Indiana Harbor and Canal
Ambient Air Monitoring Program:
Construction Phase Annual Report 2008

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Executive Summary

Ambient air monitoring data, including polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), volatile organic compounds (VOC), and metals, are currently being collected as part of the Indiana Harbor and Canal Confined Disposal Facility construction project. The construction project is located on the former Energy Cooperative, Inc. refinery site. Two monitoring locations are used: the south site (adjacent to the Indiana Harbor Canal just south of the ECI property), and the East Chicago High School.

This report presents as summary of the mean concentrations for both monitoring sites, for a number of compounds. Data are analyzed based on the location of the monitoring station, the season (corresponding to the average temperature), and whether construction activities are occurring on site.

Based on a statistical analysis of the data, there is no indication that construction activities at the ECI site are causing degradation of the ambient air at either the south monitoring site or at the high school. It is recommended that an adequate level of monitoring continue during construction activities at the ECI site, and that the data be re-evaluated on an annual basis.

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Introduction

In November 2001, the U.S. Army Corps of Engineers (USACE) implemented an ambient air monitoring program at the property known as the Energy Cooperative, Inc. (ECI) site, located in East Chicago, Indiana. The ECI site is the location of a confined disposal facility (CDF), which is currently being constructed to hold sediment dredged from the Indiana Harbor and Canal. In May 2004, the construction phase of the ambient air monitoring program was implemented. The ambient air monitoring program results, including the background phase (reference 1 below) and construction phase monitoring through 2007 (references 1 through 5) are presented in the following reports:

1. Indiana Harbor and Canal Air Monitoring: Background Phase Ambient Summary & Construction Phase Ambient Air Monitoring Program, USACE Chicago District, November 2003.

2. Indiana Harbor and Canal Ambient Air Monitoring Program: Construction Phase Annual Report 2004, USACE Chicago District, June 2005.

3. Indiana Harbor and Canal Ambient Air Monitoring Program: Construction Phase Annual Report 2005, USACE Chicago District, June 2006.

4. Indiana Harbor and Canal Ambient Air Monitoring Program: Construction Phase Annual Report 2006, USACE Chicago District, July 2007.

5. Indiana Harbor and Canal Ambient Air Monitoring Program: Construction Phase Annual Report 2007, USACE Chicago District, July 2008.

These reports include detailed information on the selection of the monitoring sites, the handling of non-detectable data, an evaluation of meteorological data, and statistical analyses of the previous air monitoring data. Because the monitoring locations, physical conditions, and data handling have not changed, that information will not be repeated in this report. Interested readers are referred to the above referenced documents for details.

The purpose of this report is to present an updated statistical analysis of the ambient air monitoring data. Air monitoring data will be compared by location, season, and parameter. The entire ambient air monitoring dataset is used for this analysis, including data from 2001 through 2008.

Air Monitoring Data

Locations and Parameters

The air monitoring data used for the statistical analysis were collected at two locations, referred to as the “south” site and as the “high school” site. These two locations are shown in Figure 1. The south site is located adjacent to the Lake George Branch of the

Indiana Harbor Canal. The high school (HS) site is located approximately 1700 feet south of the south sampler, on the East Chicago High School property. The rational for these monitoring locations is discussed in previous reports.

The air sampling stations operate in tandem, on a 6-day rotational schedule. Each sample is a 24 hour sample. Parameters measured and used in the statistical analysis include the analytes listed in Table 1. The parameters fall into several chemical groups: polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and metals.

Figure 1: Location of Ambient Air Sampling Stations and the ECI site in East Chicago, Indiana.

Table 1: Air Monitoring Analytes

PAHs Acenaphthene Acenaphthylene Fluoranthene Fluorene Naphthalene Phenanthrene Pyrene	**Metals** Aluminum Arsenic Barium Chromium Cobalt Copper Iron Lead Manganese Nickel Selenium Zinc
PCBs Congener 8 Congener 15 Congener 18 Congener 28 Congener 31	
VOCs Benzene Toluene	Total Suspended Particulates (TSP)

The PAH and PCB samples are obtained using a high-volume vacuum pump air sampler, with a glass fiber filter, a polyurethane foam (PUF) and adsorbent resin (XAD-2) media. Total suspended particulates and metals are collected using a separate high-volume vacuum pump air sampler, with a glass fiber filter medium. VOCs are collected using specially treated stainless steel canisters, which utilize a bellows-type pump to draw in air.

Data Organization

For analyzing the ambient air monitoring data, the data are subdivided into two main groups: Active and Idle. Active refers to data collected while construction activities were occurring on the ECI site. Various types of construction have occurred and will continue during the next few years, including excavations, obstruction removal, grading, embankment (dike) construction, cut-off wall construction, well installation, construction of a treatment plant and various other structures. This construction work occurs at various times of the year. Idle refers to data collected while no construction activities are occurring. This includes the initial years of data collection, before construction started on the ECI site, as well as data from more recent years when construction activities were not occurring.

Air data, particularly for volatile compounds, show temperature related trends. For this reason, the data were broken down by season: spring/fall (March, April, May, October, November), summer (June, July, August, September), and winter (December, January, February). These groups correspond to mean monthly temperatures of $<40^{o}$F (winter), 40

– 60^{o}F (spring/fall), and >60^{o}F. Thus, based on seasonal subgroups and also the status of construction activities, there are a total of twelve data subsets for each parameter:

- South site, Active, spring/fall
- South site, Active, summer
- South site, Active, winter
- South site, Idle, spring/fall
- South site, Idle, summer
- South site, Idle, winter
- HS site, Active, spring/fall
- HS site, Active, summer
- HS site, Active, winter
- HS site, Idle, spring/fall
- HS site, Idle, summer
- HS site, Idle, winter

Statistical Analysis

The ambient air monitoring data were compared using a non-parametric comparison of means, the Mann-Whitney test. Non-parametric tests are used when a normal distribution of the data cannot be assumed or when there are small numbers of data points. The handling of non-detectable data and other details of the statistical analysis can be found in previous reports.

