

Figure 3.1 Tonawanda Study Area and Census Tract Codes

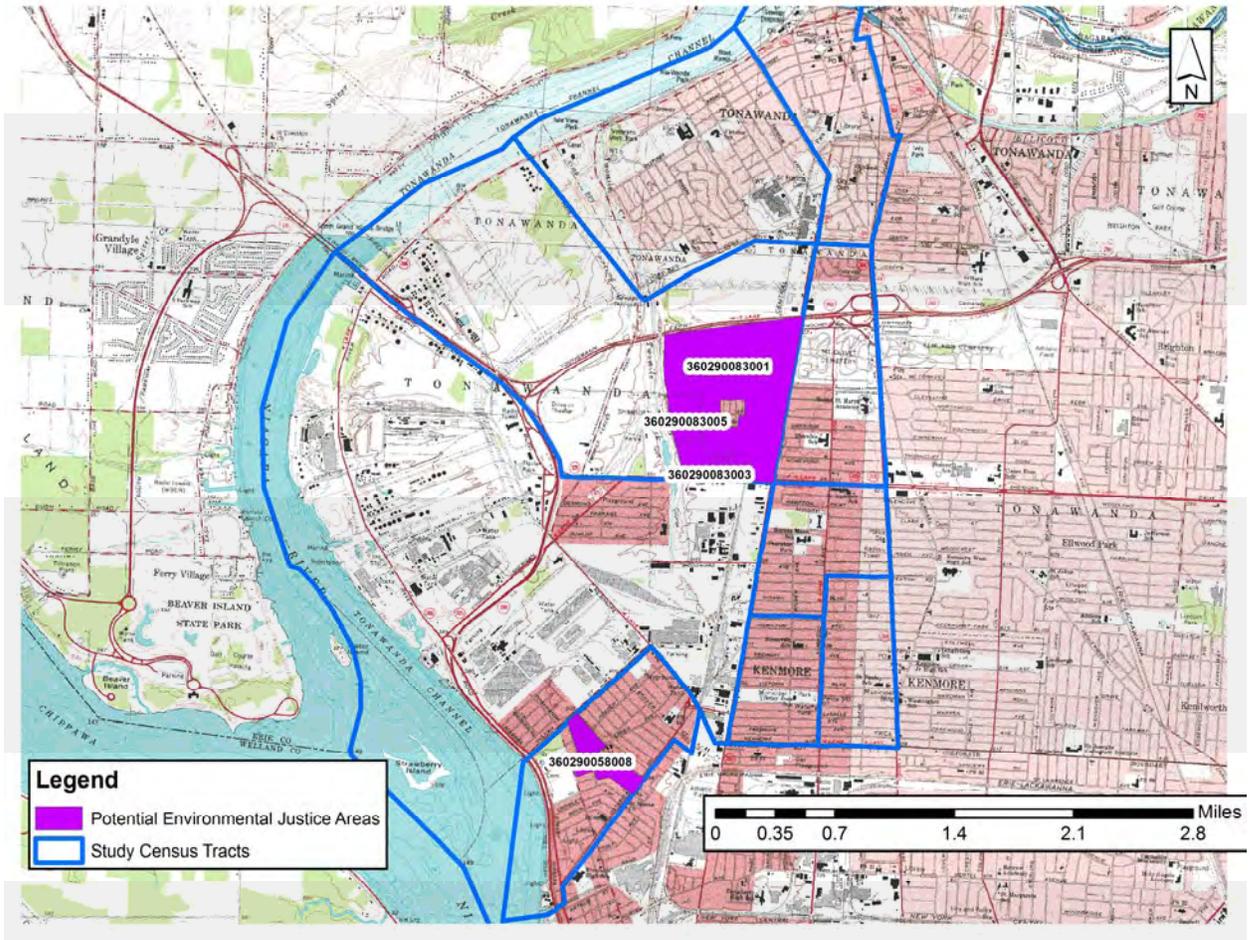


Figure 3.2 Tonawanda Study and Potential Environmental Justice Areas



Figure 5.1 BISP Monitor

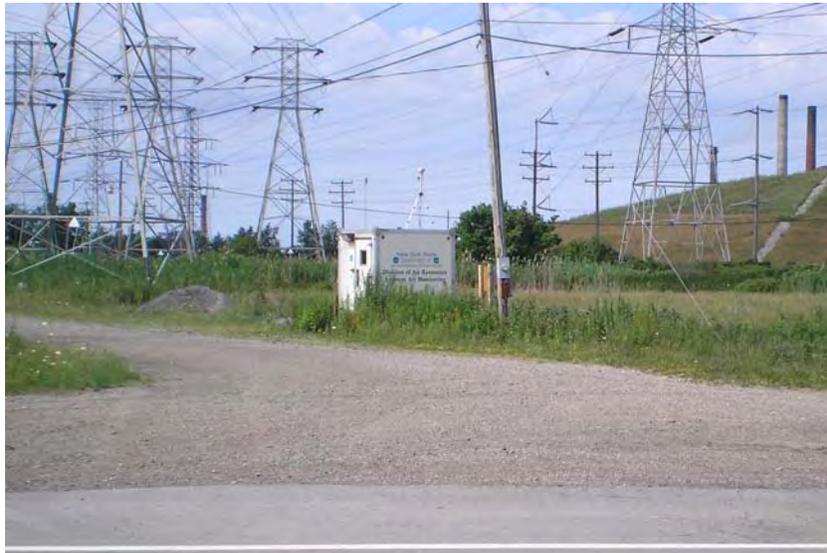


Figure 5.2 GIBI Monitor



Figure 5.3 BTRS Monitor



Figure 5.4 SPWT Monitor

- ▲ MONITORING SITES**
- STUDY AREA FACILITIES**
1. 3M TONAWANDA
 2. ABF FREIGHT SYSTEM INC
 3. ADAMS SFC INC
 4. AGWAY TERMINAL
 5. ALLIED WASTE OF NALLC
 6. AMERICAN AXLE TONAWANDA FORGE
 7. APA TRANSPORT CORP
 8. ASHLAND DISTRIBUTION COMPANY
 9. CO STEEL RECYCLING - TONAWANDA
 10. COCA-COLA BOTTLING CO OF BUFFALO
 11. COLDEN ENTERPRISES
 12. COLVIN CLEANERS INC
 13. CON-WAY CENTRAL EXPRESS - X80
 14. CROSSETT TRUCKING
 15. CROSSETT TRUCKING
 16. CSXT KENMORE YARD
 17. DTE TONAWANDA LLC
 18. E I DUPONT YERKES PLANT
 19. ELM LAWN CEMETERY CREMATORY
 20. ERIE COUNTY ASPCA
 21. ESTES EXPRESS LINES INC
 22. FEDEX FREIGHT EAST INC - BUFFALO
 23. FMC CORP - PEROXYGENS DIVIS
 24. GE INTERNATIONAL BUFFALO SERVICE CENTER
 25. GIBRALTAR STEEL CORP METAL DIVISION
 26. GM POWERTRAIN - TONAWANDA ENGINE PLANT
 27. GOLD BOND RESEARCH DIV NATIONAL GYPSUM
 28. GOODYEAR DUNLOP TIRES NORTH AMERICA LTD
 29. HUNTLEY FLY ASH LANDFILL
 30. HUNTLEY STEAM GENERATING STATION
 31. INDECK-YERKES ENERGY SERVICES
 32. KELLER TECHNOLOGY CORP
 33. KENMORE MERCY HOSPITAL
 34. LAFARGE CORP
 35. M J MECHANICAL
 36. MARATHON ASHLAND PETROLEUM ASPHALT TERMINAL
 37. NEW ENGLAND MOTOR FREIGHT
 38. NFT METRO SYSTEMS FRONTIER GARAGE
 39. NIAGARA LANDFILL INC - NIAGARA LANDFILL
 40. NOCO ENERGY CORP
 41. OVERNITE TRANSPORTATION CO
 42. PALLET SERVICES INC
 43. PRAXAIR TECHNOLOGY CENTER
 44. REG 5 HWY MNT-TONAWANDA
 45. RIVER ROAD COMPOSTING FACILITY
 46. SUNOCO TONAWANDA TERMINAL
 47. SWIFT RIVER ASSOCIATES INC
 48. TONAWANDA COKE CORP
 49. TONAWANDA SDR2 STP
 50. T-TONA HOUSEHOLD HAZ WASTE STORAGE FAC
 51. TURNING POINT INDUSTRIES
 52. U O P EQUIPMENT SYSTEMS
 53. UNIFRAX MANUFACTURING
 54. UNIVAR MFG.
 55. VALLEY RETREADING CO
 56. VANOCUR REFRACTORIES
 57. VELVET LAUNDRY AND DRY CLEANERS INC
 58. YELLOW TRANSPORTATION INC (BUF)
 59. ZERO POINT CLEAN TECH THERMO-CHEMICAL

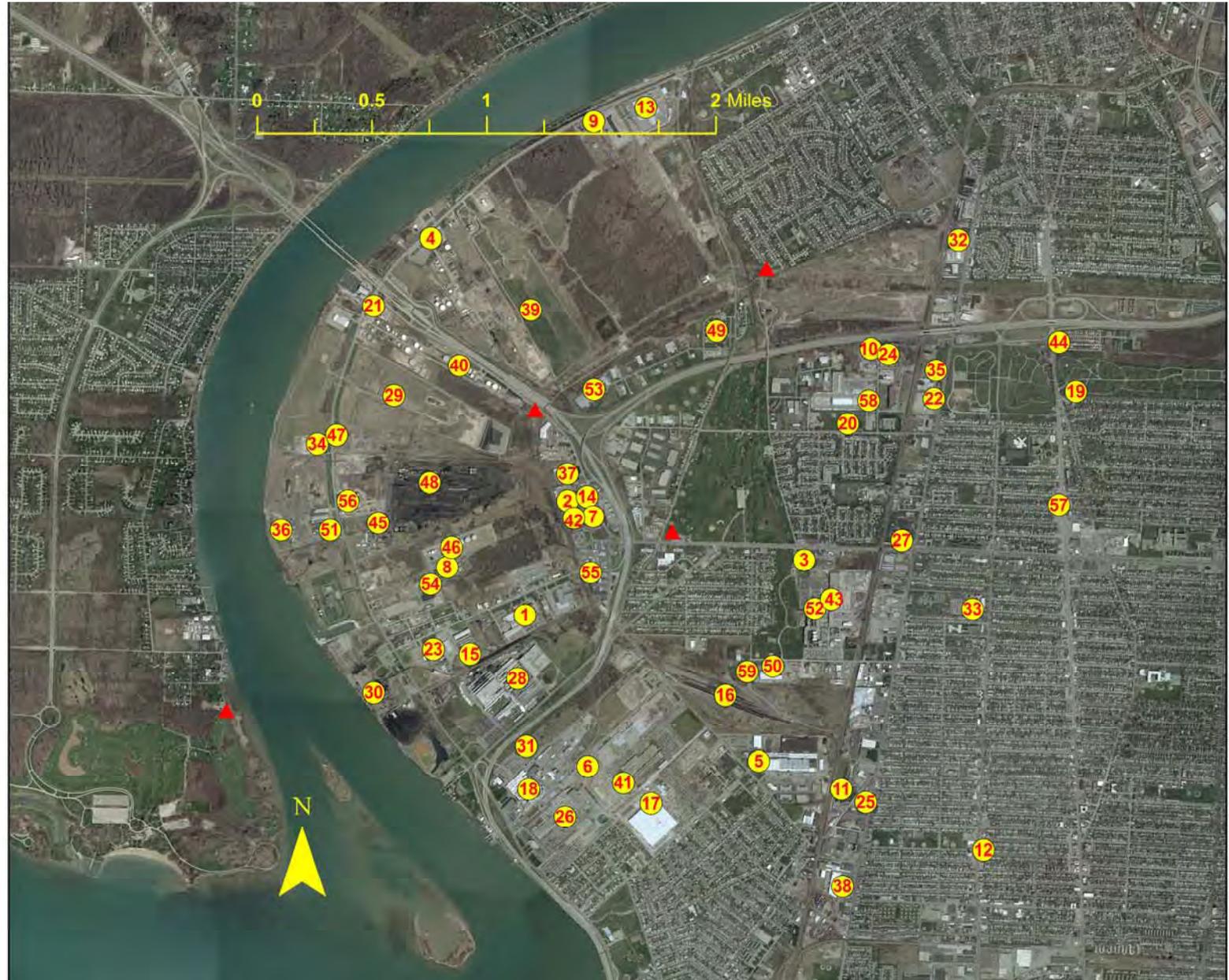


Figure 5.5 Map of Monitoring Locations and Facilities



Figure 5.6 Stainless Steel Canister



Figure 5.7 Carbonyl Cartridge

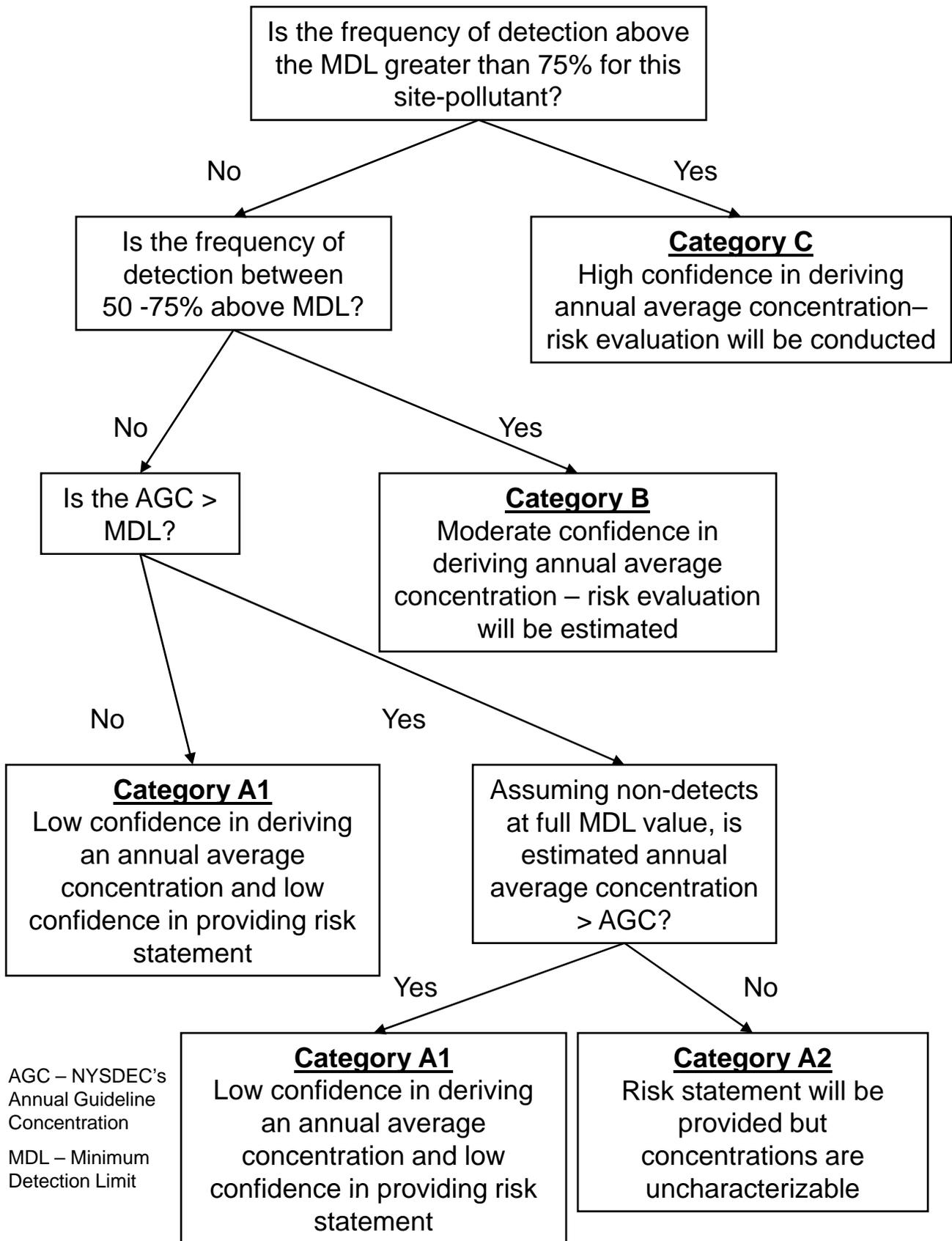


Figure 7.1 Decision Matrix to Assess the Suitability of Characterizing Annual Averages for Health Risk Evaluations

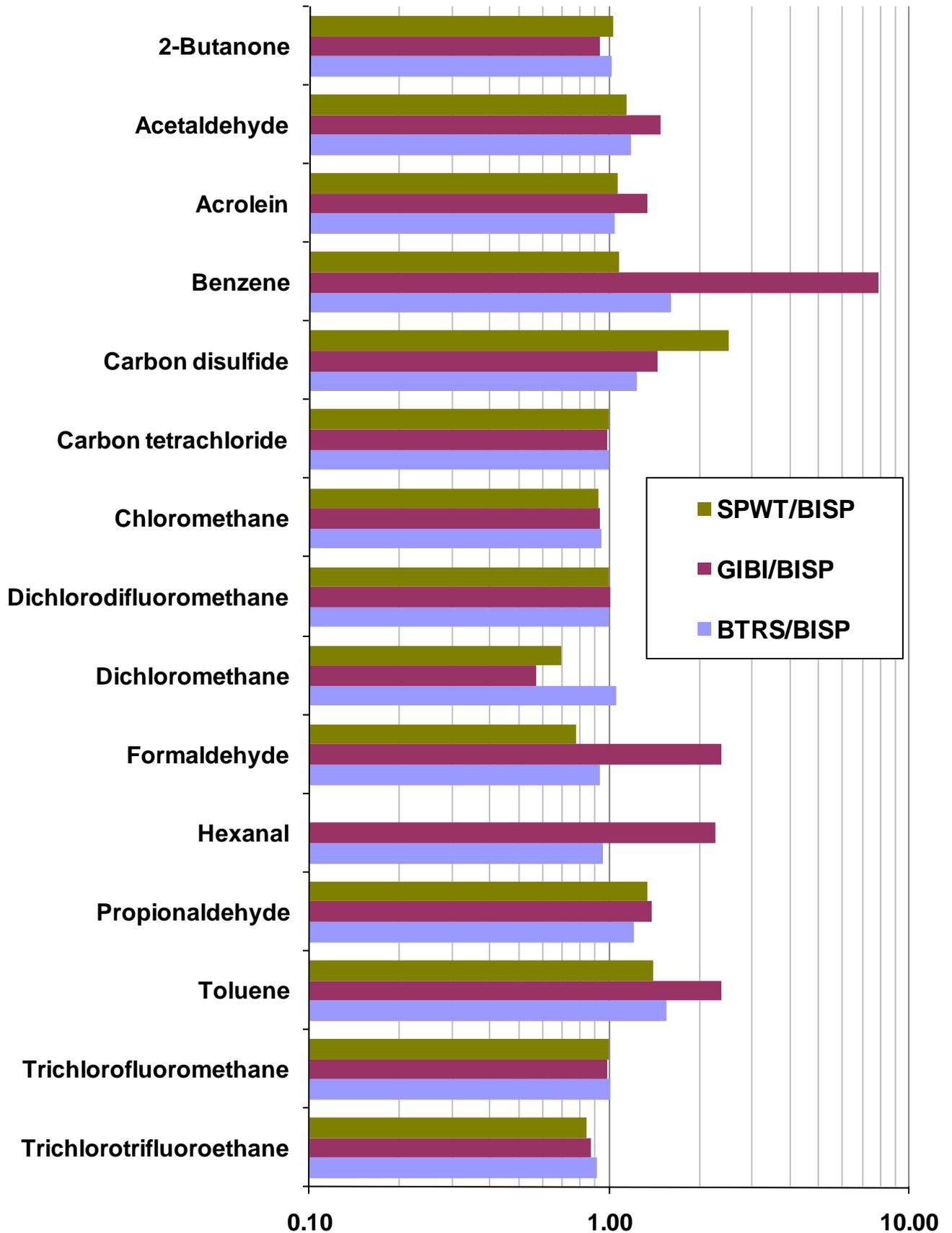


Figure 7.2 Comparison Annual Averages of Perimeter Sites to BISP (Background Site)

