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Evaluating Public Hearing Testimony in the Context of a High-Risk Environmental Rulemaking: Does public hearing testimony provide the EPA with the information the agency requests in its proposed rulemaking?

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R.I.T.

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ABSTRACT

Does public hearing testimony provide the Environmental Protection Agency (EPA) with the information the agency requests in its proposed rulemaking? In one EPA proposed rulemaking, the agency requests public comment on approximately 140 topics specific to the proposed rulemaking. This analysis examines the testimony from two public hearings to see if the speakers provided any of the information the agency requested. Public hearings are used frequently in our democratic system and can vary substantially. The public hearings associated with a high-risk environmental proposed rulemaking are compared to characteristics that are common to public hearings in general. The public participation characteristics examined are aspects of representation and substantive involvement. The EPA's describes representation in the agency's public participation policies as the "various publics" that they seek to involve in public participation. Academic literature criticizes public hearings as non-substantive with content of minimal value. The EPA public hearing testimony was analyzed for each of these—Various Publics and Substantive content—to see how well the testimony compares to the expectation of the agency's own policies and to general academic benchmarks. Understanding what information these high-risk environmental public hearings provide, how the representation compares to the agency's own public participation policies, and how the public hearings compare to the general understanding of public hearings provides meaningful information about the value of these public hearings. This case study of the public hearing testimony expected the public not to provide the information the agency requested, based on a common impression of public hearings being legitimizing events without substantive participation. The expectation for representativeness was that any meaningful or substantive content would be provided by a dominant regulated community, based on another study of public participation proceedings involving a federal agency. The proposed rule has multiple regulatory options that the agency has requested comment on. The speakers testified a preference for which regulatory option they support. In this case, the proposed rulemaking was the EPA's Hazardous and Solid Waste Management System: Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities, 2009. The proposed rulemaking had three regulatory options. Each testimony includes the speakers "vote" toward their preferred final rule outcome. The speaker's vote for a regulatory option was compared to the outcome of the final ruling on December 19, 2015.

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DEFINITONS

Acronym	Definition
EPA	Environmental Protection Agency
CCW	Coal Combustion Waste
RCRA	Resource Conservation and Recovery Act 1976
CFR	Code of Federal Regulations
CCR	Coal Combustion Residue
C2P2	Coal Combustion Partnership Program
PAHs	Polycyclic aromatic hydrocarbons
VOCs	Volatile organic carbons
PCBs	Polychlorinated biphenyls
TDS	Total dissolved solids
DOE	Department of Energy
BLM	Bureau of Land Management
IAR	Information the Agency Requested

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INTRODUCTION

In 2010, the Environmental Protective Agency (EPA) held public hearings on a proposed rulemaking for coal combustion residue after the town of Kingston, Tennessee, became a household name on the national evening news. In December of 2008, the Tennessee Valley Authority's coal ash storage surface impoundment gave way, spilling an estimated 5.4 million cubic yards (Ray, 2009) or enough to flood more than 3,000 acres one foot deep[1] in coal ash. The coal ash flowed beyond the power plant's property and into a residential area, destroyed three homes, changed the local geography, and flowed into surface waters and then down the Emery River in Tennessee.

In recent decades, regulations have required coal combustion surface impoundments to be engineered for large volumes of coal ash with routine inspections for impoundment stability. In addition to the impoundment failure, another factor that makes this issue so newsworthy is that coal ash can be toxic and can contain a variety of elements, including arsenic, barium, cadmium, chromium, lead, mercury, and selenium. At certain concentrations, these elements have toxic effects (EPA, 1988).

While this disaster was due to the structural failure of the surface impoundment, it became a focusing event for policy discussions about the management of coal combustion ash and a potentially toxic waste stream. The policy complexities continue, since coal combustion wastes, or residuals, are also considered a byproduct and is used in construction, transportation, mining, abrasives, agriculture, and other industries.

In 2009, the EPA prepared a proposed rulemaking for the Disposal of Coal Combustion Residues from Electric Utilities (EPA, 2009). In the proposed rulemaking, the agency requested information from the public on approximately 140 specific topics. Government agencies, including the EPA, encourage public participation. The EPA has specific policies describing the purposes and goals of involving the public in making policy, such as EPA's 1981 Public Participation Policy and its 2003

[1]*New York Times*, December 26, 2008, "Tennessee Ash Flood Larger than Initial Estimate" by Shaila Dewan.

Public Involvement Policy of the U.S. Environmental Protection Agency (EPA, 2003). One of the purposes of these policies is to "to strengthen EPA's commitment to public participation and establish uniform procedures for participation by the public in EPA's decision-making process" (EPA, 1981, p. 29).

Public participation has played an important role in policy making and in a democratic governance; however, it is not without criticism. No longer is it sufficient for public participation to simply be fair and frequent. Today's public participation should be effective, collaborative, and substantive. Public hearings as a subset of public participation are criticized on many fronts as being legitimizing, ineffective, non-collaborative, too late in a rulemaking process to be of any meaningful contribution, non-representative of the affected parties, and unable to provide substantive content to agencies and or organizations.

Public participation evaluations have been designed to examine a multitude of participation characteristics, beginning with the public's ability to represent the potentially affected parties and to provide useful or substantive content. This study evaluates the public hearing testimony for the speakers' representativeness and ability to provide substantive content in the very specific context of a high-risk environmental proposed rulemaking, and compares the outcome to common expectations and understanding of public hearings. The main question of this study is, "Does public hearing testimony provide EPA with the information the agency requests in a proposed rulemaking?"

This evaluation is mainly designed to ask whether the speakers at EPA's public hearings on Coal Combustion Residue could provide the information that EPA's requests within the text of the Coal Combustion proposed rulemaking (EPA, 2010). In addition to the main question, this study examines the testimony for substantive comments outside the Information the Agency Requests in the proposed rule and examines the publics that provided testimony. These last two study criteria help with the comparison to other public hearing evaluations and public participation expectations.

LITERATURE REVIEW

Coal Combustion Wastes or Residuals

Proper management of coal combustion waste (CCW) has been an ongoing issue in the United States since the 1960's. The United States has multiple environmental regulations that address CCWs and the protection of the Earth's air, water, land, human health, and natural resource management. This analysis of EPA's regulations for CCW pertains only to the Resource Conservation and Recovery Act of 1976 (RCRA) regulations and the various amendments pertaining to CCW that have occurred since 1976.

CCWs are regulated under RCRA (1976) but, in 1984, were exempted from being a hazardous waste under the Hazardous and Solid Waste Amendments, including the Bevill Exemption (under 40 CFR 261.4(b)(7) by the addition of 3001(b)(3)(A)(ii)). The Bevill exemption of "waste from the combustion of coal"[2] placed the regulation of Coal Combustion Waste under RCRA Subtitle D as a solid waste. Subtitle C requirements "are those determined to protect human health and the environment from risks associated with improper waste management" (Lurther, 2013, p. 6). Note that only Subtitle C has transportation and storage regulations pertaining to CCW; Subtitle D is only for the disposal of the solid waste. The EPA's authority under Subtitle D is negligible, leaving the enforcement of the Subtitle D requirements for disposal to the states or at the civil level (Lurther, 2013). A reversal of the Bevill exemption would allow the EPA to regulate any CCW that meets the criteria of hazardous under Subtitle C, with "strict cradle-to-grave management" requirements (Lurther, 2013, p. 2).

In a May 2000, regulatory determination of wastes from the combustion of fossil fuels, "the Agency determined there were approximately 300 CCW landfills, and 300 CCW surface

[2]The Bevill wastes are in addition to "cement kiln dust, mining and mineral processing waste, and waste from the combustion of coal and other fossil fuels at electric utilities and industrial facilities" (Lurther, 2013).

impoundments used by 440 coal-fired utilities" (U.S. EPA, 2007, p. 7). The management of the coal combustion wastes is of interest in the United States in large part because of an estimated annual generation of 129 million tons of coal combustion waste. To put some perspective on this, one report states that this volume would "fill railroad cars on a train stretching from Washington to Melbourne, Australia,"[3] or enough to fill a million railroad cars (Public Integrity Organization, 2009). This makes CCW one of the largest industrial waste streams generated in the United States. The EPA reports that more than 470 coal-fired electric utilities burned over 800 million tons of coal, generating approximately 110 million tons of CCWs, in 47 states and Puerto Rico (EPA, last updated 2015).

Coal combustion residuals (CCR) is a term used to describe coal combustion wastes when the materials are considered more than a waste. Before the 2010 CCR proposed rulemaking, the EPA supported a material reuse program for coal combustion residuals that routed this waste stream to a variety of new applications where CCRs were used as a substitute material for other natural resources. The recycling applications include manufacturing Portland cement; constructing roads, dams, and buildings; beneficial uses in agriculture; use as an industrial abrasive; and several additional applications. The EPA had created a program to encourage Coal Combustion Products Partnership (C2P2) to promote responsible recycling of usable coal ash components. Considering the current controversy over the management of coal combustion residue, the Coal Combustion Partnership Program is no longer publicized by the EPA and only historical references to this program and the awards that were issued for reuse and recycling efforts are still readily available.

The American Coal Ash Association states that 39 percent of the 70 million tons of fly ash generated in 2003 was reused in other applications (EPA, p. 8). Most coal combustion residuals are either stockpiled indefinitely or disposed of in landfills. Coal Combustion Residuals include several materials from different parts of the combustion and pollution control processes that yield fly ash,

[3]*Report Calls on EPA to Ban Coal-Waste Storage in Mines* by Renee Schoff, January 16, 2009. http://www.commondreams.org/news/2009/01/16/report-calls-epa-ban-coal-waste-storage-mines.

bottom ash, and boiler slag. The 2004 recycle rates for bottom ash and boiler slag are "just under 50 percent" and "nearly 90 percent," respectively (DOE, 2004, p. 15).

Parallel to coal ash recycling efforts, the EPA recognizes that some storage of coal combustion waste has created environmental issues. The EPA acknowledged the existence of damage sites in a 2007 report on Coal Combustion Waste Damage Case Assessments, in which a review of 59 cases alleged damage to human health or the environment has been caused by toxins. The results of the EPA review identified 11 damages cases and 25 more cases that were classified as "potential" damages cases. The 11 damage sites reportedly had exceedances of selenium, sulfate, cadmium, chromium, zinc, arsenic, iron, manganese, boron, chloride, polycyclic aromatic hydrocarbons (PAHs), volatile organic carbons (VOCs), polychlorinated biphenyls (PCBs), and total dissolved solids (TDSs), as well as a low pH, which disrupts the aquatic habitats, resulting in impacts on plant and fish wildlife.

Seven years later, in a report from the Environmental Integrity Project, Earthjustice, and the Sierra Club, this investigation added 39 more damage sites to the 67 sites that the EPA was then aware of, for a total of 137 known damage sites. Of the known sites, 35 have groundwater monitoring wells that can test waters around coal combustion ash sites. The test results indicate arsenic and lead, with the arsenic levels above the "maximum contaminate level" under the drinking water standards at 74 percent of tested sites. One site's arsenic concentration was over 341 times the standard (Environmental Integrity Project, Earthjustice and Sierra Club, 2010). Coal Combustion Wastes containing toxic substances have been proven to exceed drinking water standards and caused long-term damage to ecosystems and aquatic species.

Not all coal combustion wastes are the same in either the form of material, material properties, or elements the ash can contain. Coal combustion wastes take on different forms depending on what part of the combustion process the materials are generated from, with the major types being fly ash from stack filters, bottom ash from the bottoms of boilers, and boiler slag from melted ash (EPA, Last updated 2015). In 2007, U.S. coal-fired power plants produced about 92 million tons of coal ash,

including 72 million tons of fly ash, 18 million tons of bottom ash, and 2 million tons of boiler slag (Electric Power Research Institute, 2009).

Modern coal combustion ash storage sites are carefully selected, considering "topographic mapping, site reconnaissance, an environmental inventory[,] and surface water and groundwater studies" (Electric Power Research Institute, 1998). These robust controls were in place for the decade from 1994–2004 when care about coal combustion ash sites had increased and was trending toward the storage of dry ash. Some coal combustion residuals had been and still are stored wet, with water that is either from the removal of the ash from a boiler or to aid in moving the ash from the boiler to a storage area.

The advantage of wet coal combustion ash is that it minimizes the ash dispersal in the form of dust. A disadvantage of wet coal combustion residuals is that many of the toxins from the ash are water-soluble, depending on the conditions, and can leach out of a storage area into surrounding soils and waters. The EPA/DOE report, Coal Combustion Waste Management at Landfills and Surface Impoundments 1994 to 2004, states that between 1985 and 1995, 70 percent of landfills and 60 percent of surface impoundments had liners installed. It was also recognized that the "protective qualities of the liner materials have improved over the past decade" (EPA and DOE, 2006, pp. S-6). This indicates that while more storage sites now have liners and the protective capability of the liners has improved, there was a time pre-1994 when was not the case.

The coal combustion residuals proposed rulemaking requests information from the public on the topics listed above and a few more. The summary of what the agency solicits comments on has 14 categories for which they have requested information from the public (EPA, 2009).

Public Hearings

Public hearings are America's "most traditional" method of participation (Checkoway, 1981, p. 566). This tradition is based on the beliefs that public hearings provide a participation forum for affected parties (King, Feltey, & Susel, 1998). In 1981, the EPA formalized public participation including public hearings in its rulemaking processes for internal usage and by any other government agencies that carry out EPA programs (EPA, 1981). This 1981 policy was later updated by EPA in 2003 (Public Involvement Policy of the U.S. Environmental Protection Agency, 2003). Further investigation into public hearings provides both a favorable and a critical view of what they offer to public participation and what they may offer to the organization that holds a public hearing.

No longer is it sufficient for public participation to simply be fair and frequent. Today's public participation is encouraged to be effective, collaborative, and substantive. Public hearings as a subset of public participation are criticized on many fronts as being legitimizing, ineffective, non-collaborative, too late in a rulemaking process to be of any meaningful contribution, non-representative of the affected parties, and unable to provide substantive content to agencies and or organizations. Public participation has changed over time and continues today.

Public participation is evolving towards the goal of consistent and comparable evaluations. Researchers have encouraged studies to provide more context to public hearing evaluations (Rowe & Frewer, Public Participation Methods: A Framework for Evaluation, 2000). Context is developed by describing the public hearing setting; in this case, a U.S. governmental agency's high-risk environmental proposed rulemaking. Context is also developed in this study's design by using criteria that improve the comparison with existing studies and/or expectations of public participation, such as how substantive was the information provided or how representative was the participation. Public hearing evaluations that include representation and substantive content contribute towards a common ground for comparative evaluations.

As Rowe and Fewer continue to discuss public participation studies and evaluations, they make several statements about representativeness; that an exercise (or study) having unrepresentative participation would indicate a poorly run exercise and, in their observations, representativeness "has been stipulated in one form or another in many of the evaluations" (Rowe & Frewer, Evaluating public-participation exercises: A research agenda, 2004, p. 30). Getting representation in public policy is needed to meet the goals of public participation from potentially affected parties (EPA, 2003) and from those that may have knowledge of the topic or, as Rowe and Frewer put it, "representativeness is important if one genuinely wishes to gauge the opinions of the general public" (Rowe & Frewer, Public Participation Methods: A Framework for Evaluation, 2000, p. 13). Having representation is important to the perception of fairness (Halvorsen, Assessing the effects of public participation, 2003) and it can be essential to effective decision making.

Having a good public participation representation provides a public cross section needed to give each of those affected an opportunity to add to the knowledge. A breath of knowledge that could bring more parties to the decision-making process. Not all knowledge is considered useful by government agencies and other organizations. For example, the Bureau of Land Management (BLM) is required by regulation to respond to all substantive comments and not required to respond to non-substantive comments. Therefore, the agency has criteria to determine if comments are substantive or non-substantive.

