



Environmental Justice Analyses in EPA Air Quality Rulemakings

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Friday April 26, 2024

**Views expressed here are those of the presenter alone and do not necessarily
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Background

EPA defines environmental justice (EJ) as “*the **fair treatment and meaningful involvement** of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.*”

EPA further defines the term fair treatment to mean that no group of people should bear “***disproportionately high and adverse human health or environmental effects.***” †

Recent EO on EJ updates these definitions to “**just** treatment” and includes persons with disabilities and Tribal affiliations. ††

† Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

† † Executive Order 14096: Revitalizing Our Nation's Commitment to Environmental Justice for All

Introduction

As addressing environmental injustice is a priority, EJ analytic concerns* are carefully considered in the development of each rulemaking on a case-by-case basis.

EJ analytics are designed around three guiding questions**:

1. Are there potential EJ concerns associated with environmental stressors affected by the regulatory action for population groups of concern **in the baseline?**
2. Are there potential EJ concerns associated with environmental stressors affected by the regulatory action for population groups of concern **for the regulatory option(s) under consideration?**
3. For the regulatory option(s) under consideration, **are potential EJ concerns...exacerbated or mitigated compared to the baseline?**

*This talk focuses on quantitative assessments of EJ impacts, not outreach and/or engagement efforts

** [EPA Technical Guidance for Assessing EJ in Regulatory Analysis](#)

Environmental Justice (EJ) in OAQPS

Numerous recent and upcoming EPA rulemakings leveraging OAQPS EJ analytics

- Good Neighbor Plan (GNP), Mercury and Air Toxics Standards – Risk & Technology Review (MATS-RTR), EGU GHG Regulations (111(b) & (d)), HON, PM NAAQS, Oil & Gas, EtO/Sterilizers, etc.

EJ analytical tools, models, approaches

- Typically conduct air quality and risk/health analyses with our refined OAQPS tools/models to inform necessary EJ assessments
- Learn from each application to develop/improve our EJ analytics tools and capabilities

Relevance for the Inflation Reduction Act (IRA)

- The Climate and Economic Justice Screening Tool (CEJST) defines the starting point for IRA work in terms of defining low income and disadvantaged communities (LIDACs)
- Expect OAQPS tools/models to be applicable for EJ assessments under IRA

Overview of Types of EJ Analyses



0. Tribal Proximity Screen

- For outreach/engagement early in rulemaking process
- Includes tribal areas and limited demographics/indices
- Requires a preliminary facility list



1. Demographics Proximity Analyses

- Compares proportionality of potential EJ populations living nearby affected facilities
- Requires a more refined facility list with location information



2. Risk-Based Demographics Analyses of HAP Emissions

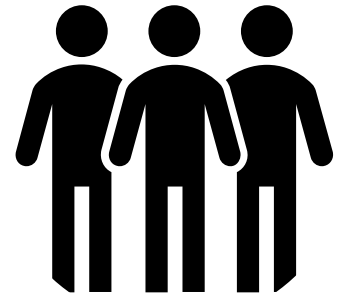
- Compares proportionality of potential EJ populations exposed to various risk-levels from hazardous air pollutants (HAP)
- Requires detailed location, emissions data, and modeling



3. PM_{2.5} and Ozone Exposure/Health Impact Analyses

- Compares PM_{2.5} and Ozone exposure/health impacts of potential EJ populations
- Requires air quality modeling surfaces and additional scientific support for health impact application

1. Demographics Proximity Analysis



- Demographics of total population living near facilities impacted by rule.
- Typically, within 5km and 50km from facilities; can look at any radius \leq 50km.
- Do for all types of air toxics rules if facility locations are known (Risk and Technology Reviews, Area Source rules, New Source Performance Standards, and Technology reviews)
- Look at % and size of population for each demographic and compare to National averages.
- Demographics currently evaluated:

Race/Ethnicity
<ul style="list-style-type: none">• White• Black• American Indian and Alaska Native Tribes• Hispanic/Latino• Other/Multiracial

Age
<ul style="list-style-type: none">• Children (0 – 17)• Adults (18 – 64)• Older Adults (65 and up)

Other
<ul style="list-style-type: none">• Over 25 without a High School Diploma• Below Poverty Level• Below 2x Poverty Level• Linguistic Isolation

2. Risk-Based Demographics Analyses of HAP Emissions



- Conducted for rules where risks are being evaluated (e.g., risk and technology reviews) or emissions concentrations are known/being modeled.
- Focus on demographics of populations exceeding specified cancer/noncancer risk or exposures within the specified radius. Examples:
 - % of population within 5 km of Facility A with a cancer risk \geq 1-in-1 million that is African American.
- Used to evaluate demographics most impacted by HAP emissions in the baseline population and how those impacts change as a result of the regulation.
- More data intensive. Typically requires facility location, emissions point locations, emissions quantities by HAP, and stack release data (e.g., stack height, diameter, flow rate, temperature, etc) in order to conduct air dispersion modeling.

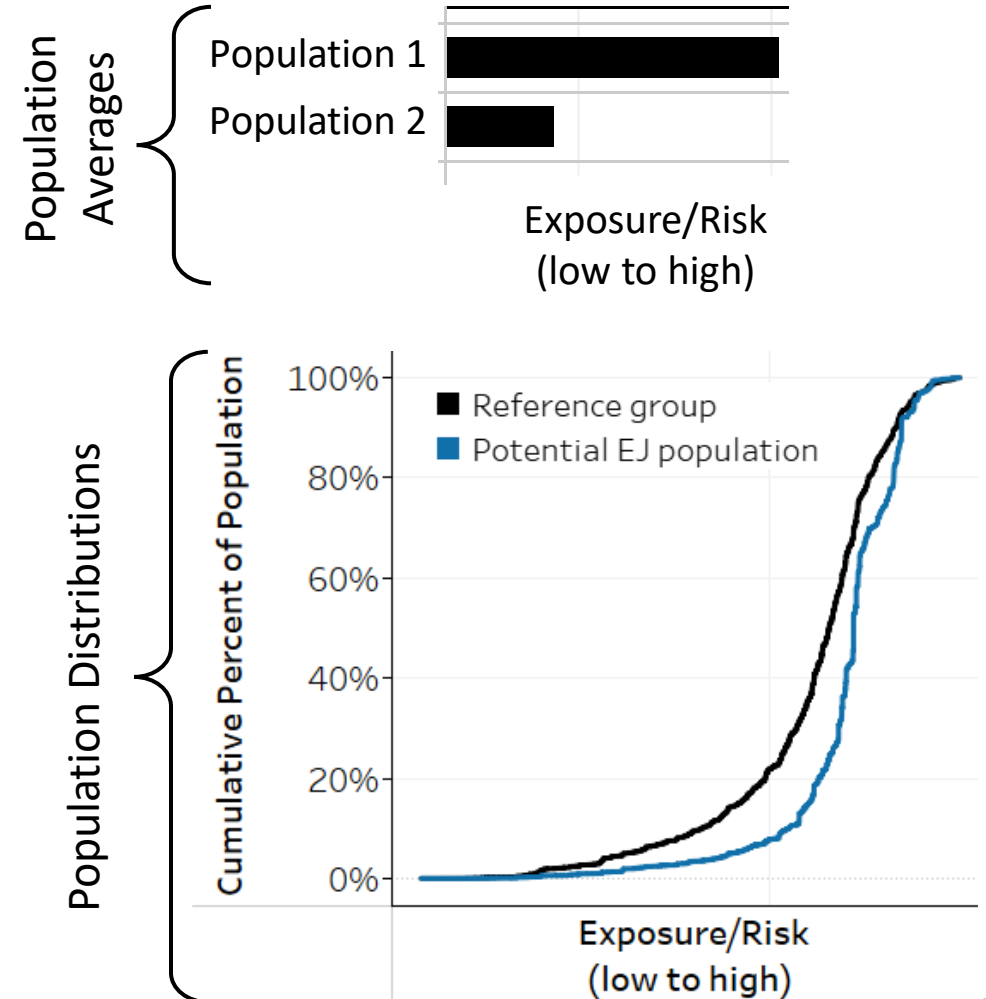
3. PM_{2.5} and Ozone Exposure/Health Impact Analyses