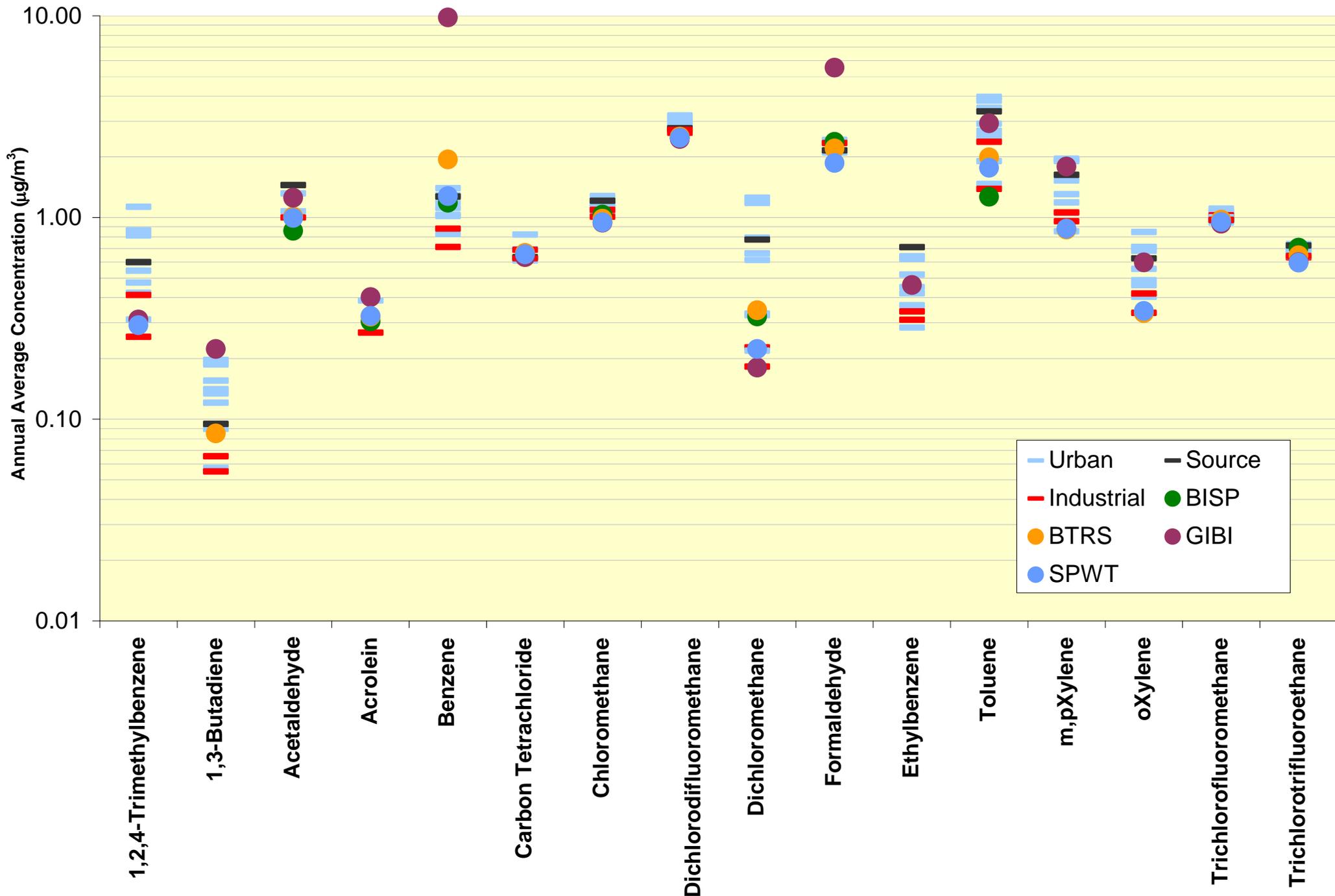


Figure 7.3 Comparison of NYS Air Monitoring Concentrations and Tonawanda Study Sites

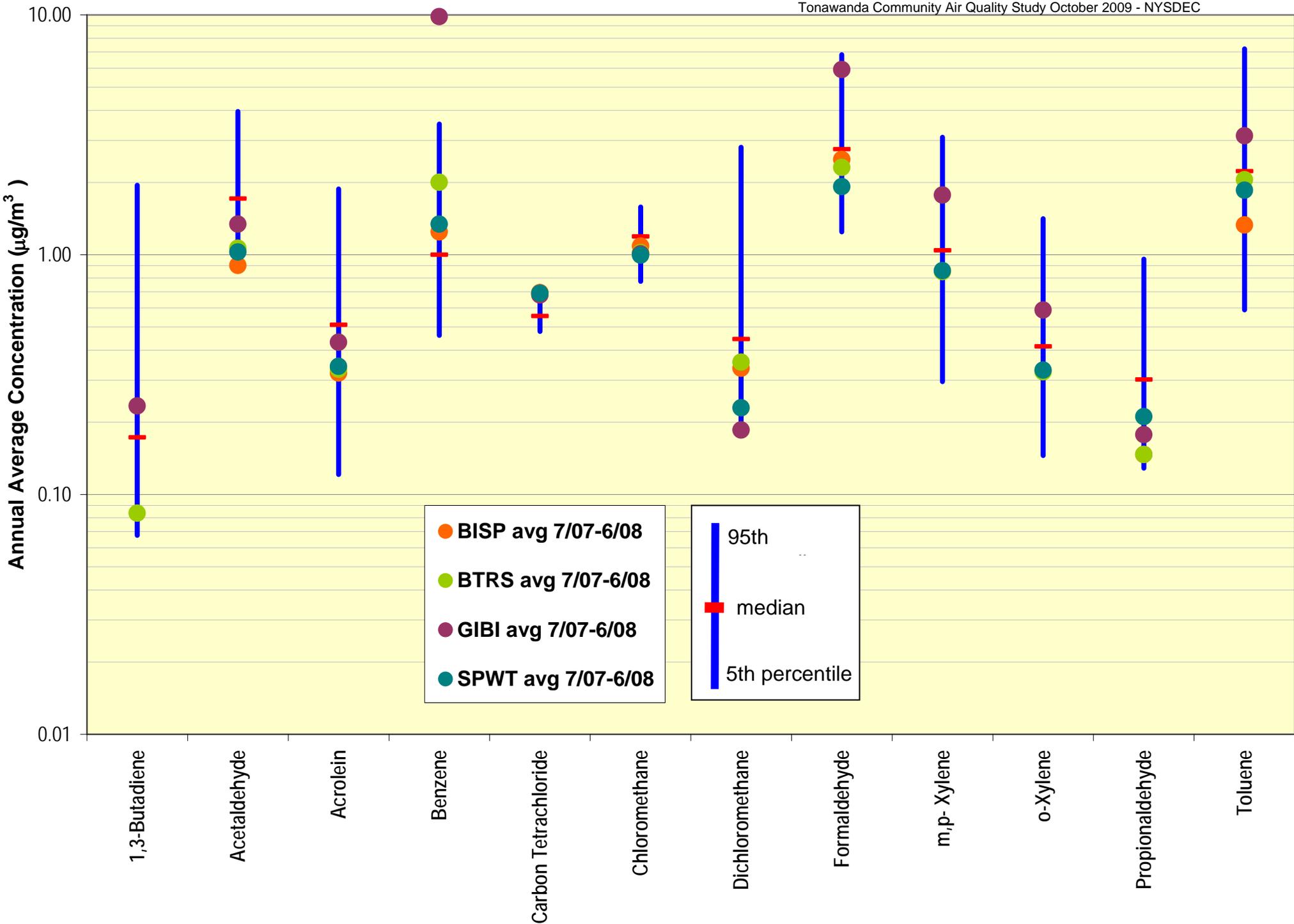


Figure 7.4 Comparison of US (2005) Air Monitoring Concentrations and Tonawanda Study Sites

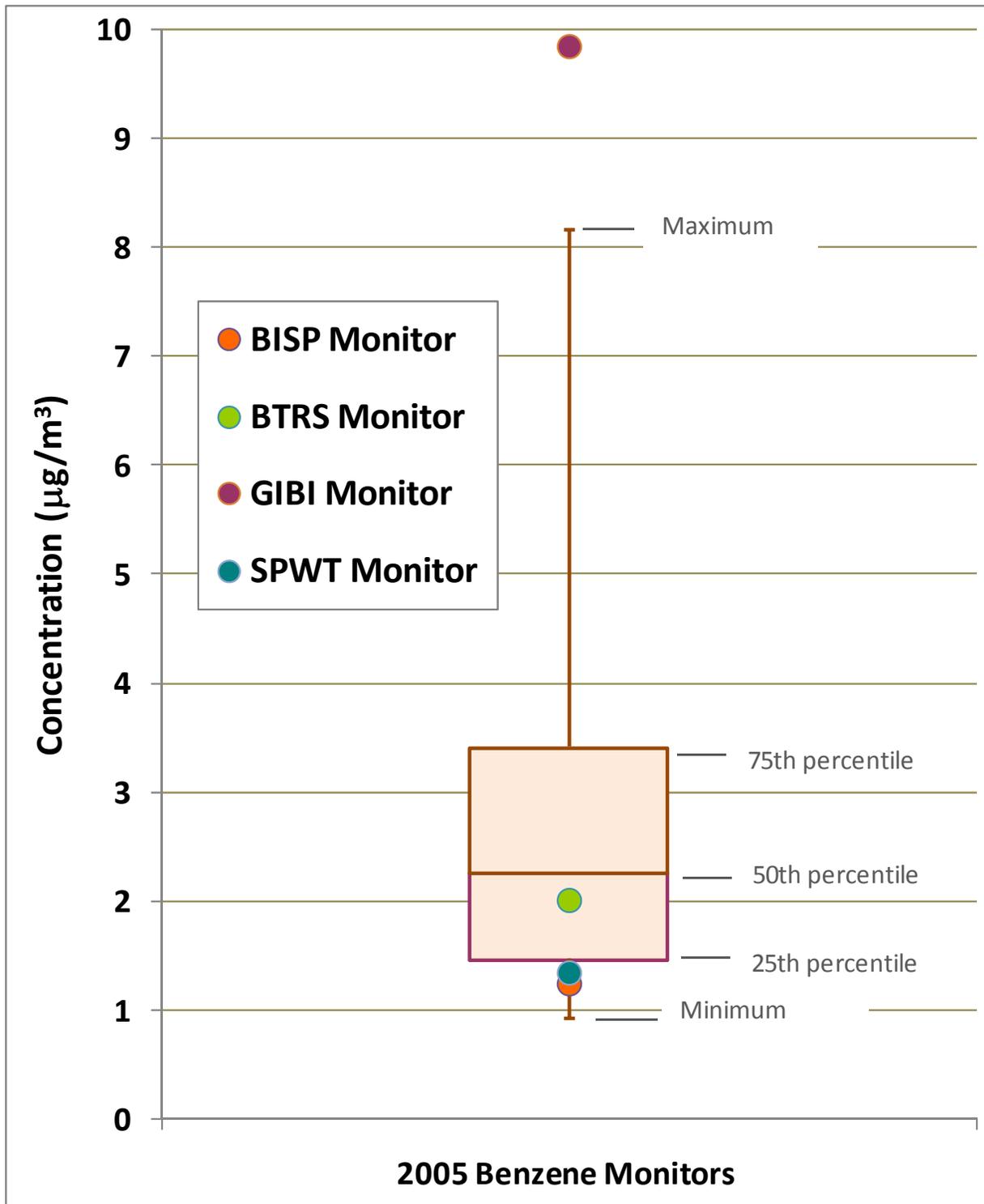


Figure 7.5 Comparison of 2005 Annual Average Benzene Concentrations from Monitors Near Facilities Releasing Benzene

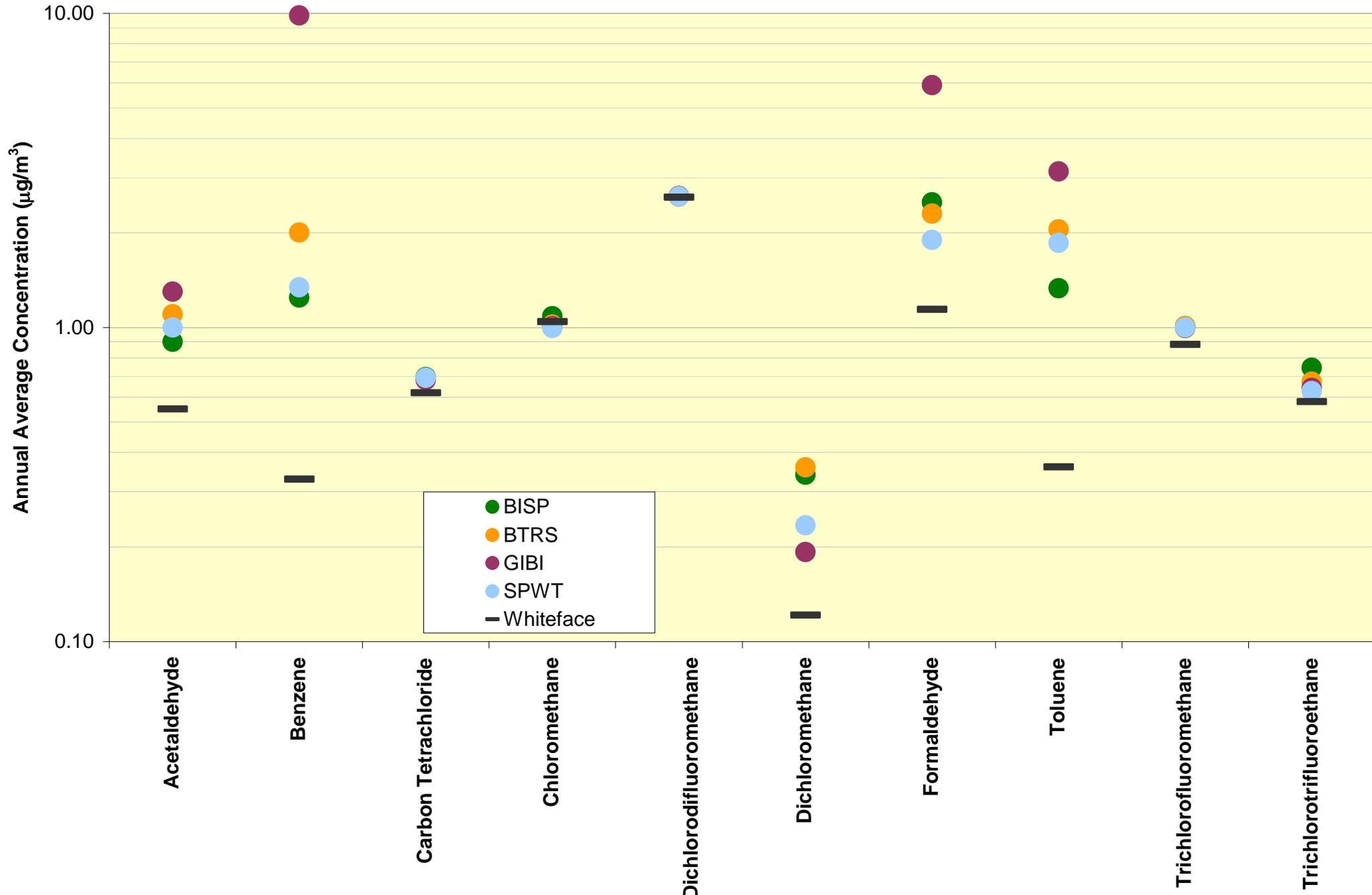


Figure 7.6 NYS Air Toxic Concentrations for Rural (Whiteface Mountain) Monitor and Tonawanda Study Sites

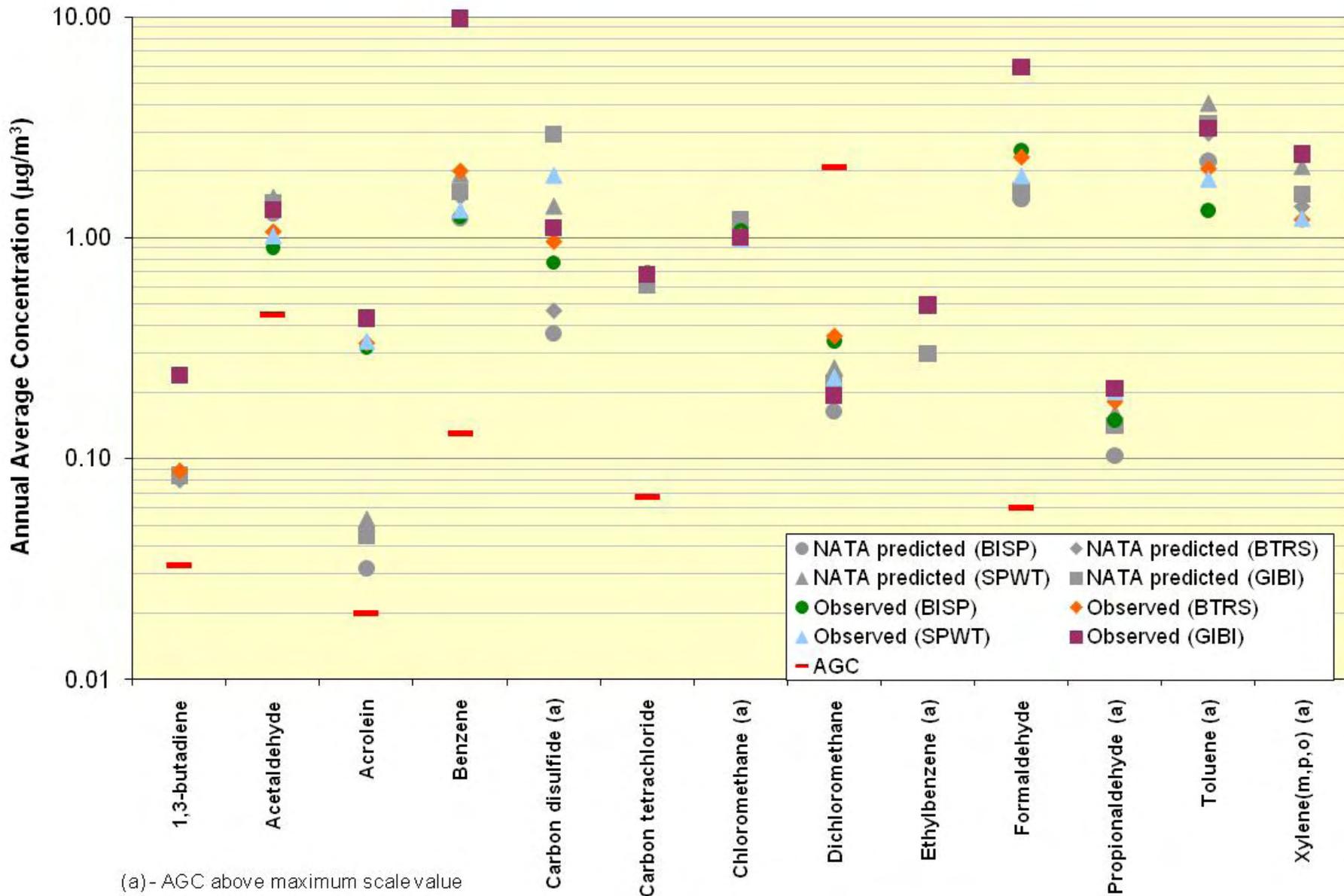


Figure 7.7 Comparison Study Monitors and USEPA’s 2002 National-scale Air Toxics Assessment Annual Average Concentrations

