

# MPCA's Cumulative Effects Analysis for Environmental Review

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# New Cumulative Effects Process in Environmental Review

- MN Supreme Court 'CARD' decision (*Citizens Advocating Responsible Development vs. Kandiyohi County*)  
(Minn. R. 4410.1700, subp. 7, item B)
- RGU is to identify any past, present or reasonably foreseeable future projects that may interact with the project in such a way as to cause cumulative potential effects.
- Consider geographic area in which "projects" may affect the same natural resources

# Cumulative Effects in Environmental Review

- Historic MPCA interpretation did not include quantitative assessment of air toxics from non-project sources
- Environmental review projects (>250 tpy)  
*or*
- Facilities with emissions from 100 – 250 tpy (considered on case-by-case basis)

# Historic Process for Evaluating Air Toxics

## Criteria Pollutants

- PM10
- PM2.5
- SO2
- NOx
- CO
- Lead
- VOCs

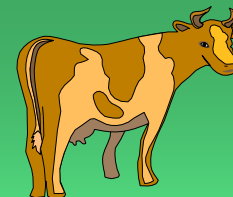
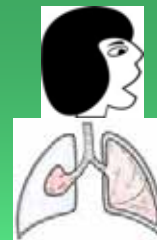
## Greenhouse gases

## Other Emissions

- H2S
- Odors
- Ozone-depleters

## Air Toxics

- CAA HAPs
- TRI
- Other Toxics
- NOx
- Lead
- Diesel Exhaust



# *Facility* Air Emissions Risk Assessment

## Required when:

- Environmental review air trigger met (250 tpy criteria pollutant)
- *or*
- Air emissions between 100-250 tpy (case-by-case determination)
- Ethanol facilities increase by 5 million gallons per year
- Electric production facilities greater than or equal to 25 MW
- At MPCA's discretion

# Facility Air Emissions Risk Assessment

- Facility only: existing sources + modification
- Doesn't include on-site tailpipe emissions
- Criteria pollutants compared to AAQS
- Background evaluation = comparison of modeled concentrations and monitored concentrations (same chemicals only)
- No summing background & facility

# Risk Management Considerations

## Historic MPCA 'risk goals' for facility risks:

- ***Cancer***: total facility incremental cancer risk: 1 in 100,000
- ***Noncancer*** hazard index for chemicals with same toxic endpoint: 1

# Risk Management Considerations

## EPA 'risk goals':

- Cancer - "acceptable" excess cancer risk range:  
1 in 10,000 - 1 in a 1,000,000
- Noncancer -  
any exposures above hazard index of '1' for same toxic endpoint may have potential for causing adverse effects

# Possible Cumulative Effects Scope

## Criteria Pollutants

- PM<sub>10</sub>
- PM<sub>2.5</sub>
- SO<sub>2</sub>
- NO<sub>x</sub>
- CO
- Lead
- VOCs

