St. Croix (U.S. Virgin Islands) Special Volatile Organic Compounds (VOCs) Air Toxics Monitoring Study

This document describes the analysis of air monitoring and other data collected under EPA's initiative to assess potentially elevated air toxics levels at neighborhood communities downwind of an industrial area which includes an oil refinery, rum distillery, and a red mud alumina site in St. Croix, U.S. Virgin Islands. The document has been prepared for technical audiences (e.g., risk assessors, meteorologists) and their management. It is intended to describe the technical analysis of data collected for this community in clear, but generally technical terms.

I. Executive Summary

- Air monitoring has been conducted at three locations near the industrial area in St. Croix, U.S. Virgin Islands. The sites, Bethlehem Village (Bethlehem), Central High School (CHS), and the Federal Aviation Authority (FAA), are within 3 miles of the industrial area.
- This short-term study relied on the School Air Toxics (SAT) Study that was conducted in 2009. However, only samples for volatile organic compounds (VOCs) were collected and analyzed. The SAT Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOP) were followed throughout the project as well as Region 2's Quality Assurance Project Plan.
- Based on past monitoring conducted in St. Croix and previous studies that the U.S. Environmental Protection Agency (EPA) conducted in industrial areas, U.S. EPA Region 2, in conjunction with the U.S. Virgin Islands Department of Planning and Natural Resources (VIDPNR), recommended a special air toxics monitoring study to screen and assess the levels of VOCs at neighborhood communities downwind from an industrial area in St. Croix.
- Air monitoring was performed for the Bethlehem and CHS sites from February 14, 2011 to May 27, 2011 for benzene, 1,3-butadiene, and other VOCs. Air monitoring for the FAA site was performed from February 14, 2011 to June 2, 2011 for the same pollutants.
- On May 9, 2011, residents complained of strong odors in the vicinity of the monitoring sites. On this day, scheduled VOC samples were conducted. Although the study was not designed to assess odors reported by the community, additional air sampling at all three site locations was conducted on May 10, 2011 in response to continued complaints of strong odors. U.S. EPA Region 2 also requested that the canisters used on these two days be concurrently analyzed for speciated non-methane organic compounds (SMNOCs).
- Measured levels of benzene and 1,3-butadiene and the associated longer-term concentration estimates at the Bethlehem, CHS, and FAA sites are below levels of concern. Although they were below the levels of significant concern that had been suggested by the information available prior to sampling, these results indicate the influence of pollutants of concern that are the focus of EPA actions to reduce emissions nationwide.

- For the Bethlehem and CHS monitoring sites, air sampling data collected over the approximately 4-month sampling period indicates influences from nearby sources of benzene and 1,3-butadiene. Similarly, the FAA site does indicate influences from nearby sources of 1,3-butadiene.
- Levels of carbon disulfide, a pollutant often associated with odors, was highest at the Bethlehem Village site; however, still below screening levels.
- EPA Region 2 will continue to explore with Virgin Islands officials the ability to expand their existing monitoring network to sample for other air pollutants. EPA does not believe that more VOC monitoring similar to this study will provide additional technical information. EPA is also working with the Virgin Islands to identify practical ways of enhancing local air monitoring capabilities during emergency responses and odor complaints. EPA and the Virgin Islands will continue to oversee industrial facilities in the area through air permits and other compliance programs
- EPA remains concerned about emissions from sources of air toxics and continues to work to reduce these emissions across the country, through national rules and by providing information and suggestions to assist with reductions in local areas (http://www.epa.gov/ttn/atw/eparules.html).

II. Background on this Initiative

Based on community concerns, U.S. EPA Region 2, in conjunction with VIDPNR, conducted a special air toxics monitoring study to screen and assess the levels of VOCs at neighborhood communities downwind of an industrial area in St. Croix, U.S. Virgin Islands. This ambient air monitoring study yielded data of sufficient quality to allow a preliminary air toxics risk screening assessment for the area.

- Monitors were placed at each site for approximately 90 days with 24 hour air samples taken on at least 15 different days during that time. The samples were analyzed for benzene and 1,3-butadiene, and other VOCs.[1]
- These monitoring results and other information collected at each site during this initiative allow EPA to:
  - assess specific air toxics concentrations occurring at these sites and associated estimates of longer-term concentrations in light of health risk-based criteria for long-term exposures,
  - better understand, in many cases, potential contributions from nearby sources to key air toxics concentrations in the St. Croix communities near the industrial area,
  - consider what next steps might be appropriate to better understand and address air toxics in the St. Croix area, and
  - improve the information and methods EPA will use in the future (e.g., National-Scale Air Toxics Assessment, or NATA) for estimating air toxics concentrations in other communities across the U.S.

[1] In analyzing air samples for these key pollutants, samples are also being analyzed for some additional pollutants that are routinely included in the analytical methods for the key pollutants.

Assessment of air quality under this initiative is specific to the air toxics identified for monitoring at these sites. Information on health effects of air toxics being monitored[2] and educational materials describing risk concepts[3] are also available from EPA's website.

III. Basis for Selecting the Sites and the Air Monitoring Conducted

U.S. EPA Region 2, in conjunction with VIDPNR, conducted a special air toxics monitoring study to screen and assess the levels of VOCs at neighborhood communities downwind of the industrial area in St. Croix, U.S. Virgin Islands. The area is located on the south shore of St. Croix (Figure 1). One of the facilities in the industrial area, an oil refinery, receives and processes crude oil to produce refined products including gasoline, diesel, home heating oil, jet fuel, kerosene, and residual fuel oil. This facility recently added a Delayed Coking Unit (DCU) to process heavy crude oil imported from Venezuela which has a higher sulfur content compared to other crude sources. The other facility is a rum distillery that can produce up to 80,000 proof gallons per day. Also in the industrial area is a red mud lagoon, which is a byproduct of refining bauxite into alumina from an alumina processing plant that was shutdown in 2002.

Monitors were placed at three locations in highly sensitive populated areas (Figure 1). Below is a brief description of the locations selected and an approximate distance from the industrial area:

- **Bethlehem Village (Bethlehem) –** The site is a VIDPNR air monitoring station. It is located northwest downwind of the industrial area.
- **FAA site (FAA) –** This is also an existing VIDPNR air monitoring site. It is west downwind of the industrial area.
- **Central High School (CHS) –** The school was selected for this study because it has been heavily affected by releases from the industrial area during recent odor events. This site is 1.8 miles northwest of the industrial area.

Monitoring commenced at Bethlehem and CHS on February 14, 2011 and continued through May 27, 2011. For FAA, monitoring commenced on February 14, 2011 and continued until June 2, 2011. During this period, 15 to 17 valid samples of VOCs were analyzed for benzene and 1,3-butadiene, and a small standardized set of additional VOCs.[4] This includes an additional VOC sample conducted on May 10, 2011 following an odor event, which happened to be a scheduled sampling day for this study. U.S. EPA Region 2 requested that the canister samples taken on May 9, 2011 (day of the release) and May 10, 2011 (day after the release) be concurrently analyzed for both VOC and SNMOC.

All VOC results, with the exception of acrolein, were evaluated for health concerns. Results of a recent short-term laboratory study have raised questions about the consistency and reliability of monitoring results of acrolein. As a result, U.S. EPA Region 2 will not use these acrolein data in evaluating the potential for health concerns from exposure to air toxics in outdoor air as part of this study (http://www.epa.gov/schoolair/acrolein.html). All sampling methodologies are described in Region 2's Quality Assurance Project Plan.

[2] For example, http://www.epa.gov/ttn/fera/risk_atoxic.html.
[3] For example, http://www.epa.gov/ttn/atw/3_90_022.html, http://www.epa.gov/ttn/atw/3_90_024.html.
[4] In analyzing air samples for these key pollutants, samples are also being analyzed for some additional pollutants that are routinely included in the analytical methods for the key pollutants.

IV. Monitoring Results and Analysis

A. Background for the Analysis

The Virgin Island study was undertaken to address community concerns about health risk resulting from exposure to air pollution in St. Croix neighborhoods downwind of the industrial area. Benzene and 1,3-butadiene are two air toxics pollutants typically associated with emissions from oil refining. They are the key pollutants for this study.

The primary objective of this initiative is to investigate - through monitoring air concentrations of key air toxics at the three monitoring sites over a 3-4 month period- whether levels measured and associated longer-term concentration estimates are of a magnitude, in light of health risk-based criteria, for which follow-up activities will be considered. To evaluate the monitoring results consistent with this objective, EPA developed health risk-based air concentrations (the long-term comparison levels summarized in Appendix A) for the monitored air toxics using established EPA methodology and practices for health risk assessment[5] and, in the case of cancer risk, consistent with the implied level of risk. Consistent with the long-term or chronic focus of the modeling analyses, EPA has analyzed the full record of concentrations of air toxics measured at these monitoring locations, using routine statistical tools, to derive a 95 percent confidence interval[6] for the estimate of the longer-term average concentration of each of these pollutants. In this project, EPA is reporting all actual numerical values for pollutant concentrations including any values below method detection limit (MDL).[7] Additionally, a value of 0.0 is used when a measured pollutant has no value detected (ND). The projected range for the longer-term concentration estimate for each chemical (most particularly the upper end of the range) is compared to the long-term comparison levels. These long-term comparison levels conservatively presume continuous (all-day, all-year) exposure over a lifetime. The analysis of the air concentrations also includes a consideration of the potential for cumulative multiple pollutant impacts.[8]

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[5] This methodology is similar to what was used for EPA's School Air Toxics Monitoring Initiative.

[6] When data are available for only a portion of the period of interest (e.g., samples not collected on every day during this period), statisticians commonly calculate the 95% confidence interval around the dataset mean (or average) in order to have a conservative idea of how high or low the "true" mean may be. More specifically, this interval is the range in which the mean for the complete period of interest is expected to fall 95% of the time (95% probability is commonly used by statisticians). The interval includes an equal amount of quantities above and below the sample dataset mean. The interval that includes these quantities is calculated using a formula that takes into account the size of the dataset (i.e., the 'n') as well as the amount by which the individual data values vary from the dataset mean (i.e., the "standard deviation"). This calculation yields larger confidence intervals for smaller datasets as well as ones with more variable data points. For example, a dataset including 1.0, 3.0, and 5.0, results in a mean of 3.0 and a 95% confidence interval of 3.0 +/- ~5 (or -2.0 to 8.0). For comparison purposes, a dataset including 2.5, 3 and 3.5 results in a mean of 3.0 and a 95% confidence interval of 3.0 +/- ~1.2 (or 1.8 to 4.2). The smaller variation within the data in the second set of values causes the second confidence interval to be smaller.

[7] Method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99% confidence that the pollutant concentration is greater than zero and is determined from the analysis of a sample in a given matrix containing the pollutant.

[8] As this analysis of a 3-4 month monitoring dataset is not intended to be a full risk assessment, consideration of potential multiple pollutant impacts may differ among sites. For example, in instances where no individual pollutant appears to be present above its comparison level, we also checked for the presence of multiple pollutants at levels just below their respective comparison levels (giving a higher priority to such instances).

In general, where the monitoring results indicate estimates of longer-term average concentrations that are above the comparison levels - i.e., above the cancer-based comparison levels or notably above the noncancer-based comparison levels - EPA will consider the need for follow-up actions such as:

- → Terminating or continue monitoring based on screening levels (used in the SAT assessment) in Appendix A;
- → Considering longer-term monitoring where initial data are inclusive and additional information is needed to better characterize the potential for impacts; or,
- → Pursuing long-term emission and risk reduction activities (such as enforcement or other actions) where monitoring data show potentially unacceptable impacts.

This analysis also:

- → Describes the air toxics measurements in terms of potential longer-term concentrations, and, as available, compares the measurements at these sites to monitoring data from national monitoring programs.
- → Describes the meteorological data by considering conditions on sampling days as compared to those over all the days within the 3-4 month monitoring period and what conditions might be expected over the longer-term (as indicated, for example, by information from a nearby weather station).
- → Describes available information regarding activities and emissions at the nearby source(s) of interest, such as that obtained from consultation with the local air pollution authority.

B. Chemical Concentrations

EPA developed two types of long-term health risk-related comparison levels (summarized in Appendix A) to address our primary objective. The primary objective is to investigate through the monitoring data collected for key pollutants at the monitoring sites, whether pollutant levels measured and associated longer-term concentration estimates are elevated enough in comparison with health risk-based criteria to indicate that follow-up activities be considered. These comparison levels conservatively presume continuous (all-day, all-year) exposure over a lifetime.

In developing or identifying these comparison levels, EPA has given priority to use of relevant and appropriate air standards and EPA risk assessment guidance and precedents.[9] These levels are based upon health effects information, exposure concentrations and risk estimates developed and assessed by EPA, the U.S. Agency for Toxic Substances and Disease Registry, and the California EPA. These agencies recognize the need to account for potential differences in sensitivity or susceptibility of different groups (e.g., asthmatics) or lifestages/ages (e.g., young

[9] The development of long-term comparison levels, as well as of individual sample screening levels, is described in detail in *Schools Air Toxics Monitoring Activity (2009), Uses of Health Effects Information in Evaluating Sample Results* (http://www.epa.gov/schoolair/pdfs/UsesOfHealthEffectsInfoinEvalSampleResults.pdf).

children or the elderly) to a particular pollutant's effects so that the resulting comparison levels are relevant for these potentially sensitive groups as well as the broader population.

In addition to evaluating individual pollutants with regard to their corresponding comparison levels, EPA also considered the potential for cumulative impacts from multiple pollutants in cases where individual pollutant levels fall below the comparison levels but where multiple pollutant mean concentrations are within an order of magnitude of their comparison levels.

Using the analysis approach described above, EPA analyzed the chemical concentration data (Table 1 and Figures 2a-2b) with regard to areas of interest identified below.

Key findings drawn from the information on chemical concentrations and the considerations discussed below include:

- For the Bethlehem and CHS monitoring sites, air sampling data collected over the approximately 4-month sampling period does indicate influences from nearby sources of benzene and 1,3-butadiene. Similarly, the FAA site does indicate influences from 1,3-butadiene, but do not indicate influences from benzene.
- The two-day air monitoring following an odor event located in the industrial area does indicate influences of SNMOCs at all three monitoring sites.
- The air sampling data and related longer-term concentration estimates for benzene and 1,3-butadiene are below concentrations of significant concern for all three locations.
- Although levels of benzene and 1,3-butadiene were below the levels of significant concern, these results indicate the influence of pollutants of concern that are the focus of EPA actions nationwide.

Benzene, key pollutant:

- Do the monitoring data indicate influence from a nearby source?
  - → The monitoring data include some benzene concentrations for Bethlehem and CHS that are higher as compared to concentrations commonly observed in other locations nationally.[10] For the FAA site, there were not any benzene concentrations higher than commonly observed in other locations nationally.
- Do the monitoring data indicate elevated levels that pose significant long-term health concerns?
  - → For all three monitoring sites, measured benzene levels and the associated longer-term concentration estimate were below levels of significant health concern.

[10] For example, two of the concentrations at Bethlehem, and one at CHS (Table 2) were higher than 75 percent of samples collected under EPA's National Monitoring Program (2004-2009) and special studies such as the School Air Toxics Monitoring Initiative (2009-2010), Gulf Oil Spill Monitoring (2010), and a Community-Scale Air Toxics Ambient Monitoring Program (CSATAMP) for Tonawanda, NY from 2006-2009 (Appendix B). EPA is using the 75th percentile point of concentrations at these historical monitoring sites as an indicator of the measured concentrations at other locations nationwide.

However, these results do indicate the influence of pollutants of concern that are the focus of EPA actions nationwide.

- For Bethlehem, CHS, and the FAA monitoring sites, the estimate of longer-term benzene concentration (i.e., the upper bound of the 95 percent confidence interval on the mean of the dataset) is below the long-term comparison levels (Table 1).[11] These comparison levels are based on consideration of continuous exposure concentrations (24 hours a day, all year, over a lifetime).
- Further, the longer-term concentration estimate is more than tenfold lower than the cancer-based comparison level, indicating the longer-term estimate is below a continuous (24 hours a day, 7 days a week) lifetime exposure concentration associated with 1-in-100,000 additional cancer risk for all three site locations.

→ Additionally, EPA did not identify any concerns regarding short-term exposures as each individual measurement is below the individual sample screening level for benzene (which is based on consideration of exposure all day, every day over a period ranging from a couple of weeks to longer for some pollutants).[9]

→ In summary, the individual measurements do not indicate concentrations of concern for short-term exposures, and the combined contributions of all individual measurements in the estimate of longer-term concentration do not indicate a level of significant concern for long-term exposures at the Bethlehem, CHS, and FAA monitoring site locations.

<u>1,3-Butadiene, key pollutant:</u>

- Do the monitoring data indicate influence from a nearby source?

  → The monitoring data include some 1,3-butadiene concentrations at Bethlehem, CHS, and FAA that are higher than concentrations commonly observed in other locations nationally.[12]

- Do the monitoring data indicate elevated levels that pose significant long-term health concerns?

  → The monitoring data for 1,3-butadiene does not indicate levels of health concern for long-term exposures.

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[11] For Bethlehem, the upper end of the interval is only 1.5 times higher than the mean of the monitoring data and less than 8% of the long-term cancer-based comparison level. For CHS, the upper end of the interval is only 1.4 times higher than the mean of the monitoring data and less than 8% of the long-term cancer-based comparison level. For the FAA site, the upper end of the interval is only 1.3 times higher than the mean of the monitoring data and less than 6% of the long-term cancer-based comparison level.

[12] For example, two of the concentrations at this Bethlehem, five at CHS, and one at FAA (Table 2) were higher than 75 percent of samples collected under EPA's National Monitoring Program (2004-2009) and special studies such as the School Air Toxics Monitoring Initiative (2009-2010), Gulf Oil Spill Monitoring (2010), and a Community-Scale Air Toxics Ambient Monitoring Program (CSATAMP) for Tonawanda, NY from 2006-2009 (Appendix B). EPA is using the 75th percentile point of concentrations at these historical monitoring sites as an indicator of the measured concentrations at other locations nationwide.

- The estimate of longer-term 1,3-butadiene concentration (i.e., the upper bound of the 95 percent confidence interval on the mean of the dataset) is below the long-term comparison levels (Table 1).[13] These comparison levels are based on consideration of continuous exposure concentrations (24 hours a day, all year, over a lifetime).
- Further, the longer-term concentration estimate is more than tenfold lower than the cancer-based comparison level, indicating the longer-term estimate is below a continuous (24 hours a day, 7 days a week) lifetime exposure concentration associated with 1-in-100,000 additional cancer risk for all three site locations.

→ Additionally, EPA did not identify any concerns regarding short-term exposures as each individual measurement is below the individual sample screening level for 1,3-butadiene (which is based on consideration of exposure all day, every day over a period ranging from a couple of weeks to longer for some pollutants).[9]

→ In summary, for all three monitoring site locations, the individual measurements do not indicate concentrations of concern for short-term exposures, and the combined contributions of all individual measurements in the estimate of longer-term concentration do not indicate a level of concern for long-term exposures.