Substantive comments are those that, within a "reasonable basis", either question the accuracy of the information or the adequacy of, methodology for or assumptions used for the environmental analysis. Substantive comments also present new information relevant to the analysis or reasonable alternatives. The substantive comments could also cause changes or revisions in one or more of the alternatives (Bureau of Land Management, 2008, p. 66). Agencies prefer substantive public participation that has a specific actionable input. Another participation that is valuable is "someone

proposing some option or something we hadn't considered" (Yao, 2006, p. 61). Comparatively non-substantive content discusses values and rights, which are not specifically actionable.

Non-substantive testimony covers that which includes "personal values or opinions … preference" (Bureau of Land Management, Unknown, p. 2). Other comments that are considered non-substantive include "comments in favor of or against the proposed action or alternatives without reasoning that meet the criteria [of substantive]" (Bureau of Land Management, 2008, p. 66). BLM managers are frustrated "about a growing volume of nonsubstantive comments online" even though they do take them in account. The BLM employees describe themselves as "reflect[ing] pretty well the American public." However, their non-substantive interests and biases should be pushed away "When you're doing an analysis, you've got to be really careful about getting away from those biases" (Yao, 2006, p. 68). Agencies want actionable items based on hard data and experience. As citizens, we want public participation forums where our opinion and values can be expressed and certainly so at any time when our fundamental rights may be compromised.

Public hearings have been evaluated over several years using study-specific criteria, leaving the overall evaluation process without standard criteria to provide some common matching characteristics. The lack of standard criteria evolved, in large part, because there are many types of public hearings and no common list of desirable features. Each of these different public hearings has been analyzed for features that were desirable to the organizations funding the evaluations. The criteria evaluated across public hearings vary significantly enough that it is difficult to make comparisons with other examples of public hearings (Abelson & Gauvin, 2006).

Substantive participation is commonly described in public participation research and evaluation as being a desirable feature. The main question in this study is, "Does the public hearing testimony provide EPA with the information the agency requests in the proposed rulemaking?" In addition to this new research question, the additional contextual analysis will help provide some comparison to other public participation studies and a better understanding of EPA public hearing testimony. The public

hearing testimony is evaluated in the context of high-risk environmental rulemaking. It is also a unique situation where the proposed ruling presents three regulatory options. This allows for the analysis to see which alternative the various publics select "from the alternatives considered" (EPA, 2003, p. 8).

Favorable Public Participation/Hearings

Public participation brings public ideas and expertise forward, allowing the government to make policies based on "information that is widely dispersed in Society" (Lukensmeyer, Goldman, & Stern, 2011, p. 12). The public participation process can provide an exchange of knowledge between agencies and non-governmental organizations and the general citizenry. The knowledge exchange increases the "community empowerment, and capacity-building, or fostering social goals" (Laurian & Shaw, 2009, p. 293).

Citizens want to protect their own rights or "basic human rights regarding democracy and procedural justice" (Rowe & Frewer, Public Participation Methods: A Framework for Evaluation, 2000, p. 5). Perhaps integral to that, citizens are concerned with establishing rights and responsibilities over the use of common natural resources (such as air, soil, water, and biodiversity). Citizen participation should not be understated in environmental rulemaking "to provide checks and balances on administrative government and to improve the quality of decisions" (Prizzia, 2005, p. 3). The drive to protect one's own rights prompts some to advocate for the rights of others that cannot advocate for themselves. This provides participation from citizens that may not be typically represented.

Criticism of Public Participations/Hearings

Public participation to collect knowledge and opinions from the citizens has been criticized for decades. The hearings are also viewed as key social mechanisms for "legitimating risky economic activities and isolating risks from the authority of government" (Topal, 2009, p. 280). Through these criticisms and to continuously improve public participation, many different forms of public

participation have been created. In the mid-1990s, Creighton, Thomas, and others discussed the multiple forms of public participation, including public hearings. While there are enough criticisms of public participation to go around, public hearings have, on their own, evoked criticisms (Halvorsen, Critical Next Steps in Research on Public Meetings and Environmental Decision Making, 2006). Research shows that public hearing participation falls short as "a way for citizens to express their views and influence policies and plans of governmental agencies" (Checkoway, 1981, p. 567). Public hearings have been considered a token attempt at real public participation and a way to include the public and provide the appearance of public involvement, a legitimizing activity of a democratic society (Topal, 2009).

It is possible to take public hearing participation one step further into the field of risk management and environmental law, where public hearings "have proved inadequate to effectively meet the challenge of constructively involving the public" (Prizzia, 2005, p. 7). Public hearings have been criticized when evaluations have indicated that an outcome was less than a goal or a vision. Evaluations of public hearings are developing over time.

Continuous Improvement

"Despite considerable attention given to public participation ... the field of participation evaluation lags behind" (Laurian & Shaw, 2009, p. 294). Published evaluations of participation are scarce and tend to rely on few case studies. Planning professionals and academics lack definitions and criteria for success in participation, as well as methods to assess the participatory process. "It is[,] thus, difficult to compare findings over time or across settings and to propose ways to improve participation" (Laurian & Shaw, 2009, p. 294).

The goal to continuously improve public participation requires that some common criteria be developed to guide best management practices and other improvement processes. Along with common

criteria, the evaluation of public participation needs common definitions of terms and criteria. “Unless there is a clear definition of what it means for a participation exercise to be effective, there will be no theoretical benchmark against which performance may be assessed” (Abelson & Gauvin, 2006, p. 7).

Public participation will evolve through the cycles of evaluations. Criticisms lead to learnings that can be integrated into the next generation of evaluation questions and criteria. The knowledge developed through this cycle will affect future evaluation designs, all feeding the improvement cycle. These learnings are being organized into groups of common criteria and questions, each grouping being referred to as a framework. Multiple frameworks should be developed so evaluations can look to each one to provide consistency and effectiveness, as well as comparative value for characteristics such as education of the public, integration of public comments into final decisions, the public’s ability to provide unique content, and other aspects. Developing and sharing comprehensive public participation evaluation frameworks will foster and improve evaluations (Abelson & Gauvin, 2006).

Evaluations of Public Participation

Public participation has been encouraged and implemented for decades, yet the evaluation of public participation “is in its infancy” (Abelson & Gauvin, 2006, p. v). There was “little information about what citizens or decision makers expected or desired” from public participation (Halvorsen, Critical Next Steps in Research on Public Meetings and Environmental Decision Making, 2006, p. 152) or even “whether, when, how[,] and why participation is evaluated in practice” (Laurian & Shaw, 2009, p. 294). When the expectations for public participation are not clear, designing a meaningful evaluation can be muddy.

In recent years, public participation has been moving toward consistent and comparable evaluations to provide for an improved arena of public participation. Searching for the improved approach to public participation, independent of the situation, “is unlikely to bear fruit” (Abelson &

Gauvin, 2006, p. 3). “Rigorous evaluation” may guide researchers, practitioners, and policymakers to “identify better [public participation] methods than others—methods that are better suited to different situations and perhaps even a “best” method for different but definable contexts” (Abelson & Gauvin, 2006, p. 3). Frameworks are typically developed using one of three approaches: user-based or interest-based, theory-based, and goal-free (Abelson & Gauvin, 2006).

A user-based or interest-based approach to public participation evaluation can focus on the needs of the evaluating organization with no regard to a broader base, such as government or regulatory agencies, the affected community, the advocacy community, taxpayers, or a multitude of special interests. The evaluations tend to focus on the immediate needs of an organization, based on the local goals for that public participation. The various stakeholders will commonly have different and potentially incompatible goals. Some evaluations attempt to address the needs of the broader community in their criteria evaluations, but caution should be taken because the integrations of many interests can dilute an evaluation and fail to satisfy the broader stakeholders (Beierle, 1998).

Along with user-based evaluations, theory-based evaluations are important and should be based on public participation models and use normative evaluations (Abelson & Gauvin, 2006) (Laurian & Shaw, 2009). There are many theoretical goals of public participations that have prompted evaluators to ask questions such as how did the public participate; was the participation representative; were the participants satisfied; was the process traditional; did it develop trust and or play a legitimizing role; what was the quality of dialogue; was the participation deliberative vs. non-deliberative, substantive vs. non-substantive; did participation have an impact on policy; what information is needed for participation; did the information provide consultation competence; is the public better educated; does participation prepare citizens for more political engagement; do participants incorporate values/beliefs into discussion; was the public participation successful or effective (Abelson, et al., 2003)?

Another less-frequent type of evaluation is goal-free, where no specific interests or theories are evaluated (Abelson & Gauvin, 2006). The term goal-free is also used in some program evaluations

where the “external evaluator” may be better off evaluating a program without understanding the goals of the program to develop a “less tunnel-vision” view of the program and to allow the evaluation to address “actual effects” versus “alleged effects” (Scriven, 1991).

Some early evaluations were done using frameworks of questions and criteria about characteristics such as frequency, fairness, and convenience. These evaluations were conceptually different from those designed to evaluate representativeness. A framework is a collection of questions and criteria that help to evaluate specific characteristics. For example, the framework for public education may include questions that evaluate whether the public knows enough to contribute substantive content or if they learned more from a public participation event. Another possible question under a public education framework may study whether the public's knowledge aligns with media content. Frameworks might include questions to evaluate characteristics of participation processes and or outcomes (Abelson & Gauvin, 2006).

The selection of a framework that is aligned with both the questions and the situation being evaluated is critical to the usefulness of the evaluation results. “The choice of approach should be tailored to the kind of problems the evaluator is interested in and the questions he or she is trying to answer” (Beierle, 1998, p. 15). Some organizations, such as the department one works for or the recommendation of a central government, may dictate the framework to be used in an evaluation. This could be because they have allocated resources to develop a meaningful framework or because they do not have the resources to customize a framework and have grabbed an existing one that may be able to provide some meaningful results. Either way, whether using an existing framework or developing an applicable one for a specific situation, it is important to realize that “No framework can fit all. Applicability is very important” (Abelson & Gauvin, 2006, p. 29).

Contextual Variables

As public participation practitioners want to provide ever-improving and meaningful participation, they look to evaluations of past participation to see what might help them enhance their current processes, designs, and evaluations. This comparative analysis identifies the importance of learning from participation events such as giving more attention to details, including which methods were used and in what context. Yet, Rowe and Frewer stated in 2004 that evaluation literature scarcely provides any details of a participation's context (Abelson & Gauvin, 2006). Practitioners need "more rigorous study of the role context plays in the public participation process" such as "characteristics of the issue, attributes of the sponsoring organization, the type of decision being made" (Abelson & Gauvin, 2006, p. v).

In the broader picture, there is the context of public participation that is universal and may be desirable in all forms of this process. In additional to those, there is the context that is specific to a participation. Here is where the specific context is most valuable. "Lack of explicit statements about the criteria themselves or their generalizability is a major limitation of these studies and an area that could be improved upon in future evaluation studies" (Abelson & Gauvin, 2006). With greater consideration given to describing participatory mechanisms and their associated contextual attributes in more general terms, improved theory building about what works and under which circumstances should follow (Abelson & Gauvin, 2006).

One such public participation context is in high-risk environmental decision making. Gone are the policy issues that could be handled with "common sense and ingenuity." Today's problems are beyond straightforward and easily resolved; instead, they are "'wicked problems'—with no solutions, only temporary and imperfect resolutions" (King, Feltey, & Susel, 1998, p. 319). Today, administrators may benefit from public comments about complex technical and ethical problems. Involving the public in science and technical issues has been a topic of debate, especially in the arena of "health and environmental risk management" (Rowe & Frewer, 2000, p. 4).

Several scholars have addressed public participation in high-risk decision making, environmental and/or technical issues. Some question the public's ability to provide knowledge or meaningful participation. People may agree that a risk exists, but differ on what the risk is, how significant the risk is, and who is credible for managing the risk. In one evaluation of risk in public participation, Topal examines risk in the context of science and technology with a framework within which risk can be "properly determined and handled through rational techniques like quantitative calculations and cost-benefit analyses" (Topal, 2009, p. 281). "The decisions generally privilege the interests that are better supported by technoscientific arguments and rationalities" (Topal, 2009, p. 278). The context of a high-risk environmental rulemaking may provide a domain in which these findings could be generalized and provide some external validity to this case study design (Yin, 2009).

EPA Public Participation Policies

Public hearings may take place at various times throughout a decision-making process. The EPA states that it is best to position public hearings toward the end of a rulemaking and public participation process to provide the public the opportunity to become educated and well-informed about the issues (EPA, 1981).

It should be noted that public hearings are not the only way in which the EPA can solicit public participation. In the EPA's approach to public hearings, the agency is targeting parties that are likely to be affected by the rulemaking outcome, either positively or negatively. The agency provides education materials to the public to encourage meaningful contributions.

One of the goals of the EPA's public involvement policy refers to the various public as sources of information. "Learn from individuals and organizations representing various public sectors and the information they are uniquely able to provide (community values, concerns, practices, local norms, and

relevant history, such as locations of past contaminant sources, potential impacts on small businesses or other sectors, industry conducted study results, etc.)" (EPA, 2003, p. 8).

EPA's Public Involvement Policy defines public in the broad sense of "meaning the general population of the United States" and identifies those with "a particular interest or may be affected by Agency programs and decisions" (EPA, 2003, p. 31).

RESEARCH QUESTIONS

Public participation has been evaluated by many criteria with multitudes of writings found in literature searches. Searching for public participation pertaining to the EPA yielded many search results that can be generalized into two groups: a notice of previous or upcoming EPA public hearings, and special interest groups providing guidance on how to provide testimony at the public hearings. This search did not locate any literature evaluating the EPA public hearing testimony. The search did readily locate EPA's public participation goals and intentions, which provided the basis for references in this study (EPA, 1981); (EPA, 2003). Available information provided guidance on how to participate and when to participate, but nothing was found about how or if the public hearing participation helped the agency.

Since the research in this case study focused on public hearing testimony associated with a high-risk environmental rulemaking where three proposed rulemaking regulatory schemes are proposed, this provides insight into a very specific contextual setting.

Information the Agency Requests

The paper evaluates the first research question—"Does the public hearing testimony provide EPA with the information the agency requests in the proposed rulemaking?—as a goal-free question. The results of this question are not being compared to any other known study results.

The proposed rulemaking pertains to the disposal of coal combustion residuals. The EPA proposes three alternatives in a 563-page document, "Hazardous and Solid Waste Management System: Identification and Listing of Special Wastes: Disposal of Coal Combustion Residuals from Electric Utilities" (EPA, 2009). The proposed rulemaking includes requests for information. This is one way the agency gathers knowledge about this high-risk environmental toxic disposal issue.

Management of coal combustion residuals is a complex balancing of many pros and cons. Coal Combustion ash is tied to the costs of many existing processes. The major ones are providing electricity, construction, and transportation. Challenges to the economics of coal combustion ash are the factors of sustainability, such as limited coal combustion ash storage options, contamination of clean water and healthy aquatic ecosystems, and the effects on clean air. The Information the Agency Requests (IARs) have been sorted into 14 categories (Table 1.) relating to coal combustion ash storage and reuse in various byproducts (EPA, 2009, p. 381).

Table 1. Information the Agency Requests Categories

Beneficial Use	Damage Cases
Financial Assurance	General
Liners	Management of CCR
RCRA Subtitle C	RCRA Subtitle D
Regulatory Impact Analysis	Risk Assessment
State Programs	Stigma
Surface Impoundment Closeout	Surface Impoundment Stability

Various Publics

The second research question is "Which Various Publics did attend the public hearings for high-risk environmental proposed rulemaking?" The "various publics" question is designed to see which of EPA's publics, as defined in the agency's participation and involvement policies, did attend these EPA public hearings. "Various Public" is a term referring to public representation in the EPA's public participation policy. In EPA's public involvement policy, one of the goals refers to the various public sectors as

sources of information: “Learn from *individuals and organizations representing various public sectors* and the information they are uniquely able to provide (community values, concerns, practices, local norms, and relevant history, such as locations of past contaminant sources, potential impacts on small businesses or other sectors, industry-conducted study results, etc.)” (emphasis added) (EPA, 2003, p. 8).