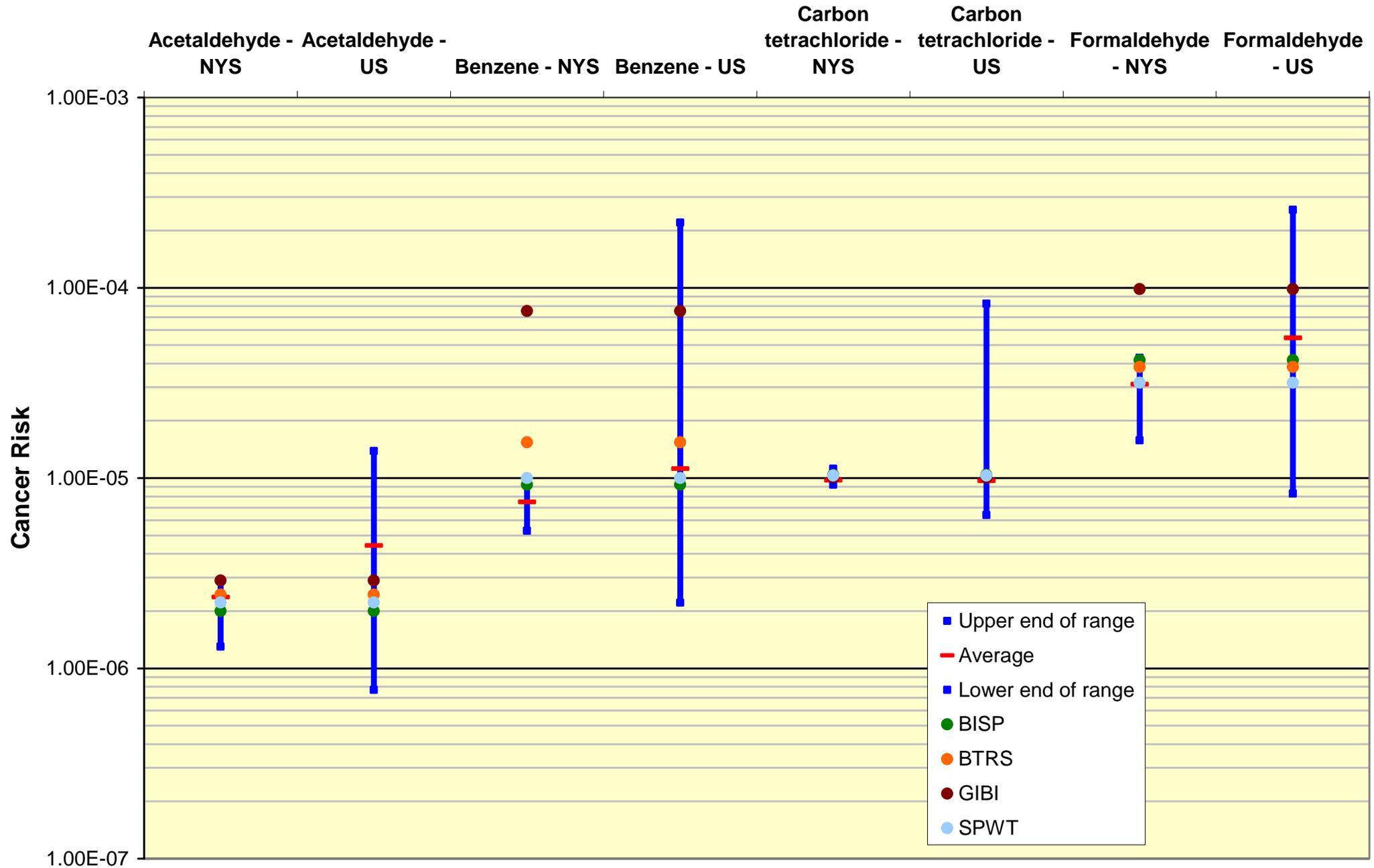


Figure 7.8 Comparison New York State, US and Tonawanda Study Site Cancer Risk Estimates for Acetaldehyde, Benzene, Carbon Tetrachloride and Formaldehyde

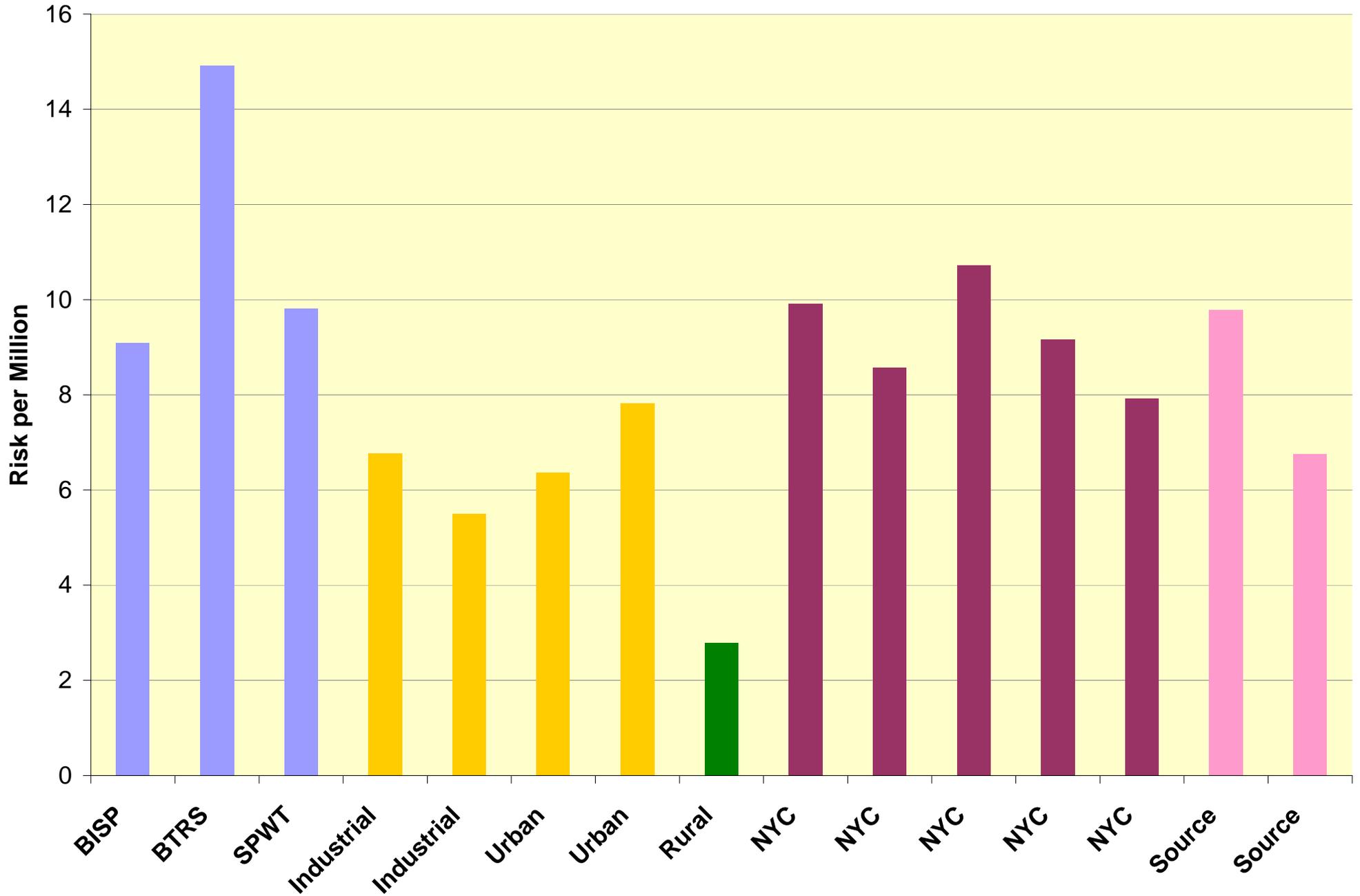
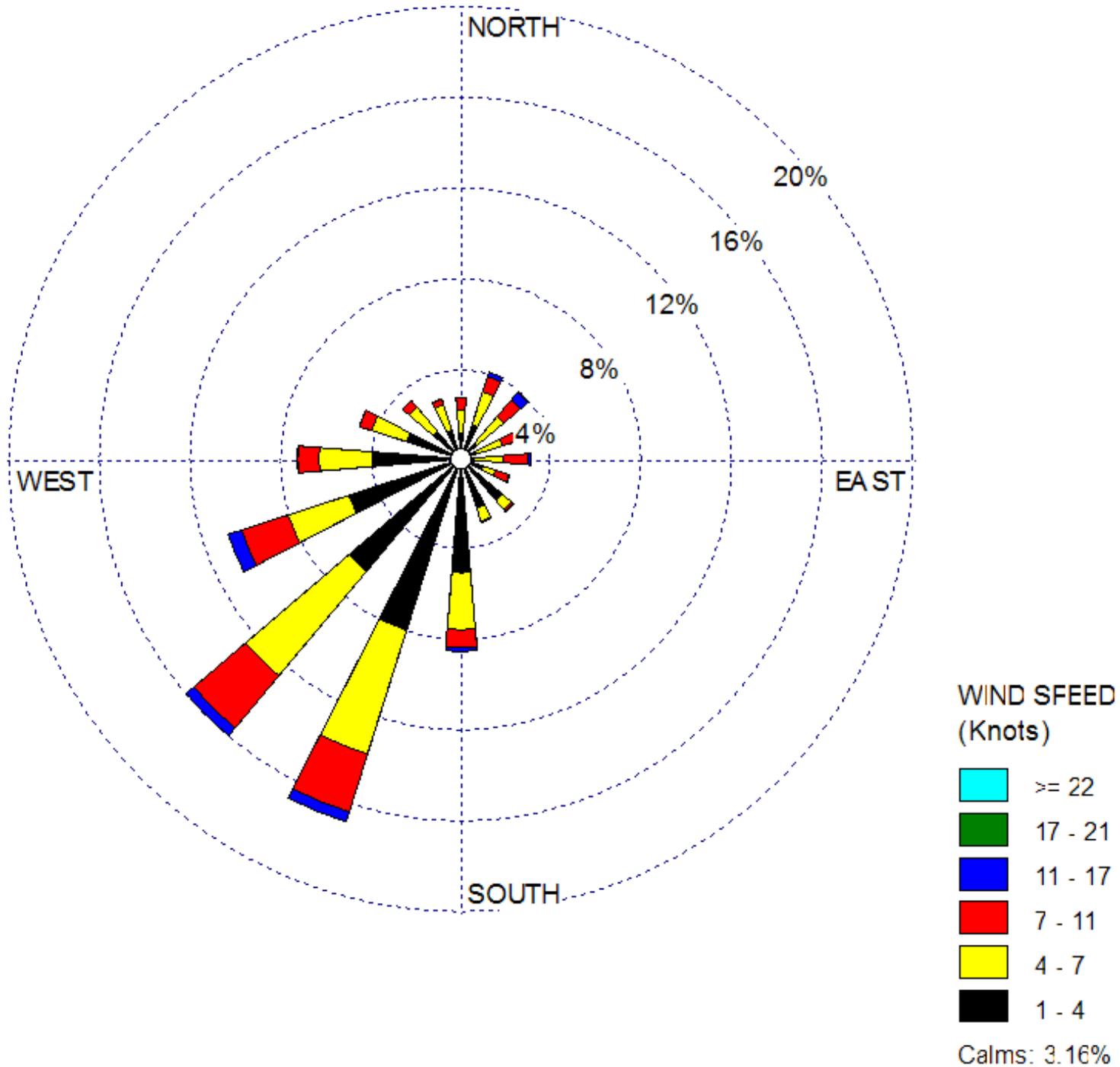


Figure 7.9 Comparison Benzene Risk Estimates for Study and State Sites (The risk estimate of 75 per million for the GIBI monitor is not included.)



Figures Page - **Figure 7.10.** Beaver Island State Park Wind Direction and Wind Speed over the Study Period (12 Months).

