

**Hudson River PCBs  
Superfund Site  
PCB Air Quality Monitoring  
Citizens Advisory Group Meeting  
December 9, 2004**

Key Points Presented

CAG Presentation October 24, 2004

- Use of NYSDEC Annual Guideline Concentration for PCB in Air
- Collection of baseline data at the facility
- EPA coordination with NYSDEC and NYSDOH



**The Application of New York State Air  
Guide –1:  
GUIDELINES for the Control of Toxic  
Ambient Air Contaminants**

**Citizens Advisory Group Meeting  
December 9, 2004**

Thomas Gentile  
NYSDEC  
Division of Air Resources

# Air Guide -1

## Provides Rule Guidance for Application of 6NYCRR Part 212: General Process Emission Sources

- Developed over 20 years ago to provide guidance for regional engineers to determine a toxicity rating for air contaminants and insure protection of public health.
- Modeling software to predict ambient impacts of uncontrolled emissions.
- Contains annual and short-term guidelines for numerous air pollutants
- Used in Department's risk management decision- making process

# A Wide Range of Issues Are Considered in Addition to the Annual Guideline

- Location of the source with respect to residences or other sensitive environmental receptors, including consideration of the area's anticipated growth;
- Emission dispersion characteristics at or near the source, taking into account the physical location of the source with respect to terrain; and
- Projected maximum cumulative impact taking into account emissions from all sources at the facility under review and the pre-existing ambient concentration of the air contaminant under review (background).
- Toxic and other properties and the emission rate potential of the air contaminant.

# Risk Management Considerations

- Guideline value is not a standard, it allows the Department to make essential regulatory decisions protecting public health and the environment in a timely and effective manner while considering the most current toxicological and exposure information.
- If the annual guideline concentration (AGC) is based on an inhalation cancer risk value, the Department will permit the source if the risk is between one in one hundred thousand ( $10^{-5}$ ) and one in one million ( $10^{-6}$ ) if the source has implemented the best achievable control technology;
- NYSDEC Annual Guideline Concentration Range for PCBs is 10 – 100 ng/m<sup>3</sup>;

# Why NYSDEC/NYSDOH supports the use of the 24 hour quality of life standard

- A standard for immediate action.
- The project will be collecting data which can be used to address long term exposure.
- The standard is within the cancer risk range used by the EPA at superfund sites.
- The project will be active for approximately 6 years.
- The 24 hour standard adequately addresses long term exposure for non-cancer and cancer risk public health concerns.



# PCB Air Concentrations

Citizens Advisory Group Meeting  
December 9, 2004



# Available Air Concentration Data

- Remnant Deposit Remediation Air Monitoring – 1991
  - 985 Airborne PCB samples
  - Only Aroclor 1242 detected
  - Concentrations ranged from 0.03 to 0.13  $\mu\text{g}/\text{m}^3$
  - 13 samples only above limit of quantification



# Air Quality Performance Standard

Elements of the Standard:

- PCBs are the primary pollutant of concern
- Continuous monitoring required for PCBs

Pollutant	Performance Standard	Monitoring Frequency
PCBs (Residential Areas)	0.11 micrograms per cubic meter	Daily (24-hour) basis
PCBs (Commercial/Industrial Areas)	0.26 micrograms per cubic meter	Daily (24-hour) basis

# U.S. EPA Superfund Risk Assessment



- Evaluated human health protection of a reasonable maximum exposure.
- Reasonable Maximum Exposure – the highest exposure that is reasonably expected to occur
- Potentially Exposed Individuals – include child and adult residents

# Exposure Assessment

- Exposures to young children and adults
- PCB Concentration in air
- Inhalation Rate (cubic meters/day)
- Frequency of Exposure (days/year)
- Duration of Exposure (# of years)
- Conversion Factor
- Bodyweight of Individual
- Averaging time for cancer and non-cancer assessment

# Exposure Equation

$$\text{Intake} = \frac{\text{Conc} \times \text{Contact Rate} \times \text{Expos. Freq.} \times \text{Expos. Dur.} \times \text{Conv. Factor}}{\text{Bodyweight} \times \text{Averaging Time}}$$

Cancer – based on lifespan or 70 years.

