

MNRISKS Data Deep Dive



**Using publicly available data to evaluate
stationary-source contributions to cumulative
human health risk**

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Presentation Overview



1. Project Background
2. Explanation of a Risk Assessment
3. What the Data Tells Us
 - a. Emissions
 - b. Human Health Risks
4. Implications for Cumulative Impacts Analysis

The trash burner was built in a community that was already extremely over-polluted

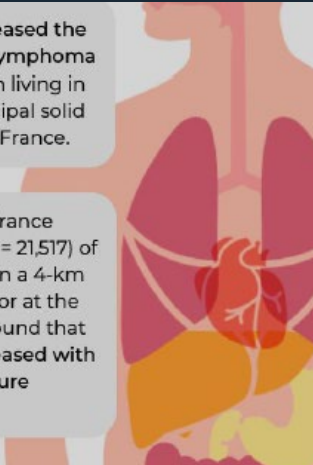
“According to the Environmental Protection Agency, burning trash releases nearly as much carbon dioxide as burning coal. Mercury, lead, nitrogen oxides and particulate matter also are emitted into the air. These toxins are linked to heart disease, asthma and other respiratory ailments.”

A study analyzed the occurrence of miscarriages in women aged 15-49 years residing near seven incinerators in Northern Italy (2002-2006), and found that an increase of PM10 caused by incinerators was associated with an increased risk of miscarriage.

A 2005 study in Japan found that proximity of schools to municipal waste incineration plants may be associated with an increased prevalence of wheeze, headache, stomach ache, and fatigue in school children.

Dioxin emissions increased the risk of non-Hodgkin's lymphoma among the population living in the vicinity of a municipal solid waste incinerator in France.

Another study in France considered all births (n = 21,517) of women residing within a 4-km radius of an incinerator at the time of delivery and found that pre-term delivery increased with increased exposure (2003-2010).



HERC'S POLLUTION IMPACT

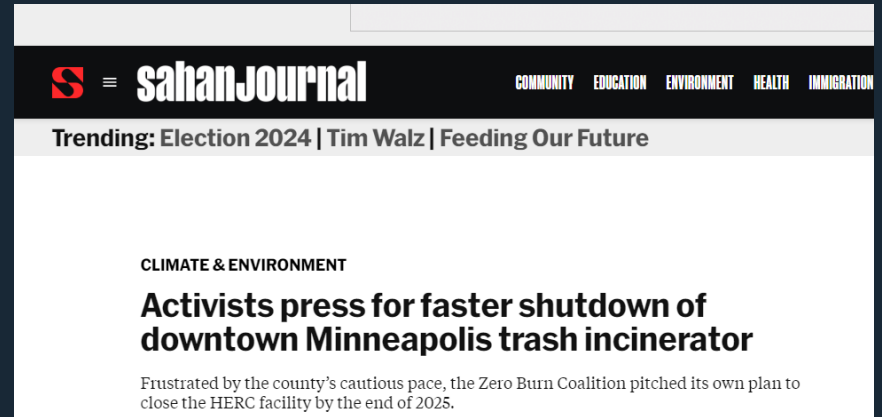
What are the environmental pollution concerns?

Of total emissions in Hennepin County, HERC contributes

25% Nitrogen Oxides
14% Sulfur Dioxide
7% Particulate Matter

What are health concerns from HERC?

Emissions can increase cardiovascular, respiratory, organ, and brain damage.



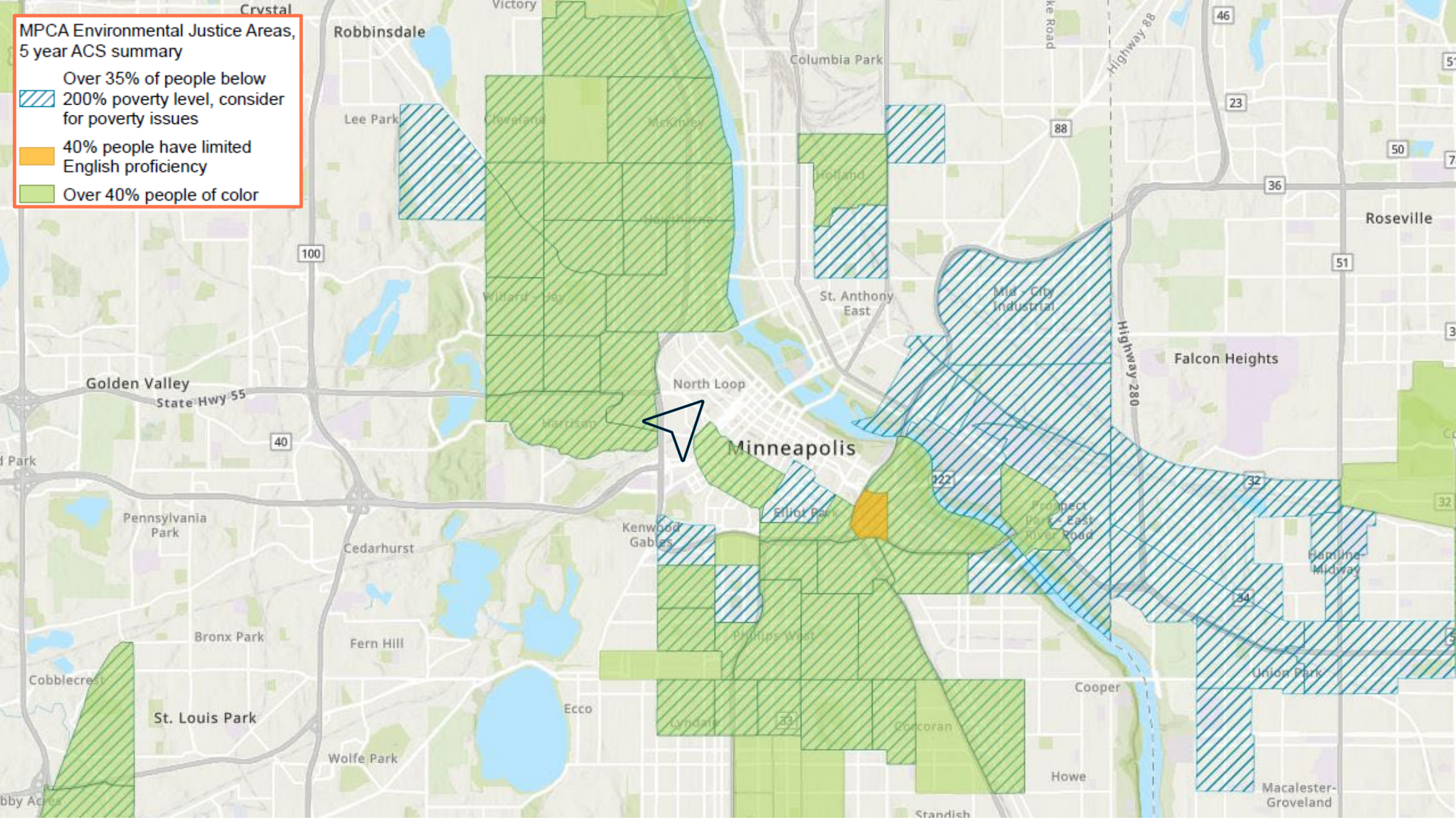
“Air pollution from HERC threatens the most vulnerable in communities around it, and taxpayers have subsidized HERC with millions of dollars over the years.”