EPA’s Public Involvement Policy defines public in the broad sense, “meaning the general population of the United States,” and identifies those with “a particular interest or (who) may be affected by Agency programs and decisions” (EPA, 2003, p. 31). The EPA’s publics (Table 2.) include, but are not limited to, 24 categories.

Table 2. Various Public Categories

Agencies	Agriculture	Appointed officials
Business	Civic and Community-based	Consumer
Elected Officials	Environmental	Environmental Justice
Ethnic	Faith-based	Indigenous Peoples
Industrial Interests	Labor	Minorities
News media	Other	Professional Representatives and Societies
Public Health	Research	Scientific
Self	Small Business	Trade

The portion of the public that does participate comprises self-selected citizens who are motivated to present testimony at a public hearing because they expect either a loss or a gain of profit on a previous investment, have been directly and negatively affected by personal health issues or by those of a loved one, or want to stop the action to avoid negative impacts on their communities (“Not In My BackYard”: NIMBY).

Substantive Testimony

The third research question is, “Does the public provide substantive testimony at the high-risk environmental proposed rulemaking public hearings?” The EPA requests meaningful participation from

the public. This may best be described as substantive testimony, which is different from values and opinions; it provides content that the agency may be able to act on and may be appropriate for integration into the final rule (Table 3.). That participation would be considered substantive and is defined in this case study using the description the Bureau of Land Management (BLM) has established for public participation in its projects and programs, since it is obligated under regulations to respond to substantive participation. (U.S. Department of the Interior Bureau of Land Management, 2010). The BLM descriptions were confirmed with other sources; "Public Comment Analysis Final BRMP scope of work" (Unknown, 2012) and "The Council on Environmental Quality Regulations" (Yao, 2006, p. 51).

Table 3. Substantive Categories

Accuracy	Adequacy
Alternatives	Content Change
Flawed Analysis	New Information
Regulatory Consistency	

The testimony in the public hearing is evaluated for substantive content in addition to the evaluation of Information the Agency Requests.

Majority Vote

The fourth research question is, "What vote does the public support at the high-risk environmental proposed rulemaking public hearings?" EPA is proposing three alternative regulatory options for the management of coal combustion residue: Subtitle C, Subtitle D, or Subtitle D Prime.

The Subtitle C option would regulate coal combustion residue as a "special waste." A waste would have an exception to the hazardous waste requirements under special conditions. If the CCW

were destined for disposal, then full hazardous waste disposal regulations requirements would apply, but if the CCW were destined for a special use—in this case, recycled materials—and arguably provided economic and environmental advantages, then the CCW could be routed to recycling options as a material substitute instead of being designated as a hazardous waste.

The Subtitle D option would regulate coal combustion residue under national minimum criteria. Subtitle D Prime is a modification of Subtitle D, exempting existing surface impoundments from closure or installation of composite liners (EPA, Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities, 2014). This is a perfect opportunity to see how the representatives of the public hearing select an alternative.

METHODOLOGY

The United States government has interests in being transparent to the public. This transparency leads to the availability of documented and publicly available public hearing testimony (Coglianese, Kilmartin, & Mendelson, 2008). This case study of the EPA's public hearing testimony used the following documents as the transcriptions for two such public hearings: United States Environmental Protection Agency, Office of Resource Conservation and Recovery, Office of Solid and Emergency Response, Public Hearing on EPA's Proposed Rule on Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities.

The first hearing analyzed was in Arlington, Virginia, on Monday, August 30, 2010. The second hearing analyzed was in Denver, Colorado on Thursday, September 2, 2010 (EPA, Coal Combustion Residues (CCR) - Public Hearings, Denver, CO, 2011).

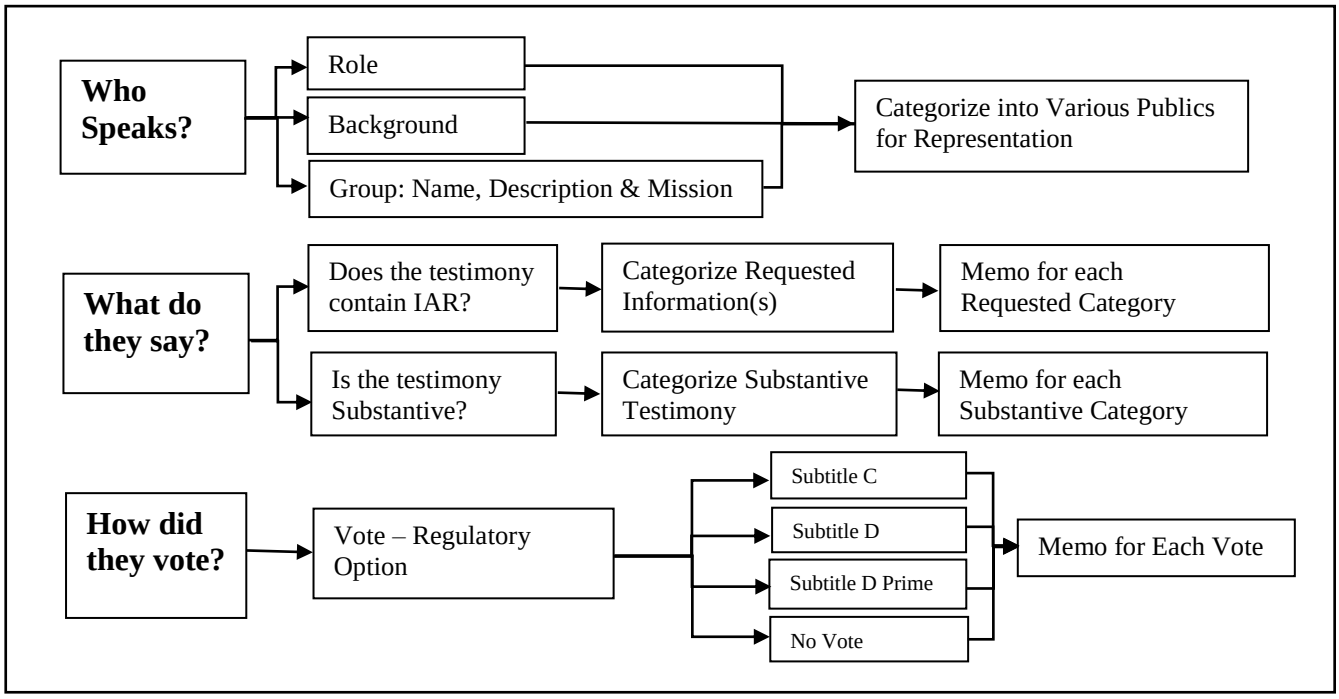
The public hearing testimonies in this case study were evaluated for multiple topics: Information the Agency Requests (IAR), Various Publics, Substantive Content, and the Voting

Selection the speaker prefers. Preparation for this analysis included developing a knowledge of each of the three main types of content and understanding how speakers testify to their vote preferences. The IAR content was extracted from the proposed regulation, sorted into 14 categories, and reviewed. The speaker's self-identification was used to assign a Various Public. Substantive Content was identified using seven standard substantive categories, and the testimony was read carefully to identify rulemaking options that a speaker voted for.

This study was designed to take the full public hearing testimony into account and to fine-tune portions of the speakers' presentations into data that answer the studies questions. The main question asks about Information the Agency Requests (IAR), so IAR is the topic. Each question in this study has a topic, and the topics have categories that further define and describe what falls under the topic and further assists in fine-tuning the match between the testimony and the categories.

To prepare for a first review of the public hearing testimony transcript (Transcript), all the topics and categories developed for this case study were read to make the descriptions and definitions fresh in thought. This familiarity assisted in the capture of testimony that matched a topic and then helped to sort each into the matching category. When a portion of the testimony matched a topic and category, the text was copied into the study's database under the matching category. The first review of the testimony captured text from the Transcript and added it to the database. This testimony from the first review was labeled Database Testimony since it is no longer the full Transcript. The IAR from the testimony that supported the category match was typed into a database's category memo fields. These memo fields were used later to help defend a match or to make a change. If this was not enough to defend a match, a review of the applicable portion of the descriptions and definitions was used to resolve the match. The process of analyzing the testimony is mapped out in Figure 4.

Figure 4. Characterizing the Public Hearing Testimony



At the end of the first review, the Database Testimony was broadly matched to the categories and was ready for a second review for further matching, using the details of the descriptions and definitions to fine-tune the testimony to category matches.

When the testimony was captured in the first review, there were some occasions when a paraphrased text was added instead of the full testimony text to shorten the amount of testimony needed. In these instances, the paraphrase is either noted by the author's initials (DPS) or the portion of the testimony added to the database is in quote marks. The quote marks indicate what portion of the noted testimony was actual, leaving any not in a quotation mark as the author's paraphrase and equal to the earlier DPS notation.

After the first review was completed, each of the topics and categories was then reviewed individually to see if there was consistency in how each category was matched. This second review compares the Database Testimony to the descriptions and definitions to fine-tune the testimony to the study's questions. Some Database Testimony was removed as not being a close enough match or

moved to another category to provide for a better match. Some testimony, such as the Information the Agency Requests testimony, was matched up with the specific description or definitions that were used to make the matching decision.

Study Data

One Excel file with multiple worksheets accompanies this study to provide readers the information used to define the Information the Agency Requests and to define both substantive and non-substantive participation. In the Information the Agency Requested worksheet there are 14 categories, each defined by matching specific requests from the proposed rulemaking. The database containing the second reviewed Database Testimony, and the worksheets used to analyze the studies data, some of which have first-review data. The study's descriptions and definitions were used to establish the boundaries for the IAR, Various Publics, and Substantive (and Non-substantive) topics and categories that facilitate matching Transcript to Document Testimony categories. The Transcript that matched the categories was added to a database worksheet. Other worksheets in the Excel file include Basic Data, IAR Damage Cases, RPTS Info the Agency Requests, VP Raw Data, Various Publics Summary, Results Non-IAR Substantive, and Votes.

Database

The Database Testimony was entered into the database worksheet. The database has evolved through this analysis. Here are some Excel tips that improved the mechanics of adding testimony to the database and provided for data validation and reliability in this study.

1. The top rows and far left columns were frozen to allow the data collection titles and the speaker's self-identification to remain visible during data entry, to help ensure that the data is being entered correctly into the worksheet.

2. First, the row width was set to allow one row or speaker to be visible at a time, to prevent data being entered on the wrong speaker.
3. Use Data Validation for data entry to pick from a list of consistent categories, such as the various Publics, Voting, and Substantive categories.
4. Color-code the cells—one color for each topic—to help with quick access to which columns should be for any given testimony.
5. Change the default direction for the cursor to move when hitting the Enter key; changing it to Enter moves the cursor to "right" instead of down, to facilitate adding data across a row in the worksheet. This will help with the navigation during data collection.
6. To move quickly to the data summary row at the bottom of the testimony, first name a row or cell next to the data summary row, then use Find & Select on the Home page and GOTO.
7. Once the database is collected and reviewed, do not use this data for any in-depth data analysis that includes tasks such as sorting without using a column with a row number value to allow for an un-sort. When at all possible, hide unneeded rows/columns and use a filter to show the view that should then be copied and pasted into another worksheet for more detailed reviews.

The collection of information from the speaker's testimony into the database aligns with the natural flow of the speaker's testimony, starting with either a self-identification or a statement on position. As the testimony proceeds, it addresses the main question of this research study, IAR. The self-identification is used to match each speaker with a Various Public category. Many of the speakers then testify to their preferred proposed rulemaking options by stating their rulemaking preference or their Vote. Once the speaker has stated their Various Public and their Vote, the testimony begins to be more specific in terms of the details of the proposed rulemaking topic (Coal Combustion Residuals).

All speakers were added to the database for a Various Publics categorization. Each speaker's information is tracked by adding a row to the database that includes the hearing number and the Transcript page number related to the speaker's introduction. To further examine any details of a speaker's testimony and words of interest, refer to the public hearing transcripts by hearing number and page number.

Various Publics

The EPA provides multiple references to “the public” throughout the public participation policies, but a complete list was located in the 2003 public participation policy where ”the public” term is described as including but not limited to a list of 24 subcategories of Various Public (EPA, 2003) While the policies list the publics, they do not attempt to define these, which leaves one to define the categories according to a common understanding of the terms used. In this study, the Various Publics become defined more specifically as the speakers were categorized into each Various Publics. A quick review of the Various Publics sorted by category in this study is available in the Various Publics worksheet.

The categorization of speakers into Various Publics was not complicated. The testimony presented by a speaker provides self-identification and is described by five memo fields: Role, Background, Group Name, Group Description, and Mission. The self-identification testimony is added to the database and matched under the appropriate Various Publics category. The five supportive memo fields were populated with testimony that supported the Various Publics categorization. This is used to defend or to change a Various Publics categorization in the second review.

During the second review, all speakers’ Various Publics were reviewed by examining one category at a time to look for consistency in how each Various Publics category was defined. Some Various Publics were changed in the second review, as needed, to build consistency in each Various Publics category. Some organizations were reviewed to determine which Various Publics category would be the best match.

Here are examples of several different self-identifications (Table 5.) where the speaker provides either exact language for assigning the Various Publics or may give enough other context to make the Various Publics categorization straightforward.

Table 5. Examples of Speaker Self-identifications for Various Publics Categorization

	Role	Background	Name	Group Description	Various Public 1
1.	Social Justice director of St. Charles Borromeo Catholic Church	Board member of the Virginia Chapter of Interfaith Power and Light	St. Charles Borromeo Catholic Church	… organization made up of people from all faith traditions who have come together out of a strong belief that we are called to be responsible stewards of the environment	Faith-based
2.	Works for Separation Technologies	The more difficult it is for a power company to landfill their fly ash, the better it is for my company	Separation Technologies	We produce and sell patented equipment ... for processing fly ash	Industrial interests
3.	Was asked by a consortium of the environmental community to prepare a report on the history of recycling under RCRA	Working on RCRA regulatory, legislative, and litigation issues since 1979	Consultant to environmental groups		Environment
4.	Resident of MD				Self

The first speaker clearly self-identified as a member of a Faith-based Public in four of the Various Publics categories. It was not uncommon for speakers to state clearly in the public hearing testimony their role, background, and affiliation, as well as provide a description of the affiliated group.

The second speaker clearly identified as an Industrial Interest by naming the company they work for, what its product is, and how it relates to coal combustion residue.

The third speaker is easy to categorize, but it takes the testimony tracked in the categories to guide the decision. The speaker has a background in RCRA regulatory, legislative, and litigation issues since 1979 and self-identifies as someone who was asked to consult on the issue at hand. This alone may be enough to categorize this speaker as an Environment Public. In this case, the speaker was asked to consult by a consortium of the environmental community. This last portion of the self-identification confirmed the categorization of the environment.

The fourth speaker said very little about their identity except where they resided. The balance of this speaker's testimony was examined for other clues that may further define their Various Publics. The message was certainly pro-environment, as many of these speakers do present, but they are testifying as themselves and with no other affiliation, which is why they are categorized as Self. There is one difficulty in categorizing the Self Various Publics: All speakers are there as themselves with or without an affiliation. The Self was selected when the speaker specifically states "I am here as a citizen," or as a family member, etc., and does not make references to any other possible Various Publics.

Some Various Publics were difficult to distinguish between, such as Industrial Interests, Business, Small Business and Trade, and then Environment, Environmental Justice, Faith-based, Indigenous Peoples, and Self, for example. This led to some groupings of the Various Publics into like publics, which will be reviewed further in the Findings section.