Other Air Toxics:

- Do the monitoring data indicate elevated levels of any other air toxics (or HAPs) that pose significant long-term health concerns?
  → Carbon disulfide was highest at Bethlehem Village (4.7 µg/m^3 to 12.1 µg/m^3) than the other two sites. These values, while lower than the 7,000 µg/m^3 screening level, are higher than the NATTS sites and other SAT sites.
  → The data show low levels of the other HAPs monitoring in which the longer-term concentration estimates for these HAPs are below their long-term comparison levels for all three site locations (Appendix C). Additionally each individual measurement for these pollutants is below the individual sample screening level (Appendix D) for that pollutant.[9]

Multiple Pollutants:

- Do the data collected for the air toxics monitored indicate the potential for other monitored pollutants to be present at levels that in combination with the key pollutant levels indicate an increased potential for cumulative impacts of significant concern (e.g., that might warrant further investigation)?
  → Although the multiple air toxics monitored at this location were below the levels of significant concern for multi-pollutant cumulative risk, these results indicate the

[13] For Bethlehem Village, the upper end of the interval is only 1.6 times higher than the mean of the monitoring data and only 4% of the long-term noncancer-based comparison level. For Central High School, the upper end of the interval is only 1.3 times higher than the mean of the monitoring data and less than 5% of the long-term noncancer-based comparison level and for FAA Site, the upper end of the interval is 1.8 times higher than the mean of the monitoring data and only 4% of the long-term noncancer-based comparison level.

influence of multiple pollutants of concern that are the focus of EPA actions nationwide (Appendix C).[14]

C. Wind and Other Meteorological Data

At each site monitored as part of this initiative, EPA collected meteorological data, minimally for wind speed and direction, during the sampling period. Additionally, EPA identified the nearest National Weather Service (NWS) station at which a longer record is available.

In reviewing these data at each site in this initiative, EPA is considering if these data indicate that the general pattern of winds on our sampling dates are significantly different from those occurring across the full sampling period or from those expected over the longer-term. Additionally, EPA are noting, particularly for sites where the measured chemical concentrations show little indication of influence from a nearby source, whether wind conditions on some portion of the sampling dates were indicative of a potential to capture contributions from the nearby key source in the air sample collected.

The meteorological station at Bethlehem collected wind speed and Cardinal wind direction measurements (i.e., NE, E, SE, etc.) beginning on March 10, 2011, and ending on May 27, 2011; for the CHS monitoring station, wind speed and Cardinal wind direction measurements were collected beginning on March 12, 2011 continuing through the sampling period (March 16, 2011 to May 27, 2011) and ending on June 27, 2011. Finally, the FAA station located at the St. Croix Henry E. Rohlsen Airport NWS station collected wind speed and wind direction measurements beginning on February 1, 2011 continuing through the sampling period (February 12, 2011 to June 2, 2011), and ending on June 30, 2011. As a result, the FAA meteorological measurements were used as surrogates for the days in which no on-site data was available for Bethlehem Village and Central High School sites. The meteorological data collected at the monitoring sites on sampling days are presented in Table 2 and Figure 3.

The nearest NWS station is at the Henry E. Rohlsen Airport NWS station in Christiansted, VI. This station is approximately 1 mile southwest of Bethlehem Village, 2 miles south southwest of Central High School, and 0.25 miles south of FAA. Measurements taken at that station include wind, temperature, and precipitation. These are presented in Table 2 and Appendix E.

<u>Meteorological Observations:</u>

- What are the directions of the key source of benzene and 1,3-butadiene emissions in relation to the monitoring sites?
  - → The industrial area emitting the key pollutants into the air (described in section III above) lie 1.46 miles east to east-southeast of Bethlehem; 1.55 miles southeast of CHS, and 2.42 miles east of FAA monitoring sites.

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[14] Combined impacts of pollutants or stressors other than those monitored in this project is a broader area of consideration in other EPA activities. General information on additional air pollutants is available at http://www.epa.gov/air/airpollutants.html.

→ Using the property boundaries of the industrial area (in lieu of information regarding the location of specific source of benzene and 1,3-butadiene), EPA have identified approximate ranges of wind directions to use in considering the potential influence of the industrial on air concentrations at the St. Croix community neighborhoods.

→ The general ranges of wind directions for the industrial area with respect to the monitoring sites are referred to here as zone of influence (ZOI), and are presented below:

  - In relation to Bethlehem, the industrial area is approximately east-northeast to southeast from 78 to135 degrees;
  - In relation to CHS, the industrial area is approximately east-southeast to south from 112 to 168 degrees;
  - In relation to the FAA site, the industrial area is approximately east-northeast to the east-southeast from 56 to 112 degrees.

- On days the air samples were collected, how often did wind come from the direction of the key sources?

  → For the Bethlehem monitoring site, there were 15 out of 16 sampling days in which the on-site wind data had a portion of the winds from the ZOI (Figures 4a-4b, Table 2). Similarly, for Central High School, there were 11 out of 17 days, and for the FAA site there were 15 out of 15 days in which the on-site data had a portion of the winds from the respective ZOI.

- How do wind patterns on the air monitoring days compare to those across the complete monitoring period and what might be expected over the longer-term at the monitoring sites?

  → For all monitoring site locations, the wind patterns across the air monitoring days appear similar to those observed over the record of on-site meteorological data during the sampling period.

  → EPA note that wind patterns at the nearest NWS station (at Henry E. Rohlsen Airport) during the sampling period are not similar to on-site wind patterns at the Bethlehem and CHS sites, and are not similar to those recorded at the NWS station over the long-term (2000-2010 period; Appendix E). Because of this, there is some uncertainty as to whether the general wind patterns at the Bethlehem and CHS monitoring sites for longer periods would be similar to the general wind patterns at the Henry E. Rohlsen Airport (see below).

- How do wind patterns at the Bethlehem and CHS sites compare to those at the St. Croix Henry E. Rohlsen Airport NWS station, particularly with regard to prevalent wind directions and the direction of the key source?

  → During the sampling period for which data are available at all three sites (approximately 4 months), the prevalent winds at the Bethlehem site are predominantly from the southeast, the winds from the CHS site are from the south-southwest and west-southwest. The wind directions at the FAA site (which are collected from the Henry G. Rohlsen NWS Station), are more from the east-northeast to east. The windroses for the three sites during the sampling period (Figure 3 and Appendix E) do not show similarities in wind flow patterns for Bethlehem and CHS.

- Are there other meteorological patterns that may influence the measured concentrations at the monitoring sites?
  - → No, EPA did not observe other meteorological patterns that may influence the measured concentrations at these monitoring sites.

V. Other Monitoring: May 9-10, 2011.

During the sampling period, an odor event occurred in the industrial area on May 9, 2011, which was also a scheduled sampling day under this study. As a result, EPA Region 2 asked that additional analytes be resolved from the canister to assess speciated non-methane organic compounds (SNMOCs) in addition to the VOCs. Additionally, a special sample was collected on May 10, 2011 (the day after the release) for both VOCs and SNMOCs to compare concentrations from the release the previous day.

While no measurements were greater than their individual sample screening levels, the following observations were made between the sampling days:

- → At Bethlehem, less than half of the 125 VOC and SNMOC pollutants showed an increase in concentrations from May 9th to May 10th. For the key pollutants, benzene and 1,3-butadiene concentrations increased from May 9th to May 10th (benzene: 0.56 $\mu g/m^3$ to 0.57 $\mu g/m^3$; 1,3-butadiene: non-detect to 0.11 $\mu g/m^3$). In addition, carbon disulfide at Bethlehem Village was unusually highest at this site (4.7 $\mu g/m^3$ to 12.1 $\mu g/m^3$).
- → At CHS, less than half of the 125 VOC and SNMOC pollutants showed an increase in concentrations from May 9th to May 10th. For the key pollutants, benzene and 1,3-butadiene concentrations increased from May 9th to May 10th (benzene: 0.50 $\mu g/m^3$ to 0.71 $\mu g/m^3$; 1,3-butadiene: non-detect to 0.17 $\mu g/m^3$).
- → At FAA, nearly half of the 125 VOC and SNMOC pollutants showed an increase in concentrations from May 9th to May 10th. For the key pollutants, benzene and 1,3-butadiene concentrations increased from May 9th to May 10th (benzene: 0.33 $\mu g/m^3$ to 0.82 $\mu g/m^3$; 1,3-butadiene: non-detect to 0.11 $\mu g/m^3$).

VI. Key Source Information

- Were the sources operating as usual during the monitoring period?
  - – The nearby sources of benzene and 1,3-butadiene have operating permits issued by EPA Region 2 that includes operating requirements.[15]
  - – Information from the nearby source indicates that this facility was operating at a rate of 277 million barrels of crude oil a day.

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[15] Operating permits, which are issued to air pollution sources under the Clean Air Act, are described at: http://www.epa.gov/air/oaqps/permits.

VII. Integrated Summary and Next Steps

A. Summary of Key Findings

1. What are the key HAPs for these monitoring sites?
   - → Benzene and 1,3 butadiene are the key HAPs for this study. The ambient air concentrations of benzene and 1,3 butadiene on a few days during the monitoring period indicated contributions from a source in the area.
2. Do the data collected at the three monitoring sites indicate an elevated level of concern?
   - → The levels measured and associated longer-term concentration estimates for the key pollutants were below levels of concern for long-term exposures.
   - → Although the levels measured were below levels of concern for long-term exposures, these results indicate the influence of pollutants of concern that are the focus of EPA actions to reduce emissions nationwide.
3. Are there indications, e.g., from the meteorological or other data, that the sample set may not be indicative of longer-term air concentrations? Would EPA expect higher (or lower) concentrations at other times of year?
   - → The data EPA have collected appear to somewhat reflect air concentrations during the entire sampling period, with indications from the on-site meteorological data that the sampling day conditions were similar with conditions overall during this period.
   - → The wind flow patterns at the nearest NWS station during the sampling period appear to be representative of long-term wind flow at that site. The lack of long-term meteorological data at the monitoring sites, along with our finding that the wind patterns from the nearest NWS station are similar to those at monitoring sites, however, limit somewhat our ability to confidently predict longer-term wind patterns at each monitoring site (which might provide further evidence relevant to concentrations during other times).

B. Next Steps for Key Pollutants

1. Based on the analysis described here, U.S. EPA Region 2 will not extend air toxics monitoring at the monitoring sites.
2. EPA remains concerned about emissions from sources of air toxics and continues to work to reduce these emissions across the country, through national rules and by providing information and suggestions to assist with reductions in local areas (http://www.epa.gov/ttn/atw/eparules.html).
3. U.S. EPA Region 2 and VIDPNR will continue to oversee industrial facilities in the Virgin Islands through air permits and other programs.

VIII. Figures and Tables

A. Tables

1. St. Croix, VI Monitoring Sites – Key Pollutant Analysis.
2. St. Croix, VI Monitoring Site Key Pollutant Concentrations (Benzene and 1,3-Butadiene) and Meteorological Data.

B. Figures

1. St. Croix, VI Monitoring Sites and the Industrial Area.

2a. St. Croix, VI Monitoring Sites – Key Pollutant (Benzene) Analysis.

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IX. Appendices

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E. Windroses for Henry E. Rohlsen Airport NWS Station.

Figure 1. St. Croix, VI Monitoring Sites and the Industrial Area.

Note: The Industrial Area is denoted by the hatched shading.

Scale: miles 0 0.59 1.18

Scale: 1 inch = 0.59 miles

Table 1. St. Croix, VI Monitoring Sites – Key Pollutant Analysis.

Parameter	School Name	Units	Mean of Measurements	95% Confidence Interval on the Mean	Long-term Comparison Level[a]	
					Cancer-Based[b]	Noncancer-Based[c]
Benzene	Bethlehem Village	µg/m^3	0.66 [d]	0.35 - 0.98	13	30
	Central High School	µg/m^3	0.73 [e]	0.43 - 1.04		
	FAA Site	µg/m^3	0.55 [f]	0.40 - 0.69		
1,3-Butadiene	Bethlehem Village	µg/m^3	0.05 [g]	0.02 - 0.08	3.3	2
	Central High School	µg/m^3	0.08 [h]	0.06 - 0.10		
	FAA Site	µg/m^3	0.04 [i]	0.02 - 0.07		

µg/m^3 micrograms per cubic meter
NA Not applicable

[a] Details regarding these values are in the technical report, Schools Air Toxics Monitoring Activity (2009) Uses of Health Effects Information.

[b] Air toxics for which the upper 95% confidence limit on the mean concentration is above the cancer-based comparison level will be fully discussed in the text and may be considered a priority for potential follow-up activities, if indicated in light of the full set of information available for the site. Findings of the upper 95% confidence limit below 1% of the comparison level (i.e., where the upper 95% confidence limit is below the corresponding 1-in-1-million cancer risk based concentration) are generally considered a low priority for follow-up activity. Situations where the summary statistics for a pollutant are below this comparison level but above 1% of of this level are fully discussed in the text of the report.

[c] Air toxics for which the upper 95% confidence limit on the mean concentration are near or below the noncancer-based comparison level are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the 95% confidence limits extend appreciably above the noncancer-based comparison level are fully discussed in the school-specific report and may be considered a priority for follow-up activity, if indicated in light of the full set of information available for the site.

[d] The mean of measurements for benzene is the average of all sample results, which include 16 detections that ranged from 0.323 to 2.71 µg/m^3.

[e] The mean of measurements for benzene is the average of all sample results, which include 17 detections that ranged from 0.316 to 2.90 µg/m^3.

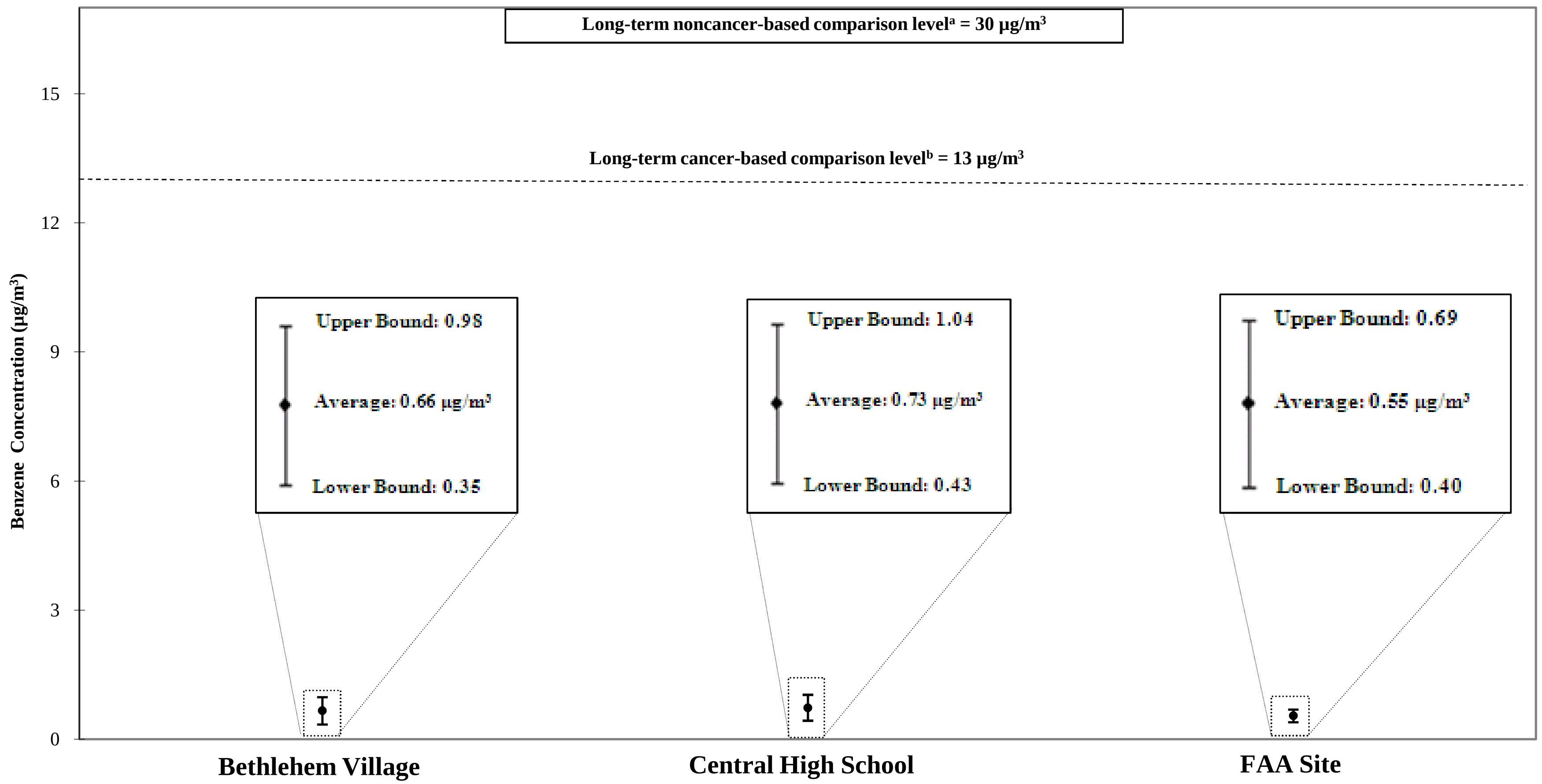
[f] The mean of measurements for benzene is the average of all sample results, which include 15 detections that ranged from 0.278 to 1.10 µg/m^3.

[g] The mean of measurements for 1,3-butadiene is the average of all sample results, which include 16 detections that ranged from 0.049 to 0.206 µg/m^3 as well as six samples in which no chemical was registered by the laboratory analytical equipment. For these samples, a value of zero was used in calculating the mean.

[h] The mean of measurements for 1,3-butadiene is the average of all sample results, which include 17 detections that ranged from 0.049 to 0.168 µg/m^3 as well as two samples in which no chemical was registered by the laboratory analytical equipment. For these samples, a value of zero was used in calculating the mean.

[i] The mean of measurements for 1,3-butadiene is the average of all sample results, which include 15 detections that ranged from 0.049 to 0.111 µg/m^3 as well as six samples in which no chemical was registered by the laboratory analytical equipment. For these samples, a value of zero was used in calculating the mean.