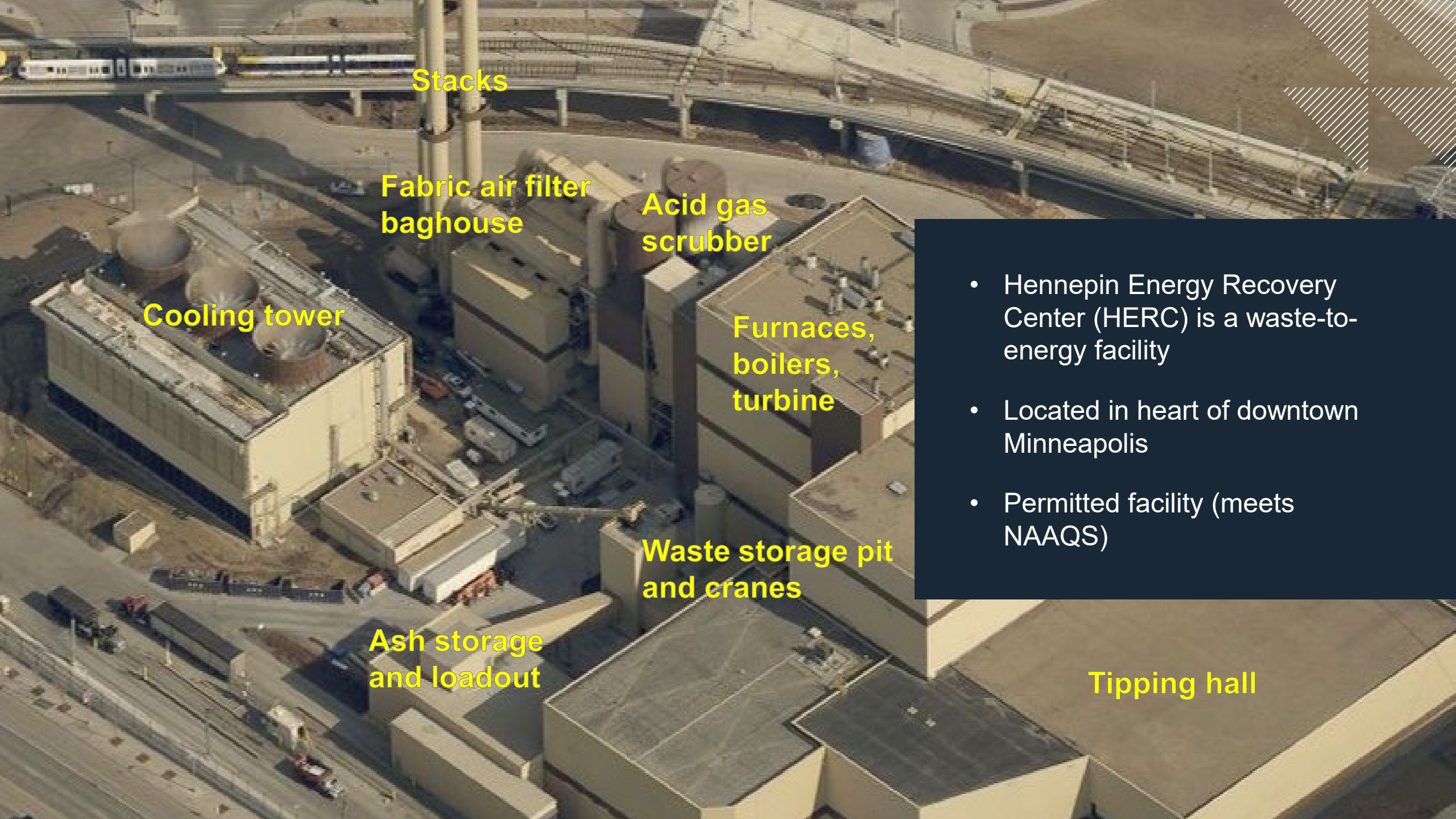
The trash burner is one of the **biggest** polluters in Hennepin County

- #1 nitrogen oxides
- #2 sulfur dioxide
- #2 PM2.5
- #3 lead
- #4 PM10
- #6 carbon monoxide

**MPCA Environmental Justice Areas,
5 year ACS summary**

-  Over 35% of people below 200% poverty level, consider for poverty issues
-  40% people have limited English proficiency
-  Over 40% people of color





Stacks

Fabric air filter
baghouse

Acid gas
scrubber

Cooling tower

Furnaces,
boilers,
turbine

Waste storage pit
and cranes

Ash storage
and loadout

Tipping hall

- Hennepin Energy Recovery Center (HERC) is a waste-to-energy facility
- Located in heart of downtown Minneapolis
- Permitted facility (meets NAAQS)

Quantifying HERC Air Emissions Modeled Results on Residents

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Request 2017 MNRISKS output for Hennepin County



Confirm HERC emissions in MNRISKS



Compare total results to HERC's alone by census tract



Identify any census tracts for possible future study

MNRISKS Emission Sources



- Point Source (example: HERC)
- Non-Point Source (example: residential heating)
- On-Road Mobile Source (example: cars)
- Non-Road Mobile Source (example: tractors)

See “MNRISKS: Minnesota statewide screening of health risks from air pollution” for details about the specific emission-rate methodology used in MNRISKS

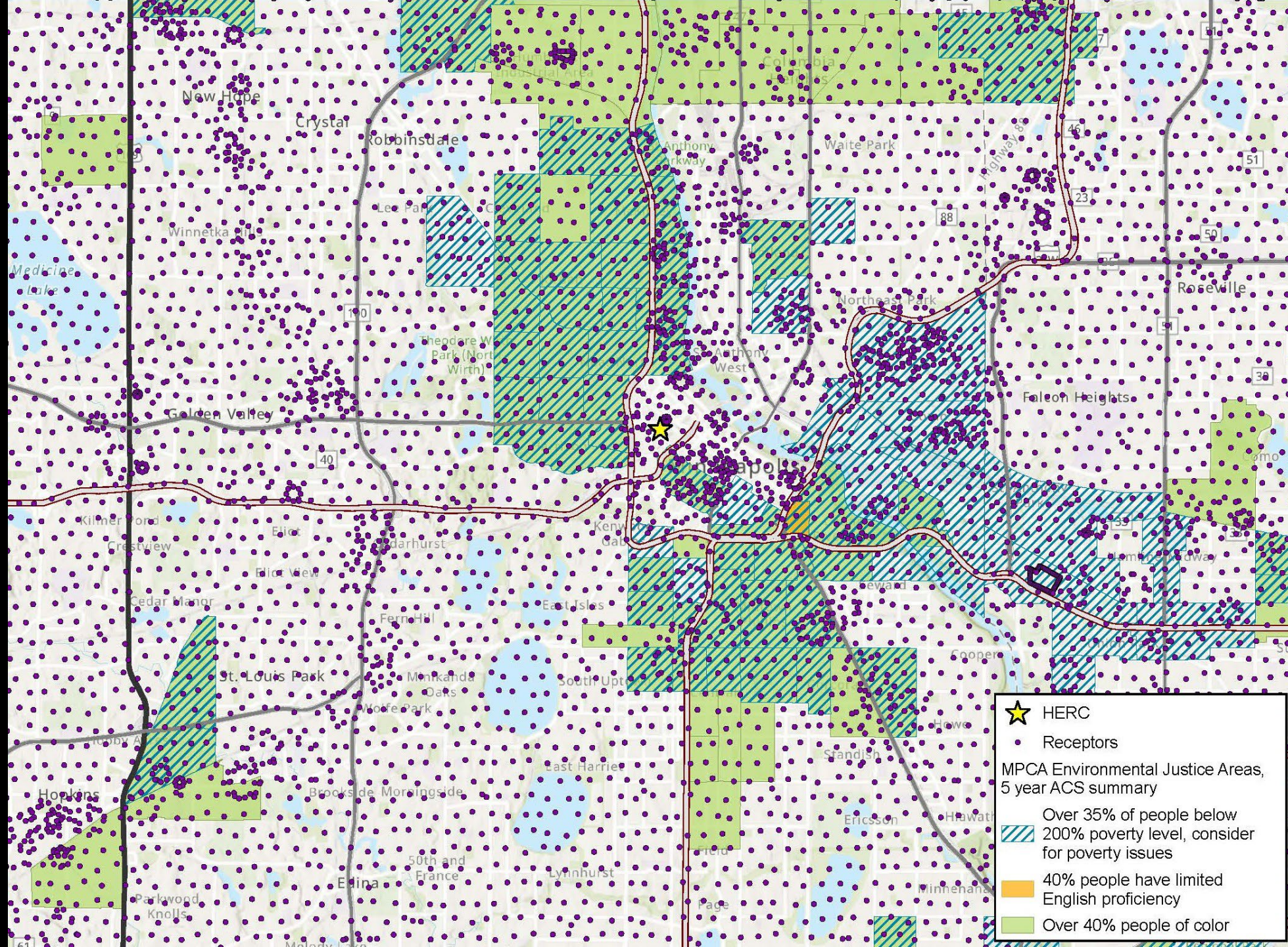


Air Concentration to Human Health Risk

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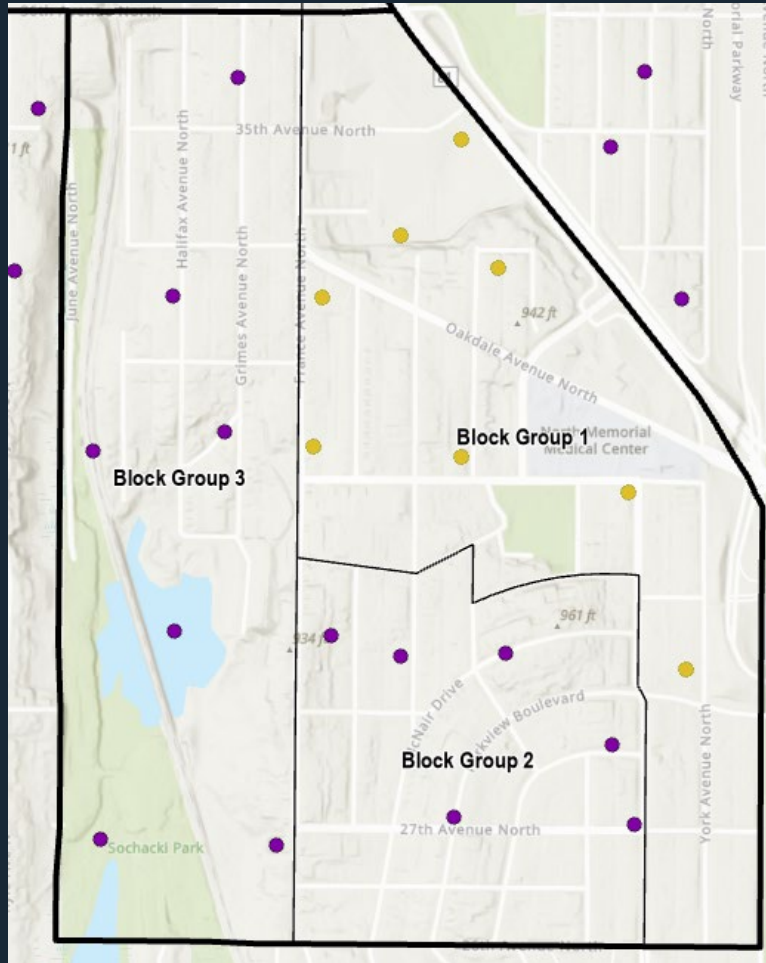
$$\sum \left(\begin{array}{l} \text{Individual pollutant} \\ \text{model result } \mu\text{g/m}^3 \end{array} \right) \div \left(\begin{array}{l} \text{Health benchmark} \\ \text{level } \mu\text{g/m}^3 \end{array} \right) = \text{Total risk by receptor}$$