In addition, where it was difficult to establish the lines between a few Various Publics, there was one more interesting feature of a speaker's self-identification: 64 of the 302 speakers provided a second self-identification. This study allows for Various Publics to wear more than one hat by tracking when a speaker identifies themselves in more than one way.

Voting

The proposed rulemaking contained three possible regulatory options: Subtitle C and Subtitle D, and a modification called Subtitle D Prime. The agency's request for public participation provided an opportunity for speakers to identify a preference for one regulatory option. Tracking the speaker's regulatory choice was a simple following one of the three options. While tracking the speaker's regulatory choice, the speaker's comments about the vote were added in the memo field. The memo field is used later in the second review to help defend or change a categorization. A review of the votes

in the testimony promptly resulted in the addition of a fourth category, a No Vote. A No Vote simply reflects the testimony from speakers where they do not specify one of the three proposed regulatory options in the proposed rulemaking.

Information the Agency Requests

The first question in this study is, "Does the public hearing testimony provide EPA with the information the agency requests in the proposed rulemaking?" The Transcripts were analyzed to see how many times the testimony refers to the Information the Agency Requests (IAR) in the EPA's proposed rulemaking and how that testimony is distributed across the 14 categories of the IAR topic (Table 6.).

The proposed rulemaking requests information in the proposed rule under the heading "XIV. Is the EPA Soliciting Comments on Specific Issues?" Here the EPA summarized and sorted the IAR into 14 categories (EPA, 2009, p. 381).

Table 6. Information the Agency Requests (IAR) Categories

Beneficial Use	Damage Cases
Financial Assurance	General
Liners	Management of CCR
RCRA Subtitle C	RCRA Subtitle D
Regulatory Impact Analysis	Risk Assessment
State Programs	Stigma
Surface Impoundment Closeout	Surface Impoundment Stability

Each of the IAR categories was further defined in this research by locating all requests for information from the 563-page proposed rulemaking text (EPA, 2009) using a series of keys words: request(ing)(s), seek(ing)(s), solicit(ing)(s) or the phrase "interested in suggestions." These keywords identified about 140 instances of IAR and the associated text from the proposed rule. The IAR text was

copied from the proposed rule and placed into a worksheet labeled Information the Agency Requests, along with the page number(s) for reference.

Once all 140 Information the Agency Requests were gathered, they were sorted into one of the 14 EPA categories to further describe or define each category. The categories can have multiple requests under them; for example, the Management of Coal Combustion Category has 13 specific requests for information that help to define the category.

The sorted requests for information were reviewed one category at a time to look for consistency in how the IAR responses were placed into each category.

The testimony for the EPA public hearings was evaluated to see if the public hearing speakers could provide the IAR in the proposed rulemaking. When a speaker makes a reference to an IAR topic from the proposed rulemaking, it is captured and added to the database under a matching category, along with a reference to the hearing number and the Transcript page number. This is referred to as the first review and was done with a broad sense of what testimony matched an IAR category. Many speakers provided comments that were not collected in the first review, mostly because they were clearly an opinion without a chance of being IAR. The amount of testimony that was not collected was large and not needed to answer the studies questions and, therefore, was considered outside the scope and, thus, not collected in the database. An estimate of the collected comments versus uncollected comments is that this study collected approximately 25% of the overall testimony as being specific to IAR.

This first review intentionally captures Database Testimony that is slightly broader than the topic of IAR. This potential IAR database testimonies will provide a range of testimony that will later be used to narrow down or fine-tune the category. In the second review, Database Testimony was re-examined to see if the testimony falls into one of three groupings: 1) the speaker's opinion without matching an IAR, 2) an IAR that requires a re-categorization, 3) or whether the testimony is substantive but not an IAR.

In the example of one category, Management of Coal Combustion Residues, the first review collected 30 testimonies as a potential match. The second review resulted in a reduction of the Database Testimony to 18. The second review of the Database Testimony matches each testimony directly to the request for information located in the proposed regulation. This allows a view of which of the 14 categories of IAR are referenced in the public hearing transcripts. The following is one example of the proposed rule request for information and some of the Database Testimony that was matched to it.

Text from the proposed rulemaking that requests information pertaining to the category of Management of Coal Combustion Residuals includes: "… it is evident that each of the main four types of CCRs when subjected to a TCLP leach test, yields a different amount of trace element constituents. EPA is *soliciting* public comments on whether, considering these differences in the mobility of hazardous metals between the four major types of CCRs, regulatory oversight should be equally applied to each of these CCR types when destined for disposal" (EPA, 2009, p. 49). Three different speakers in the two hearings referenced this request for information (Table 7.)

Table 7. Example of Database Testimony Matched to an IAR Category: Management of Coal Combustion Residue

# Found in testimonies	Hearing Page Number	Testimony 1	Testimony 2	Testimony 3
3	1.238, 2.223, 2.322	Scrubber waste should stay collected ... To avoid the externalities ... Properly sequestered and taken out of our Environment	bottom ash meets TCLP and the RCRA standards … a nonhazardous waste and beneficial use Material	…when tested with EPAs new more accurate test, the coal ash leached up to 18,000 parts per billion, 1,800 times the federal drinking water standard. Selenium leached from one pond at up to 29,000 parts billion, 580 times the drinking water standard

These three testimonies are direct quotes from the speakers, with some gaps in their words to allow for an effective tracking of the portion that closely matches the IAR category. In this example of IAR testimony, the three matching testimonies have different levels of being a good match for the category, with the third comment matching the most closely. This analysis does not rank how well the

Database Testimony matches the IAR. It simply notes when speakers make a solid reference to the category.

The second review removed Database Testimonies that were more opinion-oriented and not consider the substantive testimony. An example of a testimony that was removed during the second review for being an opinion includes: "… legitimate reason for EPA to propose regulatory improvements pertaining to wet ash disposal impoundments. Unreasonable to propose rules that declare all ash hazardous and drastically limit its many current beneficial uses" (EPA, 2010, p. 243).

In this Database Testimony, the speaker simply states that the EPA's reason for doing something is legitimate and another action is unreasonable. This analysis evaluated these phrases as being opinions and not meeting the definitions for Information the Agency Requests.

One criterion for the second review of the IAR Database Testimony attempts to remove testimony that is non-substantive information. A substantive participation implies, among other definitions, knowledge that is new and not previously known information. An attempt was made to identify testimony that the agency already knew about. The following is an example of a testimony, under the category Management of Coal Combustion Residue, that was deleted during the second review, since the information is mostly likely not new knowledge: "Boiler slag ... has unique physical and chemical characteristics … vitrified inert materials … Mohs Scale hardness of 6+ and extremely low leach ability" (EPA, 2010, p. 48). The technical knowledge about boiler slag being a hardness of +6 on the Mohs Scale was assumed to be public knowledge within the industry and within the agency.

Damage Case Category

Of the 14 Information the Agency Requests categories, the Damage Cases category requires some additional review that is not applicable to the other 13 categories. Any site listed in the testimony was collected in the first review and added to the Database Testimony under the Damage Cases

category. The speaker may mention the body of water that a site is close to, the township where the site is located, the company that owns the site, or some aspect of the site's name, which can be the legal name of a site or perhaps a name used within the site's community.

Each time a testimony referred to a damage site, the keywords of the site's name, location, or other details were tracked. The collected keywords were then used to search through publications specifically mentioned in the EPA proposed rulemaking's IAR (EPA, 2009), such as the Electric Power Research Institute's Evaluation of Coal Combustion Product Damage Cases. The proposed rulemaking also included IAR on Damage Cases identified by EPA. EPA has published information on Damage Cases, including Coal Combustion Waste Damage Cases Assessments (U.S. EPA, 2007), and three attachments (source document unknown). EPA also asked for information about Damage Sites as reported by the Environmental Integrity Project, Earthjustice, and Sierra Club in a recent report, "In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment" (Environmental Integrity Project, Earthjustice and Sierra Club, 2010). If the keywords referred to a site in any of these publications, then it was considered as making a reference to an IAR in the category of Damage Cases.

The next description under Damage Cases is for the following type of information: "… requesting public comment on the exact locations of CCR waste management units so that the Agency can more fully account for water bodies that may exist between a waste management unit and a drinking water well …" (EPA, 2009, p. 27).

This description seeks the exact location of potential Damage Sites relative to neighboring drinking water supplies. These potential Damage Sites not already known could be located near neighboring drinking water supplies. It is not within the scope of this analysis to examine the sites mentioned to determine their proximity to bodies of water. It is sufficient to know that a citizen felt strongly enough about a location as a potential Damage Site to attend and present participation about

the site to have it recognized as one for further evaluation. This evaluation of Damage Case sites is managed in a worksheet labeled IAR Damage Cases.

Substantive Testimony

The Bureau of Land Management (BLM) has established and made public a useful description of substantive participation. (U.S. Department of the Interior Bureau of Land Management, 2010). This definition was supported by other researchers (Yao, 2006). This case study has sorted the types of substantive participation into seven categories. Also in the research are descriptions and definitions of participation that are non-substantive. These descriptions and definitions were used to provide clarity on what was and what was not substantive (Substantive and Non-Substantive Worksheets) (Bureau of Land Management, Unknown).

Non-substantive content can be difficult to read and to intentionally exclude from analysis as it represents the essence of us all, our lives, family and traditions, values and opinions. However, care was taken to categorize testimony as substantive or non-substantive approaching the BLM definitions. As the researcher, I attempted to make this categorization consistent as possible and added only substantive content to the Database Testimony. Most of the testimony was non-substantive and considered outside the scope of this study. Placing the non-substantive testimony outside of this studies scope is not to diminish its value in any way. It is difficult to read heartful and horrendous stories of fellow citizens and not act in some way. It is highly possible that we do not understand the value of non-substantive participation.

Some speakers had more than one substantive testimony. This case study, therefore, has data collection for Substantive 1 and Substantive 2, and each one has a memo field. In the same manner as the Various Publics, the Substantive Information memo field helps to defend or change a match.

One definition of substantive participation in the context of government agencies comes from the U.S. Department of the Interior's BLM. The BLM, under the National Environmental Policy Act (NEPA), is required to have public participation in decision-making processes and to respond to substantive comments (U.S. Department of the Interior Bureau of Land Management, 2010). The definition BLM uses for its own regulatory compliance is the basis of the definition used in this analysis: "Substantive comments are those that suggest the analysis is flawed in a specific way. Generally, they challenge the accuracy of information presented[;] challenge the adequacy, methodology[,] or assumptions of the environmental or social analysis (with supporting rationale)[;] present new information relevant to the analysis[;] or present reasonable alternatives (including mitigation) other than those presented in the document. Such substantive comments may lead to changes or Revisions in the analysis or in one or more of the alternatives. There may be many or no substantive comments in a letter …" (U.S. Department of the Interior Bureau of Land Management, 2010). The BLM would define public participation with content expressing values as being non-substantive. Comments like "save the forest/ecosystem/whales/salmon/loggers" are non-substantive (U.S. Department of the Interior Bureau of Land Management, 2010).

New Information is a category under the Substantive topic. This study does not examine testimony content to determine whether the information is New Information to the EPA because we cannot access what is new to the agency. Where the speaker identified the information as new, it was categorized as new. This may have caused a bias against categorizing testimony as new information and may understate this type of testimony.

The first review of the public hearing Transcript collected substantive testimony using a broad stroke for identifying testimony that meets the definition of the Substantive categories. This broad stroke will provide a range of testimony that will later be used to narrow down or fine-tune the category. Additional substantive testimony was identified when the second review of the IAR was done

and the testimony was determined not to be IAR, but did continue to meet the Substantive definition. During the second review of the substantive testimony, some testimony was removed because it proved to be less substantive and more of an opinion.

Two Public Hearings

Two of eight public hearings were selected for this case study: the first and second public hearings. The first public hearing was in Arlington, Virginia, and the second was in Denver, Colorado. Each hearing represents regions that are significantly different in many ways to give two very different models of publics that participated. Arlington, Virginia, is close to major political cities, on the nation's East Coast, with a high population density and moderate rainfall. Denver, Colorado, is not close to major political cities, is toward the western portion of our nation, has a lower population density, and has less rainfall relative to Arlington. These factors are expected to influence the individuals who might participate in a public hearing on the topic of coal combustion residue management. Choosing these two examples made it possible to collect some diversity in the public hearing testimony and, thus, broaden the applicability of this case study with other studies.

FINDINGS

This study has fine-tuned the full testimony and developed data on the count of speakers providing testimony at each hearing, tracked speakers referencing IAR, the IAR by category, the Various Publics and Various Publics as they related to other topics, how many speakers provided Substantive Testimony, and how the speakers Voted. Table 8. provides some data terms to help with understanding the findings.

Table 8. Basic Data Types and descriptions

Data terms	Definition
Arlington, VA.	Data specific to a single hearing: EPA public hearing held on August 20, 2010. Arlington, VA, is an eastern city in a highly-populated area of the United States, adjacent to Washington, DC. The hearing had 150 speakers.
Denver, CO	Data specific to a single hearing: EPA public hearing held on September 2, 2010. Denver, CO, is in a less-populated area of the midwestern area of the United States. The hearing had 152 speakers.
Combined Hearings	Data of the combined hearings where Arlington, VA, & Denver, CO. The hearing had a total of 302 speakers.
Information the Agency Requests (IAR)	Information the Agency Requests is the main topic in this study. The proposed rulemaking has approximately 140 times the agency requests information. The topic is subdivided into 14 categories. There were 114 speakers who provided references to IAR within the 3-minute presentation at EPA public hearings as represented in the transcripts, or 38% of the Combined speakers.
Database Testimony	This data is used to evaluate the main question of the study. The Transcript was (first) reviewed and testimony pertaining to IAR was collected and added to the database. The Database Testimony was reviewed and fine-tuned to change the data in many of the categories and add one to the number of speakers who provided IAR.
First Review	Public hearing Transcript testimony that was reviewed and copied into the database as broadly applying to the study's questions.
Second Review	The Document Testimony required a second review to fine-tune the category definitions and remove the more opinion-oriented (non-substantive) from the testimony data. This review has both reduced and increased some of the data in categories across the study. All data in this study report are the second review unless otherwise stated.
Various Publics 1	Data that represents the first way a speaker self-identifies. There are a total 302 VP1s. This Data is viewed by hearing(s), IAR, Substantive Testimony, and Votes.
Various Publics 2	Data that represents a second way a speaker may self-identify. A total of 64 speakers provided the second public.
Transcript	The documents that relay activities and testimony presented at the EPA public hearings.
Substantive 1	Data that represent Substantive Testimony from the Transcripts. Does not include references to the Information the Agency Requests, although that testimony would also be considered substantive. In this category, 89 speakers provided Substantive Testimony.
Substantive 2	Data that represents a second Substantive Testimony made by individual speakers. Of the 89 speakers who provided some substantive comments, 13 of the speakers provided a second substantive comment.
Votes	The data represents which of four voting options apply to this proposed rulemaking. The No Vote and the Subtitle C votes were 41% and 39%, respectively. Subtitle D and D Prime reviewed 15% and 4%, respectively.

Information the Agency Requests

The specific wording of a study's question guides the design of the study; provides strength to the argument; and requires aligned definitions, data organization, and data collection to produce reporting that answers the question effectively. The study's results should align nicely with the format and units of the study's question.

The first study question is, "Does the public hearing testimony provide the EPA with the information the agency requests in the proposed rulemaking?" The public hearing testimony limit is 3 minutes long, a reference to the Information the Agency Requests (IAR) is required to match the IAR category. This study does not expect the full substantive response within the scope of the three minutes. The topic for this question is Information the Agency Requests. This topic has 14 categories that further describe and define the topic. Collecting the IAR for this study was done broadly for the first review and fine-tuned during the second review. The Table 9, Information the Agency Requests Category Count, First and Second Review, illustrates the change from first review IAR to second review IAR.