Description

- Can be done whenever modeled air quality surfaces are available
- Can be used to evaluate both pre-rule (i.e., baseline) and rule-specific population exposures/risks
- Can include mortality and/or morbidity health endpoints
- Demographics currently available include:
 - Race/ethnicity
 - Poverty status
 - Educational attainment
 - Employment status
 - Insurance status
 - Life Expectancy
 - Linguistic isolation
 - Historically Redlined Areas
 - Tribal Lands
 - Age
 - Sex

Examples



Examples

- Two examples of EJ analytics in recent significant air quality rulemaking packages (performed by an array of EPA analysts)
 - One of the earliest quantitative EJ analyses ([Oil & Gas](#))
 - Hazardous air pollutant/air toxic EJ analysis ([HON](#))

When considering each example:

We do our best with the data available to answer the 3 guiding questions for each pollutant of concern**:

1. Are there potential EJ concerns associated with environmental stressors affected by the regulatory action for population groups of concern **in the baseline?**
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** [EPA Technical Guidance for Assessing EJ in Regulatory Analysis](#)

Example 1: Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review (Oil & Gas Final)

Overview: Reduce methane and other harmful air pollution emissions, such as ozone from volatile organic compounds (VOCs), from both new and existing sources in the oil and natural gas industry. For the final rule, our air quality modelers were able to estimate nationwide ozone concentrations for the chosen policy option. This allowed us to answer Qs 1, 2 & 3 for criteria pollutants

EJ Analytics Responding to Q1:

- Quantitative **baseline** EJ analyses
 - Risk from oil and natural gas air toxic emissions
 - Ozone exposures from oil and natural gas VOC emissions
 - Oil and natural gas workers and communities
 - Potential household energy market impacts
- Qualitative discussion of EJ climate impacts

Additional EJ Analytics Responding to Q2:

- Quantitative **policy** EJ analyses
 - Ozone exposures from oil and natural gas VOC emissions due to the policy
- Additional EJ Analytics Responding to Q3:
- Quantitative **policy** EJ analyses
 - The percent change in Ozone exposures from oil and natural gas VOC emissions due to the policy compared to the baseline

Example 1: Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review (Oil & Gas Final)

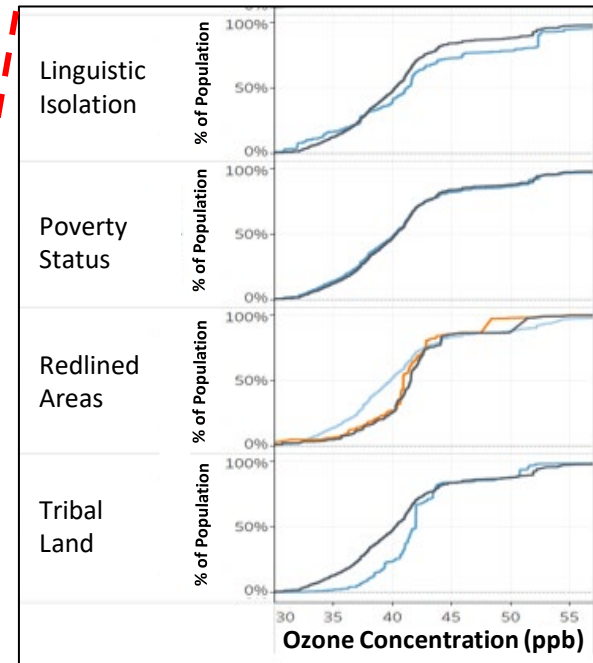
Cancer Risk and Demographic Population Estimates for 2017 NEI Nonpoint Emissions