## Greenhouse Gases

### Air Toxics

- CAA HAPs
- TRI
- Other Toxics
- NO<sub>x</sub>
- Lead

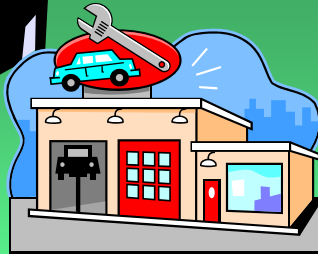
### Other Emissions

- H<sub>2</sub>S
- Odors
- Ozone-depleting chemicals

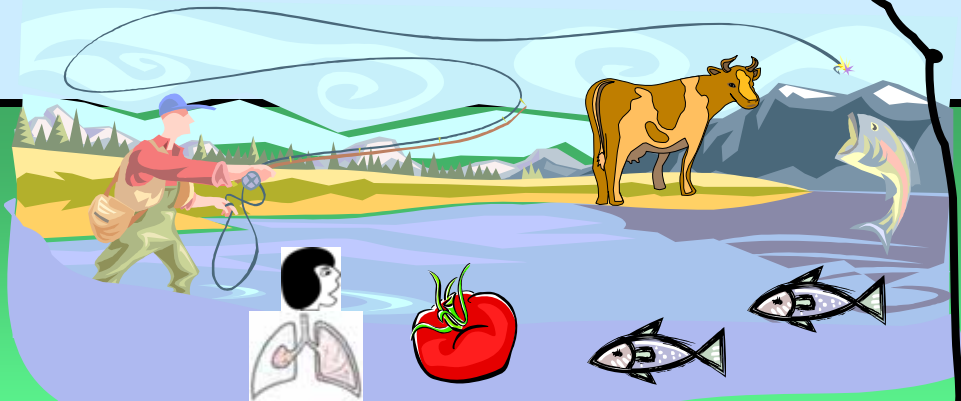
## Point Sources



## Mobile Sources



## Area Sources



Inhalation Eggs Milk Beef Fish  
Vegetables Pork Soil Poultry

# MPCA's Draft Cumulative Effects Approach (cont)

*Total Cumulative 'Risks'\* = sum of risks from:*

- Onsite sources
- Modeled nearby sources
- Monitoring data

\* 'Risks' includes excess cancer risks and acute and chronic noncancer hazard index

# **MPCA's Draft Cumulative Effects Approach**

**3 air toxics emission source categories:**

- » Onsite**
- » Nearby**
- » Other**

# **MPCA's Draft Cumulative Effects Approach (cont)**

## **Onsite Sources**

- **All on-site sources**
- **Includes tail-pipe emissions from idling trucks (recently included in 2 ethanol projects)**

