

## **Tonawanda Community Air Quality Study – January 2013 Data Analyses Update Graphs**

### **DATA ANALYSES UPDATES FOR VOC, CARBONYL, AND PAH DATA**

The following pages provide the updated data analyses for the Volatile Organic Compounds (VOCs) and carbonyls from the Study year through the 4<sup>th</sup> year post-Study and for the Polycyclic Aromatic Hydrocarbons (PAHs) during the 1<sup>st</sup> and the 2<sup>nd</sup> years post-Study after which the PAH monitoring ceased. The Study year was from 7/5/07 through 6/29/08.

The five air contaminants with local emissions that had average annual concentrations for the Study year which exceeded the respective New York State Department of Environmental Conservation (NYSDEC) Annual Guideline Concentration (AGC) include three of the monitored VOCs (benzene, 1,3-butadiene, and acrolein) and two of the monitored carbonyls (formaldehyde and acetaldehyde). The updated VOC and carbonyl data analyses presented here include these five key contaminants. The ambient air concentrations and therefore exposure risks for these five contaminants all decreased from the Study year to the 4<sup>th</sup> year post-Study at both the industrial (GIBI) and residential (BTRS) monitors. The overall reductions in both the ambient air concentrations and estimated exposure risks for all five of these contaminants at both monitoring locations are provided in the subsequent pages.

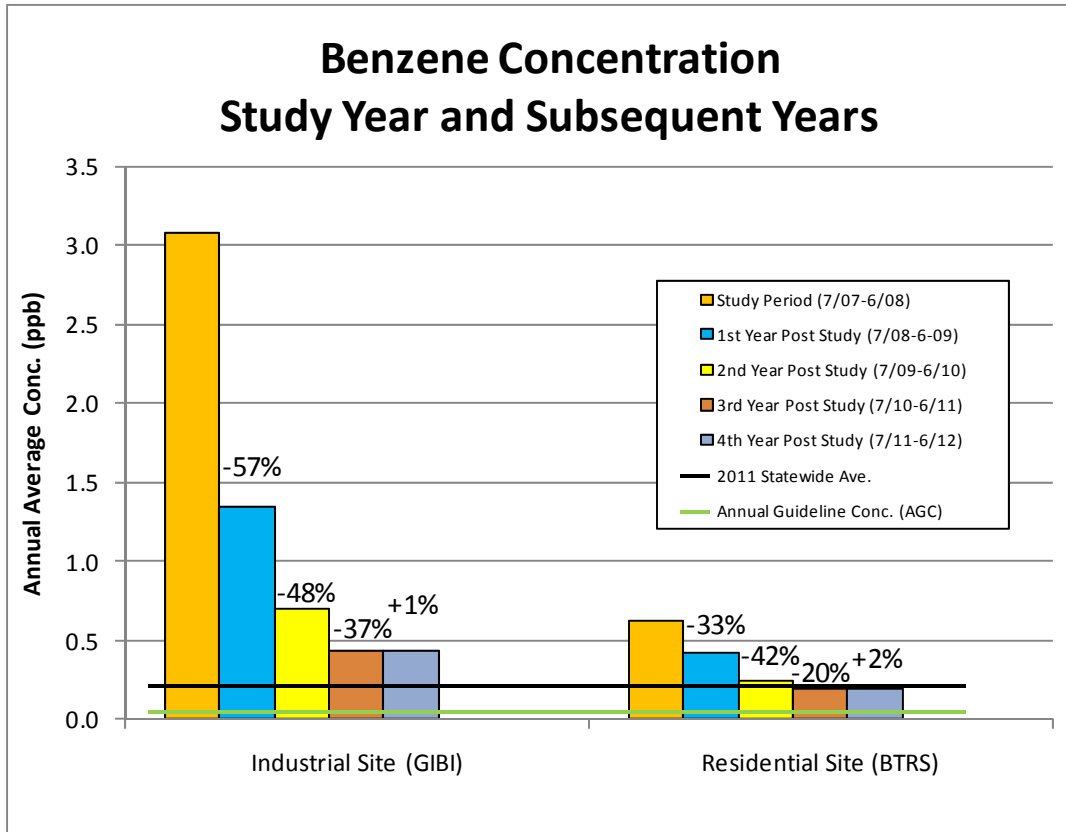
In addition to the continuing VOC and carbonyl monitoring, PAH monitoring was added at one of the monitoring locations (GIBI) after the completion of the Study year and it continued for two years (starting July 2008 and extending through June 2010). The PAH monitoring used the EPA Compendium Method TO-13A and ASTM 6209-98 sample collection procedures to collect samples and analyze samples for PAHs in ambient air as required for the National Air Toxics Trends Stations (NATTS) Program.<sup>1</sup> The concentrations of the 22 PAHs monitored decreased from the 1<sup>st</sup> year post-Study to the 2<sup>nd</sup> post-Study year. The percent decreases for these various PAHs are provided in the last two pages.

Observed reductions in the measured ambient air concentrations for many of these contaminants were the result, in part, of operational modifications made by the Tonawanda Coke Corporation (TCC) in response to NYSDEC and U.S. Environmental Protection Agency's (USEPA) inspections of the facility and subsequent federal and state enforcement actions against TCC.

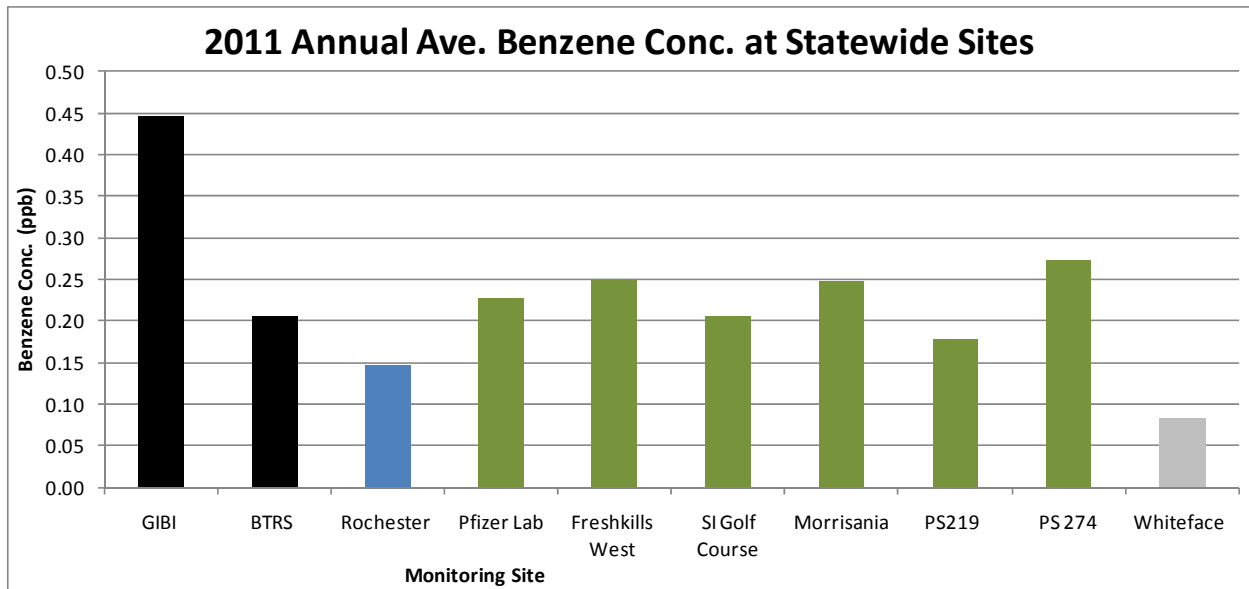
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<sup>1</sup> US Environmental Protection Agency (2012). 2010 National Monitoring Programs Annual Report (UATMP, NATTS, CSATAM) Final Report: November 2012. EPA-454/R-12-006a

