57	17.54	0.07	0.38	100.00	0.00
25-Dec-90	T	1519	1.33	2.26	0.02	0.87	1.16	0.01	-	*	*
06-Jan-91	Sn	1539D	1.52	5.26	0.06	0.44	4.55	0.01	-	*	*
18-Jan-91	F	1544	1.52	4.62	0.05	0.42	7.23	0.02	-	*	*
30-Jan-91	W	1558	0.56	12.61	0.05	0.38	10.53	0.03	0.39	100.00	0.00
11-Feb-91	M	1574	2.55	5.11	0.09	1.15	2.62	0.02	0.83	35.15	0.21
23-Feb-91	St	1598	1.39	1.44	0.01	0.70	0.00	0.00	0.43	4.65	0.01
Average			1.46	11.49	0.10	0.73	22.66	0.08	0.68	38.72	0.10

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

**TABLE B-8. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE,
AND STANDARD DEVIATION FOR CASE 2¹**

Houston, TX (H1TX)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
12-Mar-90	M	1170D	0.65	89.23	0.41	0.43	11.76	0.04	0.40	110.00	0.31
24-Mar-90	St	1184	1.41	34.04	0.34	0.64	61.42	0.28	0.88	37.71	0.23
05-Apr-90	Th	1187	1.12	7.14	0.06	0.18	0.00	0.00	0.86	48.84	0.30
17-Apr-90	T	1210	1.80	12.22	0.16	0.65	61.54	0.28	0.74	31.29	0.16
11-May-90	F	1230D	0.63	4.80	0.02	0.28	69.09	0.13	0.80	2.50	0.01
23-May-90	W	1245	2.32	17.71	0.29	1.01	34.83	0.25	1.16	37.23	0.30
04-Jun-90	M	1255	1.94	7.75	0.11	0.79	25.32	0.14	0.58	15.65	0.06
16-Jun-90	St	1267	1.62	0.62	0.01	0.46	41.76	0.13	0.45	29.21	0.09
22-Jul-90	Sn	1308	1.08	11.11	0.08	0.38	0.00	0.00	0.31	81.97	0.18
03-Aug-90	F	1323	1.15	2.62	0.02	0.28	71.43	0.14	0.18	0.00	0.00
15-Aug-90	W	1334	1.91	4.72	0.06	1.21	11.57	0.10	0.64	1.57	0.01
27-Aug-90	M	1357	1.42	15.49	0.16	0.80	1.26	0.01	0.66	33.33	0.16
08-Sep-90	St	1373D	1.03	1.94	0.01	0.18	0.00	0.00	0.18	0.00	0.00
20-Sep-90	Th	1390	1.25	6.40	0.06	0.68	0.00	0.00	0.18	0.00	0.00
02-Oct-90	T	1413	1.45	18.69	0.19	1.01	12.94	0.09	1.24	19.35	0.17
14-Oct-90	Sn	1426	1.55	6.45	0.07	1.29	11.67	0.11	0.82	6.13	0.04
26-Oct-90	F	1435	2.01	1.99	0.03	1.21	29.75	0.25	0.59	44.07	0.18
07-Nov-90	W	1451	1.31	3.83	0.04	0.80	7.50	0.04	0.74	10.81	0.06
19-Nov-90	M	1474	1.14	12.28	0.10	0.93	8.60	0.06	0.42	16.87	0.05
01-Dec-90	St	1488	1.65	0.61	0.01	0.68	2.94	0.01	0.18	0.00	0.00
13-Dec-90	Th	1502	2.08	19.23	0.28	0.57	17.54	0.07	0.28	71.43	0.14
25-Dec-90	T	1519	1.33	2.26	0.02	0.87	1.16	0.01	0.18	0.00	0.00
06-Jan-91	Sn	1539D	1.52	5.26	0.06	0.44	4.55	0.01	0.18	0.00	0.00
18-Jan-91	F	1544	1.52	4.62	0.05	0.42	7.23	0.02	0.18	0.00	0.00
30-Jan-91	W	1558	0.56	12.61	0.05	0.38	10.53	0.03	0.29	73.68	0.15
11-Feb-91	M	1574	2.55	5.11	0.09	1.15	2.62	0.02	0.83	35.15	0.21
23-Feb-91	St	1598	1.39	1.44	0.01	0.70	0.00	0.00	0.43	4.65	0.01
Average			1.46	11.49	0.10	0.68	18.78	0.08	0.53	26.35	0.10

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-9. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Orlando, FL (ORFL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
10-Jul-90	T	1290	3.55	7.89	0.20	-	*	*	0.37	*	*
16-Jul-90	M	1302	2.52	13.12	0.23	0.55	16.51	0.06	0.69	*	*
22-Jul-90	Sn	1307	3.54	2.55	0.06	1.09	12.84	0.10	0.57	*	*
28-Jul-90	St	1316	2.82	46.10	0.92	0.73	70.34	0.36	-	*	*
03-Aug-90	F	1320	3.15	8.25	0.18	1.00	1.01	0.01	-	*	*
09-Aug-90	Th	1332	3.52	8.25	0.21	1.45	4.14	0.04	0.77	31.17	0.17
15-Aug-90	W	1350	3.34	0.90	0.02	1.00	4.00	0.03	-	*	*
27-Aug-90	M	1359	4.48	4.25	0.13	1.20	10.88	0.09	0.47	8.51	0.03
02-Sep-90	Sn	1363	2.78	4.32	0.08	0.91	23.20	0.15	0.43	*	*
08-Sep-90	St	1377	4.54	0.44	0.01	0.95	25.26	0.17	0.67	13.53	0.06
14-Sep-90	F	1383	3.99	3.26	0.09	1.14	7.02	0.06	0.77	11.76	0.06
20-Sep-90	Th	1386	0.42	*	*	0.53	*	*	1.08	*	*
26-Sep-90	W	1397	3.44	4.37	0.11	1.00	4.00	0.03	1.04	4.83	0.04
08-Oct-90	M	1418	1.85	2.16	0.03	0.49	2.06	0.01	0.44	*	*
14-Oct-90	Sn	1424	33.54	3.40	0.81	9.41	101.97	6.78	10.79	*	*
20-Oct-90	St	1432	2.02	8.44	0.12	0.93	9.73	0.06	0.60	8.40	0.04
26-Oct-90	F	1446	3.21	0.94	0.02	1.49	35.69	0.37	2.04	6.39	0.09
01-Nov-90	Th	1449D	2.35	0.43	0.01	0.96	1.05	0.01	1.13	12.39	0.10
07-Nov-90	W	1465	3.37	5.05	0.12	1.24	4.84	0.04	1.03	15.53	0.11
13-Nov-90	T	1466	4.34	3.46	0.11	1.77	2.83	0.04	1.44	27.18	0.28
01-Dec-90	St	1484	2.12	1.89	0.03	1.02	1.96	0.01	0.49	28.57	0.10
13-Dec-90	Th	1508D	7.01	0.43	0.02	2.91	3.79	0.08	1.23	93.88	0.81
25-Dec-90	T	1522	6.38	2.67	0.12	2.67	0.75	0.01	0.44	22.73	0.07
06-Jan-91	Sn	1533	1.81	2.21	0.03	0.67	8.96	0.04	0.43	13.95	0.04
18-Jan-91	F	1554D	3.48	1.44	0.04	1.35	0.74	0.01	1.94	21.65	0.30
30-Jan-91	W	1567	3.59	7.24	0.18	1.26	6.35	0.06	0.61	31.40	0.13
11-Feb-91	M	1580	3.60	3.06	0.08	1.47	2.05	0.02	1.97	12.72	0.18
23-Feb-91	St	1596	2.44	6.56	0.11	1.04	7.69	0.06	1.13	14.16	0.11
Average			4.40	5.67	0.15	1.49	14.22	0.33	1.30	21.04	0.15

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-10. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Orlando, FL (ORFL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
10-Jul-90	T	1290	3.55	7.89	0.20	0.18	0.00	0.00	0.28	69.09	0.13
16-Jul-90	M	1302	2.52	13.12	0.23	0.55	16.51	0.06	0.44	117.24	0.36
22-Jul-90	Sn	1307	3.54	2.55	0.06	1.09	12.84	0.10	0.38	104.00	0.28
28-Jul-90	St	1316	2.82	46.10	0.92	0.73	70.34	0.36	0.18	0.00	0.00
03-Aug-90	F	1320	3.15	8.25	0.18	1.00	1.01	0.01	0.18	0.00	0.00
09-Aug-90	Th	1332	3.52	8.25	0.21	1.45	4.14	0.04	0.77	31.17	0.17
15-Aug-90	W	1350	3.34	0.90	0.02	1.00	4.00	0.03	0.18	0.00	0.00
27-Aug-90	M	1359	4.48	4.25	0.13	1.20	10.88	0.09	0.47	8.51	0.03
02-Sep-90	Sn	1363	2.78	4.32	0.08	0.91	23.20	0.15	0.31	81.97	0.18
08-Sep-90	St	1377	4.54	0.44	0.01	0.95	25.26	0.17	0.67	13.53	0.06
14-Sep-90	F	1383	3.99	3.26	0.09	1.14	7.02	0.06	0.77	11.76	0.06
20-Sep-90	Th	1386	0.30	80.00	0.17	0.36	98.59	0.25	0.63	142.86	0.64
26-Sep-90	W	1397	3.44	4.37	0.11	1.00	4.00	0.03	1.04	4.83	0.04
08-Oct-90	M	1418	1.85	2.16	0.03	0.49	2.06	0.01	0.31	83.87	0.18
14-Oct-90	Sn	1424	33.54	3.40	0.81	9.41	101.97	6.78	5.49	193.44	7.50
20-Oct-90	St	1432	2.02	8.44	0.12	0.93	9.73	0.06	0.60	8.40	0.04
26-Oct-90	F	1446	3.21	0.94	0.02	1.49	35.69	0.37	2.04	6.39	0.09
01-Nov-90	Th	1449D	2.35	0.43	0.01	0.96	1.05	0.01	1.13	12.39	0.10
07-Nov-90	W	1465	3.37	5.05	0.12	1.24	4.84	0.04	1.03	15.53	0.11
13-Nov-90	T	1466	4.34	3.46	0.11	1.77	2.83	0.04	1.44	27.18	0.28
01-Dec-90	St	1484	2.12	1.89	0.03	1.02	1.96	0.01	0.49	28.57	0.10
13-Dec-90	Th	1508D	7.01	0.43	0.02	2.91	3.79	0.08	1.23	93.88	0.81
25-Dec-90	T	1522	6.38	2.67	0.12	2.67	0.75	0.01	0.44	22.73	0.07
06-Jan-91	Sn	1533	1.81	2.21	0.03	0.67	8.96	0.04	0.43	13.95	0.04
18-Jan-91	F	1554D	3.48	1.44	0.04	1.35	0.74	0.01	1.94	21.65	0.30
30-Jan-91	W	1567	3.59	7.24	0.18	1.26	6.35	0.06	0.61	31.40	0.13
11-Feb-91	M	1580	3.60	3.06	0.08	1.47	2.05	0.02	1.97	12.72	0.18
23-Feb-91	St	1596	2.44	6.56	0.11	1.04	7.69	0.06	1.13	14.16	0.11
Average			4.39	8.32	0.15	1.43	16.72	0.32	0.95	41.83	0.43

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-11. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Pensacola, FL (PEFL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
10-Feb-90	St	1158	0.91	43.96	0.28	0.60	23.33	0.10	1.13	16.89	0.13
22-Feb-90	Th	1159	1.38	5.80	0.06	-	*	*	1.75	7.45	0.09
12-Mar-90	M	1174	2.52	3.58	0.06	1.06	18.01	0.13	1.75	70.49	0.87
24-Mar-90	St	1186D	1.69	12.46	0.15	1.57	19.81	0.22	1.89	0.00	0.00
05-Apr-90	Th	1194	3.86	3.11	0.08	1.52	4.62	0.05	3.00	4.67	0.10
17-Apr-90	T	1206	3.01	3.32	0.07	1.15	7.86	0.06	1.51	2.65	0.03
29-Apr-90	Sn	1213	2.05	8.31	0.12	0.75	36.24	0.19	0.66	12.12	0.06
11-May-90	F	1225	2.18	18.85	0.29	0.58	19.13	0.08	1.09	23.04	0.18
23-May-90	W	1250	2.86	5.59	0.11	0.77	2.60	0.01	1.37	8.76	0.08
04-Jun-90	M	1257	1.87	20.91	0.28	0.58	0.00	0.00	0.40	12.66	0.04
16-Jun-90	St	1263	5.16	2.91	0.11	1.12	17.04	0.13	1.18	64.41	0.54
28-Jun-90	Th	1279	0.91	16.57	0.11	0.76	*	*	0.63	*	*
10-Jul-90	T	1298	3.46	2.89	0.07	0.41	9.76	0.03	-	*	*
16-Jul-90	M	1301	1.98	7.07	0.10	0.48	14.74	0.05	1.03	15.53	0.11
22-Jul-90	Sn	1313	1.57	13.42	0.15	-	*	*	-	*	*
28-Jul-90	St	1318	5.03	18.11	0.64	1.27	48.82	0.44	2.79	13.29	0.26
03-Aug-90	F	1327	3.61	2.77	0.07	0.50	18.18	0.06	-	*	*
09-Aug-90	Th	1330	4.15	0.96	0.03	1.08	12.09	0.09	2.52	13.92	0.25
15-Aug-90	W	1339	4.35	1.61	0.05	1.18	16.17	0.13	1.55	27.10	0.30
21-Aug-90	T	1349	2.63	2.67	0.05	0.74	20.41	0.11	0.41	*	*
27-Aug-90	M	1353	1.71	7.62	0.09	0.46	24.18	0.08	0.43	7.06	0.02
02-Sep-90	Sn	1364	2.58	5.83	0.11	0.43	*	*	0.55	31.19	0.12
08-Sep-90	St	1368	3.60	9.18	0.23	0.89	8.99	0.06	0.81	21.12	0.12
14-Sep-90	F	1381	1.81	13.85	0.18	0.38	*	*	-	*	*
20-Sep-90	Th	1388	2.62	7.27	0.13	0.73	4.14	0.02	1.46	25.43	0.26
26-Sep-90	W	1402	3.73	2.42	0.06	1.46	2.74	0.03	3.39	3.54	0.08
02-Oct-90	T	1406	1.67	1.20	0.01	0.49	8.16	0.03	-	*	*
08-Oct-90	M	1415	1.71	5.85	0.07	0.51	9.90	0.04	0.49	8.16	0.03
14-Oct-90	Sn	1423	15.15	*	*	2.73	*	*	10.56	*	*
20-Oct-90	St	1431	2.37	0.84	0.01	0.76	6.62	0.04	2.31	0.43	0.01
26-Oct-90	F	1444	1.67	5.99	0.07	0.59	18.80	0.08	1.46	2.74	0.03
01-Nov-90	Th	1448	2.26	3.99	0.06	1.14	3.51	0.03	2.64	5.30	0.10
07-Nov-90	W	1458	2.11	6.18	0.09	0.92	6.52	0.04	1.85	5.41	0.07
14-Nov-90	W	1467	2.22	7.21	0.11	1.29	8.56	0.08	1.88	5.87	0.08
01-Dec-90	St	1495	1.57	0.64	0.01	0.88	9.09	0.06	0.46	4.35	0.01
13-Dec-90	Th	1500	1.49	6.71	0.07	0.85	2.35	0.01	2.55	3.14	0.06
25-Dec-90	T	1517	0.93	11.89	0.08	0.67	7.52	0.04	0.88	12.57	0.08
06-Jan-91	Sn	1527	1.10	0.91	0.01	0.49	6.19	0.02	0.49	8.16	0.03
18-Jan-91	F	1545D	1.23	2.45	0.02	0.73	6.90	0.04	1.34	0.75	0.01
30-Jan-91	W	1564	0.74	39.46	0.21	0.39	0.00	0.00	-	*	*
12-Feb-91	T	1582	2.96	5.75	0.12	1.81	2.77	0.04	2.00	5.00	0.07
23-Feb-91	St	1601D	0.88	0.00	0.00	0.69	1.46	0.01	1.31	0.77	0.01
Average			2.65	8.30	0.11	0.88	11.87	0.07	1.71	13.45	0.13

