Environmental Justice Analysis for the 2008 Definition of Solid Waste Final Rule – Draft for Public Comment

Informational Presentation to the Science Advisory Board Environmental Justice Technical Guidance Review Panel

June 19, 2013

U.S. Environmental Protection Agency
Office of Resource Conservation and Recovery

Background

- Under the October 2008 Definition of Solid Waste (DSW) final rule certain hazardous secondary materials being recycled would no longer be regulated as hazardous waste, as long as certain conditions were met.

- The intended effect of the DSW rule was to encourage safe recycling of hazardous secondary material and answer long-standing questions about the RCRA definition of solid waste.

- Based on issues raised by Sierra Club and others regarding the protectiveness of the rule, particularly for low-income and minority communities, EPA committed to performing an expanded environmental justice analysis of the 2008 DSW rule.

- EPA held three public roundtable to discuss the methodology for the DSW EJ analysis; comments from these discussions have been addressed in the draft analysis.

DSW EJ Analysis Methodology

Step 1:
Hazard characterization

Step 2: Identification of potentially affected communities

Step 3: Demographics of potentially affected communities

Step 4: Identifying other factors that affect vulnerability in communities

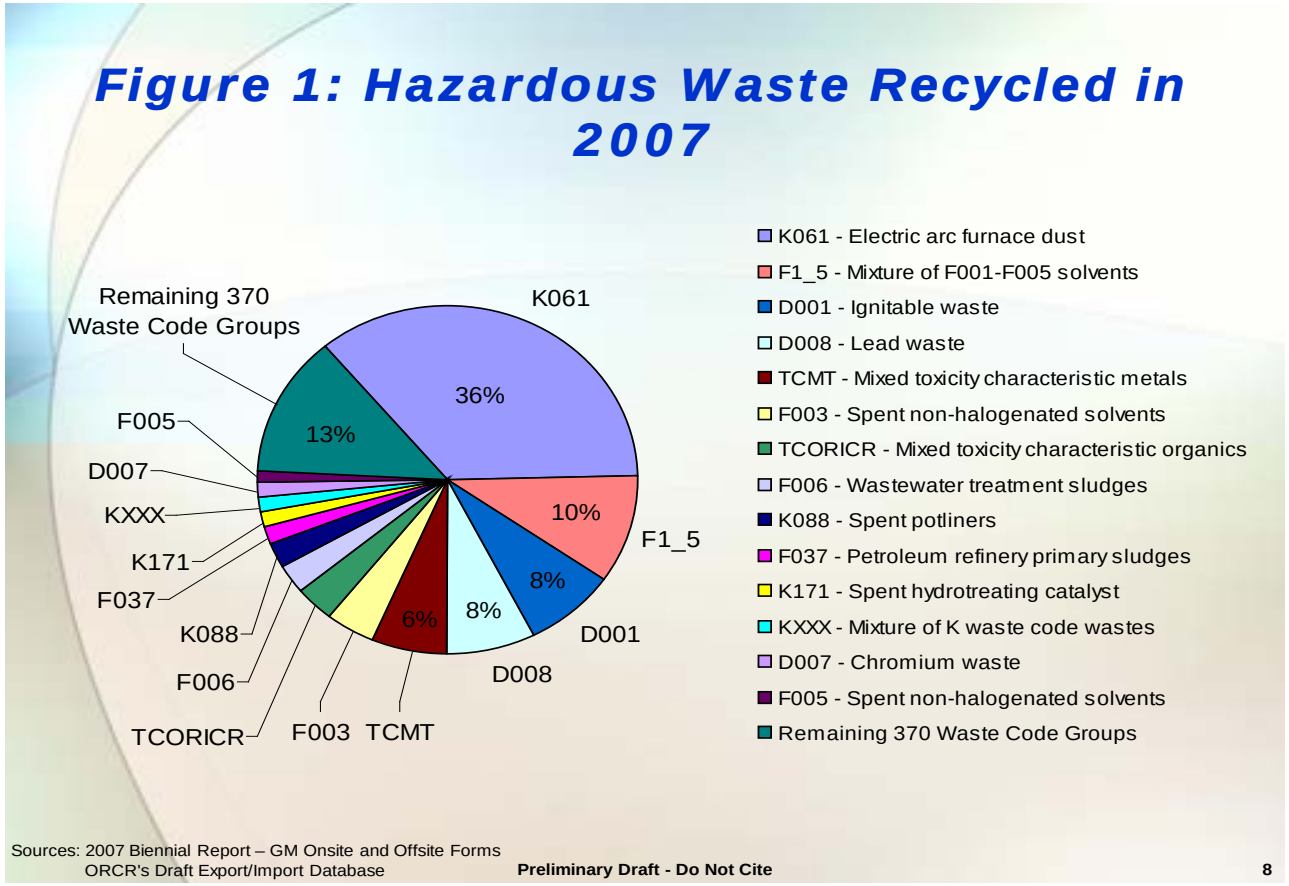
Step 5: Information synthesis: assessment of disproportional impact