# VOLATILE ORGANIC CARBONS (VOCs) DATA ANALYSES UPDATES

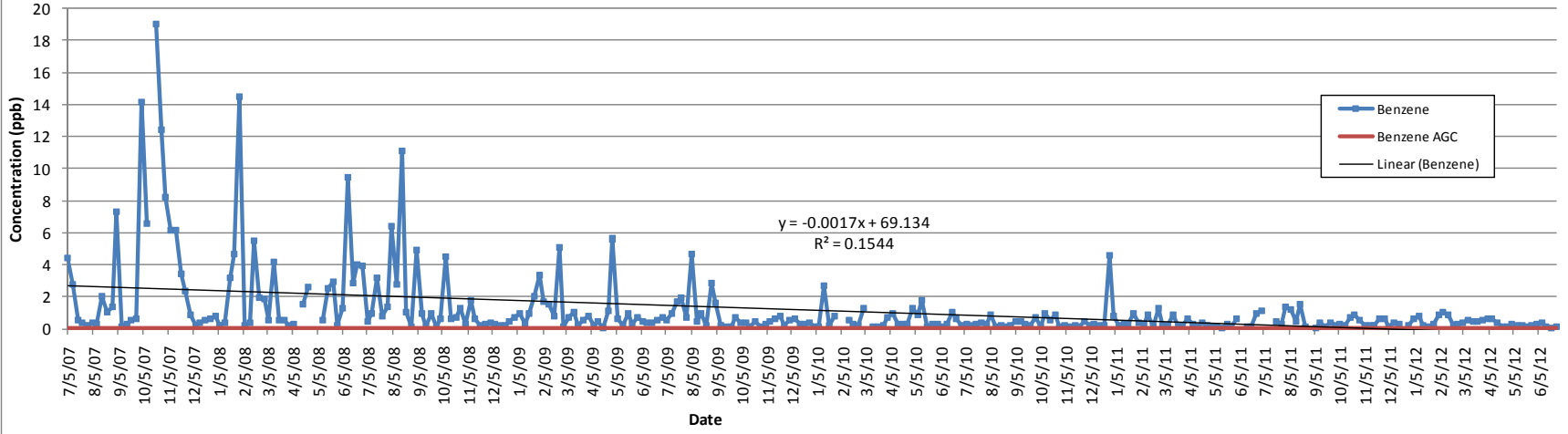


**Note:** Overall annual average benzene concentration decrease from the Study year to the 4<sup>th</sup> year post Study is 86% at the GIBI monitor and 69% at the BTRS monitor.

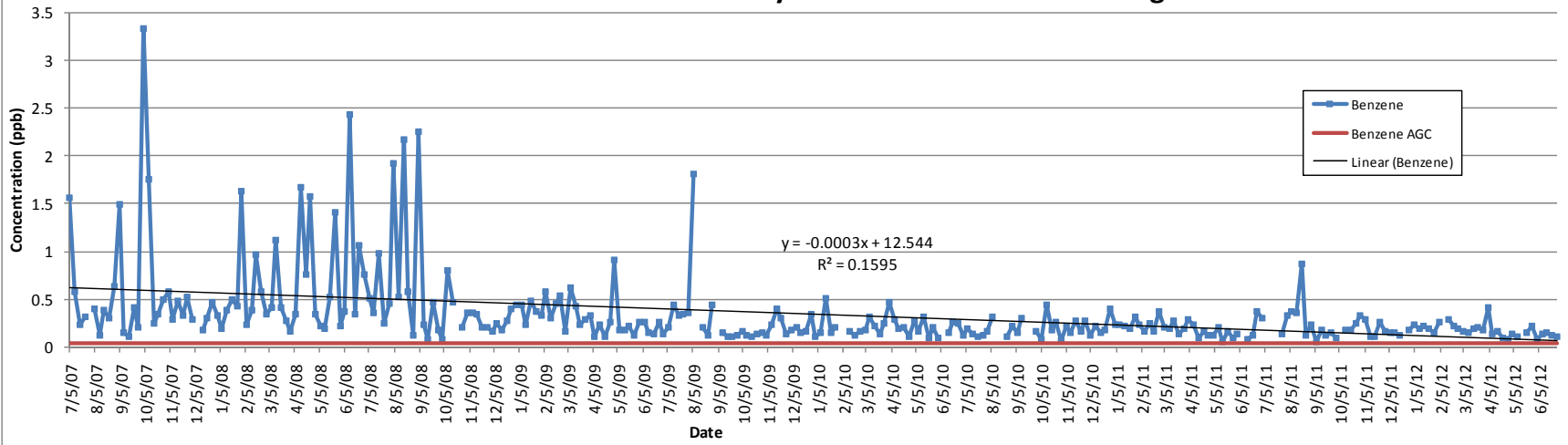


**Note:** The NYS monitoring sites are organized according to geographical locations with the various colors representing the following: BLACK = SITE SPECIFIC, BLUE = SUBURBAN, GREEN = URBAN, and GRAY = RURAL.