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-12. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Pensacola, FL (PEFL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
10-Feb-90	St	1158	0.91	43.96	0.28	0.60	23.33	0.10	1.13	16.89	0.13
22-Feb-90	Th	1159	1.38	5.80	0.06	0.18	0.00	0.00	1.75	7.45	0.09
12-Mar-90	M	1174	2.52	3.58	0.06	1.06	18.01	0.13	1.75	70.49	0.87
24-Mar-90	St	1186D	1.69	12.46	0.15	1.57	19.81	0.22	1.89	0.00	0.00
05-Apr-90	Th	1194	3.86	3.11	0.08	1.52	4.62	0.05	3.00	4.67	0.10
17-Apr-90	T	1206	3.01	3.32	0.07	1.15	7.86	0.06	1.51	2.65	0.03
29-Apr-90	Sn	1213	2.05	8.31	0.12	0.75	36.24	0.19	0.66	12.12	0.06
11-May-90	F	1225	2.18	18.85	0.29	0.58	19.13	0.08	1.09	23.04	0.18
23-May-90	W	1250	2.86	5.59	0.11	0.77	2.60	0.01	1.37	8.76	0.08
04-Jun-90	M	1257	1.87	20.91	0.28	0.58	0.00	0.00	0.40	12.66	0.04
16-Jun-90	St	1263	5.16	2.91	0.11	1.12	17.04	0.13	1.18	64.41	0.54
28-Jun-90	Th	1279	0.91	16.57	0.11	0.47	123.40	0.41	0.41	111.11	0.32
10-Jul-90	T	1298	3.46	2.89	0.07	0.41	9.76	0.03	0.18	0.00	0.00
16-Jul-90	M	1301	1.98	7.07	0.10	0.48	14.74	0.05	1.03	15.53	0.11
22-Jul-90	Sn	1313	1.57	13.42	0.15	0.18	0.00	0.00	0.18	0.00	0.00
28-Jul-90	St	1318	5.03	18.11	0.64	1.27	48.82	0.44	2.79	13.29	0.26
03-Aug-90	F	1327	3.61	2.77	0.07	0.50	18.18	0.06	0.18	0.00	0.00
09-Aug-90	Th	1330	4.15	0.96	0.03	1.08	12.09	0.09	2.52	13.92	0.25
15-Aug-90	W	1339	4.35	1.61	0.05	1.18	16.17	0.13	1.55	27.10	0.30
21-Aug-90	T	1349	2.63	2.67	0.05	0.74	20.41	0.11	0.30	77.97	0.16
27-Aug-90	M	1353	1.71	7.62	0.09	0.46	24.18	0.08	0.43	7.06	0.02
02-Sep-90	Sn	1364	2.58	5.83	0.11	0.31	81.97	0.18	0.55	31.19	0.12
08-Sep-90	St	1368	3.60	9.18	0.23	0.89	8.99	0.06	0.81	21.12	0.12
14-Sep-90	F	1381	1.81	13.85	0.18	0.28	71.43	0.14	0.18	0.00	0.00
20-Sep-90	Th	1388	2.62	7.27	0.13	0.73	4.14	0.02	1.46	25.43	0.26
26-Sep-90	W	1402	3.73	2.42	0.06	1.46	2.74	0.03	3.39	3.54	0.08
02-Oct-90	T	1406	1.67	1.20	0.01	0.49	8.16	0.03	0.18	0.00	0.00
08-Oct-90	M	1415	1.71	5.85	0.07	0.51	9.90	0.04	0.49	8.16	0.03
14-Oct-90	Sn	1423	7.67	195.30	10.59	1.46	175.26	1.80	5.37	193.30	7.34
20-Oct-90	St	1431	2.37	0.84	0.01	0.76	6.62	0.04	2.31	0.43	0.01
26-Oct-90	F	1444	1.67	5.99	0.07	0.59	18.80	0.08	1.46	2.74	0.03
01-Nov-90	Th	1448	2.26	3.99	0.06	1.14	3.51	0.03	2.64	5.30	0.10
07-Nov-90	W	1458	2.11	6.18	0.09	0.92	6.52	0.04	1.85	5.41	0.07
14-Nov-90	W	1467	2.22	7.21	0.11	1.29	8.56	0.08	1.88	5.87	0.08
01-Dec-90	St	1495	1.57	0.64	0.01	0.88	9.09	0.06	0.46	4.35	0.01
13-Dec-90	Th	1500	1.49	6.71	0.07	0.85	2.35	0.01	2.55	3.14	0.06
25-Dec-90	T	1517	0.93	11.89	0.08	0.67	7.52	0.04	0.88	12.57	0.08
06-Jan-91	Sn	1527	1.10	0.91	0.01	0.49	6.19	0.02	0.49	8.16	0.03
18-Jan-91	F	1545D	1.23	2.45	0.02	0.73	6.90	0.04	1.34	0.75	0.01
30-Jan-91	W	1564	0.74	39.46	0.21	0.39	0.00	0.00	0.18	0.00	0.00
12-Feb-91	T	1582	2.96	5.75	0.12	1.81	2.77	0.04	2.00	5.00	0.07
23-Feb-91	St	1601D	0.88	0.00	0.00	0.69	1.46	0.01	1.31	0.77	0.01
Average			2.47	12.75	0.36	0.81	20.93	0.12	1.36	19.67	0.29

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-13. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Port Neches (PNTX)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
12-Mar-90	M	1180	4.44	80.95	2.54	4.23	21.75	0.65	1.27	43.48	0.39
24-Mar-90	St	1183D	6.37	115.54	5.20	4.35	20.69	0.64	2.26	27.94	0.45
05-Apr-90	Th	1192	3.48	8.62	0.21	1.84	31.06	0.40	1.58	19.68	0.22
17-Apr-90	T	1201	6.81	70.10	3.37	2.99	6.37	0.13	1.45	13.79	0.14
29-Apr-90	Sn	1212D	4.09	93.76	2.71	0.84	38.10	0.23	-	*	*
11-May-90	F	1224	-	*	*	-	*	*	-	*	*
23-May-90	W	1240	7.49	75.22	3.98	1.93	9.87	0.13	1.39	10.07	0.10
04-Jun-90	M	1256	3.23	2.79	0.06	1.40	5.71	0.06	0.41	19.51	0.06
16-Jun-90	St	1271	4.27	55.74	1.68	2.12	13.21	0.20	0.48	48.42	0.16
28-Jun-90	Th	1281	7.35	49.69	2.58	5.22	21.07	0.78	1.78	1.69	0.02
10-Jul-90	T	1289	3.22	0.93	0.02	1.99	6.55	0.09	-	*	*
22-Jul-90	Sn	1305	2.43	19.38	0.33	0.61	19.67	0.08	-	*	*
03-Aug-90	F	1328	4.66	76.82	2.53	1.71	22.22	0.27	0.41	*	*
15-Aug-90	W	1335	7.86	56.74	3.15	3.34	14.37	0.34	1.49	4.03	0.04
27-Aug-90	M	1351	8.46	8.04	0.48	3.88	14.43	0.40	1.77	15.30	0.19
08-Sep-90	St	1371	4.12	10.68	0.31	1.97	10.69	0.15	0.49	4.08	0.01
20-Sep-90	Th	1392	3.51	15.12	0.37	2.52	1.99	0.04	0.59	1.71	0.01
02-Oct-90	T	1414	2.83	0.71	0.01	1.14	0.00	0.00	0.59	3.39	0.01
14-Oct-90	Sn	1420	5.42	14.76	0.57	3.26	11.66	0.27	1.05	16.27	0.12
26-Oct-90	F	1437	5.67	0.53	0.02	2.16	1.85	0.03	1.93	7.79	0.11
07-Nov-90	W	1454	4.61	22.56	0.74	2.03	17.73	0.25	1.51	*	*
30-Nov-90	F	1469	5.20	12.51	0.46	3.88	17.81	0.49	0.44	*	*
01-Dec-90	St	1482	5.32	9.40	0.35	3.74	7.76	0.21	0.49	*	*
13-Dec-90	Th	1499	3.36	46.43	1.10	1.17	9.44	0.08	-	*	*
25-Dec-90	T	1521	4.72	0.85	0.03	2.12	0.47	0.01	0.83	3.64	0.02
06-Jan-91	Sn	1532	4.00	9.76	0.28	2.48	0.81	0.01	0.45	4.44	0.01
18-Jan-91	F	1543	7.23	2.49	0.13	1.77	4.52	0.06	0.88	2.27	0.01
30-Jan-91	W	1559	2.44	18.48	0.32	0.79	2.53	0.01	0.94	21.28	0.14
11-Feb-91	M	1576	7.28	3.99	0.21	3.56	9.28	0.23	2.86	4.20	0.08
23-Feb-91	St	1592	4.64	9.05	0.30	1.50	10.67	0.11	1.52	3.30	0.04
Average			4.98	30.75	1.17	2.43	12.15	0.22	1.15	13.16	0.11

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

**TABLE B-14. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE,
AND STANDARD DEVIATION FOR CASE 2¹**

Port Neches (PNTX)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc. (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc. (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc. (ppb)	Absolute Percent Diff	Std Dev (ppb)
12-Mar-90	M	1180	4.44	80.95	2.54	4.23	21.75	0.65	1.27	43.48	0.39
24-Mar-90	St	1183D	6.37	115.54	5.20	4.35	20.69	0.64	2.26	27.94	0.45
05-Apr-90	Th	1192	3.48	8.62	0.21	1.84	31.06	0.40	1.58	19.68	0.22
17-Apr-90	T	1201	6.81	70.10	3.37	2.99	6.37	0.13	1.45	13.79	0.14
29-Apr-90	Sn	1212D	4.09	93.76	2.71	0.84	38.10	0.23	0.18	0.00	0.00
11-May-90	F	1224	0.18	0.00	0.00	0.18	0.00	0.00	0.18	0.00	0.00
23-May-90	W	1240	7.49	75.22	3.98	1.93	9.87	0.13	1.39	10.07	0.10
04-Jun-90	M	1256	3.23	2.79	0.06	1.40	5.71	0.06	0.41	19.51	0.06
16-Jun-90	St	1271	4.27	55.74	1.68	2.12	13.21	0.20	0.48	48.42	0.16
28-Jun-90	Th	1281	7.35	49.69	2.58	5.22	21.07	0.78	1.78	1.69	0.02
10-Jul-90	T	1289	3.22	0.93	0.02	1.99	6.55	0.09	0.18	0.00	0.00
22-Jul-90	Sn	1305	2.43	19.38	0.33	0.61	19.67	0.08	0.18	0.00	0.00
03-Aug-90	F	1328	4.66	76.82	2.53	1.71	22.22	0.27	0.30	77.97	0.16
15-Aug-90	W	1335	7.86	56.74	3.15	3.34	14.37	0.34	1.49	4.03	0.04
27-Aug-90	M	1351	8.46	8.04	0.48	3.88	14.43	0.40	1.77	15.30	0.19
08-Sep-90	St	1371	4.12	10.68	0.31	1.97	10.69	0.15	0.49	4.08	0.01
20-Sep-90	Th	1392	3.51	15.12	0.37	2.52	1.99	0.04	0.59	1.71	0.01
02-Oct-90	T	1414	2.83	0.71	0.01	1.14	0.00	0.00	0.59	3.39	0.01
14-Oct-90	Sn	1420	5.42	14.76	0.57	3.26	11.66	0.27	1.05	16.27	0.12
26-Oct-90	F	1437	5.67	0.53	0.02	2.16	1.85	0.03	1.93	7.79	0.11
07-Nov-90	W	1454	4.61	22.56	0.74	2.03	17.73	0.25	0.85	157.40	0.94
30-Nov-90	F	1469	5.20	12.51	0.46	3.88	17.81	0.49	0.31	83.87	0.18
01-Dec-90	St	1482	5.32	9.40	0.35	3.74	7.76	0.21	0.34	92.54	0.22
13-Dec-90	Th	1499	3.36	46.43	1.10	1.17	9.44	0.08	0.18	0.00	0.00
25-Dec-90	T	1521	4.72	0.85	0.03	2.12	0.47	0.01	0.83	3.64	0.02
06-Jan-91	Sn	1532	4.00	9.76	0.28	2.48	0.81	0.01	0.45	4.44	0.01
18-Jan-91	F	1543	7.23	2.49	0.13	1.77	4.52	0.06	0.88	2.27	0.01
30-Jan-91	W	1559	2.44	18.48	0.32	0.79	2.53	0.01	0.94	21.28	0.14
11-Feb-91	M	1576	7.28	3.99	0.21	3.56	9.28	0.23	2.86	4.20	0.08
23-Feb-91	St	1592	4.64	9.05	0.30	1.50	10.67	0.11	1.52	3.30	0.04
Average			4.82	29.72	1.14	2.36	11.74	0.21	0.95	22.93	0.13