# MPCA's Draft Cumulative Effects Approach (cont)

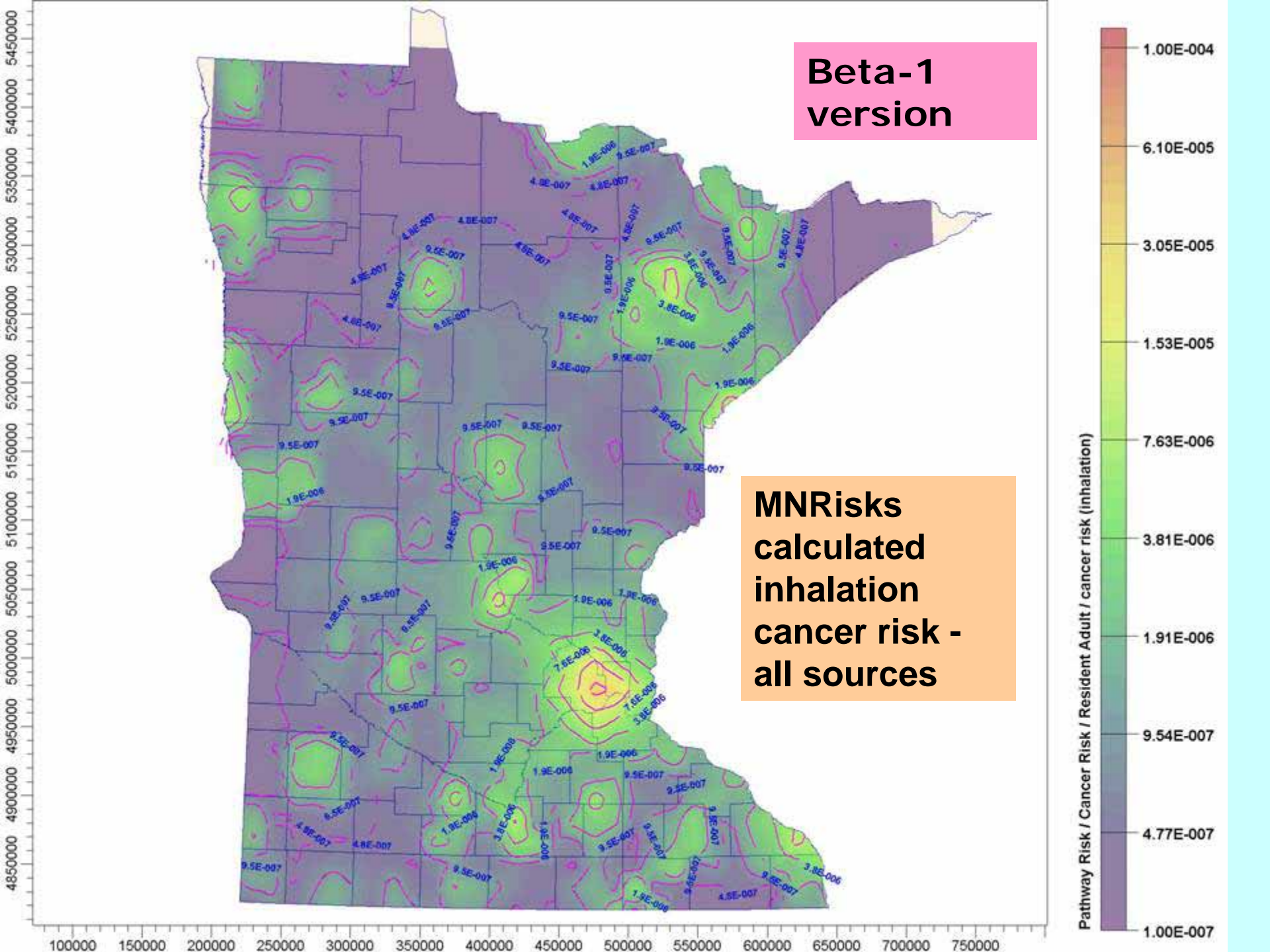
## *Nearby Sources Include*

- Off-site **point, area and mobile**
- Point sources
  - use MPCA Environmental Data Access (EDA) web-based test of when multiple facilities interact based on simple proximity tests
- Characterize one of two ways
  - Modeling
  - Monitoring

# MPCA's Draft Cumulative Effects Approach (cont)

## *Nearby Source Modeling*

- Several possible methods
- Patterned after Prevention of Significant Deterioration (PSD) (40 CFR 52.21) and related guidance.
- Point & mobile sources (*not area yet*)
- MNRiskS
  - Possible use in future
  - Emissions from MN 2002 emissions inventory
  - Includes point, mobile and area source



# What are area and mobile sources?

On-Road Mobile Sources	Area Sources	Area Sources (cont'd)
<b>Cars</b> <b>Buses</b> <b>Trucks</b>	<b>Agricultural Field Burning</b> <b>Agricultural Pesticide Use</b> <b>Agricultural Production - Animal Waste</b> <b>Agricultural Production - Fertilizer Application</b>	<b>Industrial Processes: Construction</b> <b>Industrial Surface Coating</b> <b>Mineral Processes: SIC 32</b> <b>Paved Roads</b> <b>Petroleum Bulk Stations/Terminals: Breathing</b>
Non-Road Mobile Sources	<b>Agriculture Production - Crops, Tilling</b>	<b>Refrigeration</b>
<b>CNG</b> <b>LPG</b> <b>Marine Vessels, Commercial</b> <b>Off-highway Vehicle Diesel</b> <b>Off-highway Vehicle Gasoline, 2-Stroke</b> <b>Off-highway Vehicle Gasoline, 4-Stroke</b> <b>Pleasure Craft</b> <b>Railroad Equipment</b>	<b>Animal Cremation</b> <b>Asphalt Paving</b> <b>Auto body Refinishing</b> <b>Commercial and Consumer Products Usage</b> <b>Commercial Cooking</b> <b>Domestic Animals - Waste Emissions</b> <b>Dry Cleaners</b> <b>Fluorescent Lamp Breakage</b> <b>Fluorescent Lamp Recycling</b> <b>Gasoline Service Stations</b> <b>Gasoline Trucks in Transit</b> <b>Grain Elevators</b> <b>Graphic Arts</b> <b>Hospital Sterilization</b> <b>Human Cremation</b> <b>Human Perspiration</b>	<b>Residential Fossil Fuel Combustion</b> <b>Residential Wood Burning</b> <b>Solvent Cleaning</b> <b>Stationary Fuel Combustion, Commercial/Institutional</b> <b>Stationary Source Fuel Combustion, Industrial</b> <b>Structure Fires</b> <b>Surface Coatings - Architectural</b> <b>Swimming Pools</b> <b>Tank/Drum Cleaning</b> <b>Traffic Markings</b> <b>Unpaved Roads</b> <b>Waste Disposal, Open Burning</b> <b>Waste Incineration</b> <b>Wild Animals - Waste Emissions</b>