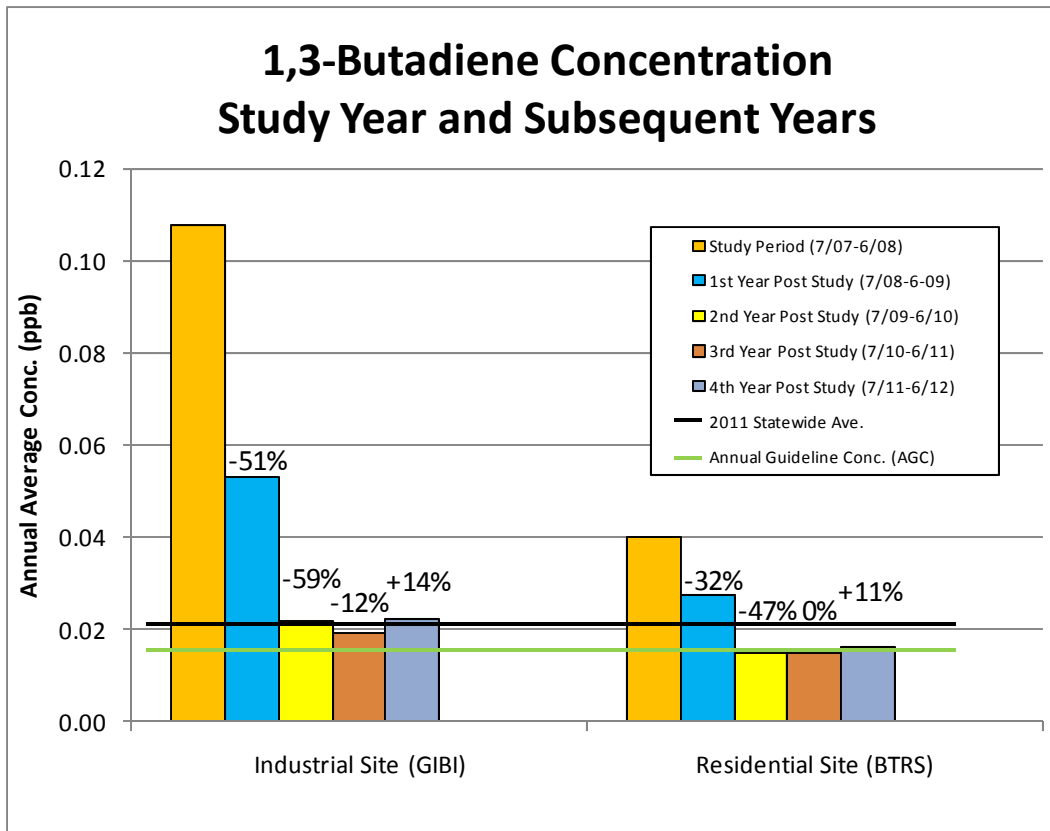
**GIBI Benzene - Individual 1-in-6 day Summa Canister Monitoring Data**



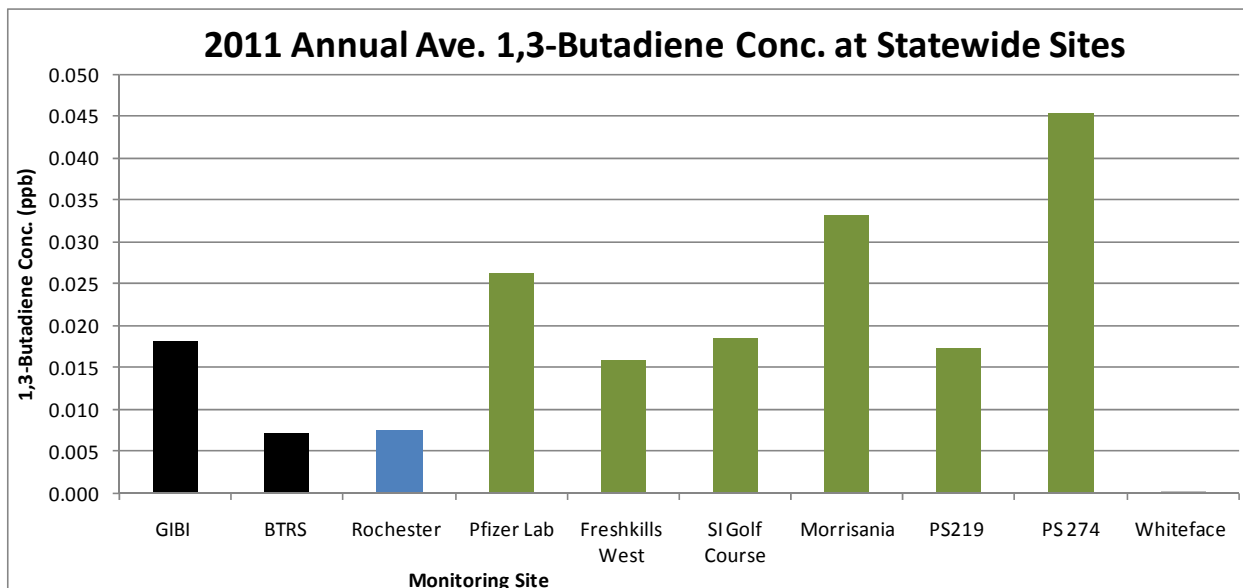
**BTRS Benzene - Individual 1-in-6 day Summa Canister Monitoring Data**



**Note:** The black lines are the overall average linear trendlines. AGC = Annual Guideline Concentration.

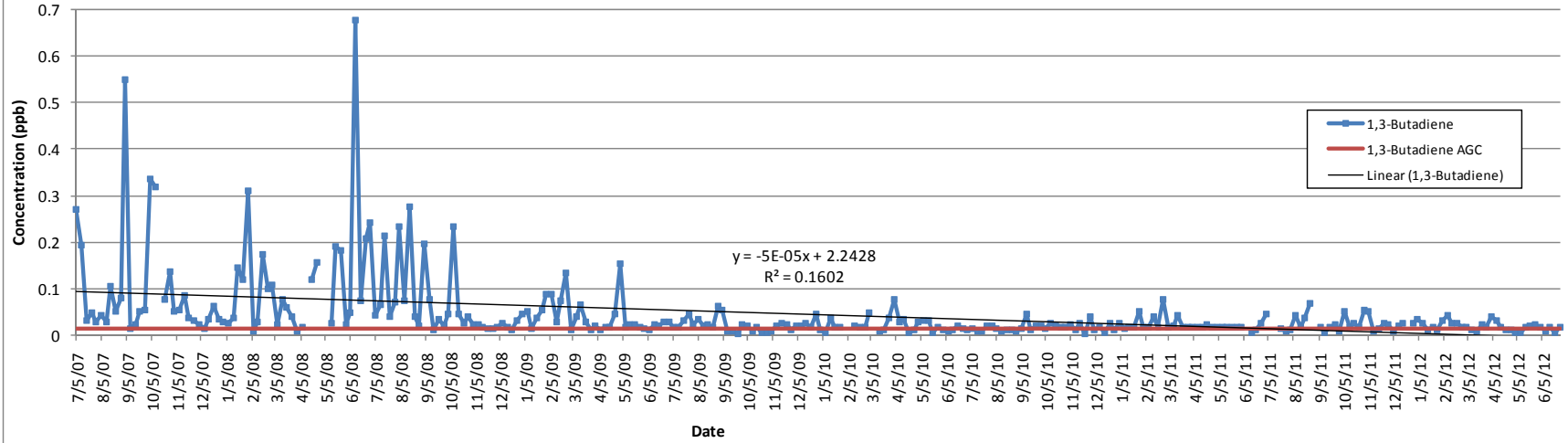


**Note:** Overall annual average 1,3-butadiene concentration **decrease** from the Study year to the 4<sup>th</sup> year post Study is 79% at the GIBI monitor and 59% at the BTRS monitor.