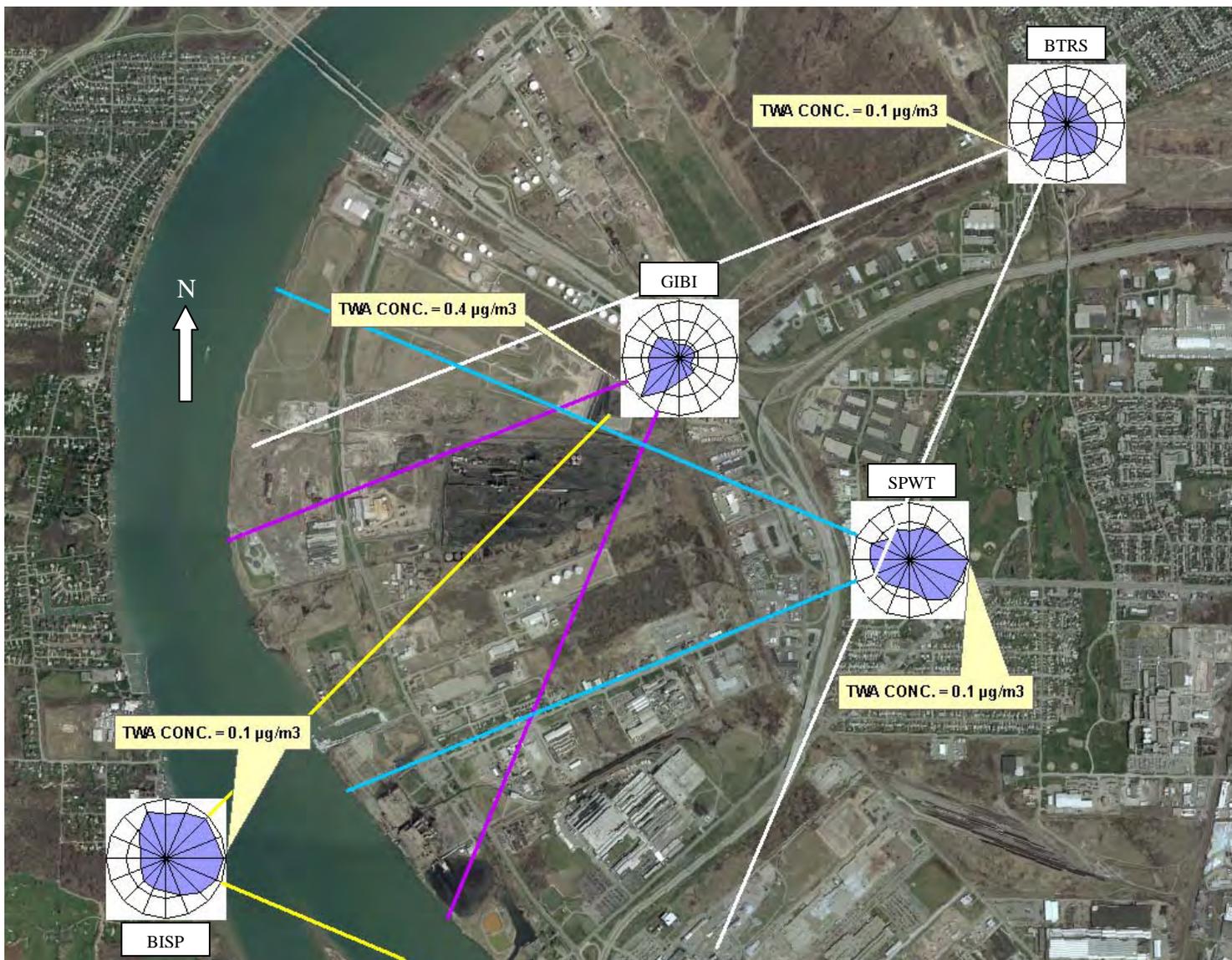


Figure 7.11. 1,3-Butadiene TW Pollution Roses

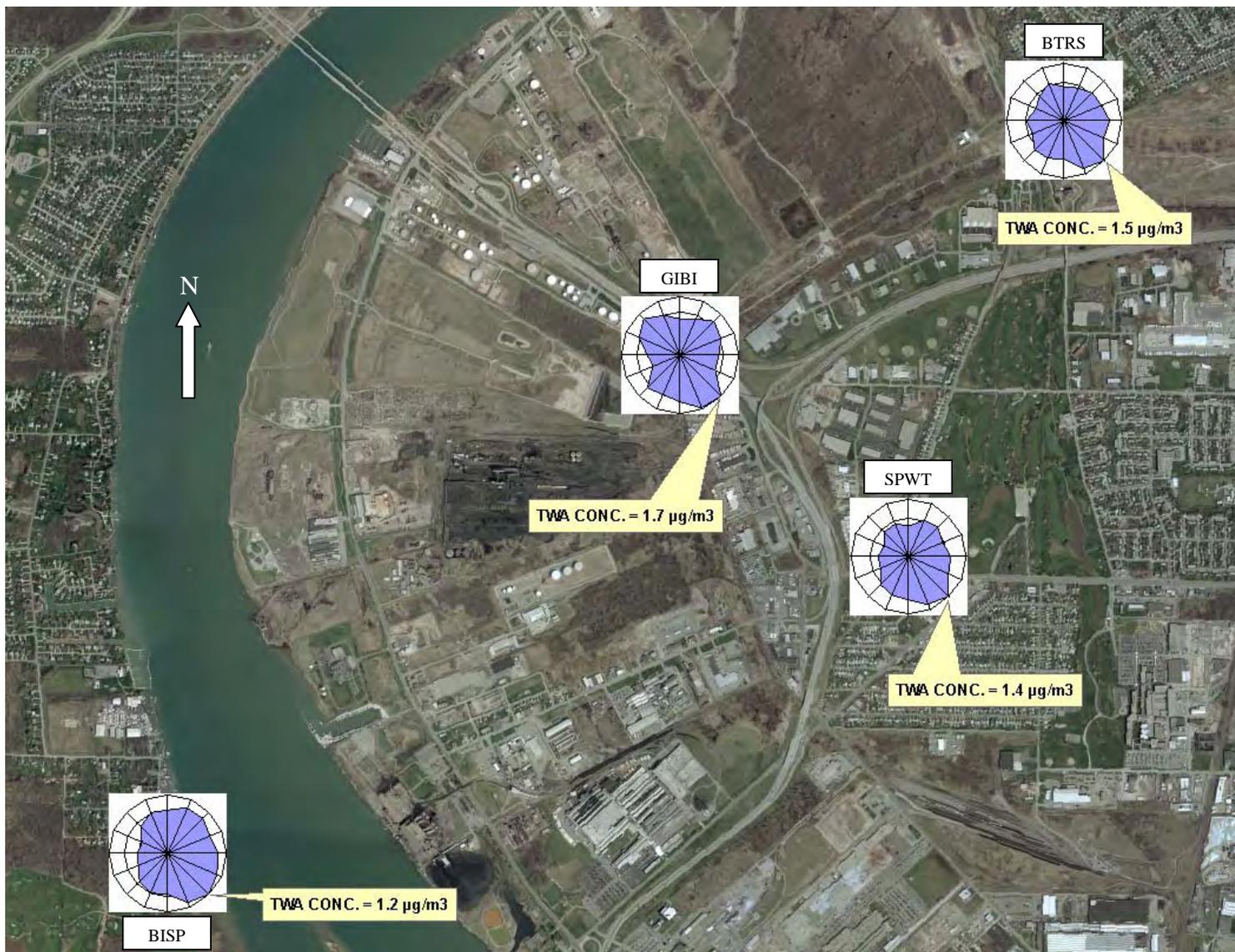


Figure 7.12. Acetaldehyde TW Pollution Roses

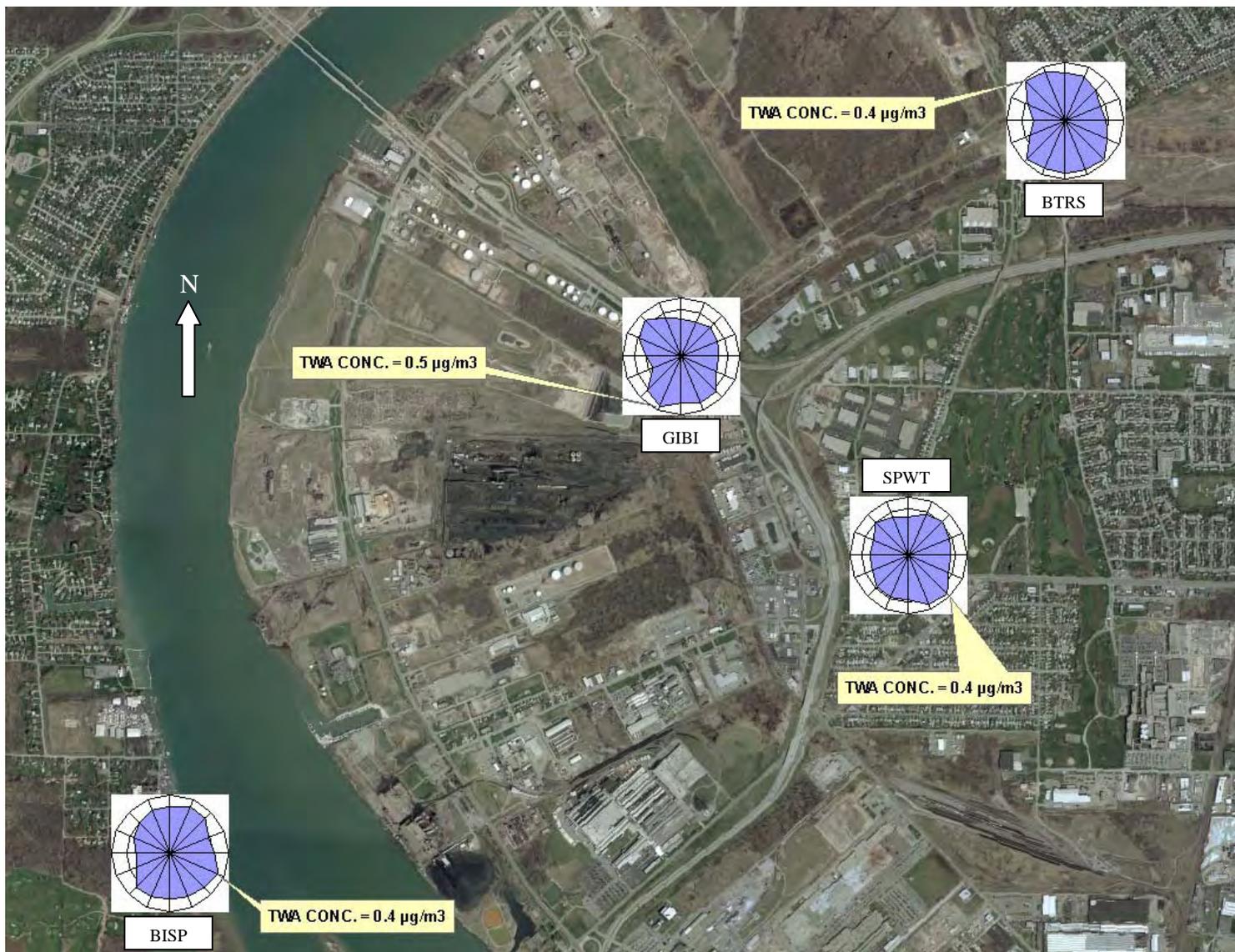


Figure 7.13. Acrolein TW Pollution Roses

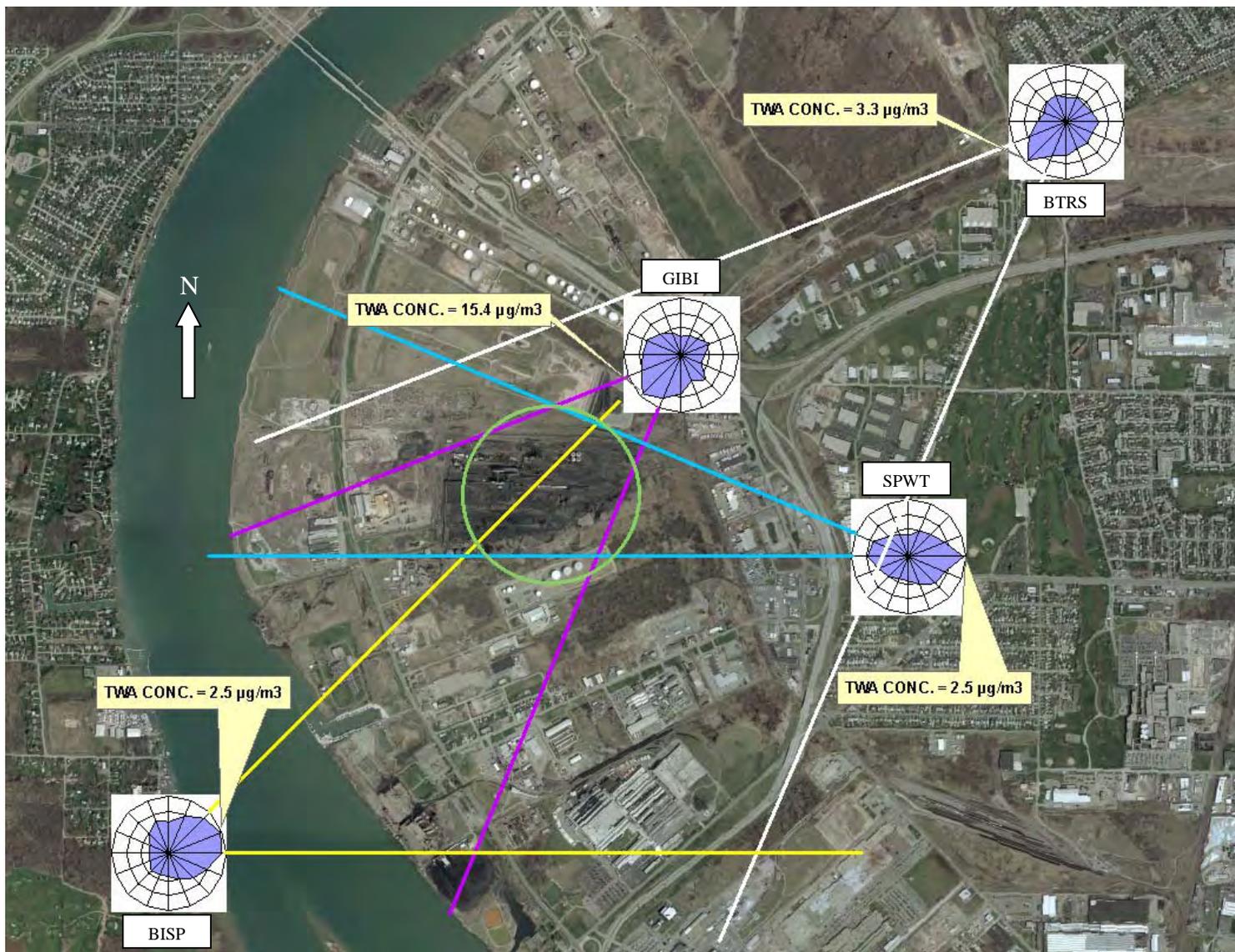


Figure 7.14. Benzene TW Pollution Roses

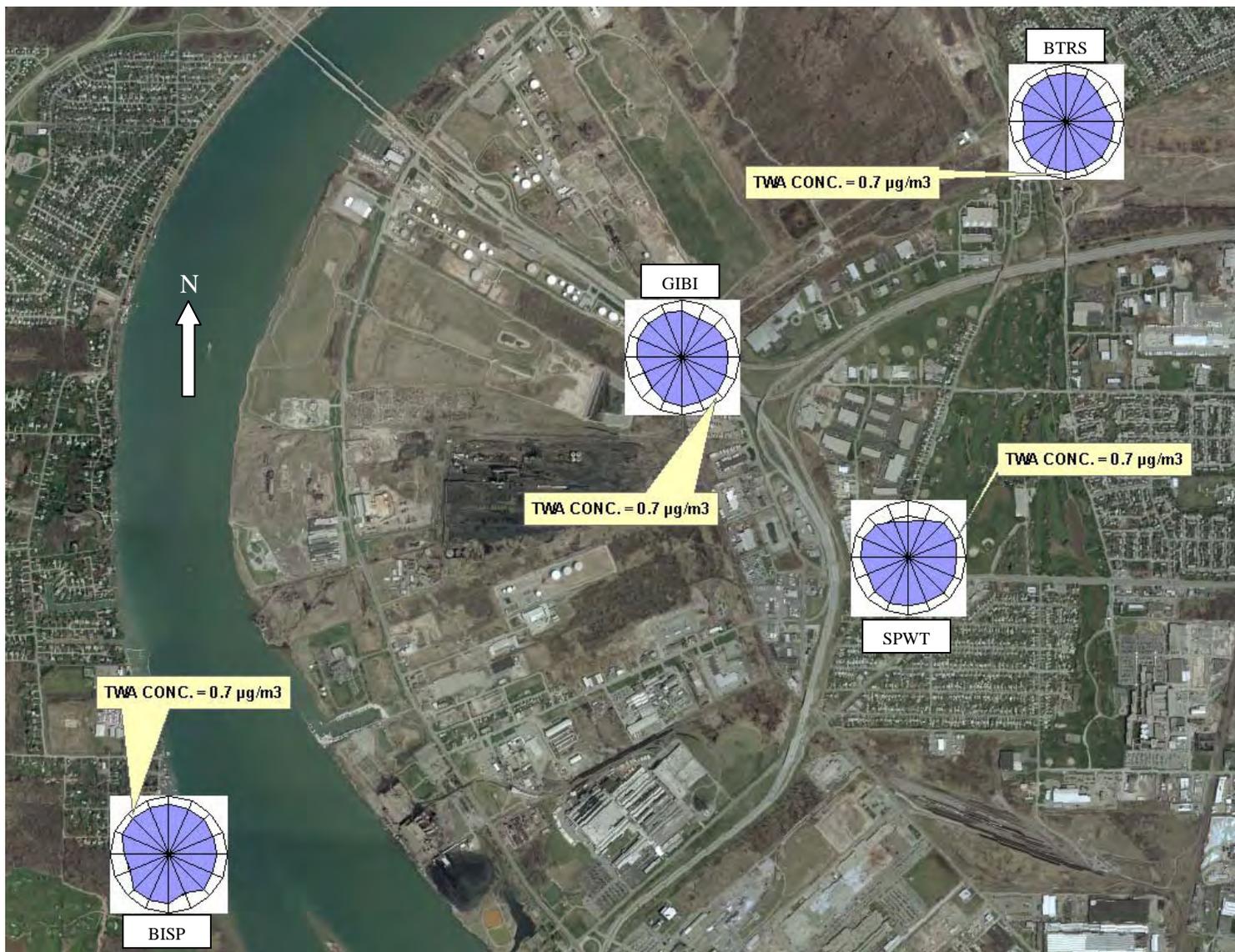


Figure 7.15. Carbon Tetrachloride TW Pollution Roses

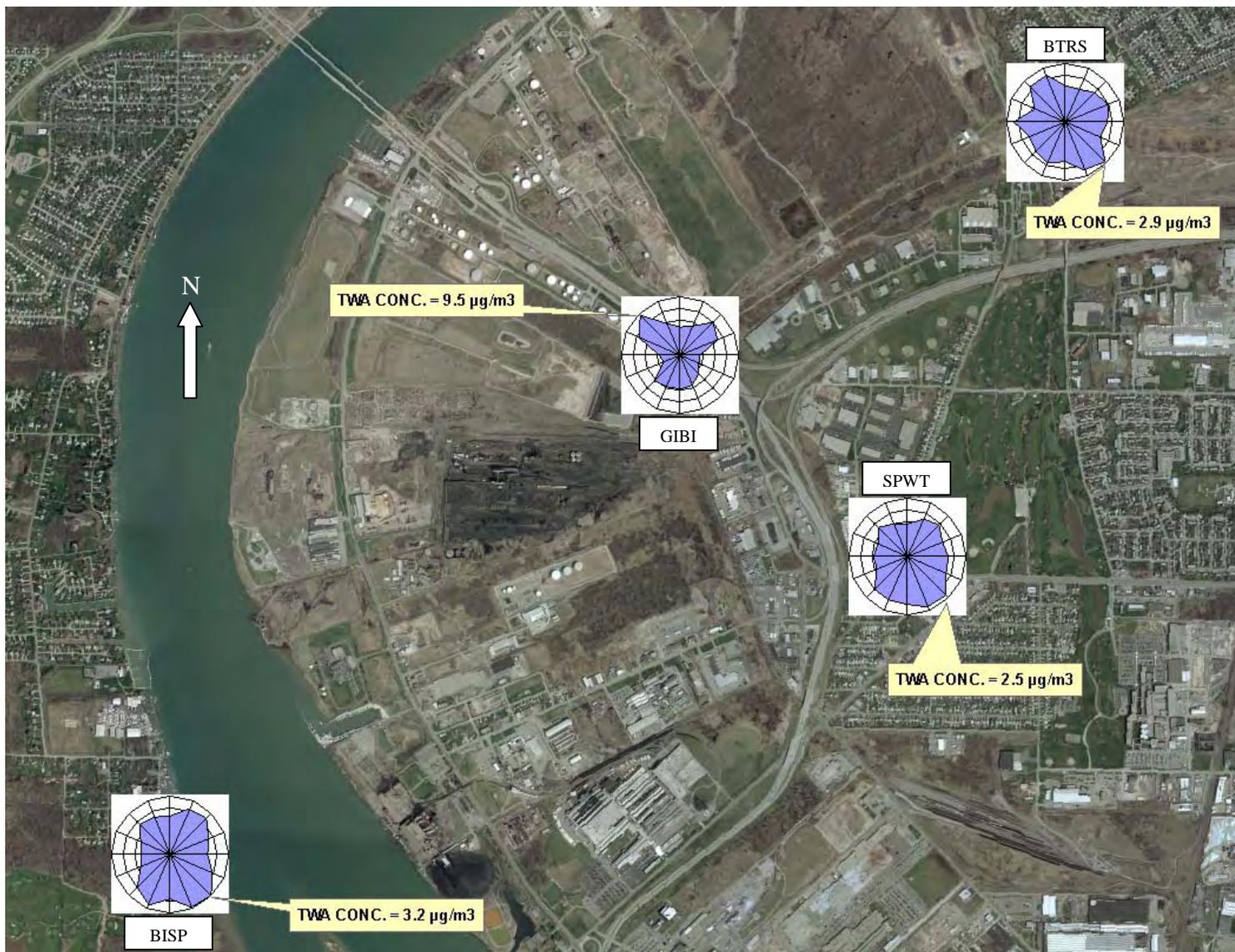


Figure 7.16. Formaldehyde TWA Pollution Roses

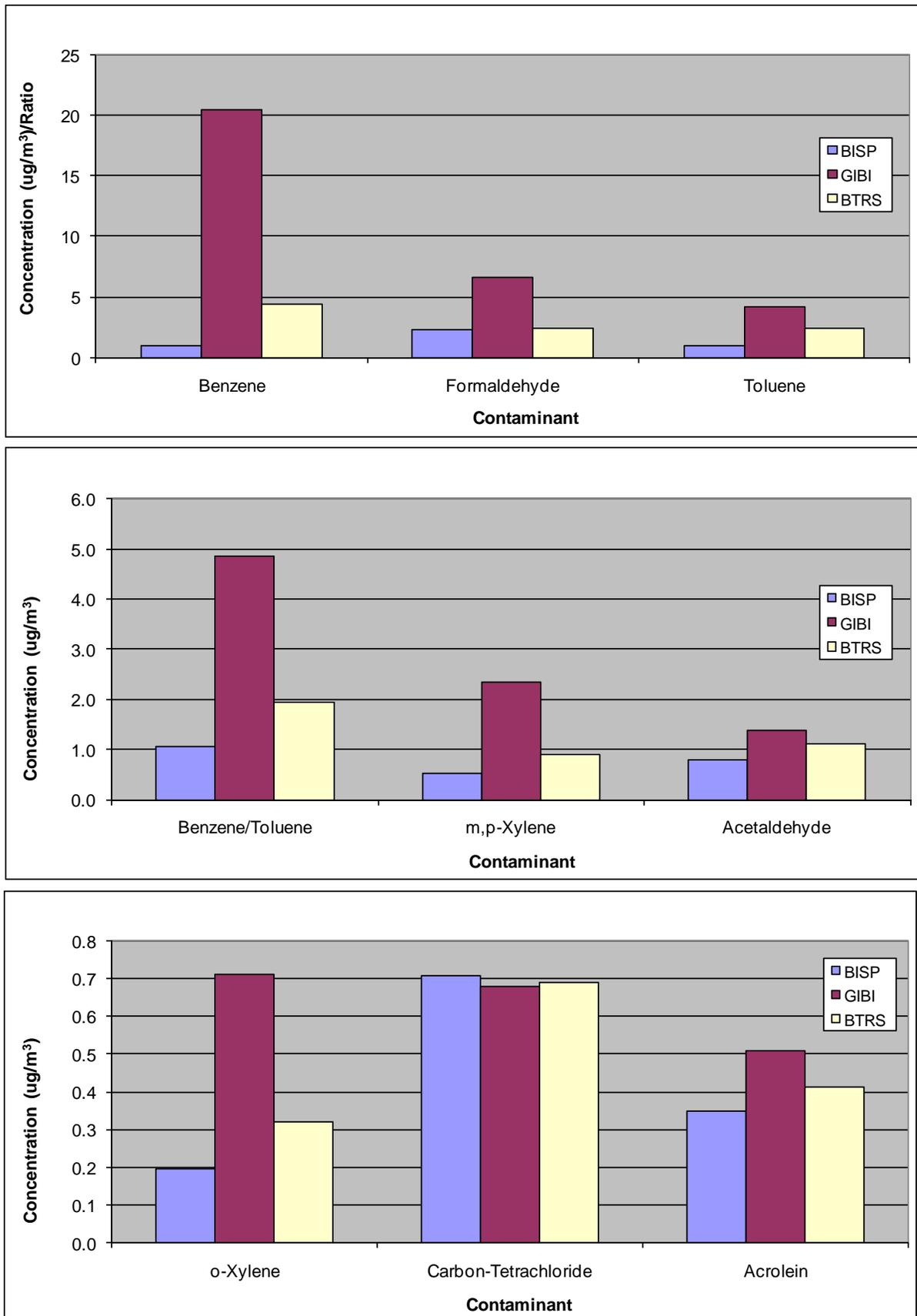


Figure 7.17. Concentrations Upwind versus Downwind of Tonawanda Coke Corporation with Winds from 225°. The BISP monitor is the upwind site and the GIBI and BTRS monitors are the downwind sites with this wind scenario.