Results

Appendix A contains the results of comparisons of means. These tables give the updated means and the results of statistical comparisons of the data sets. The continued primary objective of this analysis is to evaluate the potential impacts of construction activities at the ECI site on the ambient air quality near the facility. To facilitate this evaluation, the data have been compared based on location and activity (or lack of activity). The data presentation follows the format used in previous Indiana Harbor and Canal ambient air monitoring reports. The results are discussed further, below.

South Site versus High School Site

The ambient concentrations of each analyte were compared between locations (south monitoring site versus the high school monitoring site) for both idle (no construction) and active (construction) periods. Data were broken down into seasonal groups for comparison, and the overall data group was also used for comparison. Tables A1 through A8 show the mean concentrations and also the statistical significance of each comparison.

For PAHs (shown in Tables A1 and A2), acenaphthene, acenaphthylene, and fluorene were significantly different between the south site and the high school for idle conditions, with the south site having a higher acenaphthene, acenaphthylene, and fluorene concentration than the high school in the spring/fall, winter, and overall; and the south site having higher acenaphthylene concentration than the high school in the summer. For the active period, summer and overall acenaphthylene concentrations, and spring/fall fluorene concentrations were also higher at the south site than at the high school site. The remaining data show no seasonal or overall differences. The higher acenaphthylene concentration at the south site for the winter idle period, and the higher spring/fall fluorene and summer acenaphthylene concentrations at the south site during active periods were new trends; the addition of new information has lead to the identification of new trends in the data. The higher concentrations of acenaphthene, acenaphthylene, and fluorene at the south site during idle conditions and higher acenaphthylene and fluorene concentrations at the south site during active conditions are attributed to the known concentrations of PAHs in the canal sediment and water column.

For PCBs (shown in Tables A3 and A4), there were differences between the south site and the high school for all seasons and overall, for both idle and active periods. Congeners 15, 18, 28, 31, and the total PCB concentration were statistically different, with concentrations at the south site being higher than the concentrations at the high school site in the spring/fall, summer, and overall for both the idle and active periods. Congeners 18, 28, 31, and total PCBs were also statistically higher at the south site for the winter, idle conditions than at the high school. Congener 8 did not show any statistically significant differences between the two monitoring locations for any season for both idle and active periods. The higher concentrations of PCBs at the south site are attributed to the known concentrations of PCBs in the canal sediment and water column. All PCB trends are consistent with previously reported results; there were no new trends with inclusion of the latest data.

Except for benzene concentration being higher at the high school site than the south site during the spring/fall and overall for the idle period, the concentrations of VOCs (benzene and toluene) were statistically similar for all seasons, for both idle and active conditions. Concentrations are very similar for all seasons, and do not appear to show strong seasonality. It is not known why the high school site has higher benzene concentration in the spring/fall idle period and the overall idle period, however it is possible that there is a local source of benzene emissions nearer the high school than the south monitoring site. VOC data are summarized in Tables A5 and A6. All VOC trends are consistent with previously reported results; there were no new trends with inclusion of the latest data.

Only one metal, copper, showed any statistical differences between the two monitoring sites. During idle conditions, the copper concentration is higher at the high school during the summer. It is not known why the high school site has higher concentration in the summer idle period, however it is possible that there is a local source of copper emissions nearer the high school than the south monitoring site. The higher copper concentrations at the high school were also reported in previous studies. There were no statistical differences in any metal concentrations between the two monitoring sites during the active period. Metals data are summarized in Tables A7 and A8.

Idle versus Active

Data for each monitoring site, the south site and the high school, were compared between idle (no construction) and active (construction) periods. The intent of this comparison is to evaluate differences in ambient air conditions that may be attributed to construction activities. The data were analyzed as seasonal groups and also as an overall data group. The data are presented in Appendix A, Tables A9 through A16.

Several PAHs (Table A9 and A10) showed seasonal and overall differences between active and idle conditions. At the south site, acenaphthylene and naphthalene were statistically higher in the summer during idle conditions. Fluoranthene, fluorene, phenanthrene, and pyrene were higher overall during active conditions. Most of these trends are consistent with previously reported results, the only new trend is of overall fluorene being higher during the active conditions than the idle conditions. Higher concentrations during idle conditions and summer months may indicate that these compounds are originating from other local sources, possibly seasonal sources such as warm weather maintenance or operations, rather than from the ECI site. One trend that was observed previously was not observed with incorporation of the latest data: higher naphthalene concentrations during winter active conditions. Higher active overall concentrations of some PAHs (fluoranthene, fluorene, phenanthrene, and pyrene) are attributed to the prevalence of summer data (when most PAH concentrations are highest – see Tables A17 and A18 and the Seasonal Dependence discussion below) in the active period data set, rather than actual impact from construction activities. This is confirmed by the fact that the active vs. idle comparisons by season do not show statistical differences.

At the school, acenaphthylene and naphthalene were higher during active conditions in the winter. Acenaphthene, fluoranthene, fluorene, phenanthrene, and pyrene were higher overall during the active conditions. Naphthalene was higher during idle conditions in the summer in previous years' reports, but was not observed with incorporation of the latest data. Higher winter acenaphthylene and naphthalene during active conditions are new trends observed with the latest data. As discussed in the previous paragraph, the higher active overall concentrations of most of the PAHs are attributed to the prevalence of summer data (when most PAH concentrations are highest – see Tables A17 and A18 and the Seasonal Dependence discussion below) in the active period data set, rather than actual impact from construction activities. This is confirmed by the fact the active vs. idle comparisons of these PAHs by season do not show statistical differences.