Non-Cancer – based on period of exposure (i.e., 6 years)

# Cancer Assessment

- Toxicity information based on peer-reviewed scientific information available at [www.epa.gov/iris](http://www.epa.gov/iris)
- Cancer slope factor – indicator of relative ability of chemical to cause cancer
- PCBs are classified as probable human carcinogens based on adequate animal data and suggestive human data
- Cancer risks are within EPA's risk range

# Cancer Slope Factors for PCBs

## CSF in $\text{mg/kg-day}^{-1}$ (IRIS, [www.epa.gov/iris](http://www.epa.gov/iris))

- High Risk & Persistence (soil, sediment, fish)  
Upper-bound CSF = 2
- Low Risk & Persistence (air, water)  
Upper-bound CSF = 0.4
- Lowest Risk & Persistence (PCBs with  $\leq 4$  chlorines)  
Upper bound CSF = 0.07

# Comparison of EPA Child and Adult Exposure Assumptions and Risk

Assumptions	Child (0 – 6 yrs)	Adult
Risk Level	$2 \times 10^{-6}$	$2 \times 10^{-6}$
Concentration	0.11 ug/m <sup>3</sup>	0.26 ug/m <sup>3</sup>
Inhalation Rate	10 m <sup>3</sup> /day	20 m <sup>3</sup> /day
Exposure Frequency	350 days/yr	350 days/yr
Exposure Duration	6 years	6 years
Bodyweight	33 lbs	154 lbs
Cancer Slope Factor	0.4 mg/kg-day	0.4 mg/kg-day
Reporting Requirements	Daily	Daily

# Non-Cancer Assessment



# Non-Cancer Toxicity Values

- Sub-chronic (less than 7 years)
- Chronic
  - 7 years or more (1/10<sup>th</sup> of lifetime)
  - Also protective of young children exposed for less than 7 years where critical study endpoint is of concern for children
- PCBs are systemic toxicants
- Reference Dose
  - Aroclor 1016 (most similar to Aroclor 1242)

# Chronic Non-Cancer PCB Toxicity Factors (IRIS)

- Reference Dose (RfD): *chemical intake likely to be without an appreciable risk of adverse effects to humans during a lifetime.*
- RfD for Aroclor 1016 most similar to Aroclor 1242
- RfD is based on feeding studies with Rhesus monkeys that included exposures before and during pregnancy. Study evaluated a number of health end points including effects on off-spring
- Critical Effect (NOAEL) identified was reduced birthweight among offspring exposed to Aroclor 1016
- Level at which reduced birthweight was seen in animals was reduced by an additional factor of 100 to protect sensitive humans.
- Reference Dose = 0.00007 mg/kg-day

# Comparison of EPA Exposure Assumptions and Non-Cancer Hazards

Assumptions	Child (0 – 6 yrs)	Adult
Hazard Level	1	1
Concentration in Air	0.11 ug/m <sup>3</sup>	0.26 ug/m <sup>3</sup>
Inhalation Rate	10 m <sup>3</sup> /day	20 m <sup>3</sup> /day
Exposure Frequency	350 days/yr	350 days/yr
Exposure Duration	6 years	6 years
Bodyweight	33 lbs	154 lbs
Reference Dose mg/kg-day	0.00007	0.00007
Reporting Requirements	Daily	Daily

# Conclusions

- Adult and child air PCB concentrations are based on potential residential settings
- Standard defaults are used in calculations
- Concentrations represent reasonable maximum exposures based on period of exposure
- Concentrations do not exceed EPA's risk range (i.e., risk range of one in a million to one in ten thousand and non-cancer hazards are less than or equal to 1)

# PCB Air Emission Design Requirements from Quality of Life Standards

- RD Team is responsible for demonstrating that the design will minimize impacts on air quality to the extent practicable.
  - Design review by EPA in consultation with NYSDEC and NYSDOH

# Intermediate Design Process

- Designers are currently collecting and evaluating existing data
- Designers are also selecting equipment and considering potential emissions from the project
- Based on that information, the designers will determine the need for additional baseline sampling