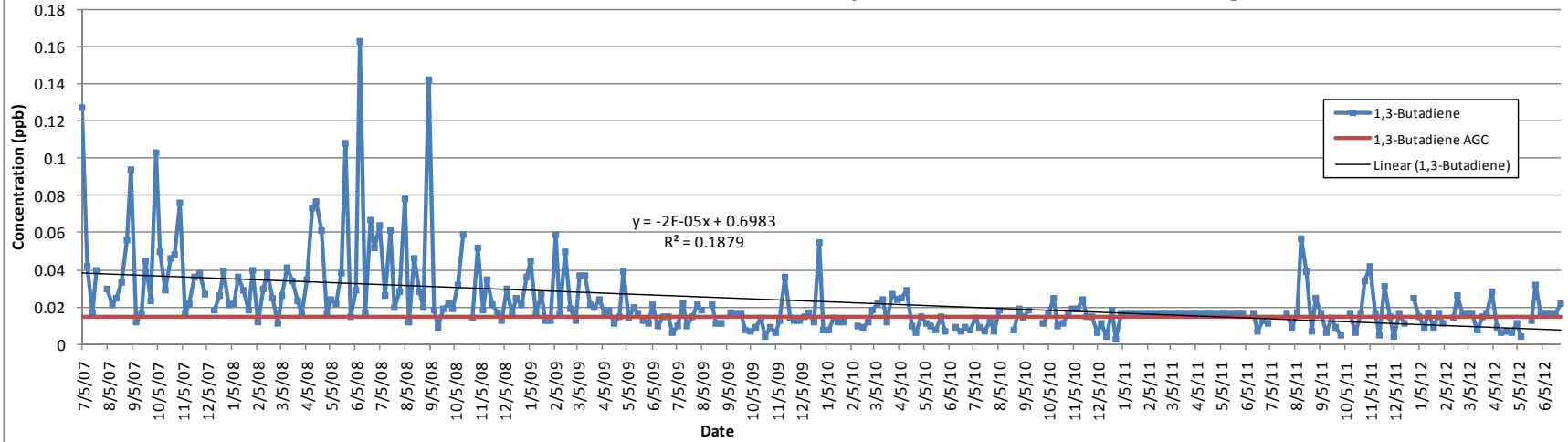


**Note:** The NYS monitoring sites are organized according to geographical locations with the various colors representing the following: BLACK = SITE SPECIFIC, BLUE = SUBURBAN, GREEN = URBAN, and GRAY = RURAL.

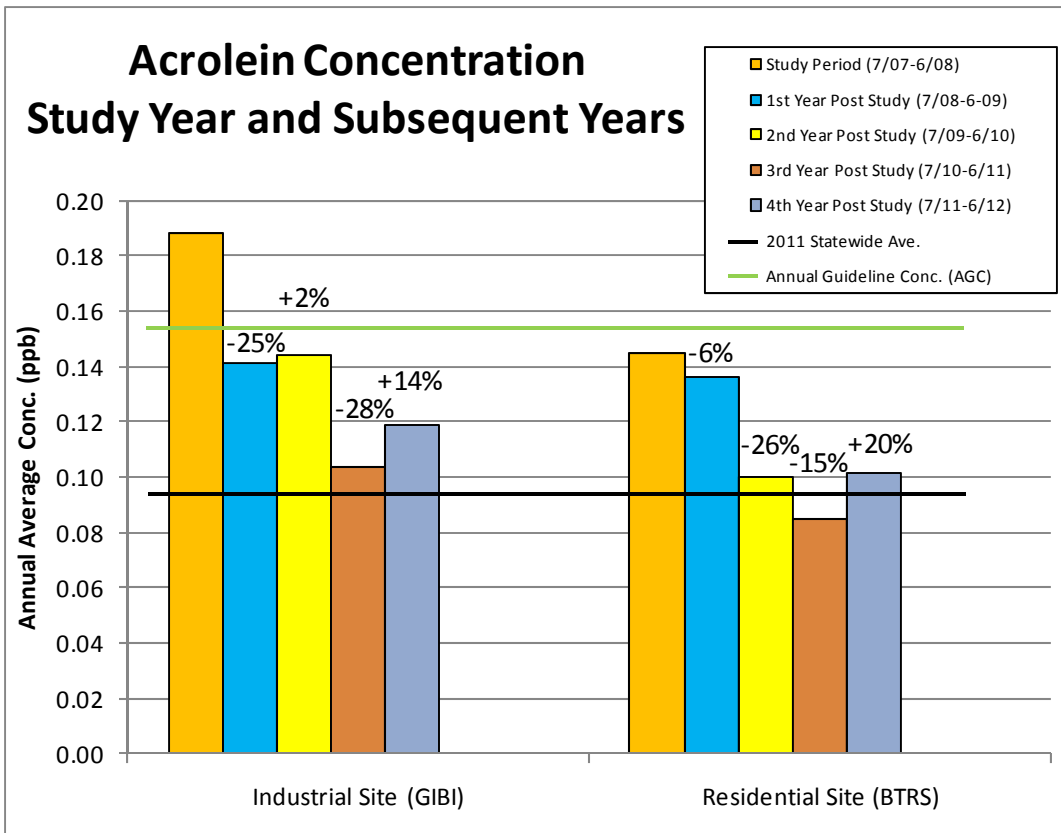
**GIBI 1,3-Butadiene - Individual 1-in-6 day Summa Canister Monitoring Data**



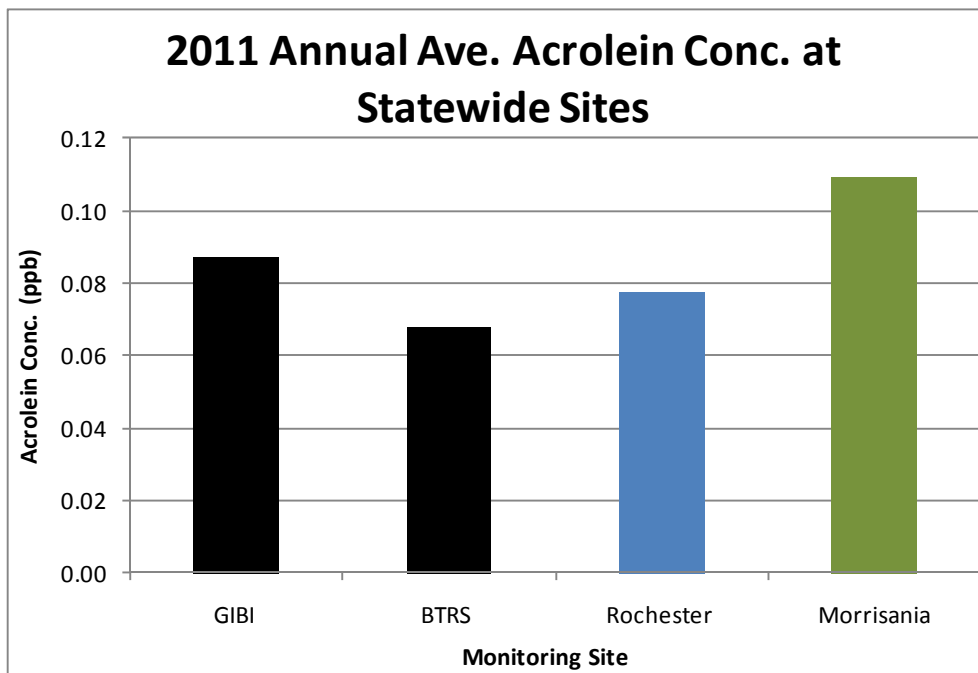
**BTRS 1,3-Butadiene - Individual 1-in-6 day Summa Canister Monitoring Data**