For PCBs at the south site (Table A11), the overall concentrations of congeners 8, 15, 18, 28, 31, and total PCBs were all statistically higher during active periods. At the school (Table A12), the overall concentrations of congeners 8, 15, 18, 28, 31, and total PCBs were also all statistically higher during active periods. This is consistent with previous years' report results. As discussed in the previous paragraphs about PAHs, the higher active overall concentrations of these PCBs are attributed to the prevalence of summer data (when the PCB concentrations are highest – see Tables A19 and A20 and the

Seasonal Dependence discussion below) in the active period data set, rather than actual impact from construction activities. This is confirmed by the fact the active vs. idle comparisons of PCBs by season do not show any statistical differences.

Also, it should be noted that although the PCB concentrations were found to be higher during active concentrations at both the south site and the high school site, the mean total PCB concentrations are 0.000132 ug/m^3 and 0.000095 ug/m^3 (at the south site and high school site, respectively) during idle conditions and 0.000201 ug/m^3 (south site) and 0.000127 ug/m^3 (high school site) during active conditions. These concentrations are more than 10 times *less* than the USEPA Region 3 risk based concentration for total PCBs in ambient air. The risk based concentration for total PCBs in ambient air is 0.0031 ug/m^3, which corresponds to a lifetime cancer risk of 1 x 10^{-6}. The PCB concentrations measured at the south site and high school represent an even lower risk.

VOC data are summarized in Tables A13 and A14. There were no statistical differences between VOC (benzene and toluene) concentrations during idle and active periods for any season or overall at the south site. These results are consistent with previous years' report results. For the high school site, benzene is statistically higher during the idle than the active periods for the spring/fall season and overall. Compounds with higher concentrations during idle conditions may be emitted from industry or other local sources. Toluene, on the other hand, is statistically higher during the active period overall. The higher active overall toluene concentration is attributed to the prevalence of summer data when toluene concentrations are highest. These are new trends observed with the latest VOC data from the high school site.

Concentrations of some metals showed statistically significant differences between active and idle conditions (Tables A15 and A16). At the south site (Table A15), aluminum (winter and overall), barium (summer and overall), the overall chromium, overall cobalt, overall iron, overall lead, overall manganese, and overall total suspended particulates (TSP) concentrations were statistically higher during active conditions than during idle conditions. The south site summer cobalt and summer copper concentrations were statistically higher during idle than active conditions. Most of the trends were identified previously, except for the higher overall cobalt concentration during active conditions. The overall cobalt concentration was identified as statistically higher during the active than idle periods 2 years previously, but this trend was not observed last year. Overall nickel concentration was previously observed to be higher during active conditions, but this trend was not observed with the latest data. As with PAHs and PCBs, the higher active overall concentrations of some metals and TSP are attributed to the prevalence of summer data (when metal and TSP concentrations are higher – see Tables A23 and A24 and the Seasonal Dependence discussion below) in the active period data set, rather than actual impact from construction activities. This is generally confirmed by the fact that the active vs. idle comparisons of metals and TSP at the south site by season do not show any statistical differences.

At the high school site (Table A16), aluminum (winter and overall), overall barium, overall chromium, overall iron, overall lead, overall manganese, and overall TSP concentrations were statistically greater during active conditions. The high school site spring/fall, summer, and overall copper concentration was statistically higher during idle than active conditions. Spring/fall barium concentration and overall nickel concentration were previously identified as statistically higher during the active than idle periods, but these trends were not confirmed with the latest data. The higher spring/fall and overall copper concentrations during idle conditions are the only new trends with the latest data. Again, as with PAHs, PCBs, and metals and TSP at the south site, the higher active overall concentrations of some metals and TSP at the high school site are attributed to the prevalence of summer data (when metal and TSP concentrations are higher – see Tables A23 and A24 and the Seasonal Dependence discussion below) in the active period data set, rather than actual impact from construction activities. This is generally confirmed by the fact that the active vs. idle comparisons of metals and TSP at the high school site by season do not show any statistical differences.

Seasonal Dependence of Concentration

Many factors, including air temperature and wind velocity, can impact the concentration of compounds in the ambient air. For this reason, the average concentrations for each compound during each period, and at each location were compared between seasons. The data are presented in Appendix A, Tables A17 through A24.

In general, the PAHs had statistically greater concentrations during the summer period than during the spring/fall or winter (Tables A17 and A18). Most of the PAHs also show a significant difference between the spring/fall concentration and the winter concentration. Although the concentrations may be different between location and period, the tendency for seasonally higher concentrations holds true for all the data except for acenaphthylene at both the south and high school sites during active conditions. The winter acenaphthylene concentration is higher than the spring/fall and summer acenaphthylene concentrations at both the south site and the high school site during the active period. This is not consistent with greater volatility of the compounds during warmer months and is difficult to explain. This trend was also observed in previous years' results.

The PCB data during idle conditions (Table A19) showed a similar expected trend, with the summer concentrations being statistically greater than the spring/fall concentrations, which were in turn statistically greater than the winter concentrations for both the south and high school sites. This is the expected behavior of the compounds based on air temperature data. During active conditions (Table A20), the summer concentrations were also statistically greater than the spring/fall concentrations which were in turn statistically greater than the winter concentrations for the south and high school sites. Previously, for the active conditions, there was not a statistical difference between the spring/fall and winter data for the individual congeners data. With the latest data, the trend of PCBs being higher in the summer than in the spring/fall than the winter was observed for all congeners and for total PCBs for both the active and idle conditions at both the south and high school sites.

The VOC data showed fewer trends based on temperature. The idle toluene data (Table A21) for both the south site and the high school were statistically greater during the summer than during the spring/fall and during the winter. This is consistent with previous years' data trends. The benzene data during idle conditions showed no significant difference between the seasons for either the south or high school site. During active conditions (Table A22), summer benzene and toluene concentrations were statistically higher than spring/fall concentrations at the south site. Summer toluene concentrations were also statistically significantly higher than winter concentrations. The summer concentration being higher than spring/fall concentration were new trends based on the latest data. It is likely that the benzene and toluene data do not show as much seasonal trend for two reasons: first these compounds are quite volatile, even at lower temperatures and so are already in the air regardless of the air temperature, and second, there are probably many local sources of these ubiquitous compounds and the multiple emissions may have a greater impact than temperature or other climactic factors.