# MPCA's Draft Cumulative Effects Approach (cont)

## *Nearby Source Monitoring*

- Ambient air monitoring data
- Represents what isn't modeled
- Monitoring data expressed as sum of cancer risks & hazard indices (by toxic endpoint)
- If more sources are modeled, lower background concentrations are allowed

# MPCA's Draft Cumulative Effects Approach (cont)

## *Other (monitoring)*

- Regional/background concentrations related to sources not accounted for in modeling
- Air monitoring data from a nearby monitor or a monitoring station representative of the area
- Monitoring data sets used depend on the degree of modeling supplemented
- Monitoring data expressed as sum of cancer risks & hazard indices (by toxic endpoint)

Option 1: highest background (no modeling)	Option 2: lesser background (model onsite & nearby sources in approx 2 mi)	Option 3: pristine background (model <u>all</u> sources - could include MNRiskS results)
<b>1-Hour Acute HI Values***</b> Mostly Rural Sites: 0.2 Intermediate Sites: 0.3 Mostly Urban Sites: 0.6	<b>1-Hour Acute HI Values***</b> Mostly Rural Sites: 0.2 Intermediate Sites: 0.2 Mostly Urban Sites: 0.3	<b>1-Hour Acute HI Values***</b> 0.15
<b>Chronic HI Values***</b> Mostly Rural Sites: 0.6 Intermediate Sites: 1.0 Mostly Urban Sites: 1.3	<b>Chronic HI Values***</b> Mostly Rural Sites: 0.6 Intermediate Sites: 0.6 Mostly Urban Sites: 1.0	<b>Chronic HI Values***</b> 0.59
<b>Cancer risk values (10-5)***</b> Mostly Rural Sites: 2.5 Intermediate Sites: 4.0 Mostly Urban Sites: >5	<b>Cancer risk values (10-5)***</b> Mostly Rural Sites: 2.5 Intermediate Sites: 2.5 Mostly Urban Sites: 4.0	<b>Cancer risk values (10-5)***</b> 2.07

\*\*\*monitoring data soon to be updated to reflect 95% UCL of mean concentrations 19