This first review of the combined hearings had 150 speakers providing IAR. After the second review, the number of speakers who provided IAR was 114. The number of total references to IAR was 172. Given this data, it appears that more than half of the speakers (62%) did not make a reference to the IAR, although 38% of the speakers did make a reference to the IAR categories (Table 10.)

Table 9. Information the Agency Requests: Do speakers make a reference to IAR?

Does the public hearing testimony make a reference to an Information the Agency Requests category?	Combined Hearings	
	Speaker Count	Speaker Percent
Yes	114	38%
No	188	62%
Total	**302**	**100%**

Table 10. Information the Agency Requests: Combined Hearing, First & Second Review

Information the Agency Requests (IAR) Category	Broadly Collected		Fine-tuned	
	IAR First Review Count	IAR First Review Percent	IAR Second Review Count	IAR Second Review Percent
Beneficial Use	50	20%	32	19%
Damage Cases	41	17%	39	23%
Financial Assurance	1	0%	1	1%
General	3	1%	0	0%
Liners	6	2%	6	3%
Management of CCR	30	12%	18	10%
RCRA Subtitle C	16	7%	5	3%
RCRA Subtitle D	6	2%	1	1%
Regulatory Impact Analysis	12	5%	5	3%
Risk Assessment	12	5%	10	6%
State Programs	23	9%	26	15%
Stigma	37	15%	21	12%
Surface Impoundment Closeout	7	3%	1	1%
Surface Impoundment Stability	2	1%	7	4%
Total of times speakers referenced an Information the Agency Requests	**246**	**100%**	172	100%

Damage Cases

The count of references to Damage Cases under Information the Agency Requests is tracked above, indicating that 23% of the references to IAR were specific to a Damage Case. There are four definitions or descriptions of Damage Cases from the proposed regulations. A speaker's testimony with references to a damage case was looked at more thoroughly to see which cases were already known by the Electric Power Research Institute (EPRI) or EPA, which were mentioned "In Harm's Way" (Environmental Integrity Project, Earthjustice and Sierra Club, 2010), or where the speaker may have provided the specific location of drinking water supplies at risk. An attempt was made to take all the Damage Case references and narrow them down to individual sites. This yielded a possible 45

individual sites that were then compared to EPRI's, EPA's, or Environmental Integrity's publications. That resulted in finding 20 damage locations mentioned in the publications; some of these sites were listed multiple times between the various publications. Of the Damage Cases listed, 17 were from sites that EPA knew about in Coal Combustion Waste Damage Case Assessment (U.S. EPA, 2007) and other publications; eight were from a February 2010 report from which EPA requested more information, "In Harm's Way" (Environmental Integrity Project, Earthjustice and Sierra Club, 2010); and three were from another report EPA specifically referenced, Evaluation of Coal Combustion Product Damage Cases (EPRI, 2010). Some of the sites were mentioned in more than one report; each report was tracked when this occurred. The analysis indicates there is 20 damage sites that were mentioned in the testimony that are not specifically mentioned the publications.

Another Information the Agency Requests asked for "… public comment of the exact locations of CCR waste units so that the Agency can more fully account for water bodies that may exist between a waste management unit and a drinking water well…" (EPA, 2009, p. 27). This would require further investigation to determine whether the 20 previously unknown sites are either one actual or potential site, and whether they place drinking water supplies in danger.

Some Damages Cases were in the Database Testimony once or twice, but a few sites were listed as many as four or five times: Constellation, Brooklyn Park, Glen Burnie, Pasadena, Dundalk, and the Baltimore City area, all in Maryland; and the Four Corners power plant and Colstrip plant, both in Montana. These damage sites were located within the same Region Two that was mentioned at the Arlington, Virginia, hearing. This is normal information and nothing to be surprised about. These Damage Cases were managed in the worksheet IAR Damage Cases.

Various Publics

Representation in public policy is needed to meet the goals of public participation from potentially affected parties and those who may have knowledge of the topic. Various Publics are tracked in this study to see which publics are represented at the hearings, using the terminology that the EPA used in its own policies (EPA, 2003), as well as providing some context through which this study may be compared or matched to other public hearing or public participation studies. The first results for Various Publics look at the data for Combined Hearing and at the first way a speaker self-identifies, (Table 11.)

When the various publics are viewed, the highest publics in attendance are the Self and the Environment publics, at 26% and 14% respectfully. The Self in this study accounts for 26% of the total participant 13% s. These are the public with the highest percent of Information the Agency Requests at 18%. The Self is second (13%) to Business (14 %) for providing Substantive Testimony. The Self is the highest percent in the No Vote option at 24%, while 31% Voted for Subtitle C, 4.3% for Subtitle D, and 0% for Subtitle D Prime. The Environment is highest in Information the Agency Requested (IAR) at 19%, and highest in Non-IAR substantive and the highest in Total Substantive (IAR and Non-IAR substantive). The Environment voted mostly for Subtitle C at 29 votes and voted 4th for No Vote at 12 votes. Clearly the Various publics of Self and Environment provided significant Substantive Testimony.

The lines between some of the individual various publics are unclear; for example, where does one draw the line between Small Business and Business and Industrial Interests or Trade? Various Publics that are very similar are also examined by adding the publics together into groups. Various Publics with no counts were dropped.

Table 11. Various Public Attendance (EPA, 2003)

Various Publics	Combined Hearings Attendance Various Publics 1 Count	Combined Hearings Attendance Various Publics 1 Percent
Agencies	7	2%
Agriculture	2	1%
Appointed Officials	0	0%
Business	26	9%
Civic and Community-based	4	1%
Consumer	0	0%
Elected Officials	2	1%
Environment	43	14%
Environmental Justice	7	2%
Ethnic	0	0%
Faith-based	18	6%
Indigenous Peoples	7	2%
Industrial Interests	27	9%
Labor	5	2%
Minorities	0	0%
News media	0	0%
Other	3	1%
Professional Representatives & Societies	23	8%
Public Health	21	7%
Research	2	1%
Scientific	5	2%
Self	80	26%
Small Business	9	3%
Trade	11	4%
Total	**302**	**100%**

One of the challenges in the categorization of the Various Publics addressed tracking the testimony by attorneys. The categorization was decided by whom the attorney represented. The attorneys ranged from an elected official such as a district attorney who testified about prosecuting crimes to a Public Health mother who spoke for all children and self-identified as a retired attorney; included two environment attorneys who represented Non-Governmental Organizations (NGOs)

investigating coal ash dumps or beneficial use sites; and one Various Publics–Other attorney who said that "it's time to transition to a clean energy process."

Some researchers have examined the Various Publics in broader terms than the individual publics. One such grouping is seen in a study done by Checkoway (Checkoway, 1981) there the public's are regrouped into those that are regulated and those that are non-regulated. This grouping makes sense specifically in a rulemaking study. Table 12. and Table 13. illustrate how the Various Publics in this study can be grouped as regulated and non-regulated.

Table 12. Various Publics Grouping: Regulated Industries

Various Publics Categories	Arlington, VA VP1 Count	Denver, CO VP1 Count	Combined Hearing VP1 Count	Combined Group VP1 Total Percentage
Business	1	25	26	
Industrial Interests	23	4	27	
Small Business	6	3	9	
Trade	7	4	11	
"Industry" Group	37	36	73	**24.2%**
Labor	5	0	5	
"Industry" Group including Labor	42	36	78	**25.8%**

Table 13. Various Publics Grouping: Non-regulated

Various Public Categories	Arlington, VA VP1 Count	Denver, CO VP1 Count	Combined Hearing VP1 Count
Self	37	43	80
Environmental	24	19	43
Public Health	9	12	21
Faith-based	7	11	18
Environmental Justice	6	1	7
Indigenous Peoples	0	7	7
Civic & Community-based	4	0	4
Group	**87**	**93**	**180**
Percent of Group Compared to Hearing			**60%**

The following table is a view of the highest represented publics at the combined hearings and how those publics relate to Information the Agency Requests and Substantive Testimony and how they voted.

It should be noted that some speakers self-identify as being more than one various public. In an early design, this study combined the Various Publics 1 and the Various Publics 2 to a Combined Various Publics. The thought was that this would represent all the different ways the speakers identified themselves at the hearing. There were 302 total speakers at the two hearings, 64 or 21% provided a second various public. The reporting became cumbersome since not all speakers had second Various Publics. Additionally, no matter how many ways the speakers described themselves, there was only one testimony per person.

While this study did not include the Various Publics 2 in the analysis, it is significant to include some examples of how adding the additional description to a participant makes more them relatable and less one-dimensional. All of us are more than one Various Publics in the same way that all of us are also consumers, each of them can identify with multiple publics. Some speakers provided good self-identification to show a more rounded public identity (Table 14.).

Substantive Testimony

Substantive Testimony was collected in the database during the first review of the public hearing Transcripts. The review was first looking for IAR and found that speakers also provided Substantive Testimony outside the IAR. Of the total 302 speakers in the combined hearings, 78 (26%) provided Substantive Testimony that was not IAR; of those, 13 had two substantive comments. The highest Substantive categories are Flawed Analysis and New Information, with Adequacy as a close third. In total, 91 Non-IAR Substantive comments were collected from the combined hearings (Table 16.). The use of the term Substantive Testimony outside the IAR, indicates that the Information the Agency Requests is also substantive.

Table 14. Various Publics: Examples of two self-identities

Various Publics 1	Various Publics 1 Memo	Various Publics 2	Various Publics 2 Memo
Agriculture	… son's water [rural farming community] exceeds national primary drinking water standards; son now lives at home with family but pays for toxic house.	Public Health	… we believe the First Energy fly ash dump has caused a higher number of cancer and other illnesses in our community, and many financial issues.
Elected Officials	Prosecute all types of criminals—murderers, gang ...	Environmental Justice	"Dumping grounds are often in minority areas. You never see that in a rich area."
Environment	… federal policy representative of Sierra Club.	Self	… born and raised in a lakeside community outside Knoxville, TN, not too far from the disaster site (TVA Kingston site).
Environment	… our region is relied on for energy export. Need EPA to take firm action to regulate the storage of CCW …	Environmental Justice	… initiate tribal consultants in our region on the CCW problems.
Environment	… we seek to protect everyone's right to breathe clean air.	Public health	I think this rule (Subtitle C) is about public health.
Environmental Justice	… small group of activists who have fought since … 1979 … this is an environmental justice issue …	Environment	… as well as a pollution issue.
Faith-based	Interfaith organization—made up of people from all faiths traditions who have come together out of our strong belief	Environmental Justice	… leaving several communities, disproportionately poor and minority ones at significant risk of toxic if not deadly drinking water
Faith-based	Episcopal Church - I can tell you that god is not going to fix this ...	Environment	Sierra Club Member
Indigenous peoples	Western Shoshone	Public Health	… we have already borne the ... burden (of) ... nuclear development ... Don't think that we should continue to bear the burden of risk of generating electric industry from coal-fired power plants as well.
Industrial interests	… concrete industry spokesperson	Environment	Active life member of Sierra Club.
Labor	… representing railroad workers across America. 100,000 members, many of whom operate coal trails.	Civic and Community-based	… positive externalities from the railroad being used for coal. Gave a small-town use of the railways …
Self	No specific identification, but talks about societal difficulties getting over stigmas.	Public Health	1 in 50 people who are in communities where coal ash is improperly dumped gets cancer ... Really large number.
Self	I'm here today as a private citizen.	Research	… risk assessor with 20 years' experience in environmental health.
Self	… concerned public citizen.	Public Health	… friends and families who have died from cancer and other illness.
Self	… here tonight not to give technical comments on the rule ...	Agencies	I used to work with you guys over at EPA
Self	… state my concerns for ... The use of fossil fuels & the byproducts that … cause a lot of irreparable damage to our land, animals, air, human beings, & plants.	Indigenous peoples	… request that the EPA do more tribal consultation and make that public, as well as come out to the Navajo Nation and do this public hearing there.

Table 15. Non-IAR Substantive 1 and 2 by Category

Substantive Category	Combined Hearing Substantive 1 Count	Combined Hearing Substantive 2 Count	Combined Hearing Substantive 1+2 Count
Accuracy	1	1	2
Adequacy	18	2	19
Alternatives	5	0	5
Content Change	4	1	5
Flawed Analysis	23	6	29
New Information	22	2	23
Regulatory Consistency	5	1	6
Total	**78**	**13**	**91**

Public hearings are often criticized for not being substantive (Topal, 2009). This study has analyzed the testimony and found references to substantive topics.

The Table 17. Substantive Testimony by Category: Top 10 Best Examples lists 10 Substantive Testimonies and matching Substantive categories. Even though this study does not specifically address the ranking of how the testimony matches a category, the list below is ranked as more and more substantive, beginning with testimony questioning the analysis of fugitive dust and ending with a comment about the technical calculations of cancer rates and the use of the wrong cancer factor in this EPA regulation compared to the way the EPA has used the information in other regulations. To assist a reader in understanding how the Substantive Testimonies in the table above were matched, some notes are included in Table 18. for each of the matches provided in Table 17, "Substantive Testimony by Category: Top 10 Best Examples."

Table 16. Substantive Testimony by Category: Top 10 Best Examples

Substantive Categories	Substantive Testimony
Flawed Analysis	… flaw in proposed rule in that it does not address exposure to fly ash from fugitive dust.
New Information	… due to changes in the chemical and reactive properties of the ash caused by the sulfur that's mixed in during the SO2 removal process… sell only about 6 percent of our ash this year…. Users… find it more desirable to use non-sulfur-containing ash from unscrubbed plants.
Alternatives	… railroad embankments, structural fills, flowable fills, or waste and soil stabilization … in our very dry climate (Colorado), managing storm water and snow run-off is relatively easy.
Content Change	… the status of small amounts of fly ash and waste streams from concrete production and construction is unclear.
Flawed Analysis	… the EPA itself acknowledges that Subtitle D would allow many coal ash dumps and waste ponds to go uncleaned.
New Information	… what will happen in the future as sea levels rise and storm surges cause waves to overtop the water piles, potentially washing much of their contents into the river and bays?
Flawed Analysis	… is coal ash is not regulated, the only recourse for individuals (low-income and minority populations) in these communities is citizen suits. No one there can afford to sue.
New Information	… toxicity level for sulfates is 500 milligrams per liter. The sulfate levels in this reservoir from the leaking ash ponds was 8,100 ... Nearly 16 times the toxic level of sulfates. If a cow would drink this, she would die.
New Information	… cancerous assessment of arsenic exposure have been based on studies of skin cancer. Epidemiological evidence on arsenic ingestion shows greater risks of several internal organ cancers such as kidney, lung, and liver and prostrate to that estimated using the skin cancer data will underestimate total cancer risks from arsenic ... also ... outcomes including diabetes and hypertension.
Adequacy	EPA … The Human and Ecological Risk Assessment of 2010 … identifying the risk from arsenic as being one of the greatest drivers … in regulation… the risks identified by arsenic in that document are … considerable underestimates of the actual risks posed by arsenic ... key issue ... cancer slope factor ... was for skin cancer ... EPA in drinking water standard in 2001 ... recognized that arsenic is a cause of lung cancer and bladder cancer … and National Research Council recommended as well that arsenic should be regulated as a lung cancer and a bladder cancer risk. ... most importantly ... EPA science advisory panel issued a recommended slope of 25.7, considerably above 1.5 ... essential that the risks in EPA's coal combustion ash analysis be revised.