The metals data (Tables A23 and A24) showed some seasonal trends, more for the idle datasets than the active datasets. It should be noted that metals are not expected to show as much temperature dependent trends as organic compounds, since the atmospheric transport of metals is driven by particulate concentration (except for mercury) rather than volatilization. There is some seasonal correlation to metal concentrations in the air, which may be attributed to other factors such as more anthropogenic activity during the warm seasons, or to seasonal wind patterns. In general, the summer concentrations were statistically higher than the spring/fall and winter concentrations for idle conditions for most but not all metals. More seasonal trends were identified with the inclusion of the latest data than with previous years' data for both idle and active conditions. Selenium concentrations at both the south site (idle conditions) and the high school site (idle and active conditions) were greater during the spring/fall than during the summer for idle conditions. This trend is not consistent with other metals' results and is difficult to explain.

Conclusions

The air monitoring data presented were statistically analyzed based on location, season, and whether construction activities were occurring on the ECI site. The data and statistical significance are presented in tables. Based on a statistical analysis of the data, there is no indication that construction activities at the ECI site are causing degradation of the ambient air at either the south monitoring site or at the high school. It is recommended that an adequate level of monitoring continue for the purpose of expanding the dataset, and that the data and statistical analysis be revisited on an annual basis.

Appendix A Data Summary

Table A 1: Comparison of Mean Concentrations between Locations (South site vs. High School site) of PAHs during IDLE conditions

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ng/m^3	S/D*	ng/m^3	S/D*	ng/m^3	S/D*	ng/m^3	S/D*
Acenaphthene	South	9.099	yes	15.287		3.921	yes	9.092	yes
	HS	7.124		16.252		2.539		8.069	
Acenaphthylene	South	2.825	yes	2.864	yes	3.155	yes	2.937	yes
	HS	2.313		2.156		2.708		2.393	
Fluoranthene	South	3.245		5.854		2.032		3.540	
	HS	3.049		6.620		2.080		3.670	
Fluorene	South	9.142	yes	14.633		5.223	yes	9.344	yes
	HS	7.032		15.008		3.783		8.089	
Naphthalene	South	89.296		96.984		74.578		86.739	
	HS	93.133		109.646		79.690		93.274	
Phenanthrene	South	14.944		27.603		9.130		16.401	
	HS	13.709		28.557		8.287		15.868	
Pyrene	South	2.149		3.330		1.894		2.374	
	HS	2.113		3.340		1.818		2.338	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 2: Comparison of Mean Concentrations between Locations (South site vs. High School site) of PAHs during ACTIVE conditions

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ng/m^3	S/D*	ng/m^3	S/D*	ng/m^3	S/D*	ng/m^3	S/D*
Acenaphthene	South	7.160		12.549		3.997		9.148	
	HS	6.250		14.065		2.871		9.315	
Acenaphthylene	South	2.976		1.899	yes	4.077		2.632	yes
	HS	2.417		1.542		3.791		2.182	
Fluoranthene	South	3.213		5.543		2.376		4.139	
	HS	3.157		6.205		2.393		4.412	
Fluorene	South	8.464	yes	14.102		5.499		10.578	
	HS	6.736		14.062		4.432		9.699	
Naphthalene	South	78.861		70.806		86.181		75.991	
	HS	85.179		81.336		91.559		84.066	
Phenanthrene	South	16095		30.400		9.475		21.594	
	HS	14.421		30.691		8.811		20.952	
Pyrene	South	2.536		3.397		2.185		2.871	
	HS	2.206		3.208		2.139		2.637	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 3: Comparison of Mean Concentrations between Locations (South site vs. High School site) of PCBs during IDLE Conditions

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*
Congener 8	South	36.591		75.926		18.183		41.013	
	HS	34.654		71.191		16.069		38.268	
Congener 15	South	6.531	yes	13.526	yes	2.491		7.082	yes
	HS	4.723		10.432		2.005		5.345	
Congener 18	South	33.949	yes	58.885	yes	12.155	yes	33.637	yes
	HS	19.378		39.873		7.604		20.987	
Congener 28	South	23.403	yes	45.874	yes	8.343	yes	24.531	yes
	HS	13.845		29.942		5.413		15.361	
Congener 31	South	24.931	yes	48.567	yes	8.797	yes	26.027	yes
	HS	14.330		30.236		5.486		15.670	
Sum PCBs	South	125.352	yes	243.651	yes	48.843	yes	132.144	yes
	HS	85.581		173.471		34.828		95.021	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 4: Comparison of Mean Concentrations between Locations (South site vs. High School site) of PCBs during ACTIVE Conditions

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*
Congener 8	South	39.250		83.504		17.989		55.937	
	HS	36.896		72.295		21.373		51.069	
Congener 15	South	6.638	yes	16.532	yes	3.278		10.578	yes
	HS	4.563		10.228		3.156		6.949	
Congener 18	South	31.891	yes	73.493	yes	16.295		48.561	yes
	HS	18.526		37.266		15.251		26.569	
Congener 28	South	22.466	yes	69.577	yes	10.909		41.822	yes
	HS	13.213		30.604		9.815		20.638	
Congener 31	South	23.030	yes	66.239	yes	11.050		40.732	yes
	HS	13.329		30.363		10.138		20.616	
Sum PCBs	South	134.657	yes	301.617	yes	57.620		200.661	yes
	HS	86.243		183.938		57.462		126.894	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 5: Comparison of Mean Concentrations between Locations (South site vs. High School site) of VOCs during IDLE Conditions

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Benzene	South	1.1702	yes	1.3129		1.3646		1.2686	yes
	HS	1.3603		1.5192		1.4665		1.4324	
Toluene	South	1.7396		2.8654		2.0194		2.1278	
	HS	1.9744		3.1095		2.2534		2.3443	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 6: Comparison of Mean Concentrations between Locations (South site vs. High School site) of VOCs during ACTIVE Conditions