**Note:** The black lines are the overall average linear trendlines. AGC = Annual Guideline Concentration.

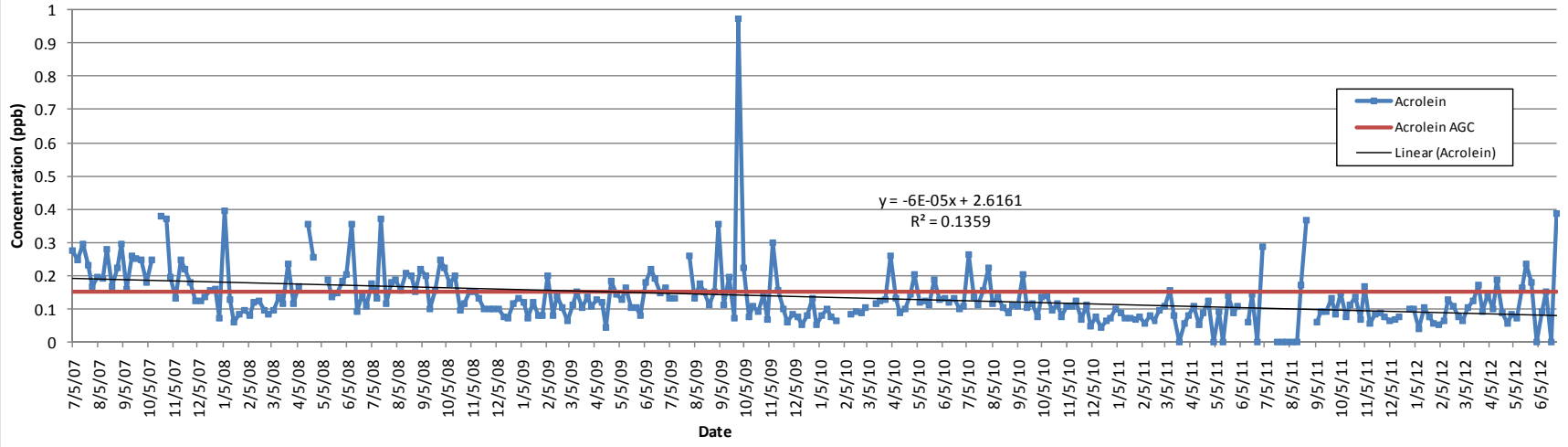


**Note:** Overall annual average acrolein concentration decrease from the Study year to the 4<sup>th</sup> year post Study is 37% at the GIBI monitor and 30% at the BTRS monitor.

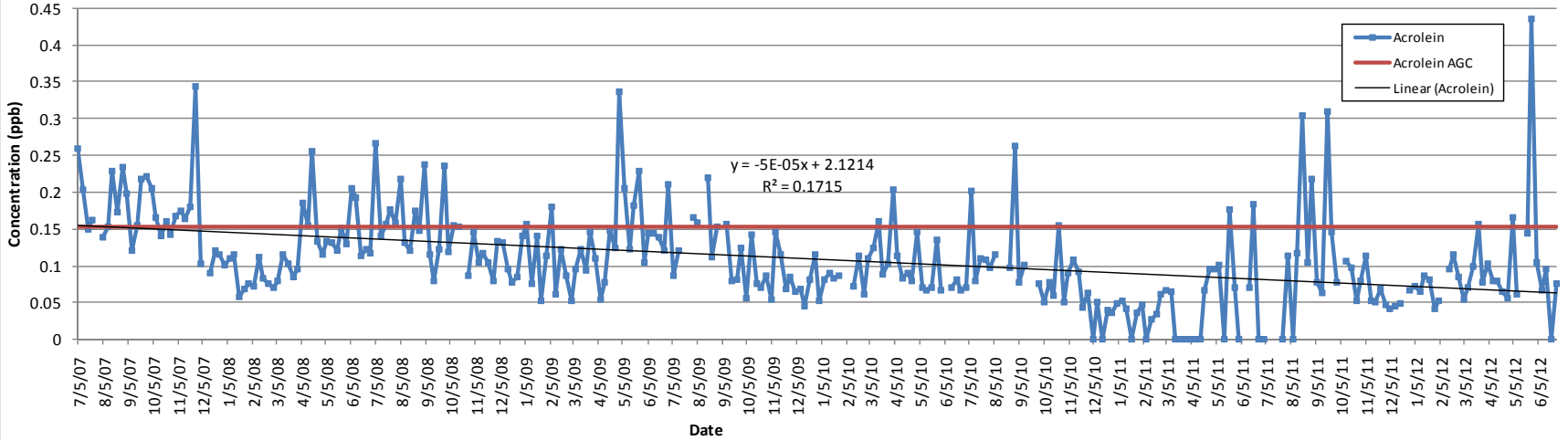


**Note:** The NYS monitoring sites are organized according to geographical locations with the various colors representing the following: BLACK = SITE SPECIFIC, BLUE = SUBURBAN, and GREEN = URBAN.