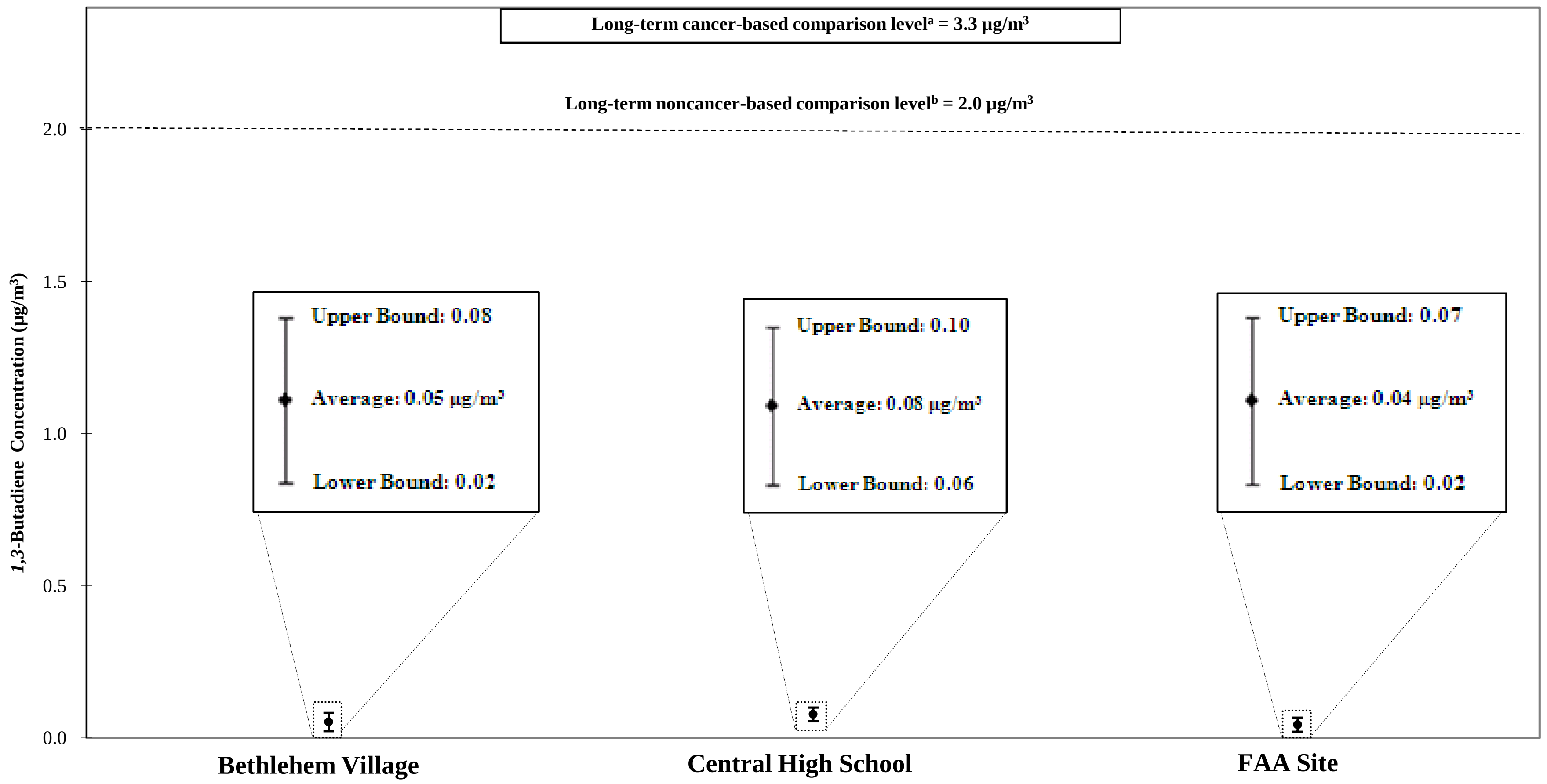
Figure 2a. St. Croix, VI Monitoring Sites – Key Pollutant (Benzene) Analysis



[a] Air toxics for which the upper 95% confidence limit on the mean concentration are near or below the noncancer-based comparison level are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the 95% confidence limits extend appreciably above the noncancer-based comparison level are fully discussed in the school-specific report and may be considered a priority for follow-up activity, if indicated in light of the full set of information available for the site.

[b] Air toxics for which the upper 95% confidence limit on the mean concentration is above the cancer-based comparison level will be fully discussed in the text and may be considered a priority for potential follow-up activities, if indicated in light of the full set of information available for the site. Findings of the upper 95% confidence limit below 1% of the comparison level (i.e., where the upper 95% confidence limit is below the corresponding 1-in-1-million cancer risk based concentration) are generally considered a low priority for follow-up activity. Situations where the summary statistics for a pollutant are below this comparison level but above 1% of of this level are fully discussed in the text of the report.

Figure 2b. St. Croix, VI Monitoring Sites – Key Pollutant (1,3-Butadiene) Analysis



[a] Air toxics for which the upper 95% confidence limit on the mean concentration is above the cancer-based comparison level will be fully discussed in the text and may be considered a priority for potential follow-up activities, if indicated in light of the full set of information available for the site. Findings of the upper 95% confidence limit below 1% of the comparison level (i.e., where the upper 95% confidence limit is below the corresponding 1-in-1-million cancer risk based concentration) are generally considered a low priority for follow-up activity. Situations where the summary statistics for a pollutant are below this comparison level but above 1% of of this level are fully discussed in the text of the report.

[b] Air toxics for which the upper 95% confidence limit on the mean concentration are near or below the noncancer-based comparison level are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the 95% confidence limits extend appreciably above the noncancer-based comparison level are fully discussed in the school-specific report and may be considered a priority for follow-up activity, if indicated in light of the full set of information available for the site.

Table 2. St. Croix, VI Monitoring Site Key Pollutant Concentrations (Benzene and 1,3-Butadiene) and Meteorological Data.

Monitoring Site	Parameter	Units	2/14/2011	2/20/2011	2/24/2011	2/26/2011	3/4/2011	3/10/2011	3/12/2011	3/16/2011	3/22/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	4/27/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	5/27/2011	6/2/2011
Bethlehem Village Site	Benzene	µg/m^3	1.27	--	0.48	0.35	0.42	0.32	--	0.34	0.40	0.74	0.34	0.60	0.38	--	0.41	0.56	0.57	0.73	2.71	--	--
	Butadiene, 1,3-	µg/m^3	0.08	--	0.05	ND	0.07	ND	--	0.05	ND	0.10	0.06	0.05	0.06	--	ND	ND	0.11	ND	0.21	--	--
	% Hours w/Wind Direction from Expected ZOI A (78°-135°)[a]	%	100	--	37.5	62.5	12.5	83.3	--	0.0	8.3	4.2	12.5	17.8	16.7	--	16.7	37.5	41.7	4.2	33.3	--	--
	Wind Speed (avg. of hourly speeds)	mph	11.9	--	10.4	13.7	5.3	4.2	--	6.8	7.8	9.2	5.7	4.9	1.7	--	7.9	7.6	2.1	8.8	5.8	--	--
	Wind Direction (avg. of unitized vector)[b]	deg.	104.3	--	67.3	75.0	49.8	111.2	--	130.6	132.2	149.0	127.3	36.2	332.6	--	131.2	126.4	141.9	190.0	162.4	--	--
	% of Hours with Speed below 2 knots	%	0.0	--	0.0	0.0	16.7	29.2	--	0.0	4.2	35.6	0.0	16.7	37.5	--	4.2	33.3	25.0	0.0	0.0	--	--
	Daily Average Temperature	° F	78.8	--	75.6	76.5	74.8	76.0	--	78.4	78.5	77.1	80.6	80.7	80.9	--	78.1	78.4	85.4	0.0	0.0	--	--
	Daily Precipitation	inches	0.00	--	0.00	0.00	0.01	0.00	--	0.00	0.00	0.00	0.00	0.96	0.00	--	0.00	0.00	0.00	0.24	0.00	--	--
Central High School	Benzene	µg/m^3	0.57	0.54	--	0.56	0.68	0.46	--	2.90	--	0.52	1.12	0.53	0.49	0.32	0.43	0.50	0.71	0.52	0.78	0.84	--
	Butadiene, 1,3-	µg/m^3	0.06	0.11	--	0.05	0.12	0.06	--	0.06	--	0.08	0.11	0.08	0.12	0.05	ND	ND	0.17	0.08	0.06	0.12	--
	% Hours w/Wind Direction from Expected ZOI A (112°-168°)[a]	%	95.8	4.2	--	62.5	12.5	0.0	--	0.0	--	0.0	0.0	8.3	0.0	0.0	4.2	0.0	12.5	8.3	50.0	8.3	--
	Wind Speed (avg. of hourly speeds)	mph	11.9	5.5	--	13.3	5.5	5.7	--	6.9	--	7.3	6.8	3.7	1.2	8.8	7.2	6.8	2.2	3.7	4.9	2.0	--
	Wind Direction (avg. of unitized vector)[b]	deg.	103.6	39.1	--	75.0	53.6	42.2	--	204.0	--	263.5	251.6	243.7	20.6	248.1	156.8	233.7	247.2	214.1	144.6	235.9	--
	% of Hours with Speed below 2 knots	%	0.0	16.7	--	0.0	16.7	12.5	--	0.0	--	0.0	0.0	54.2	87.5	0.0	0.0	0.0	54.2	20.8	12.5	54.2	--
	Daily Average Temperature	° F	78.8	75.6	--	76.5	74.8	73.8	--	78.1	--	78.8	79.2	77.8	80.2	80.7	81.3	80.9	79.1	78.2	78.5	84.1	--
	Daily Precipitation	inches	0.00	0.00	--	0.00	0.01	0.00	--	0.09	--	0.12	0.01	0.01	0.95	0.00	0.10	0.11	0.02	0.09	0.13	0.14	--
FAA Site	Benzene	µg/m^3	1.01	0.37	--	0.33	--	--	0.49	0.46	0.53	--	0.45	0.40	0.34	--	0.41	0.33	0.82	0.28	--	0.86	1.10
	Butadiene, 1,3-	µg/m^3	0.10	0.05	---	ND	---	---	0.07	0.05	ND	---	0.07	0.04	ND	---	ND	ND	0.11	ND	---	0.09	0.09
	% Hours w/Wind Direction from Expected ZOI A (56°-124°)[a]	%	8.3	25.0	--	66.7	--	--	37.5	100	83.3	--	87.5	37.5	33.3	--	58.3	95.8	87.5	91.7	--	45.8	54.2
	Wind Speed (avg. of hourly speeds)	mph	11.9	5.5	--	13.7	--	--	8.0	9.8	10.3	--	8.8	5.1	4.6	--	10.2	9.7	4.4	8.8	--	4.7	4.1
	Wind Direction (avg. of unitized vector)[b]	deg.	105.9	36.0	--	77.1	--	--	43.6	69.6	66.3	--	78.0	31.2	2.9	--	70.4	65.8	55.6	190.1	--	74.3	78.2
	% of Hours with Speed below 2 knots	%	0.0	16.7	--	0.0	--	--	8.3	0.0	4.2	--	4.2	29.2	20.8	--	20.8	0.0	0.0	4.2	--	12.5	29.2
	Daily Average Temperature	° F	78.8	75.5	--	76.5	--	--	72.6	76.5	76.3	--	74.2	80.3	80.1	--	78.6	78.1	77.8	80.3	--	80.5	81.4
	Daily Precipitation	inches	0.00	0.00	--	0.00	--	--	0.01	0.09	0.05	--	0.01	0.96	0.00	--	0.00	0.01	0.10	0.24	--	0.00	0.01

Due to insturment error, meterological measurements were not collected for part or all days at the monitoring sites. As such, hourly wind infromation was extracted from the Henry E. Rohlsen Airport NWS station and used as a surrogate.

[a] Based on count of hours for which vector wind direction is from expected zone of influence.

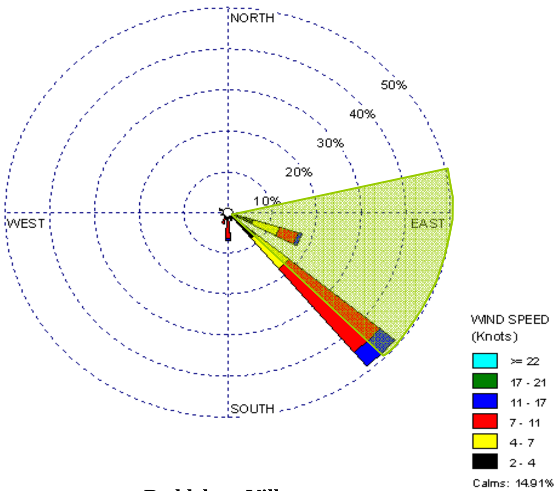
[b] Wind direction for each day is represented by values derived by scalar averaging of hourly estimates that were produced (by wind instrumentation's logger) as unitized vectors (specified as degrees from due north).

[c] For wind directions measured at the Bethlehem Site, due to the limitations of wind measurement equipment at this site, the equipment reports at the end of each hour, the results were the calculated average degrees based on their cardinal values.

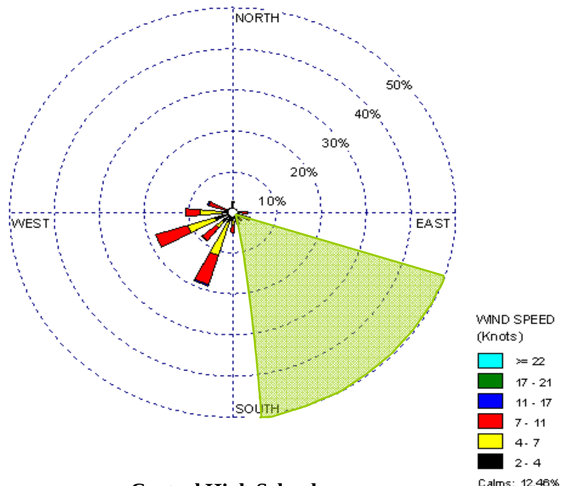
-- No sample was conducted for this pollutant on this day or the sample was invalid.

ND No detection of this chemical was registered by the laboratory analytical equipment.

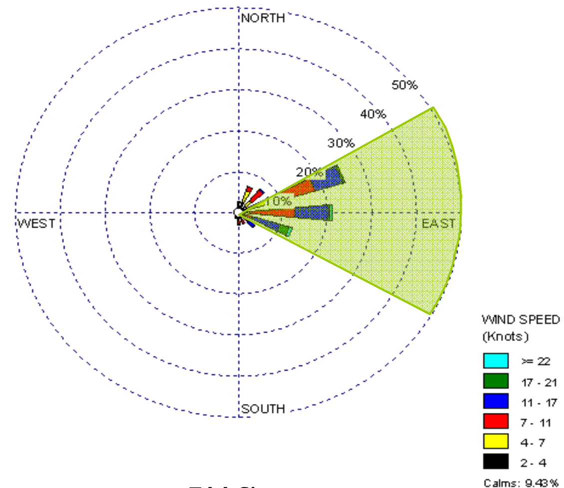
Figure 3. St. Croix, VI Monitoring Sites - Sample Day and Sample Period Windroses.



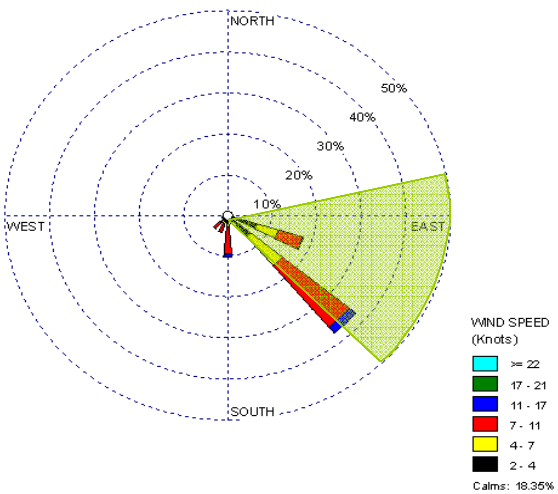
Bethlehem Village
Composite Hourly Windrose
on Sample Days
(Mar. 10, 2011- May 27, 2011)



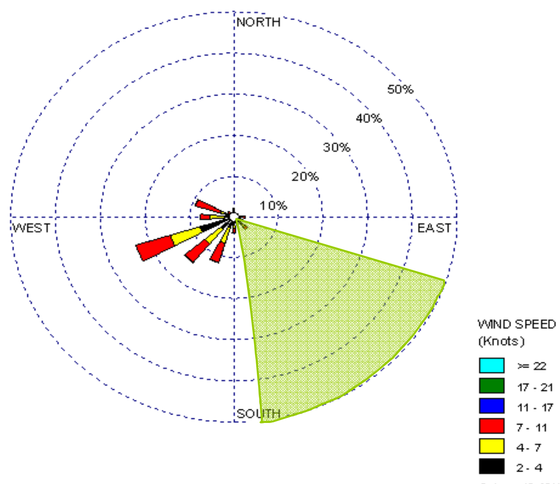
Central High School
Composite Hourly Windrose
on Sample Days
(Mar. 16, 2011- May 27, 2011)



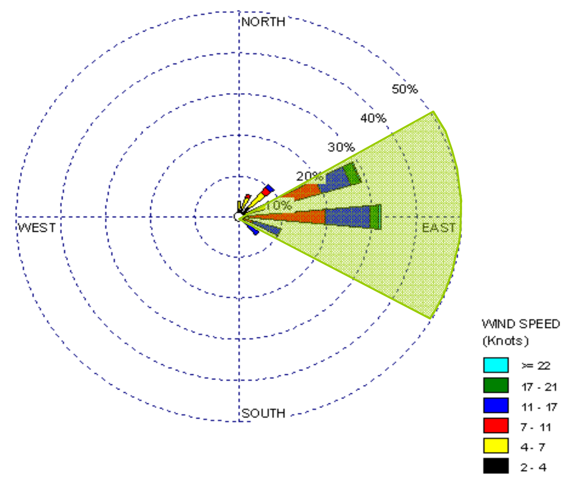
FAA Site
Composite Hourly Windrose
On Sample Days
(Feb 12, 2011- Jun. 2, 2011)



Bethlehem Village
Composite Hourly Windrose
Across the Sample Period
(Mar. 10, 2011- May 27, 2011)

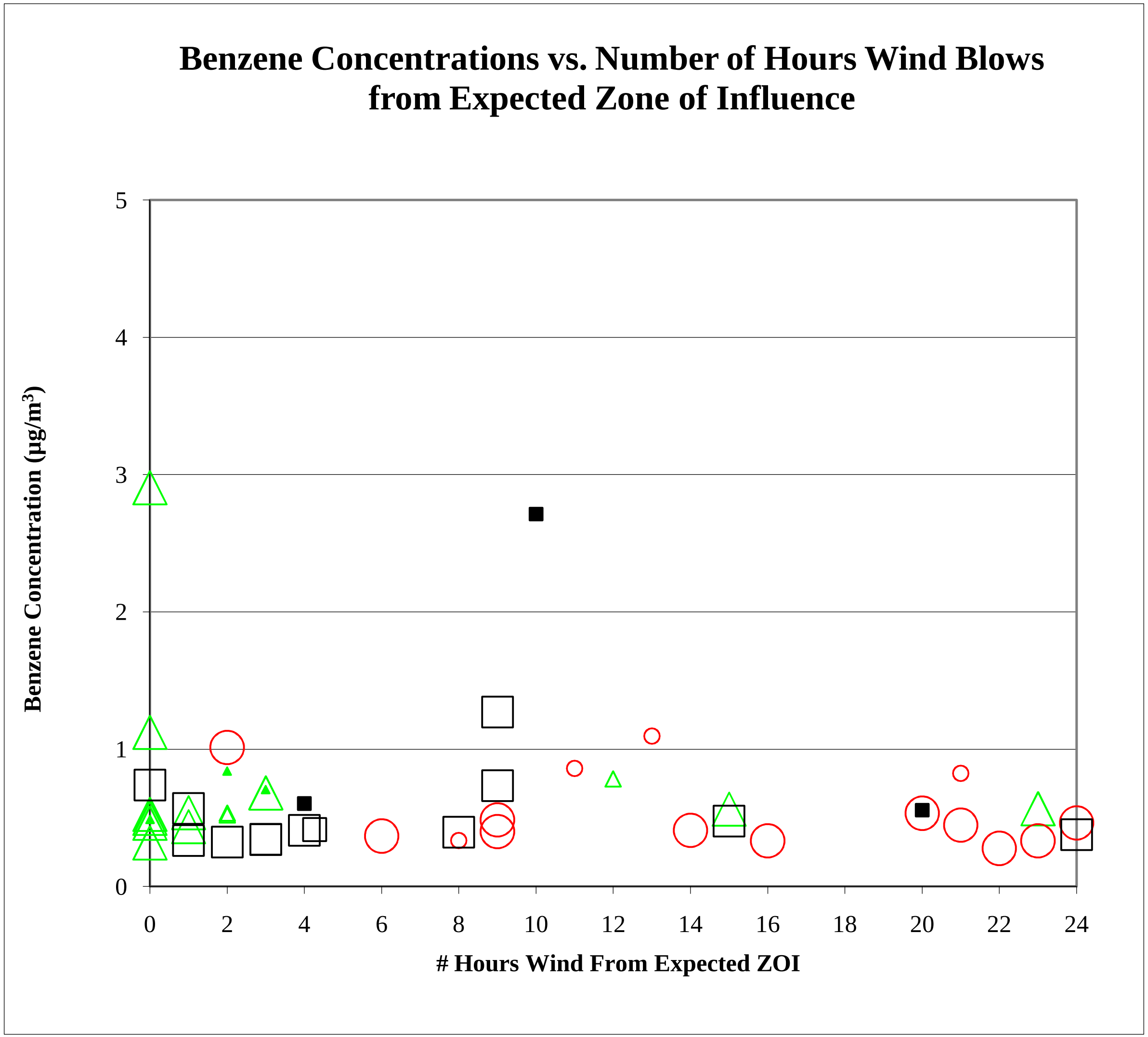


Central High School
Composite Hourly Windrose
Across the Sample Period
(Mar. 16, 2011- May 27, 2011)



FAA Site
Composite Hourly Windrose
Across the Sample Period
(Feb. 12, 2011- Jun. 2, 2011)

Figure 4a. St. Croix, VI Monitoring Sites – Key Pollutant (Benzene) Analysis.