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Benzene	South	1.1039		1.4541		1.0867		1.2712	
	HS	1.1296		1.5599		1.6065		1.3858	
Toluene	South	2.1173		2.9817		1.6020		2.4858	
	HS	2.4615		3.4984		2.3732		2.9521	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 7: Comparison of Mean Concentrations between Locations (South site vs. High School site) of Metals during IDLE Conditions

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Aluminum	South	0.321		0.368		0.177		0.292	
	HS	0.323		0.375		0.173		0.293	
Arsenic	South	0.00162		0.00177		0.00131		0.00157	
	HS	0.00161		0.00174		0.00131		0.00156	
Barium	South	0.0173		0.0242		0.0144		0.0183	
	HS	0.0177		0.0257		0.0150		0.0190	
Chromium	South	0.00514		0.00558		0.00336		0.00474	
	HS	0.00493		0.00531		0.00327		0.00456	
Cobalt	South	0.00073		0.00090		0.00073		0.00078	
	HS	0.00073		0.00091		0.00064		0.00075	
Copper	South	0.0766		0.1175	yes	0.0914		0.0919	
	HS	0.0965		0.1565		0.0716		0.1050	
Iron	South	0.962		1.124		0.633		0.910	
	HS	0.941		1.069		0.627		0.884	
Lead	South	0.0190		0.0221		0.0143		0.0185	
	HS	0.0165		0.0183		0.0130		0.0159	
Manganese	South	0.0899		0.1066		0.0557		0.0845	
	HS	0.0853		0.0991		0.0534		0.0797	
Nickel	South	0.00187		0.00194		0.00155		0.00180	
	HS	0.00185		0.00186		0.00160		0.00178	
Selenium	South	0.00221		0.00180		0.00167		0.00194	
	HS	0.00239		0.00173		0.00162		0.00200	
Zinc	South	0.109		0.111		0.087		0.103	
	HS	0.100		0.098		0.078		0.093	
TSP (g/m^3)	South	4.65E-05		5.49E-05		3.53E-05		4.55E-05	
	HS	4.61E-05		5.53E-05		3.51E-05		4.53E-05	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 8: Comparison of Mean Concentrations between Locations (South site vs. High School) of Metals during ACTIVE Conditions

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Aluminum	South	0.327		0.405		0.205		0.350	
	HS	0.326		0.369		0.207		0.333	
Arsenic	South	0.00240		0.00170		0.00125		0.00195	
	HS	0.00215		0.00164		0.00156		0.00184	
Barium	South	0.0207		0.0214		0.0198		0.0209	
	HS	0.0207		0.0247		0.0210		0.0227	
Chromium	South	0.00554		0.00606		0.00418		0.00563	
	HS	0.00517		0.00562		0.00408		0.00526	
Cobalt	South	0.00144		0.00067		0.00061		0.00099	
	HS	0.00123		0.00069		0.00064		0.00090	
Copper	South	0.0830		0.0995		0.0706		0.0894	
	HS	0.0720		0.1291		0.0823		0.1005	
Iron	South	0.933		1.371		0.715		1.115	
	HS	0.872		1.259		0.691		1.038	
Lead	South	0.0242		0.0253		0.0163		0.0238	
	HS	0.0210		0.0225		0.0165		0.0212	
Manganese	South	0.0866		0.1181		0.0558		0.0980	
	HS	0.0820		0.1053		0.0517		0.0898	
Nickel	South	0.00271		0.00215		0.00155		0.00232	
	HS	0.00249		0.00215		0.00170		0.00224	
Selenium	South	0.00239		0.00184		0.00162		0.00205	
	HS	0.00213		0.00188		0.00164		0.00195	
Zinc	South	0.088		0.107		0.073		0.095	
	HS	0.076		0.101		0.066		0.087	
TSP (g/m^3)	South	4.82E-05		5.96E-05		3.54E-05		5.21E-05	
	HS	4.71E-05		5.52E-05		3.49E-05		4.96E-05	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 9: Comparison of Mean Concentrations between Periods (Idle vs. Active) of PAHs at the South Site

Analyte & Location		Spring/Fall ng/m³	S/D*	Summer ng/m³	S/D*	Winter ng/m³	S/D*	Overall ng/m³	S/D*
Acenaphthene	Idle	9.099		15.287		3.921		9.092	
	Active	7.160		12.549		3.997		9.148	
Acenaphthylene	Idle	2.825		2.864	yes	3.155		2.937	
	Active	2.976		1.899		4.077		2.632	
Fluoranthene	Idle	3.245		5.854		2.032		3.540	yes
	Active	3.213		5.543		2.376		4.139	
Fluorene	Idle	9.142		14.633		5.223		9.344	yes
	Active	8.464		14.102		5.499		10.578	
Naphthalene	Idle	89.296		96.984	yes	74.578		86.739	
	Active	78.861		70.806		86.181		75.991	
Phenanthrene	Idle	14.944		27.603		9.130		16.401	yes
	Active	16.095		30.400		9.475		21.594	
Pyrene	Idle	2.149		3.330		1.894		2.374	yes
	Active	2.536		3.397		2.185		2.871	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 10: Comparison of Mean Concentrations between Periods (Idle vs. Active) of PAHs at the High School Site

Analyte & Location		Spring/Fall ng/m³	S/D*	Summer ng/m³	S/D*	Winter ng/m³	S/D*	Overall ng/m³	S/D*
Acenaphthene	Idle	7.124		16.252		2.539		8.069	yes
	Active	6.250		14.065		2.871		9.315	
Acenaphthylene	Idle	2.313		2.156		2.708	yes	2.393	
	Active	2.417		1.542		3.791		2.182	
Fluoranthene	Idle	3.049		6.620		2.080		3.670	yes
	Active	3.157		6.205		2.393		4.412	
Fluorene	Idle	7.032		15.008		3.783		8.089	yes
	Active	6.736		14.062		4.432		9.699	
Naphthalene	Idle	93.133		109.646		79.690	yes	93.274	
	Active	85.179		81.336		91.559		84.066	
Phenanthrene	Idle	13.709		28.557		8.287		15.868	yes
	Active	14.421		30.691		8.811		20.952	
Pyrene	Idle	2.113		3.340		1.818		2.338	yes
	Active	2.206		3.208		2.139		2.637	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 11: Comparison of Mean Concentrations between Periods (Idle vs. Active) of PCBs at the South Site

