

The Office of Air and Radiation

Environmental Justice Screening and Assessment

June 20, 2013

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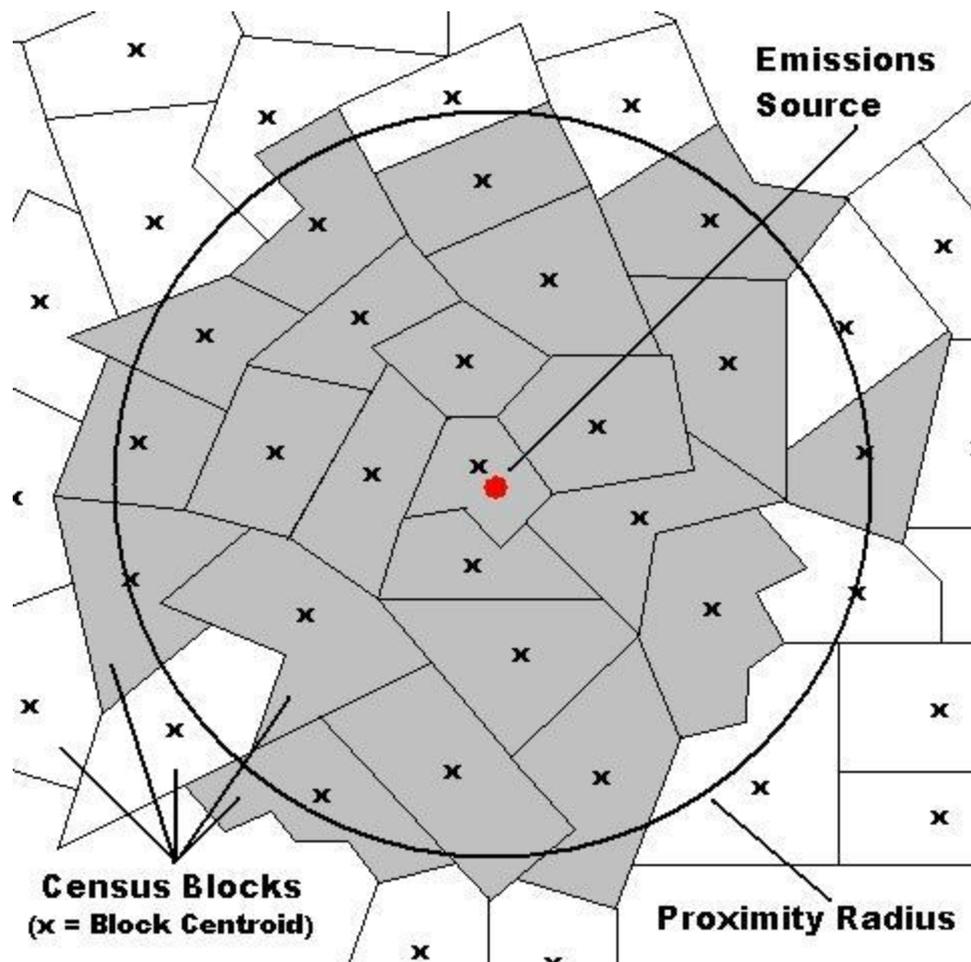
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Methods and Tools

- The OAQPS addresses EJ in rulemakings by using a variety of different methods and tools of varying degrees of sophistication, depending on the availability of information and the results of preliminary evaluations.
 1. Qualitative / Narrative Statements – Used when unable to quantify affected populations or impacts due to unknown or uncertain source locations, unclassifiable areas and/or impracticable etc.
 - Examples: Reciprocating Internal Combustion Engines (RICE), Grain Elevators
 2. Demographic Proximity Analyses – Identify populations and their socioeconomic makeup within a specified distance (i.e., 3 miles) to a facility with comparative analysis to the national averages.
 - Tools: EJView and EJSCREEN (ArcGIS based)
 - Examples: Polyvinyl Chloride (PVC), Pulp and Paper
 3. Risk Based Demographic Analyses – Identify the socioeconomic makeup of the population within different cancer and/or noncancer risk levels due to hazardous air pollutant exposures near the facilities subject to a specific NESHAP.
 - Examples: RTR analyses such as Chromium Electroplating, Secondary Lead, Wool Fiberglass
 4. Risk Characterization (NAAQS pollutants) – Identify populations susceptible and vulnerable to criteria air pollutant health impacts in the baseline; characterize the change in risk among these populations; approach first applied in the Detroit Multi-pollutant Pilot Project and subsequently received favorable peer review in the journal *Risk Analysis*; methods are generally consistent with those described by Joel Schwartz in his recent *American Journal of Public Health* articles.
 - Tools: [BenMAP](#) and [CMAQ](#)
 - Example: Detroit multi-pollutant pilot project; CSAPR, MATs