**GIBI Acrolein - Individual 1-in-6 day Summa Canister Monitoring Data**

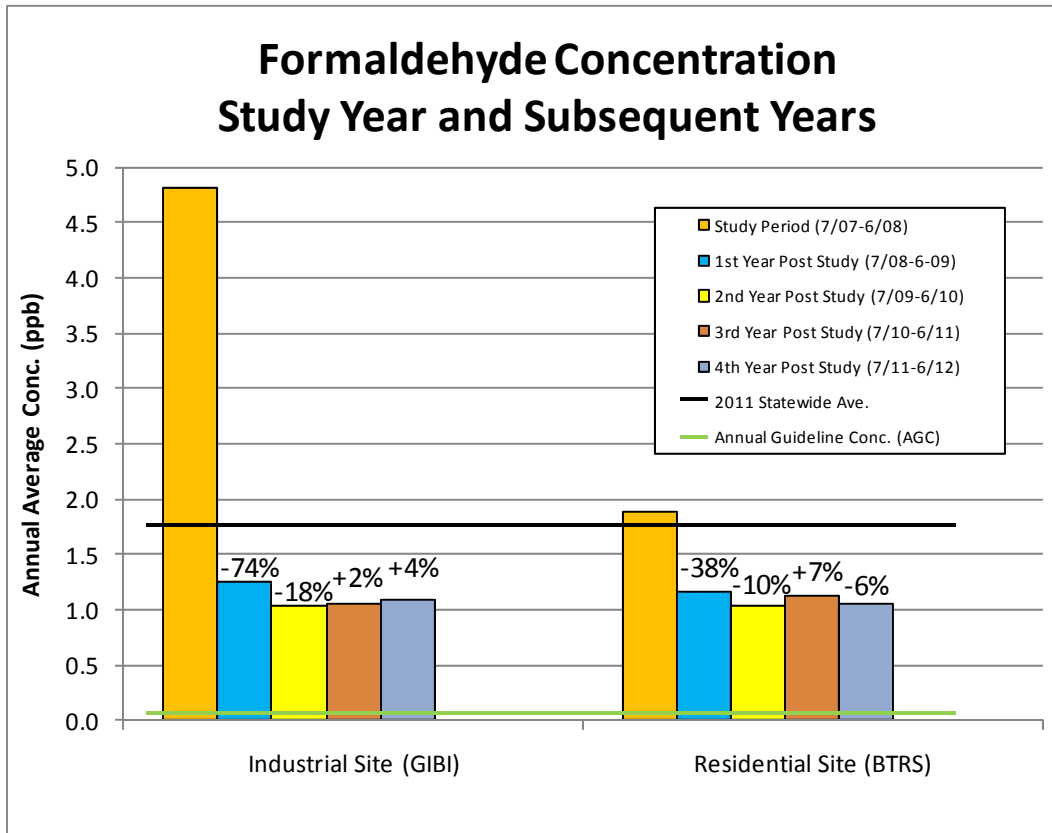


**BTRS Acrolein - Individual 1-in-6 day Summa Canister Monitoring Data**

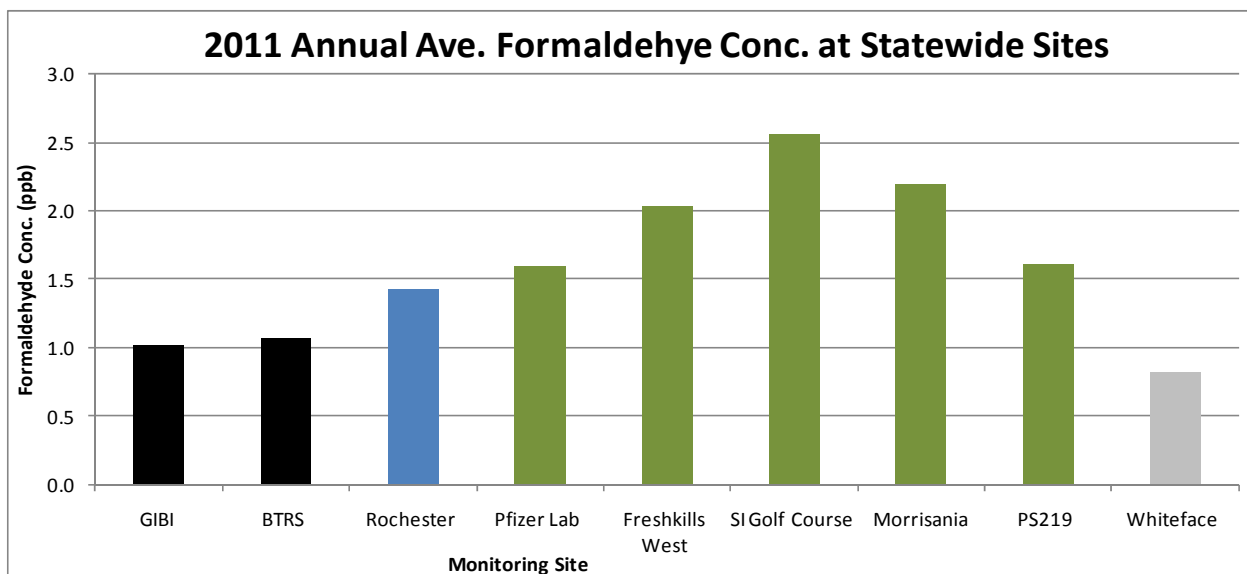


**Note:** The black lines are the overall average linear trendlines. AGC = Annual Guideline Concentration.

## CARBONYLS DATA ANALYSES UPDATES



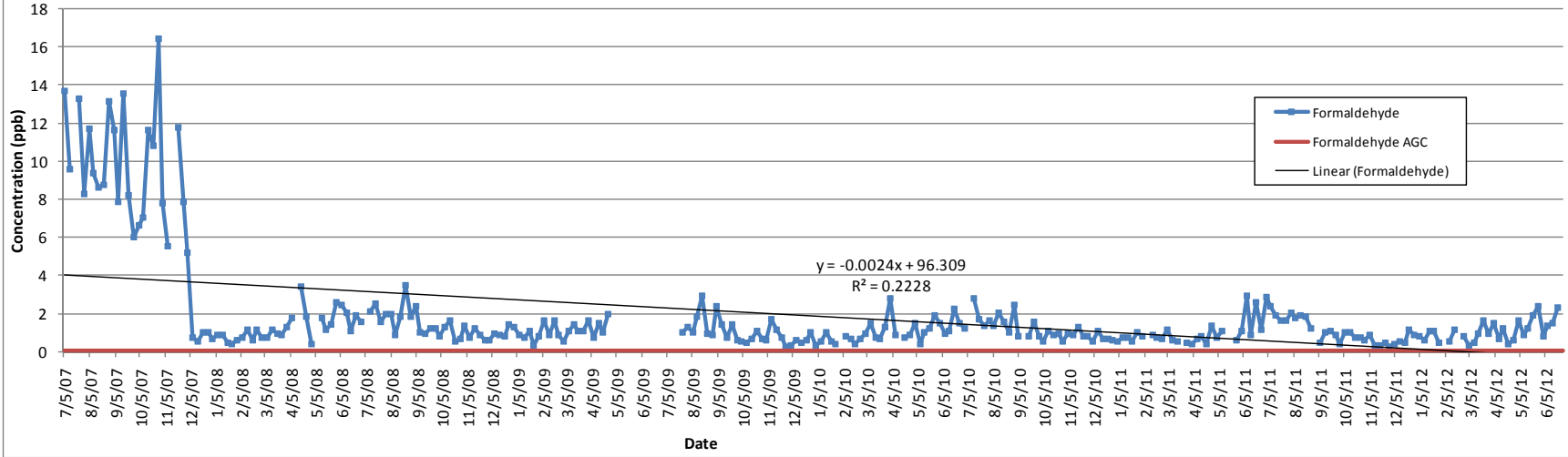
**Note:** Overall annual average formaldehyde concentration decrease from the Study year to the 4<sup>th</sup> year post Study is 77% at the GIBI monitor and 44% at the BTRS monitor.