Step 6: Identification of potential preventive and mitigation strategies

Goal: Use results of DSW EJ analysis to help develop proposed revisions to the 2008 DSW rule

Step 1: Hazard Characterization Identifying Potential Hazards

- The hazard characterization section includes a general discussion on types, quantities and properties of hazardous secondary materials that may be eligible for the 2008 DSW rule.



Step 1: Hazard Characterization Identifying Potential Hazards (cont'd)

- The report then includes a more in-depth analysis of the exposure routes and health effects of two representative hazardous secondary materials:
  - Spent solvents
  - Electric arc furnace dust
- Spent solvents were selected because of their prevalence in damage cases, the large amount of solvents currently recycled, and the potential hazards posed by solvents.
- Spent solvents also include a broad range of chemicals and associated hazards including both halogenated and nonhalogenated organic chemicals. In addition, spent solvent that is recycled typically presents particular management challenges associated with storage of liquids, and with control of volatile air emissions.

Step 1: Hazard Characterization
Identifying Potential Hazards(cont'd)

- Electric arc furnace dust (K061) was selected because it was the most commonly recycled material in 2007 and is very different from solvents, both physically and chemically. Together spent solvents and K061 capture a range of characteristics of hazardous secondary materials that are recycled.

- K061 is usually in a solid state and presents different management challenges than liquid solvents.

  – For example, K061 may be stored in waste piles, while solvents are generally stored in tanks or drums.

  – K061 is also often present as a dust, which presents hazards associated with wind-blown dust.

  – In addition, K061 contains metals, a class of potential contaminants that is generally considered to pose hazards different from organic chemicals found in solvents.

Step 1: Hazard Characterization Identifying Potential Hazards (cont'd)

- The report evaluates a range of potential hazards for both types of materials (fires/explosions, volatile organic air emissions, wind dispersal, soil/groundwater/surface water contamination).

- The environmental justice analysis then looks at how a shift from Subtitle C hazardous waste regulation to the DSW rule would affect the likelihood of these problems occurring under eight basic scenarios.

Step 1: Hazard Characterization
DSW scenarios

1. **Generator continues current recycling practices (under DSW rule).**

2. **Generator switches from off-site hazardous waste disposal to on-site reclamation under DSW rule.**

3. **Generator switches from off-site hazardous waste disposal to off-site recycling under the control of the generator (same company or tolling).**

4. **Generator switches from off-site hazardous waste disposal to off-site recycling at a RCRA-permitted facility.**

5. **Generator switches from off-site hazardous waste disposal to off-site recycling at a U.S. facility without a RCRA permit.**

6. **Generator switches from off-site hazardous waste disposal to exporting for recycling.**

7. **Generator switches from off-site recycling at a facility that immediately recycles and therefore does not need a RCRA permit to another type of recycling under DSW.**

8. **Generator switches from off-site recycling at a RCRA-permitted facility or exporting waste for recycling to another type of recycling under DSW.**

Step 1: Hazard Characterization
Regulatory Comparison

- For each of the eight scenarios, the report analyzes key differences in regulatory requirements for generators, transporters, and intermediate and reclamation facilities.

- These differences are then correlated to potential hazards identified earlier in the report for generators, transporters, and intermediate and reclamation facilities.

- Similarly, each of the eight scenarios are correlated to potential decreases in hazards (from reductions in transportation, incineration, landfilling, mining, and energy use) .