• Maximum annual average • All sources combined • Unique source category • Facility specific	• Cancer risk factor by pollutant • Chronic noncancer reference concentration by pollutant	• Summation by receptor location • Non-cancer benchmark value above 1.0 • Cancer benchmark value above 1.0×10^{-5} (1 in 100,000)
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Receptors Averaged Across Block Groups for Total Census Tract Risk

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- Average cancer risk results and noncancer results for receptors within the bounds of a census tract
- Block Group 3 has seven receptors with modeled concentration results, so the overall Block Group 3 risk is the average of those seven receptors' maximum results



What does the data tell us?

How do HERC's emissions compare to other sources in the county?

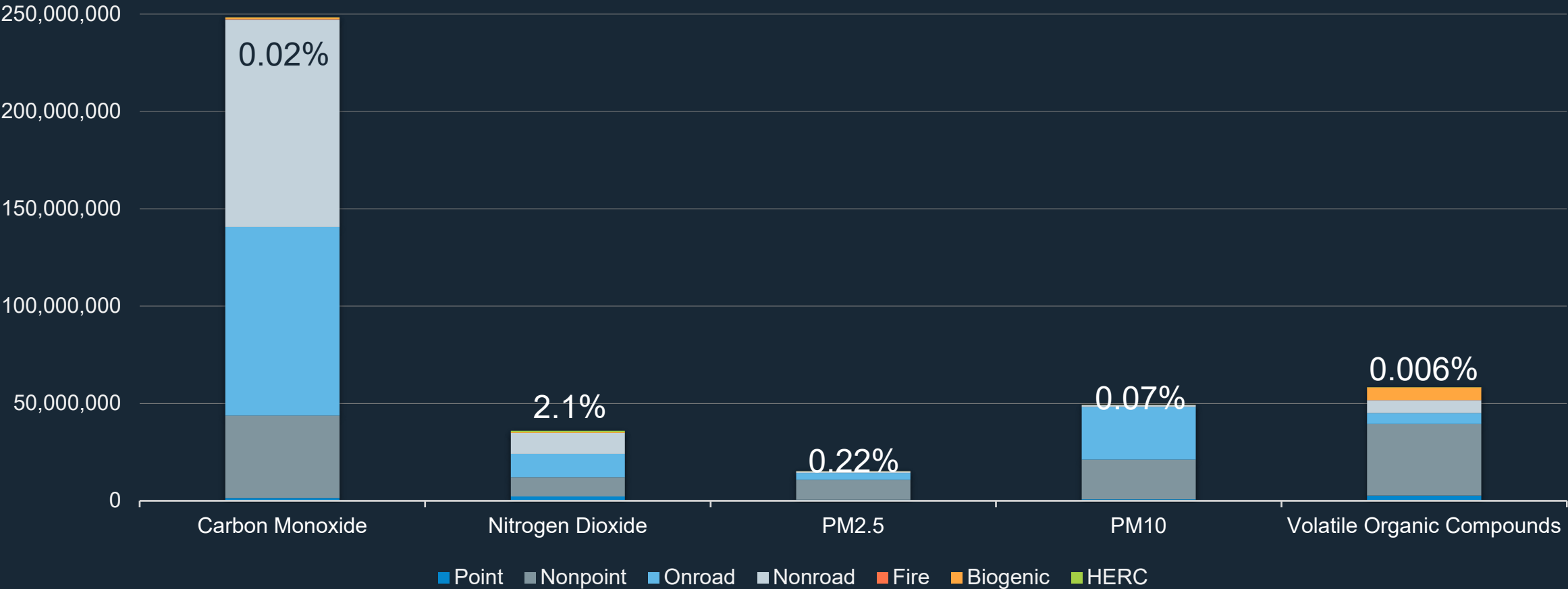
Does HERC contribute significantly to modeled health risks?

Are HERC's impacts significant by themselves?

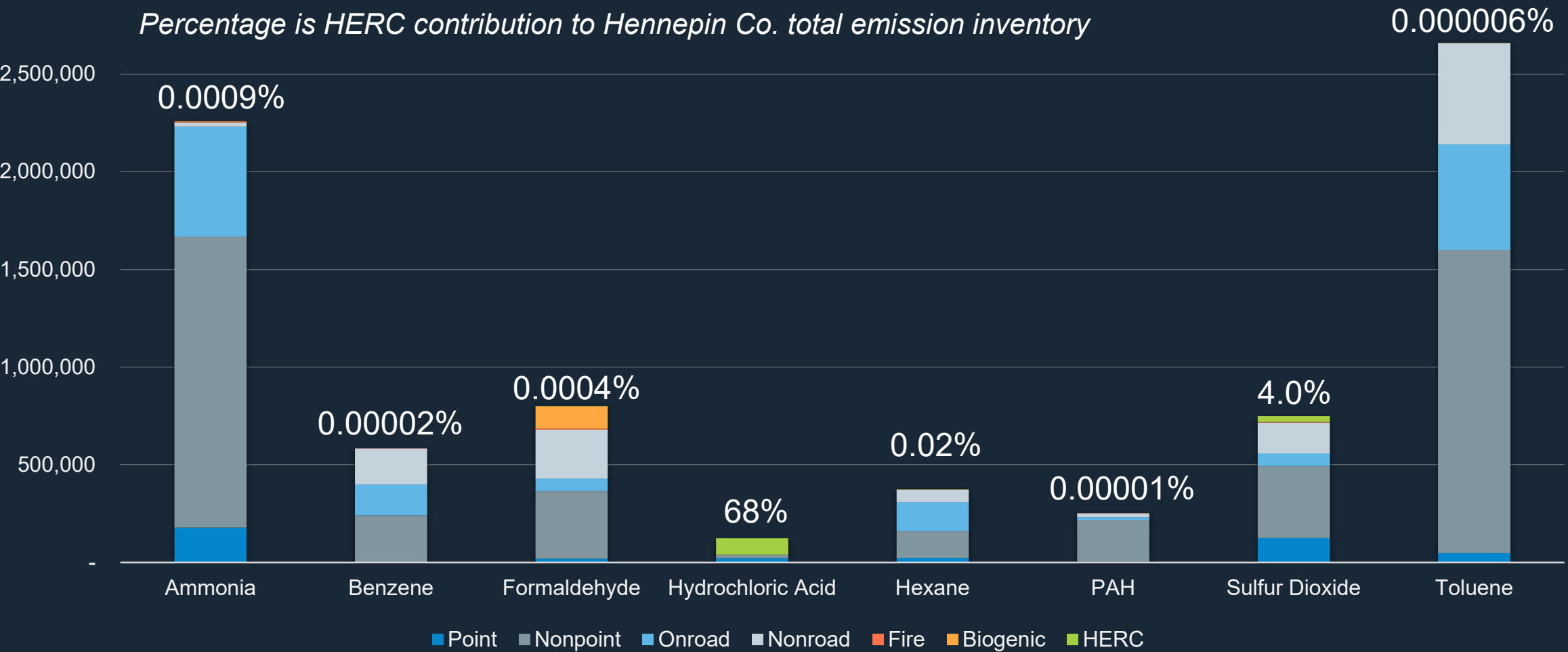
HERC's Individual Pollutant Emissions (lb./yr.) Compared to Other Sources