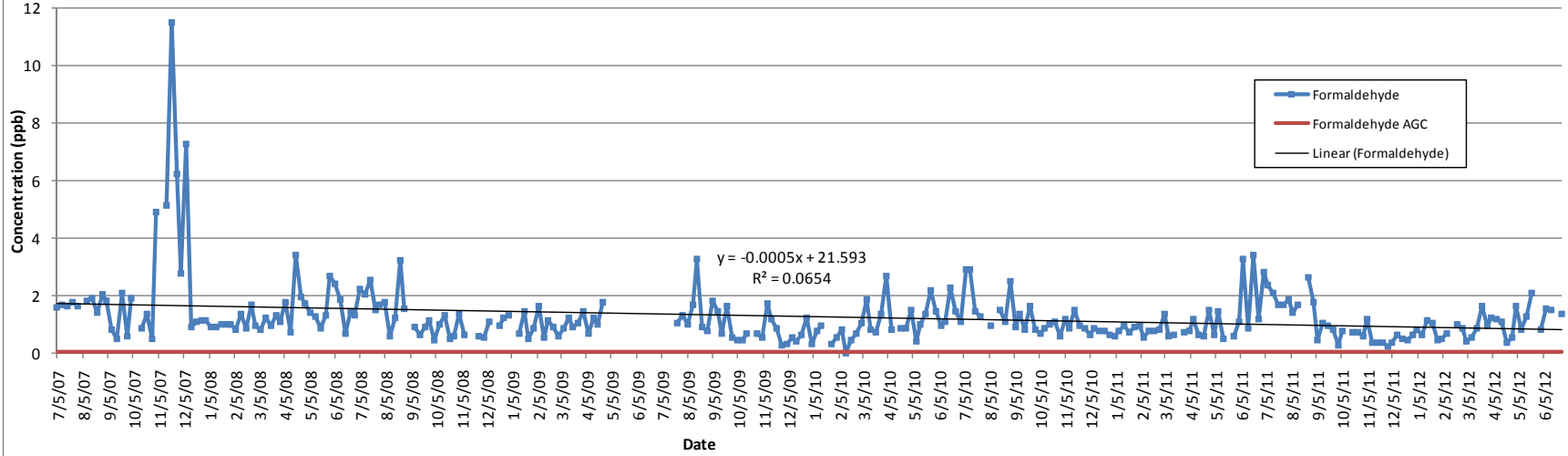
**Note:** The NYS monitoring sites are organized according to geographical locations with the various colors representing the following: BLACK = SITE SPECIFIC, BLUE = SUBURBAN, GREEN = URBAN, and GRAY = RURAL.



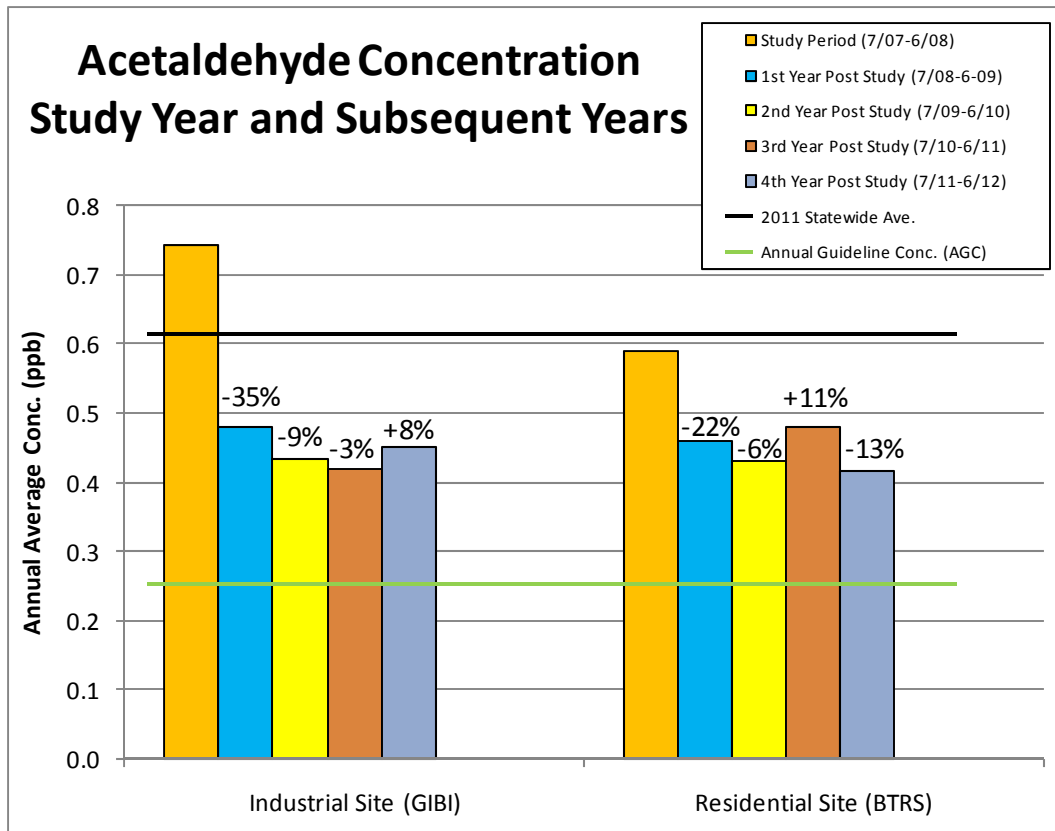
### GIBI Formaldehyde - Individual 1-in-6 day Summa Canister Monitoring Data



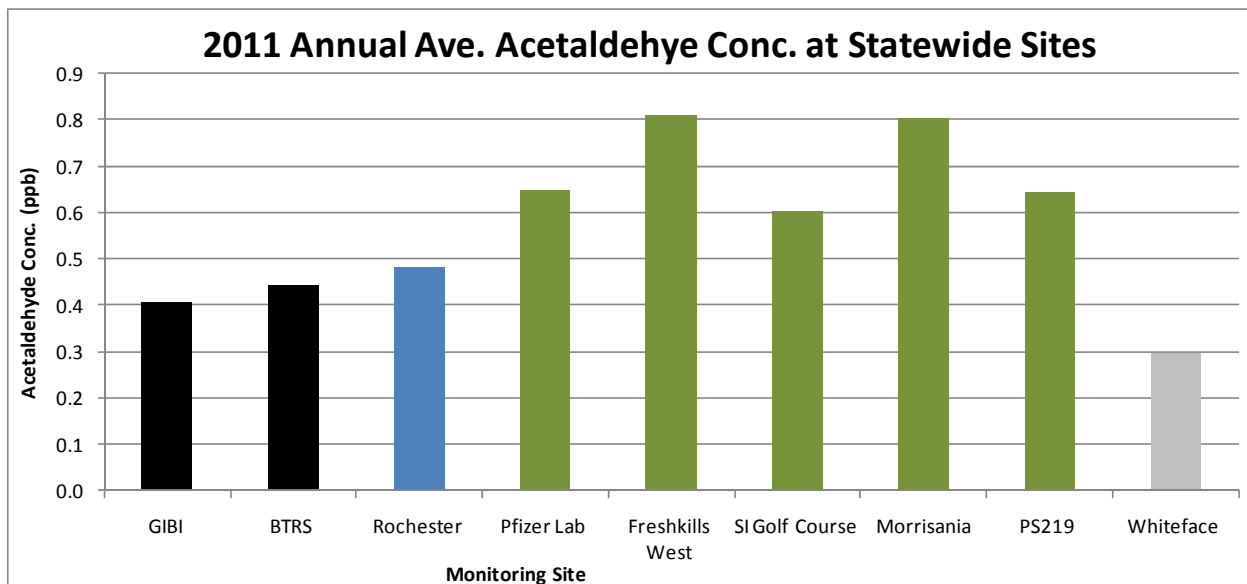
### BTRS Formaldehyde - Individual 1-in-6 day Summa Canister Monitoring Data