Step 1: Hazard Characterization Conclusions - Generators

- Under the 2008 DSW rule, generators could experience an increased risk of fires and explosions, soil and water contamination, increased air emissions, more hazardous residues, and abandoned material due to:
  - Longer accumulation times (all scenarios),
  - No explicit containment standards (all scenarios),
  - Potential drop in generator status (SQGs not subject to air emission standards, personnel training/contingency planning, more rigorous tank standards) (all scenarios),
  - No permit/public involvement for storage prior to reclamation (scenarios 1, 2, 8)
  - Potential increase of volatile emissions at the generating facility due to onsite recycling (scenarios 1, 2, 8), and
  - Breaking the “derived-from” rule, resulting in some reclamation residues no longer being subject to hazardous waste standards (scenarios 1, 2, 8).

Step 1: Hazard Characterization Conclusions - Transporters

- Under the 2008 DSW rule, transporters could see an increased risk of releases to the environment because some types of hazardous secondary materials would no longer qualify as a DOT hazardous material and would not be subject to hazardous material packaging, labeling, marking, placarding, parking, driving and tracking requirements or Reportable Quantity (RQ) requirements under 49 CFR Part 172 (scenarios 1, 3-8).

- However, communities could also see a reduction in accidents, pollution, traffic, and noise because of the shorter transportation distance under most of the scenarios (scenarios 2-8).

Step 1: Hazard Characterization
Conclusions – Intermediate and Reclamation Facilities

- Under the 2008 DSW rule, reclamation facilities could experience an increased risk of fires and explosions, soil and water contamination, increased air emissions, more hazardous residues, and more abandoned material due to
  - Shift from RCRA permitted facilities to unpermitted management (Scenarios 5, 6, 8)
  - No explicit containment standards (Scenarios 5, 6, 8)
  - No explicit air emissions standards (Scenarios 5, 6, 8)
  - Potential increase of volatile emissions due to recycling (Scenarios 2-7), and
  - Breaking the “derived-from” rule, resulting in some reclamation residues no longer being subject to hazardous waste standards. (Scenarios 1, and 4-8)
- However, one scenario would experience a decreased risk of releases to the environment and of abandoned material because hazardous secondary material would be diverted from unpermitted recyclers (excluded because of “no prior storage”) to DSW facilities that, at a minimum, meet the contained standard, have financial assurance and pass a reasonable efforts audit (Scenario 7).

Step 2: Identification

Of Potentially Affected Communities

- The DSW EJ analysis identifies the following as communities potentially affected by the 2008 DSW rule:

1. Communities around facilities that have notified EPA that they plan to operate under the DSW rule (40 facilities),

2. Communities around hazardous waste facilities which could accept hazardous secondary materials under the DSW rule plus hazardous waste generators that generate significant amounts of recyclable hazardous secondary materials (i.e., more than a standard truckload, 25 tons, a year) that could begin recycling onsite (~2,700 facilities), and

3. Communities around facilities in the damage case study (~218 facilities)

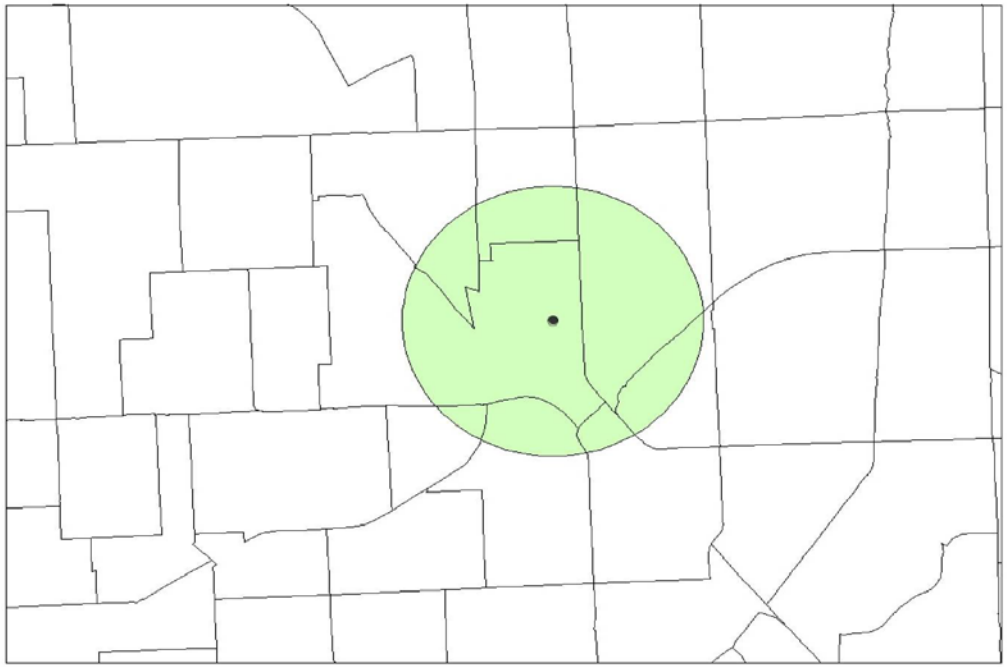
4. Current non-hazardous waste industrial recyclers that could easily expand to accept DSW materials (~25 facilities).