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-15. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Sauget, IL (SAIL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
12-Mar-90	M	1165	1.16	12.07	0.10	0.52	5.83	0.02	0.54	35.51	0.13
24-Mar-90	St	1177	1.52	13.16	0.14	1.33	4.51	0.04	1.53	34.75	0.37
05-Apr-90	Th	1195	2.16	22.22	0.34	1.03	0.98	0.01	1.52	0.66	0.01
16-Apr-90	M	1208	1.39	19.49	0.19	0.54	31.78	0.12	1.31	4.58	0.04
11-May-90	F	1226	0.97	7.25	0.05	0.60	33.33	0.14	0.96	15.71	0.11
23-May-90	W	1246	1.97	2.54	0.04	1.06	23.70	0.18	1.36	0.74	0.01
04-Jun-90	M	1262	3.05	14.12	0.30	1.66	3.02	0.04	0.88	2.27	0.01
16-Jun-90	St	1269	3.09	110.03	2.40	1.53	*	*	0.74	*	*
28-Jun-90	Th	1280	1.88	6.38	0.08	-	*	*	0.55	14.55	0.06
10-Jul-90	T	1294	7.23	0.14	0.01	1.89	6.35	0.08	1.12	31.39	0.25
24-Jul-90	T	1315	2.48	2.02	0.04	0.81	3.73	0.02	1.62	28.40	0.33
03-Aug-90	F	1329	1.97	150.13	2.09	0.65	38.76	0.18	1.06	21.80	0.16
14-Aug-90	T	1344	2.81	4.98	0.10	0.77	6.54	0.04	0.97	23.83	0.16
27-Aug-90	M	1354	6.15	0.16	0.01	1.12	11.66	0.09	0.56	30.63	0.12
08-Sep-90	St	1372	3.16	3.49	0.08	1.10	22.83	0.18	0.86	1.17	0.01
25-Sep-90	T	1401	3.45	0.29	0.01	1.07	5.61	0.04	2.91	4.81	0.10
02-Oct-90	T	1404	4.54	5.95	0.19	1.53	7.84	0.08	3.15	3.17	0.07
14-Oct-90	Sn	1419	2.84	16.58	0.33	1.04	11.54	0.00	1.91	0.52	0.01
26-Oct-90	F	1441	2.08	5.77	0.08	1.28	19.61	0.18	1.19	2.53	0.02
07-Nov-90	W	1461D	1.88	0.53	0.01	1.05	2.87	0.02	1.04	2.90	0.02
19-Nov-90	M	1471	3.18	27.04	0.61	1.79	26.82	0.34	1.48	19.66	0.21
01-Dec-90	St	1491D	1.13	2.67	0.02	0.87	36.78	0.23	0.75	4.03	0.02
13-Dec-90	Th	1501	1.48	8.11	0.08	0.98	3.08	0.02	0.71	8.45	0.04
27-Dec-90	Th	1523	1.83	8.22	0.11	1.31	7.63	0.07	0.93	9.73	0.06
06-Jan-91	Sn	1535	1.71	3.51	0.04	1.24	2.43	0.02	0.92	2.17	0.01
18-Jan-91	F	1552D	1.88	1.06	0.01	0.91	2.20	0.01	1.11	4.52	0.04
30-Jan-91	W	1565	1.76	7.95	0.10	1.02	0.00	0.00	1.07	3.74	0.03
12-Feb-91	T	1581	1.72	1.16	0.01	0.88	3.43	0.02	0.83	6.06	0.04
23-Feb-91	St	1604D	1.94	6.68	0.09	0.95	0.00	0.00	1.10	0.00	0.00
Average			2.51	16.32	0.27	1.09	11.96	0.08	1.19	11.37	0.09

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-16. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Sauget, IL (SAIL)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
12-Mar-90	M	1165	1.16	12.07	0.10	0.52	5.83	0.02	0.54	35.51	0.13
24-Mar-90	St	1177	1.52	13.16	0.14	1.33	4.51	0.04	1.53	34.75	0.37
05-Apr-90	Th	1195	2.16	22.22	0.34	1.03	0.98	0.01	1.52	0.66	0.01
16-Apr-90	M	1208	1.39	19.49	0.19	0.54	31.78	0.12	1.31	4.58	0.04
11-May-90	F	1226	0.97	7.25	0.05	0.60	33.33	0.14	0.96	15.71	0.11
23-May-90	W	1246	1.97	2.54	0.04	1.06	23.70	0.18	1.36	0.74	0.01
04-Jun-90	M	1262	3.05	14.12	0.30	1.66	3.02	0.04	0.88	2.27	0.01
16-Jun-90	St	1269	3.09	110.03	2.40	0.86	157.89	0.95	0.46	121.74	0.40
28-Jun-90	Th	1280	1.88	6.38	0.08	0.18	0.00	0.00	0.55	14.55	0.06
10-Jul-90	T	1294	7.23	0.14	0.01	1.89	6.35	0.08	1.12	31.39	0.25
24-Jul-90	T	1315	2.48	2.02	0.04	0.81	3.73	0.02	1.62	28.40	0.33
03-Aug-90	F	1329	1.97	150.13	2.09	0.65	38.76	0.18	1.06	21.80	0.16
14-Aug-90	T	1344	2.81	4.98	0.10	0.77	6.54	0.04	0.97	23.83	0.16
27-Aug-90	M	1354	6.15	0.16	0.01	1.12	11.66	0.09	0.56	30.63	0.12
08-Sep-90	St	1372	3.16	3.49	0.08	1.10	22.83	0.18	0.86	1.17	0.01
25-Sep-90	T	1401	3.45	0.29	0.01	1.07	5.61	0.04	2.91	4.81	0.10
02-Oct-90	T	1404	4.54	5.95	0.19	1.53	7.84	0.08	3.15	3.17	0.07
14-Oct-90	Sn	1419	2.84	16.58	0.33	1.04	11.54	0.00	1.91	0.52	0.01
26-Oct-90	F	1441	2.08	5.77	0.08	1.28	19.61	0.18	1.19	2.53	0.02
07-Nov-90	W	1461D	1.88	0.53	0.01	1.05	2.87	0.02	1.04	2.90	0.02
19-Nov-90	M	1471	3.18	27.04	0.61	1.79	26.82	0.34	1.48	19.66	0.21
01-Dec-90	St	1491D	1.13	2.67	0.02	0.87	36.78	0.23	0.75	4.03	0.02
13-Dec-90	Th	1501	1.48	8.11	0.08	0.98	3.08	0.02	0.71	8.45	0.04
27-Dec-90	Th	1523	1.83	8.22	0.11	1.31	7.63	0.07	0.93	9.73	0.06
06-Jan-91	Sn	1535	1.71	3.51	0.04	1.24	2.43	0.02	0.92	2.17	0.01
18-Jan-91	F	1552D	1.88	1.06	0.01	0.91	2.20	0.01	1.11	4.52	0.04
30-Jan-91	W	1565	1.76	7.95	0.10	1.02	0.00	0.00	1.07	3.74	0.03
12-Feb-91	T	1581	1.72	1.16	0.01	0.88	3.43	0.02	0.83	6.06	0.04
23-Feb-91	St	1604D	1.94	6.68	0.09	0.95	0.00	0.00	1.10	0.00	0.00
Average			2.49	15.99	0.26	1.03	16.58	0.11	1.18	15.17	0.10

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-17. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Toledo, OH (TLOH)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
05-Apr-90	Th	1193	1.88	13.83	0.18	0.70	57.14	0.28	1.45	2.76	0.03
16-Apr-90	M	1205D	1.43	28.77	0.29	1.01	26.87	0.19	1.21	2.49	0.02
29-Apr-90	Sn	1214	1.53	5.90	0.06	0.75	33.56	0.18	1.43	17.54	0.18
11-May-90	F	1223	1.22	1.64	0.01	-	*	*	0.83	15.76	0.09
23-May-90	W	1243	1.73	16.81	0.21	1.05	1.90	0.01	2.04	21.57	0.31
04-Jun-90	M	1253	0.79	10.13	0.06	-	*	*	0.55	10.91	0.04
16-Jun-90	St	1264	3.17	66.03	1.48	1.23	75.92	0.66	1.04	68.60	0.50
28-Jun-90	Th	1278	2.02	3.47	0.05	-	*	*	0.69	5.80	0.03
10-Jul-90	T	1293	3.46	0.29	0.01	0.76	73.68	0.40	2.08	16.87	0.25
22-Jul-90	Sn	1306	1.56	5.13	0.06	-	*	*	1.34	16.42	0.16
03-Aug-90	F	1326	4.19	12.89	0.38	2.65	10.57	0.20	3.16	14.90	0.33
15-Aug-90	W	1345	4.90	0.41	0.01	1.39	5.05	0.05	3.73	14.23	0.37
27-Aug-90	M	1355	5.43	3.50	0.13	1.57	33.12	0.37	0.76	10.53	0.06
08-Sep-90	St	1367	2.36	18.64	0.31	1.16	74.14	0.61	1.39	5.76	0.06
20-Sep-90	Th	1387	1.35	23.70	0.23	0.55	*	*	1.52	8.58	0.09
02-Oct-90	T	1410	2.67	2.25	0.04	1.36	4.41	0.04	2.22	4.97	0.08
14-Oct-90	Sn	1425	2.06	6.80	0.10	-	*	*	2.14	0.47	0.01
26-Oct-90	F	1440	1.89	17.99	0.24	0.68	*	*	1.35	2.96	0.03
07-Nov-90	W	1455	1.60	6.90	0.08	0.81	2.47	0.01	1.16	7.79	0.06
19-Nov-90	M	1478D	3.45	2.03	0.05	2.36	15.71	0.26	1.54	1.95	0.02
01-Dec-90	St	1486	2.05	10.73	0.16	1.07	10.33	0.08	1.29	9.30	0.08
13-Dec-90	Th	1507	2.04	6.39	0.09	0.59	*	*	1.00	9.05	0.06
Average			2.40	12.01	0.19	1.16	30.35	0.24	1.54	12.24	0.13

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-18. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Toledo, OH (TLOH)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
05-Apr-90	Th	1193	1.88	13.83	0.18	0.70	57.14	0.28	1.45	2.76	0.03
16-Apr-90	M	1205D	1.43	28.77	0.29	1.01	26.87	0.19	1.21	2.49	0.02
29-Apr-90	Sn	1214	1.53	5.90	0.06	0.75	33.56	0.18	1.43	17.54	0.18
11-May-90	F	1223	1.22	1.64	0.01	0.18	0.00	0.00	0.83	15.76	0.09
23-May-90	W	1243	1.73	16.81	0.21	1.05	1.90	0.01	2.04	21.57	0.31
04-Jun-90	M	1253	0.79	10.13	0.06	0.18	0.00	0.00	0.55	10.91	0.04
16-Jun-90	St	1264	3.17	66.03	1.48	1.23	75.92	0.66	1.04	68.60	0.50
28-Jun-90	Th	1278	2.02	3.47	0.05	0.18	0.00	0.00	0.69	5.80	0.03
10-Jul-90	T	1293	3.46	0.29	0.01	0.76	73.68	0.40	2.08	16.87	0.25
22-Jul-90	Sn	1306	1.56	5.13	0.06	0.18	0.00	0.00	1.34	16.42	0.16
03-Aug-90	F	1326	4.19	12.89	0.38	2.65	10.57	0.20	3.16	14.90	0.33
15-Aug-90	W	1345	4.90	0.41	0.01	1.39	5.05	0.05	3.73	14.23	0.37
27-Aug-90	M	1355	5.43	3.50	0.13	1.57	33.12	0.37	0.76	10.53	0.06
08-Sep-90	St	1367	2.36	18.64	0.31	1.16	74.14	0.61	1.39	5.76	0.06
20-Sep-90	Th	1387	1.35	23.70	0.23	0.37	101.37	0.26	1.52	8.58	0.09
02-Oct-90	T	1410	2.67	2.25	0.04	1.36	4.41	0.04	2.22	4.97	0.08
14-Oct-90	Sn	1425	2.06	6.80	0.10	0.18	0.00	0.00	2.14	0.47	0.01
26-Oct-90	F	1440	1.89	17.99	0.24	0.43	116.28	0.00	1.35	2.96	0.03
07-Nov-90	W	1455	1.60	6.90	0.08	0.81	2.47	0.01	1.16	7.79	0.06
19-Nov-90	M	1478D	3.45	2.03	0.05	2.36	15.71	0.26	1.54	1.95	0.02
01-Dec-90	St	1486	2.05	10.73	0.16	1.07	10.33	0.08	1.29	9.30	0.08
13-Dec-90	Th	1507	2.04	6.39	0.09	0.39	106.49	0.29	1.00	9.05	0.06
Average			2.40	12.01	0.19	0.91	34.05	0.18	1.54	12.24	0.13

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-19. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Washington, DC (W1DC)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
12-Mar-90	M	1171	3.85	46.55	1.27	1.37	59.85	0.58	2.89	13.84	0.28
24-Mar-90	St	1179	2.34	61.24	1.01	1.73	41.62	0.51	1.49	45.64	0.48
05-Apr-90	Th	1188	3.75	53.67	1.42	1.54	31.92	0.35	1.53	48.37	0.52
17-Apr-90	T	1203D	3.62	4.42	0.11	0.67	46.62	0.22	2.26	11.09	0.18
29-Apr-90	Sn	1220	3.61	14.15	0.36	1.38	3.64	0.04	1.59	13.84	0.16
11-May-90	F	1233	1.90	70.18	0.94	0.69	62.77	0.30	1.01	55.45	0.40
23-May-90	W	1249	2.84	32.10	0.64	0.93	43.85	0.29	1.12	17.86	0.14
04-Jun-90	M	1258	2.11	30.88	0.46	0.66	29.01	0.13	0.98	42.86	0.30
16-Jun-90	St	1265	9.49	5.48	0.37	3.57	15.13	0.38	2.90	34.48	0.71
28-Jun-90	Th	1284	9.88	6.28	0.44	2.77	5.42	0.11	2.68	28.04	0.53
10-Jul-90	T	1295	9.38	11.30	0.75	2.40	1.25	0.02	1.97	30.89	0.43
22-Jul-90	Sn	1309	8.10	2.84	0.16	1.83	15.30	0.20	1.86	9.68	0.13
03-Aug-90	F	1322	8.36	2.63	0.16	3.04	5.26	0.11	3.59	57.94	1.47
15-Aug-90	W	1340	8.61	7.09	0.43	2.70	11.50	0.22	2.90	15.54	0.32
27-Aug-90	M	1360	7.55	30.09	1.61	2.25	8.46	0.13	2.53	17.39	0.31
08-Sep-90	St	1379	3.89	6.44	0.18	1.05	10.53	0.08	1.34	13.43	0.13
20-Sep-90	Th	1385	3.69	2.71	0.07	1.21	33.06	0.28	2.30	6.54	0.11
02-Oct-90	T	1411	4.13	5.33	0.16	1.34	1.49	0.00	2.00	1.00	0.01
14-Oct-90	Sn	1430	3.85	2.34	0.06	1.35	8.18	0.08	1.12	13.45	0.11
26-Oct-90	F	1442	2.72	7.00	0.13	1.23	8.98	0.08	1.29	5.45	0.05
07-Nov-90	W	1457	3.70	5.95	0.16	1.59	4.42	0.05	1.60	12.50	0.14
19-Nov-90	M	1480D	4.40	1.82	0.06	1.64	3.06	0.04	1.25	20.80	0.18
01-Dec-90	St	1485	7.48	0.13	0.01	2.62	0.00	0.00	1.89	14.32	0.19
13-Dec-90	Th	1503	4.43	4.29	0.13	1.94	1.55	0.02	1.35	65.19	0.62
25-Dec-90	T	1520	3.96	5.82	0.16	1.76	3.99	0.05	1.06	11.32	0.08
06-Jan-91	Sn	1528	3.71	0.00	0.00	2.06	1.46	0.02	1.68	13.73	0.16
18-Jan-91	F	1550	2.11	0.48	0.01	1.02	5.88	0.04	0.81	9.88	0.06
30-Jan-91	W	1566	5.47	3.48	0.13	2.07	0.97	0.01	1.75	12.03	0.15
11-Feb-91	M	1588D	3.07	5.86	0.13	1.15	6.11	0.05	0.80	13.84	0.08
23-Feb-91	St	1595	3.82	4.19	0.11	1.52	2.63	0.03	1.15	2.62	0.02
Average			4.86	14.49	0.39	1.70	15.80	0.15	1.75	21.97	0.28