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*
Congener 8	Idle	36.591		75.926		18.183		41.013	yes
	Active	39.250		83.504		17.989		55.937	
Congener 15	Idle	6.531		13.526		2.491		7.082	yes
	Active	6.638		16.532		3.278		10.578	
Congener 18	Idle	33.949		58.885		12.155		33.637	yes
	Active	31.891		73.493		16.295		48.561	
Congener 28	Idle	23.403		45.874		8.343		24.531	yes
	Active	22.466		69.577		10.909		41.822	
Congener 31	Idle	24.931		48.567		8.797		26.027	yes
	Active	23.030		66.239		11.050		40.732	
Sum PCBs	Idle	125.352		243.651		48.843		132.144	yes
	Active	134.657		301.617		57.620		200.661	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 12: Comparison of Mean Concentrations between Periods (Idle vs. Active) of PCBs at the High School Site

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*	pg/m^3	S/D*
Congener 8	Idle	34.654		71.191		16.069		38.268	yes
	Active	36.896		72.295		21.373		51.069	
Congener 15	Idle	4.723		10.432		2.005		5.345	yes
	Active	4.563		10.228		3.156		6.949	
Congener 18	Idle	19.378		39.873		7.604		20.987	yes
	Active	18.526		37.266		15.251		26.569	
Congener 28	Idle	13.845		29.942		5.413		15.361	yes
	Active	13.213		30.604		9.815		20.638	
Congener 31	Idle	14.330		30.236		5.486		15.670	yes
	Active	13.329		30.363		10.138		20.616	
Sum PCBs	Idle	85.581		173.471		34.828		95.021	yes
	Active	86.243		183.938		57.462		126.894	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 13: Comparison of Mean Concentrations between Periods (Idle vs. Active) of VOCs at the South Site

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Benzene	Idle	1.1702		1.3129		1.3646		1.2686	
	Active	1.1039		1.4541		1.0867		1.2712	
Toluene	Idle	1.7396		2.8654		2.0194		2.1278	
	Active	2.1173		2.9817		1.6020		2.4858	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 14: Comparison of Mean Concentrations between Periods (Idle vs. Active) of VOCs at the High School Site

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Benzene	Idle	1.3603	yes	1.5192		1.4665		1.4324	yes
	Active	1.1296		1.5599		1.6065		1.3858	
Toluene	Idle	1.9744		3.1095		2.2534		2.3443	yes
	Active	2.4615		3.4984		2.3732		2.9521	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 15: Comparison of Mean Concentrations between Periods (Idle vs. Active) of Metals at the South Site

Analyte & Location		**Spring/Fall**		**Summer**		**Winter**		**Overall**	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Aluminum	Idle	0.321		0.368		0.177	yes	0.292	yes
	Active	0.327		0.405		0.205		0.350	
Arsenic	Idle	0.00162		0.00177		0.00131		0.00157	
	Active	0.00240		0.00170		0.00125		0.00195	
Barium	Idle	0.0173	yes	0.0242		0.0144		0.0183	yes
	Active	0.0207		0.0214		0.0198		0.0209	
Chromium	Idle	0.00514		0.00558		0.00336		0.00474	yes
	Active	0.00554		0.00606		0.00418		0.00563	
Cobalt	Idle	0.00073		0.00090	yes	0.00073		0.00078	yes
	Active	0.00144		0.00067		0.00061		0.00099	
Copper	Idle	0.0766		0.1175	yes	0.0914		0.0919	
	Active	0.0830		0.0995		0.0706		0.0894	
Iron	Idle	0.962		1.124		0.633		0.910	yes
	Active	0.933		1.371		0.715		1.115	
Lead	Idle	0.0190		0.0221		0.0143		0.0185	yes
	Active	0.0242		0.0253		0.0163		0.0238	
Manganese	Idle	0.0899		0.1066		0.0557		0.0845	yes
	Active	0.0866		0.1181		0.0558		0.0980	
Nickel	Idle	0.00187		0.00194		0.00155		0.00180	
	Active	0.00271		0.00215		0.00155		0.00232	
Selenium	Idle	0.00221		0.00180		0.00167		0.00194	
	Active	0.00239		0.00184		0.00162		0.00205	
Zinc	Idle	0.109		0.111		0.087		0.103	
	Active	0.088		0.107		0.073		0.095	
TSP (g/m^3)	Idle	4.65E-05		5.49E-05		3.53E-05		4.55E-05	yes
	Active	4.82E-05		5.96E-05		3.54E-05		5.21E-05	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 16: Comparison of Mean Concentrations between Periods (Idle vs. Active) of Metals at the High School Site