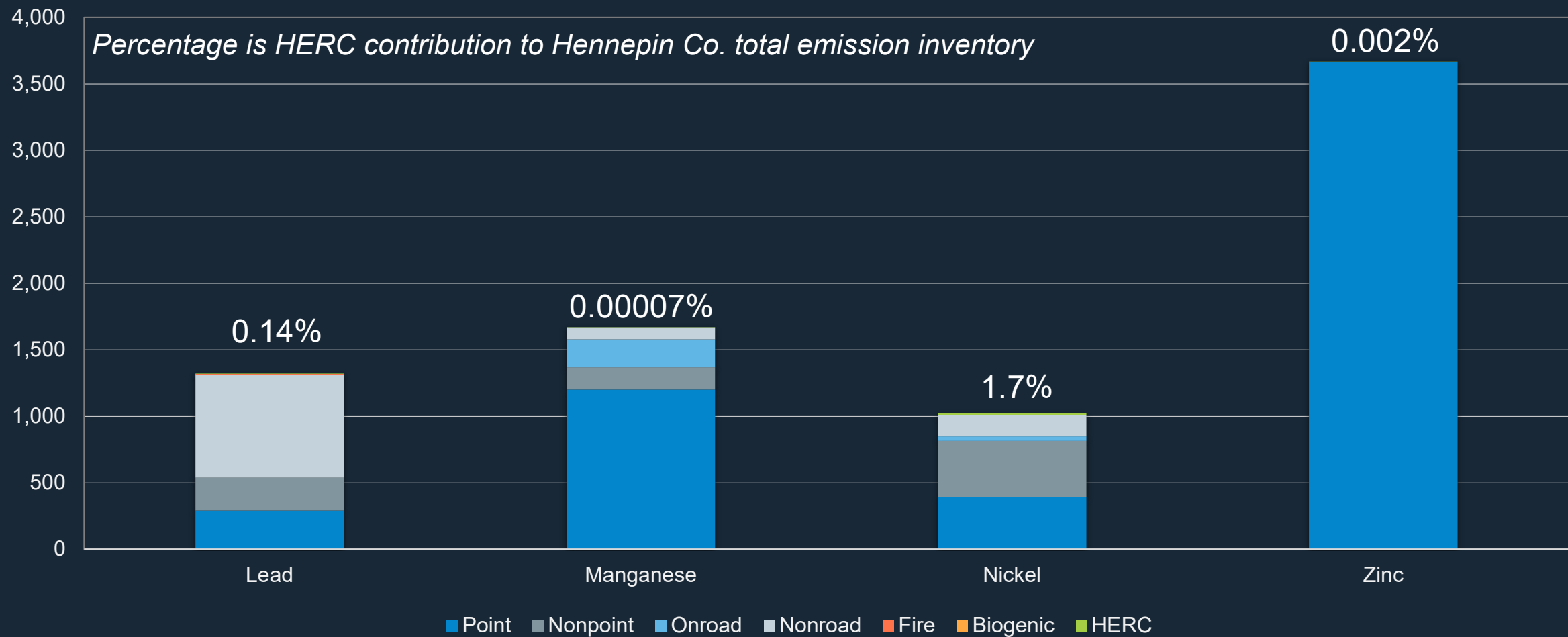
Percentage is HERC contribution to Hennepin Co. total emission inventory



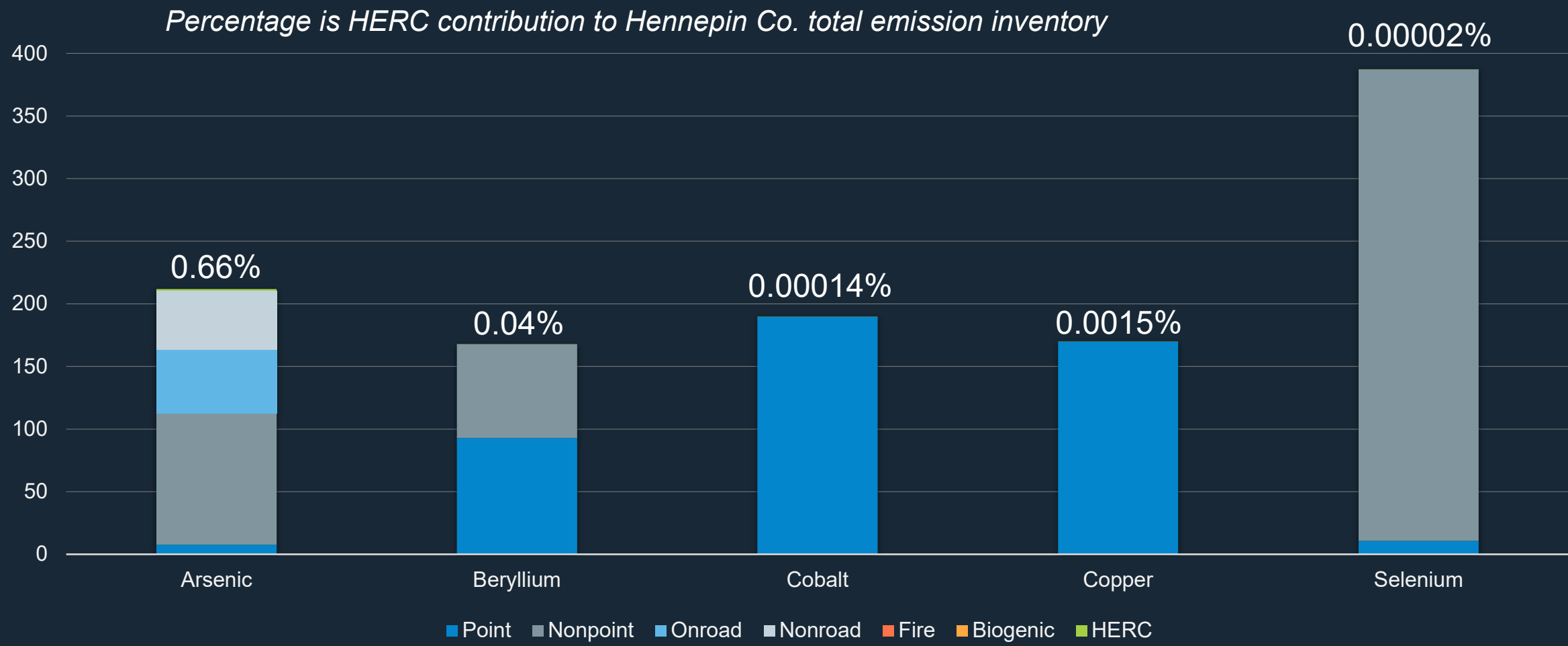
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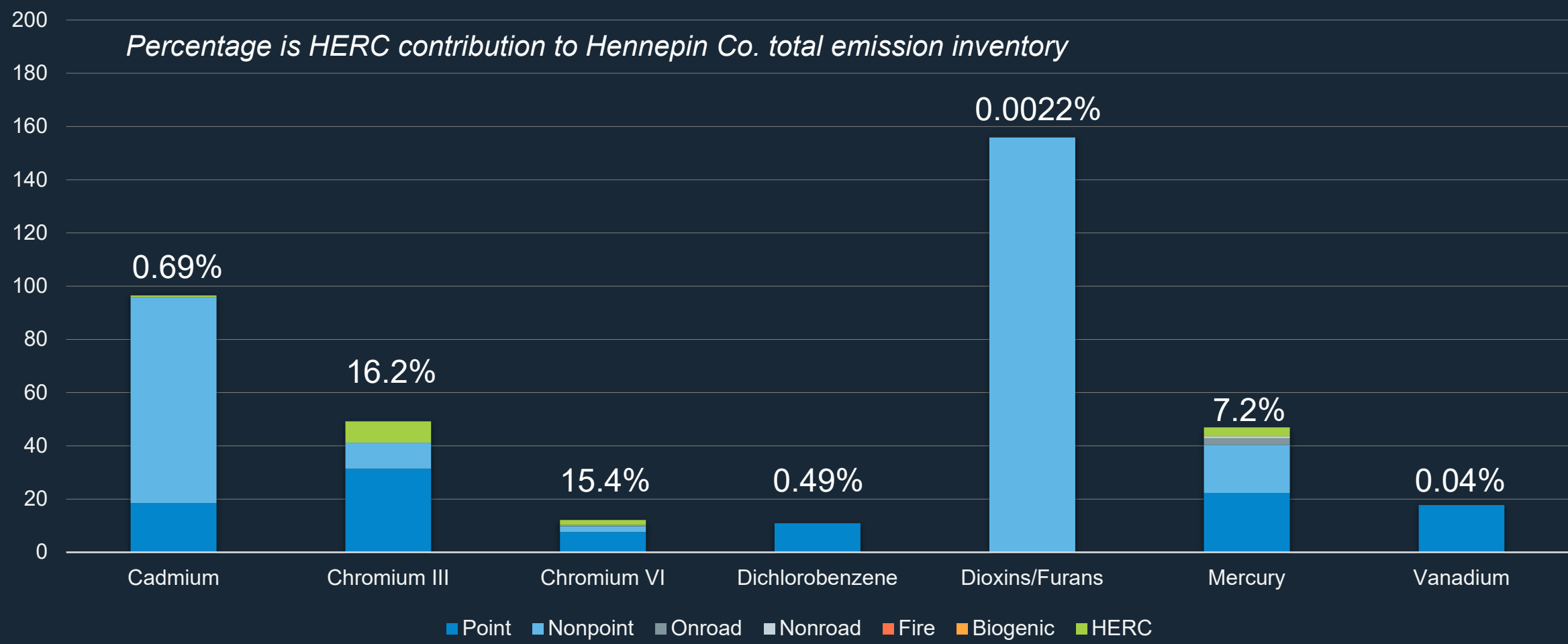
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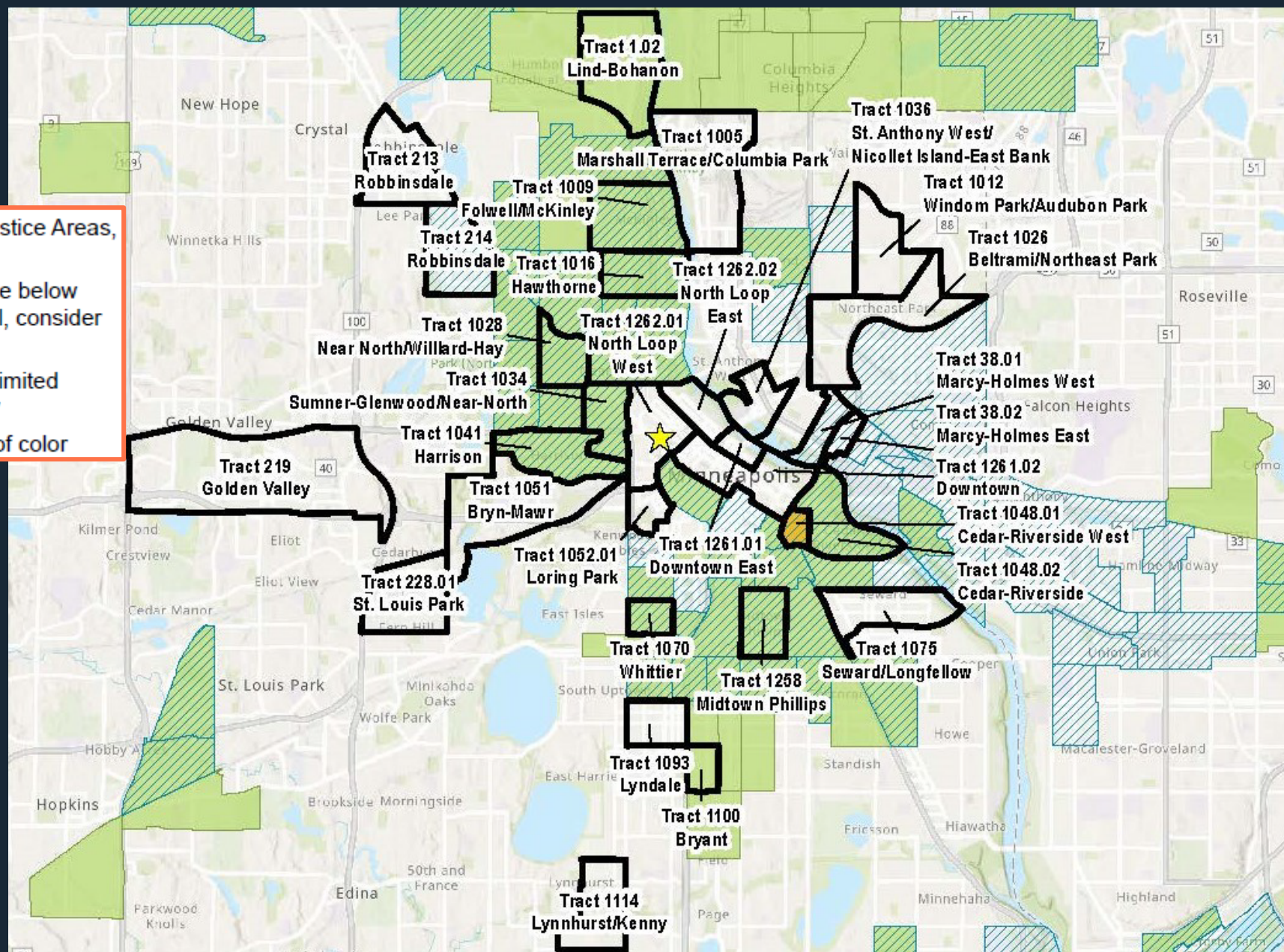