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-20. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Washington, DC (W1DC)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
12-Mar-90	M	1171	3.85	46.55	1.27	1.37	59.85	0.58	2.89	13.84	0.28
24-Mar-90	St	1179	2.34	61.24	1.01	1.73	41.62	0.51	1.49	45.64	0.48
05-Apr-90	Th	1188	3.75	53.67	1.42	1.54	31.92	0.35	1.53	48.37	0.52
17-Apr-90	T	1203D	3.62	4.42	0.11	0.67	46.62	0.22	2.26	11.09	0.18
29-Apr-90	Sn	1220	3.61	14.15	0.36	1.38	3.64	0.04	1.59	13.84	0.16
11-May-90	F	1233	1.90	70.18	0.94	0.69	62.77	0.30	1.01	55.45	0.40
23-May-90	W	1249	2.84	32.10	0.64	0.93	43.85	0.29	1.12	17.86	0.14
04-Jun-90	M	1258	2.11	30.88	0.46	0.66	29.01	0.13	0.98	42.86	0.30
16-Jun-90	St	1265	9.49	5.48	0.37	3.57	15.13	0.38	2.90	34.48	0.71
28-Jun-90	Th	1284	9.88	6.28	0.44	2.77	5.42	0.11	2.68	28.04	0.53
10-Jul-90	T	1295	9.38	11.30	0.75	2.40	1.25	0.02	1.97	30.89	0.43
22-Jul-90	Sn	1309	8.10	2.84	0.16	1.83	15.30	0.20	1.86	9.68	0.13
03-Aug-90	F	1322	8.36	2.63	0.16	3.04	5.26	0.11	3.59	57.94	1.47
15-Aug-90	W	1340	8.61	7.09	0.43	2.70	11.50	0.22	2.90	15.54	0.32
27-Aug-90	M	1360	7.55	30.09	1.61	2.25	8.46	0.13	2.53	17.39	0.31
08-Sep-90	St	1379	3.89	6.44	0.18	1.05	10.53	0.08	1.34	13.43	0.13
20-Sep-90	Th	1385	3.69	2.71	0.07	1.21	33.06	0.28	2.30	6.54	0.11
02-Oct-90	T	1411	4.13	5.33	0.16	1.34	1.49	0.00	2.00	1.00	0.01
14-Oct-90	Sn	1430	3.85	2.34	0.06	1.35	8.18	0.08	1.12	13.45	0.11
26-Oct-90	F	1442	2.72	7.00	0.13	1.23	8.98	0.08	1.29	5.45	0.05
07-Nov-90	W	1457	3.70	5.95	0.16	1.59	4.42	0.05	1.60	12.50	0.14
19-Nov-90	M	1480D	4.40	1.82	0.06	1.64	3.06	0.04	1.25	20.80	0.18
01-Dec-90	St	1485	7.48	0.13	0.01	2.62	0.00	0.00	1.89	14.32	0.19
13-Dec-90	Th	1503	4.43	4.29	0.13	1.94	1.55	0.02	1.35	65.19	0.62
25-Dec-90	T	1520	3.96	5.82	0.16	1.76	3.99	0.05	1.06	11.32	0.08
06-Jan-91	Sn	1528	3.71	0.00	0.00	2.06	1.46	0.02	1.68	13.73	0.16
18-Jan-91	F	1550	2.11	0.48	0.01	1.02	5.88	0.04	0.81	9.88	0.06
30-Jan-91	W	1566	5.47	3.48	0.13	2.07	0.97	0.01	1.75	12.03	0.15
11-Feb-91	M	1588D	3.07	5.86	0.13	1.15	6.11	0.05	0.80	13.84	0.08
23-Feb-91	St	1595	3.82	4.19	0.11	1.52	2.63	0.03	1.15	2.62	0.02
Average			4.86	14.49	0.39	1.70	15.80	0.15	1.75	21.97	0.28

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-21. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Wichita, KS (W1KS)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
13-Mar-90	T	1173	1.38	1.45	0.01	0.40	*	*	0.96	54.17	0.37
25-Mar-90	Sn	1176	3.96	4.80	0.13	2.48	1.21	0.02	2.04	45.70	0.66
05-Apr-90	Th	1198D	2.18	7.34	0.11	1.58	0.63	0.01	1.49	6.06	0.06
17-Apr-90	T	1209	3.75	11.48	0.30	0.85	61.18	0.37	1.47	9.52	0.10
29-Apr-90	Sn	1218	4.16	10.58	0.31	2.04	6.86	0.10	1.97	4.06	0.06
11-May-90	F	1227	2.45	1.63	0.03	0.69	18.98	0.09	1.50	6.02	0.06
23-May-90	W	1248	3.72	4.04	0.11	1.42	16.90	0.17	1.57	7.03	0.08
04-Jun-90	M	1254	3.22	0.62	0.01	1.29	24.81	0.23	1.44	44.44	0.45
16-Jun-90	St	1272	6.37	7.22	0.33	1.92	10.42	0.14	0.75	55.03	0.29
28-Jun-90	Th	1287	7.28	0.14	0.01	2.14	7.96	0.12	2.16	55.56	0.85
10-Jul-90	T	1296	7.90	1.01	0.06	2.95	13.92	0.29	2.51	2.39	0.04
22-Jul-90	Sn	1311	2.79	6.45	0.13	0.97	6.19	0.04	1.57	19.11	0.21
03-Aug-90	F	1333	5.03	21.07	0.75	2.36	33.90	0.57	0.78	11.61	0.06
15-Aug-90	W	1342	4.58	10.48	0.34	1.68	5.95	0.07	1.31	*	*
27-Aug-90	M	1362	8.95	11.62	0.74	2.20	8.66	0.13	2.23	9.44	0.15
08-Sep-90	St	1370	6.78	0.74	0.04	2.65	7.18	0.13	4.01	1.75	0.05
20-Sep-90	Th	1395	4.58	4.80	0.16	1.97	5.60	0.08	1.93	5.18	0.07
02-Oct-90	T	1412	4.91	0.81	0.03	1.58	2.53	0.00	3.72	4.58	0.12
14-Oct-90	Sn	1428	4.78	3.14	0.11	2.26	11.50	0.18	2.73	2.20	0.04
26-Oct-90	F	1439	6.08	0.82	0.04	2.11	8.53	0.13	3.83	1.31	0.04
07-Nov-90	W	1459D	2.63	2.67	0.05	1.30	2.32	0.02	1.41	10.68	0.11
19-Nov-90	M	1468	4.13	4.61	0.13	2.18	5.50	0.08	1.75	1.14	0.01
01-Dec-90	St	1487	3.42	5.26	0.13	1.71	9.97	0.12	1.47	1.36	0.01
13-Dec-90	Th	1511	2.56	3.91	0.07	1.12	16.07	0.13	0.86	0.00	0.00
25-Dec-90	T	1515D	5.41	0.56	0.02	2.64	4.93	0.09	1.43	3.51	0.04
06-Jan-91	Sn	1536	3.46	0.87	0.02	1.48	1.35	0.01	1.16	7.79	0.06
18-Jan-91	F	1549	7.39	0.68	0.04	3.53	3.40	0.08	3.15	1.90	0.04
30-Jan-91	W	1560D	5.94	3.03	0.13	2.11	10.43	0.16	1.31	2.30	0.02
11-Feb-91	M	1578	7.43	1.35	0.07	2.68	0.37	0.01	3.52	0.57	0.01
23-Feb-91	St	1603	4.60	3.91	0.13	1.54	7.79	0.08	1.67	4.20	0.05
Average			4.73	4.57	0.15	1.86	10.86	0.13	1.92	13.06	0.14

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-22. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Wichita, KS (W1KS)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
13-Mar-90	T	1173	1.38	1.45	0.01	0.29	75.86	0.16	0.96	54.17	0.37
25-Mar-90	Sn	1176	3.96	4.80	0.13	2.48	1.21	0.02	2.04	45.70	0.66
05-Apr-90	Th	1198D	2.18	7.34	0.11	1.58	0.63	0.01	1.49	6.06	0.06
17-Apr-90	T	1209	3.75	11.48	0.30	0.85	61.18	0.37	1.47	9.52	0.10
29-Apr-90	Sn	1218	4.16	10.58	0.31	2.04	6.86	0.10	1.97	4.06	0.06
11-May-90	F	1227	2.45	1.63	0.03	0.69	18.98	0.09	1.50	6.02	0.06
23-May-90	W	1248	3.72	4.04	0.11	1.42	16.90	0.17	1.57	7.03	0.08
04-Jun-90	M	1254	3.22	0.62	0.01	1.29	24.81	0.23	1.44	44.44	0.45
16-Jun-90	St	1272	6.37	7.22	0.33	1.92	10.42	0.14	0.75	55.03	0.29
28-Jun-90	Th	1287	7.28	0.14	0.01	2.14	7.96	0.12	2.16	55.56	0.85
10-Jul-90	T	1296	7.90	1.01	0.06	2.95	13.92	0.29	2.51	2.39	0.04
22-Jul-90	Sn	1311	2.79	6.45	0.13	0.97	6.19	0.04	1.57	19.11	0.21
03-Aug-90	F	1333	5.03	21.07	0.75	2.36	33.90	0.57	0.78	11.61	0.06
15-Aug-90	W	1342	4.58	10.48	0.34	1.68	5.95	0.07	0.75	151.68	0.80
27-Aug-90	M	1362	8.95	11.62	0.74	2.20	8.66	0.13	2.23	9.44	0.15
08-Sep-90	St	1370	6.78	0.74	0.04	2.65	7.18	0.13	4.01	1.75	0.05
20-Sep-90	Th	1395	4.58	4.80	0.16	1.97	5.60	0.08	1.93	5.18	0.07
02-Oct-90	T	1412	4.91	0.81	0.03	1.58	2.53	0.00	3.72	4.58	0.12
14-Oct-90	Sn	1428	4.78	3.14	0.11	2.26	11.50	0.18	2.73	2.20	0.04
26-Oct-90	F	1439	6.08	0.82	0.04	2.11	8.53	0.13	3.83	1.31	0.04
07-Nov-90	W	1459D	2.63	2.67	0.05	1.30	2.32	0.02	1.41	10.68	0.11
19-Nov-90	M	1468	4.13	4.61	0.13	2.18	5.50	0.08	1.75	1.14	0.01
01-Dec-90	St	1487	3.42	5.26	0.13	1.71	9.97	0.12	1.47	1.36	0.01
13-Dec-90	Th	1511	2.56	3.91	0.07	1.12	16.07	0.13	0.86	0.00	0.00
25-Dec-90	T	1515D	5.41	0.56	0.02	2.64	4.93	0.09	1.43	3.51	0.04
06-Jan-91	Sn	1536	3.46	0.87	0.02	1.48	1.35	0.01	1.16	7.79	0.06
18-Jan-91	F	1549	7.39	0.68	0.04	3.53	3.40	0.08	3.15	1.90	0.04
30-Jan-91	W	1560D	5.94	3.03	0.13	2.11	10.43	0.16	1.31	2.30	0.02
11-Feb-91	M	1578	7.43	1.35	0.07	2.68	0.37	0.01	3.52	0.57	0.01
23-Feb-91	St	1603	4.60	3.91	0.13	1.54	7.79	0.08	1.67	4.20	0.05
Average			4.73	4.57	0.15	1.86	13.03	0.13	1.90	17.68	0.16

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

TABLE B-23. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 1¹

Washington, DC (W2DC)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)	Mean ² Conc (ppb)	Absolute ³ Percent Diff	Std ³ Dev (ppb)
12-Mar-90	M	1172	10.04	69.46	4.93	4.89	67.76	2.34	5.24	62.08	2.30
24-Mar-90	St	1181	5.22	68.84	2.54	2.50	84.57	1.49	1.84	99.73	1.29
05-Apr-90	Th	1191	6.13	29.88	1.29	2.29	18.82	0.30	2.12	32.62	0.49
17-Apr-90	T	1199	6.28	45.54	2.02	2.39	78.41	1.32	2.90	60.45	1.24
29-Apr-90	Sn	1217D	4.44	5.19	0.16	1.79	8.40	0.11	2.21	41.63	0.65
11-May-90	F	1234	3.45	41.16	1.00	1.04	62.80	0.46	1.31	60.54	0.56
23-May-90	W	1247	4.76	37.39	1.26	1.38	26.09	0.25	1.58	6.33	0.07
04-Jun-90	M	1259	2.95	48.14	1.00	1.38	38.55	0.37	1.10	34.55	0.27
16-Jun-90	St	1266	10.36	3.28	0.24	4.46	22.42	0.71	3.78	8.74	0.23
28-Jun-90	Th	1283	13.32	1.73	0.16	3.82	6.03	0.16	4.51	24.64	0.78
10-Jul-90	T	1292	11.14	14.46	1.14	3.60	13.63	0.35	2.27	23.79	0.38
22-Jul-90	Sn	1312	8.62	9.40	0.57	2.30	5.66	0.09	2.07	9.20	0.13
03-Aug-90	F	1325	12.28	10.02	0.87	4.00	0.50	0.01	4.99	29.26	1.03
15-Aug-90	W	1336	10.77	18.57	1.41	3.23	0.00	0.00	3.28	24.73	0.57
27-Aug-90	M	1356	8.77	14.26	0.88	2.70	1.11	0.02	2.61	1.92	0.04
08-Sep-90	St	1378	5.56	0.90	0.04	1.76	5.13	0.06	1.86	3.23	0.04
20-Sep-90	Th	1389	6.24	3.05	0.13	2.46	4.48	0.08	2.90	8.28	0.17
02-Oct-90	T	1408	7.59	3.82	0.21	2.03	6.90	0.00	2.72	3.68	0.07
14-Oct-90	Sn	1429	5.70	11.93	0.48	2.62	21.80	0.40	1.36	20.59	0.20
26-Oct-90	F	1443	7.86	12.60	0.70	1.53	3.28	0.04	1.30	11.58	0.11
07-Nov-90	W	1456	8.99	6.57	0.42	1.99	3.51	0.05	3.38	9.19	0.22
19-Nov-90	M	1473	10.43	2.68	0.20	2.76	8.70	0.17	1.98	19.75	0.28
01-Dec-90	St	1489D	9.40	1.49	0.10	3.10	3.55	0.08	2.59	1.16	0.02
13-Dec-90	Th	1506	9.88	16.10	1.12	2.50	10.02	0.18	2.07	19.85	0.29
25-Dec-90	T	1518	9.63	3.12	0.21	1.80	1.67	0.02	1.01	18.91	0.13
06-Jan-91	Sn	1529D	6.23	4.98	0.00	2.56	12.50	0.23	1.71	0.00	0.00
18-Jan-91	F	1551	9.37	2.03	0.13	1.69	2.37	0.03	1.30	19.31	0.18
30-Jan-91	W	1568D	10.09	1.88	0.13	2.82	5.67	0.11	4.03	28.57	0.81
11-Feb-91	M	1583	4.64	7.76	0.25	1.50	3.34	0.04	1.08	13.95	0.11
23-Feb-91	St	1599D	7.53	1.06	0.06	1.44	1.39	0.01	0.92	4.35	0.03
Average			7.92	16.58	0.79	2.47	17.64	0.32	2.40	23.42	0.42

¹ In Case 1, mean concentrations are calculated using detected tube concentrations only.

² "-" indicates concentration below analytical detection limit (ADL).

³ "*" indicates insufficient data to perform calculation.