KEY

Bethlehem Village (ZOI: 78-135 degrees)
- Wind Speed: 0.1-2.5 mph
- Wind Speed: 2.5-5.0 mph
- Wind Speed: >5.0 mph

Central High School (ZOI: 112-168 degrees)
- Wind Speed: 0.1-2.5 mph
- Wind Speed: 2.5-5.0 mph
- Wind Speed: > 5.0 mph

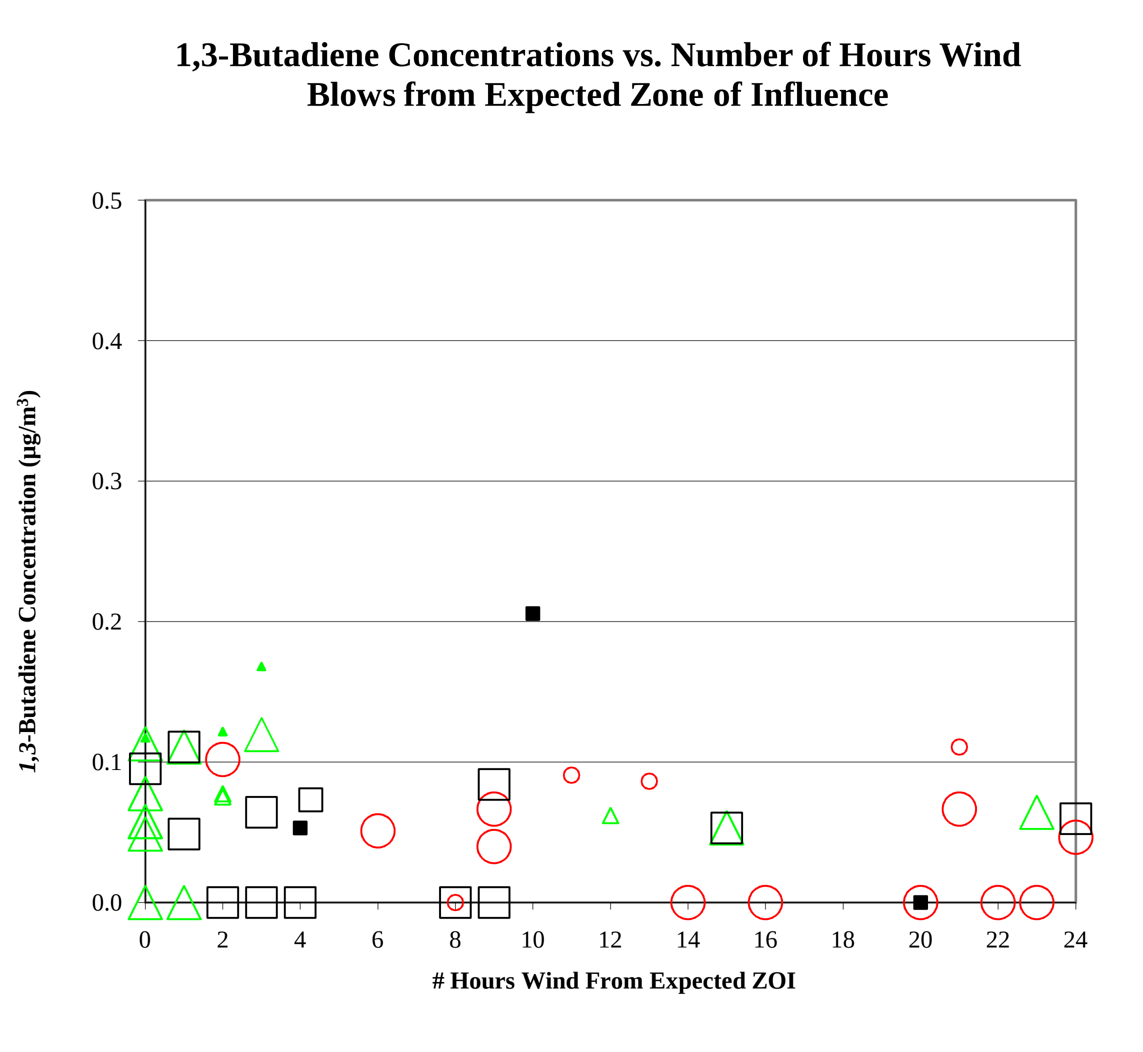
FAA Site (ZOI: 56-124 degrees)
- Wind Speed: 0.1-2.5 mph
- Wind Speed: 2.5-5.0 mph
- Wind Speed: > 5.0 mph

Pollutant: Benzene
Timeframe: February 14, 2011-June 2, 2011

Note

Each symbol denotes a 24-hour collection of air for chemical analysis. The size of the symbol indicates the magnitude of the wind speed for that day (wind data shown in Table 2). The expected zone of source influence is a rough approximation of the range of directions from which winds carrying chemicals emitted by the key source may originate.

Figure 4b. St. Croix, VI Monitoring Sites – Key Pollutant (1,3-Butadiene) Analysis.



KEY

Bethlehem Village (ZOI: 78-135 degrees)
- Wind Speed: 0.1-2.5 mph
- Wind Speed: 2.5-5.0 mph
- Wind Speed: >5.0 mph

Central High School (ZOI: 112-168 degrees)
- Wind Speed: 0.1-2.5 mph
- Wind Speed: 2.5-5.0 mph
- Wind Speed: > 5.0 mph

FAA Site (ZOI: 56-124 degrees)
- Wind Speed: 0.1-2.5 mph
- Wind Speed: 2.5-5.0 mph
- Wind Speed: > 5.0 mph

Pollutant: 1,3-Butadiene
Timeframe: February 14, 2011-June 2, 2011

Note
Each symbol denotes a 24-hour collection of air for chemical analysis. The size of the symbol indicates the magnitude of the wind speed for that day (wind data shown in Table 2). The expected zone of source influence is a rough approximation of the range of directions from which winds carrying chemicals emitted by the key source may originate.

Appendix A. Summary Description of Long-term Comparison Levels

In addressing the primary objective identified above, to investigate through the monitoring data collected for key pollutants at the monitoring sites whether levels are of a magnitude, in light of health risk-based criteria, to indicate that follow-up activities be considered, EPA developed two types of long-term health risk-related comparison levels. These two types of levels are summarized below.[16]

Cancer-based Comparison Levels

- For air toxics where applicable, EPA developed cancer risk-based comparison levels to help consider whether the monitoring data collected at the site locations indicate the potential for concentrations to pose incremental cancer risk above the range that EPA generally considers acceptable in regulatory decision-making to someone exposed to those concentrations continuously (24 hours a day, 7 days a week) over an entire lifetime.[17] This general range is from 1 to 100 in a million.
- Air toxics with long-term mean concentrations below one one-hundredth of this comparison level would be below a comparably developed level for 1-in-a-million risk (which is the lower bound of EPA's traditional acceptable risk range). Such pollutants, with long-term mean concentrations below the Agency's traditional acceptable risk range, are generally considered to pose negligible risk.
- Air toxics with long-term mean concentrations above the acceptable risk range would generally be a priority for follow-up activities. In this evaluation, EPA compared the upper 95% confidence limit on the mean concentration to the comparison level. Pollutants for which this upper limit falls above the comparison level are fully discussed in the monitoring report and may be considered a priority for potential follow-up activities in light of the full set of information available for that site.
- Situations where the summary statistics for a pollutant are below the cancer-based comparison level but above 1% of that level are fully discussed in Appendix C.

[16] These comparison levels are described in more detail *Schools Air Toxics Monitoring Activity (2009), Uses of Health Effects Information in Evaluating Sample Results*.
[17] While no one would be exposed at a school for 24 hours a day, every day for an entire lifetime, EPA chose this worst-case exposure period as a simplification for the basis of the comparison level in recognition of other uncertainties in the analysis. Use of continuous lifetime exposure yields a lower, more conservative, comparison level than would use of a characterization more specific to the school population (e.g., 5 days a week, 8-10 hours a day for a limited number of years).

<u>Noncancer-based Comparison Levels</u>

- To consider concentrations of air toxics other than lead (for which EPA has a national ambient air quality standard) with regard to potential for health effects other than cancer, EPA derived noncancer-based comparison levels using EPA chronic reference concentrations (or similar values). A chronic reference concentration (RfC) is an estimate of a long-term continuous exposure concentration (24 hours a day, every day) without appreciable risk of adverse effects over a lifetime.[18] This differs from the cancer risk-based comparison level in that it represents a concentration without appreciable risk *vs.* a risk-based concentration.
- In using this comparison level in this initiative, the upper end of the 95% confidence limit on the mean is compared to the comparison level. Air toxics for which this upper confidence limit is near or below the noncancer-based comparison level (i.e., those for which longer-term average concentration estimates are below a long-term health-related reference concentration) are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the 95% confidence limits extend appreciably above the noncancer-based comparison level are fully discussed below and may be considered a priority for follow-up activity if indicated in light of the full set of information available for the pollutant and the site.

In developing or identifying these comparison levels, EPA has given priority to use of relevant and appropriate air standards and EPA risk assessment guidance and precedents. These levels are based upon health effects information, exposure concentrations and risk estimates developed and assessed by EPA, the U.S. Agency for Toxic Substances and Disease Registry, and the California EPA. These agencies recognize the need to account for potential differences in sensitivity or susceptibility of different groups (e.g., asthmatics) or lifestages/ages (e.g., young children or the elderly) to a particular pollutant's effects so that the resulting comparison levels are relevant for these potentially sensitive groups as well as the broader population.

[18] EPA defines the RfC as "an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a NOAEL, LOAEL, or benchmark concentration, with uncertainty factors generally applied to reflect limitations of the data used. Generally used in EPA's noncancer health assessments." http://www.epa.gov/ncea/iris/help_gloss.htm#r

Appendix B. VOC and SNMOC Measurements Sampling at Selected Monitoring Sites (2004-2010).[a]

Pollutant	Method Type	Units	# Samples Analyzed	% Detections	Maximum	Arithmetic Mean[b]	Geometric Mean	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Acetonitrile	VOC	$\mu g/m^3$	8,867	77%	4482.76	9.12	1.02	ND	0.10	0.39	1.60	21.3
Acetylene	VOC	$\mu g/m^3$	9,013	100%	118.22	1.09	0.72	0.20	0.42	0.69	1.20	2.90
Acrylonitrile	VOC	$\mu g/m^3$	9,012	10%	8.70	0.46	0.21	ND	ND	ND	ND	0.18
Amyl methyl ether, *tert-*	VOC	$\mu g/m^3$	9,013	1%	1.59	0.08	0.02	ND	ND	ND	ND	ND
Benzene	VOC	$\mu g/m^3$	9,219	100%	60.80	1.33	0.92	0.32	0.57	0.85	1.37	3.32
Bromochloromethane	VOC	$\mu g/m^3$	9,013	0%	0.58	0.12	0.06	ND	ND	ND	ND	ND
Bromodichloromethane	VOC	$\mu g/m^3$	9,219	6%	22.71	0.25	0.10	ND	ND	ND	ND	0.05
Bromoform	VOC	$\mu g/m^3$	9,013	1%	0.26	0.07	0.06	ND	ND	ND	ND	ND
Bromomethane	VOC	$\mu g/m^3$	9,219	80%	120.76	0.09	0.05	ND	0.03	0.04	0.05	0.09
Butadiene, 1,3-	VOC	$\mu g/m^3$	9,219	79%	14.51	0.12	0.07	ND	0.02	0.05	0.11	0.31
Butane, *n* -	SNMOC	$\mu g/m^3$	2,729	99%	213.34	6.56	3.07	0.54	1.34	2.45	6.48	25.1
Butene, *cis* -2-	SNMOC	$\mu g/m^3$	2,729	75%	1.88	0.15	0.12	ND	0.01	0.09	0.15	0.34
Butene, *trans* -2-	SNMOC	$\mu g/m^3$	2,729	79%	3.34	0.17	0.12	ND	0.05	0.10	0.15	0.39
Carbon disulfide	VOC	$\mu g/m^3$	6,556	93%	245.36	4.40	0.47	ND	0.06	0.16	3.55	18.3
Carbon tetrachloride	VOC	$\mu g/m^3$	9,219	98%	2.14	0.66	0.63	0.35	0.55	0.63	0.76	0.98
Chlorobenzene	VOC	$\mu g/m^3$	9,219	6%	0.95	0.15	0.07	ND	ND	ND	ND	0.02
Chloroethane	VOC	$\mu g/m^3$	9,161	60%	18.71	0.06	0.04	ND	ND	0.03	0.04	0.11
Chloroform	VOC	$\mu g/m^3$	9,161	74%	48.04	0.22	0.15	ND	ND	0.10	0.16	0.56
Chloromethane	VOC	$\mu g/m^3$	9,219	100%	13.59	1.34	1.29	0.91	1.12	1.28	1.47	1.98
Chloromethylbenzene	VOC	$\mu g/m^3$	9,013	1%	0.47	0.07	0.04	ND	ND	ND	ND	ND
Chloroprene	VOC	$\mu g/m^3$	9,013	1%	1.09	0.15	0.08	ND	ND	ND	ND	ND
Chlorotoluene, *alpha-*	VOC	$\mu g/m^3$	206	77%	0.19	0.03	0.02	ND	0.01	0.02	0.03	0.05
Cyclohexane	SNMOC	$\mu g/m^3$	2,729	89%	104.98	0.91	0.33	ND	0.10	0.20	0.63	3.69
Cyclopentane	SNMOC	$\mu g/m^3$	2,729	92%	181.88	0.40	0.21	ND	0.09	0.17	0.36	1.03
Cyclopentene	SNMOC	$\mu g/m^3$	2,729	34%	2.89	0.20	0.15	ND	ND	ND	0.10	0.31
Decane, *n* -	SNMOC	$\mu g/m^3$	2,729	86%	112.90	0.60	0.26	ND	0.09	0.19	0.43	1.54
Decene, 1-	SNMOC	$\mu g/m^3$	2,729	0%	0.44	0.20	0.15	ND	ND	ND	ND	ND
Dibromochloromethane	VOC	$\mu g/m^3$	9,013	5%	6.39	0.11	0.06	ND	ND	ND	ND	0.01
Dibromoethane, 1,2-	VOC	$\mu g/m^3$	9,219	2%	0.46	0.04	0.03	ND	ND	ND	ND	ND

Appendix B. VOC and SNMOC Measurements Sampling at Selected Monitoring Sites (2004-2010).[a]

Pollutant	Method Type	Units	# Samples Analyzed	% Detections	Maximum	Arithmetic Mean[b]	Geometric Mean	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Dichlorobenzene, *m*-	VOC	µg/m^3	9,219	3%	1.08	0.06	0.04	ND	ND	ND	ND	ND
Dichlorobenzene, *o*-	VOC	µg/m^3	9,219	3%	0.84	0.07	0.04	ND	ND	ND	ND	ND
Dichlorobenzene, *p*-	VOC	µg/m^3	9,219	63%	56.82	0.21	0.10	ND	ND	0.05	0.12	0.43
Dichlorodifluoromethane	VOC	µg/m^3	9,219	100%	33.18	2.87	2.81	2.18	2.52	2.77	3.12	3.86
Dichloroethane, 1,1-	VOC	µg/m^3	9,219	2%	0.28	0.03	0.03	ND	ND	ND	ND	ND
Dichloroethylene, 1,1-	VOC	µg/m^3	9,219	2%	1.31	0.05	0.03	ND	ND	ND	ND	ND
Dichloroethylene, *cis* -1,2-	VOC	µg/m^3	9,219	2%	1.35	0.15	0.05	ND	ND	ND	ND	ND
Dichloroethylene, *trans* -1,2-	VOC	µg/m^3	9,013	1%	2.00	0.09	0.05	ND	ND	ND	ND	ND
Dichloromethane	VOC	µg/m^3	9,219	92%	430.73	1.05	0.41	ND	0.22	0.31	0.53	1.94
Dichloropropane, 1,2-	VOC	µg/m^3	9,219	2%	0.42	0.04	0.03	ND	ND	ND	ND	ND
Dichloropropene, *cis* -1,3-	VOC	µg/m^3	9,219	2%	0.64	0.03	0.02	ND	ND	ND	ND	ND
Dichloropropene, *trans-1,3-*	VOC	µg/m^3	9,219	2%	0.73	0.12	0.04	ND	ND	ND	ND	ND
Dichlorotetrafluoroethane	VOC	µg/m^3	9,013	84%	1.43	0.13	0.12	ND	0.09	0.12	0.14	0.16
Diethylbenzene, *m* -	SNMOC	µg/m^3	2,729	58%	3.23	0.20	0.14	ND	ND	0.06	0.14	0.45
Diethylbenzene, *p* -	SNMOC	µg/m^3	2,729	48%	13.83	0.36	0.18	ND	ND	ND	0.14	0.80
Dimethylbutane, 2,2-	SNMOC	µg/m^3	2,729	88%	5.22	0.32	0.23	ND	0.11	0.20	0.33	0.82
Dimethylbutane, 2,3-	SNMOC	µg/m^3	2,729	93%	8.34	0.50	0.30	ND	0.13	0.24	0.54	1.57
Dimethylpentane, 2,3-	SNMOC	µg/m^3	2,729	88%	8.96	0.54	0.35	ND	0.13	0.31	0.61	1.47
Dodecane, *n* -	SNMOC	µg/m^3	2,729	72%	82.44	0.64	0.23	ND	ND	0.12	0.31	1.31
Dodecene, 1-	SNMOC	µg/m^3	2,729	40%	8.03	0.39	0.20	ND	ND	ND	0.13	0.80
Ethane	SNMOC	µg/m^3	2,729	100%	412.00	16.74	5.59	1.12	2.48	4.06	8.73	78.7
Ethyl acrylate	VOC	µg/m^3	9,013	0%	0.78	0.14	0.04	ND	ND	ND	ND	ND
Ethyl *tert* -butyl ether	VOC	µg/m^3	9,013	1%	4.72	0.25	0.06	ND	ND	ND	ND	ND
Ethyl-1-butene, 2-	SNMOC	µg/m^3	2,729	0%	0.79	0.32	0.24	ND	ND	ND	ND	ND
Ethylbenzene	VOC	µg/m^3	9,219	98%	46.36	0.50	0.30	0.05	0.15	0.29	0.54	1.51
Ethylene	SNMOC	µg/m^3	2,704	97%	534.04	1.87	1.21	0.29	0.76	1.19	1.76	3.63
Ethylene dichloride	VOC	µg/m^3	9,219	6%	5.22	0.15	0.09	ND	ND	ND	ND	0.04
Ethyltoluene, *m* -	SNMOC	µg/m^3	2,729	92%	13.33	0.28	0.20	ND	0.10	0.18	0.32	0.65
Ethyltoluene, *o* -	SNMOC	µg/m^3	2,729	75%	31.63	0.21	0.15	ND	ND	0.11	0.20	0.41