- Categories 3 and 4 represent communities around future new facilities that would reclaim hazardous secondary materials for the first time under the DSW rule.

Step 3: Demographics Of Potentially Affected Communities

- Under Step 3, EPA analyzed the demographics of the communities surrounding facilities that would potentially use the DSW rule using an "areal apportionment method."
  - Under this method (based on the work of Dr. Paul Mohai and Dr. Robin Saha), every census block area that is at least partially inside a specified distance (3 km radius, reflecting the area potentially impacted by an acute release of hazardous secondary material) was given weight in determining the characteristics of the potentially affected community.
  - For example, if 20% of a census block is captured by a circle around the facility with the specified radius, then 20% of its population will be used. The sum of these apportioned populations was then used to determine the characteristics of the potentially affected communities.

Example: Areal Apportionment Method



Example figure from Kearney and Kiros *International Journal of Health Geographics* 2009 **8**:33

Step 3: Demographics Of Potentially Affected Communities Preliminary Results

- The demographics of the potentially affected communities (including minority populations and populations below the poverty level) were evaluated at both the community level and the population level.
  - For the community level analysis, the question to be answered is whether the potentially affected communities have a disproportionately higher percentage of minority and/or low-income populations.
  - For the population level analysis, the question is whether the total population across all potentially affected communities is disproportionately minority and/or low-income.

Step 3: Demographics Of Potentially Affected Communities Preliminary Results (continued)

- For the community-level evaluation, a potential disproportionate impact is determined to be present if more than 50% of the potentially affected communities in a category have a higher minority and/or low-income population than the comparison group.

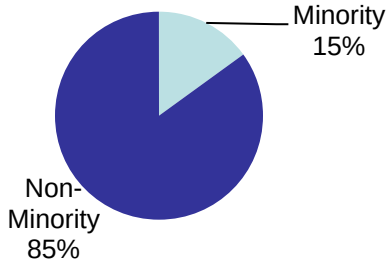
- For the population-level evaluation, a potential disproportionate impact is determined to be present if:

(1) The probability of an individual being in a low-income or minority population around a potentially affected facility is significantly higher than the probability of an individual not being in a group of concern (Affect PopulationThreshold Ratio > 1), or

(2) the probability of an individual being in a low-income or minority population within a 3-km radius around a potentially affected facility is significantly higher than the probability of an individual being in a low-income or minority population outside the 3-km radius around the potentially affected facility. (Demographic Ratio >1)

Simplified Explanation of Community Level Analysis vs. Population Level Analysis

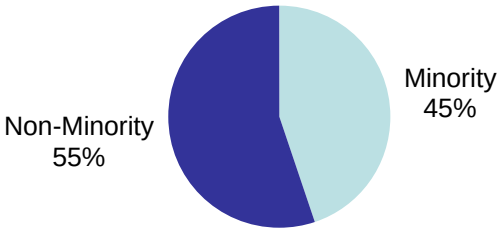
Community #1



Total Population = 40

6 minority, 34 non-minority

Community #2



Total Population = 3,625

1,625 minority, 2,000 non-minority

Comparison population = 30% minority

Community-Level Analysis: No disproportionate impact. 50% of the communities have a lower percentage than comparison population, 50% have a higher percentage, and average difference is 0%.

Population-Level Analysis: Potential disproportionate impact. Approximately 44.5% of the population in potentially affected areas is minority, as compared to 30% in the comparison population.