TABLE B-24. SUMMARY OF MEAN CONCENTRATION, ABSOLUTE PERCENT DIFFERENCE, AND STANDARD DEVIATION FOR CASE 2¹

Washington, DC (W2DC)

Sample Date	Week Day	ID Number	Formaldehyde			Acetaldehyde			Acetone		
			Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)	Mean Conc (ppb)	Absolute Percent Diff	Std Dev (ppb)
12-Mar-90	M	1172	10.04	69.46	4.93	4.89	67.76	2.34	5.24	62.08	2.30
24-Mar-90	St	1181	5.22	68.84	2.54	2.50	84.57	1.49	1.84	99.73	1.29
05-Apr-90	Th	1191	6.13	29.88	1.29	2.29	18.82	0.30	2.12	32.62	0.49
17-Apr-90	T	1199	6.28	45.54	2.02	2.39	78.41	1.32	2.90	60.45	1.24
29-Apr-90	Sn	1217D	4.44	5.19	0.16	1.79	8.40	0.11	2.21	41.63	0.65
11-May-90	F	1234	3.45	41.16	1.00	1.04	62.80	0.46	1.31	60.54	0.56
23-May-90	W	1247	4.76	37.39	1.26	1.38	26.09	0.25	1.58	6.33	0.07
04-Jun-90	M	1259	2.95	48.14	1.00	1.38	38.55	0.37	1.10	34.55	0.27
16-Jun-90	St	1266	10.36	3.28	0.24	4.46	22.42	0.71	3.78	8.74	0.23
28-Jun-90	Th	1283	13.32	1.73	0.16	3.82	6.03	0.16	4.51	24.64	0.78
10-Jul-90	T	1292	11.14	14.46	1.14	3.60	13.63	0.35	2.27	23.79	0.38
22-Jul-90	Sn	1312	8.62	9.40	0.57	2.30	5.66	0.09	2.07	9.20	0.13
03-Aug-90	F	1325	12.28	10.02	0.87	4.00	0.50	0.01	4.99	29.26	1.03
15-Aug-90	W	1336	10.77	18.57	1.41	3.23	0.00	0.00	3.28	24.73	0.57
27-Aug-90	M	1356	8.77	14.26	0.88	2.70	1.11	0.02	2.61	1.92	0.04
08-Sep-90	St	1378	5.56	0.90	0.04	1.76	5.13	0.06	1.86	3.23	0.04
20-Sep-90	Th	1389	6.24	3.05	0.13	2.46	4.48	0.08	2.90	8.28	0.17
02-Oct-90	T	1408	7.59	3.82	0.21	2.03	6.90	0.00	2.72	3.68	0.07
14-Oct-90	Sn	1429	5.70	11.93	0.48	2.62	21.80	0.40	1.36	20.59	0.20
26-Oct-90	F	1443	7.86	12.60	0.70	1.53	3.28	0.04	1.30	11.58	0.11
07-Nov-90	W	1456	8.99	6.57	0.42	1.99	3.51	0.05	3.38	9.19	0.22
19-Nov-90	M	1473	10.43	2.68	0.20	2.76	8.70	0.17	1.98	19.75	0.28
01-Dec-90	St	1489D	9.40	1.49	0.10	3.10	3.55	0.08	2.59	1.16	0.02
13-Dec-90	Th	1506	9.88	16.10	1.12	2.50	10.02	0.18	2.07	19.85	0.29
25-Dec-90	T	1518	9.63	3.12	0.21	1.80	1.67	0.02	1.01	18.91	0.13
06-Jan-91	Sn	1529D	6.23	4.98	0.00	2.56	12.50	0.23	1.71	0.00	0.00
18-Jan-91	F	1551	9.37	2.03	0.13	1.69	2.37	0.03	1.30	19.31	0.18
30-Jan-91	W	1568D	10.09	1.88	0.13	2.82	5.67	0.11	4.03	28.57	0.81
11-Feb-91	M	1583	4.64	7.76	0.25	1.50	3.34	0.04	1.08	13.95	0.11
23-Feb-91	St	1599D	7.53	1.06	0.06	1.44	1.39	0.01	0.92	4.35	0.03
Average			7.92	16.58	0.79	2.47	17.64	0.32	2.40	23.42	0.42

¹ In Case 2, mean concentrations are calculated using half the analytical detection limit (ADL) for tube concentrations below ADL.

Appendix C - Analytical Data Listing

TABLE C-1. SUMMARY OF CONCENTRATION AND PURITY FOR BRLA

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
10-Jul-90	T	1297	51	4.96	5.56	0.980	0.998	0.99	1.07	0.993	0.995	-999	-999	0.814	0.783
16-Jul-90	M	1303	55	4.41	4.27	0.999	0.998	2.38	1.77	0.996	0.992	-999	-999	0.741	0.795
22-Jul-90	Sn	1304	55	3.19	1.81	0.988	0.978	-999	-999	0.000	0.765	-999	-999	0.000	0.721
28-Jul-90	St	1317	55	6.31	7.17	0.999	0.999	-999	-999	0.859	0.906	-999	-999	0.000	0.000
03-Aug-90	F	1321	55	3.92	4.73	0.997	0.998	-999	-999	0.773	0.742	-999	-999	0.000	0.000
09-Aug-90	Th	1331	55	6.06	6.19	0.998	0.997	2.11	2.45	0.987	0.990	3.48	3.28	0.975	0.989
15-Aug-90	W	1338	55	6.58	6.59	0.999	0.998	2.24	2.35	0.977	0.978	-999	-999	0.856	0.909
21-Aug-90	T	1347	55	6.01	7.65	0.998	0.995	-999	1.18	0.975	0.958	-999	-999	0.732	0.000
27-Aug-90	M	1358	55	3.99	3.21	1.000	0.999	-999	-999	0.796	0.647	-999	-999	0.000	0.000
02-Sep-90	Sn	1365	55	2.73	2.50	0.976	0.996	-999	-999	0.667	0.974	-999	-999	0.000	0.000
08-Sep-90	St	1380	55	3.18	2.29	0.997	0.999	-999	-999	0.795	0.000	-999	-999	0.000	0.000
14-Sep-90	F	1382	55	3.87	3.57	0.983	0.992	-999	-999	0.981	0.959	-999	-999	0.478	0.807
20-Sep-90	Th	1394	55	5.29	5.20	1.000	1.000	1.29	1.50	0.993	0.991	-999	-999	0.667	0.000
26-Sep-90	W	1396	55	11.02	10.93	1.000	1.000	7.32	7.16	0.992	0.992	7.05	7.34	0.982	0.984
02-Oct-90	T	1409	55	5.37	5.49	1.000	1.000	2.19	2.25	0.992	0.992	0.76	0.88	0.978	0.945
08-Oct-90	M	1417	55	3.82	3.85	1.000	1.000	1.39	1.47	0.992	0.991	-999	-999	0.801	0.910
14-Oct-90	Sn	1427	51	6.53	6.55	1.000	1.000	3.91	3.93	0.993	0.993	3.45	3.46	0.980	0.979
20-Oct-90	St	1433D	55	5.84	5.42	1.000	1.000	3.32	3.08	0.992	0.991	4.54	4.15	0.974	0.973
26-Oct-90	F	1445	51	4.89	4.91	0.999	0.999	3.86	3.53	0.992	0.992	2.70	2.67	0.965	0.981
01-Nov-90	Th	1447	55	6.13	6.18	1.000	1.000	3.54	3.54	0.990	0.992	4.73	5.02	0.678	0.980
07-Nov-90	W	1453	56	6.45	6.57	1.000	1.000	3.22	3.14	0.992	0.992	3.43	3.47	0.980	0.978
19-Nov-90	M	1476D	49	6.64	6.93	1.000	1.000	3.47	4.45	0.992	0.993	3.18	2.72	0.980	0.976
01-Dec-90	St	1493	49	4.33	4.14	0.999	0.999	1.61	1.05	0.991	0.992	0.86	1.24	0.938	0.971
13-Dec-90	Th	1497D	49	3.60	3.84	0.999	0.998	-999	-999	0.991	0.990	-999	-999	0.983	0.980
25-Dec-90	T	1512	60	6.13	6.07	1.000	1.000	2.19	2.32	0.991	0.993	1.41	1.30	0.984	0.971
06-Jan-91	Sn	1534	60	2.00	2.36	0.998	1.000	1.00	1.29	0.992	0.992	1.18	1.30	0.980	0.968
18-Jan-91	F	1556	60	2.82	2.78	1.000	0.999	1.23	1.37	0.991	0.992	1.69	1.71	0.985	0.985
30-Jan-91	W	1562D	60	2.70	2.29	0.999	0.999	1.52	1.08	0.992	0.991	1.75	1.45	0.978	0.982
12-Feb-91	F	1584D	60	6.98	6.83	1.000	0.999	3.71	3.62	0.992	0.992	4.11	4.00	0.984	0.984
23-Feb-91	T	1594	62	3.85	4.04	0.999	0.999	1.79	1.69	0.992	0.993	1.51	1.54	0.984	0.966

"-999.00" indicates concentration below analytical detection limit (ADL).

TABLE C-2. SUMMARY OF CONCENTRATION AND PURITY FOR C4IL

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
24-Mar-90	St	1175	46	3.72	3.96	0.997	0.925	2.61	2.56	0.887	0.992	3.03	2.80	0.893	0.440
05-Apr-90	Th	1196	46	3.80	4.29	0.993	0.999	1.71	1.92	0.981	0.995	2.60	3.38	0.998	0.979
17-Apr-90	T	1207	46	3.71	4.06	0.994	0.999	1.53	1.82	0.995	0.994	2.02	1.97	0.904	0.960
29-Apr-90	Sn	1219	51	2.86	2.88	0.999	0.998	1.04	1.81	0.601	0.953	1.32	2.73	0.516	0.845
11-May-90	F	1228	51	3.26	3.49	0.994	0.996	1.76	1.75	0.983	0.894	2.21	1.84	0.977	0.632
23-May-90	W	1244	51	3.36	2.74	0.949	0.991	1.51	1.48	0.997	0.994	5.10	4.85	0.986	0.907
04-Jun-90	M	1261	51	2.45	2.44	0.989	0.989	0.94	0.91	0.994	0.990	3.52	3.60	0.607	0.970
16-Jun-90	St	1268	51	7.72	7.28	0.983	0.997	3.54	3.26	0.991	0.977	3.90	3.08	0.794	0.818
28-Jun-90	Th	1285	51	5.63	5.95	0.890	0.997	2.55	2.38	0.534	0.981	3.71	3.34	0.569	0.911
22-Jul-90	Sn	1314	55	7.47	7.72	0.999	0.999	2.96	3.03	0.995	0.993	4.32	3.37	0.816	0.816
03-Aug-90	F	1324	55	12.53	14.75	0.998	0.996	4.02	5.64	0.947	0.983	4.45	2.29	0.941	0.905
16-Aug-90	Th	1343	55	5.30	5.05	1.000	0.999	1.75	1.94	0.990	0.992	4.01	3.50	0.996	0.995
27-Aug-90	M	1352	55	8.02	6.84	0.999	0.998	2.04	2.28	0.992	0.966	3.25	3.00	0.990	0.967
08-Sep-90	St	1375	55	5.12	5.38	0.999	0.997	2.28	2.22	0.999	0.997	2.12	1.93	0.919	0.989
20-Sep-90	Th	1391	55	4.45	5.39	1.000	0.999	2.14	2.39	0.992	0.992	7.27	8.37	0.980	0.981
02-Oct-90	T	1407	55	4.91	5.26	1.000	1.000	1.81	1.90	0.993	0.992	6.80	7.12	0.984	0.983
14-Oct-90	Sn	1421	51	4.39	4.79	0.999	0.999	2.24	2.42	0.992	0.993	2.96	2.95	0.977	0.978
26-Oct-90	F	1436	51	4.41	4.26	1.000	1.000	2.31	2.31	0.992	0.991	3.74	3.31	0.974	0.981
08-Nov-90	Th	1452	56	3.98	4.04	1.000	1.000	1.98	1.90	0.992	0.992	3.94	3.94	0.978	0.985
19-Nov-90	M	1475	49	3.61	4.14	1.000	1.000	1.90	2.23	0.991	0.993	2.28	2.65	0.984	0.977
01-Dec-90	St	1483	49	4.47	3.25	1.000	1.000	2.38	1.39	0.992	0.993	2.10	1.86	0.978	0.971
13-Dec-91	Th	1504	49	3.57	3.39	0.999	0.999	1.71	1.09	0.993	0.992	1.01	0.98	0.974	0.980
28-Dec-90	F	1525	60	3.25	3.21	1.000	1.000	1.58	1.57	0.992	0.993	1.28	1.18	0.928	0.921
04-Jan-91	F	1537D	60	4.57	4.66	1.000	0.999	2.09	2.07	0.993	0.993	1.24	1.24	0.891	0.978
18-Jan-91	F	1547	60	3.85	3.71	1.000	1.000	1.41	1.38	0.993	0.993	1.45	1.19	0.978	0.974
30-Jan-91	W	1557	60	5.19	4.42	1.000	1.000	2.01	2.04	0.993	0.992	1.74	1.79	0.981	0.980
11-Feb-91	M	1577	60	3.52	3.33	1.000	1.000	1.31	1.32	0.993	0.992	0.97	0.91	0.980	0.977
23-Feb-91	St	1593	62	3.14	3.22	0.999	1.000	0.98	1.01	0.992	0.992	0.82	0.84	0.979	0.982