Table 17. Comments for 10 Substantive Matches

Comments on substantive matching: Substantive Testimony by Category—Top 10 Best Examples (Respectively)
At first glance, this could clearly be out of scope and therefore non-substantive. However, if there is fugitive dust from an exposed surface of CCRs, probably fly ash, and the winds make that dust airborne, which regulations would be responsible for that? This has not been mentioned as a regulated topic in my research. Should this indeed be regulated under RCRA as a land application? You know that what is blown around does settle.
This testimony included new information about a specific market for a business. This just did not match with any of the Beneficial Use categories.
Information the Agency Requests mention construction and fill, etc., but none of the categories address changes in precipitation. The testimony points to less need if there is less rainfall to protect from runoff.
The waste stream of beneficial use process is not found as an issue in the Information the Agency Requests.
This is certainly not new information, but a substantive question into EPA knowingly "allowing" dumps to continue polluting.
Before you start categorizing this as out of scope, let's think about a recent global event that was thwarted by unexpected water levels, the Japan Nuclear Crisis. We know that water levels are rising, might there be some portion of the proposed rule that addresses rising sea levels? It does refer to Damn safety, does that regulated siting? Searching for the proposed rule for keywords Sea, rise, and level, the only close topic that is found related to surface water levels which are defined by groundwater values, nothing about sea.
This testimony may be simply an opinion. But I propose that it is the opinion of many and probably based on substantial truths. There would not be an uprise around this topic if there were no meat in the topic, meaning that many Environmental Justice issues may very well be true. So, where else does an advocate for the poor speak up about injustice towards other humans?
This speaker has testimony under Information the Agency Requests Damage Cases but the Second Review moved this testimony to substantive under New information but it is considered new data for the agency.
This may have fit under Information the Agency Requests Risk Assessment, but the second review placed this comment here. Other words from this same speaker are placed under Information the Agency Requests, but this portion of the speaker's testimony was considered new information above what the EPA was asking for.
A quick search through the proposed regulation leads to nothing about arsenic, cancer, or the word "health" outside the "protective of human health" phrase.

Speakers who provided either type of Substantive Testimony, IAR or non-IAR represented almost half of the total speakers at 48%, (146 out of 302). There was also a group that provided both types of testimony at 15%, (46 out of 302).

Vote

The majority vote for the proposed regulations was No, at 41%, quickly followed by a Subtitle C vote by 39% of the speakers. Subtitle D was supported by only 15% and Subtitle D Prime by 4% of the speakers. The voting categories are in Table 18 with count and percent of speakers.

Table 18. Voting Topic with Categories

Question Topic	Category	Vote Count	Percent of Total Speakers
Vote	No	125	41%
Vote	Subtitle C	119	39%
Vote	Subtitle D	45	15%
Vote	Subtitle D Prime	13	4%
Vote	**Total**	**302**	**100%**
Vote	**Goal**	**302**	**100%**

The No vote and the Subtitle C vote counts were basically the same in the count but not in intent. A No vote simply reflects testimony that does not specify the speaker's preferred regulatory option. The testimony may have clearly stated the speaker's preference without stating which regulatory option they preferred. One example was an assistant general counsel representing the American Road and Transportation Builders, who stated, "not to regulate coal ash as a hazardous waste," which was interpreted as a No vote for Subtitle C without stating which of the other two options was preferred. The rest of the testimony clearly indicates his position for continued use of the CCR as "an essential material in transportation improvement projects … results in GHG reductions … reduction in oil consumption … reduces the need for future cement manufacturing … to preserve all of the benefits that recycled coal ash has provided … not to regulate coal ash as a hazardous waste." (EPA, Coal Combustion Residues (CCR) - Public Hearings, Arlington, VA, 2011, p. 25). This speaker never specifically states what other option is preferred, but more simply states which option is not desired.

Speakers also represented their views about the larger picture beyond the regulatory options proposed in the regulation. This testimony is not IAR and could be considered as non-substantive for this public hearing, since it is outside the intent of the proposed regulation. However, it is representative of the larger energy issue: "EPA should not compromise just because the problem is so large ... We don't even need to burn coal ... We need renewable energy sources and we have them"

(EPA, Coal Combustion Residues (CCR) - Public Hearings, Denver, CO, 2011, p. 334). Another speaker testified that: " … if there's anything that the EPA can do to help us not pay the fossil fuel companies to continue to destroy our planet, that would be kind of cool" (EPA, Coal Combustion Residues (CCR) - Public Hearings, Denver, CO, 2011, p. 338). This testimony talks of larger policy issues and reflect the values of the speaker, but is not considered as information that can be acted upon in this context. Another observation of the No vote testimony is that those speakers did present as many as 11 substantive comments.

Substantive Testimony (IAR and Non-IAR) and Voting by Various Publics

In the findings section above, Various Publics data reflects the attendance of all speakers to the public hearings. This study was designed to allow Various Publics to be analyzed for providers of Substantive Testimony, both Information the Agency Requests (IAR) and for Non-IAR Substantive Testimony. This study's first question asks about speakers providing the Information the Agency Requests (IAR) and the third question asks about speakers providing Non-IAR Substantive Testimony from the EPA proposed rule-making. When the testimony that applies to these questions is analyzed by Various Publics, we can see who provides Substantive Testimony at high-risk public hearings. This allows for us to look across the publics as they relate to each other.

The Substantive Testimony and speakers Voting choices can be viewed by the Various Publics in Table 19. The data is sorted largest to smallest by the Various Publics Percent of Total Speakers, by representation. This clearly illustrates which Various Publics attended in the highest percent of the total number of speakers; Self, Environment, Industrial Interests and Business as third, and Professional Representatives and Society as forth. The data is highlighted to show which data is first (green), second (blue), third (orange) and forth (gray) in the attendance column. The data in the Substantive columns and the Voting columns are also ranked by highlighting as first, second, third and fourth, relative each

to their own category. This allows for a pattern of which various publics is first, second, third or fourth across each of the Substantive and voting columns.

Table 19. Substantive Testimony (IAR and Non-IAR) and Voting by Various Public

Various Publics	Various Publics Percent of Total Speakers	Total Information the Agency Requested Percent of Total IAR	Non-IAR Substantive Percent of Total Non-IAR Substantive	Total Substantive (IAR and Non-IAR) Percent of Total Substantive	NO VOTE Count	Vote Subtitle C Count	Voted Subtitle D Count	Subtitle D Prime Count
Self	26%	18%	13%	16%	35	43	2	
Environment	14%	19%	15%	18%	12	29	2	
Industrial Interests	9%	8%	11%	9%	13		12	2
Business	9%	15%	14%	15%	7		11	8
Professional Reps. and Societies	8%	11%	5%	9%	15	4	4	
Public Health	7%	6%	5%	6%	9	12		
Faith Based	6%	4%	4%	4%	3	14	1	
Trade	4%	5%	9%	6%	5		4	2
Small Business	3%	4%	3%	3%	7		2	
Agencies	2%	2%	2%	2%	2	1	3	1
Environmental Justice	2%	2%	0%	1%	1	6		
Indigenous Peoples	2%	2%	2%	2%	7			
Labor	2%	1%	3%	2%	1		4	
Scientific	2%	3%	4%	3%	1	4		
Civic and Community Based	1%	1%	2%	1%	2	2		
Other	1%	1%	2%	1%	1	2		
Agriculture	1%	1%	1%	1%	1	1		
Elected Officials	1%	0%	0%	0%	1	1		
Research	1%	1%	1%	1%	2			
Appointed Officials	0%	0%	0%	0%				
Consumer	0%	0%	0%	0%				
Ethnic	0%	0%	0%	0%				
Minorities	0%	0%	0%	0%				
News Media	0%	0%	0%	0%				
Total	**100%**	**100%**	**100.0%**	**100%**	**125**	**119**	**45**	**13**

For the most part, the Various Publics that are first or second in attendance are also first and second in the Substantive categories. There is one exception to that pattern, for Non-IAR Substantive, where Business ranks second and Self ranks third. This change in the pattern is not assumed to be a meaningful statement about Business's motivation and or ability to present more Non-IAR Substantive testimony based on the percent differences between the top Non-IAR various publics is 1% (15%, 14%, and 13%). This would be a pattern to look for if this study included more speakers, perhaps the other 6 public hearings associated with Disposal of Coal Combustion Residues from Electric Utilities (EPA, 2009), to increase the number of speakers and to reexamine the pattern.

Comparing the Two Hearings

The testimony from the Arlington, VA and Denver CO's public hearings t are reviewed to see how the two public hearings compare. Each public hearing had about the same number of attendees: with the Arlington, VA, hearing having 150 speakers and Denver, CO, having 152 speakers.

When comparing Arlington, VA, and Denver, CO, in the IAR category data (Table 20.) the most evident difference is the total number of times a speaker makes a reference to an IAR Category, with Arlington, VA, at 101 and Denver, CO, at 70. Arlington, VA, speakers testified more about IAR: Beneficial Use, Damages cases, Management of CCR, State Programs, Stigmas and Surface Impoundment Stability categories compared to Denver CO. Whereas, Denver CO testified more on Liners, RCRA Subtitle C and RCRA Subtitle D, and Risk Assessment categories. In Arlington, VA, the most frequent IAR category was Damage Cases (25), followed by Beneficial Use (18) and State Programs (15) and then Stigma (12). The most frequent IAR categories for Denver CO are also Damage Cases (14), Beneficial Use (14), Stigma (9) and Management of CCR and Risk Assessment (both at 6). The two public hearing locations although they differ in the number of speakers who address the IAR categories, have the same top concerns for Damages Cases and Beneficial Use. The

two locations are also very close on the IAR category of Stigma (Arlington VA, 12 and Denver, CO, 9).

Table 20. Information the Agency Requests by Category for Arlington, VA and Denver, CO

Information the Agency Requests (IAR) Categories	Arlington, VA, References to IAR Count	Arlington, VA, References to IAR Percent	Denver, CO, References to IAR Count	Denver, CO, References to IAR Percent
Beneficial Use	18	18%	14	20%
Damage Cases	25	25%	14	20%
Financial Assurance	1	1%	0	0%
General	0	0%	0	0%
Liners	1	1%	5	7%
Management of CCR	12	12%	6	9%
RCRA Subtitle C	1	1%	4	6%
RCRA Subtitle D	0	0%	1	1%
Regulatory Impact Analysis	5	5%	0	0%
Risk Assessment	4	4%	6	9%
State Programs	15	15%	10	14%
Stigma	12	12%	9	13%
Surface Impoundment Closeout	1	1%	0	0%
Surface Impoundment Stability	6	6%	1	1%
Total of times speakers referenced an Information the Agency Requests	**101**	**100%**	**70**	**100%**

When comparing Arlington, VA and Denver, CO for Various Publics categories (Table 21.), it appears that both locations are highest in attendance for Self (Arlington, VA has Self at 37 and Denver, CO has Self at 43). The two locations are very similar for the next Various Publics as Arlington, VA has Industrial Interests at 23 and Denver, CO has Business at 25.

Table 21. Various Publics for Arlington, VA. and Denver, CO.

Various Publics	Arlington, VA, Count	Arlington, VA, Percent	Denver, CO, Count	Denver, CO, Percent	Comparing VA & CO Absolute Count	Comparing VA & CO Absolute Percent
Agencies	3	2%	4	3%	1	1%
Agriculture	2	1%		0%	2	1%
Appointed Officials		0%		0%	0	0%
Business	1	1%	25	16%	24	16%
Civic and Community-based	4	3%		0%	4	3%
Consumer		0%		0%	0	0%
Elected Officials	2	1%		0%	2	1%
Environment	24	16%	19	13%	5	4%
Environmental Justice	6	4%	1	1%	5	3%
Ethnic		0%	0	0%	0	0%
Faith-based	7	5%	11	7%	4	3%
Indigenous Peoples		0%	7	5%	7	5%
Industrial Interests	23	15%	4	3%	19	13%
Labor	5	3%		0%	5	3%
Minorities	0	0%		0%	0	0%
News Media	0	0%		0%	0	0%
Other	1	1%	2	1%	1	1%
Professional Representatives and Societies	11	7%	12	8%	1	1%
Public Health	9	6%	12	8%	3	2%
Research	1	1%	1	1%	0	0%
Scientific	1	1%	4	3%	3	2%
Self	37	25%	43	28%	6	4%
Small Business	6	4%	3	2%	3	2%
Trade	7	5%	4	3%	3	2%
Total	**150**	**100%**	**152**	**100%**		

The two locations are also similar in what Various Publics they did not attract: Appointed Officials, Consumer, Ethnic, Minorities and News Media. The comparison of these two locations on the issues they deem most important and the types of publics that attend indicate that these two locations are similar and that these provides some validity to the study.

The major differences between the two hearings are the number of speakers who referenced a IAR and how they described their economic relationship to the policy. As well as the difference between the two public hearings with the inclusion of Indigenous Peoples in the Denver, CO, hearing. It happens that the Indigenous Peoples did not provide either IAR or Substantive Testimony so their inclusion may simply reflect the local population and does not alter the conversation.

In Arlington, VA the speakers self-identified as Industrial Interests and in Denver, CO the speakers are clearly self-identified as Business. The testimony and data here does not indicate an explanation for this difference. When comparing the two hearings using Regulated (Table 22.) and Not-regulated (Table 23.) publics, the difference between them for the Industrial Interests vs Business does not pertain as the two groups are comparable as Regulated Publics.

In comparing the two public hearing locations for which had the most references to Substantive Testimony, Arlington, VA, has 51 to Denver, CO's 38 (Table 24.). There could be any number of reasons why the numbers came out this way. The differences are the most apparent in the New Information, Alternatives, and Regulatory Consistency categories, where similarities exist in all the remaining categories. Perhaps there is something about Arlington, VA that positions that community to be knowledgeable in the three substantive categories as compared to Denver, CO.

Table 22. Regulated Publics Groupings for Arlington, VA. and Denver, CO.

Various Public Categories	Arlington VA Count	Denver CO Count	Combined Hearing Counts
Business	1	25	26
Industrial Interests	23	4	27
Small Business	6	3	9
Trade	7	4	11
Labor	5	0	5
Regulated Group Total Count	**42**	**36**	**78**
Percentage of Group compared to hearing	**29%**	**24%**	**26%**

Table 23. Non-Regulated Publics by Category for Arlington, VA. and Denver, CO.

Various Public Categories	Arlington, VA, Count	Denver, CO, Count	Combined Hearing Count
Self	37	43	80
Environmental	24	19	43
Public Health	9	12	21
Faith-based	7	11	18
Environmental Justice	6	1	7
Indigenous Peoples	0	7	7
Civic and Community-based	4	0	4
Group	**87**	**93**	**180**
Percent of Non-regulated Group compared to hearing	**58%**	**61%**	**60%**

Table 24. Substantive Category for Arlington, VA, and Denver, CO

Substantive Category	Arlington, VA, Substantive Count	Denver, CO, Substantive Count
Accuracy	2	0
Adequacy	9	10
Alternatives	0	5
Content Change	3	2
Flawed Analysis	16	13
New Information	16	7
Regulatory Consistency	5	1
Total	**51**	**38**

When comparing the two public hearings, the last questions to ask is how does this public vote? When comparing how the two public hearings voted, it is interesting to observe that Arlington, Va and Denver CO only differed from the combined hearing vote by 2% in all voting options except one. So, for the No Vote, Arlington, VA and Denver, CO were each different from the combined by only 2%. The only Voting option where this was not true is the Subtitle D Prime. For this voting option Denver, CO (10) exceeded Arlington, VA (3) by 7 votes.