	Risks \geq 100-in-1 million		
Number of Cells	36		
Total Population	38,885 (936 census blocks)		
		Nationwide	
	Population	%	%
Minority	13,268	34.1	39.9
African American	140	0.4	12.2
Native American	77	0.2	0.7
Other and Multiracial	1,443	3.7	8.2
Hispanic or Latino	11,608	29.9	18.8 *
Age 0-17	10,679	27.5	22.6 *
Age \geq 65	4,272	11	15.7
Below the Poverty Level	2,000	5.1	13.4
Over 25 Without a High School Diploma	2,788	7.2	12.1
Linguistically Isolated	808	2.1	5.4

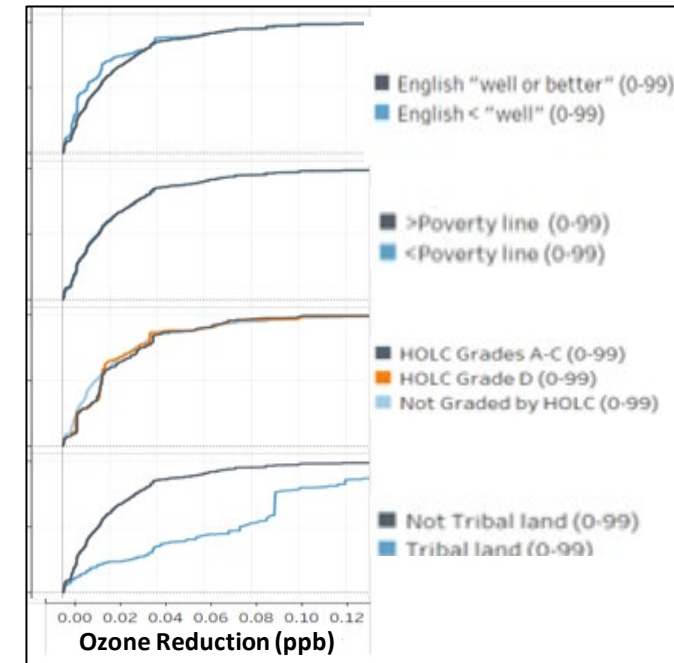
Example 1: Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review (Oil & Gas Final)

Population Groups	Populations (Ages)	2038		
		Baseline (ppb)	Absolute Reductions (ppb)	Percentage Reductions
Reference	Reference (0-99)	41.1	0.024	0.058
Race	American Indian (0-99)	43.1	0.030	0.070
	Asian (0-99)	42.0	0.019	0.045
	Black (0-99)	39.8	0.022	0.055
	White (0-99)	41.2	0.025	0.061
Ethnicity	Non-Hispanic (0-99)	40.5	0.024	0.059
	Hispanic (0-99)	42.8	0.024	0.056
Educational Attainment	More educated (>24)	40.9	0.024	0.059
	Less educated (>24)	41.5	0.023	0.055
Employment Status	Employed (0-99)	41.1	0.025	0.061
	Unemployed (0-99)	41.5	0.023	0.055
	Not in the labor force (0-99)	41.0	0.024	0.059
Insurance Status	Insured (0-64)	41.2	0.024	0.058
	Uninsured (0-64)	40.7	0.028	0.069
Life Expectancy	Top 75% (0-99)	41.3	0.023	0.056
	Bottom 25% (0-99)	40.1	0.028	0.070
	Life expectancy data unavailable (0-99)	41.3	0.026	0.063
Linguistic Isolation	English "well or better" (0-99)	41.0	0.024	0.059
	English < "well" (0-99)	42.3	0.021	0.050
Poverty Status	>Poverty line (0-99)	41.0	0.024	0.058
	<Poverty line (0-99)	41.1	0.024	0.058
Redlined Areas	HOLC Grades A-C (0-99)	42.0	0.025	0.060
	HOLC Grade D (0-99)	41.2	0.025	0.061
	Not Graded by HOLC (0-99)	40.9	0.024	0.059
Tribal Land	Not Tribal land (0-99)	41.0	0.024	0.058
	Tribal land (0-99)	42.5	0.069	0.162