Step 3: Demographics Of Potentially Affected Communities Preliminary Results (continued)

- For both types of evaluations, the EJ analysis compared the potentially affected communities to both the national and state total populations.
  - The national-level comparison is intended to capture any regional disproportional effects (for example, if the potentially affected communities are all located in states with minority and/or low-income populations that are higher than the national average).
  - The state-level comparison is intended to capture any disproportional effects occurring within the state. (In most cases, the RCRA program is implemented by the state.)

Step 3: Demographics of potentially affected communities Preliminary Results (continued)

Community-Level Analysis of Potential Disproportionate Impacts of 2008 DSW Rule to Minority and Low-Income Communities *Highlighted Values Indicate Potential Disproportionate Impact*				
	National Comparison % communities with higher minority representation (average difference)	National Comparison % communities with higher low-income representation (average difference)	State Comparison % communities with higher minority representation (average difference)	State Comparison % communities with higher low-income representation (average difference)
Notification Facilities (40 total)	7.5% (-20.7%)	32.5% (-2.0%)	50.0% (IA) (3.1%) 20.0% (NJ) (-11.0%) 31.3% (PA) (-2.3%)	64.0% (IA) (1.7%) 0% (NJ) (-3.7%) 50% (PA) (2.6%)
Damage Case Facilities (217 total)	53% (8.2%)	65% (5.9%)	55.8% (8.2%)	69% (6.7%)
Hazardous Waste Facilities and Generators (2,677 total)	42% (0.9%)	48% (1.5%)	47.9% (4.0%)	50.6% (1.8%)
Non-Hazardous Industrial Waste Facilities (25 total)	36% (-5.0%)	40% (-0.5%)	36% (-2.55%)	44% (-0.3%)

Step 3: Demographics Of Potentially Affected Communities Preliminary Results (Continued)

Population-Level Analysis of Potential Disproportionate Impacts of 2008 DSW Rule to Minority and Low-Income Communities
Highlighted Values Indicate Potential Disproportionate Impact to Population of Concern
All Results Statistically Significant (p-value <0.05)

	National Comparison Minority Population Affected Population Ratio Demographic Ratio	National Comparison Low-Income Population Affected Population Ratio Demographic Ratio	State Comparison Minority Population Affected Population Ratio Demographic Ratio	State Comparison Low-Income Population Affected Population Ratio Demographic Ratio
Notification Facilities (40 total)	0.70 0.76	1.05 1.04	1.80 (IA) 1.76 (IA) 1.02 (NJ) 1.01 (NJ) 1.46 (PA) 1.47 (PA)	1.34 (IA) 1.32 (IA) 0.64 (NJ) 0.65 (NJ) 1.74 (PA) 1.63 (PA)
Damage Case Facilities (217 total)	2.87 1.86	1.98 1.80	2.59 1.64	2.04 1.90
Hazardous Waste Facilities (2,677 total)	1.90 1.80	1.39 1.50	1.94 2.04	1.47 1.83
Non-Hazardous Industrial Waste Facilities (25 total)	1.19 1.12	1.16 1.14	1.34 1.20	1.17 1.15

Step 3: Demographics Of Potentially Affected Communities Preliminary Results (Continued)

- For the community-level analysis, the only category of facilities that consistently appear to have potential disproportionate impacts at the community level are the facilities that have had environmental damages from recycling.

- However, the population-level analysis shows a greater incidence of potential disproportionate impact to minority and low-income populations, with the damage case facilities, the hazardous waste facilities and the non-hazardous waste facilities all consistently showing potential disproportionate impact.

- The differences between the two evaluations occur when the population of those communities that do have a greater percentage of minority or low-income individuals also have a significantly higher total population than those communities that do not.

Step 4: Identifying Other Factors That Affect Vulnerability In Communities

- In addition to considering the potential for the DSW rule to result in adverse impacts that disproportionately affect minority and low-income communities, the DSW EJ analysis also considers other factors that could affect the impacts of the rule.

- These factors are described under five broad categories:
  - Susceptible Populations
  - Multiple and Cumulative Effects
  - Unique Exposure Pathways
  - Ability to Participate in Decision-Making Process
  - Physical Infrastructure

- All of these factors have the potential to exacerbate the potential for adverse impacts to minority and low-income communities, but two of these factors are particularly relevant concern to the DSW rule:
  - Ability to Participate in Decision-Making Process
  - Multiple and Cumulative Effects

Step 4: Identifying Other Factors That Affect Vulnerability In Communities (continued)

Ability to Participate in Decision-Making Process

- The DSW rule, by removing the RCRA permitting requirement, also inadvertently removed the key provision allowing communities to participate in the regulatory process. Communities with lower participation levels may experience greater adverse impacts.