Table 25. Vote Categories for Arlington, VA; Denver, CO; and Combined Hearings

Vote Category	Arlington, VA, Count	Arlington, VA, Percent of hearing	Denver, CO, Count	Denver, CO, Percent of Hearing	Combined Hearing Count	Combined Hearing Percent of Total Speakers
No Vote	59	39%	66	43%	125	41%
Subtitle C	63	42%	56	37%	119	39%
Subtitle D	25	17%	20	13%	45	15%
Subtitle D Prime	3	2%	10	7%	13	4%
Total	150	100%	152	100%	**302**	100%

DISCUSSION

Several scholars have addressed public participation in high-risk decision-making, environmental, and/or technical issues. Some question the public's ability to provide knowledge or meaningful participation. People may agree that a risk exists, but differ on what the risk is, how significant the risk is, and who or which business or agency is credible for managing the risk. This study examines the public hearing testimony of a high-risk environmental rulemaking to answer the main question about speakers providing Information the Agency Requests (IAR), but also with the intent of characterizing this public hearing using representation and substantive content. If public hearing speakers can testify to the EPA's IAR, then the testimony may be considered potentially valuable to the agency. The characteristics of the public hearings in this study are compared with the general knowledge of public hearings. This may illustrate how the high-risk environmental public hearing compares to a more common public hearing. Can public hearings can be generalized, or is a public hearing associated with a publicized and controversial high-risk environmental rulemaking different from a common public hearing.

Information the Agency Requests

The first question in this study is, "Does the public hearing testimony provide EPA with the information the agency requests in the proposed rulemaking?" This is analyzed by reviewing the public

hearing testimony for content that matches the various requests for information within the text of EPA's proposed rulemaking. Analyzing the Information the Agency Requests (IAR) testimony is goal-free because there are no criteria for how many public hearing speakers can make references to the EPA's IAR (Abelson & Gauvin, 2006). The EPA public hearings allow for each speaker to testify for 3 minutes. The IAR in the proposed rulemaking would require more than 3 minutes to provide a full response. However, there are speakers in these public hearings who are clearly capable of providing the IAR to EPA. The speaker's capability to provide the IAR is based on the speaker's ability to address the topics the agency requests within such a brief testimony.

Most speakers in this study (62%) did not make a reference to the IAR. While some researchers question the public's ability to provide knowledge or meaningful participation, this study also indicates that 38% of the speakers did refer to the IAR categories. This study does not address whether a public hearing is the most effective method to obtain this IAR; simply that IAR is obtained at the hearing.

Of the 114 speakers who provided Information the Agency Requests (IAR), 44 provided more than one IAR, with 34 providing two, six referring to three, and four speakers mentioning four different IAR categories. Clearly, more than a third of the public hearing speakers can present the IAR to the EPA. A few have taken on the challenge of referring to several topics within the short 3-minute speaking opportunity.

The IAR topic was sorted into 14 categories and the IAR Testimony was tracked by each category. Five categories had the highest number of references; Damages Cases, 23%; Beneficial Use, 19%; State Programs, 15%; Stigma, 12%; and Management of Coal Combustion Residue at 10%. All other IAR categories referred to constitute less than 7% of the total. A view of some IAR's highest categories helps to illustrate the potential value of the testimony.

Damage Cases

The results of reviewing Damage Cases indicate that approximately 20 known sites were mentioned and that 25 possible new sites were mentioned. Although these additional 25 sites have not assessed as either potential or actual damage cases, they are included in the testimony because they are significant enough in the speakers' minds to bring the site to the attention of EPA authorities. It would take further investigation of the keywords used from this testimony and a complete search and possibly site assessments to make any other determination about these sites.

It should be noted that a few speakers testified about sites where water supplies for humans and livestock were harmful and potentially deadly. The testimony had repetitive references to cancers of the kidney, lung, liver, and prostrate, and concerns about neurological damage and developmental disorders. Several speakers referred to the reports of high cancer rates (1 out of 50) associated with arsenic exposure that are "2,000 times higher than what the U.S. EPA considers the acceptable risk of arsenic" (EPA, Coal Combustion Residues (CCR) - Public Hearings, Arlington, VA, 2011, p. 377). A self-identified victim of coal combustion waste testifies that "the power plant … killed 1,400 head of sheep and wouldn't even allow to put city water in there for the poor … to drink" (EPA, Coal Combustion Residues (CCR) - Public Hearings, Denver, CO, 2011, p. 278). It would require further investigation to determine whether the site this speaker is referring to was included in the damage sites listed in this study. This speaker only referred to a New Mexico power plant and to a Highway 6800 for location information.

Beneficial Use

The most common Beneficial Use testimony is specific to clarifying the definition of Beneficial Use as referring to boiler slag, fly ash in concrete, and construction. Other Beneficial Use testimony mentions that backfill operations are not alike in claiming that their limestone mine with a low permeability of 10^{-7} or 10^{-8} would provide a suitable location for backfill with CCR. Another Beneficial

Use testimony mentioned that CCRs mitigate a reaction between the cement and silica, which prevents rapid deterioration. Some people experienced damage or were fearful of future damage sites based on practices that include the storage of CCW as a material for potential Beneficial Use. Others were for Beneficial Use and they wanted it to continue.

Support to continue Beneficial Use support tended to be for avoiding substitute environmental actions, such as mining or generation of greenhouse gases, or for saving jobs created based on the decades of developing Beneficial Uses or for saving investments made into the Beneficial Use byproduct manufacturing, or the cost savings for the purchase of Beneficial Use byproducts over substitute products.

State Programs

The testimony relative to state programs is extremely broad, from one location in Puerto Rico that allegedly sells coal ash to anyone that will take it for $0.15 a ton to another example where the speaker testifies that the EPA discounts the "important role many states play today … very active in our landfill and pond operations plans, inspections, and requirements for closure. State engineers and geologists and hydrologists are in the best position to implement" (EPA, Coal Combustion Residues (CCR) - Public Hearings, Denver, CO, 2011, p. 148). Additional examples were given of exemptions for storage, and for land and fill applications, where the states have regulations on the books that are not being enforced. One such example of this testimony is from a Utility Waste Activities Group about "very extensive regulations in the country requiring liners, groundwater monitoring[,] and other protections that many other states in the country still lack … fraught with gaps that make [S]ubtitle C regulations a necessity" (EPA, 2010, p. 243). Some speakers address the discrepancy in regulations at the state level that affect drinking waters that cross state borders, allowing water to be contaminated before it enters a state with effective Coal Combustion Waste (CCW) management.

More than one-third of the speakers did make solid references to Information the Agency Requested (IAR). The agency's public participation policies identify as desirable the opportunity to "Learn from individuals and organizations representing various public sectors and the information they are uniquely able to provide (community values, concerns, practices, local norms, and relevant history, such as locations of past contaminant sources, potential impacts on small businesses or other sectors, industry conducted study results, etc.)" (EPA, 2003, p. 8). It could be said that these publics were educated on the issues and able to express their views on governmental plans. This study does not evaluate whether the IAR is used by the EPA, but the speakers did provide IAR, which is the first step in determining whether the testimony has the potential of being valuable to the EPA.

Various Publics

The second research question is, "Which Various Publics attend the high-risk environmental proposed rulemaking public hearings?" The categorization of the Various Publics was first intended to see how many of the EPA publics, as described in the agency's public participation policies, attend these particular public hearings. One criticism of public hearings is that they are not representative. (Rowe & Frewer, Public Participation Methods: A Framework for Evaluation, 2000)

Using the agency's own Various Publics, the speakers at these hearings were represented as: Self at 26%, Environment at 14%, with Business and Industrial Interests at 9%; followed by Professional Representatives and Societies at 8% and Public Health at 7%; Faith-based at 6%; Trade at 4%, Small Business at 3%; Agencies, Environmental Justice, Indigenous Peoples, and Scientific at 2%; and Agriculture, Civic and Community-based, Elected Officials, Other, and Research, all at 1%.

When the Various Publics are reviewed, the highest publics in attendance are the Self and the Environment publics, at 26% and 14%, respectively. Self is the highest of the Various Publics to attend the public hearings in this study. This value indicates to researchers that citizens want to protect their rights, especially rights over usage of natural resources.

One way that the Self and the Environment are useful in public participation is seen in the writings of Lukensmeyer, Goldman, and Stern, who state that public participation brings public ideas and expertise forward, allowing the government to make policies based on "information that is widely dispersed in [s]ociety" (Lukensmeyer, Goldman, & Stern, 2011, p. 12).

The Self Various Public speakers did express their views, as seen in the testimonies that supported the many aspects of this controversial issue: pro-business, pro-recycling, pro-public health, environment, and future generations. This public did provide a check and balance to the discussion on management of Coal Combustion Wastes with the testimony on several controversial topics. It is not known, however, if this testimony improved the quality of the decisions (Prizzia, 2005).

In this study, the design allows the examination of the individual Various Publics to see how a public related to the topics and categories associated with the questions of this study. It may be expected for the Self to be highest in representation, based on public hearings being considered a citizen's participation. The Self having the highest Information the Agency Requests (IAR)AR is unexpected and goes against the perception that citizens may not be well-enough informed to provide Substantive Testimony. It is interesting and validating that the Self had the highest number of votes in both the No vote and Subtitle C, since these are the expected choices of the non-regulated community.

The Environment was next in the Various Publics at 14% in representation, second-highest in the Information the Agency Requests (IAR) topic, and third in Non-IAR Substantive. The Environment category is simply more individuals and citizens who advocate for the Earth and for public health (both now and for generations to come), and are educated and providing Substantive Testimony to the EPA. The next in attendance are Industrial Interests at 27, Business at 26, and Professional Representatives & Societies at 23, closely followed by Faith Based groups at 18. All other Various Publics are below the count of 10. It may be interesting to note that some various publics were not represented; Appointed Officials, Consumer, Ethnic, Minorities, and News Media. Truth be told, arguments could be made that we are all Consumers and that Ethnic and Minorities can also be in attendance but as a subset of

another Various Publics such as Self, Environment, Civic and Community Based, Environmental Justice, Faith-based, Indigenous Peoples, or Labor.

Industrial Interests, Business and Professional Representation & Societies are the next three groups in representation. The Various Publics are analyzed not only for attendance to show how each group attended but also for their involment in providing Information the Agency Requests. The Business category of Various Publics provides less Information the Agency Requests (IAR) at 15% compared to either Self at 18% or Environment at 19%. Business provides more IAR as compared to Professional Representations & Society at 11% and Industrial Interests at 8%. The results of IAR are not compared to any other evaluation results, but were surprising in that the Self and Environmental exceeded the number of IAR from Business.

Business is second to Environment in Non-IAR Substantive at 14%, and votes first for Subtitle D Prime and second for Subtitle D. All of this is expected since each public is testifying per their interests, as Yin would state; that when the data shows a predictive behavior such as publics voting in line with their interests, this provides a pattern matching that adds to the study's internal validity (Yin, 2009).

Some of EPA Various Publics were not represented in the public hearings, including: Appointed Officials, Consumer, Ethnic, Minorities, and News Media. A few officials were categorized as Elected Officials. The lines between the two may have been blurred, but either way, this was an insignificant portion of the speakers at 1%. The next of the Various Publics not identified was the Consumer. In truth, we knew that all speakers to the public hearings are consumers. It would have been interesting, for example, to know how many of these speakers are consumers of electricity from coal. None of the speakers identified themselves as consumers of electricity from coal, even though you knew it was the most likely option.

For the balance of the unrepresented speakers, next are Ethnic and Minorities. While there was the occasional mention of race, such as "Brandywine Coal combustion waste landfill is in a

[predominantly] African-American, rural portion of Prince George's County" (EPA, 2010, p. 74), most of the terms used for this portion of the population are as Indigenous Peoples or rural neighborhoods.

The Professional Various Publics category voted the same percent of No Vote as Environment. This prompted a review of the category to see who was included. Professional mainly constitutes professional societies in the coal industry and the transportation or concrete industry. There are professors representing economics, and mining and energy law. It is unclear why this group would refrain from presenting a vote, resulting in a No Vote in this study.

Providing testimony in these public hearings may be comparable to the results from another federal public hearing study "Indeed, regulated industries commonly constitute 90% of the presentations in federal agency proceedings" (Checkoway, 1981, p. 568). To compare this value to one from this study, some of the individual Various Publics will have to be grouped together since several of them would qualify as being regulated industries. Regulated Industries for the Coal Combustion Residual proposed rulemaking would be electric power generation plants as generators and any business or trade that is involved in the handling and or management of coal combustion residue, as either a waste or a byproduct. This would include businesses of all sizes, industrial interests, and trades. The regulated interests may also include labor.

The Regulated Industry that attended these public hearings represented at 26% of the combined hearings. This value is significantly less than the speakers in another study of federal public hearings with a similar metric, where the Regulated Industry speakers gave "90% of the presentations in federal agency proceedings" (Checkoway, 1981, p. 568). It is not known how close the two activities—"presentations in federal proceedings" and presenting testimony in a public hearing—may be to make this a strong comparison. Care should be taken when comparing these two values, because this does illustrate the importance of context. The Checkoway study states that 90% of the presentations are given by members of a Regulated Industry. Perhaps another way to phrase that would be that of the people there to give presentations, 90% of them were Regulated Industry. Another study from a community public renewal proceeding reported public representation as being "dominated" by the local

"property industry, state highway hearings by those who rank among the highest income, education, and occupational levels" (Checkoway, 1981, p. 568). Checkoway goes on to state that the regulated industries tend to allocate 100 times more resources to such presentations than citizen organizations.

The Regulated interests clearly did not dominate the high-risk environmental proposed rulemaking public hearings. The Non-regulated publics were a majority at the public hearings, with 60%. This representation further supports the idea that public hearings for a high-risk environmental rulemaking are attended more by the citizens speaking for themselves or for others, either from an Earth-based, advocacy, religious, or civic perspective.

A relatively high percentage (21%) of speakers wanted to represent more than one public in their testimony. These 64 speakers also wanted to represent the Environment, Environmental Justice, Public Health, Self, Professional Representatives and Societies, Indigenous Peoples, Civic and Community-based, Elected Official, and Industrial Interests.

The Environmental Justice representatives in the public hearings included residents and citizens known as Self in this study, but these speakers also included prominent people in society such as a district attorney of the 4th Circuit in Alabama, vice chair of the Maryland Commission on Environmental Justice, spokesperson for the Anne Arundel Council for the Environment, and directors of several not-for-profits (including faith-based not-for-profits, a researcher, and a filmmaker). This representation did indicate an advocacy for those underprivileged and poorer communities where residents may be unlikely to represent themselves.

Another interesting speaker observation was one who first identified as Self and then as Agencies. This speaker did attract some interest as he continued his self-description with "here tonight not to give technical comments on the rule but to point out that we're back here (attempting to regulate coal combustion residue as hazardous and getting push back from OMB) again" and his other Various Publics description simply as "I used to work for you guys over at EPA" (EPA, Coal Combustion

Residues (CCR) - Public Hearings, Arlington, VA, 2011, p. 414). Note that a past EPA employee is an Agency Various Public.

This study shows that citizens can express their views in a public hearing by bringing their ideas and expertise from society and providing information for potential use by the EPA. This study shows that these public hearings were not dominated by the regulated industries. This study does not examine statements about the Testimony influencing policy, or the public hearing being an action to legitimize a democratic society, providing a distribution of risk or checks and balances with on governments.

Faith-based groups represented 6% in these public hearings. The Faith-based groups were just under Public Health at 7% and the Professional Representatives and Societies at 8%. As well as placing the faith based representation close to the Business and Industrial interests at 9% each. The overall message from the Faith-based group is a respect for natural resources, the purity of the land, and for the concerns for our collective future.