**Note:** The black lines are the overall average linear trendlines. AGC = Annual Guideline Concentration.

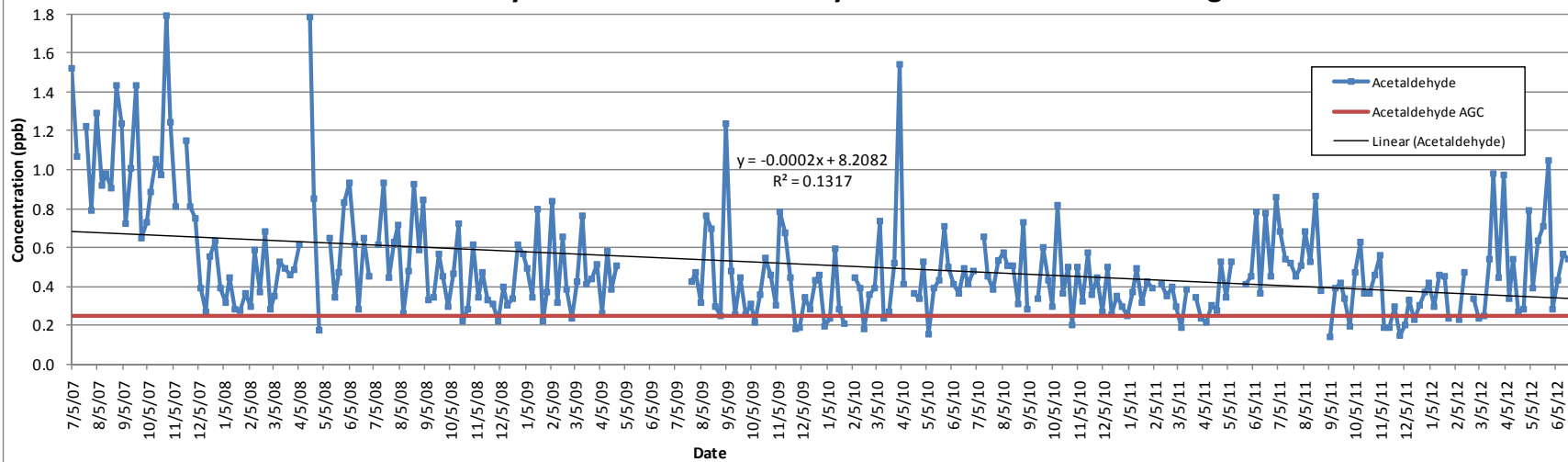


**Note:** Overall annual average acetaldehyde concentration decrease from the Study year to the 4<sup>th</sup> year post Study is 39% at the GIBI monitor and 30% at the BTRS monitor.

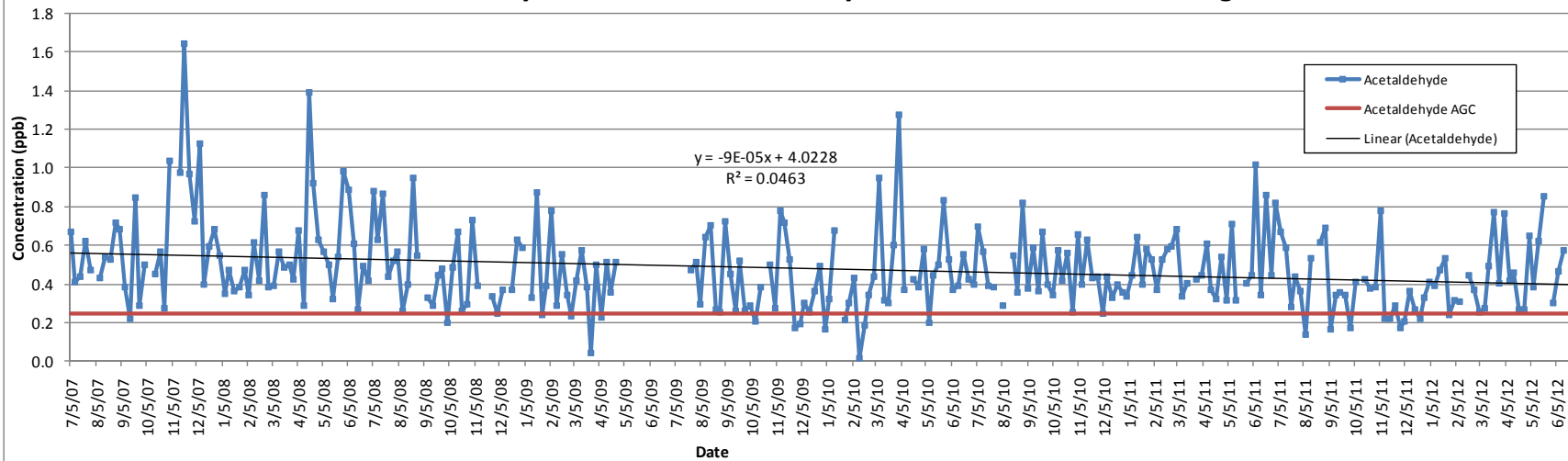


**Note:** The NYS monitoring sites are organized according to geographical locations with the various colors representing the following: BLACK = SITE SPECIFIC, BLUE = SUBURBAN, GREEN = URBAN, and GRAY = RURAL.

### GIBI Acetaldehyde - Individual 1-in-6 day Summa Canister Monitoring Data



### BTRS Acetaldehyde - Individual 1-in-6 day Summa Canister Monitoring Data



**Note:** The black lines are the overall average linear trendlines. AGC = Annual Guideline Concentration.

**RISK REDUCTIONS FROM THE STUDY YEAR (7/5/07-6/29/08)**  
**TO THE 4<sup>TH</sup> POST STUDY YEAR (7/2/11-6/26/12)**

- **Cancer**
  - Benzene
    - GIBI (Industrial Site): from 75 to 11 in a million
    - BTRS (Residential Site): from 15 to 4.9 in a million
  - Formaldehyde
    - GIBI (Industrial Site): from 98 to 22 in a million
    - BTRS (Residential Site): from 38 to 21 in a million
  - Acetaldehyde
    - GIBI (Industrial Site): from 2.9 to 1.8 in a million
    - BTRS (Residential Site): from 2.4 to 1.7 in a million
  - 1,3-Butadiene
    - GIBI (Industrial Site): from 7.3 to 1.5 in a million
    - BTRS (Residential Site): from 2.7 to 1.1 in a million
- **Non Cancer**
  - Acrolein
    - GIBI (Industrial Site): Hazard Quotient from 1.2 to 0.8
    - BTRS (Residential Site): Hazard Quotient from 0.9 to 0.7

**Note:** The Annual Guideline Concentration (AGC) for acrolein has changed from the value that was used in the original Study. The new AGC was used to estimate the non-cancer acrolein exposure risk.

Hazard Quotient - The ratio of the potential exposure to the substance and the level at which no adverse effects are expected. If the HQ is calculated to be equal to or less than 1, then no adverse health effects are expected as a result of exposure. If the HQ is greater than 1, then adverse health effects are possible. The HQ cannot be translated to a probability that adverse health effects will occur and it is unlikely to be proportional to risk. It is especially important to note that an HQ exceeding 1 does not necessarily mean that adverse effects will occur.

**POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) DATA**  
**ANALYSES UPDATES**