# Cumulative Effects & Risk Management

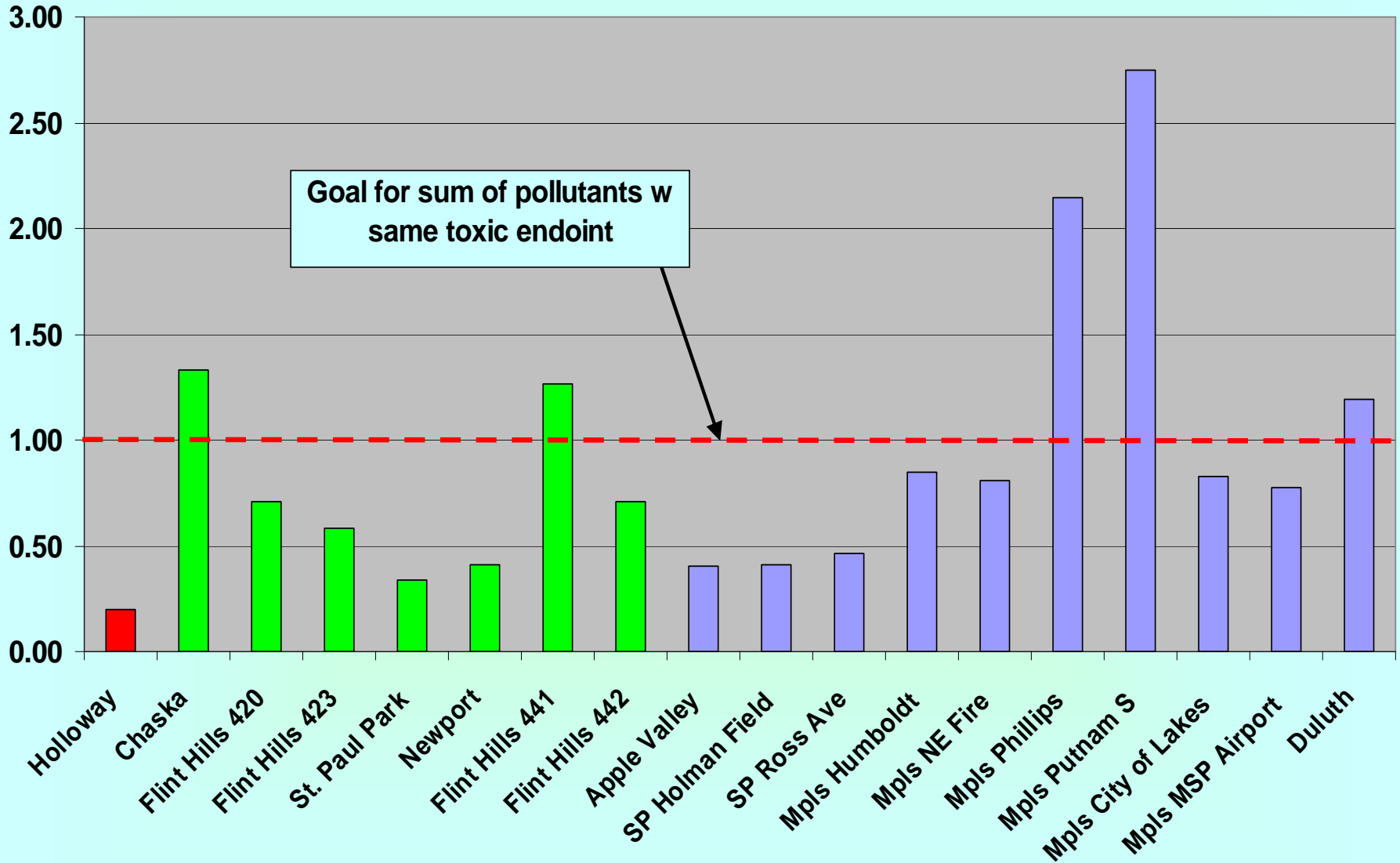
New 'risk goals' ?

- Extend upper cancer risk goal range to 1 in 10,000 (1E-04)
- Total facility cancer risk goal still 1 in 100,000 (1E-05)
- Noncancer hazard index for chemicals with same toxic endpoint: 1