- This effect is most likely to occur in communities that have traditionally been excluded from the decision-making process.

Multiple and Cumulative Effects

- An examination of the facilities that have notified under the DSW rule shows that multiple environmental hazards are a potential concern for communities around the facilities.

- All have multiple facilities reporting to EPA, either under RCRA, the Clean Air Act (CAA), or Comprehensive Environmental Response, Compensation and Liability Act, (CERCLA - also known as Superfund) within a three kilometer radius of the facility.
  - In the most extreme case, one community included 380 RCRA facilities, 71 stationary CAA sources, and 3 CERCLA sites, all within a 3 kilometer radius.

Step 5: Information Synthesis

- **Finding 1: Hazardous Secondary Material Recycling Does Pose Significant Potential Hazards**
  - Hazardous secondary materials sent to recycling are physically and chemically identical to many of the hazardous wastes sent for disposal. The most commonly recycled hazardous secondary materials are spent solvents and electric arc furnace dust (which is recycled to reclaim metals).
  - These two classes of hazardous secondary materials can pose risk via a wide variety of exposure routes, and that risk can result in a range of potential adverse health effects, both cancer and non-cancer, and, particularly in the case of spent solvents, a potential for acute impacts such as fires and explosions.

- **Finding 2: Potential for Hazards From Hazardous Secondary Materials Recycling Adversely Impacting Human Health and the Environment Is Increased Under the 2008 DSW Rule**
  - A detailed comparative analysis of the regulatory requirements under the DSW rule and under the hazardous waste regulations reveals potentially significant gaps in environmental protection. Of particular concern are:
    - The absence of measures to prevent problems, such as weekly inspections, training, contingency plans, etc.
    - Incentives to accumulate larger volumes of hazardous secondary materials, and
    - The reduction in access to information and the opportunity for public participation.

Step 5: Information Synthesis (continued)

- **Finding 3: Many of the Communities Potentially Impacted by this Increase In Risk of Adverse Impacts are Minority and Low-Income Communities, and In Some Cases the Populations Potentially Impacted Are Disproportionately Minority and/or Low Income**
  - In particular, the population-level analysis shows a potential disproportionate impact to minority and low-income populations, with the damage case facilities, the hazardous waste facilities and the non-hazardous waste facilities all consistently showing statistically significant disproportionate representation in potentially affected communities.
- **Finding 4: Underlying Vulnerabilities Traditionally Associated with Minority and Low-Income Communities Pose the Potential to Exacerbate Potential Adverse Impacts of the DSW Rule**
  - Ability to participate in decision-making processes and multiple and cumulative effects are of particular concern.

Step 6: Identification of Preventative and Mitigative Strategies

- The fact that EPA identified potential adverse impacts from the 2008 DSW rule warrants investigation of possible ways to address those impacts.
  - EPA would investigate ways of addressing those impacts regardless of whether the adverse impacts disproportionately affect low-income and minority communities. However, the potential for disproportionate impacts could affect how strategies are communicated and implemented.
  - Any regulatory change must be done within the structure of EPA's authority to regulate discarded material.

Peer Review

- Peer review of the draft DSW environmental justice analysis was performed by an EPA contractor, following EPA's Peer Review Handbook.

- Three experts were selected who met identified criteria:
  - Knowledge, expertise, and experience with conducting environmental justice analyses,
  - Familiarity with RCRA and the DSW rule, and
  - Expertise in statistics.

- Peer reviewers were provided a peer review charge and worked independently over a four-week period to prepare individual written comments, which were compiled into a summary report.

Peer Review (continued)

- The reviewers said that the draft analysis adequately reviews, presents, analyzes, and summarizes the available data.
  - Based on the peer review, the EPA determined that the current analysis was adequate for the purpose of obtaining public comment.
- A copy of the peer review report and a discussion of EPA's approach to addressing peer review comments were published with the draft DSW EJ analysis as part of the 2011 DSW proposed rule.
- EPA solicited public comment on the Agency's response to peer review comments, include possible additional changes to the analysis, and on the draft DSW EJ analysis itself.
- EPA will address all the public comments on the DSW EJ analysis as part of the final DSW rule.