Analyte & Location		Spring/Fall		Summer		Winter		Overall	
		ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*	ug/m^3	S/D*
Aluminum	Idle	0.323		0.375		0.173	yes	0.293	yes
	Active	0.326		0.369		0.207		0.333	
Arsenic	Idle	0.00161		0.00174		0.00131		0.00156	
	Active	0.00215		0.00164		0.00156		0.00184	
Barium	Idle	0.0177		0.0257		0.0150		0.0190	yes
	Active	0.0207		0.0247		0.0210		0.0227	
Chromium	Idle	0.00493		0.00531		0.00327		0.00456	yes
	Active	0.00517		0.00562		0.00408		0.00526	
Cobalt	Idle	0.00073		0.00091		0.00064		0.00075	
	Active	0.00123		0.00069		0.00064		0.00090	
Copper	Idle	0.0965	yes	0.1565	yes	0.0716		0.1050	yes
	Active	0.0720		0.1291		0.0823		0.1005	
Iron	Idle	0.941		1.069		0.627		0.884	yes
	Active	0.872		1.259		0.691		1.038	
Lead	Idle	0.0165		0.0183		0.0130		0.0159	yes
	Active	0.0210		0.0224		0.0165		0.0211	
Manganese	Idle	0.0853		0.0991		0.0534		0.0797	yes
	Active	0.0820		0.1053		0.0517		0.0898	
Nickel	Idle	0.00185		0.00186		0.00160		0.00178	
	Active	0.00249		0.00215		0.00170		0.00224	
Selenium	Idle	0.00239		0.00173		0.00162		0.00200	
	Active	0.00212		0.00188		0.00164		0.00195	
Zinc	Idle	0.101		0.098		0.078		0.093	
	Active	0.076		0.101		0.066		0.087	
TSP (g/m^3)	Idle	4.61E-05		5.53E-05		3.51E-05		4.53E-05	yes
	Active	4.71E-05		5.52E-05		3.49E-05		4.96E-05	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 17: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of PAHs during IDLE Conditions

Analyte & Location		**Concentration (ng/m^3)**			**Statistical Significance***
		Spring/Fall	Summer	Winter	
Acenaphthene	South	9.099	15.287	3.921	Summer > Spring/Fall > Winter
	HS	7.124	16.252	2.539	Summer > Spring/Fall > Winter
Acenaphthylene	South	2.825	2.864	3.155	
	HS	2.313	2.156	2.708	
Fluoranthene	South	3.245	5.854	2.032	Summer > Spring/Fall > Winter
	HS	3.049	6.620	2.080	Summer > Spring/Fall > Winter
Fluorene	South	9.142	14.633	5.223	Summer > Spring/Fall > Winter
	HS	7.032	15.008	3.783	Summer > Spring/Fall > Winter
Naphthalene	South	89.296	96.984	74.578	
	HS	93.133	109.646	79.690	
Phenanthrene	South	14.944	27.603	9.130	Summer > Spring/Fall > Winter
	HS	13.709	28.557	8.287	Summer > Spring/Fall > Winter
Pyrene	South	2.149	3.330	1.894	Summer > Spring/Fall > Winter
	HS	2.113	3.340	1.818	Summer > Spring/Fall > Winter

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 18: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of PAHs during ACTIVE Conditions

Analyte & Location		**Concentration (ng/m^3)**			**Statistical Significance***
		Spring/Fall	Summer	Winter	
Acenaphthene	South	7.160	12.549	3.997	Summer > Spring/Fall > Winter
	HS	6.250	14.065	2.871	Summer > Spring/Fall > Winter
Acenaphthylene	South	2.976	1.899	4.077	Spring/Fall > Summer; Winter > Summer
	HS	2.417	1.542	3.791	Winter > Spring/Fall > Summer
Fluoranthene	South	3.213	5.543	2.376	Summer > Spring/Fall; Summer > Winter
	HS	3.157	6.205	2.393	Summer > Spring/Fall; Summer > Winter
Fluorene	South	8.464	14.102	5.499	Summer > Spring/Fall > Winter
	HS	6.736	14.062	4.432	Summer > Spring/Fall > Winter
Naphthalene	South	78.861	70.806	86.181	
	HS	85.179	81.336	91.559	
Phenanthrene	South	16095	30.400	9.475	Summer > Spring/Fall > Winter
	HS	14.421	30.691	8.811	Summer > Spring/Fall > Winter
Pyrene	South	2.536	3.397	2.185	Summer > Spring/Fall; Summer > Winter
	HS	2.206	3.208	2.139	Summer > Spring/Fall; Summer > Winter

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 19: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of PCBs during IDLE Conditions

Analyte & Location		Concentration (pg/m^3)			Statistical Significance*
		Spring/Fall	Summer	Winter	
Congener 8	South	36.591	75.926	18.183	Summer > Spring/Fall > Winter
	HS	34.654	71.191	16.069	Summer > Spring/Fall > Winter
Congener 15	South	6.531	13.526	2.491	Summer > Spring/Fall > Winter
	HS	4.723	10.432	2.005	Summer > Spring/Fall > Winter
Congener 18	South	33.949	58.885	12.155	Summer > Spring/Fall > Winter
	HS	19.378	39.873	7.604	Summer > Spring/Fall > Winter
Congener 28	South	23.403	45.874	8.343	Summer > Spring/Fall > Winter
	HS	13.845	29.942	5.413	Summer > Spring/Fall > Winter
Congener 31	South	24.931	48.567	8.797	Summer > Spring/Fall > Winter
	HS	14.330	30.236	5.486	Summer > Spring/Fall > Winter
Sum PCBs	South	125.352	243.651	48.843	Summer > Spring/Fall > Winter
	HS	85.581	173.471	34.828	Summer > Spring/Fall > Winter

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 20: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of PCBs during ACTIVE Conditions

Analyte & Location		Concentration (pg/m^3)			Statistical Significance*
		Spring/Fall	Summer	Winter	
Congener 8	South	39.250	83.504	17.989	Summer > Spring/Fall > Winter
	HS	36.896	72.295	21.373	Summer > Spring/Fall > Winter
Congener 15	South	6.638	16.532	3.278	Summer > Spring/Fall > Winter
	HS	4.563	10.228	3.156	Summer > Spring/Fall > Winter
Congener 18	South	31.891	73.493	16.295	Summer > Spring/Fall > Winter
	HS	18.526	37.266	15.251	Summer > Spring/Fall > Winter
Congener 28	South	22.466	69.577	10.909	Summer > Spring/Fall > Winter
	HS	13.213	30.604	9.815	Summer > Spring/Fall > Winter
Congener 31	South	23.030	66.239	11.050	Summer > Spring/Fall > Winter
	HS	13.329	30.363	10.138	Summer > Spring/Fall > Winter
Sum PCBs	South	134.657	301.617	57.620	Summer > Spring/Fall > Winter
	HS	86.243	183.938	57.462	Summer > Spring/Fall > Winter