Appendix B. VOC and SNMOC Measurements Sampling at Selected Monitoring Sites (2004-2010).[a]

Pollutant	Method Type	Units	# Samples Analyzed	% Detections	Maximum	Arithmetic Mean[b]	Geometric Mean	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Ethyltoluene, *p* -	SNMOC	µg/m^3	2,729	85%	6.39	0.20	0.15	ND	0.07	0.12	0.21	0.42
Heptane, *n* -	SNMOC	µg/m^3	2,729	96%	20.73	0.86	0.37	0.06	0.15	0.25	0.73	3.56
Heptene, 1-	SNMOC	µg/m^3	2,729	66%	3.45	0.29	0.17	ND	ND	0.08	0.19	0.86
Hexachloro-1,3-butadiene	VOC	µg/m^3	9,219	8%	1.85	0.16	0.13	ND	ND	ND	ND	0.11
Hexane, *n* -	SNMOC	µg/m^3	2,729	100%	280.22	1.85	0.77	0.15	0.32	0.61	1.76	6.85
Hexene, 1-	SNMOC	µg/m^3	2,729	75%	1.08	0.15	0.12	ND	ND	0.09	0.16	0.29
Hexene, *cis* -2-	SNMOC	µg/m^3	2,729	12%	1.19	0.10	0.07	ND	ND	ND	ND	0.08
Hexene, *trans* -2-	SNMOC	µg/m^3	2,729	10%	0.84	0.09	0.08	ND	ND	ND	ND	0.07
Isobutane	SNMOC	µg/m^3	2,729	100%	274.55	5.18	1.77	0.27	0.64	1.27	4.65	22.4
Isobutene/1-Butene	SNMOC	µg/m^3	2,729	87%	37.46	0.96	0.66	ND	0.27	0.54	1.02	2.66
Isopentane	SNMOC	µg/m^3	2,729	93%	431.42	8.48	4.21	ND	1.51	3.61	9.15	22.9
Isoprene	SNMOC	µg/m^3	2,729	85%	7.58	0.83	0.35	ND	0.07	0.20	0.91	2.94
Isopropylbenzene	SNMOC	µg/m^3	2,729	47%	6.45	0.09	0.07	ND	ND	ND	0.07	0.14
Methyl Ethyl Ketone	VOC	µg/m^3	9,110	86%	376.97	2.13	1.29	ND	0.48	1.04	1.99	5.59
Methyl Isobutyl Ketone	VOC	µg/m^3	9,013	68%	20.40	0.29	0.17	ND	ND	0.09	0.20	0.66
Methyl Methacrylate	VOC	µg/m^3	9,013	5%	41.77	0.86	0.21	ND	ND	ND	ND	0.03
Methyl *tert* -butyl ether	VOC	µg/m^3	9,219	15%	175.22	0.93	0.18	ND	ND	ND	ND	0.50
Methyl-1-butene, 2-	SNMOC	µg/m^3	2,729	65%	39.36	0.32	0.19	ND	ND	0.09	0.24	0.69
Methyl-1-butene, 3-	SNMOC	µg/m^3	2,729	5%	2.25	0.26	0.16	ND	ND	ND	ND	0.06
Methyl-1-pentene, 2-	SNMOC	µg/m^3	2,729	11%	1.22	0.08	0.06	ND	ND	ND	ND	0.06
Methyl-1-pentene, 4-	SNMOC	µg/m^3	2,729	16%	4.68	0.23	0.18	ND	ND	ND	ND	0.25
Methyl-2-butene, 2-	SNMOC	µg/m^3	2,729	66%	6.43	0.19	0.14	ND	ND	0.08	0.17	0.42
Methylcyclohexane	SNMOC	µg/m^3	2,729	94%	48.98	1.52	0.42	ND	0.12	0.29	0.84	7.26
Methylcyclopentane	SNMOC	µg/m^3	2,729	99%	171.53	0.92	0.45	0.09	0.20	0.40	0.89	3.32
Methylheptane, 3-	SNMOC	µg/m^3	2,729	75%	5.65	0.27	0.16	ND	ND	0.10	0.21	0.77
Methylheptane, 2-	SNMOC	µg/m^3	2,729	76%	7.42	0.35	0.20	ND	0.02	0.14	0.28	1.02
Methylhexane, 2-	SNMOC	µg/m^3	2,729	84%	14.23	0.69	0.40	ND	0.13	0.30	0.63	2.07
Methylhexane, 3-	SNMOC	µg/m^3	2,729	94%	22.07	0.96	0.58	ND	0.22	0.58	1.12	2.85
Methylpentane, 2-	SNMOC	µg/m^3	2,729	98%	41.30	1.95	1.15	0.21	0.52	1.07	2.22	6.17

Appendix B. VOC and SNMOC Measurements Sampling at Selected Monitoring Sites (2004-2010).[a]

Pollutant	Method Type	Units	# Samples Analyzed	% Detections	Maximum	Arithmetic Mean[b]	Geometric Mean	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Methylpentane, 3-	SNMOC	μg/m^3	2,729	99%	95.17	1.06	0.58	0.13	0.29	0.49	1.10	3.47
Nonane, *n* -	SNMOC	μg/m^3	2,729	90%	13.35	0.38	0.20	ND	0.08	0.15	0.31	1.38
Nonene, 1-	SNMOC	μg/m^3	2,729	47%	1.97	0.14	0.11	ND	ND	ND	0.10	0.24
Octane, *n* -	VOC	μg/m^3	9,013	77%	77.55	0.26	0.14	ND	0.04	0.09	0.19	0.56
Octene, 1-	SNMOC	μg/m^3	2,729	33%	2.00	0.13	0.10	ND	ND	ND	0.06	0.20
Pentane, *n* -	SNMOC	μg/m^3	2,728	100%	1746.94	5.27	2.04	0.42	0.91	1.74	4.17	15.8
Pentene, 1-	SNMOC	μg/m^3	2,729	86%	100.40	0.45	0.19	ND	0.09	0.15	0.24	0.76
Pentene, *cis*- 2-	SNMOC	μg/m^3	2,729	64%	10.86	0.14	0.10	ND	ND	0.07	0.11	0.23
Pentene, *trans* -2-	SNMOC	μg/m^3	2,729	79%	5.33	0.19	0.15	ND	0.05	0.12	0.20	0.40
Pinene, *a* -	SNMOC	μg/m^3	2,729	74%	14.54	0.74	0.36	ND	ND	0.20	0.56	2.19
Pinene, *b* -	SNMOC	μg/m^3	2,729	20%	3.29	0.59	0.38	ND	ND	ND	ND	0.81
Propane	SNMOC	μg/m^3	2,729	100%	382.98	14.27	6.36	1.29	2.70	5.10	13.59	55.7
Propylbenzene, *n* -	SNMOC	μg/m^3	2,729	75%	3.76	0.14	0.11	ND	0.02	0.08	0.14	0.27
Propylene	VOC	μg/m^3	9,013	100%	79.86	1.11	0.69	0.19	0.39	0.64	1.12	3.00
Propyne	SNMOC	μg/m^3	2,729	0%	0.28	0.10	0.07	ND	ND	ND	ND	ND
Styrene	VOC	μg/m^3	9,161	84%	34.29	0.30	0.14	ND	0.04	0.10	0.21	0.81
Tetrachloroethane, 1,1,2,2-	VOC	μg/m^3	9,219	2%	1.30	0.07	0.05	ND	ND	ND	ND	ND
Tetrachloroethylene	VOC	μg/m^3	9,219	72%	219.75	0.45	0.17	ND	ND	0.09	0.23	0.71
Toluene	VOC	μg/m^3	9,219	100%	229.50	2.78	1.63	0.34	0.81	1.55	3.13	8.74
Trichlorobenzene, 1,2,4-	VOC	μg/m^3	9,219	5%	4.23	0.14	0.08	ND	ND	ND	ND	0.01
Trichloroethane, 1,1,1-	VOC	μg/m^3	9,219	84%	6.44	0.12	0.10	ND	0.07	0.09	0.11	0.16
Trichloroethane, 1,1,2-	VOC	μg/m^3	9,219	2%	0.33	0.03	0.02	ND	ND	ND	ND	ND
Trichloroethylene	VOC	μg/m^3	9,219	30%	12.63	0.24	0.12	ND	ND	ND	0.05	0.27
Trichlorofluoromethane	VOC	μg/m^3	9,161	100%	31.52	1.63	1.57	1.17	1.39	1.55	1.74	2.25
Trichlorotrifluoroethane	VOC	μg/m^3	8,955	98%	25.67	0.81	0.78	0.54	0.69	0.77	0.85	1.15
Tridecane, *n* -	SNMOC	μg/m^3	2,729	20%	20.36	0.26	0.11	ND	ND	ND	ND	0.19
Tridecene, 1-	SNMOC	μg/m^3	2,729	4%	36.95	0.42	0.07	ND	ND	ND	ND	ND
Trimethylbenzene, 1,2,3-	SNMOC	μg/m^3	2,728	66%	18.35	0.17	0.12	ND	ND	0.07	0.13	0.32
Trimethylbenzene, 1,2,4-	VOC	μg/m^3	9,219	93%	54.56	0.46	0.26	ND	0.10	0.25	0.49	1.33

Appendix B. VOC and SNMOC Measurements Sampling at Selected Monitoring Sites (2004-2010).[a]

Pollutant	Method Type	Units	# Samples Analyzed	% Detections	Maximum	Arithmetic Mean[b]	Geometric Mean	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile
Trimethylbenzene, 1,3,5-	VOC	µg/m^3	9,219	86%	16.62	0.16	0.10	ND	0.03	0.08	0.15	0.44
Trimethylpentane, 2,2,3-	SNMOC	µg/m^3	2,729	52%	9.93	0.22	0.15	ND	ND	0.05	0.15	0.39
Trimethylpentane, 2,2,4-	SNMOC	µg/m^3	2,729	90%	68.91	0.61	0.32	ND	0.12	0.26	0.52	1.55
Trimethylpentane, 2,3,4-	SNMOC	µg/m^3	2,729	82%	16.59	0.23	0.15	ND	0.06	0.11	0.21	0.54
Undecane, *n* -	SNMOC	µg/m^3	2,729	79%	254.56	1.04	0.32	ND	0.07	0.19	0.48	2.02
Undecene, 1-	SNMOC	µg/m^3	2,729	36%	14.46	0.46	0.22	ND	ND	ND	0.10	0.93
Vinyl chloride	VOC	µg/m^3	9,219	14%	1.61	0.03	0.02	ND	ND	ND	ND	0.03
Xylene, *m,p*-	VOC	µg/m^3	9,219	99%	105.95	1.17	0.67	0.11	0.33	0.65	1.30	3.78
Xylene, *o*-	VOC	µg/m^3	9,219	98%	24.10	0.46	0.28	0.04	0.13	0.26	0.52	1.45

Key Pollutant

ND No results of this chemical were registered by the laboratory analytical equipment.

[a] The summary statistics in this table represent the range of actual daily measurement values taken at monitoring sites participating under EPA's National Monitoring Contract from 2004 through 2009. Additionally, data from special studies were included, such as EPA's Phase 1 School Air Toxics Monitoring Initiative (2009 and 2010), monitoring data following the BP Oil Spill in the Gulf of Mexico (2010), and community-scale air toxics data for Tonawanda, NY (2007-2010). During the time period of interest, there 117 sites measuring VOCs and 24 sites measuring SNMOCs. We note that some sites did not sample for particular pollutant types for all years of interest. The historical concentrations measured at these sites can thus provide a comparison point useful in understanding the magnitude of pollutant concentrations taken at the Virgin Islands monitoring sites. For example, it may be useful to calculate the frequency of the pollutant concentrations that are higher than the 75th percentile of the above historical sampling.

[b] In calculations involving non-detects (ND), a value of zero is used.

Appendix C. Analysis of Other (non-key) Air Toxics Monitored at the Monitoring Sites and Multiple-pollutant Considerations.

At each site, monitoring has been targeted to get information on a limited set of key hazardous air pollutants (HAPs).[19] These pollutants are the primary focus of the monitoring activities at each monitoring site and a priority for EPA based on our emissions, modeling and other information. In analyzing air samples for these key pollutants, EPA has also obtained results for some other pollutants that are routinely included with the same test method. Our consideration of the data collected for these additional HAPs is described in the first section below. In addition to evaluating monitoring results for individual pollutants, EPA also considered the potential for cumulative impacts from multiple pollutants as described in the second section below (See Tables C-1 through C-3).

<u>Other Air Toxics (HAPs)</u>

- Do the monitoring data indicate elevated levels of any other air toxics or hazardous air pollutant (HAPs) that pose significant long-term health concerns?
  - → The longer-term concentration estimates for the other HAPs monitored for Bethlehem, CHS, and the FAA sites are below their long-term comparison levels.
    - ▪ Further, for pollutants with cancer-based comparison levels at these monitoring sites, the longer-term concentration estimates for all but one of these (acrylonitrile at FAA only) are more than 10-fold lower, and all but four (also carbon tetrachloride (all three sites), *p*-dichlorobenzene (Bethlehem only), and ethylbenzene (Bethlehem only)) are more than 100-fold lower.[20]
  - → Additionally each individual measurement for these pollutants is below the individual sample (short-term) screening level developed for considering potential short-term exposures for that pollutant.[21]

<u>Additional Information on Four HAPs:</u>

- ▪ The first HAP mentioned above is acrylonitrile. The mean and 95 percent upper bound on the mean for acrylonitrile are approximately 22% for FAA of the cancer-based comparison level. A review of information available at other sites nationally shows that the mean acrylonitrile concentrations at the FAA site are greater than the 95th percentile

[19] Section 112(b) of the Clean Air Act identifies 189 hazardous air pollutants, three of which have subsequently been removed from this list. These pollutants are the focus of regulatory actions involving stationary sources described by CAA section 112 and are distinguished from the six pollutants for which criteria and national ambient air quality standards (NAAQS) are developed as described in section 108. One of the criteria pollutants, lead, is also represented as lead compounds on the HAP list.
[20] For pollutants with cancer-based comparison levels, being 10-fold and 100-fold lower than the comparison level would indicate longer-term estimates below continuous (24 hours a day, 7 days a week) lifetime exposure concentrations associated with 10^{-5} and 10^{-6} excess cancer risk, respectively.
[21] The individual sample screening levels and their use is summarized on the website and described in detail in *Schools Air Toxics Monitoring Activity (2009), Uses of Health Effects Information in Evaluating Sample Results.*

of historical samples collected from 2004 to 2010 at selected VOC monitoring sites (Appendix B).

- The second HAP mentioned above is carbon tetrachloride. For all three monitoring site locations, the mean and 95 percent upper bound on the mean for carbon tetrachloride are approximately 4% of the cancer-based comparison level. A review of information available at other sites nationally shows that the mean concentration of carbon tetrachloride at all the sites are between the 50^{th} and 75^{th} percentile of historical samples collected from 2004 to 2010 at selected VOC monitoring sites (Appendix B). Carbon tetrachloride is found globally as a result of its significant past uses in refrigerants and propellants for aerosol cans and its chemical persistence. Virtually all uses have been discontinued. However, it is still measured throughout the world as a result of its slow rate of degradation in the environment and global distribution in the atmosphere.
- The third HAP mentioned above is *p*-dichlorobenzene. The mean and 95 percent upper bound on the mean for *p*-dichlorobenzene are approximately 6% for Bethlehem Village and 4% for Central High School of the cancer-based comparison level. A review of information available at other sites nationally shows that the mean concentration of *p*-dichlorobenzene at Bethlehem is between the 75^{th} and 95^{th} percentile of historical samples collected from 2004 to 2010 at selected VOC monitoring sites (Appendix B).
- The fourth HAP mentioned above is ethylbenzene. For all three monitoring sites, the mean and 95 percent upper bound on the mean for ethylbenzene are approximately 1% of the cancer-based comparison level. A review of information available at other sites nationally shows that the mean concentration of ethylbenzene at the Bethlehem Village site is between the 50^{th} and 75^{th} percentile of historical samples collected from 2004 to 2010 at selected VOC monitoring sites (Appendix B).

Multiple Pollutants

As described in the main body of the report and background materials, this study and the associated analyses are focused on investigation of key pollutants for each monitoring sites that were identified by previous analyses. This focused design does not provide for the consideration of combined impacts of pollutants or stressors other than those monitored in this project. Broader analyses and those involving other pollutants may be the focus of other EPA activities.[22]

In our consideration of the potential for impacts from key pollutants at the three St. Croix locations, EPA has also considered the potential for other monitored pollutants to be present at levels that in combination with the key pollutant levels contribute to an increased potential for cumulative impacts. This was done in cases where estimates of longer-term concentrations for any non-key HAPs are within an order of magnitude of their comparison levels even if these pollutant levels fall below the comparison levels. This analysis is summarized below.

- Do the data collected for the air toxics monitored indicate the potential for other monitored pollutants to be present at levels that in combination with the key pollutant

[22] General information on additional air pollutants is available at http://www.epa.gov/air/airpollutants.html.

levels indicate an increased potential for cumulative impacts of significant concern (e.g., that might warrant further investigation)?

→ The multiple air toxics monitored at Bethlehem, CHS, and the FAA sites were below the levels of significant concern for multi-pollutant cumulative risk; however, these results do indicate the influence of multiple pollutants of concern that are the focus of EPA actions nationwide.

Table C-1. Bethlehem Village - Other Monitored Pollutant Analysis.

Parameter	Units	Mean of Measurements[a]	95% Confidence Interval on the Mean	Long-term Comparison Level[b] Cancer-Based[c]	Long-term Comparison Level[b] Noncancer-Based[d]
NON-KEY HAPS WITH MEAN LOWER THAN 10% OF THE LOWEST COMPARISON LEVEL					
Carbon tetrachloride	µg/m³	0.62	0.57 - 0.67	17	100
Chloromethane	µg/m³	1.51	1.33 - 1.68	NA	90
Dichlorobenzene, *p*-	µg/m³	0.09	0.06 - 0.13	9.1	800
Carbon Disulfide	µg/m³	7.12	5.91 - 8.33	NA	700
Ethylbenzene	µg/m³	0.33	0.25 - 0.41	40	1000
Xylene, *m/p*-	µg/m³	0.82	0.58 - 1.06	NA	100
Acetonitrile	µg/m³	0.32	0.29 - 0.36	NA	60
Xylene, *o*-	µg/m³	0.35	0.27 - 0.44	NA	100
Dichloromethane	µg/m³	0.29	0.19 - 0.38	210	1000
Toluene	µg/m³	1.46	0.58 - 2.33	NA	5000
Styrene	µg/m³	0.26	0.18 - 0.34	NA	1000
Methyl isobutyl ketone	µg/m³	0.22	0.15 - 0.28	NA	3000
Trichloroethane, 1,1,1-	µg/m³	0.05	0.03 - 0.07	NA	5000
Acrylonitrile	µg/m³	0.09	0.03 - 0.14	1.5	2
Bromomethane	µg/m³	0.05 [e]	0.03 - 0.07	NA	5
Tetrachloroethylene	µg/m³	0.03 [f]	0.01 - 0.06	17	270
NON-KEY HAPS WITH MORE THAN 50% ND RESULTS					
Chloroform	µg/m³	68% of the results were ND[g]		NA	98
Hexachloro-1,3-butadiene	µg/m³	75% of the results were ND[h]		4.5	90
Ethylene dichloride	µg/m³	75% of the results were ND[i]		3.8	2400
Chloroethane	µg/m³	81% of the results were ND[j]		NA	10000
Bromoform	µg/m³	88% of the results were ND[k]		91	NA
Trichloroethylene	µg/m³	88% of the results were ND[l]		50	600
Methyl *tert*- butyl ether	µg/m³	88% of the results were ND[m]		380	3000
Dibromoethane, 1,2-	µg/m³	94% of the results were ND[n]		0.17	9
Vinyl chloride	µg/m³	94% of the results were ND[o]		11	100
Dichloroethene, 1,1-	µg/m³	94% of the results were ND[p]		NA	200
NO OTHER HAPS WERE DETECTED IN ANY SAMPLES					

µg/m³ micrograms per cubic meter

NA Not Applicable

ND No detection of this chemical was registered by the laboratory analytical equipment.