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-3. SUMMARY OF CONCENTRATION AND PURITY FOR CANJ

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
12-Mar-90	M	1166	46	8.96	8.16	0.997	0.995	4.39	4.79	0.995	0.995	4.41	3.96	0.933	0.945
24-Mar-90	St	1178	46	2.99	3.83	0.987	0.980	1.86	1.87	0.412	0.995	2.63	2.09	0.394	0.988
05-Apr-90	Th	1190D	46	4.34	4.34	0.997	0.997	1.93	2.03	0.997	0.991	2.37	2.11	0.541	0.864
17-Apr-90	T	1200	46	5.03	4.84	0.991	0.997	2.61	2.44	0.991	0.994	2.37	2.38	0.981	0.692
29-Apr-90	Sn	1215	51	3.84	3.64	0.989	0.991	1.91	1.58	0.980	0.904	1.41	1.56	0.969	0.973
11-May-90	F	1232	51	2.48	2.24	0.996	0.969	1.01	0.85	0.997	0.887	1.52	1.28	0.967	0.855
23-May-90	W	1242	51	3.07	3.09	0.993	0.987	1.30	1.23	0.997	0.988	1.77	2.25	0.654	0.976
04-Jun-90	M	1260	51	2.90	2.82	0.992	0.972	1.30	1.18	0.987	0.989	1.06	1.19	0.570	0.971
16-Jun-90	St	1270	51	5.32	5.26	0.999	0.997	2.02	1.85	0.985	0.996	1.68	1.58	0.630	0.873
28-Jun-90	Th	1282	51	9.52	9.44	0.994	0.961	3.90	3.84	0.970	0.999	3.75	4.19	0.980	0.953
10-Jul-90	T	1288	55	8.87	8.82	0.990	0.996	3.52	4.19	0.979	0.996	2.90	3.01	0.958	0.980
22-Jul-90	Sn	1310	55	9.26	8.97	1.000	0.999	3.51	3.21	0.994	0.994	2.49	2.63	0.981	0.983
03-Aug-90	F	1319	55	9.05	10.57	0.971	0.998	4.10	3.81	0.991	0.945	4.23	6.38	0.920	0.957
15-Aug-90	W	1337	55	8.21	8.38	0.999	0.998	4.03	4.30	0.995	0.921	4.39	4.48	0.984	0.939
27-Aug-90	M	1361	55	7.23	6.91	0.999	1.000	3.13	3.22	0.978	0.998	2.78	3.17	0.972	0.957
08-Sep-90	St	1369	55	3.08	3.23	0.999	0.997	1.08	1.19	0.979	0.995	1.94	2.08	0.603	0.974
20-Sep-90	Th	1384	55	3.13	3.35	1.000	0.997	2.10	2.43	0.987	0.991	3.52	2.90	0.850	0.973
02-Oct-90	T	1403	55	4.03	4.03	1.000	1.000	1.88	1.90	0.993	0.992	2.40	2.41	0.982	0.979
14-Oct-90	Sn	1422	51	5.04	5.05	1.000	0.999	2.90	2.91	0.992	0.993	1.38	1.42	0.974	0.968
26-Oct-90	F	1438	51	2.32	2.38	0.999	0.999	1.42	1.46	0.991	0.992	1.79	1.79	0.980	0.980
07-Nov-90	W	1463D	56	3.64	3.61	1.000	1.000	2.08	2.14	0.992	0.993	2.11	1.96	0.978	0.982
19-Nov-90	M	1472	49	3.12	3.18	0.999	0.999	1.87	1.75	0.991	0.992	1.22	1.16	0.955	0.979
01-Dec-90	St	1494	49	4.81	4.82	1.000	1.000	2.66	2.53	0.992	0.992	1.71	1.84	0.983	0.981
13-Dec-90	Th	1505	49	5.20	4.95	1.000	1.000	2.82	2.77	0.993	0.993	1.97	1.83	0.978	0.981
25-Dec-90	T	1513D	60	3.38	3.21	1.000	1.000	1.91	1.82	0.993	0.994	1.33	1.20	0.981	0.982
06-Jan-91	Sn	1531	60	4.28	4.43	1.000	0.999	2.22	2.29	0.993	0.993	1.77	1.73	0.807	0.992
18-Jan-91	F	1548	60	2.64	2.40	0.999	1.000	1.40	1.32	0.992	0.992	1.30	1.24	0.976	0.979
30-Jan-91	W	1570D	60	5.40	5.09	1.000	1.000	2.48	2.41	0.992	0.993	2.40	2.39	0.967	0.979
11-Feb-91	M	1586D	60	2.81	2.82	0.999	0.999	1.38	1.34	0.993	0.993	1.04	1.05	0.964	0.966
23-Feb-91	St	1597	62	3.08	2.89	0.998	0.998	1.54	1.42	0.992	0.992	1.37	1.29	0.973	0.981

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-4. SUMMARY OF CONCENTRATION AND PURITY FOR HITX

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
12-Mar-90	M	1170D	46	0.36	0.94	0.921	0.912	0.40	0.45	0.927	0.970	-999	0.62	0.917	0.851
24-Mar-90	St	1184	46	1.17	1.65	0.997	0.930	0.83	0.44	0.926	0.849	0.71	1.04	0.895	0.726
05-Apr-90	Th	1187	46	1.08	1.16	0.997	0.996	-999	-999	0.966	0.981	1.07	0.65	0.763	0.743
17-Apr-90	T	1210	46	1.91	1.69	0.925	0.996	0.85	0.45	0.948	0.918	0.62	0.85	0.900	0.926
11-May-90	F	1230D	51	0.64	0.61	0.941	0.925	0.37	-999	0.988	0.871	0.81	0.79	0.667	0.768
23-May-90	W	1245	51	2.11	2.52	0.998	0.978	0.83	1.18	0.992	0.985	0.94	1.37	0.817	0.805
04-Jun-90	M	1255	51	2.01	1.86	0.990	0.992	0.69	0.89	0.937	0.984	0.53	0.62	0.851	0.736
16-Jun-90	St	1267	51	1.61	1.62	0.972	0.978	0.36	0.55	0.988	0.951	0.38	0.51	0.729	0.740
22-Jul-90	Sn	1308	55	1.02	1.14	0.999	0.998	0.38	0.38	0.947	0.978	0.43	-999	0.667	0.667
03-Aug-90	F	1323	55	1.13	1.16	0.994	0.996	-999	0.38	0.887	0.886	-999	-999	0.928	0.752
15-Aug-90	W	1334	55	1.95	1.86	1.000	0.995	1.14	1.28	0.975	0.984	0.63	0.64	0.975	0.883
27-Aug-90	M	1357	55	1.53	1.31	0.996	0.993	0.79	0.80	0.998	0.946	0.77	0.55	0.979	0.979
08-Sep-90	St	1373D	55	1.04	1.02	0.994	0.993	-999	-999	0.998	0.984	-999	-999	0.667	0.908
20-Sep-90	Th	1390	55	1.29	1.21	1.000	0.999	0.68	0.68	0.993	0.992	-999	-999	0.667	0.667
02-Oct-90	T	1413	55	1.31	1.58	1.000	0.999	0.94	1.07	0.993	0.992	1.12	1.36	0.979	0.979
14-Oct-90	Sn	1426	51	1.50	1.60	1.000	0.994	1.21	1.36	0.993	0.993	0.79	0.84	0.924	0.932
26-Oct-90	F	1435	51	1.99	2.03	1.000	1.000	1.03	1.39	0.994	0.992	0.72	0.46	0.791	0.667
07-Nov-90	W	1451	51	1.28	1.33	1.000	1.000	0.77	0.83	0.990	0.993	0.70	0.78	0.788	0.790
19-Nov-90	M	1474	49	1.21	1.07	0.999	1.000	0.89	0.97	0.993	0.992	0.45	0.38	0.955	0.816
01-Dec-90	St	1488	49	1.65	1.64	0.999	1.000	0.69	0.67	0.977	0.992	-999	-999	0.667	0.667
13-Dec-90	Th	1502	49	2.28	1.88	1.000	1.000	0.62	0.52	0.989	0.989	0.38	-999	0.973	0.667
25-Dec-90	T	1519	60	1.31	1.34	0.978	1.000	0.86	0.87	0.989	0.990	-999	-999	0.667	0.805
06-Jan-91	Sn	1539D	60	1.48	1.56	1.000	1.000	0.45	0.43	0.993	0.991	-999	-999	0.667	0.667
18-Jan-91	F	1544	60	1.48	1.55	0.999	1.000	0.40	0.43	0.990	0.990	-999	-999	0.667	0.667
30-Jan-91	W	1558	60	0.52	0.59	1.000	0.998	0.36	0.40	0.979	0.967	-999	0.39	0.667	0.667
11-Feb-91	M	1574	60	2.48	2.61	1.000	1.000	1.16	1.13	0.993	0.991	0.97	0.68	0.790	0.783
23-Feb-91	St	1598	62	1.38	1.40	1.000	1.000	0.70	0.70	0.992	0.991	0.42	0.44	0.817	0.817

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-5. SUMMARY OF CONCENTRATION AND PURITY FOR ORFL

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Form (ppb)	Form (ppb)	Form Purity	Form Purity	Acetald (ppb)	Acetald (ppb)	Acetald Purity	Acetald Purity	Acetone (ppb)	Acetone (ppb)	Acetone Purity	Acetone Purity
10-Jul-90	T	1290	51	3.41	3.69	0.993	0.998	-999	-999	0.979	0.994	0.37	-999	0.987	0.930
16-Jul-90	M	1302	55	2.35	2.68	0.998	0.998	0.59	0.50	0.978	0.972	-999	0.69	0.907	0.942
22-Jul-90	Sn	1307	55	3.49	3.58	1.000	0.993	1.02	1.16	0.994	0.943	-999	0.57	0.934	0.913
28-Jul-90	St	1316	55	2.17	3.47	0.998	0.998	0.47	0.98	0.969	0.997	-999	-999	0.896	0.788
03-Aug-90	F	1320	55	3.28	3.02	0.986	0.997	1.00	0.99	0.815	0.965	-999	-999	0.619	0.813
09-Aug-90	Th	1332	55	3.37	3.66	0.999	0.999	1.42	1.48	0.969	0.989	0.89	0.65	0.862	0.988
15-Aug-90	W	1350	55	3.32	3.35	0.998	0.995	0.98	1.02	0.986	0.932	-999	-999	0.916	0.588
27-Aug-90	M	1359	55	4.38	4.57	1.000	0.999	1.13	1.26	0.958	0.996	0.45	0.49	0.856	0.947
02-Sep-90	Sn	1363	55	2.84	2.72	1.000	0.998	1.01	0.80	0.974	0.992	-999	0.43	0.900	0.885
08-Sep-90	St	1377	55	4.53	4.55	1.000	0.998	1.07	0.83	0.999	0.983	0.62	0.71	0.592	0.929
14-Sep-90	F	1383	55	3.92	4.05	0.995	0.990	1.18	1.10	0.977	0.998	0.72	0.81	0.971	0.960
20-Sep-90	Th	1386	55	-999	0.42	0.893	0.982	-999	0.53	0.963	0.979	-999	1.08	0.883	0.884
26-Sep-90	W	1397	55	3.36	3.51	1.000	0.999	0.98	1.02	0.992	0.992	1.01	1.06	0.978	0.947
08-Oct-90	M	1418	55	1.87	1.83	1.000	1.000	0.49	0.48	0.991	0.993	-999	0.44	0.969	0.983
14-Oct-90	Sn	1424	51	32.97	34.11	1.000	1.000	4.61	14.20	0.993	0.993	-999	10.79	0.000	0.984
20-Oct-90	St	1432	55	1.93	2.10	1.000	1.000	0.88	0.97	0.990	0.990	0.62	0.57	0.975	0.964
26-Oct-90	F	1446	51	3.22	3.19	0.999	0.999	1.75	1.22	0.992	0.986	1.97	2.10	0.981	0.967
01-Nov-90	Th	1449D	55	2.35	2.34	1.000	1.000	0.95	0.96	0.993	0.993	1.06	1.20	0.969	0.975
07-Nov-90	W	1465	56	3.45	3.28	1.000	1.000	1.27	1.21	0.992	0.991	0.95	1.11	0.966	0.971
13-Nov-90	T	1466	49	4.26	4.41	1.000	1.000	1.74	1.79	0.993	0.990	1.24	1.63	0.962	0.969
01-Dec-90	St	1484	49	2.10	2.14	1.000	0.999	1.01	1.03	0.992	0.987	0.56	0.42	0.980	0.965
13-Dec-90	Th	1508D	49	7.02	6.99	0.999	0.998	2.96	2.85	0.994	0.995	0.65	1.80	0.801	0.963
25-Dec-90	T	1522	60	6.29	6.46	1.000	1.000	2.66	2.68	0.992	0.993	0.39	0.49	0.796	0.915
06-Jan-91	Sn	1533	60	1.83	1.79	0.997	1.000	0.64	0.70	0.992	0.992	0.40	0.46	0.943	0.894
18-Jan-91	F	1554D	60	3.50	3.45	1.000	1.000	1.35	1.34	0.991	0.992	1.73	2.15	0.972	0.976
30-Jan-91	W	1567	60	3.46	3.72	0.999	0.999	1.22	1.30	0.993	0.992	0.51	0.70	0.979	0.980
11-Feb-91	M	1580	60	3.54	3.65	1.000	1.000	1.45	1.48	0.992	0.993	1.84	2.09	0.974	0.974
23-Feb-91	St	1596	62	2.36	2.52	0.999	0.999	1.00	1.08	0.992	0.993	1.05	1.21	0.968	0.971

"-999" indicates concentration below analytical detection limit.

TABLE C-6. SUMMARY OF CONCENTRATION AND PURITY FOR PEFL

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
10-Feb-90	St	1158	46	1.11	0.71	0.792	0.939	0.67	0.53	0.954	0.985	1.22	1.03	0.929	0.881
22-Feb-90	Th	1159	46	1.42	1.34	0.978	0.985	-999	-999	0.962	0.947	1.81	1.68	0.907	0.875
12-Mar-90	M	1174	46	2.56	2.47	0.965	0.998	1.15	0.96	0.972	0.682	1.13	2.36	0.986	0.748
24-Mar-90	St	1186D	46	1.79	1.58	0.998	0.977	1.41	1.72	0.970	0.983	1.89	1.89	0.936	0.931
05-Apr-90	Th	1194	46	3.80	3.92	0.994	0.996	1.48	1.55	0.988	0.994	2.93	3.07	0.607	0.996
17-Apr-90	T	1206	46	2.96	3.06	0.771	0.996	1.10	1.19	0.599	0.986	1.49	1.53	0.428	0.972
29-Apr-90	Sn	1213	51	2.13	1.96	0.987	0.943	0.61	0.88	0.985	0.978	0.62	0.70	0.469	0.940
11-May-90	F	1225	51	1.97	2.38	0.983	0.963	0.63	0.52	0.995	0.885	0.96	1.21	1.000	0.875
23-May-90	W	1250	51	2.78	2.94	0.998	0.957	0.78	0.76	0.982	0.890	1.43	1.31	0.952	0.824
04-Jun-90	M	1257	51	1.67	2.06	0.982	0.995	0.58	0.58	0.973	0.895	0.37	0.42	0.802	0.817
16-Jun-90	St	1263	51	5.23	5.08	0.994	0.988	1.21	1.02	0.992	0.884	1.56	0.80	0.803	0.667
28-Jun-90	Th	1279	51	0.98	0.83	0.994	0.995	-999	0.76	0.981	0.997	0.63	-999	0.946	0.930
10-Jul-90	T	1298	51	3.41	3.51	0.927	0.997	0.43	0.39	0.796	0.988	-999	-999	0.952	0.927
16-Jul-90	M	1301	55	2.05	1.91	0.992	0.997	0.51	0.44	0.985	0.902	1.11	0.95	0.946	0.901
22-Jul-90	Sn	1313	55	1.46	1.67	0.997	0.999	-999	-999	0.994	0.992	-999	-999	0.611	0.781
28-Jul-90	St	1318	55	4.57	5.48	0.992	0.999	0.96	1.58	0.901	0.954	2.60	2.97	0.985	0.969
03-Aug-90	F	1327	55	3.56	3.66	0.996	0.998	0.45	0.54	0.995	0.990	-999	-999	0.875	0.963
09-Aug-90	Th	1330	55	4.17	4.13	0.990	0.972	1.01	1.14	0.986	0.975	2.69	2.34	0.931	0.953
15-Aug-90	W	1339	55	4.38	4.31	0.999	0.994	1.08	1.27	0.991	0.997	1.76	1.34	0.979	0.832
21-Aug-90	T	1349	55	2.66	2.59	0.994	0.996	0.81	0.66	0.879	0.986	0.41	-999	0.880	0.570
27-Aug-90	M	1353	55	1.64	1.77	0.991	0.986	0.40	0.51	0.964	0.946	0.44	0.41	0.896	0.912
02-Sep-90	Sn	1364	55	2.65	2.50	0.997	0.997	0.43	-999	0.991	0.980	0.46	0.63	0.868	0.853
08-Sep-90	St	1368	55	3.43	3.76	0.995	0.998	0.93	0.85	0.974	0.990	0.72	0.89	0.911	0.749
14-Sep-90	F	1381	55	1.68	1.93	0.996	0.980	0.38	-999	0.946	0.960	-999	-999	0.790	0.786
20-Sep-90	Th	1388	55	2.52	2.71	1.000	0.995	0.71	0.74	0.970	0.987	1.27	1.64	0.984	0.977
26-Sep-90	W	1402	55	3.68	3.77	1.000	1.000	1.44	1.48	0.992	0.993	3.33	3.45	0.982	0.982
02-Oct-90	T	1406	55	1.68	1.66	1.000	0.999	0.47	0.51	0.992	0.991	-999	-999	0.883	0.878
08-Oct-90	M	1415	55	1.66	1.76	1.000	1.000	0.48	0.53	0.993	0.990	0.47	0.51	0.957	0.966
14-Oct-90	Sn	1423	51	15.15	-999	1.000	0.000	2.73	-999	0.990	0.000	10.56	-999	0.982	0.000
20-Oct-90	St	1431	55	2.36	2.38	0.999	1.000	0.73	0.78	0.991	0.986	2.30	2.31	0.975	0.967
26-Oct-90	F	1444	51	1.62	1.72	0.999	0.999	0.53	0.64	0.992	0.992	1.44	1.48	0.974	0.982
01-Nov-90	Th	1448	55	2.21	2.30	1.000	1.000	1.16	1.12	0.990	0.991	2.57	2.71	0.978	0.980
07-Nov-90	W	1458	56	2.04	2.17	1.000	1.000	0.89	0.95	0.990	0.990	1.80	1.90	0.980	0.981
14-Nov-90	W	1467	49	2.14	2.30	0.999	1.000	1.23	1.34	0.993	0.990	1.93	1.82	0.977	0.976
01-Dec-90	St	1495	49	1.57	1.56	1.000	1.000	0.92	0.84	0.982	0.983	0.47	0.45	0.982	0.977
13-Dec-90	Th	1500	60	1.44	1.54	1.000	1.000	0.84	0.86	0.991	0.989	2.51	2.59	0.980	0.979
25-Dec-90	T	1517	60	0.87	0.98	1.000	1.000	0.64	0.69	0.992	0.991	0.82	0.93	0.975	0.970
06-Jan-91	Sn	1527	60	1.09	1.10	1.000	1.000	0.47	0.50	0.992	0.991	0.51	0.47	0.965	0.956
18-Jan-91	F	1545D	60	1.24	1.21	0.996	0.999	0.70	0.75	0.991	0.991	1.33	1.34	0.974	0.974
30-Jan-91	W	1564	60	0.59	0.88	0.999	0.984	0.39	0.39	0.976	0.964	-999	-999	0.909	0.906
12-Feb-91	T	1582	60	2.87	3.04	0.999	0.999	1.78	1.83	0.993	0.994	1.95	2.05	0.977	0.977
23-Feb-91	St	1601D	62	0.88	0.88	0.998	0.999	0.69	0.68	0.991	0.992	1.30	1.31	0.972	0.976