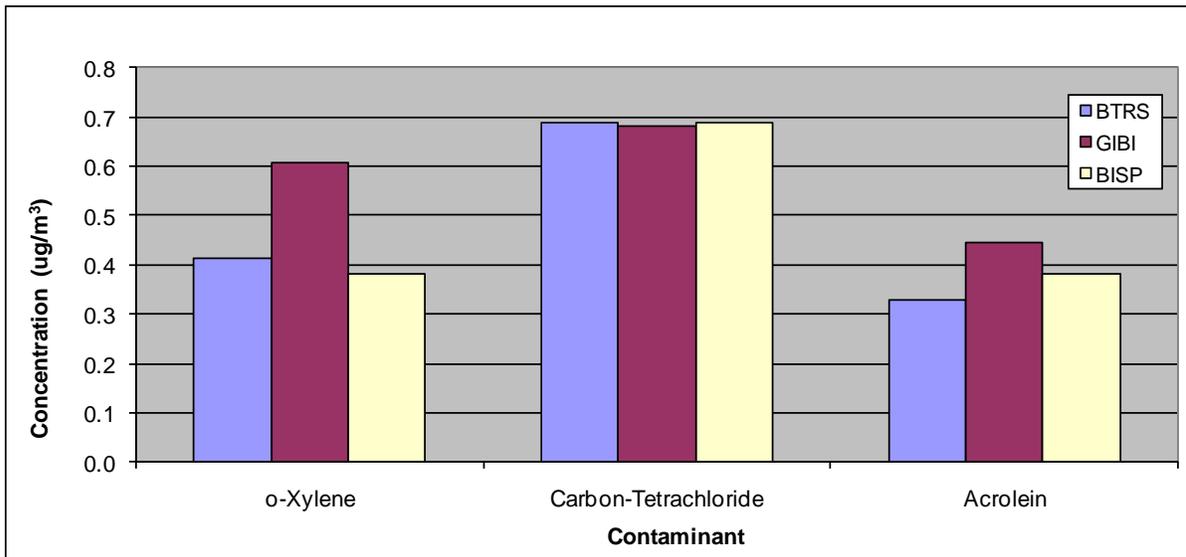
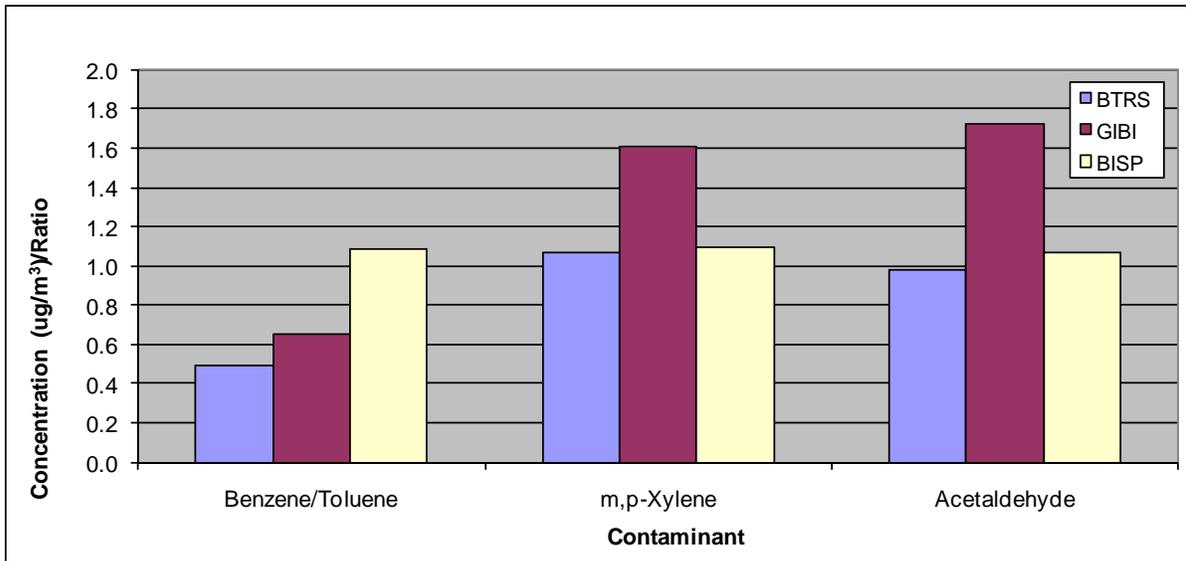
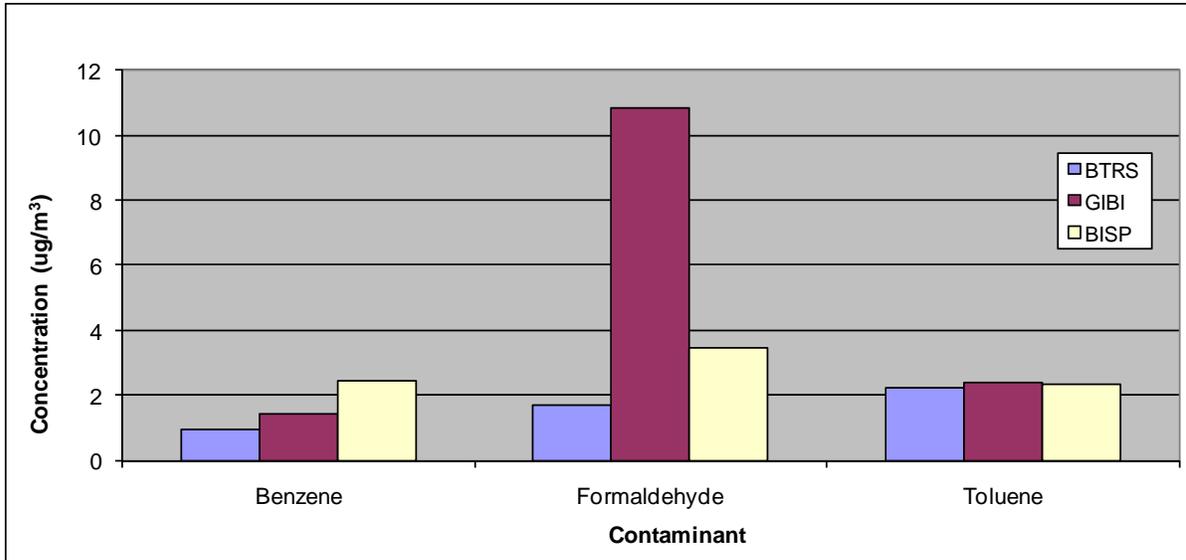


Figure 7.18. Concentrations Upwind versus Downwind of Tonawanda Coke Corporation with Winds from 45°. The GIBI and BTRS monitors are the upwind sites and the BISP monitor is the downwind site with this wind scenario.

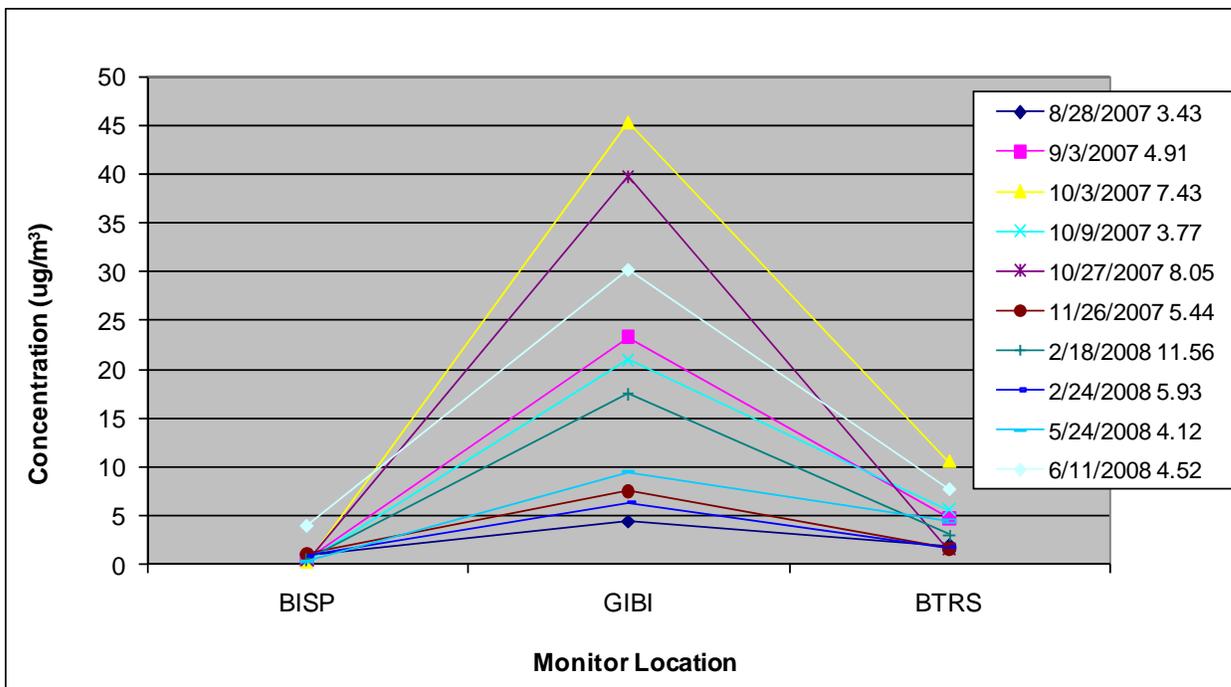


Figure 7.19. Benzene Concentrations Upwind versus Downwind of Tonawanda Coke Corporation with Winds from 225°. The BISP monitor is the upwind site and the GIBI and BTRS monitors are the downwind sites with this wind scenario. The average daily wind speeds in miles per hour (mph) are included adjacent to the date in the legend.

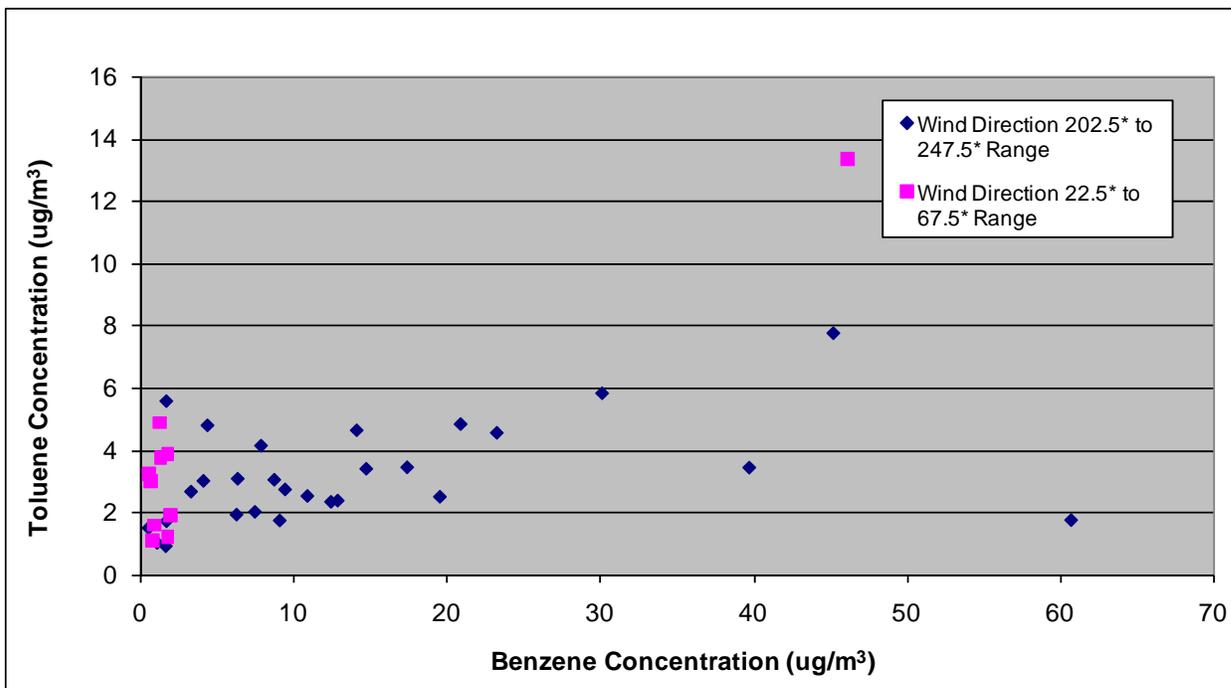


Figure 7.20. Benzene to Toluene Concentrations at the GIBI Monitor with Varying Wind Direction Ranges. The coke oven is upwind and the adjacent highway is downwind with the 202.5° to 247.5° wind direction range and the adjacent highway is upwind and the coke oven is downwind with the 22.5° to 67.5° wind direction range. The wind rose for the one outlying point for the 22.5° to 67.5° wind direction range is provided as Figure 7.3.14.

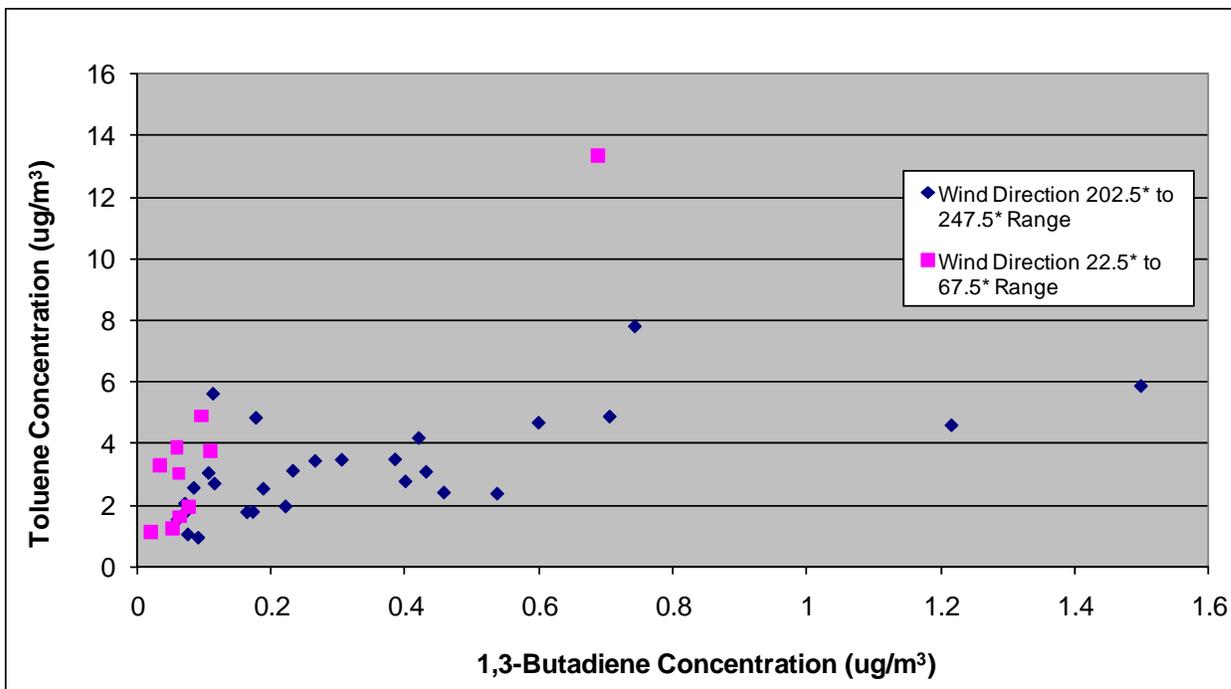


Figure 7.21. 1,3-Butadiene to Toluene Concentrations at the GIBI Monitor with Varying Wind Direction Ranges. The coke oven is upwind and the adjacent highway is downwind with the 202.5° to 247.5° wind direction range and the adjacent highway is upwind and the coke oven is downwind with the 22.5° to 67.5° wind direction range. The wind rose for the one outlying point for the 22.5° to 67.5° wind direction range is provided as Figure 7.3.14.

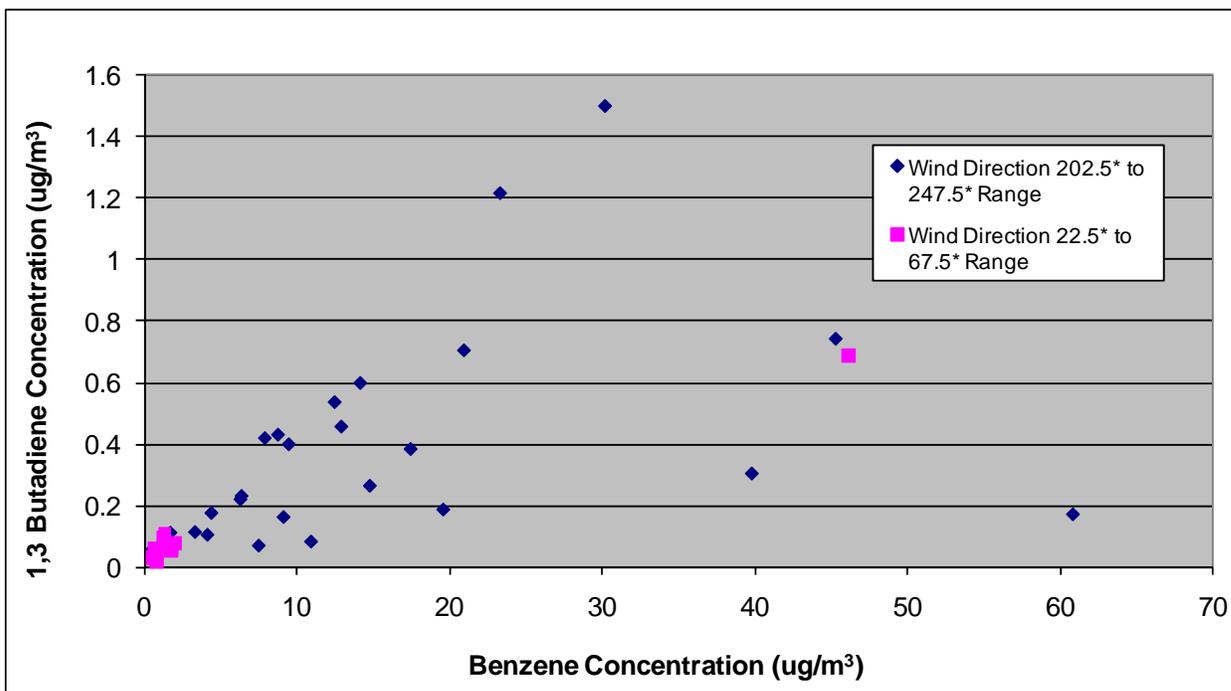


Figure 7.22. Benzene to 1,3-Butadiene Concentrations at the GIBI Monitor with Varying Wind Direction Ranges. The coke oven is upwind and the adjacent highway is downwind with the 202.5° to 247.5° wind direction range and the adjacent highway is upwind and the coke oven is downwind with the 22.5° to 67.5° wind direction range. The wind rose for the one outlying point for the 22.5° to 67.5° wind direction range is provided as Figure 7.3.14.