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 21: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of VOCs during IDLE Conditions

Analyte & Location		**Concentration (ug/m^3)**			**Statistical Significance***
		Spring/Fall	Summer	Winter	
Benzene	South	1.1702	1.3129	1.3646	
	HS	1.3603	1.5192	1.4665	
Toluene	South	1.7396	2.8654	2.0194	Summer > Spring/Fall; Summer > Winter
	HS	1.9744	3.1095	2.2534	Summer > Spring/Fall; Summer > Winter

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 22: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of VOCs during ACTIVE Conditions

Analyte & Location		**Concentration (ug/m^3)**			**Statistical Significance***
		Spring/Fall	Summer	Winter	
Benzene	South	1.1039	1.4541	1.0867	Summer > Spring/Fall
	HS	1.1296	1.5599	1.6065	
Toluene	South	2.1173	2.9817	1.6020	Summer > Winter; Summer > Spring/Fall
	HS	2.4615	3.4984	2.3732	

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 23: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of Metals during IDLE Conditions

Analyte & Location		Concentration (ug/m^3)			Statistical Significance*
		Spring/Fall	Summer	Winter	
Aluminum	South	0.321	0.368	0.177	Spring/Fall > Winter; Summer > Winter
	HS	0.323	0.375	0.173	Spring/Fall > Winter; Summer > Winter
Arsenic	South	0.00162	0.00177	0.00131	Summer > Spring/Fall > Winter
	HS	0.00161	0.00174	0.00131	Summer > Spring/Fall > Winter
Barium	South	0.0173	0.0242	0.0144	Summer > Spring/Fall > Winter
	HS	0.0177	0.0257	0.0150	Summer > Spring/Fall > Winter
Chromium	South	0.00514	0.00558	0.00336	Spring/Fall > Winter; Summer > Winter
	HS	0.00493	0.00531	0.00327	Spring/Fall > Winter; Summer > Winter
Cobalt	South	0.00073	0.00090	0.00073	Summer > Winter; Summer > Spring/Fall
	HS	0.00073	0.00091	0.00064	
Copper	South	0.0766	0.1175	0.0914	Summer > Spring/Fall; Summer > Winter
	HS	0.0965	0.1565	0.0716	Summer > Spring/Fall; Summer > Winter
Iron	South	0.962	1.124	0.633	Spring/Fall > Winter; Summer > Winter
	HS	0.941	1.069	0.627	Spring/Fall > Winter; Summer > Winter
Lead	South	0.0190	0.0221	0.0143	Summer > Winter; Spring/Fall > Winter
	HS	0.0165	0.0183	0.0130	Summer > Spring/Fall > Winter
Manganese	South	0.0899	0.1066	0.0557	Spring/Fall > Winter; Summer > Winter
	HS	0.0853	0.0991	0.0534	Spring/Fall > Winter; Summer > Winter
Nickel	South	0.00187	0.00194	0.00155	Summer > Winter; Spring/Fall > Winter
	HS	0.00185	0.00186	0.00160	Summer > Winter; Spring/Fall > Winter
Selenium	South	0.00221	0.00180	0.00167	Spring/Fall > Summer
	HS	0.00239	0.00173	0.00162	Spring/Fall > Summer
Zinc	South	0.109	0.111	0.087	Summer > Winter
	HS	0.100	0.098	0.078	Summer > Winter
TSP (g/m^3)	South	4.65E-05	5.49E-05	3.53E-05	Summer > Spring/Fall > Winter
	HS	4.61E-05	5.53E-05	3.51E-05	Summer > Spring/Fall > Winter

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval

Table A 24: Comparison of Mean Seasonal Concentrations between Locations (South site vs. High School) of Metals during ACTIVE Conditions

Analyte & Location		Concentration (ug/m^3)			Statistical Significance*
		Spring/Fall	Summer	Winter	
Aluminum	South	0.327	0.405	0.205	Summer > Spring/Fall > Winter
	HS	0.326	0.369	0.207	Summer > Winter; Spring/Fall > Winter
Arsenic	South	0.00240	0.00170	0.00125	Spring/Fall > Winter; Summer > Winter
	HS	0.00215	0.00164	0.00156	Summer > Winter
Barium	South	0.0207	0.0214	0.0198	
	HS	0.0207	0.0247	0.0210	
Chromium	South	0.00554	0.00606	0.00418	
	HS	0.00517	0.00562	0.00408	
Cobalt	South	0.00144	0.00067	0.00061	
	HS	0.00123	0.00069	0.00064	
Copper	South	0.0830	0.0995	0.0706	Summer > Winter
	HS	0.0720	0.1291	0.0823	Summer > Spring/Fall
Iron	South	0.933	1.371	0.715	Summer > Spring/Fall; Summer > Winter
	HS	0.872	1.259	0.691	Summer > Spring/Fall; Summer > Winter
Lead	South	0.0242	0.0253	0.0163	Summer > Winter
	HS	0.0210	0.0225	0.0165	Summer > Spring/Fall
Manganese	South	0.0866	0.1181	0.0558	Summer > Spring/Fall; Summer > Winter
	HS	0.0820	0.1053	0.0517	Summer > Spring/Fall; Summer > Winter
Nickel	South	0.00271	0.00215	0.00155	Summer > Winter
	HS	0.00249	0.00215	0.00170	
Selenium	South	0.00239	0.00184	0.00162	
	HS	0.00213	0.00188	0.00164	Spring/Fall > Summer
Zinc	South	0.088	0.107	0.073	Summer > Spring/Fall
	HS	0.076	0.101	0.066	Summer > Spring/Fall
TSP (g/m^3)	South	4.82E-05	5.96E-05	3.54E-05	Summer > Winter; Summer > Spring/Fall
	HS	4.71E-05	5.52E-05	3.49E-05	Summer > Winter; Summer > Spring/Fall

*S/D indicates a statistically significant difference between the two values at a 95% confidence interval