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-7. SUMMARY OF CONCENTRATION AND PURITY FOR PNTX

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
12-Mar-90	M	1180	46	2.64	6.23	0.980	0.965	3.77	4.69	0.988	0.994	0.99	1.54	0.484	0.958
24-Mar-90	St	1183D	46	2.69	10.05	0.991	0.999	3.90	4.80	0.889	0.980	1.94	2.57	0.876	0.982
05-Apr-90	Th	1192	46	3.33	3.63	0.992	0.998	1.55	2.12	0.997	0.997	1.42	1.73	0.931	0.532
17-Apr-90	T	1201	46	4.42	9.19	0.998	0.997	2.89	3.08	0.994	0.960	1.55	1.35	0.575	0.911
29-Apr-90	Sn	1212D	51	2.17	6.00	0.991	1.000	0.68	1.00	0.918	0.985	-999	-999	0.871	0.912
11-May-90	F	1224	51	-999	-999	0.910	0.933	-999	-999	0.978	0.981	-999	-999	0.797	0.878
23-May-90	W	1240	51	4.67	10.30	0.995	0.992	2.02	1.83	0.994	0.992	1.46	1.32	0.816	0.973
04-Jun-90	M	1256	51	3.18	3.27	0.997	0.990	1.44	1.36	0.982	0.997	0.45	0.37	0.840	0.929
16-Jun-90	St	1271	51	3.08	5.46	0.993	0.998	1.98	2.26	0.987	0.994	0.36	0.59	0.988	0.929
28-Jun-90	Th	1281	51	5.52	9.17	0.997	0.994	4.67	5.77	0.995	0.988	1.76	1.79	0.997	0.987
10-Jul-90	T	1289	55	3.23	3.20	0.994	0.996	1.92	2.05	0.995	0.996	-999	-999	0.916	0.898
22-Jul-90	Sn	1305	55	2.19	2.66	0.998	0.998	0.55	0.67	0.994	0.986	-999	-999	0.795	0.925
03-Aug-90	F	1328	55	2.87	6.45	0.999	1.000	1.52	1.90	0.997	0.999	-999	0.41	0.893	0.996
15-Aug-90	W	1335	55	5.63	10.09	0.999	0.992	3.10	3.58	0.995	0.950	1.46	1.52	0.797	0.812
27-Aug-90	M	1351	55	8.80	8.12	0.998	0.998	4.16	3.60	0.990	0.985	1.90	1.63	0.958	0.986
08-Sep-90	St	1371	55	4.34	3.90	0.999	0.999	2.07	1.86	0.993	0.998	0.50	0.48	0.838	0.922
20-Sep-90	Th	1392	55	3.77	3.24	1.000	1.000	2.54	2.49	0.992	0.992	0.59	0.58	0.960	0.871
02-Oct-90	T	1414	55	2.84	2.82	1.000	1.000	1.14	1.14	0.993	0.992	0.60	0.58	0.953	0.951
14-Oct-90	Sn	1420	51	5.02	5.82	1.000	0.999	3.07	3.45	0.992	0.993	0.96	1.13	0.987	0.786
26-Oct-90	F	1437	51	5.68	5.65	1.000	1.000	2.18	2.14	0.992	0.990	1.85	2.00	0.987	0.988
07-Nov-90	W	1454	56	4.09	5.13	1.000	1.000	1.85	2.21	0.991	0.991	-999	1.51	0.667	0.989
30-Nov-90	F	1469	49	4.87	5.52	1.000	0.999	3.53	4.22	0.993	0.993	-999	0.44	0.674	0.884
01-Dec-90	St	1482	49	5.07	5.57	1.000	1.000	3.59	3.88	0.993	0.992	0.49	-999	0.907	0.807
13-Dec-90	Th	1499	49	2.58	4.14	1.000	1.000	1.11	1.22	0.991	0.992	-999	-999	0.667	0.917
25-Dec-90	T	1521	60	4.70	4.74	0.999	0.999	2.12	2.11	0.993	0.993	0.81	0.84	0.817	0.818
06-Jan-91	Sn	1532	60	3.80	4.19	1.000	0.999	2.47	2.49	0.993	0.993	0.46	0.44	0.763	0.894
18-Jan-91	F	1543	60	7.32	7.14	0.999	0.999	1.81	1.73	0.991	0.992	0.87	0.89	0.815	0.818
30-Jan-91	W	1559	60	2.21	2.66	1.000	0.999	0.80	0.78	0.991	0.992	1.04	0.84	0.787	0.922
11-Feb-91	M	1576	60	7.13	7.42	1.000	0.999	3.39	3.72	0.992	0.992	2.80	2.92	0.980	0.977
23-Feb-91	St	1592	62	4.43	4.85	0.999	1.000	1.42	1.58	0.993	0.992	1.54	1.49	0.794	0.793

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-8. SUMMARY OF CONCENTRATION AND PURITY FOR SAIL

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
12-Mar-90	M	1165	46	1.09	1.23	0.983	0.956	0.50	0.53	0.764	0.987	0.44	0.63	0.909	0.988
24-Mar-90	St	1177	46	1.42	1.62	0.984	0.999	1.30	1.36	0.969	0.993	1.79	1.26	0.961	0.876
05-Apr-90	Th	1195	46	1.92	2.40	0.974	0.983	1.03	1.02	0.971	0.965	1.51	1.52	0.583	0.521
16-Apr-90	M	1208	46	1.52	1.25	0.990	0.988	0.45	0.62	0.985	0.927	1.28	1.34	0.855	0.796
11-May-90	F	1226	51	1.00	0.93	0.970	0.993	0.50	0.70	0.990	0.994	0.88	1.03	0.971	0.585
23-May-90	W	1246	51	1.94	1.99	0.991	0.976	1.18	0.93	0.992	0.987	1.36	1.35	0.989	0.953
04-Jun-90	M	1262	51	3.26	2.83	0.988	0.983	1.63	1.68	0.995	0.944	0.87	0.89	0.911	0.816
16-Jun-90	St	1269	51	4.79	1.39	0.998	0.996	1.53	-999	0.999	0.923	0.74	-999	0.976	0.727
28-Jun-90	Th	1280	51	1.82	1.94	0.965	0.967	-999	-999	0.972	0.880	0.59	0.51	0.745	0.807
10-Jul-90	T	1294	55	7.23	7.22	0.995	0.990	1.95	1.83	0.987	0.976	0.94	1.29	0.919	0.993
24-Jul-90	T	1315	55	2.50	2.45	0.996	0.994	0.82	0.79	0.994	0.983	1.85	1.39	0.793	0.898
03-Aug-90	F	1329	55	3.44	0.49	0.999	0.995	0.77	0.52	0.961	0.980	0.94	1.17	0.983	0.778
14-Aug-90	T	1344	55	2.74	2.88	0.992	0.998	0.79	0.74	0.965	0.993	0.85	1.08	0.907	0.990
27-Aug-90	M	1354	55	6.14	6.15	0.999	1.000	1.18	1.05	0.986	0.983	0.47	0.64	0.863	0.949
08-Sep-90	St	1372	55	3.10	3.21	0.998	0.999	1.22	0.97	0.993	0.983	0.85	0.86	0.998	0.626
25-Sep-90	T	1401	55	3.45	3.44	1.000	1.000	1.04	1.10	0.993	0.992	2.84	2.98	0.977	0.962
02-Oct-90	T	1404	55	4.40	4.67	1.000	1.000	1.47	1.59	0.992	0.992	3.10	3.20	0.983	0.983
14-Oct-90	Sn	1419	51	3.07	2.60	0.999	1.000	1.10	0.98	0.991	0.990	1.91	1.90	0.977	0.982
26-Oct-90	F	1441	51	2.14	2.02	0.999	1.000	1.40	1.15	0.992	0.991	1.17	1.20	0.964	0.977
07-Nov-90	W	1461D	56	1.87	1.88	1.000	0.999	1.03	1.06	0.989	0.990	1.05	1.02	0.965	0.953
19-Nov-90	M	1471	49	2.75	3.61	1.000	0.999	1.55	2.03	0.991	0.992	1.33	1.62	0.977	0.977
01-Dec-90	St	1491D	49	1.11	1.14	1.000	0.997	0.71	1.03	0.989	0.991	0.76	0.73	0.969	0.969
13-Dec-90	Th	1501	49	1.54	1.42	0.998	0.999	0.96	0.99	0.989	0.976	0.68	0.74	0.980	0.968
27-Dec-90	Th	1523	60	1.75	1.90	0.999	1.000	1.26	1.36	0.993	0.993	0.88	0.97	0.975	0.978
06-Jan-91	Sn	1535	60	1.74	1.68	0.999	1.000	1.25	1.22	0.990	0.990	0.93	0.91	0.983	0.983
18-Jan-91	F	1552D	60	1.87	1.89	1.000	0.999	0.92	0.90	0.992	0.992	1.13	1.08	0.978	0.975
30-Jan-91	W	1565	60	1.83	1.69	0.999	1.000	1.02	1.02	0.990	0.991	1.05	1.09	0.971	0.974
12-Feb-91	T	1581	60	1.73	1.71	1.000	1.000	0.86	0.89	0.988	0.990	0.85	0.80	0.980	0.968
23-Feb-91	St	1604D	62	2.01	1.88	0.999	1.000	0.95	0.95	0.991	0.988	1.10	1.10	0.969	0.964

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-9. SUMMARY OF CONCENTRATION AND PURITY FOR TLOH

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
05-Apr-90	Th	1193	46	1.75	2.01	0.921	0.992	0.50	0.90	0.925	0.940	1.43	1.47	0.938	0.977
16-Apr-90	M	1205D	46	1.22	1.63	0.910	0.971	0.87	1.14	0.965	0.933	1.22	1.19	0.940	0.879
29-Apr-90	Sn	1214	51	1.57	1.48	0.972	0.984	0.87	0.62	0.937	0.957	1.55	1.30	0.952	0.901
11-May-90	F	1223	51	1.21	1.23	0.987	0.958	-999	-999	0.961	0.907	0.89	0.76	0.959	0.645
23-May-90	W	1243	51	1.87	1.58	0.992	0.981	1.04	1.06	0.986	0.985	2.26	1.82	0.863	0.970
04-Jun-90	M	1253	51	0.75	0.83	0.916	0.904	-999	-999	0.940	0.958	0.58	0.52	0.954	0.953
16-Jun-90	St	1264	51	4.21	2.12	0.994	0.981	1.69	0.76	0.995	0.964	1.39	0.68	0.932	0.995
28-Jun-90	Th	1278	51	2.05	1.98	0.955	0.975	-999	-999	0.983	0.974	0.71	0.67	0.935	0.923
10-Jul-90	T	1293	55	3.45	3.46	0.986	0.952	1.04	0.48	0.981	0.990	2.25	1.90	0.890	0.972
22-Jul-90	Sn	1306	55	1.52	1.60	0.995	0.968	-999	-999	0.987	0.816	1.23	1.45	0.974	0.863
03-Aug-90	F	1326	55	3.92	4.46	0.997	0.999	2.51	2.79	0.976	0.990	2.92	3.39	0.987	0.991
15-Aug-90	W	1345	55	4.91	4.89	0.999	0.999	1.42	1.35	0.984	0.960	3.46	3.99	0.874	0.975
27-Aug-90	M	1355	55	5.52	5.33	1.000	1.000	1.83	1.31	0.980	0.984	0.80	0.72	0.965	0.979
08-Sep-90	St	1367	55	2.58	2.14	0.998	0.987	1.59	0.73	0.958	0.953	1.43	1.35	0.931	0.536
20-Sep-90	Th	1387	55	1.19	1.51	0.998	0.992	-999	0.55	0.976	0.944	1.45	1.58	0.945	0.998
02-Oct-90	T	1410	55	2.64	2.70	1.000	1.000	1.39	1.33	0.992	0.992	2.16	2.27	0.983	0.981
14-Oct-90	Sn	1425	51	1.99	2.13	1.000	1.000	-999	-999	0.989	0.990	2.14	2.13	0.969	0.980
26-Oct-90	F	1440	51	2.06	1.72	0.997	1.000	0.68	-999	0.992	0.991	1.33	1.37	0.967	0.973
07-Nov-90	W	1455	56	1.65	1.54	1.000	1.000	0.82	0.80	0.989	0.988	1.20	1.11	0.978	0.979
19-Nov-90	M	1478D	49	3.48	3.41	1.000	0.999	2.54	2.17	0.978	0.975	1.52	1.55	0.978	0.973
01-Dec-90	St	1486	49	1.94	2.16	1.000	0.998	1.01	1.12	0.981	0.988	1.23	1.35	0.943	0.972
13-Dec-90	Th	1507	49	2.10	1.97	1.000	1.000	0.59	-999	0.992	0.993	0.95	1.04	0.978	0.981