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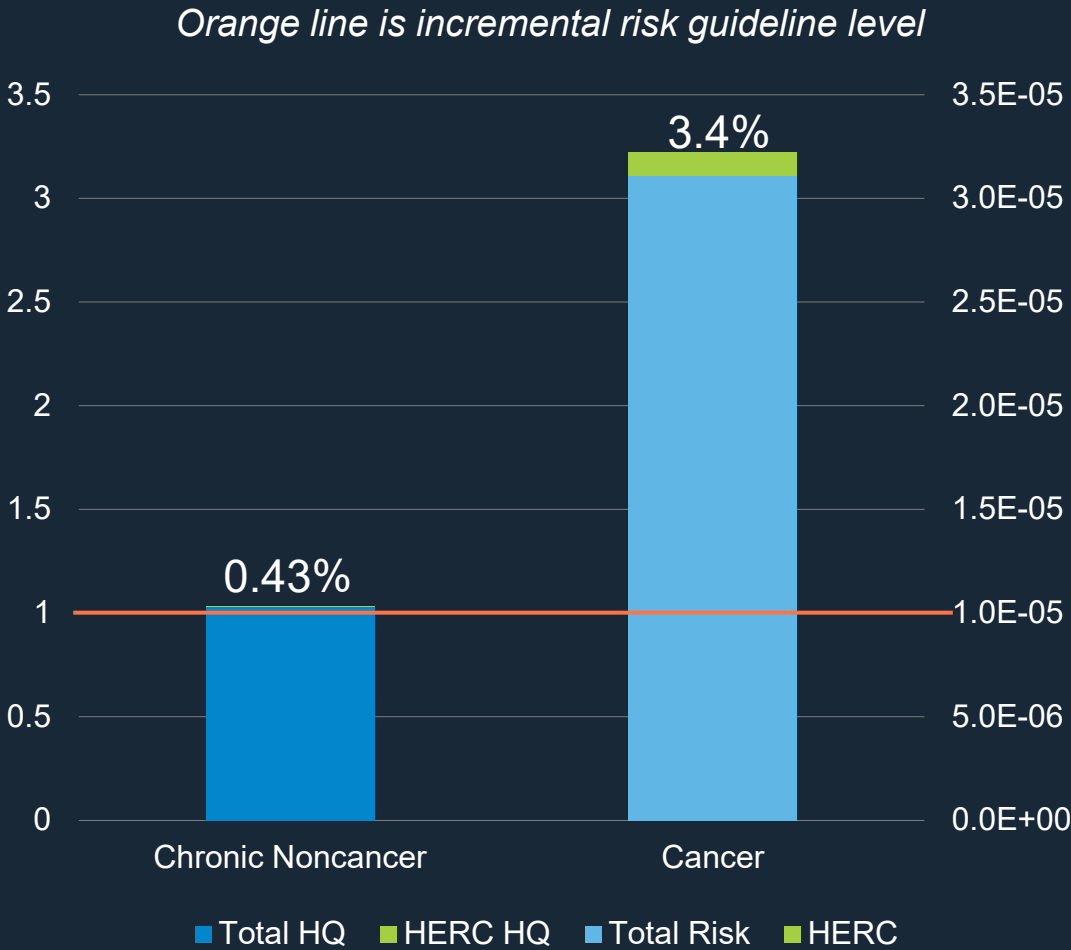
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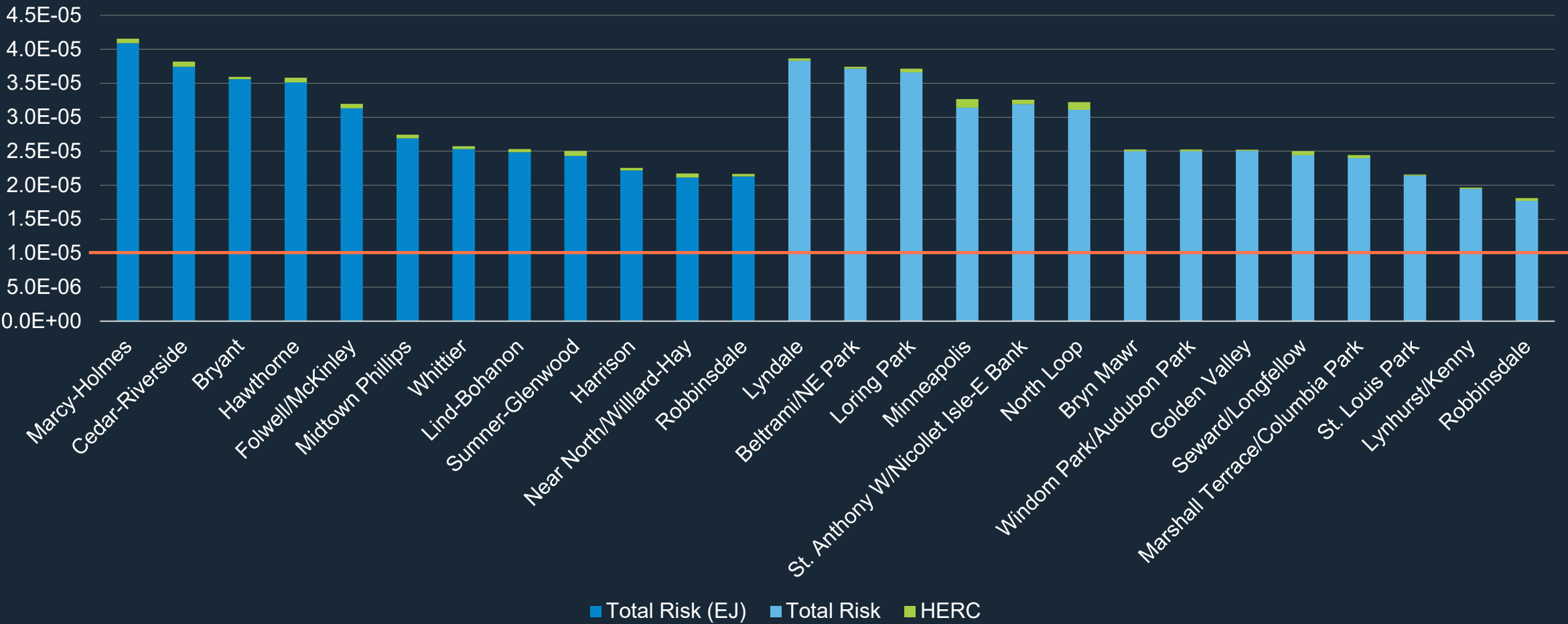
Risk Results for North Loop