Demographic Proximity Analysis

- Goal: to compare demographics of populations near emissions sources to the demographics of the whole U.S.
- Census blocks - smallest areas for which demographics are available (about 50 people on average).
- Issue: Which census blocks are “near” emissions sources? (currently using 3 mile radius)
- General Strategy:
 - Choose a “proximity radius” within which nearby residents may be affected by local emissions sources.
 - Count “near source” populations in census blocks whose distance from one or more emissions sources is less than the proximity radius.
 - Determine the demographic composition (e.g., race, income, etc.) of these census blocks and compare them to the corresponding compositions nationally.

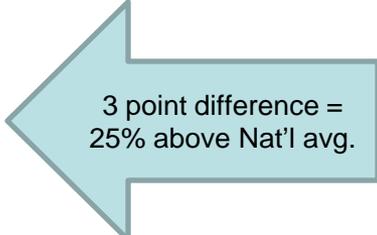


Example: Census blocks which would be counted in this proximity analysis are highlighted in grey

Pulp and Paper (Proximity Results)

The demographic data in the table below shows that while most demographic categories are below or within 10 percent of their corresponding national averages, the African American population percentage within 3 miles of any source affected by this rulemaking exceeds the national average by 3 percentage points (15 percent versus 12 percent), or +25 percent, and those age 65+ exceed the national average by 2 percentage points (14 percent versus 12 percent) or +17 percent.

Demographic Summary	Near Source Total	% of Near Source Total	National Total	% of National Total
Population	2,437,688		285,339,128	
White	1,929,157	79%	214,539,706	75%
African American	365,077	15%	35,043,873	12%
Native American	20,449	1%	2,489,515	1%
Other or Multiracial	123,005	5%	33,265,937	12%
Minority	508,531	21%	70,799,422	25%
Hispanic or Latino	78,804	3%	39,083,760	14%
Age 0-17	604,248	25%	77,245,364	27%
Age 65+	343,439	14%	35,491,274	12%
No High School Diploma	314,843	13%	36,660,464	13%
Below Poverty Line	353,183	14%	37,181,029	13%



3 point difference =
25% above Nat'l avg.

Residual Risk Decision Framework



Goals

- Limit Maximum Individual Risk (MIR) for cancer to no higher than about **100 in one million** (MIR is the person exposed to maximum lifetime HAP concentrations).
- Protect the greatest number of persons to less than **one in one million** lifetime cancer risk.

Step One

- Determine what additional emission standards are needed to achieve “acceptable risk” of approximately **100 in one million** cancer risk or less, including uncertainty and without consideration of costs.

Step Two

- Set standard to provide “ample margin of safety” considering all health information and all other relevant factors (including chronic noncancer risks, potential acute impacts of concern, costs/feasibility).

Risk and Technology Review (RTR)

Risk-based Demographic Analyses

- Identify the socioeconomic makeup of the population with significant cancer or noncancer risks due to HAP exposures near the facilities subject to a specific NESHAP (case by case basis).

Secondary lead smelting source category example:

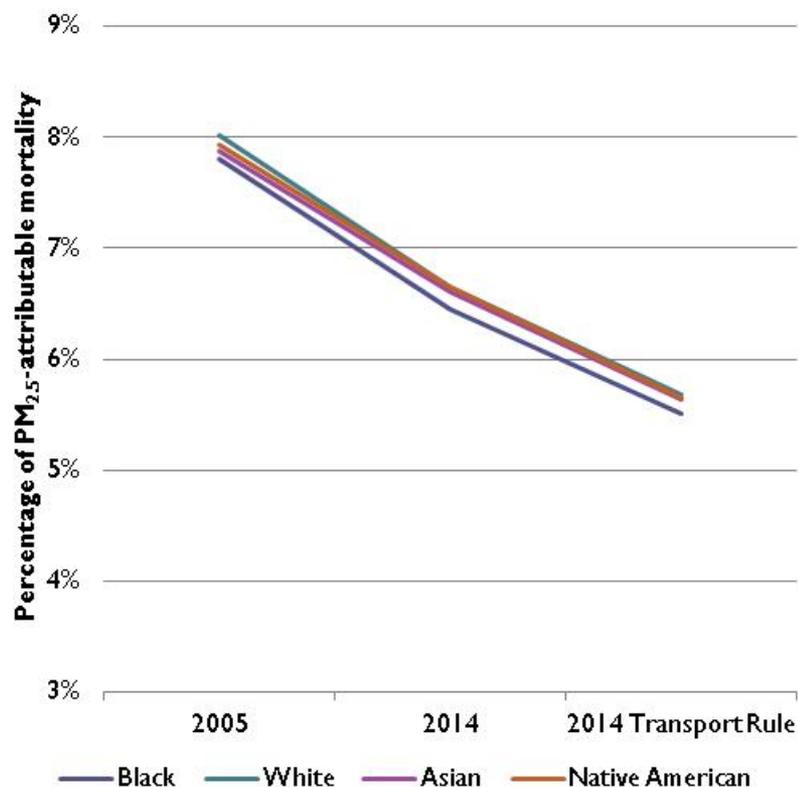
- Populations living around the 14 secondary lead smelters in the U.S. are a higher percent minority than the nation as a whole
- **Baseline cancer risks**
 - Of the 84,000 people currently exposed to cancer risks greater than one in a million from secondary lead smelting emissions, about 40% are minorities (the general minority population nationwide is about 25% of the total population)
 - Compared to the national population, this at-risk group is also a higher percent Hispanic *(56% versus 14%) and a higher percent below the poverty level (22% versus 13%)
- **Baseline noncancer risks**
 - The analysis estimates that 200 people live in areas near 3 secondary lead smelters that may currently experience ambient lead concentrations above the National Ambient Air Quality Standard (NAAQS)
 - However, only 7% of this group is comprised of minority populations
- **After implementation of the proposed controls:**
 - Proposed controls will result in nearly 60,000 fewer people exposed to cancer risks greater than one in a million and no one experiencing ambient levels above the NAAQS, thus providing benefits to a population which has a higher percent minorities than the national average

Characterizing Risk from NAAQS Pollutants

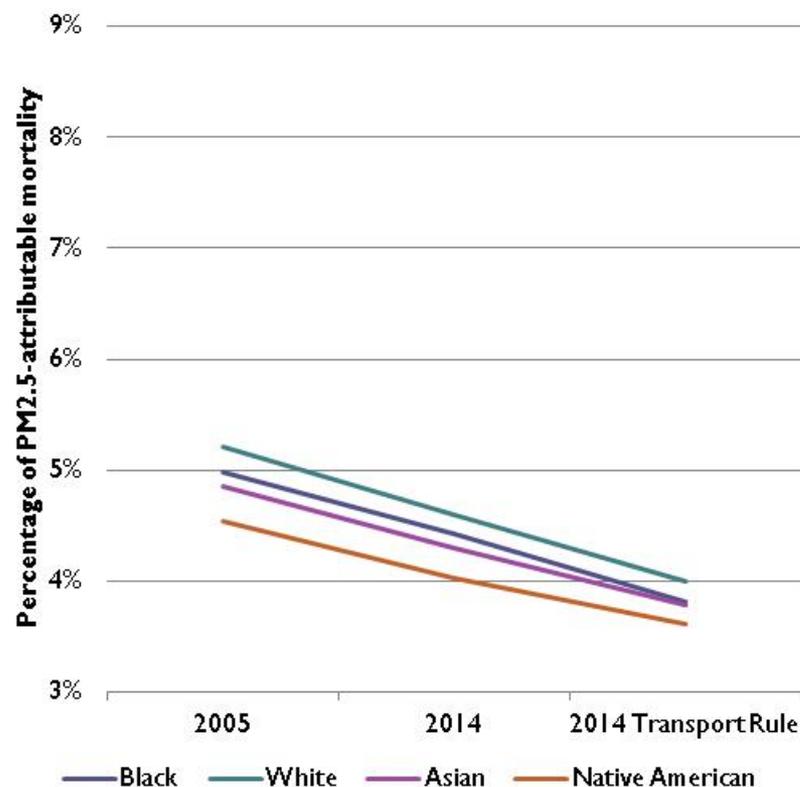
- National Ambient Air Quality Standards are set to protect public health, including the health of at-risk populations, with an adequate margin of safety.
 - Recent NAAQS reviews identified children, older adults, persons with pre-existing diseases and/or persons of lower social economic status (SES) as “at-risk” populations.
 - We use exposure factors and concentration-response functions that characterize risk among these specific populations, to the extent that relevant information is available.
- We can assess the health risks from criteria pollutants on susceptible and vulnerable populations in support of the NAAQS as well as those rules that help implement the NAAQS.
- For rules designed to help implement the NAAQS, EJ and distributional assessments generally try to answer two key questions:
 1. **What is the baseline distribution of air pollution risk by race, ethnicity and income?**
 2. **To what extent does the rule deliver air quality improvements among such populations?**