Substantive Testimony (Non-IAR)

The third research question is, "Does the public provide substantive testimony at the high-risk environmental proposed rulemaking public hearings?" Public participation studies have addressed substantive participation. In one study Yao states that "The subset of the public that can provide the type of substantive comments that agencies seek is a small, unrepresentative group." (Yao, 2006, p. 91). Using Yao as a benchmark, this study finds that 26% of the speakers provided Substantive Testimony outside of the Information the Agency Requested (IAR), this type of Substantive Testimony is referred to as Non-IAR substantive. This Non-IAR substantive participation is provided by more than one-quarter of the total speakers at EPA's high-risk environmental public hearings. It is not known if the small group in Yao's study is greater than or less than the 26% of speakers who provided Non-IAR Substantive Testimony in this study. This study's design looks at speakers who provided testimony

under both IAR and Non-IAR Substantive. By definition, testimony that provides the agency with the information they are requesting is substantive. When you add the IAR Substantive Testimony to the Non-IAR substantive testimony, speakers providing both types of substantive testimony become a significant group at 48% or almost half of the speakers in this study. Clearly, almost half of the speakers is larger than Yao's small group. This study indicates that Substantive Testimony is provided by 146 out of 302 speakers. This study implies that speakers at a high risk environmental public hearing provide most of the substantive participation. This is contrary to the belief that common public hearings are thought to attract only small groups of speakers that provide substantive testimony.

A truth remains that some of the substantive testimony at the public hearing should be heard and presented simply for the merit of its content and because the public should be aware of things that help "to provide checks and balances on administrative government and to improve the quality of decisions" (Prizzia, 2005, p. 3). The following is a partial text of a very technical substantive testimony from a University of Denver, CO, physician specializing in occupational environmental medicine and medical toxicology: "EPA… The Human and Ecological Risk Assessment of 2010 … identifying the risk from arsenic as being one of the greatest drivers … in regulation … the risks identified by arsenic in that document are … considerable underestimates of the actual risks posed by arsenic ... key issue ... cancer slope factor ... was for skin cancer ... EPA in drinking water standard in 2001 ... recognized that arsenic is a cause of lung cancer and bladder cancer .... and [the] National Research Council recommended as well that arsenic should be regulated as a lung cancer and a bladder cancer risk ... most importantly ... [an] EPA science advisory panel issued a recommended slope of 25.7, considerably above 1.5 ... absolutely essential that the risks in EPA's coal combustion ash analysis be revised …" (EPA, Coal Combustion Residues (CCR) - Public Hearings, Denver, CO, 2011, p. 209).

This is an example of knowledge that should be disseminated to the public to help keep the checks and balances in place, especially in high-risk environmental policy issues. It would take further investigation to determine how readily available information is on this technical issue on cancer slopes

for various exposure routes, or if this public hearing may prove to be useful to the public as being the easiest place for this knowledge to become public.

Although this study shows that substantive testimony is provided at these public hearings, it does not presume to identify public hearings as the best way to provide this content to the agency for consideration. Topal continues to criticize public hearings, stating that they are but a token attempt of real public participation as a way to include the public and to provide the appearance of public involvement, a legitimizing activity of a democratic society (Topal, 2009), and are a key social mechanism for "legitimating risky economic activities and isolating risks from the authority of government" (Topal, 2009, p. 280).

Majority Vote

The fourth question about the high-risk environmental public hearings asks about the speakers' vote for the regulatory options as identified in the proposed rulemaking: "What vote does the public support at the high-risk environmental proposed rulemaking public hearing?" It looks at how the Vote dispersed across the three options in the proposed Hazardous and Solid Waste Management System: Identification and Listing of Special Wastes: Disposal of Coal Combustion Residuals from Electric Utilities (EPA, 2009), and whether the majority favors the Subtitle C, Subtitle D, or Subtitle D Prime?

Recall that during the first review of the Testimony for Vote, it quickly became apparent that there was another voting option: a No vote. The No vote varied from having a technical or value-based opinion and simply not wanting to mention a Vote option. A few speakers did not vote for an option but wanted, instead, a blend of Subtitle C and Subtitle D—what was for them the best of both worlds. Others testified to none of the options for reasons unknown to this study. Overall, the speakers had a 41% No vote. The difference between No vote and Subtitle C at 39% is insignificant.

One thing that did ring true for the voting topic and the various publics is that the Regulated Industry does not want Subtitle C and the Non-regulated Publics do want Subtitle C, with a close following of No vote. It was expected in this study that these three outcomes would have the highest percentages, and that expectation was validated by the data.

The final rule was published in December 2014. The rule went more toward the Subtitle D side of the regulatory options, maintaining a similar regulatory direction with the existing Bevill exemption of the Solid Waste Disposal Act Amendments of 1980. This public hearing vote did not predict the outcome of the final ruling. This study implies that the outcome of a vote is strongly influenced by the representativeness of the voting group. The more Self and Environment representatives, the more the vote goes to their voting preference. One speculation is that the vote simply goes in the direction of the largest voting group, which may contrary to the vote going towards the "techno-scientific arguments and rationalities" in Topal's study (Topal, 2009, p. 278).

POLICY RECOMMENDATIONS

All areas of government are looking for how to do more with less, or simply how to do less. As resources become more strained and public participation policy evaluation improves, it is hoped that increasingly effective methods of public participation will be found. Perhaps the observations of these public hearings in a high-risk environmental proposed rulemaking context will add to the understanding of public hearings and provide a suggestion for evaluation frameworks on the outcome side of public participation.

Recommendation 1:

The EPA should continue holding public hearings.

This study indicates that Information the Agency Requests (IAR) and Substantive Testimony can be received at a public hearing pertaining to a high-risk environmental proposed rulemaking. This

may or may not apply to other, more-general agency public hearings, but it is submitted that the EPA should continue to hold public hearings.

Such hearings should continue even if they can show that the IAR and Substantive Testimony from them is covered somewhere else in the public participation process. This is true of the high-risk environmental public hearing held for the Hazardous and Solid Waste Management System: Identification and Listing of Special Wastes: Disposal of Coal Combustion Residuals from Electric Utilities (EPA, 2009). This study clearly indicates that more than a third of the public hearing speakers provided the EPA with IAR substantive testimony and almost half of the attendees provide Substantive Testimony, either IAR substantive, Non-IAR substantive testimony or both. The public hearing attracts participants capable of giving Information the Agency Requests and Substantive information (knowledge and expertise from society) and a value to the agency.

Even if the agency could show that the same IAR and Substantive Testimony had already been presented to the agency, the public hearing would still provide a useful resource. In a study like this, holding the public hearing could bring out some Substantive comments that the public may otherwise not be aware of, such as the example of how the agency is allegedly using its own cancer data for arsenic cancer slopes inconsistently from one regulation to another, or how the agency's own past employee testified not on the technical merits of the argument but on the nature of the relationship between the EPA and OMB on this specific matter: "… here tonight not to give technical comments on the rule but to point out that we're back here [attempting to regulate coal combustion residue as hazardous and getting push back from OMB] again" (EPA, Coal Combustion Residues (CCR) - Public Hearings, Arlington, VA, 2011, p. 414).

Therefore, one value of the public hearing is just that: it is public. This evidence may be an argument for being legitimate and democratic simply because this type of participation is transparent to the public. In this study, the largest representation was the Self; when the Self was grouped with other

similar Various Publics or Non-regulated Public, that total was 60% of the speakers. The public side of the hearing gives the speaker a feeling of power, knowing that their voice is heard and that they can help the agency with IAR.

It is proposed that the Information the Agency Requests and Substantive Testimony from the EPA's public hearings provide real value and are not simply legitimizing the democratic system. The IAR and Substantive Testimony also help with the balance of both information and regulation. Not unlike the balance of technical knowledge about arsenic and cancer slopes, it shares the values and concerns as speakers testify about both heartwarming and horrendous stories, and advocates for an industry that wants to use a breakthrough technology or simply wants to provide employment. These public speakers can stand for alternatives to the status quo, speak from tradition and religion about historical values. or speak about how this regulation can diminish these concepts.

Recommendation 2:

Public participation evaluation frameworks pertaining to public content on the outcome perspective should include, whenever possible, evaluation of representation and substantive evaluation.

When looking at the bigger picture of public participation evaluations and the creation of standard terms and criteria, representativeness appears frequently in literature as a basic metric in a study's design. Representations allows us to know which of the affected parties have participated. Representation can be described as a key component of a democratic society. Representation allows researchers to understand the substantive content in the context of the speaker. Substantive content is participation that can be acted upon and is meaningful to the organizations or agencies holding the public participation. The existence of Substantive Testimony indicates that an educated and involved public is participating. The framework used in this study evaluated the value of the testimony by for representativeness and Substantive

The framework was designed to place each Information the Agency Requested (IAR) into the context of the speaker by identifying the type of public each speaker represented. This design allowed the study to report that the highest of the Various Publics was the Self and that the Self provided the highest references to IAR. Including representation in the study allowed the evaluation of Regulated and Non-regulated publics.

The Substantive content in the evaluation framework of public hearing testimony was useful since it helps agencies like the EPA learn from society. When representativeness is also evaluated, it helps the agency learn which parts of the public are capable of participating, and willing to participate, in a meaningful and substantive way.

LIMITATIONS

Study Boundary

The question "Does the public hearing testimony provide EPA with the information the agency requests in the proposed rulemaking?" was selected to provide clear boundaries for this evaluation (Yin, 2009). The analysis pertains to the EPA public hearing testimony on one specific proposed EPA rulemaking. The analysis examines the testimony for evidence of the Information the Agency [EPA] Requests (IAR) in the proposed rulemaking.

Based on these statements on boundaries, the following items are outside the study's boundaries: any written material submitted to the EPA in association with this public hearing by the speakers, or any other communications these speakers or any other citizens or organizations have provided to the EPA on this proposed rulemaking or on any other proposed rulemaking. In addition, by bounding the study to the public hearing testimony from a specific proposed rulemaking, the point in time has been clarified and does not include anything before or after the public hearing. Later in this

analysis of IAR, another boundary was identified, and the IAR definition changed to exclude non-substantive opinions.

List of Limitations

The following is a list of limitations that were tracked throughout this study. These are not in any specific order, except that the first three regarding the number of hearings and the basic premise of reference to IAR would take precedence over some of the later limitations.

1) This study examined two hearings out of eight possible hearings associated with the proposed rulemaking. While the two hearings had many differences from as well as similarities to each other, a fuller picture of the available high-risk environmental public hearings would be achieved if the other six hearings were evaluated as well.
2) This study is based on a simple principle that assumes it is sufficient to reference an IAR in a public hearing testimony and have that be counted as a yes.
3) If the assumptions made in the identification of the Damage Cases should be strengthened, the sites better researched, and the unknown sites better described to determine if this testimony was truly a match for Damage Cases, that would be a future research project that is beyond the scope of this study. Any research to identify nearby or potential at-risk drinking water supplies would also require further investigation.
4) All the matching was done by a single researcher who has several years of education in the subjects, although little practical experience in the subject matter. This type of testimony categorization should be validated by a team of experienced people who represent various sides of the issues to ensure a fair and consistent matching of testimony to IAR and Substantive information.

5) It should be noted that the researcher in this case study has an environmental background with a BS. in Environmental Management; has focused on environmental issues during her master's degree program; and has 30 years of experience in working for a Fortune 500 company, half of that time working in health safety and environment.

CONCULSIONS

This study examines several questions pertaining to public testimony from two EPA public hearings addressing a proposed rule-making on a federal high-risk environmental policy issue. The answer to these questions are benchmarked with observations made by other public participation researchers. I wanted to know how similar or dissimilar these high-risk public hearings are to other public hearings. In the field of public participation evaluations, Rowe suggested that the context of a study is important in comparability between study's. How will the findings from this study on a high-risk environmental public hearing compare to the expectation of public hearings? The conclusion of this study shows that these high-risk public hearings are similar enough to be compared as public hearings, but different in some ways that may be indicative of the high-risk environmental context.

This study asks, "Does the public hearing testimony provide EPA with the information the agency requests in the proposed rulemaking?" This study indicates that 38% of the speakers at the EPA's high-risk environmental public hearings testify on Information the Agency Requested (IAR). The EPA agency does receive the Information the Agency Requests from the proposed rule-making. This is not compared to observations from any other studies as this question was for observation purposes only.

The response to the second research question, "Which Various Publics attend the high-risk environmental proposed rulemaking public hearings?" is answered by categorizing the speakers into Various Publics. The highest publics at the hearings were the Self at 26%, Environment at 14%, and Business and Industrial Interests both at 9% of total attendance. Public hearings are expected to be dominated by the citizens that may be affected either positively or negatively. Many of the EPA's

Various Publics were represented at these public hearings but we do not know if it included a fair representation of those who are potentially affected by the outcome of the proposed regulation. Certainly, the public represented by Environmental Justice issues seemed low at only 5%.

Further analysis of the Various Publics gave us a Regulated Industries group and a Non-regulated group. The Non-regulated (various citizen's groups) dominated the public hearing with 60% attendance. It is validating to have the attendance dominated by the Non-regulated publics as public hearings are known as a citizen's public participation. The high citizen attendance at these high-risk environmental public hearings are similar to other public hearings in that characteristic.

The Regulated group can be compared to Checkoway's work on public hearings where he describes the attendance at a Federal proceeding as dominated by the regulated community at 90%. (Checkoway, 1981). More needs to be known about the difference between Checkoway's federal proceedings and the public hearings in this study to understand why there is a difference in representation between the two public participation events.

The third research question in this study is, "Does the public provide substantive testimony at the high-risk environmental proposed rulemaking public hearings?" This question is asking for Substantive Testimony beyond the Information the Agency Requested (IAR). There were 302 speakers in the hearings, 78 (26%) speakers provided Non-IAR substantive testimony; of those, 13 had two Non-IAR Substantive comments. In total, 89 Non-IAR Substantive comments were collected from the hearings. The public hearings with the high-risk environmental issue had 26% of the speakers provide Substantive Testimony focused on Flawed Analysis, New Information and Adequacy categories.

The speakers who provided either Information the Agency Requests (IAR) and / or the Non-IAR Substantive testimony totaled to 48% of the speakers providing Substantive Testimony. Almost half of the speakers provided Substantive Testimony. Public hearing speakers are not known for providing Substantive Testimony. This appears very different from public hearings as we know them. Clearly, almost half of the speakers is larger than Yao's small group of public able to provide

substantive participation. This study indicates that substantive testimony is provided by 146 out of 302 speakers. The next question to ask by the examination of other studies, Is this unique to a high risk public hearing since the more common public hearings have been studied and found to attract only small groups of speakers that provide substantive testimony.

It may be arguable that publics who make a reference to the IAR or to a Substantive topic have not provided a full and detailed requested information. It is difficult to provide that level of detail in a 3-minute testimony, even though a few speakers did attempt to do so. The fact that 38% of the public hearing testimony does make a reference to IAR implies that the public hearings can attract speakers who can provide requested information and that these same speakers may have provided additional details of their participation in a written format at the time of the hearing. Several speakers mentioned specially that they were also submitting written details.

The study's results clearly indicate a need for further investigation into public hearings in a high-risk environment proposed rulemaking to fully understand the value they may provide the agency. A high-risk environmental public hearing may be very different from a standard public hearing. This particular high-risk environment proposed rulemaking was significant when compared to standard public hearings, since the agency arranged for eight public hearings. It is not normal for standard public hearings to hold eight public events. Most proposed rulemakings do not involve that many public hearings, but when an issue is nationally sensitive enough to generate the need for eight public hearings, the testimony is substantially different from that at a standard public hearing.

This study also suggests that evaluation frameworks for public participation outcomes should include, when possible, a review of the content of the speakers for a description of their representativeness and for the testimony being substantive. These public participation characteristics are precursors to understanding the value of the participation and provide a benchmark for comparing other public participation studies. One existing benchmark for standard public hearing Various Publics

is a 90% metric used for percentage of presentations made by Regulated Industries in federal proceedings, which implies that of the presentations given, 90% represented the Regulated Industries. This study provides an example of the difficulty in finding a consistent framework for the comparison of public participation studies. It also demonstrates that the characteristics in outcome evaluation frameworks would make future comparisons between studies more useful, and provide value to the agency requesting the testimony.

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