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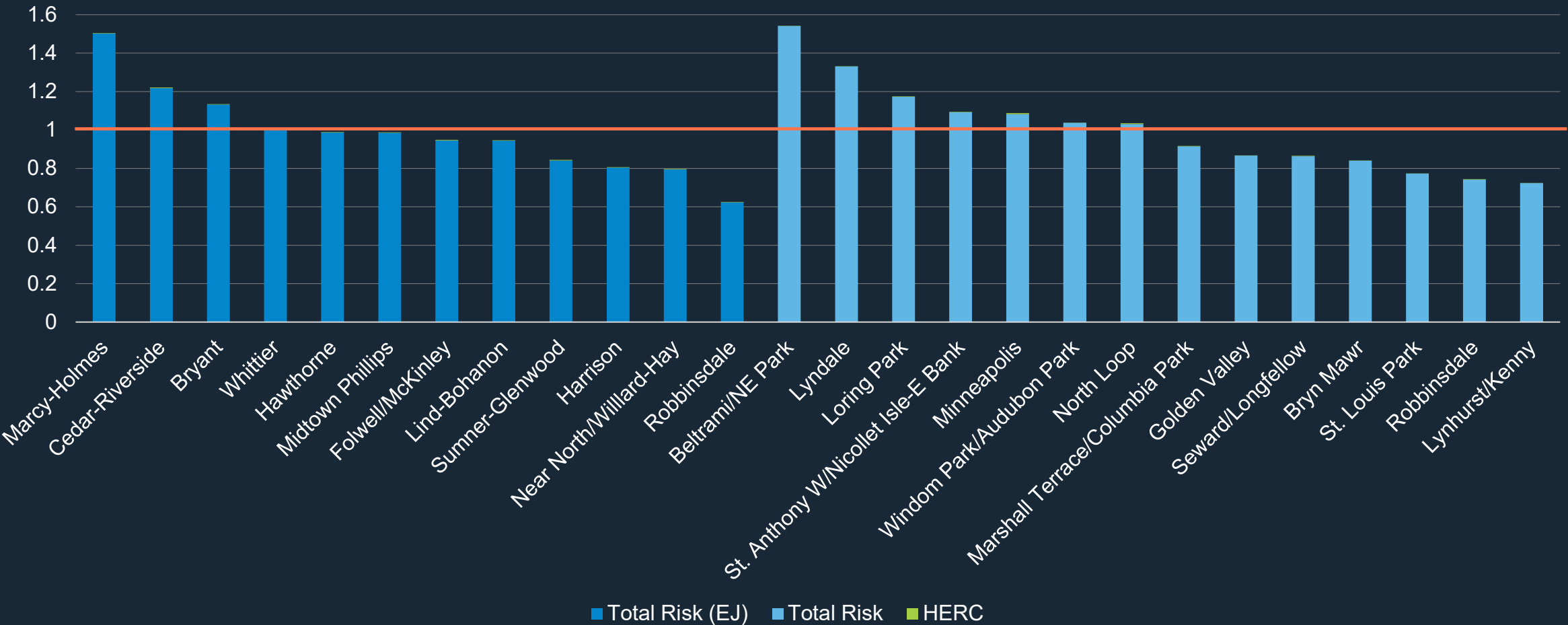