Baseline Concentrations



Reductions due to Policy



Example 2: New Source Performance Standards for the Synthetic Organic Chemical Manufacturing Industry and National Emission Standards for Hazardous Air Pollutants for the Synthetic Organic Chemical Manufacturing Industry and Group I & II Polymers and Resins Industry (HON Proposal)

Rule Overview: Requires a number of hazardous air pollutants (HAP) and volatile organic compounds (VOC) emissions from chemical plants nationwide be monitored and limited, including ethylene oxide, chloroprene, and benzene.

EJ Analysis Responding to Q1, Q2, Q3:

- Demographic proximity analysis
- Baseline and post-control risk analysis, from the source category and facility-wide

Example 2: New Source Performance Standards for the Synthetic Organic Chemical Manufacturing Industry and National Emission Standards for Hazardous Air Pollutants for the Synthetic Organic Chemical Manufacturing Industry and Group I & II Polymers and Resins Industry (HON Proposal)

	REFERENCE	PROXIMITY
Demographic Group	Nationwide Average for Reference	Baseline Proximity Analysis for Pop. Living within 10 km
Total Population	328M	9.3M
Number of Facilities	-	195
Race and Ethnicity by Percent [number of people]		
White	60 percent [197M]	47 percent [4.4M]
African American	12 percent [40M]	25 percent [2.35M]
Native American	0.7 percent [2M]	0.2 percent [20K]
Hispanic or Latino (includes white and nonwhite)	19 percent [62M]	22 percent [2M]
Other and Multiracial	8 percent [27M]	5 percent [493K]

Example 2: New Source Performance Standards for the Synthetic Organic Chemical Manufacturing Industry and National Emission Standards for Hazardous Air Pollutants for the Synthetic Organic Chemical Manufacturing Industry and Group I & II Polymers and Resins Industry (HON Proposal)

	REFERENCE	PROXIMITY	RISK-BASED	
Demographic Group	Nationwide Average for Reference	Baseline Proximity Analysis for Pop. Living within 10 km	Cancer Risk >100-in-1 million within 10 km	
			Baseline	Post-Control
Total Population	328M	9.3M	87K	0
Number of Facilities	-	195	8	0
Race and Ethnicity by Percent [number of people]				
White	60 percent [197M]	47 percent [4.4M]	54 percent [47K]	- -
African American	12 percent [40M]	25 percent [2.35M]	15 percent [13K]	- -
Native American	0.7 percent [2M]	0.2 percent [20K]	0.2 percent [202]	- -
Hispanic or Latino (includes white and nonwhite)	19 percent [62M]	22 percent [2M]	25 percent [22K]	- -
Other and Multiracial	8 percent [27M]	5 percent [493K]	6 percent [5.5K]	- -

Summary and Future Directions

Summary

- Each rule is unique and EJ analyses must be tailored to each rule:
 - Does the rule impact air toxics, criteria pollutants, or both?
 - If air toxics, we should consider a cancer risk assessment
 - If criteria pollutants, we should consider an exposure and mortality health impact assessment
 - Does the rule apply broadly or to a finite list of facilities?
 - If finite, we can perform a proximity analysis to understand what subset of the population could be affected
- Questions like these guide our analyses

Improvements to the EJ process EPA is currently developing

- Adding "Persons with disabilities" as a demographic group
- Performing higher-resolution air quality modeling, when appropriate
- Continuing to collaborate within the Agency on EJ as the area evolves

Thank you

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