[a] Mean of measurements is the average of all sample results which include actual measured values. If no chemical was registered, then a value of zero is used when calculating the mean.

[b] Details regarding these values are in the technical report, Schools Air Toxics Monitoring Activity (2009) Uses of Health Effects Information in Evaluating Sample Results.

[c] Air toxics for which the upper 95% confidence limit on the mean concentration is above this level will be fully discussed in the text and may be considered a priority for potential follow-up activities, if indicated in light of the full set of information available for the site. Findings of the upper 95% confidence limit below 1% of the comparison level (i.e., where the upper 95% confidence limit is below the corresponding 1-in-1-million cancer risk based concentration) are generally considered a low priority for follow-up activity. Situations where the summary statistics for a pollutant are below this comparison level but above 1% of this level are fully discussed in the text of the report.

Table C-1. Bethlehem Village - Other Monitored Pollutant Analysis.

[d] Air toxics for which the upper 95% confidence limit on the mean concentration are near or below the noncancer-based comparison level are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the 95% confidence limits extend appreciably above the noncancer-based comparison level are fully discussed in the school-specific report and may be considered a priority for follow-up activity, if indicated in light of the full set of information available for the site.

[e] Bromomethane was detected in 9 of 16 samples, with a range of 0.05 to 0.12 µg/m^3. The MDL is 0.035 µg/m^3.

[f] Tetrachloroethylene was detected in 11 of 16 samples with a range of 0.05 to 0.136 µg/m^3. The MDL is 0.122 µg/m^3.

[g] Chloroform was detected in 5 of 16 samples with a range of 0.07 to 0.181 µg/m^3. The MDL is 0.044 µg/m^3.

[h] Hexachloro-1,3-butadiene was detected in only 4 of 16 samples with a range from 0.05 to 0.16 µg/m^3. The MDL is 0.036 µg/m^3.

[i] Ethylene dichloride was detected in only 4 of 16 samples with a range of 0.06 to 0.09 µg/m^3. The MDL is 0.036 µg/m^3.

[j] Chloroethane was detected in 3 of 16 samples with a range of 0.03 to 0.08 µg/m^3. The MDL is 0.024 µg/m^3.

[k] Bromoform was detected in only 2 of 16 samples with a range of 0.09 to 0.10 µg/m^3. The MDL is 0.258 µg/m^3.

[l] Trichloroethylene, ***1,2-*** was detected in 2 of 16 samples with a range of 0.03 to 0.08 µg/m^3. The MDL is 0.134 µg/m^3.

[m] Methyl ***tert-*** butyl ether was detected in 2 of 16 samples with a range of 0.13 to 0.22 µg/m^3. The MDL is 0.029 µg/m^3.

[n] Dibromoethane, 1,2- was detected in only 1 of 16 samples with a value of 0.04 µg/m^3. The MDL is 0.138 µg/m^3.

[o] Vinyl chloride was detected in only 1 of 16 samples with a value of 0.01 µg/m^3. The MDL is 0.020 µg/m^3.

[p] Dichloroethene, 1,1 was detected in only 1 of 16 samples with a value of 0.04 µg/m^3. The MDL is 0.036 µg/m^3.

Table C-2. Central High School - Other Monitored Pollutant Analysis.

Parameter	Units	Mean of Measurements[a]	95% Confidence Interval on the Mean	Long-term Comparison Level[b]	
				Cancer-Based[c]	Noncancer-Based[d]
NON-KEY HAPS WITH MEAN LOWER THAN 10% OF THE LOWEST COMPARISON LEVEL					
Carbon tetrachloride	µg/m³	0.63	0.59 - 0.78	17	100
Chloromethane	µg/m³	1.65	1.24 - 4.65	NA	90
Xylene, *m/p-*	µg/m³	0.70	0.58 - 1.12	NA	100
Ethylbenzene	µg/m³	0.26	0.23 - 0.42	40	1000
Acetonitrile	µg/m³	0.34	0.29 - 0.57	NA	60
Xylene, *o-*	µg/m³	0.32	0.26 - 0.50	NA	100
Dichloromethane	µg/m³	0.23	0.19 - 0.40	210	1000
Carbon disulfide	µg/m³	0.41	0 - 5.92	NA	700
Toluene	µg/m³	1.22	1.03 - 1.95	NA	5000
Styrene	µg/m³	0.17	0.14 - 0.29	NA	1000
Methyl isobutyl ketone	µg/m³	0.19	0.16 - 0.34	NA	3000
Trichloroethane, 1,1,1-	µg/m³	0.05	0.03 - 0.09	NA	5000
Acrylonitrile	µg/m³	0.11 [e]	0.06 - 0.28	1.50	2
Bromomethane	µg/m³	0.04 [f]	0.02 - 0.12	NA	5
Dichlorobenzene, *p-*	µg/m³	0.06 [g]	0.04 - 0.14	9.1	800
NON-KEY HAPS WITH MORE THAN 50% ND RESULTS					
Dibromoethane, 1,2-	µg/m³	88% of the results were ND[h]		0.17	9
Hexachloro-1,3-butadiene	µg/m³	76% of the results were ND[i]		4.5	90
Ethylene dichloride	µg/m³	82% of the results were ND[j]		3.8	2400
Tetrachloroethylene	µg/m³	65% of the results were ND[k]		17	270
Tetrachloroethane, 1,1,2,2-	µg/m³	94% of the results were ND[l]		1.7	NA
Benzyl chloride	µg/m³	94% of the results were ND[m]		2	NA
Vinyl chloride	µg/m³	88% of the results were ND[n]		11	100
Chloroform	µg/m³	82% of the results were ND[o]		NA	98
Bromoform	µg/m³	94% of the results were ND[p]		91	NA
Trichloroethylene	µg/m³	94% of the results were ND[q]		50	600
Trichlorobenzene, 1,2,4-	µg/m³	88% of the results were ND[r]		NA	200
Chloroethane	µg/m³	76% of the results were ND[s]		NA	10000
Chlorobenzene	µg/m³	94% of the results were ND[t]		NA	1000
NO OTHER HAPS WERE DETECTED IN ANY SAMPLES					

µg/m³ micrograms per cubic meter
NA Not Applicable
ND No detection of this chemical was registered by the laboratory analytical equipment.

[a] Mean of measurements is the average of all sample results which include actual measured values. If no chemical was registered, then a value of zero is used when calculating the mean.

[b] Details regarding these values are in the technical report, Schools Air Toxics Monitoring Activity (2009) Uses of Health Effects Information in Evaluating Sample Results.

[c] Air toxics for which the upper 95% confidence limit on the mean concentration is above this level will be fully discussed in the text and may be considered a priority for potential follow-up activities, if indicated in light of the full set of information available for the site. Findings of the upper 95% confidence limit below 1% of the comparison level (i.e., where the upper 95% confidence limit is below the corresponding 1-in-1-million cancer risk based concentration) are generally considered a low priority for follow-up activit

Table C-2. Central High School - Other Monitored Pollutant Analysis.

Situations where the summary statistics for a pollutant are below this comparison level but above 1% of this level are fully discussed in the text of the report.

[d] Air toxics for which the upper 95% confidence limit on the mean concentration are near or below the noncancer-based comparison level are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the 95' confidence limits extend appreciably above the noncancer-based comparison level are fully discussed in the school-specific report and may be considered a priority for follow-up activity, if indicated in light of the full set of information available for the site.

[e] Acrylonitrile was detected in 11 of 17 samples, with a range of 0.11 to 0.28 µg/m^3. The MDL is 0.040 µg/m^3.

[f] Bromomethane was detected in 10 of 17 samples with a range of 0.05 to 0.12 µg/m^3. The MDL is 0.035 µg/m^3.

[g] Dichlorobenzene, ***p-*** was detected in 11 of 17 samples with a range of 0.05 to 0.14 µg/m^3. The MDL is 0.210 µg/m^3.

[h] Dibromoethane, 1,2- was detected in only 2 of 17 samples with a range of 0.05 to 0.69 µg/m^3. The MDL is 0.138 µg/m^3.

[i] Hexachloro-1,3-butadiene was detected in only 4 of 17 samples with a range of 0.06 to 0.10 µg/m^3. The MDL is 0.395 µg/m^3.

[j] Ethylene dichloride was detected in only 3 of 17 samples with a range of 0.07 to 0.09 µg/m^3. The MDL is 0.036 µg/m^3.

[k] Tetrachloroethylene was detected in only 6 of 17 samples with a range of 0.08 to 0.58 µg/m^3. The MDL is 0.122 µg/m^3.

[l] Tetrachloroethane, 1,1,2,2- was detected in only 1 of 17 samples with a value of 0.08 µg/m^3. The MDL is 0.165 µg/m^3.

[m] Benzyl chloride was detected in only 1 of 17 samples with a value of 0.08 µg/m^3. The MDL is 0.202 µg/m^3.

Table C-3. FAA Site - Other Monitored Pollutant Analysis.

Parameter	Units	Mean of Measurements[a]	95% Confidence Interval on the Mean	Long-term Comparison Level[b]	
				Cancer-Based[c]	Noncancer-Based[d]
NON-KEY HAPS WITH MEAN HIGHER THAN 10% OF THE LOWEST COMPARISON LEVEL					
Acrylonitrile	µg/m³	0.16	0.12 - 0.33	1.5	2
NON-KEY HAPS WITH MEAN LOWER THAN 10% OF THE LOWEST COMPARISON LEVEL					
Carbon tetrachloride	µg/m³	0.66	0.62 - 0.77	17	100
Chloromethane	µg/m³	1.72	1.57 - 2.21	NA	90
Ethylbenzene	µg/m³	0.23	0.18 - 0.38	40	1000
Xylene, *m/p-*	µg/m³	0.51	0.38 - 0.90	NA	100
Acetonitrile	µg/m³	0.33	0.28 - 0.44	NA	60
Xylene, *o-*	µg/m³	0.25	0.19 - 0.43	NA	100
Dichloromethane	µg/m³	0.29	0.23 - 0.56	210	1000
Toluene	µg/m³	1.05	0.69 - 2.53	NA	5000
Styrene	µg/m³	0.19	0.16 - 0.30	NA	1000
Carbon disulfide	µg/m³	0.09	0.06 - 0.26	NA	700
Methyl isobutyl ketone	µg/m³	0.14	0.10 - 0.31	NA	3000
Trichloroethane, 1,1,1-	µg/m³	0.07	0.05 - 0.10	NA	5000
Bromomethane	µg/m³	0.04 [e]	0.02 - 0.11	NA	5
NON-KEY HAPS WITH MORE THAN 50% ND RESULTS					
Dibromoethane, 1,2-	µg/m³	93% of the results were ND[f]		0.17	9
Hexachloro-1,3-butadiene	µg/m³	80% of the results were ND[g]		4.5	90
Tetrachloroethane, 1,1,2,2-	µg/m³	93% of the results were ND[h]		1.7	NA
Ethylene dichloride	µg/m³	80% of the results were ND[i]		3.8	2400
Dichlorobenzene, *p-*	µg/m³	53% of the results were ND[j]		9.1	800
Tetrachloroethylene	µg/m³	67% of the results were ND[k]		17	270
Chloroform	µg/m³	60% of the results were ND[l]		NA	98
Bromoform	µg/m³	87% of the results were ND[m]		91	NA
Vinyl chloride	µg/m³	93% of the results were ND[n]		11	100
Trichloroethylene	µg/m³	93% of the results were ND[o]		50	600
Trichlorobenzene, 1,2,4-	µg/m³	87% of the results were ND[p]		NA	200
Methyl *tert-* butyl ether	µg/m³	93% of the results were ND[q]		380	3000
Methyl methacrylate	µg/m³	93% of the results were ND[r]		NA	700
Chloroethane	µg/m³	80% of the results were ND[s]		NA	10000
NO OTHER HAPS WERE DETECTED IN ANY SAMPLES					

µg/m³ micrograms per cubic meter
NA Not Applicable
ND No detection of this chemical was registered by the laboratory analytical equipment.

[a] Mean of measurements is the average of all sample results which include actual measured values. If no chemical was registered, then a value of zero is used when calculating the mean.

[b] Details regarding these values are in the technical report, Schools Air Toxics Monitoring Activity (2009) Uses of Health Effects Information in Evaluating Sample Results.

[c] Air toxics for which the upper 95% confidence limit on the mean concentration is above this level will be fully discussed in the tex and may be considered a priority for potential follow-up activities, if indicated in light of the full set of information available for t site. Findings of the upper 95% confidence limit below 1% of the comparison level (i.e., where the upper 95% confidence limit is below the corresponding 1-in-1-million cancer risk based concentration) are generally considered a low priority for follow-up acti Situations where the summary statistics for a pollutant are below this comparison level but above 1% of this level are fully discuss

Table C-3. FAA Site - Other Monitored Pollutant Analysis.

in the text of the report.

[d] Air toxics for which the upper 95% confidence limit on the mean concentration are near or below the noncancer-based comparison level are generally of low concern and will generally be considered a low priority for follow-up activity. Pollutants for which the confidence limits extend appreciably above the noncancer-based comparison level are fully discussed in the school-specific report and may be considered a priority for follow-up activity, if indicated in light of the full set of information available for the site.

[e] Bromomethane was detected in 9 of 15 samples, ranging from 0.05 to 0.11 µg/m^3. The MDL is 0.035 µg/m^3.

[f] Dibromoethane, 1,2- was detected in 1 of 15 samples with a value of 0.05 µg/m^3. The MDL is 0.138 µg/m^3 .

[g] Hexachloro-1,3-butadiene was detected in 3 of 15 samples, ranging from 0.10 to 0.16 µg/m^3. The MDL is 0.390 µg/m^3.

[h] Tetrachloroethane, 1,1,2,2- was detected in 1 of 15 samples with a value of 0.08 µg/m^3. The MDL is 0.164 µg/m^3.

[i] Ethylene dichloride was detected in 3 of 15 samples ranging from 0.07 to 0.11 µg/m^3. The MDL is 0.036 µg/m^3.

[j] Dichlorobenzene, *p* - was detected in 7 of 15 samples, ranging from 0.07 to 0.15 µg/m^3. The MDL is 0.21 µg/m^3.

[k] Tetrachloroethylene was detected in only 5 of 15 samples with a range from 0.08 to 0.11 µg/m^3. The MDL is 0.122 µg/m^3.

[l] Chloroform was detected in 6 of 15 samples with a range of 0.07 to 0.15 µg/m^3. The MDL is 0.044 µg/m^3.

[m] Bromoform was detected in only 2 of 15 samples with a range of 0.11 to 0.12 µg/m^3. The MDL is 0.258 µg/m^3.

[n] Vinyl chloride was detected in only 1 of 15 samples with a value of 0.01 µg/m^3. The MDL is 0.020 µg/m^3.

[o] Trichloroethylene was detected in only 1 of 15 samples with a value of 0.04 µg/m^3. The MDL is 0.122 µg/m^3.

[p] Trichlorobenzene, 1,2,4- was detected in 2 of 15 samples with a range of 0.07 to 0.10 µg/m^3. The MDL is 0.267 µg/m^3.

[q] Methyl-*tert* -butyl ether was detected in only 1 of 15 samples with a value of 0.10 µg/m^3. The MDL is 0.029 µg/m^3.

[r] Methyl methacrylate was detected in only 1 of 15 samples with a value of 0.07 µg/m^3. The MDL is 0.090 µg/m^3.

Appendix D-1. St. Croix, VI Monitoring Sites Pollutant Concentrations - Bethlehem Village.

Parameter	Units	2/14/2011	2/24/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	3/22/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	Sample Screening Level[a]
KEY POLLUTANTS																		
Benzene	µg/m^3	1.27	0.48	0.35	0.42	0.32	0.34	0.40	0.74	0.34	0.60	0.38	0.41	0.56	0.57	0.73	2.71	30
Butadiene, 1,3-	µg/m^3	0.05	0.05	ND	0.07	ND	0.05	ND	0.10	0.06	0.05	0.06	ND	ND	0.11	ND	0.21	20
NON-KEY HAPS																		
Carbon tetrachloride	µg/m^3	0.45	0.70	0.53	0.65	0.59	0.52	0.62	0.52	0.54	0.59	0.60	0.75	0.70	0.73	0.79	0.61	200
Chloromethane	µg/m^3	1.17	1.39	1.28	1.48	1.46	1.26	1.34	1.30	1.50	1.48	1.73	2.54	1.27	1.90	1.61	1.39	1,000
Dichlorobenzene, *p-*	µg/m^3	0.10	0.07	ND	0.17	0.17	0.08	ND	0.06	0.12	0.06	0.20	ND	0.07	0.13	0.05	0.20	10,000
Carbon disulfide	µg/m^3	6.38	9.34	5.79	6.76	5.04	6.26	5.57	4.76	4.92	5.32	8.66	6.82	7.32	6.97	12.08	11.89	7,000
Ethylbenzene	µg/m^3	0.66	0.35	0.19	0.37	0.39	0.22	0.23	0.25	0.20	0.26	0.27	0.24	0.26	0.40	0.36	0.69	40,000
Xylene, *m/p-*	µg/m^3	1.97	0.87	0.54	0.90	0.53	0.62	0.59	0.69	0.51	0.63	0.56	0.53	0.56	0.97	0.80	1.86	9,000
Acetonitrile	µg/m^3	0.32	0.30	0.22	0.27	0.23	0.32	0.26	0.34	0.26	0.36	0.38	0.39	0.37	0.31	0.42	0.43	600
Xylene, *o-*	µg/m^3	0.75	0.40	0.23	0.45	0.25	0.28	0.23	0.28	0.23	0.29	0.26	0.26	0.27	0.43	0.33	0.73	9,000
Dichloromethane	µg/m^3	0.18	0.23	0.18	0.33	0.19	0.30	0.83	0.15	0.23	0.15	0.20	0.24	0.36	0.19	0.20	0.59	2,000
Toluene	µg/m^3	2.86	0.90	0.64	1.02	0.58	1.10	0.64	1.28	0.78	1.45	0.69	0.74	0.75	1.47	1.11	7.27	4,000
Styrene	µg/m^3	0.50	0.28	0.20	0.35	0.70	0.18	0.13	0.14	0.17	0.16	0.22	0.19	0.18	0.26	0.22	0.28	9,000
Methyl isobutyl ketone	µg/m^3	0.50	0.23	0.13	0.21	0.13	0.14	0.09	0.13	0.17	0.22	0.17	0.27	0.32	0.13	0.19	0.46	30,000
Trichloroethane, 1,1,1-	µg/m^3	0.06	0.06	ND	0.09	0.07	0.04	ND	0.05	0.07	0.05	0.08	ND	ND	0.09	0.07	0.13	10,000
Acrylonitrile	µg/m^3	0.36	0.20	0.11	0.15	0.10	0.11	ND	ND	ND	ND	ND	0.12	ND	ND	0.11	0.14	200
Bromomethane	µg/m^3	0.05	ND	ND	0.07	0.05	0.04	ND	0.06	0.12	0.05	0.07	0.11	ND	0.05	ND	0.08	200
Tetrachloroethylene	µg/m^3	0.07	ND	ND	0.09	ND	0.05	ND	0.06	0.07	ND	0.07	ND	ND	ND	ND	0.14	1,400
Chloroform	µg/m^3	ND	ND	ND	ND	ND	0.07	ND	0.07	0.08	ND	ND	ND	ND	0.10	ND	0.18	500
Hexachloro-1,3-butadiene	µg/m^3	0.05	ND	ND	0.16	ND	ND	ND	0.06	0.10	ND	ND	ND	ND	ND	ND	ND	320
Ethylene dichloride	µg/m^3	0.07	ND	ND	0.09	0.08	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270
Chloroethane	µg/m^3	0.03	ND	ND	ND	ND	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08	40,000
Bromoform	µg/m^3	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.10	ND	ND	ND	ND	ND	6,400
Trichloroethylene	µg/m^3	0.03	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	10,000
Methyl *tert* -butyl ether	µg/m^3	0.13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.22	7,000
Dibromoethane, 1,2-	µg/m^3	0.038	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12
Vinyl chloride	µg/m^3	0.013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000
Dichloroethene, 1,1-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.04	80
Benzyl chloride	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140
Chlorobenzene	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Chloroprene	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
Dichloroethane, 1,1-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,400
Dichloropropane, 1,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200

Appendix D-1. St. Croix, VI Monitoring Sites Pollutant Concentrations - Bethlehem Village.