HERC Impacts Are Inconsequential to Total Cancer Risk Across All Tracts

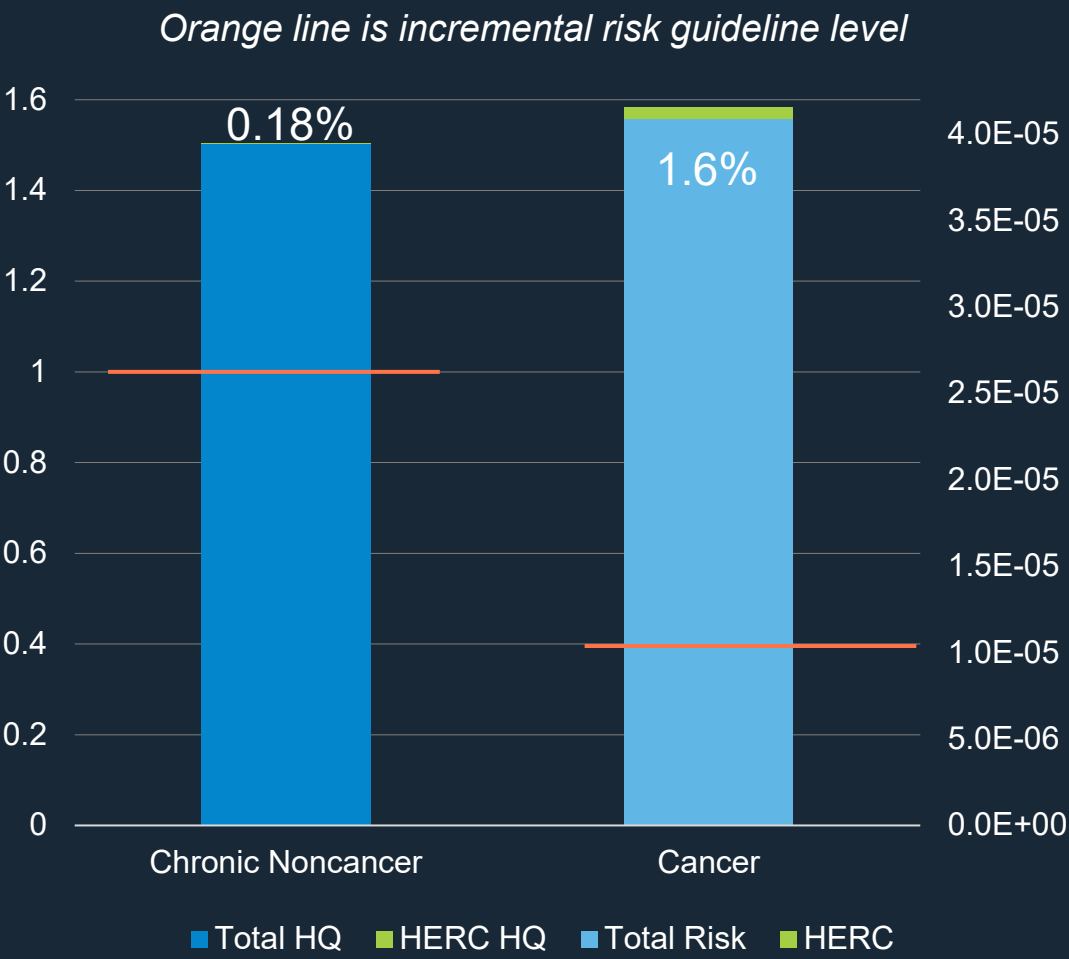
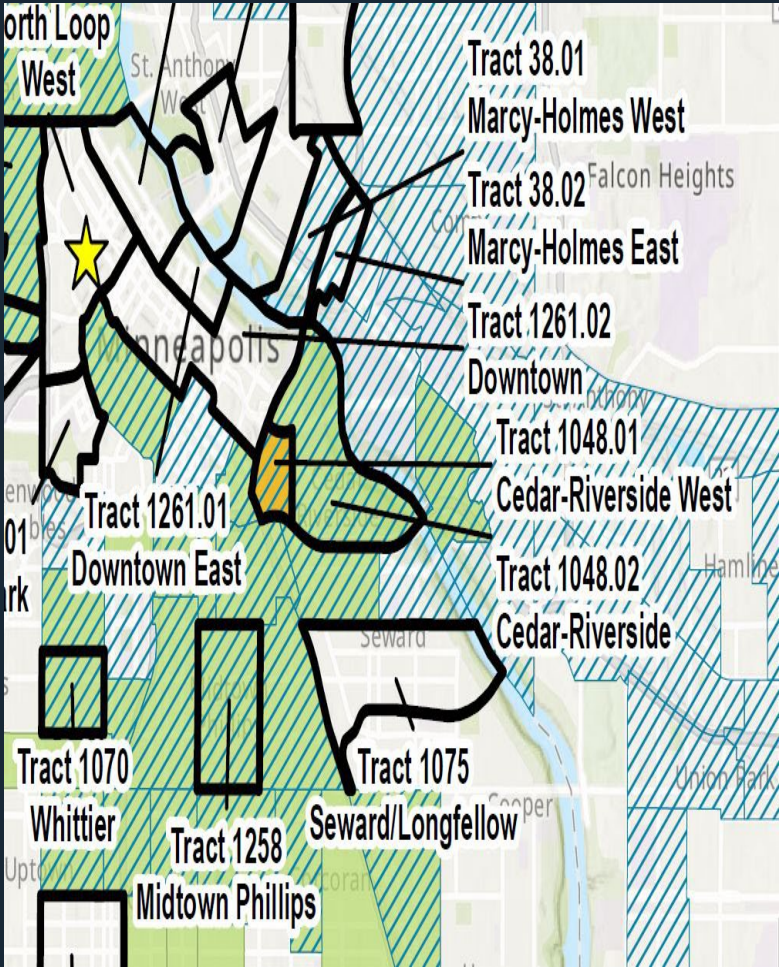
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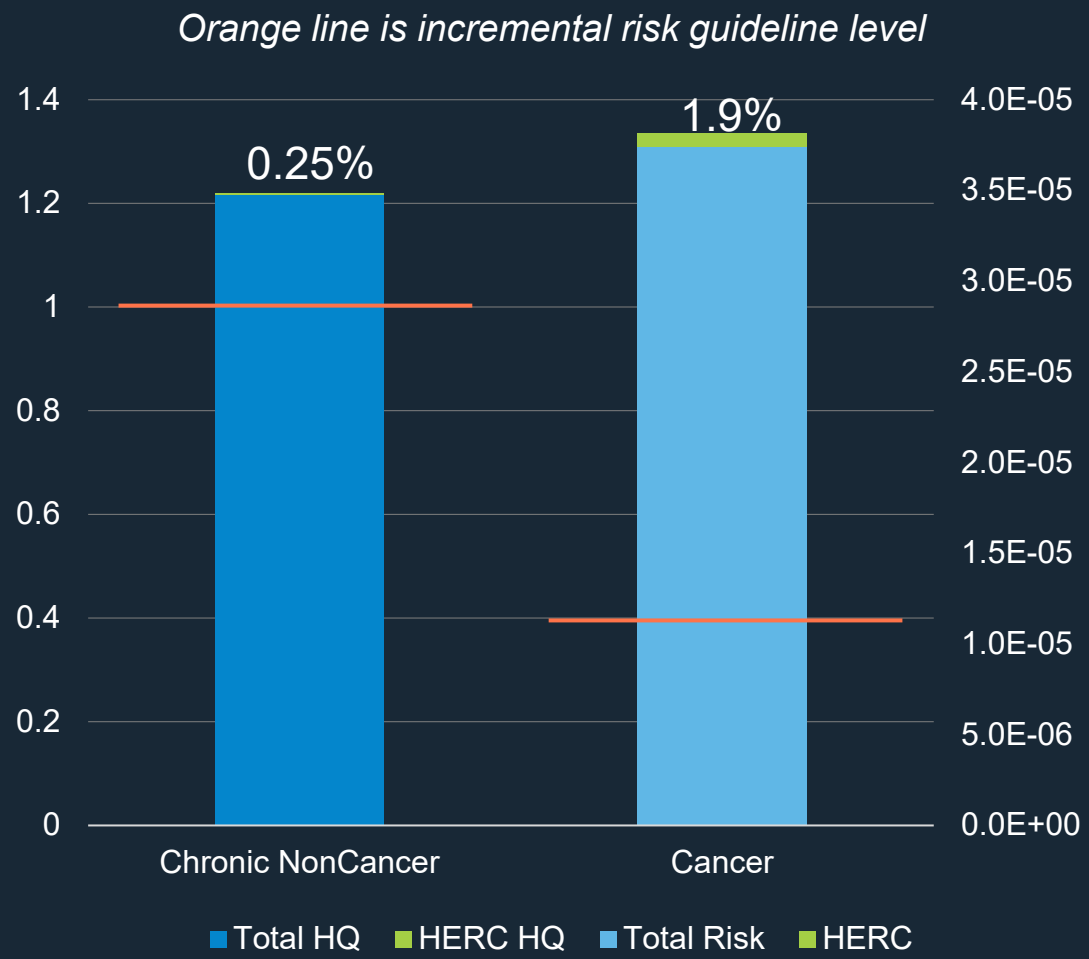
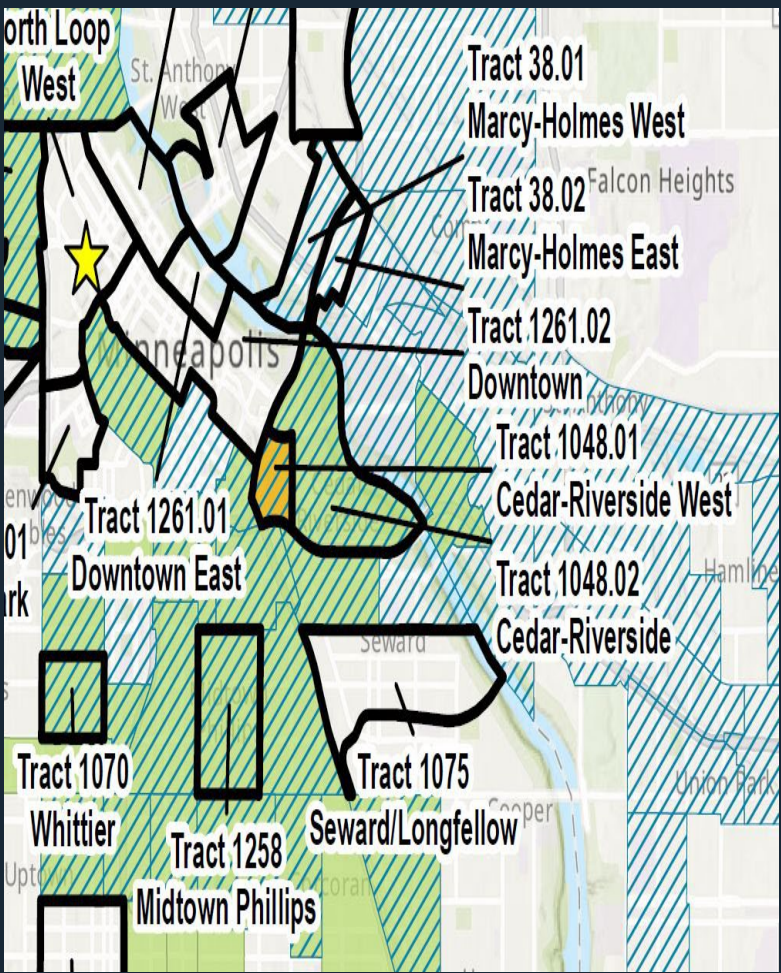
HERC Impacts Are Inconsequential to Total Noncancer Risk Across All Tracts