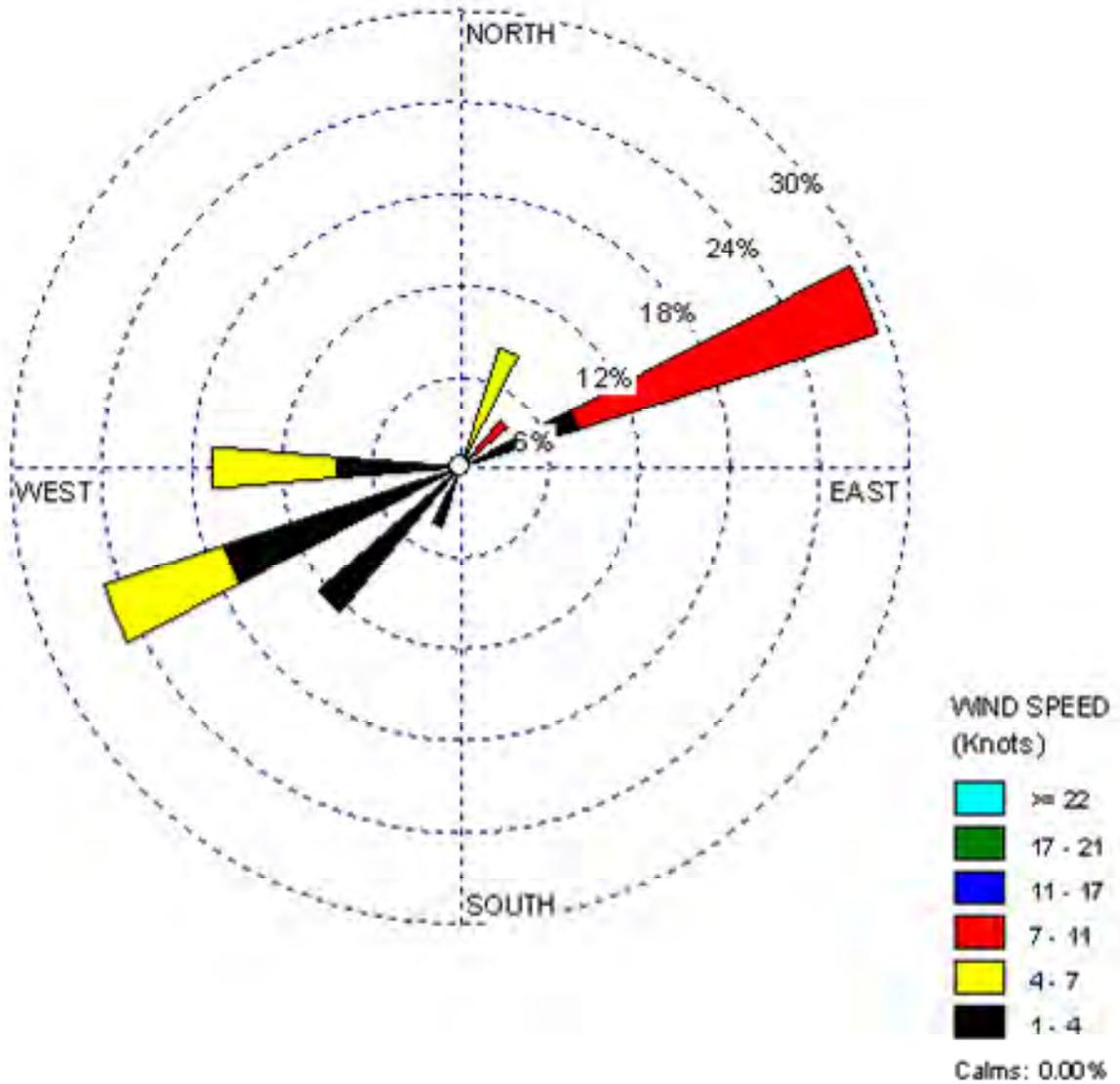


Figure 7.23. Wind Rose for the Outlying Point for the 22.5° to 67.5° Wind Direction Range in Figures 7.20-22.

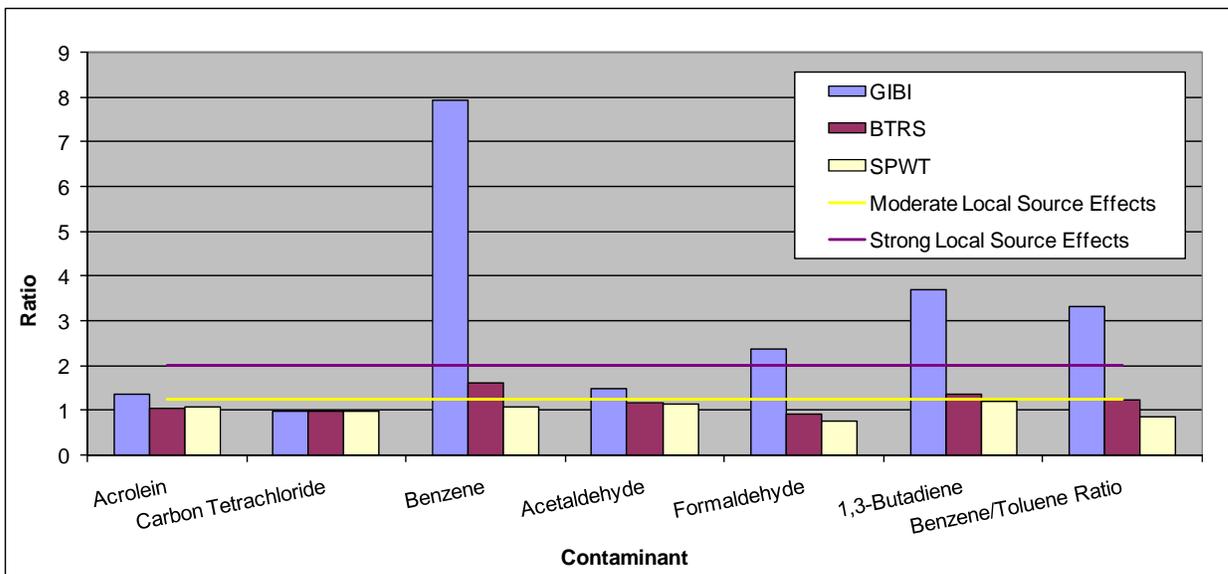


Figure 7.24. Downwind to Upwind Concentration Ratios. Each of the downwind monitor average concentrations (GIBI, BTRS, and SPWT) were divided by the upwind monitor average concentration (BISP) to determine if the influences resulting in the measured concentrations were potentially due primarily to regional background effects, local source effects, or some combination of these effects.

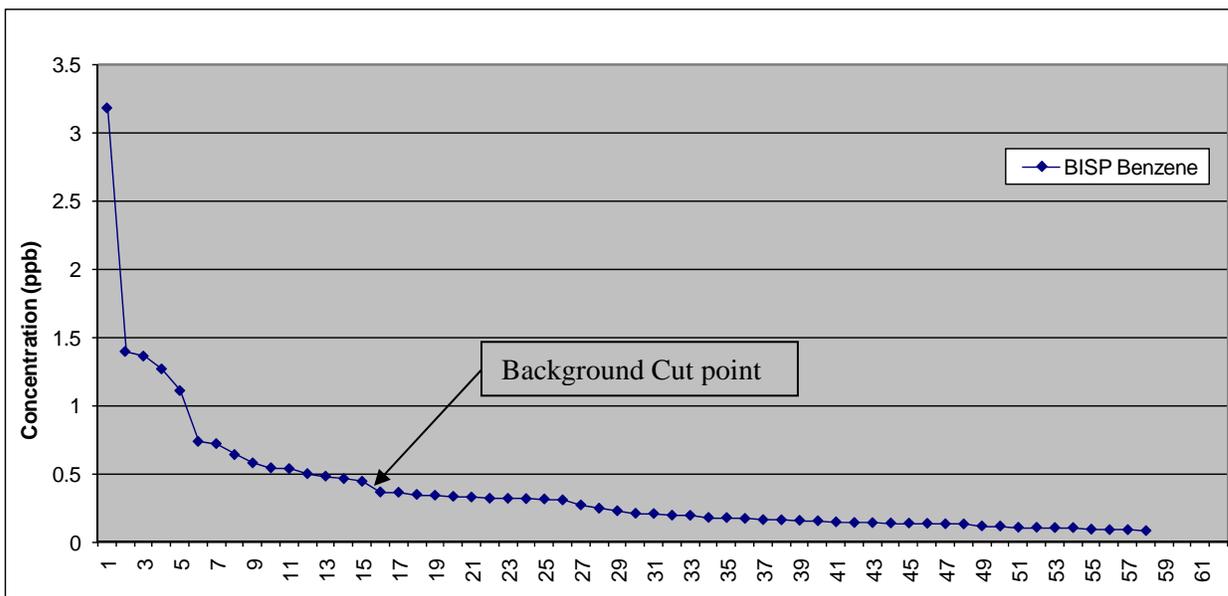


Figure 7.25. Benzene Concentrations presented in Descending Order. The background cut point for this trends analysis was chosen halfway between the data points where the slope transitions to only a very gradually decreasing line. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

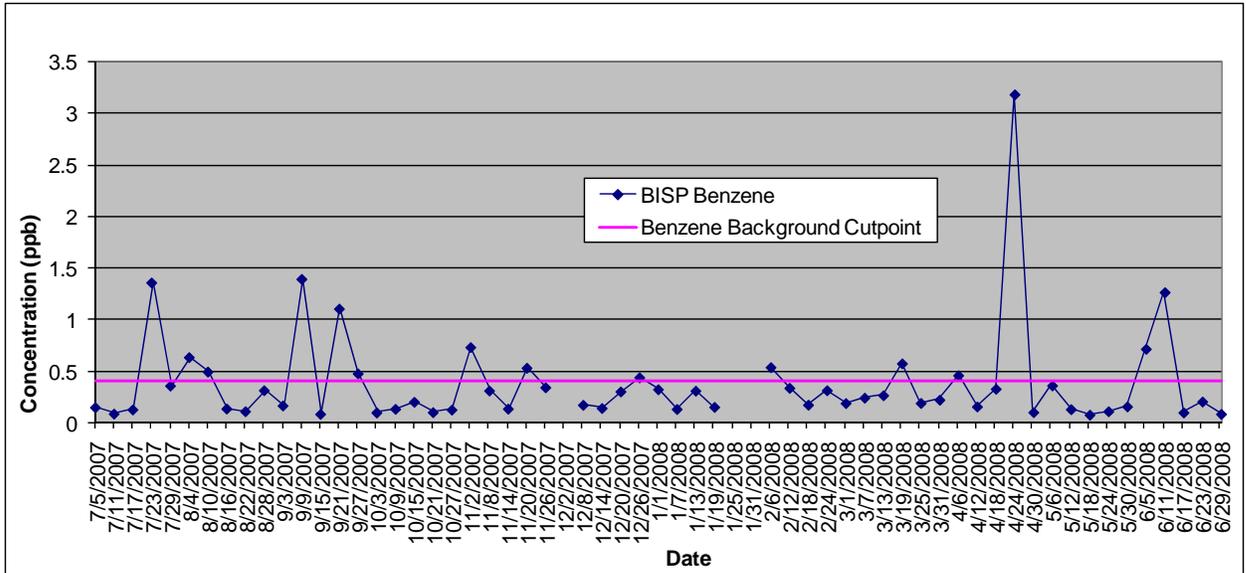


Figure 7.26. Benzene Concentrations over the Study Time Period including the Trends Analysis Cut point Concentration. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

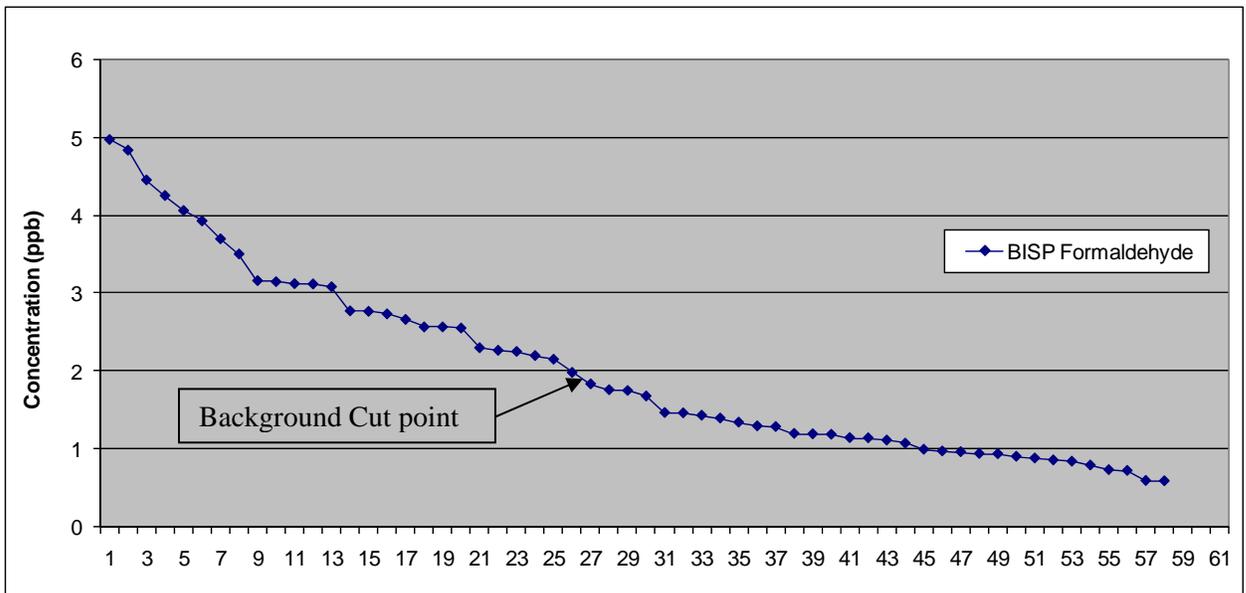


Figure 7.27. Formaldehyde Concentrations presented in Descending Order. The background cut point for this trends analysis was chosen halfway between the data points where the slope transitions to only a very gradually decreasing line. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

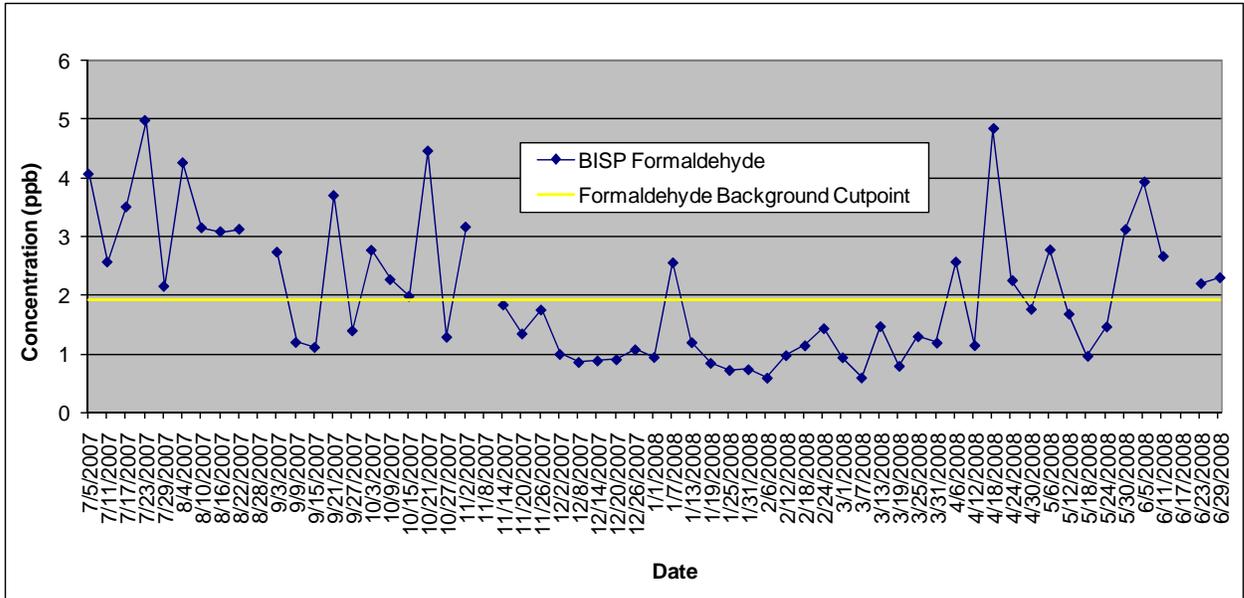


Figure 7.28. Formaldehyde Concentrations over the Study Time Period including the Trends Analysis Cut point Concentration. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

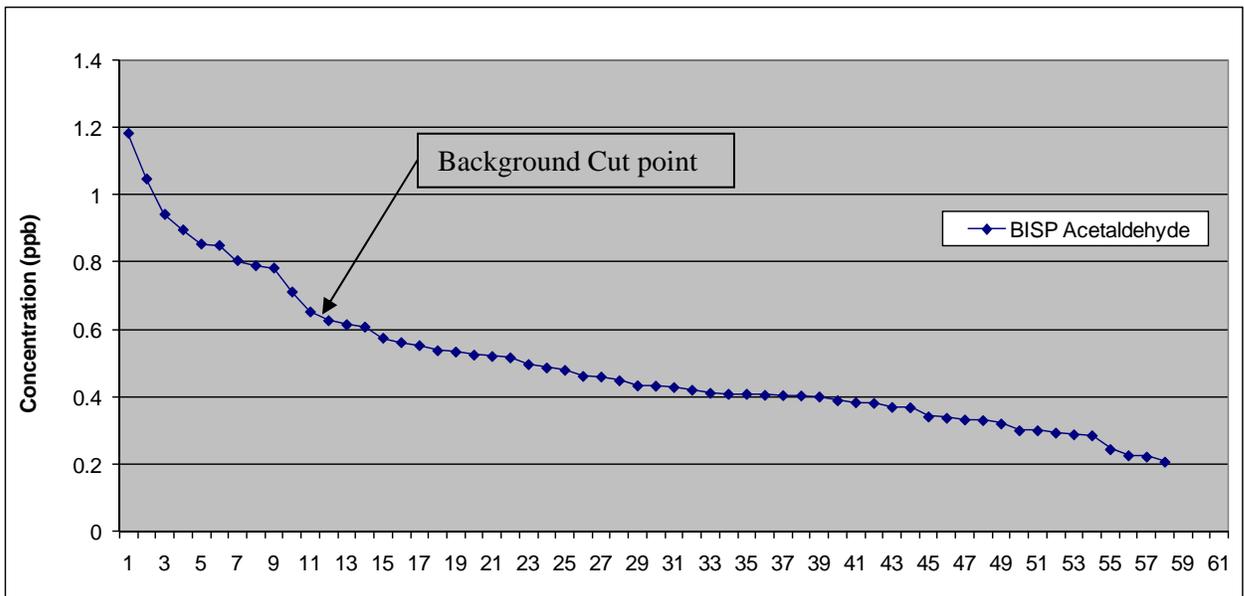


Figure 7.29. Acetaldehyde Concentrations presented in Descending Order. The background cut point for this trends analysis was chosen halfway between the data points where the slope transitions to only a very gradually decreasing line. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

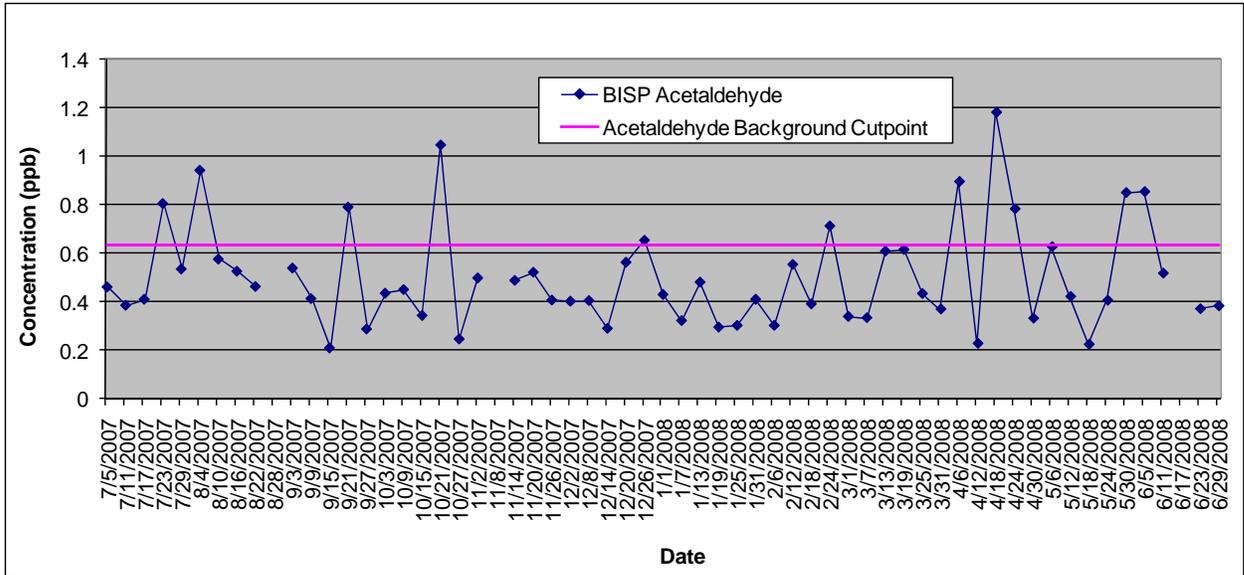


Figure 7.30. Acetaldehyde Concentrations over the Study Time Period including the Trends Analysis Cut point Concentration. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