# Cumulative Effects & Risk Management

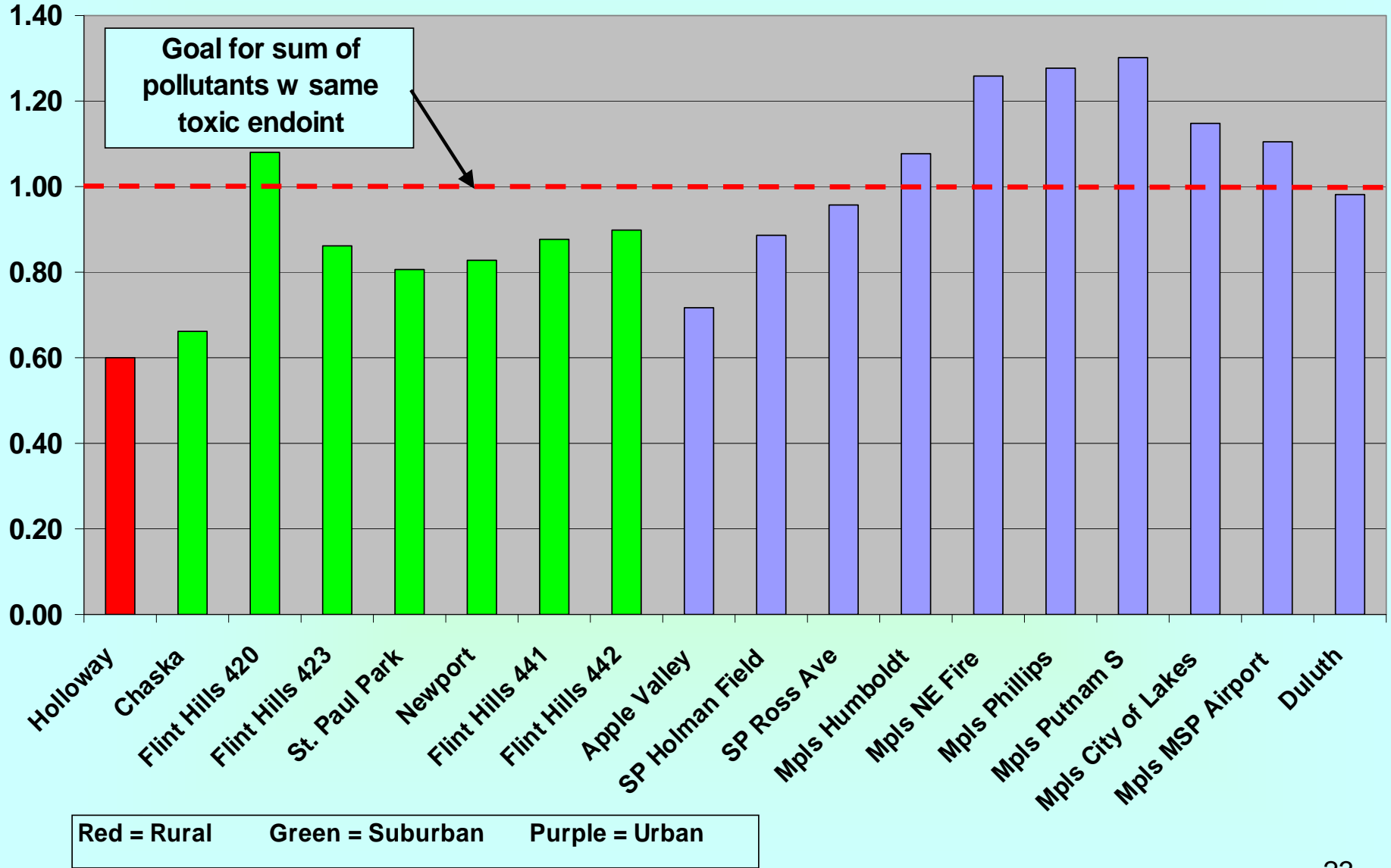
- How to account for other exposures (e.g, food, water)?
- How to permit new facilities or modifications when background levels are:
  - already above 'risk goals'
  - less than risk goals, but when facility emissions are added, total risks are above goals?