Parameter	Units	2/14/2011	2/24/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	3/22/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	Sample Screening Level[a]
Dichloropropylene, *cis*- 1,3-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Dichloropropylene, *trans* -1,3-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Ethyl acrylate	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Methyl methacrylate	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Tetrachloroethane, 1,1,2,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120
Trichloroethane, 1,1,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	440
Trichlorobenzene, 1,2,4-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,000
OTHER AIR TOXICS																		
Acetylene	µg/m^3	0.43	0.42	0.39	0.42	0.35	0.36	0.39	0.43	0.39	0.33	0.27	0.34	0.27	0.52	0.21	0.99	1,000,000
Amyl methyl ether, *tert* -	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND	8,000
Bromochloromethane	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500
Bromodichloromethane	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	700
Butyl ethyl ether, *tert* -	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.05	8,000
Dibromochloromethane	µg/m^3	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.07	ND	ND	0.03	ND	0.13	900
Dichlorobenzene, 1,3-	µg/m^3	0.03	ND	ND	0.07	ND	ND	ND	0.04	0.04	ND	ND	ND	ND	ND	ND	ND	10,000
Dichlorobenzene, *o-*	µg/m^3	0.06	ND	ND	0.08	ND	ND	ND	0.04	0.05	ND	ND	ND	ND	ND	ND	ND	10,000
Dichlorodifluoromethane	µg/m^3	2.22	2.76	2.54	2.65	2.83	2.60	2.78	2.50	2.53	2.48	2.58	2.79	2.66	2.94	2.89	2.56	2,000,000
Dichlorotetrafluoroethane	µg/m^3	0.12	0.13	0.10	0.16	0.15	0.12	0.15	0.13	0.15	0.11	0.16	0.12	0.12	0.15	0.13	0.19	2,000,000
Dichloroethylene, *cis* -1,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Dichloroethylene, *trans* -1,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Methyl ethyl ketone	µg/m^3	2.58	1.14	0.83	1.78	0.77	2.04	1.06	0.86	0.96	2.89	1.53	2.70	3.58	1.42	1.16	3.90	50,000
Octane, *n* -	µg/m^3	0.44	0.14	0.06	0.17	0.14	ND	0.07	0.23	0.11	0.18	0.15	0.13	0.16	0.21	0.53	0.70	9,000
Propylene	µg/m^3	10.4	1.12	0.85	2.12	1.09	1.13	1.61	5.23	2.03	1.70	2.17	2.15	1.32	4.77	1.62	5.61	30,000
Trichlorofluoromethane	µg/m^3	1.20	1.46	1.29	1.35	1.36	1.43	1.47	1.37	1.35	1.34	1.35	1.52	1.47	1.58	1.66	1.39	2,000,000
Trichlorotrifluoroethane	µg/m^3	0.64	0.75	0.60	0.79	0.74	0.63	0.71	0.67	0.69	0.77	0.86	0.81	0.75	0.98	0.97	0.86	2,000,000
Trimethylbenzene, 1,2,4-	µg/m^3	0.69	0.50	0.31	0.59	0.35	0.40	0.26	0.29	0.37	0.37	0.36	0.46	0.33	0.54	0.39	0.66	10,000
Trimethylbenzene, 1,3,5-	µg/m^3	0.25	0.20	0.10	0.25	0.15	0.14	0.09	0.12	0.14	0.13	0.17	0.18	0.12	0.23	0.18	0.28	10,000
SNMOC MEASUREMEN																		
Butane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.49	2.06	--	--	NA
Butene, *cis-* 2	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.32	--	--	NA
Butene, *trans* -2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.21	0.32	--	--	NA
Cyclohexane	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.16	--	--	NA
Cyclopentane	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.19	--	--	NA
Cyclopentene	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.11	ND	--	--	NA
Decane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.11	--	--	NA

Appendix D-1. St. Croix, VI Monitoring Sites Pollutant Concentrations - Bethlehem Village.

Parameter	Units	2/14/2011	2/24/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	3/22/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	Sample Screening Level[a]
Decene, *1-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Diethylbenzene, *m-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.30	0.26	--	--	NA
Diethylbenzene, *p-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.17	--	--	NA
Dimethylbutane, *2,2-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.19	--	--	NA
Dimethylbutane, *2,3-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.12	0.22	--	--	NA
Dimethylpentane, *2,3-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.12	0.18	--	--	NA
Dimethylpentane, *2,4-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.14	--	--	NA
Dodecane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.25	0.22	--	--	NA
Dodecene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.13	--	--	NA
Ethane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	1.61	1.58	--	--	NA
Ethyl-1-butene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Ethylene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.88	1.15	--	--	NA
Ethyltoluene, *m-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.17	0.22	--	--	NA
Ethyltoluene, *o-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.11	--	--	NA
Ethyltoluene, *p-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.13	--	--	NA
Heptane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.17	--	--	NA
Heptene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.06	--	--	NA
Hexane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.33	--	--	2,000
Hexene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.18	--	--	NA
Hexene, *cis-* 2	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Hexene, *trans* -2	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Isobutane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.40	1.52	--	--	NA
Isobutene/1-Butene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	1.20	0.90	--	--	NA
Isopentane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	7.77	6.60	--	--	NA
Isoprene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.36	0.39	--	--	NA
Isopropylbenzene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.09	--	--	4,000
Methyl-1-butene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.22	0.39	--	--	NA
Methyl-1-butene, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Methyl-1-pentene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Methyl-2-butene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.34	--	--	NA
Methylcyclohexane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.07	0.24	--	--	NA
Methylcyclopentane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.14	--	--	NA
Methylheptane, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.10	--	--	NA
Methylheptane, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.09	--	--	NA
Methylhexane, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.61	0.39	--	--	NA
Methylhexane, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.14	0.18	--	--	NA

Appendix D-1. St. Croix, VI Monitoring Sites Pollutant Concentrations - Bethlehem Village.

Parameter	Units	2/14/2011	2/24/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	3/22/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	Sample Screening Level[a]
Methylpentane, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.83	0.64	--	--	NA
Methylpentane, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.26	0.38	--	--	NA
Nonane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.10	--	--	NA
Nonene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Octene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.10	ND	--	--	NA
Pentane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.36	1.27	--	--	NA
Pentene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.19	0.33	--	--	NA
Pentene, 4-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Pentene, *cis-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.21	--	--	NA
Pentene, *trans* -2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.24	0.35	--	--	NA
Pinene, *alpha-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Pinene, *beta-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Propane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	2.91	10.5	--	--	NA
Propylbenzene, n-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.08	--	--	NA
Propyne	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Tridecane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Tridecene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Trimethylbenzene, 1,2,3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.09	--	--	NA
Trimethylpentane, 2,2,3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	NA
Trimethylpentane, 2,2,4-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.22	0.20	--	--	NA
Trimethylpentane, 2,3,4-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.13	--	--	NA
Undecane, *n* -	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.34	0.32	--	--	NA
Undecene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.07	ND	--	--	NA

Key Pollutant

µg/m³ micrograms per cubic meter

ND No detection of this chemical was registered by the laboratory analytical equipment. The value is assumed to be zero.

-- No sample was conducted for this pollutant on this day or the result was invalidated.

[a] The individual sample screening levels and their use is summarized on the web site and described in detail in Schools Air Toxics Monitoring Activity (2009), "Uses of Health Effects Information in Evaluating Sample Results", see http://www.epa.gov/schoolair/pdfs/UsesOfHealthEffectsInfoinEvalSampleResults.pdf. These screening levels are based on consideration of exposure all day, every day over a period ranging up to at least a couple of weeks and longer for some pollutants.

Appendix D-2. St. Croix, VI Monitoring Sites Pollutant Concentrations - Central High School.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	4/27/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	5/27/2011	Sample Screening Level[a]
KEY POLLUTANTS																			
Benzene	µg/m^3	0.57	0.54	0.56	0.68	0.46	2.90	0.52	1.12	0.53	0.49	0.32	0.43	0.50	0.71	0.52	0.78	0.84	30
Butadiene, 1,3-	µg/m^3	0.06	0.11	0.05	0.12	0.06	0.06	0.08	0.11	0.08	0.12	0.05	ND	ND	0.17	0.08	0.06	0.12	20
NON-KEY HAPS																			
Carbon tetrachloride	µg/m^3	0.65	0.67	0.56	0.64	0.65	0.54	0.64	0.51	0.57	0.53	0.53	0.71	0.70	0.72	0.78	0.63	0.60	200
Chloromethane	µg/m^3	1.21	1.30	1.58	1.61	1.42	1.33	1.55	1.61	1.25	4.65	1.31	1.46	1.41	1.77	1.87	1.32	1.34	1,000
Xylene, *m/p-*	µg/m^3	0.74	0.89	0.46	1.09	0.66	0.46	0.70	0.80	0.63	0.61	0.46	0.36	0.53	0.97	0.73	0.65	1.12	9,000
Ethylbenzene	µg/m^3	0.26	0.30	0.20	0.40	0.26	0.18	0.28	0.29	0.24	0.22	0.20	0.14	0.22	0.36	0.27	0.25	0.42	40,000
Acetonitrile	µg/m^3	0.57	0.27	0.21	0.27	0.26	0.27	0.33	0.38	0.23	0.32	0.31	0.49	0.43	0.38	0.45	0.34	0.33	600
Xylene, *o-*	µg/m^3	0.30	0.39	0.21	0.50	0.38	0.21	0.30	0.37	0.29	0.30	0.20	0.17	0.23	0.46	0.28	0.28	0.47	9,000
Dichloromethane	µg/m^3	0.20	0.17	0.20	0.18	0.40	0.35	0.32	0.15	0.17	0.20	0.30	0.23	0.33	0.19	0.15	0.18	0.20	2,000
Carbon disulfide	µg/m^3	0.03	0.03	0.05	0.05	0.04	0.03	5.92	0.05	0.03	0.03	0.10	0.08	0.17	0.07	0.07	0.07	0.18	7,000
Toluene	µg/m^3	1.38	1.40	0.61	1.62	1.01	0.77	1.32	1.60	1.39	0.98	1.08	0.60	1.10	1.62	1.09	1.13	1.95	4,000
Styrene	µg/m^3	0.12	0.14	0.24	0.29	0.25	0.14	0.25	0.14	0.18	0.13	0.18	0.12	0.15	0.21	0.13	0.11	0.13	9,000
Methyl isobutyl ketone	µg/m^3	0.22	0.17	0.16	0.10	0.13	0.10	0.25	0.17	0.07	0.28	0.19	0.25	0.31	0.16	0.34	0.24	0.17	30,000
Trichloroethane, 1,1,1-	µg/m^3	0.08	0.05	0.09	0.07	0.07	0.06	0.09	0.07	0.05	ND	0.05	ND	ND	ND	ND	0.07	0.05	10,000
Acrylonitrile	µg/m^3	0.22	0.28	0.18	0.17	0.18	0.14	ND	ND	ND	ND	ND	0.16	0.13	0.17	ND	0.13	0.11	200
Bromomethane	µg/m^3	0.09	ND	0.07	0.08	0.06	0.05	0.12	0.05	ND	0.11	ND	ND	ND	ND	0.07	ND	0.06	200
Dichlorobenzene, *p-*	µg/m^3	0.14	ND	0.10	0.11	ND	0.05	0.14	0.12	0.08	0.09	0.08	ND	ND	0.08	ND	ND	0.08	10,000
Dibromoethane, 1,2-	µg/m^3	0.07	ND	ND	ND	ND	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12
Hexachloro-1,3-butadiene	µg/m^3	0.10	ND	ND	ND	ND	0.06	0.10	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	320
Ethylene dichloride	µg/m^3	0.07	ND	0.09	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270
Tetrachloroethylene	µg/m^3	0.07	ND	0.08	ND	ND	0.09	0.08	0.09	ND	ND	ND	ND	0.58	ND	ND	ND	ND	1,400
Tetrachloroethane, 1,1,2,2-	µg/m^3	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120
Benzyl chloride	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	140
Vinyl chloride	µg/m^3	0.02	ND	ND	ND	ND	ND	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	1,000
Chloroform	µg/m^3	0.09	ND	ND	ND	ND	ND	0.11	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	500
Bromoform	µg/m^3	0.13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,400
Trichloroethylene	µg/m^3	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Trichlorobenzene, 1,2,4-	µg/m^3	0.06	ND	ND	ND	ND	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,000
Chloroethane	µg/m^3	0.03	ND	ND	ND	ND	0.04	ND	ND	ND	0.61	ND	ND	ND	ND	0.13	ND	ND	40,000
Chlorobenzene	µg/m^3	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Chloroprene	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
Dichloroethane, 1,1-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,400
Dichloroethene, 1,1-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	80

Appendix D-2. St. Croix, VI Monitoring Sites Pollutant Concentrations - Central High School.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	4/27/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	5/27/2011	Sample Screening Level[a]
Dichloropropane, 1,2-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
Dichloropropylene, *cis* -1,3-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Dichloropropylene, *trans* -1,3-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Ethyl acrylate	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Methyl methacrylate	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Methyl *tert* -butyl ether	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Trichloroethane, 1,1,2-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	440
OTHER AIR TOXICS																			
Acetylene	$\mu g/m^3$	0.35	0.58	0.44	0.82	0.50	0.41	0.46	0.57	0.37	0.43	0.26	0.32	0.33	0.72	0.24	0.31	0.62	1,000,000
Amyl methyl ether, *tert* -	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	0.02	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,000
Bromochloromethane	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500
Bromodichloromethane	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	700
Butyl ethyl ether, *tert* -	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,000
Dibromochloromethane	$\mu g/m^3$	0.08	ND	0.09	ND	0.05	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	900
Dichlorobenzene, 1,3-	$\mu g/m^3$	0.06	ND	0.07	ND	ND	0.03	0.05	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Dichlorobenzene, *o-*	$\mu g/m^3$	0.05	ND	0.07	ND	ND	0.03	0.05	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Dichlorodifluoromethane	$\mu g/m^3$	2.37	2.57	2.73	2.72	2.79	2.69	2.98	2.66	2.45	2.74	2.69	2.87	2.87	2.76	2.97	2.59	2.31	2,000,000
Dichloroethylene, *cis-* 1,2-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Dichloroethylene, *trans* -1,2-	$\mu g/m^3$	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Dichlorotetrafluoroethane	$\mu g/m^3$	0.13	0.11	0.17	0.14	0.15	0.14	0.17	0.15	0.10	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.12	2,000,000
Methyl ethyl ketone	$\mu g/m^3$	2.28	1.67	1.41	1.04	1.59	1.32	1.39	1.08	0.80	2.71	2.34	2.67	2.49	1.94	3.19	1.57	1.86	50,000
Octane, *n-*	$\mu g/m^3$	0.18	0.18	0.13	0.18	0.15	0.11	0.16	0.26	0.14	0.15	0.09	0.10	0.16	0.16	0.73	0.14	0.21	9,000
Propylene	$\mu g/m^3$	1.91	0.92	0.61	1.57	0.73	0.59	2.34	3.86	1.26	2.98	1.17	0.80	0.76	1.89	3.63	2.51	1.94	30,000
Trichlorofluoromethane	$\mu g/m^3$	1.29	1.38	1.41	1.39	1.38	1.49	1.61	1.41	1.40	1.38	1.44	1.53	1.56	1.55	1.68	1.40	1.26	2,000,000
Trichlorotrifluoroethane	$\mu g/m^3$	0.71	0.68	0.77	0.78	0.75	0.71	0.83	0.73	0.77	0.72	0.74	0.69	0.82	0.91	0.90	0.76	0.67	2,000,000
Trimethylbenzene, 1,2,4-	$\mu g/m^3$	0.38	0.55	0.35	0.88	0.53	0.32	0.59	0.50	0.46	0.50	0.31	0.28	0.36	0.67	0.30	0.36	0.56	10,000
Trimethylbenzene, 1,3,5-	$\mu g/m^3$	0.16	0.20	0.17	0.33	0.21	0.13	0.22	0.19	0.16	0.17	0.12	0.10	0.13	0.24	0.13	0.14	0.19	10,000
SNMOC MEASUREMEN																			
Butane, *n-*	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	0.85	1.33	--	--	--	NA
Butene, *cis-* 2-	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.24	--	--	--	NA
Butene, *trans* -2-	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	0.20	0.31	--	--	--	NA
Cyclohexane	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	0.25	0.10	--	--	--	NA
Cyclopentane	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.14	--	--	--	NA
Cyclopentene	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Decane, *n-*	$\mu g/m^3$	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.10	--	--	--	NA

Appendix D-2. St. Croix, VI Monitoring Sites Pollutant Concentrations - Central High School.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	4/27/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	5/27/2011	Sample Screening Level[a]
Decene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Diethylbenzene, *m-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.18	0.21	--	--	--	NA
Diethylbenzene, *p-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.06	0.06	--	--	--	NA
Dimethylbutane, 2,2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.07	0.13	--	--	--	NA
Dimethylbutane, 2,3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.20	--	--	--	NA
Dimethylpentane, 2,3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.15	--	--	--	NA
Dimethylpentane, 2,4-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.14	--	--	--	NA
Dodecane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.28	0.23	--	--	--	NA
Dodecene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.18	0.21	--	--	--	NA
Ethane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	1.60	1.42	--	--	--	NA
Ethyl-1-butene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Ethylene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.80	1.50	--	--	--	NA
Ethyltoluene, *m-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.23	--	--	--	NA
Ethyltoluene, *o-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.16	--	--	--	NA
Ethyltoluene, *p-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.13	--	--	--	NA
Heptane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.15	--	--	--	NA
Heptene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Hexane, *n-*	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.14	0.32	--	--	--	2,000
Hexene, 1-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.12	0.17	--	--	--	NA
Hexene, *cis-* 2	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.17	ND	--	--	--	NA
Hexene, *trans* -2	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	0.08	--	--	--	NA
Isobutane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.36	0.69	--	--	--	NA
Isobutene/1-Butene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.77	1.11	--	--	--	NA
Isopentane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	5.70	6.54	--	--	--	NA
Isoprene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.33	0.39	--	--	--	NA
Isopropylbenzene	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	0.07	--	--	--	4,000
Methyl-1-butene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.15	0.25	--	--	--	NA
Methyl-1-butene, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Methyl-1-pentene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Methyl-2-butene, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.16	0.23	--	--	--	NA
Methylcyclohexane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.11	0.11	--	--	--	NA
Methylcyclopentane	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.07	0.12	--	--	--	NA
Methylheptane, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.08	--	--	--	NA
Methylheptane, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.10	0.09	--	--	--	NA
Methylhexane, 2-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.47	0.51	--	--	--	NA
Methylhexane, 3-	µg/m³	--	--	--	--	--	--	--	--	--	--	--	--	0.22	0.22	--	--	--	NA

Appendix D-2. St. Croix, VI Monitoring Sites Pollutant Concentrations - Central High School.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/4/2011	3/10/2011	3/16/2011	4/5/2011	4/9/2011	4/15/2011	4/21/2011	4/27/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/21/2011	5/27/2011	Sample Screening Level[a]
Methylpentane, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.40	0.77	--	--	--	NA
Methylpentane, 3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.21	0.38	--	--	--	NA
Nonane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.06	0.10	--	--	--	NA
Nonene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Octene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Pentane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.52	0.96	--	--	--	NA
Pentene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.24	--	--	--	NA
Pentene, 4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Pentene, *cis-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	0.14	--	--	--	NA
Pentene, *trans* -2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.16	0.25	--	--	--	NA
Pinene, *alpha-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Pinene, *beta-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Propane	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	1.39	6.60	--	--	--	NA
Propylbenzene, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.10	--	--	--	NA
Propyne	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Tridecane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Tridecene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Trimethylbenzene, 1,2,3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.13	--	--	--	NA
Trimethylpentane, 2,2,3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Trimethylpentane, 2,2,4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.27	0.26	--	--	--	NA
Trimethylpentane, 2,3,4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.09	0.12	--	--	--	NA
Undecane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	0.08	0.07	--	--	--	NA
Undecene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA

Key Pollutant

µg/m^3 micrograms per cubic meter

ND No detection of this chemical was registered by the laboratory analytical equipment. The value is assumed to be zero.