Risk Results for Marcy Holmes



Risk Results for Cedar Riverside

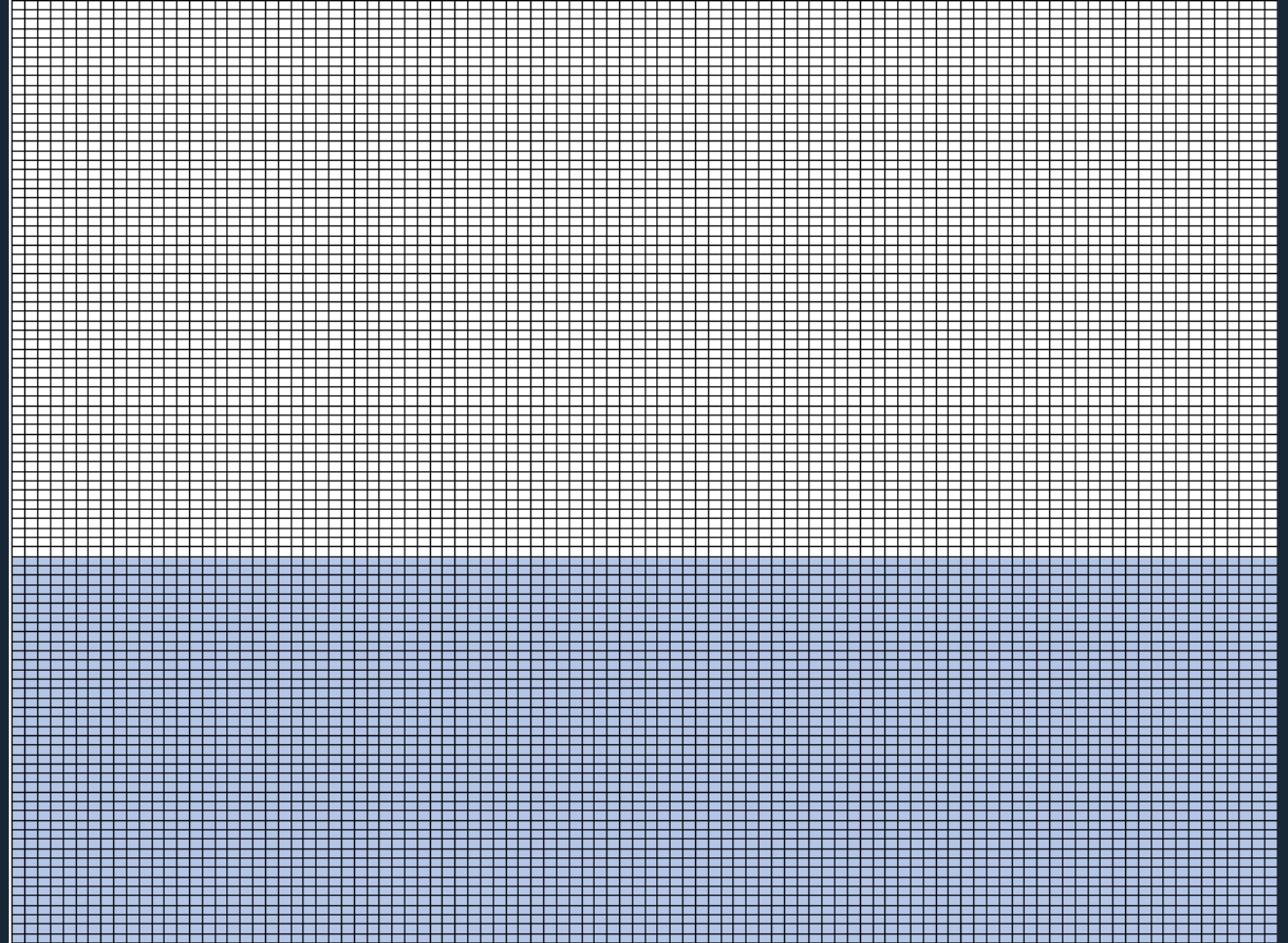


Background vs. Incremental Risk

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- Background is 41,000 in 100,000 (4.1 in 10)
- Incremental risk for individual facility cannot be above 1 in 100,000 (1.0×10^{-5})

10,000 squares; each square represents 10 people

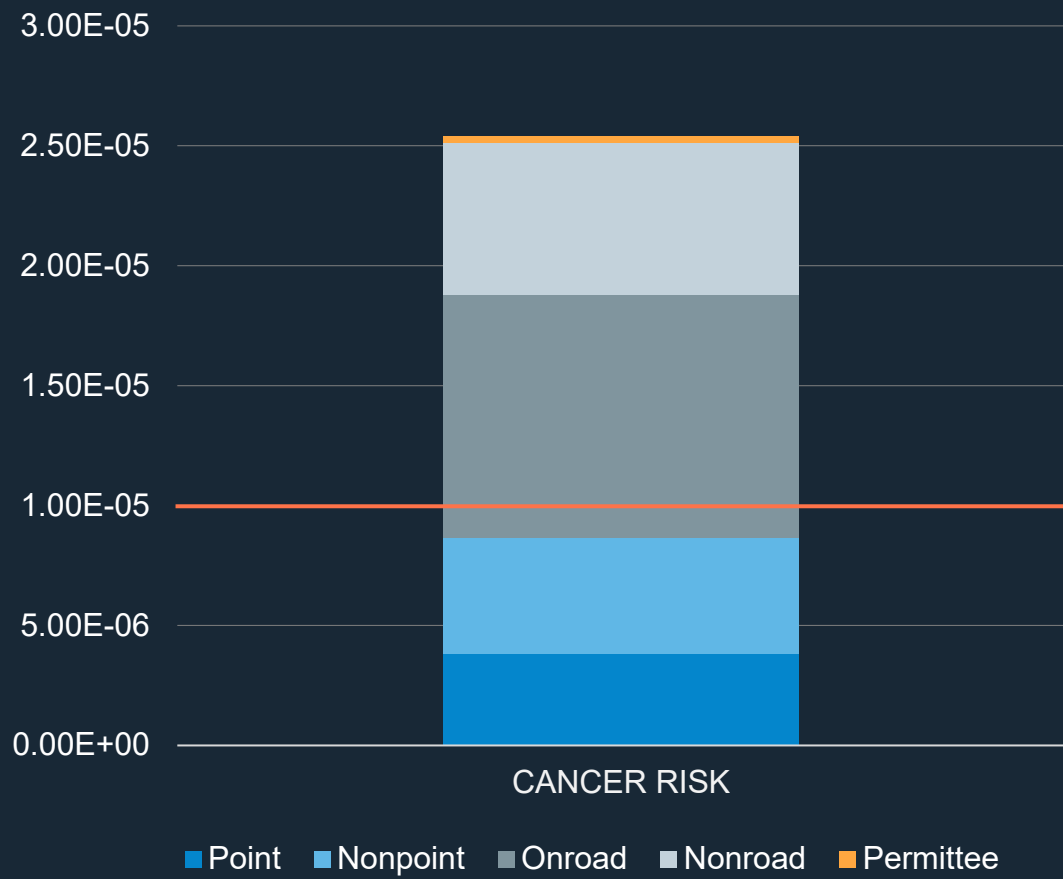


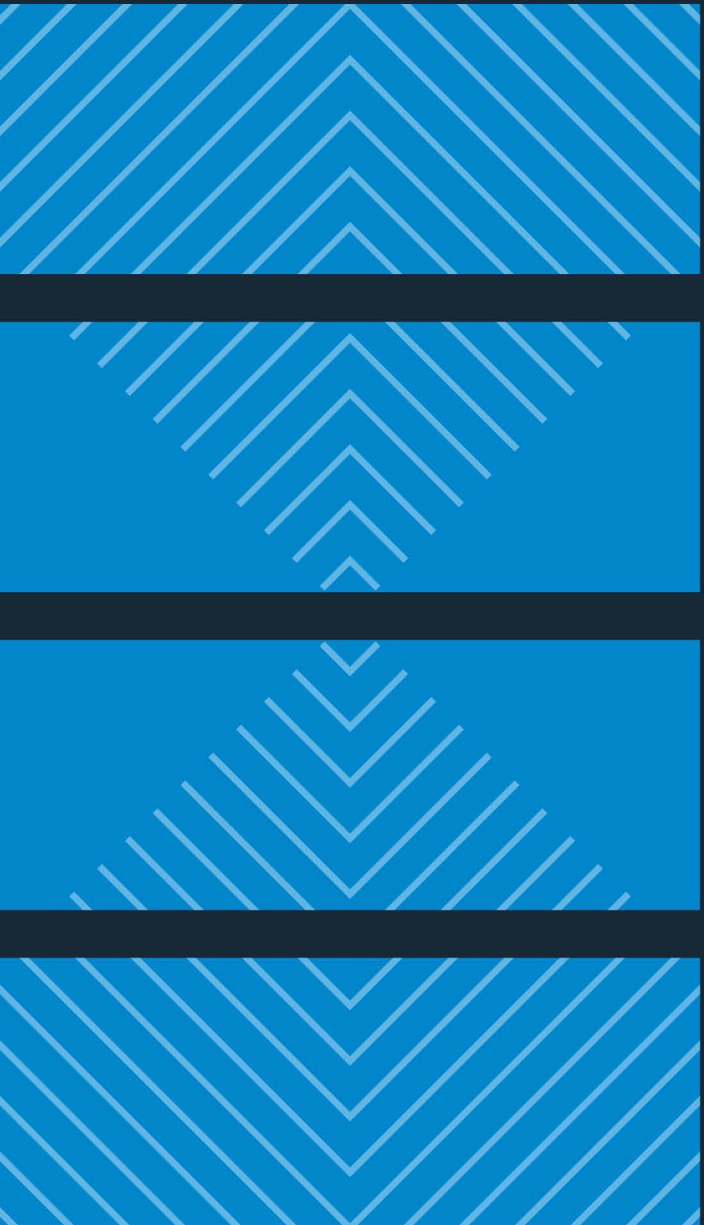
Implications for Cumulative Impacts Analysis



- Cumulative impacts analysis (CIA) in development
- Facility’s impacts plus all other air emission sources
- Will likely include socioeconomic stressors in assessment
- “Substantial adverse impact” has not been established (facility contribution to cumulative impact)
- MNRISK data offers starting point for CIA
 - Focused on seven-county metro, Duluth, and Rochester
 - Extracting permitted facilities’ contribution to total risk by census tract

Example: Culpability by Source Type





Special Thank You to Hennepin Co. and MPCA

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