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-10. SUMMARY OF CONCENTRATION AND PURITY FOR W1DC

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
12-Mar-90	M	1171	46	4.74	2.95	0.998	0.990	1.78	0.96	0.993	0.995	3.09	2.69	0.991	0.662
24-Mar-90	St	1179	46	3.05	1.62	0.998	0.954	2.09	1.37	0.929	0.992	1.83	1.15	0.500	0.981
05-Apr-90	Th	1188	46	4.75	2.74	0.998	0.994	1.78	1.29	0.923	0.991	1.90	1.16	0.990	0.998
17-Apr-90	T	1203D	46	3.70	3.54	0.997	0.948	0.82	0.51	0.983	0.997	2.13	2.38	0.989	0.626
29-Apr-90	Sn	1220	51	3.35	3.86	0.998	0.996	1.40	1.35	0.997	0.974	1.48	1.70	0.761	0.949
11-May-90	F	1233	51	2.56	1.23	0.990	0.991	0.90	0.47	0.973	0.982	1.29	0.73	0.635	0.925
23-May-90	W	1249	51	3.29	2.38	0.998	0.995	1.14	0.73	0.993	0.983	1.22	1.02	0.963	0.967
04-Jun-90	M	1258	51	2.43	1.78	0.977	0.987	0.75	0.56	0.963	0.988	1.19	0.77	0.977	0.952
16-Jun-90	St	1265	51	9.23	9.75	0.977	0.998	3.30	3.84	0.995	0.981	2.40	3.40	0.988	0.832
28-Jun-90	Th	1284	51	10.19	9.57	0.997	0.985	2.84	2.69	0.997	0.987	2.30	3.05	0.965	0.954
10-Jul-90	T	1295	55	8.85	9.91	0.993	0.997	2.41	2.38	0.996	0.972	1.67	2.28	0.864	0.995
22-Jul-90	Sn	1309	55	7.98	8.21	0.999	1.000	1.97	1.69	0.968	0.991	1.77	1.95	0.932	0.963
03-Aug-90	F	1322	55	8.25	8.47	0.980	0.951	2.96	3.12	0.951	0.904	2.55	4.63	0.939	0.959
15-Aug-90	W	1340	55	8.30	8.91	0.999	0.990	2.85	2.54	0.987	0.862	2.67	3.12	0.991	0.859
27-Aug-90	M	1360	55	6.41	8.68	0.980	1.000	2.15	2.34	0.960	0.986	2.31	2.75	0.791	0.945
08-Sep-90	St	1379	55	3.76	4.01	0.998	0.999	1.10	0.99	0.978	0.989	1.25	1.43	0.693	0.975
20-Sep-90	Th	1385	55	3.74	3.64	0.999	0.990	1.41	1.01	0.991	0.871	2.22	2.37	0.961	0.875
02-Oct-90	T	1411	55	4.24	4.02	1.000	1.000	1.35	1.33	0.993	0.993	1.99	2.01	0.978	0.977
14-Oct-90	Sn	1430	51	3.89	3.80	0.999	0.999	1.40	1.29	0.992	0.993	1.04	1.19	0.970	0.973
26-Oct-90	F	1442	51	2.62	2.81	1.000	1.000	1.17	1.28	0.992	0.993	1.25	1.32	0.974	0.980
07-Nov-90	W	1457	56	3.59	3.81	1.000	1.000	1.55	1.62	0.993	0.992	1.50	1.70	0.977	0.977
19-Nov-90	M	1480D	49	4.44	4.36	1.000	0.999	1.61	1.66	0.992	0.993	1.12	1.38	0.985	0.968
01-Dec-90	St	1485	49	7.47	7.48	1.000	1.000	2.62	2.62	0.993	0.993	1.75	2.02	0.984	0.985
13-Dec-90	Th	1503	49	4.33	4.52	1.000	1.000	1.95	1.92	0.993	0.992	0.91	1.79	0.965	0.977
25-Dec-90	T	1520	60	3.84	4.07	0.999	1.000	1.72	1.79	0.992	0.993	1.12	1.00	0.975	0.978
06-Jan-91	Sn	1528	60	3.71	3.71	1.000	0.999	2.04	2.07	0.993	0.994	1.56	1.79	0.963	0.975
18-Jan-91	F	1550	60	2.11	2.10	0.999	1.000	0.99	1.05	0.992	0.993	0.77	0.85	0.971	0.966
30-Jan-91	W	1566	60	5.37	5.56	1.000	0.999	2.08	2.06	0.992	0.992	1.64	1.85	0.982	0.975
11-Feb-91	M	1588D	60	2.98	3.16	0.999	1.000	1.18	1.11	0.992	0.992	0.74	0.85	0.970	0.972
23-Feb-91	St	1595	62	3.74	3.90	1.000	0.999	1.50	1.54	0.992	0.994	1.16	1.13	0.972	0.971

"-999" indicates concentration below analytical detection.

TABLE C-11. SUMMARY OF CONCENTRATION AND PURITY FOR WIKS

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
13-Mar-90	T	1173	46	1.39	1.37	0.957	0.975	0.40	-999	0.917	0.971	1.22	0.70	0.477	0.915
25-Mar-90	Sn	1176	46	3.86	4.05	0.983	0.972	2.49	2.46	0.890	0.999	2.50	1.57	0.853	0.988
05-Apr-90	Th	1198D	46	2.26	2.10	0.954	0.956	1.58	1.57	0.977	0.994	1.44	1.53	0.993	0.976
17-Apr-90	T	1209	46	3.96	3.53	0.997	0.989	1.11	0.59	0.969	0.939	1.54	1.40	0.990	0.984
29-Apr-90	Sn	1218	51	3.94	4.38	0.993	0.997	2.11	1.97	0.991	0.970	2.01	1.93	0.983	0.981
11-May-90	F	1227	51	2.47	2.43	0.976	0.997	0.62	0.75	0.961	0.992	1.45	1.54	0.790	0.947
23-May-90	W	1248	51	3.79	3.64	0.988	0.978	1.54	1.30	0.997	0.800	1.51	1.62	0.799	0.504
04-Jun-90	M	1254	51	3.23	3.21	0.995	0.999	1.13	1.45	0.998	0.994	1.76	1.12	0.537	0.999
16-Jun-90	St	1272	51	6.14	6.60	0.999	0.994	2.02	1.82	0.999	0.977	0.95	0.54	0.539	0.952
28-Jun-90	Th	1287	51	7.28	7.27	1.000	0.991	2.05	2.22	0.976	0.999	1.56	2.76	0.533	0.971
10-Jul-90	T	1296	55	7.94	7.86	0.985	0.992	2.74	3.15	0.977	0.987	2.48	2.54	0.515	0.945
22-Jul-90	Sn	1311	55	2.70	2.88	0.998	0.991	0.94	1.00	0.964	0.941	1.72	1.42	0.961	0.930
03-Aug-90	F	1333	55	4.50	5.56	0.991	0.977	1.96	2.76	0.948	0.977	0.73	0.82	0.915	0.820
15-Aug-90	W	1342	55	4.82	4.34	0.999	1.000	1.73	1.63	0.982	0.973	-999	1.31	0.991	0.782
27-Aug-90	M	1362	55	8.43	9.47	0.999	0.999	2.29	2.10	0.968	0.984	2.33	2.12	0.638	0.945
08-Sep-90	St	1370	55	6.75	6.80	0.999	1.000	2.74	2.55	0.994	0.998	4.04	3.97	0.973	0.970
20-Sep-90	Th	1395	55	4.47	4.69	1.000	1.000	1.91	2.02	0.992	0.992	1.88	1.98	0.969	0.971
02-Oct-90	T	1412	55	4.93	4.89	1.000	1.000	1.56	1.60	0.992	0.992	3.80	3.63	0.983	0.981
14-Oct-90	Sn	1428	51	4.70	4.85	1.000	0.999	2.13	2.39	0.993	0.992	2.70	2.76	0.982	0.974
26-Oct-90	F	1439	51	6.05	6.10	1.000	1.000	2.02	2.20	0.992	0.992	3.80	3.85	0.980	0.978
07-Nov-90	W	1459D	56	2.59	2.66	1.000	1.000	1.31	1.28	0.992	0.988	1.33	1.48	0.976	0.974
19-Nov-90	M	1468	49	4.22	4.03	1.000	1.000	2.24	2.12	0.992	0.991	1.76	1.74	0.977	0.973
01-Dec-90	St	1487	49	3.33	3.51	1.000	1.000	1.62	1.79	0.992	0.991	1.48	1.46	0.983	0.980
13-Dec-90	Th	1511	49	2.61	2.51	1.000	1.000	1.21	1.03	0.992	0.992	0.86	0.86	0.969	0.978
25-Dec-90	T	1515D	60	5.42	5.39	1.000	1.000	2.70	2.57	0.993	0.993	1.45	1.40	0.984	0.834
06-Jan-91	Sn	1536	60	3.47	3.44	1.000	1.000	1.49	1.47	0.993	0.993	1.20	1.11	0.807	0.963
18-Jan-91	F	1549	60	7.41	7.36	1.000	1.000	3.59	3.47	0.993	0.993	3.18	3.12	0.975	0.974
30-Jan-91	W	1560D	60	6.03	5.85	0.999	1.000	2.00	2.22	0.992	0.992	1.29	1.32	0.931	0.818
11-Feb-91	M	1578	60	7.38	7.48	1.000	1.000	2.68	2.67	0.992	0.992	3.51	3.53	0.971	0.973
23-Feb-91	St	1603	62	4.51	4.69	0.998	1.000	1.48	1.60	0.991	0.992	1.63	1.70	0.981	0.969

"-999" indicates concentration below analytical detection limit (ADL).

TABLE C-12. SUMMARY OF CONCENTRATION AND PURITY FOR W2DC

Sample Date	Week Day	ID Number	Lot	Formaldehyde				Acetaldehyde				Acetone			
				Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity	Tube 1 (ppb)	Tube 2 (ppb)	Tube 1 Purity	Tube 2 Purity
12-Mar-90	M	1172	46	13.52	6.55	1.000	0.999	6.54	3.23	0.994	0.977	6.86	3.61	0.900	0.994
24-Mar-90	St	1181	46	7.01	3.42	0.990	0.998	3.55	1.44	0.989	0.975	2.75	0.92	0.941	0.566
05-Apr-90	Th	1191	46	5.21	7.04	0.996	0.990	2.07	2.50	0.985	0.970	2.46	1.77	0.595	0.908
17-Apr-90	T	1199	46	7.71	4.85	0.995	0.987	3.32	1.45	0.952	0.974	3.77	2.02	0.650	0.995
29-Apr-90	Sn	1217D	51	4.32	4.55	0.993	0.988	1.71	1.86	0.969	0.974	1.75	2.67	0.998	0.493
11-May-90	F	1234	51	4.16	2.74	0.983	0.991	1.36	0.71	0.994	0.986	1.70	0.91	0.935	0.903
23-May-90	W	1247	51	5.65	3.87	0.996	0.996	1.56	1.20	0.999	0.996	1.63	1.53	0.816	0.798
04-Jun-90	M	1259	51	3.66	2.24	0.978	0.962	1.64	1.11	0.969	0.987	0.00	0.91	0.911	0.945
16-Jun-90	St	1266	51	10.53	10.19	0.974	0.997	3.96	4.96	0.987	0.999	3.61	3.94	0.933	0.915
28-Jun-90	Th	1283	51	13.20	13.43	0.993	0.994	3.93	3.70	0.996	0.987	3.95	5.06	0.908	0.884
10-Jul-90	T	1292	55	11.94	10.33	0.936	0.993	3.84	3.35	0.878	0.993	2.54	2.00	0.829	0.971
22-Jul-90	Sn	1312	55	9.02	8.21	1.000	1.000	2.36	2.23	0.995	1.000	1.97	2.16	0.995	0.961
03-Aug-90	F	1325	55	11.66	12.89	0.997	1.000	3.99	4.01	0.990	0.990	4.26	5.72	0.978	0.999
15-Aug-90	W	1336	55	9.77	11.77	0.999	0.999	3.23	3.23	0.951	0.997	3.68	2.87	0.595	0.689
27-Aug-90	M	1356	55	8.14	9.39	1.000	1.000	2.71	2.68	0.987	0.995	2.58	2.63	0.988	0.620
08-Sep-90	St	1378	55	5.53	5.58	0.997	0.998	1.71	1.80	0.980	0.985	1.83	1.89	0.704	0.982
20-Sep-90	Th	1389	55	6.14	6.33	1.000	1.000	2.40	2.51	0.992	0.992	2.78	3.02	0.980	0.982
02-Oct-90	T	1408	55	7.44	7.73	1.000	1.000	1.96	2.10	0.992	0.993	2.67	2.77	0.970	0.970
14-Oct-90	Sn	1429	51	5.36	6.04	0.999	0.999	2.33	2.90	0.992	0.993	1.22	1.50	0.981	0.980
26-Oct-90	F	1443	51	7.36	8.35	0.999	1.000	1.55	1.50	0.985	0.992	1.22	1.37	0.974	0.979
07-Nov-90	W	1456	56	8.69	9.28	1.000	1.000	1.96	2.03	0.993	0.984	3.22	3.53	0.979	0.982
19-Nov-90	M	1473	49	10.29	10.57	1.000	1.000	2.88	2.64	0.992	0.991	1.78	2.17	0.981	0.967
01-Dec-90	St	1489D	49	9.33	9.47	1.000	0.957	3.15	3.04	0.993	0.993	2.60	2.57	0.985	0.984
13-Dec-90	Th	1506	49	9.08	10.67	0.998	0.999	2.37	2.62	0.996	0.997	1.86	2.27	0.969	0.919
25-Dec-90	T	1518	60	9.48	9.78	0.999	0.999	1.81	1.78	0.990	0.987	0.91	1.10	0.817	0.789
06-Jan-91	Sn	1529D	60	6.07	6.38	1.000	0.999	2.40	2.72	0.992	0.990	1.71	1.71	0.973	0.667
18-Jan-91	F	1551	60	9.27	9.46	0.999	0.999	1.71	1.67	0.989	0.980	1.17	1.42	0.667	0.667
30-Jan-91	W	1568D	60	9.99	10.18	1.000	1.000	2.74	2.90	0.992	0.993	3.45	4.60	0.982	0.972
11-Feb-91	M	1583	60	4.46	4.82	0.999	0.999	1.47	1.52	0.990	0.993	1.00	1.15	0.973	0.978
23-Feb-91	St	1599D	62	7.49	7.57	1.000	0.999	1.45	1.43	0.990	0.978	0.90	0.94	0.902	0.667

"-999" indicates concentration below analytical detection limit (ADL).

TECHNICAL REPORT DATA <i>(Please read Instructions on the reverse before completing)</i>		
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16. ABSTRACT From March 1990 through February 1991 samples of ambient air were collected at 12 sites in the eastern part of the U.S. Every 12 days, air was integrated over 24-hour periods into passivated stainless steel canisters. Simultaneously, air was drawn through cartridges containing dinitrophenylhydrazine to collect carbonyl compounds. The samples were analyzed at a central laboratory for a total of 37 halogenated and aromatic hydrocarbons, formaldehyde, acetaldehyde, and other oxygenated species. The hydrocarbon species were analyzed by gas chromatography/multiple detectors and gas chromatography/mass spectrometry, while the carbonyl species were analyzed by liquid chromatography. An extensive quality assurance program was carried on to secure high quality data. Complete data for all the carbonyl samples are presented in this report.		
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