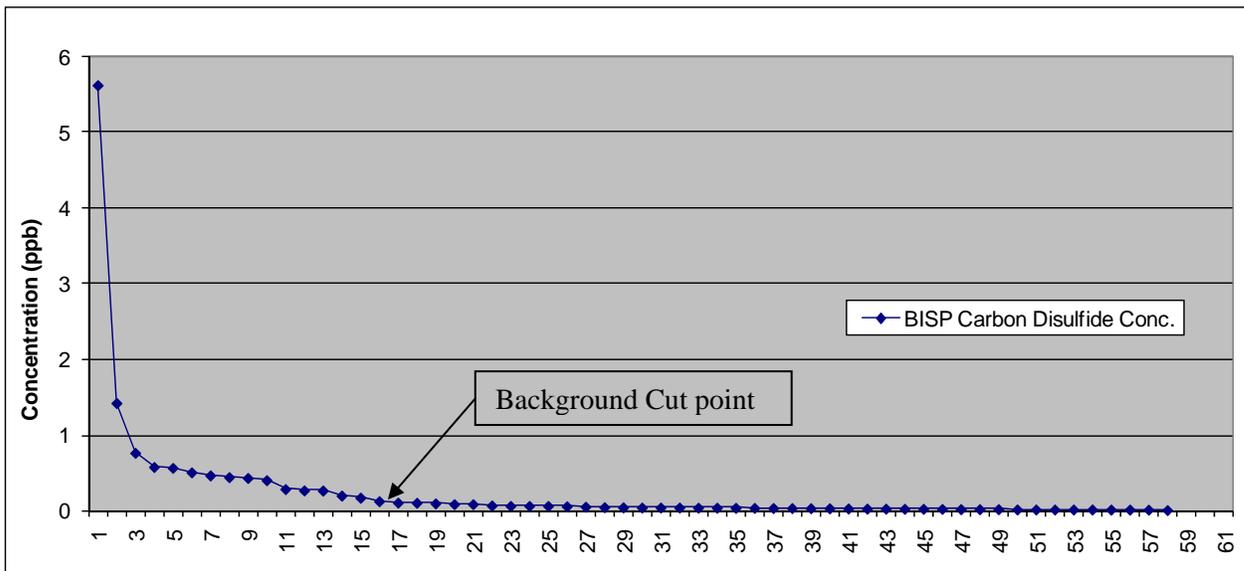


Figure 7.31. Carbon Disulfide Concentrations presented in Descending Order. The background cut point for this trends analysis was chosen halfway between the data points where the slope transitions to only a very gradually decreasing line. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

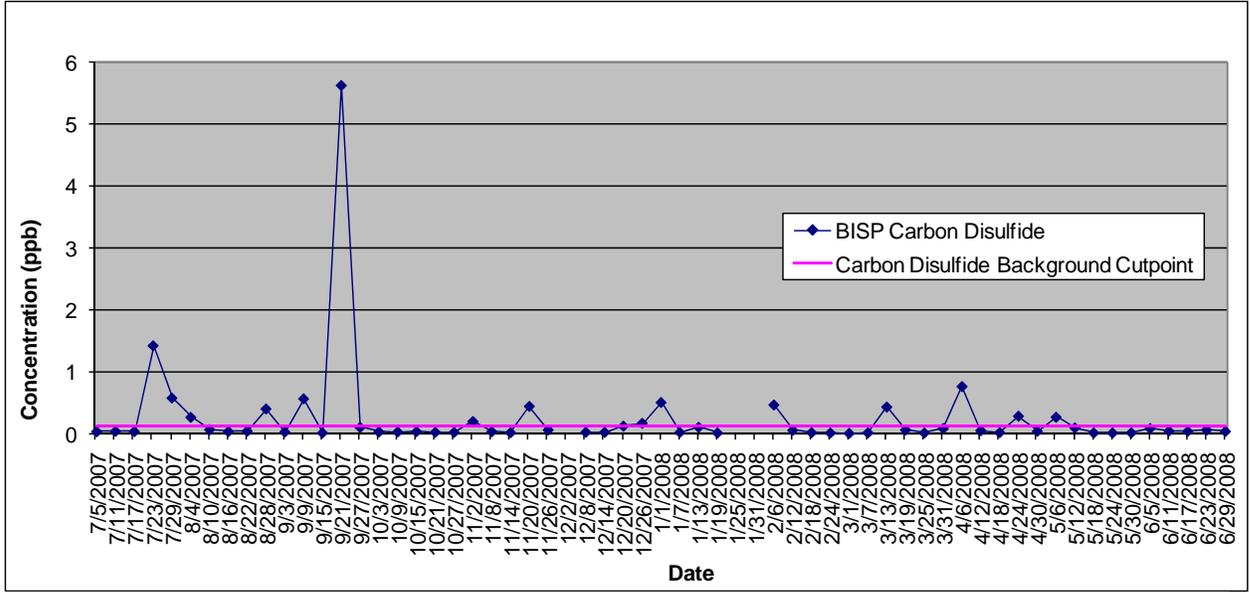


Figure 7.32. Carbon Disulfide Concentrations over the Study Time Period including the Trends Analysis Cut point Concentration. Please note that the trends background concentration provided in the text is the average of only the concentrations below the cut point indicated in this graph.

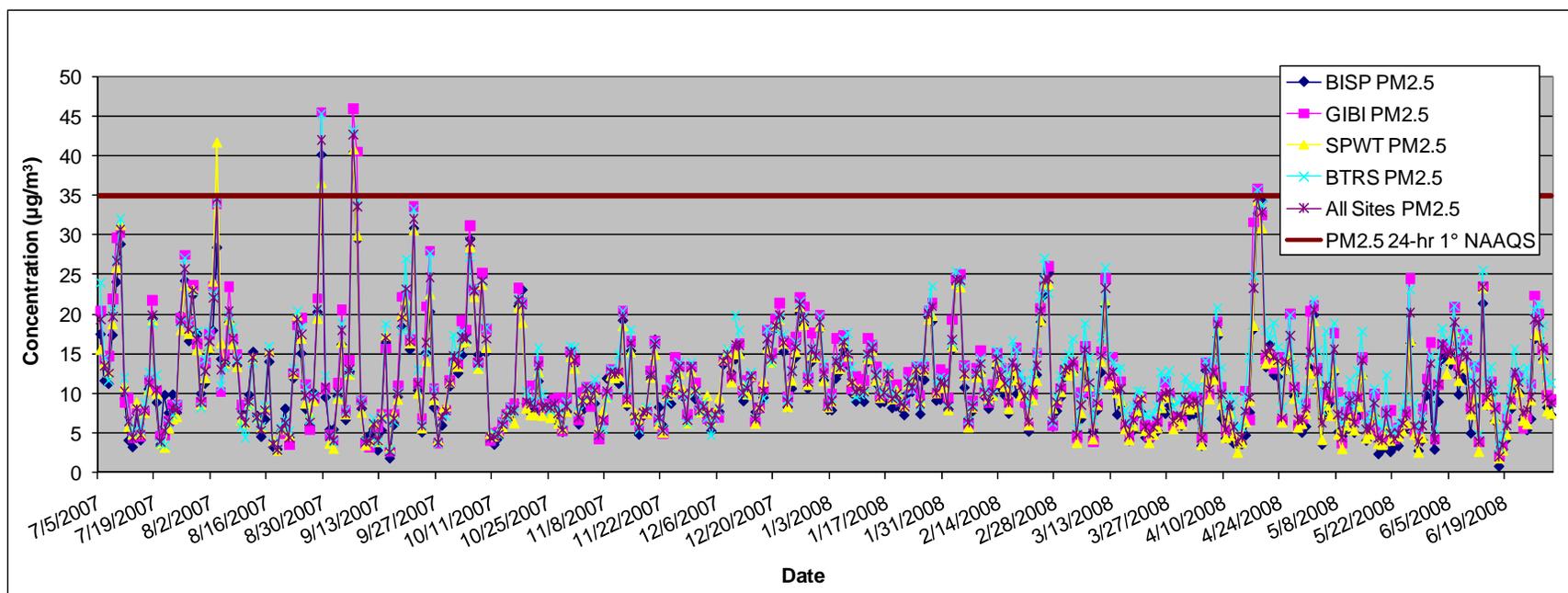


Figure 7.33. Weekly Trends of PM_{2.5} Daily Average Concentrations.

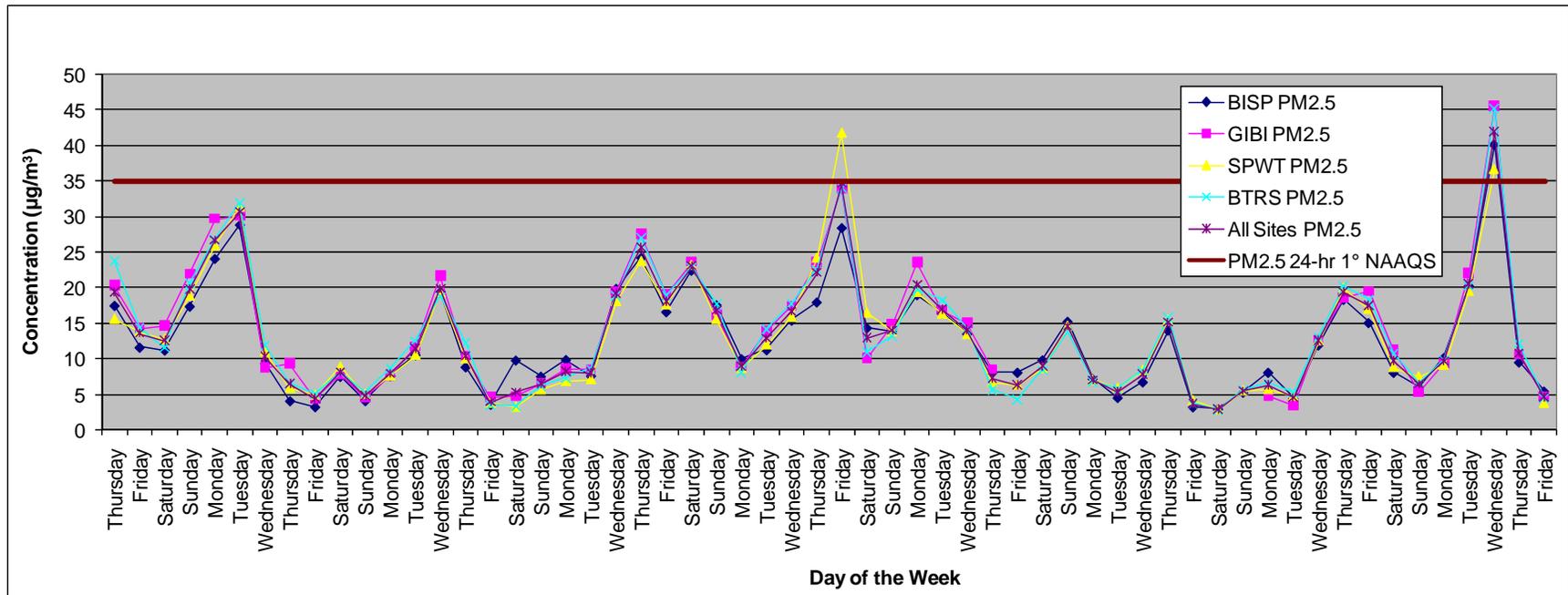


Figure 7.34. Two Months of Weekly Trends of PM_{2.5} Daily Average Concentrations.

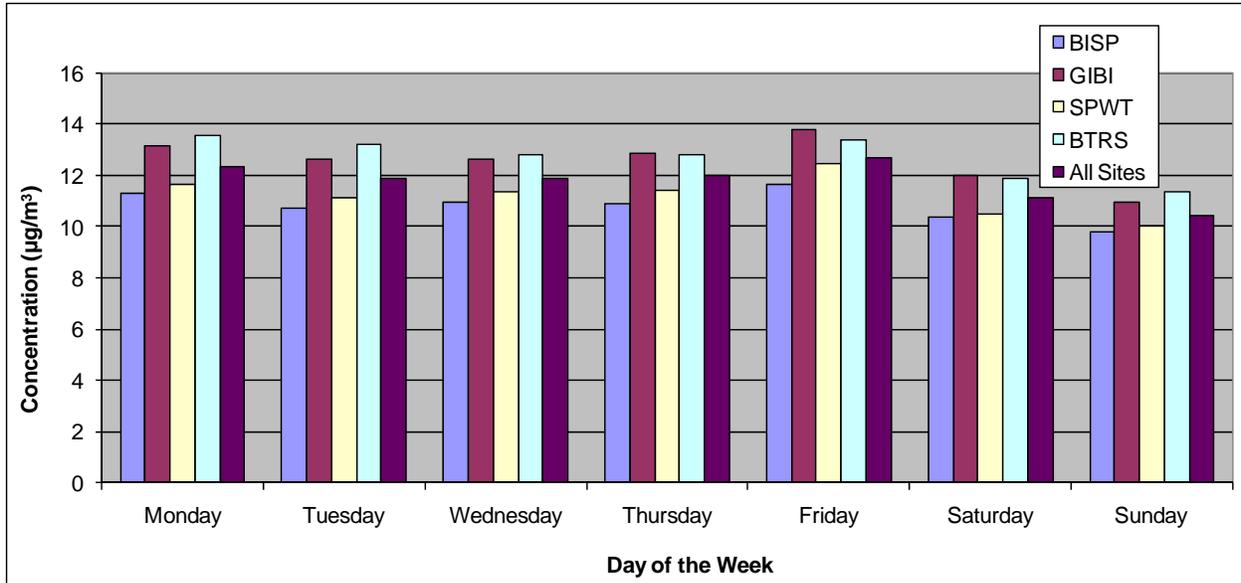


Figure 7.35. Weekly PM_{2.5} Trends using Year Long Concentration Averages for each Day of the Week.

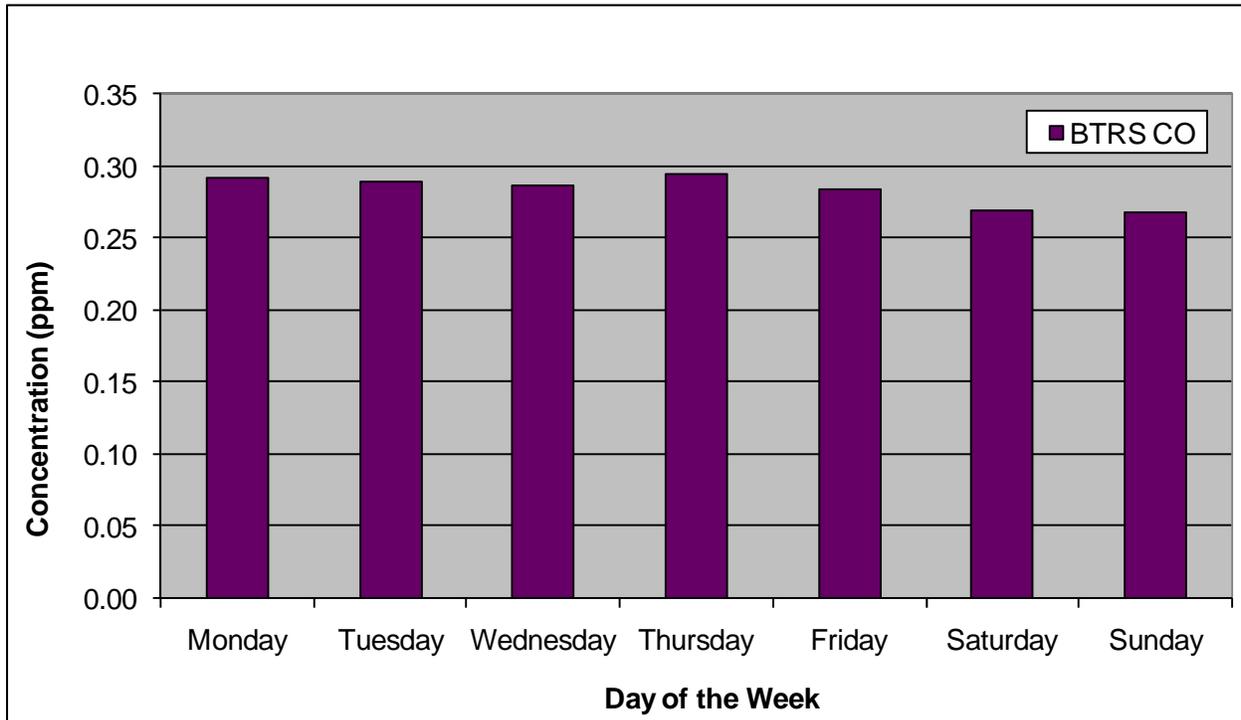


Figure 7.36. Weekly CO Trend using Year Long Concentration Averages for each Day of the Week.

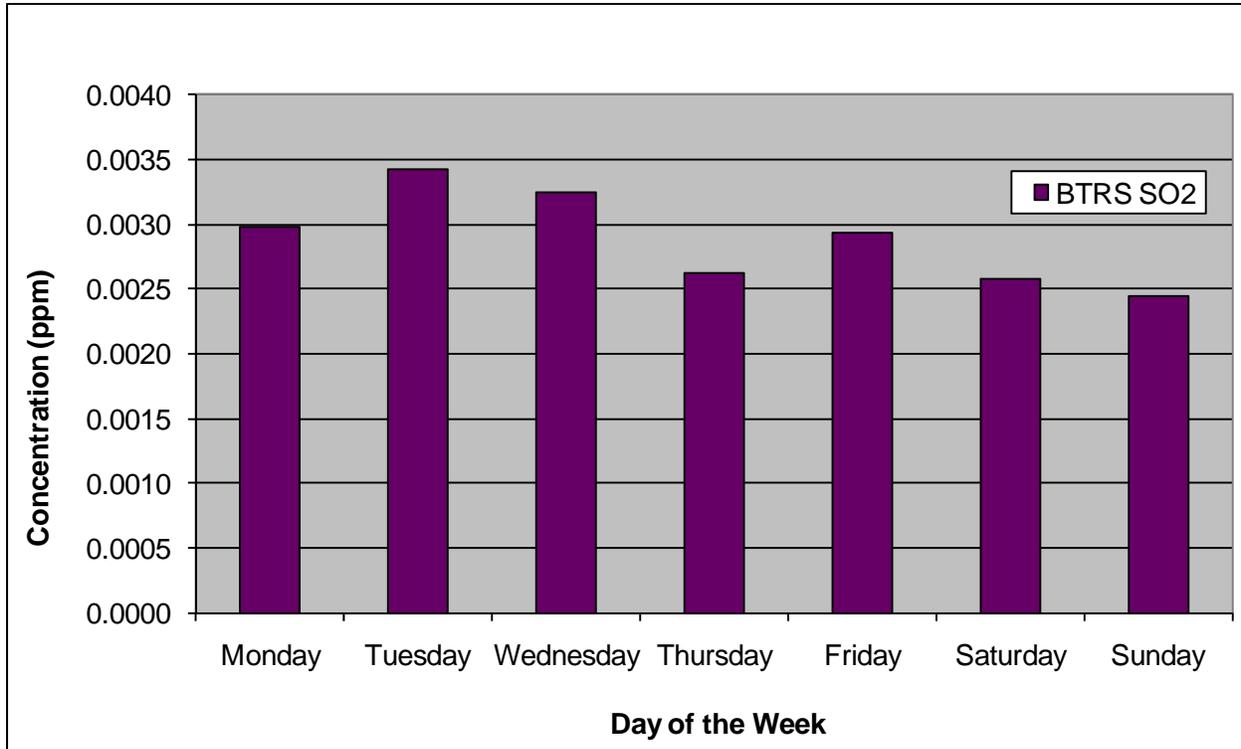


Figure 7.37. Weekly SO₂ Trend using Year Long Concentration Averages for each Day of the Week.