Example Criteria Pollutant Distributional Assessment: Cross-State Air Pollution Rule

Among populations living in counties at **greatest risk*** of air pollution



Among populations living in **all other** counties



→ The Cross-State Rule reduces the mortality burden the greatest among highly susceptible populations, irrespective of race

The Office of Transportation and Air Quality (OTAQ)

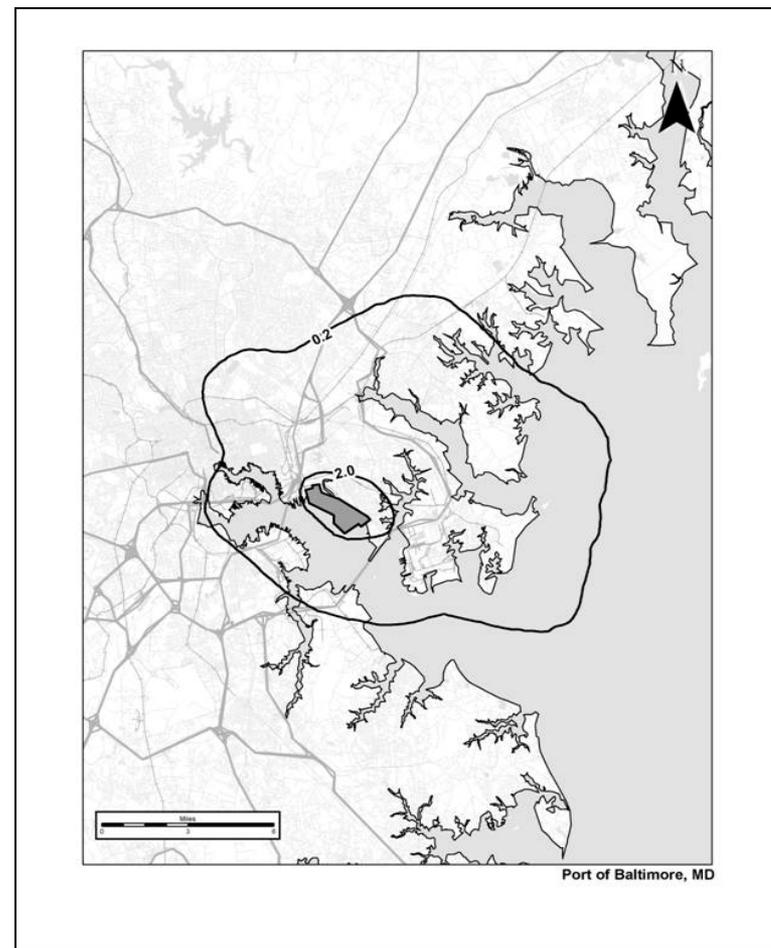
- Regulatory office establishing emission standards and certification for:
 - Motor vehicles
 - Nonroad engines
 - Locomotive, ship, and airplane engines
- OTAQ programs also include
 - Voluntary retrofit programs (National Clean Diesel Campaign)
 - SmartWay Transport Partnership recognition program for carriers and shippers that reduce emissions

Environmental Justice in the Office of Transportation and Air Quality (OTAQ)

- Over last 10-15 years, hundreds of health studies on near-road air pollution have been published.
- In the 2009 American Housing Survey, 17% of U.S. housing units were within 300 feet of a highway with 4 or more lanes, railroad, or airport.
 - Over 20 million homes
- Populations living near roads, rail yards, and marine ports, plus schools near major roads are disproportionately nonwhite and lower in income.

OTAQ Rulemaking Analysis Examples

- Literature reviews
- Statistical analyses using geographic information systems (GIS)
- Demographic analyses of U.S. government databases
 - 2000 and 2010 Census
 - American Housing Survey (Census Bureau)
 - Common Core of Data (Dept. of Ed.)
- Air quality modeling
 - Roadways
 - Rail yards
 - Ports (example shown)
 - Airports



Diesel PM Concentration Around Port of Baltimore, MD
Locomotive / Marine Rule Analysis