# Acute Noncancer Inhalation Hazard Index

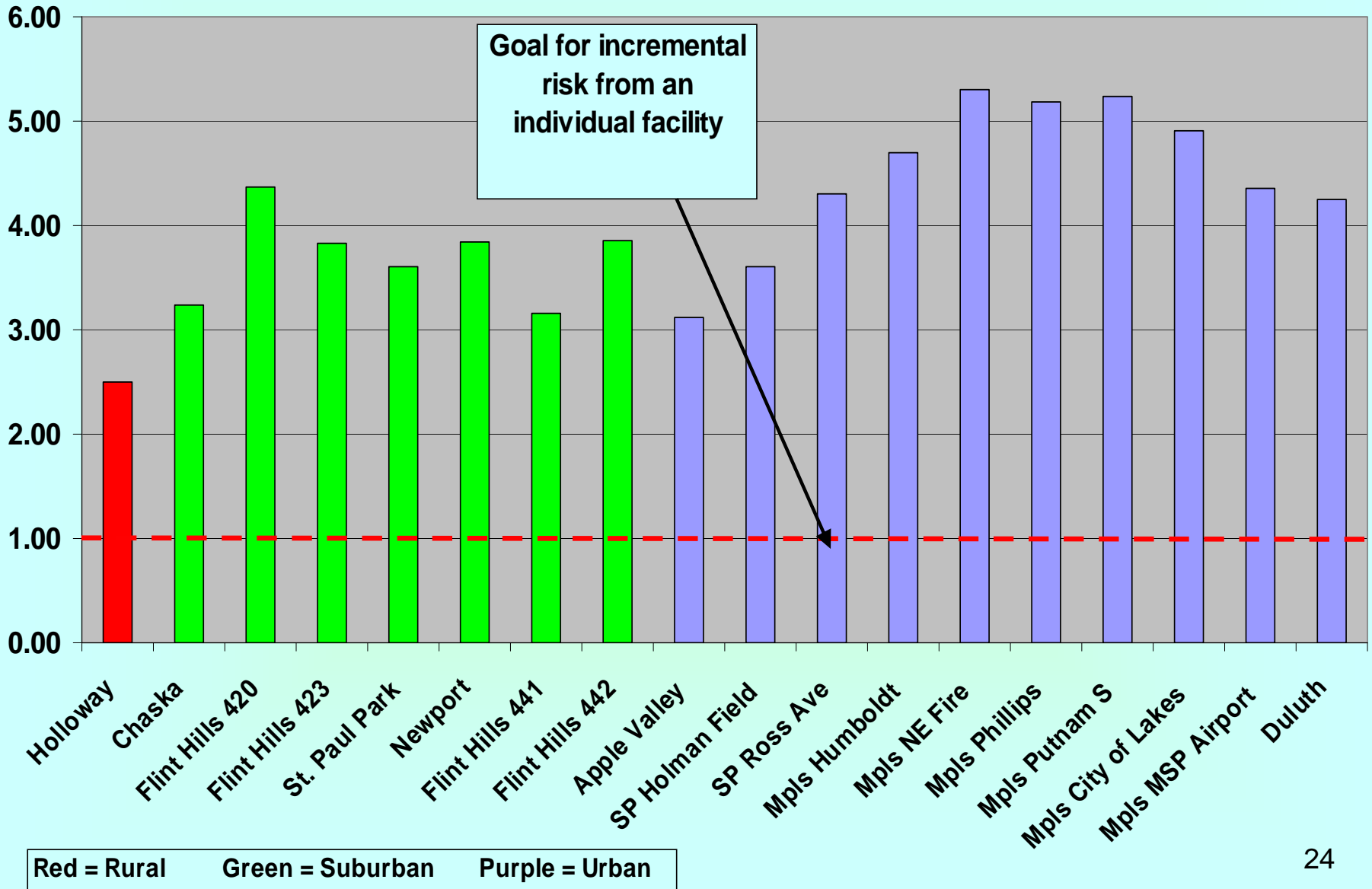


Red = Rural    Green = Suburban    Purple = Urban

# Chronic Noncancer Inhalation Hazard Index



# Inhalation Cancer Risk



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