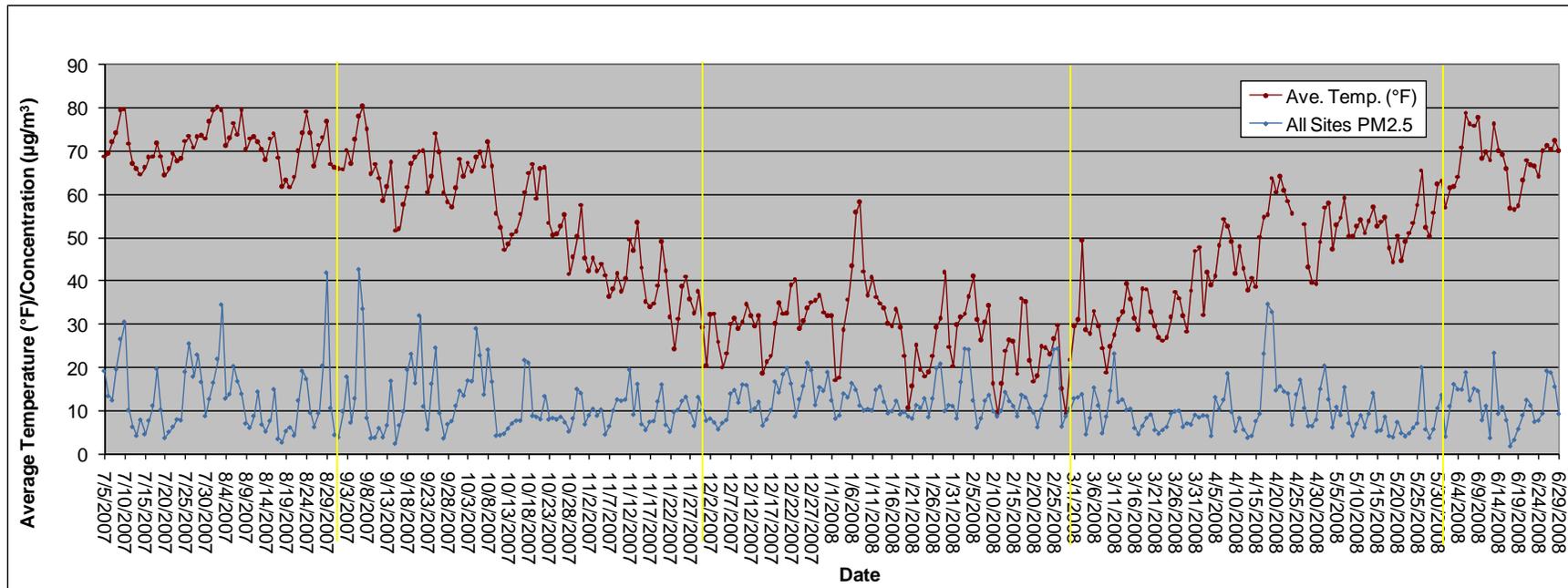


Figure 7.38. Comparisons between the PM_{2.5} Combined Daily Average Concentrations for All Four Monitoring Sites Together and the Short-Term and Long-Term Average Temperature Fluctuations measured at the BISP Meteorological Station Daily over the Study Period Year.

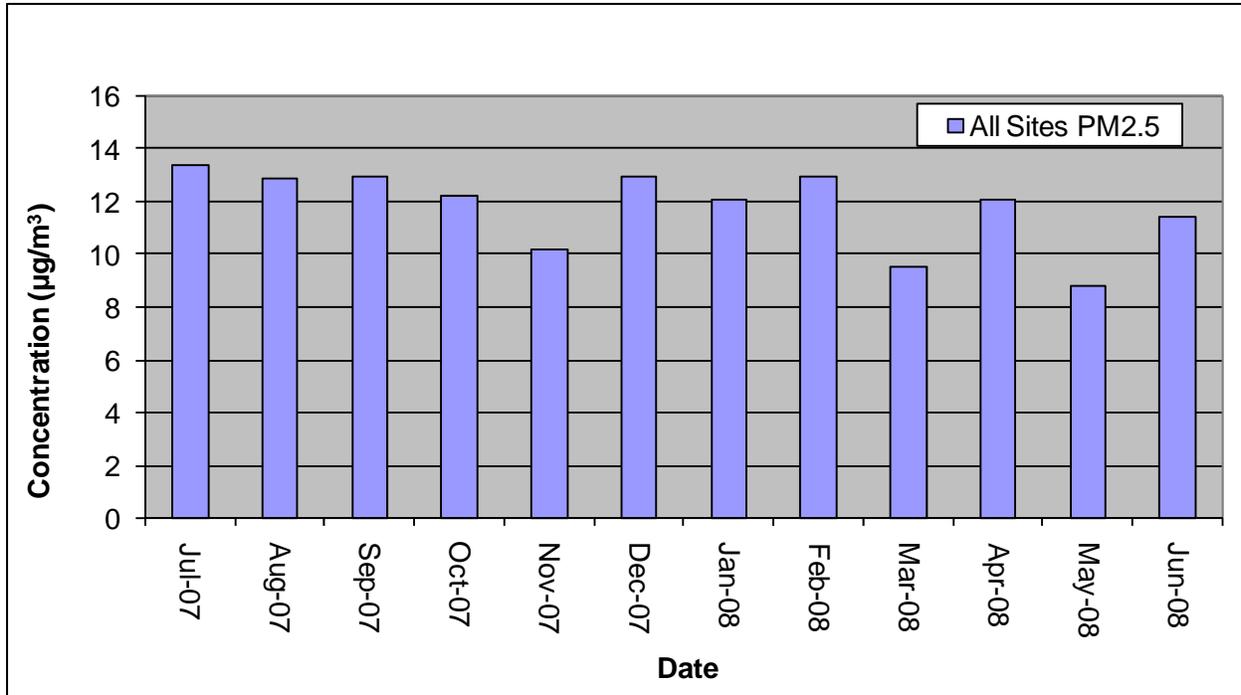


Figure 7.39. Combined Sites Average PM_{2.5} Concentrations for the Different Months of the Year.

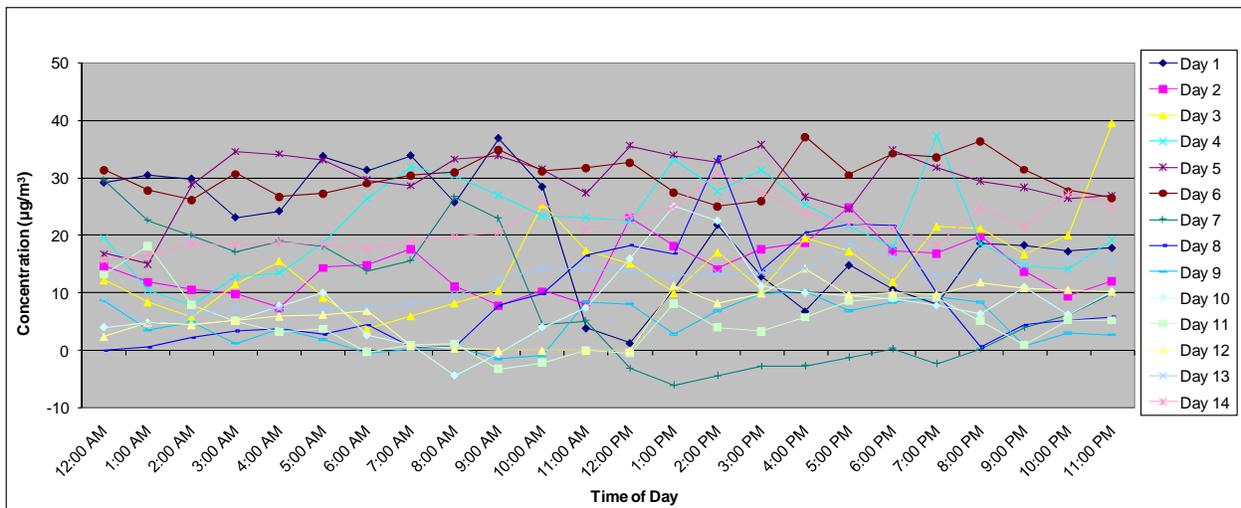


Figure 7.40. Individual Data Point Measurements of PM_{2.5} Concentrations for each Hour of the Day at the GIBI Monitor for the First Two Weeks of the Study Year.

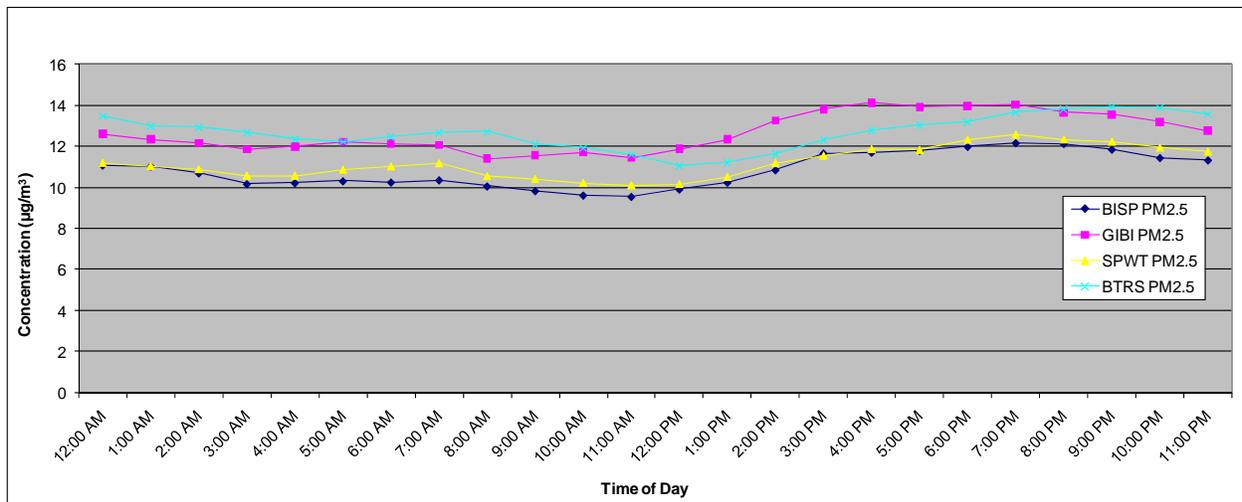


Figure 7.41. Daily PM_{2.5} Concentration Trends generated by Pooling Six Months of Concentration Measurements Data into a Combined Average of Concentrations for each Hour of the Day.

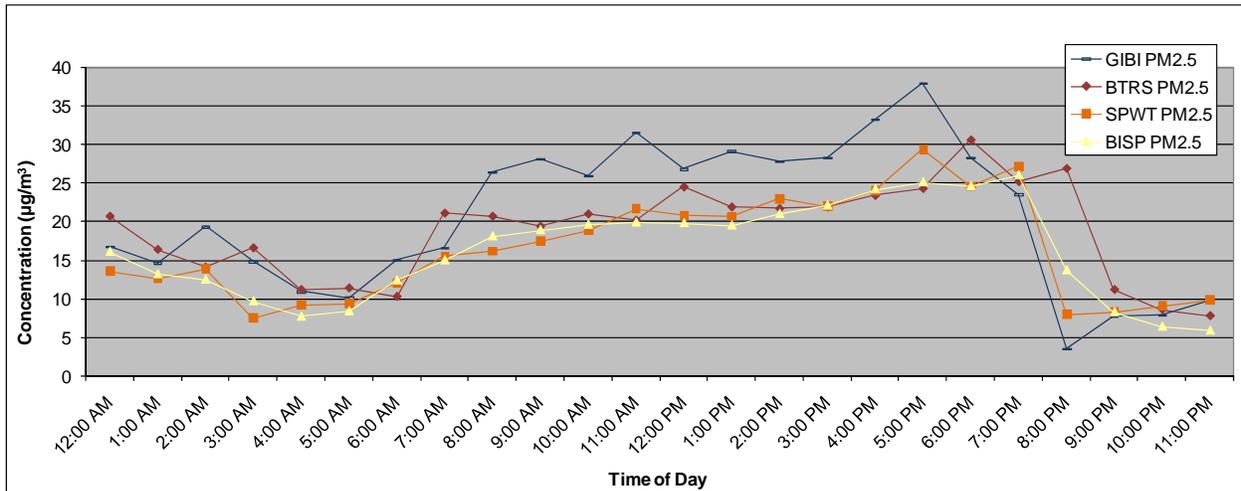
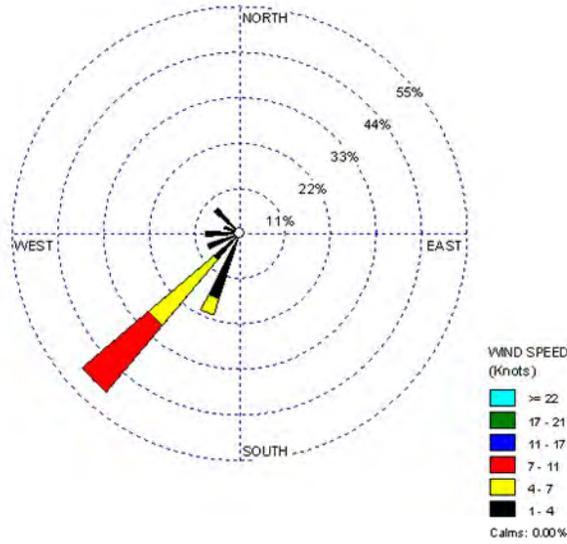


Figure 7.42. Wind Rose for 9/3/07 and Graph of the Individual Data Point Measurements of PM_{2.5} Concentrations for each Hour of the Day on 9/3/07 at all Four Monitors.

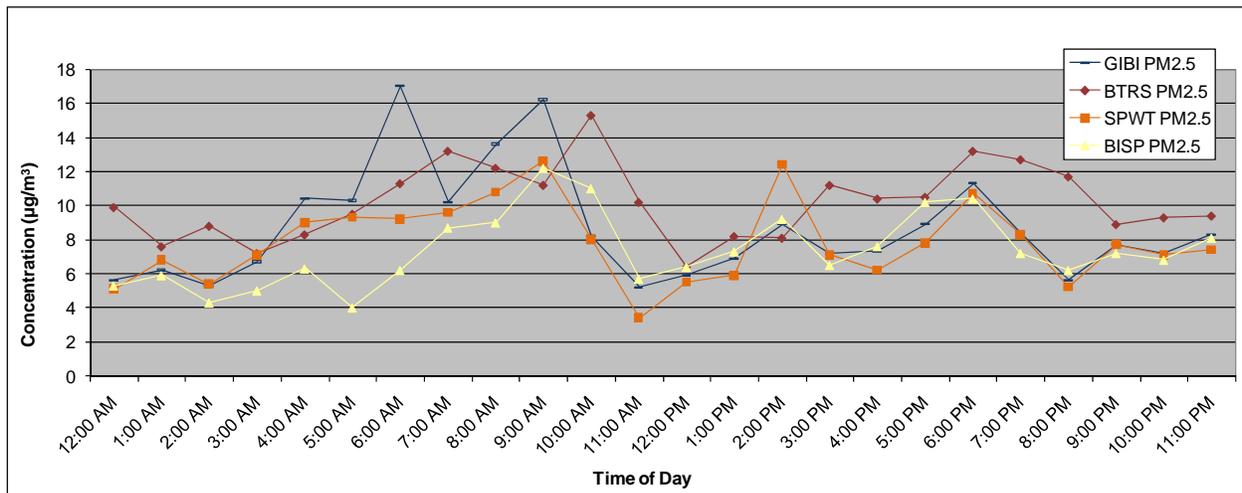
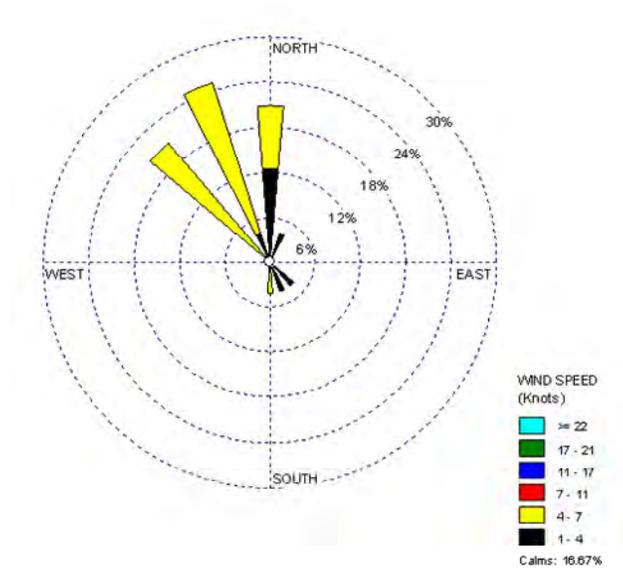


Figure 7.43. Wind Rose for 3/19/08 and Graph of the Individual Data Point Measurements of PM_{2.5} Concentrations for each Hour of the Day on 3/19/08 at all Four Monitors.

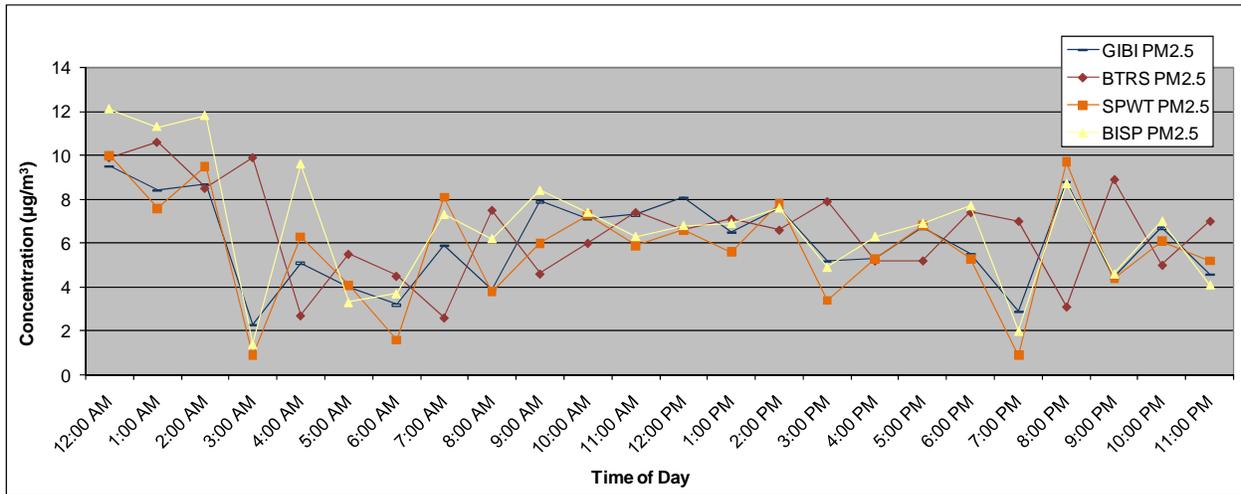
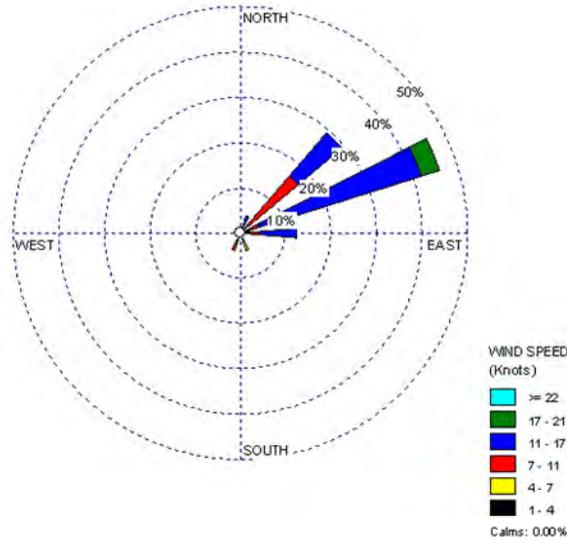


Figure 7.44. Wind Rose for 2/6/08 and Graph of the Individual Data Point Measurements of PM_{2.5} Concentrations for each Hour of the Day on 2/6/08 at all Four Monitors.