-- No sample was conducted for this pollutant on this day or the result was invalidated.

[a] The individual sample screening levels and their use is summarized on the web site and described in detail in Schools Air Toxics Monitoring Activity (2009), "Uses of Health Effects Information in Evaluating Sample Results", see http://www.epa.gov/schoolair/pdfs/UsesOfHealthEffectsInfoinEvalSampleResults.pdf. These screening levels are based on consideration of exposure all day, every day over a period ranging up to at least a couple of weeks and longer for some pollutants.

Appendix D-3. St. Croix, VI Monitoring Sites Pollutant Concentrations - FAA Site.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/12/2011	3/16/2011	3/22/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/27/2011	6/2/2011	Sample Screening Level[a]
KEY POLLUTANTS																	
Benzene	$\mu g/m^3$	1.01	0.37	0.33	0.49	0.46	0.53	0.45	0.40	0.34	0.41	0.33	0.82	0.28	0.86	1.10	30
Butadiene, 1,3-	$\mu g/m^3$	0.10	0.05	ND	0.07	0.05	ND	0.07	0.04	ND	ND	ND	0.11	ND	0.09	0.09	20
NON-KEY HAPS																	
Acrylonitrile	$\mu g/m^3$	0.19	0.19	0.13	0.33	0.23	0.18	ND	0.13	0.13	0.20	0.19	ND	0.17	0.19	0.19	200
Carbon tetrachloride	$\mu g/m^3$	0.59	0.67	0.67	0.64	0.64	0.65	0.60	0.57	0.50	0.74	0.72	0.77	0.73	0.67	0.77	200
Chloromethane	$\mu g/m^3$	1.25	1.67	1.50	1.77	1.85	1.51	1.79	1.40	1.90	1.86	1.46	2.21	1.62	1.96	2.04	1,000
Ethylbenzene	$\mu g/m^3$	0.28	0.20	0.15	0.29	0.15	0.14	0.25	0.15	0.12	0.20	0.20	0.34	0.17	0.38	0.37	40,000
Xylene, *m/p-*	$\mu g/m^3$	0.82	0.53	0.29	0.67	0.37	0.30	0.54	0.34	0.23	0.35	0.36	0.82	0.29	0.90	0.80	9,000
Acetonitrile	$\mu g/m^3$	0.23	0.23	0.20	0.36	0.40	0.27	0.31	0.29	0.25	0.42	0.34	0.36	0.40	0.39	0.44	600
Xylene, *o-*	$\mu g/m^3$	0.33	0.24	0.14	0.43	0.17	0.26	0.23	0.16	0.12	0.18	0.18	0.38	0.14	0.38	0.34	9,000
Dichloromethane	$\mu g/m^3$	0.30	0.22	0.24	0.36	0.24	0.46	0.28	0.38	0.56	0.32	0.26	0.21	0.17	0.21	0.19	2,000
Toluene	$\mu g/m^3$	1.66	0.82	0.38	1.05	0.62	0.84	2.53	0.80	0.43	0.51	0.51	1.54	0.50	1.92	1.66	4,000
Styrene	$\mu g/m^3$	0.10	0.13	0.21	0.30	0.15	0.16	0.29	0.13	0.13	0.20	0.20	0.25	0.17	0.25	0.19	9,000
Carbon disulfide	$\mu g/m^3$	0.14	0.09	0.10	0.07	0.20	0.06	0.07	0.05	0.03	0.05	0.11	0.07	0.04	0.26	0.08	7,000
Methyl isobutyl ketone	$\mu g/m^3$	0.14	0.09	0.11	0.15	0.15	0.08	0.19	0.05	0.13	0.11	0.14	0.13	0.06	0.31	0.22	30,000
Trichloroethane, 1,1,1-	$\mu g/m^3$	0.07	0.05	0.07	0.09	0.05	0.05	0.08	0.04	0.04	ND	0.09	0.09	0.07	0.09	0.10	10,000
Bromomethane	$\mu g/m^3$	0.05	0.05	0.06	0.08	0.05	ND	0.09	ND	ND	0.11	ND	ND	ND	0.07	0.07	200
Dibromoethane, 1,2-	$\mu g/m^3$	0.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12
Hexachloro-1,3-butadiene	$\mu g/m^3$	0.15	ND	ND	0.16	ND	ND	0.10	ND	ND	ND	ND	ND	ND	ND	ND	320
Tetrachloroethane, 1,1,2,2-	$\mu g/m^3$	ND	ND	ND	0.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120
Ethylene dichloride	$\mu g/m^3$	0.07	ND	ND	0.11	0.07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	270
Dichlorobenzene, *p-*	$\mu g/m^3$	0.11	0.09	ND	0.15	ND	ND	0.10	ND	ND	ND	ND	0.07	ND	0.12	0.11	10,000
Tetrachloroethylene	$\mu g/m^3$	0.08	ND	ND	0.09	0.11	ND	0.09	ND	ND	0.09	ND	ND	ND	ND	ND	1,400
Chloroform	$\mu g/m^3$	0.08	0.09	ND	ND	0.07	ND	0.11	ND	ND	ND	ND	ND	ND	0.14	0.15	500
Bromoform	$\mu g/m^3$	0.11	ND	ND	0.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,400
Vinyl chloride	$\mu g/m^3$	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000
Trichloroethylene	$\mu g/m^3$	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Trichlorobenzene, 1,2,4-	$\mu g/m^3$	0.10	ND	ND	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	2,000
Methyl tert-Butyl Ether	$\mu g/m^3$	0.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Methyl Methacrylate	$\mu g/m^3$	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
Chloroethane	$\mu g/m^3$	0.02	ND	ND	ND	0.07	ND	ND	ND	ND	ND	ND	ND	ND	0.10	ND	40,000
Benzyl chloride	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140
Dichloroethane, 1,1-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,400
Dichloropropane, 1,2-	$\mu g/m^3$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200

Appendix D-3. St. Croix, VI Monitoring Sites Pollutant Concentrations - FAA Site.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/12/2011	3/16/2011	3/22/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/27/2011	6/2/2011	Sample Screening Level[a]
Dichloropropylene, *cis* -1,3-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Dichloropropylene, *trans* -1,3-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	40
Trichloroethane, 1,1,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	440
Chlorobenzene	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Chloroprene	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
Dichloroethene, 1,1-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	80
Ethyl acrylate	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
OTHER AIR TO																	
Acetylene	µg/m^3	0.58	0.30	0.34	0.42	0.52	0.32	0.41	0.10	0.21	0.44	0.27	0.43	0.14	0.48	0.28	1,000,000
Amyl methyl ether, *tert* -	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,000
Bromochloromethane	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	500
Bromodichloromethane	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	700
Butyl ethyl ether, *tert* -	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,000
Dibromochloromethane	µg/m^3	0.07	ND	ND	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	900
Dichlorobenzene, 1,3-	µg/m^3	0.06	ND	ND	0.07	ND	ND	0.05	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Dichlorobenzene, *o-*	µg/m^3	0.05	ND	ND	0.07	ND	ND	0.05	ND	ND	ND	ND	ND	ND	ND	ND	10,000
Dichlorodifluoromethane	µg/m^3	2.28	2.55	2.82	2.86	3.08	2.75	2.89	2.32	2.78	2.91	2.66	2.73	2.74	2.51	3.03	2,000,000
Dichloroethylene, *cis* -1,2-	µg/m^3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Dichloroethylene, *trans* -1,2-	µg/m^3	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	800
Dichlorotetrafluoroethane	µg/m^3	0.13	0.11	0.15	0.18	0.13	0.12	0.17	0.10	0.12	0.13	0.11	0.12	0.12	0.15	0.19	2,000,000
Methyl ethyl ketone	µg/m^3	1.04	1.11	1.04	1.42	1.55	1.14	2.02	0.78	1.62	1.54	2.06	1.54	0.89	3.23	1.70	50,000
Octane, *n-*	µg/m^3	0.31	0.16	0.11	0.21	0.10	0.09	0.21	0.10	0.07	0.21	0.16	0.24	0.22	0.27	0.28	9,000
Propylene	µg/m^3	10.8	1.09	0.56	1.06	0.81	1.14	1.27	0.64	0.66	0.88	0.62	2.12	0.52	1.39	1.20	30,000
Trichlorofluoromethane	µg/m^3	1.24	1.37	1.46	1.45	1.69	1.53	1.55	1.27	1.45	1.57	1.49	1.55	1.57	1.42	1.64	2,000,000
Trichlorotrifluoroethane	µg/m^3	0.67	0.68	0.81	0.84	0.75	0.85	0.84	0.74	0.77	0.95	1.03	1.02	0.88	0.75	0.92	2,000,000
Trimethylbenzene, 1,2,4-	µg/m^3	0.32	0.32	0.24	0.54	0.28	0.22	0.31	0.24	0.21	0.30	0.29	0.51	0.21	0.40	0.40	10,000
Trimethylbenzene, 1,3,5-	µg/m^3	0.14	0.13	0.12	0.24	0.11	0.08	0.13	0.09	0.09	0.14	0.13	0.21	0.10	0.17	0.17	10,000
SNMOC MEASUREMEN																	
Butane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.30	2.57	--	--	--	NA
Butene, *cis-* 2	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.13	0.39	--	--	--	NA
Butene, *trans* -2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.15	0.44	--	--	--	NA
Cyclohexane	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.12	0.21	--	--	--	NA
Cyclopentane	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.14	0.25	--	--	--	NA
Cyclopentene	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Decane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.09	0.12	--	--	--	NA

Appendix D-3. St. Croix, VI Monitoring Sites Pollutant Concentrations - FAA Site.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/12/2011	3/16/2011	3/22/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/27/2011	6/2/2011	Sample Screening Level[a]
Decene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Diethylbenzene, *m-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.18	0.18	--	--	--	NA
Diethylbenzene, *p-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.15	0.18	--	--	--	NA
Dimethylbutane, 2,2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.11	0.24	--	--	--	NA
Dimethylbutane, 2,3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.14	0.31	--	--	--	NA
Dimethylpentane, 2,3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.16	0.21	--	--	--	NA
Dimethylpentane, 2,4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.11	0.15	--	--	--	NA
Dodecane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.24	0.25	--	--	--	NA
Dodecene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.18	0.14	--	--	--	NA
Ethane	µg/m^3	--	--	--	--	--	--	--	--	--	--	1.55	1.82	--	--	--	NA
Ethyl-1-butene, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Ethylene	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.75	1.29	--	--	--	NA
Ethyltoluene, *m-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.10	0.17	--	--	--	NA
Ethyltoluene, *o-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.11	0.12	--	--	--	NA
Ethyltoluene, *p-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.11	0.12	--	--	--	NA
Heptane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.11	0.21	--	--	--	NA
Heptene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Hexane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.12	0.49	--	--	--	2,000
Hexene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.17	0.20	--	--	--	NA
Hexene, *cis-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Hexene, *trans* -2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	0.10	--	--	--	NA
Isobutane	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.17	1.95	--	--	--	NA
Isobutene/1-Butene	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.96	1.34	--	--	--	NA
Isopentane	µg/m^3	--	--	--	--	--	--	--	--	--	--	4.92	7.13	--	--	--	NA
Isoprene	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.67	0.88	--	--	--	NA
Isopropylbenzene	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.09	0.08	--	--	--	4,000
Methyl-1-butene, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.15	0.38	--	--	--	NA
Methyl-1-butene, 3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Methyl-1-pentene, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Methyl-2-butene, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.12	0.29	--	--	--	NA
Methylcyclohexane	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.10	0.28	--	--	--	NA
Methylcyclopentane	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.07	0.20	--	--	--	NA
Methylheptane, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.07	0.08	--	--	--	NA
Methylheptane, 3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.09	0.11	--	--	--	NA
Methylhexane, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.44	0.47	--	--	--	NA
Methylhexane, 3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.15	0.28	--	--	--	NA

Appendix D-3. St. Croix, VI Monitoring Sites Pollutant Concentrations - FAA Site.

Parameter	Units	2/14/2011	2/20/2011	2/26/2011	3/12/2011	3/16/2011	3/22/2011	4/9/2011	4/15/2011	4/21/2011	5/3/2011	5/9/2011	5/10/2011	5/15/2011	5/27/2011	6/2/2011	Sample Screening Level[a]
Methylpentane, 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.34	1.04	--	--	--	NA
Methylpentane, 3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.20	0.63	--	--	--	NA
Nonane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.10	0.10	--	--	--	NA
Nonene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Octene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Pentane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.23	1.96	--	--	--	NA
Pentene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.13	0.34	--	--	--	NA
Pentene, 4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Pentene, *cis-* 2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.08	0.18	--	--	--	NA
Pentene, *trans* -2-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.14	0.32	--	--	--	NA
Pinene, *alpha-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Pinene, *beta-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Propane	µg/m^3	--	--	--	--	--	--	--	--	--	--	1.16	7.74	--	--	--	NA
Propylbenzene, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.09	0.09	--	--	--	NA
Propyne	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Tridecane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Tridecene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Trimethylbenzene, 1,2,3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.11	0.12	--	--	--	NA
Trimethylpentane, 2,2,3-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA
Trimethylpentane, 2,2,4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.17	0.29	--	--	--	NA
Trimethylpentane, 2,3,4-	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.10	0.12	--	--	--	NA
Undecane, *n-*	µg/m^3	--	--	--	--	--	--	--	--	--	--	0.13	0.11	--	--	--	NA
Undecene, 1-	µg/m^3	--	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	NA

Key Pollutant

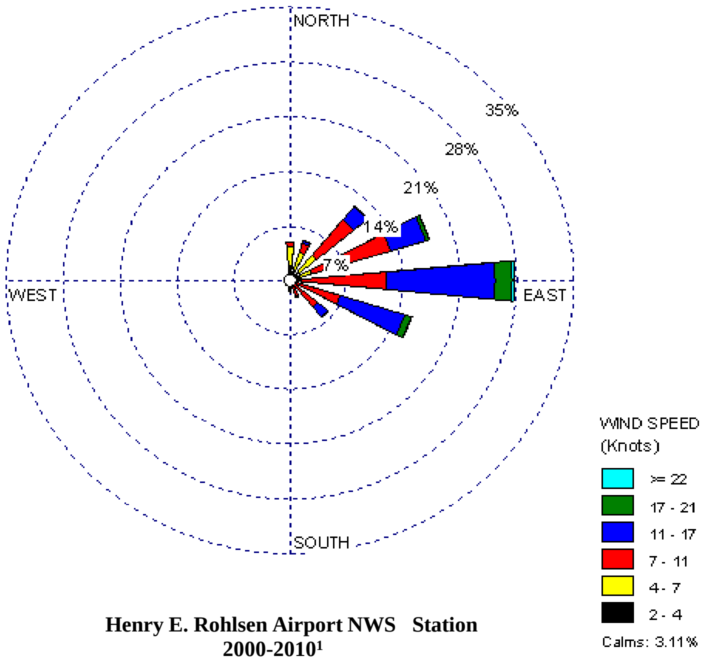
µg/m^3 micrograms per cubic meter

ND No detection of this chemical was registered by the laboratory analytical equipment. The value is assumed to be zero.

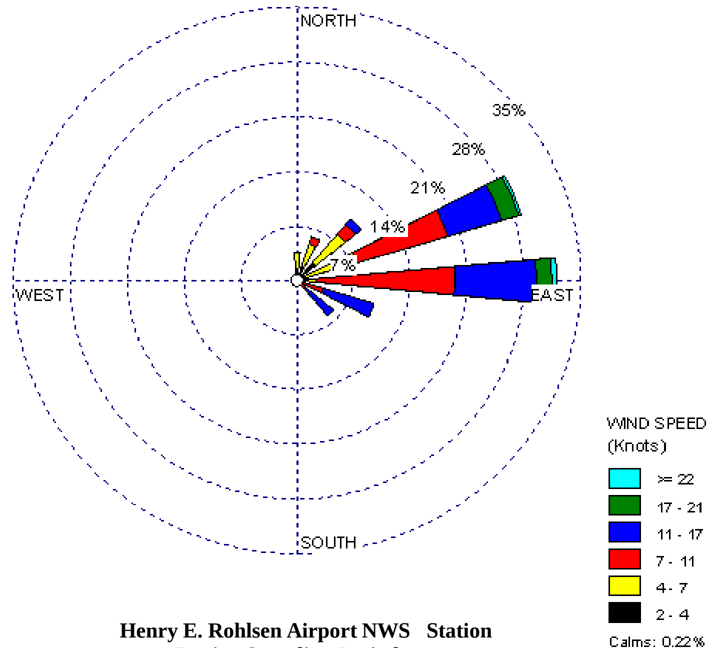
-- No sample was conducted for this pollutant on this day or the result was invalidated.

[a] The individual sample screening levels and their use is summarized on the web site and described in detail in Schools Air Toxics Monitoring Activity (2009), "Uses of Health Effects Information in Evaluating Sample Results", see http://www.epa.gov/schoolair/pdfs/UsesOfHealthEffectsInfoinEvalSampleResults.pdf. These screening levels are based on consideration of exposure all day, every day over a period ranging up to at least a couple of weeks and longer for some pollutants.

Appendix E. Windroses for Henry E. Rohlsen Airport NWS Station.



Henry E. Rohlsen Airport NWS Station 2000-2010[1]



Henry E. Rohlsen Airport NWS Station During Sampling Period (Feb. 12, 2011- Jun. 2, 2011)[1]

[1] Henry E. Rohlsen Airport NWS Station (WBAN 11624) is approximately 1.20 miles from Bethlehem Village, 1.88 miles from Central High School, and 0.25 from the FAA monitoring sites.