University of Kentucky

UKnowledge

Theses and Dissertations--Communication

Communication

2013

COMMUNICATION AT SUPERFUND SITES AND THE REIFICATION OF DIVISION: TOWARD A CONVERGENCE-BUILDING MODEL OF RISK COMMUNICATION

Anna G. Hoover
University of Kentucky, anna.hoover@uky.edu

Right click to open a feedback form in a new tab to let us know how this document benefits you.

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained and attached hereto needed written permission statements(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine).

I hereby grant to The University of Kentucky and its agents the non-exclusive license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless a preapproved embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's dissertation including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

<div align="right">

Anna G. Hoover, Student

Dr. Chike Anyaegbunam, Major Professor

Dr. Timothy L. Sellnow, Director of Graduate Studies

</div>

COMMUNICATION AT SUPERFUND SITES AND
THE REIFICATION OF DIVISION:
TOWARD A CONVERGENCE-BUILDING MODEL OF RISK COMMUNICATION

_____

DISSERTATION
_____

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Communication and Information
at the University of Kentucky

By
Anna Goodman Hoover

Lexington, Kentucky

Director: Dr. Chike Anyaegbunam, Professor of Strategic Communication

Lexington, Kentucky

2013

ABSTRACT OF DISSERTATION

COMMUNICATION AT SUPERFUND SITES AND
THE REIFICATION OF DIVISION:
TOWARD A CONVERGENCE-BUILDING MODEL OF RISK COMMUNICATION

This case study evaluates government communication practices at Superfund sites. I describe agency communication practices in Superfund communities, paying particular attention to the U.S. Environmental Protection Agency's *Seven Cardinal Rules of Risk Communication* and its role as a model for federal agencies engaged at these sites. Situating the study within a theoretical milieu that includes sensemaking and symbolic interactionism, I examine whether current practices deepen divisions among stakeholders, reducing the possibility for communicative convergence.

I implement textual analysis and narrative inquiry to examine written and spoken communication about the Paducah Gaseous Diffusion Plant National Priorities List Superfund site. Through crystallized analysis of media coverage, public comments, focus group transcripts, and local blogs, I address the following research questions:

RQ1: How does the enactment of accepted agency risk communication practices affect relationships among stakeholders, specifically:

- how do stakeholders (including federal agency personnel) characterize past and present agency risk communication practices, and
- how do stakeholders (including federal agency personnel) characterize each other in relation to these communicative practices?

RQ2: What are the related implications for improving agency risk communication approaches?

The study concludes with recommendations for improving existing agency risk communication guidelines, as well as the creation of a new communication model to promote convergent communication at Superfund sites.

Anna Goodman Hoover

April 30, 2013

COMMUNICATION AT SUPERFUND SITES AND
THE REIFICATION OF DIVISION:
TOWARD A CONVERGENCE-BUILDING MODEL OF RISK COMMUNICATION

By

Anna Goodman Hoover

Chike Anyaegbunam, Ph.D.
Director of Dissertation

Timothy L. Sellnow, Ph.D.
Director of Graduate Studies

April 30, 2013
Date

This work is dedicated to my darling daughter Evelyn.
Keep asking questions.
Doctrina Lux Mentis

ACKNOWLEDGEMENTS

This dissertation would not have been possible without the guidance and support of a number of people. Upon stepping into my first communications classroom, I could not have imagined that the professor, Dr. Chike Anyaegbunam, would become not only my Dissertation Chair, but also my colleague and friend. I am indebted to him for his wisdom, kindness, and patience. I likewise thank the members of my committee -- Dr. Tim Sellnow, Dr. Dan O'Hair, and Dr. Lisa Gaetke -- for contributing their expertise, time, and enthusiasm to this project. It has been my privilege to learn from each of you.

I owe debts of gratitude to the good friends and colleagues who have read portions of this work: Sarah Riley, Michael Arrington, Pamela Cupp, Lizeth Fowler, and John DeAtley. Their feedback has been deeply appreciated, as have the insights of the governmental staffers, NGO representatives, and community members who have provided data and served as sounding boards throughout this process. Lindell Ormsbee and Stephanie Jenkins of the university's Superfund Research Program Research Translation Core also provided tremendous support along the way. These individuals have challenged my assumptions and expanded my perspective, and I thank them for that.

Finally, and most importantly, I thank my beloved family and friends for their patience, love, and support during this adventure. For more than forty years, my parents have encouraged me to expand my horizons through constant learning. For the last thirteen of those years, I have shared the journey with my dear husband, John, and for nearly five of those years, we have been unexpectedly, remarkably, and miraculously accompanied by our darling Evelyn. To this wonderful family, I offer my deepest gratitude and everlasting love.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter One: Introduction

In the mid-1980s, several high-profile environmental crises pointed to the need for government agencies to communicate better with the public about the environmental and health risks of exposure to specific contaminants (Perrow, 1984; Shrivastava, 1987; Weick, 1988; National Research Council [NRC], 1989). From this need, the field of risk communication emerged, with scholars and practitioners developing strategies for disseminating information to and receiving information from risk-bearing communities. One of the first and most enduring products of this field is the U.S. Environmental Protection Agency's [U.S. EPA] *Seven Cardinal Rules of Risk Communication* (Covello & Allen, 1988). These guidelines, which appear in various forms across numerous best practices documents, include: "1) accept and involve the public as a legitimate partner; 2) plan carefully and evaluate your efforts; 3) listen to the public's specific concerns; 4) be honest, frank, and open; 5) coordinate and collaborate with other credible sources; 6) meet the needs of the media; and 7) speak clearly and with compassion" (U.S. EPA, 1988).

For almost a quarter of a century, these rules have guided the development and implementation of scores of stakeholder communication efforts by U.S. EPA and other federal agencies engaged at hazardous waste sites (ATSDR, 1994; Tinker, 1996; Keystone Center, 2005). The approach delineated by the *Seven Cardinal Rules* and similar governmental best practices guides represents an enormous advance from the sparse risk communication efforts that preceded them (Covello & Sandman, 2001). However, further evaluation is needed concerning the long-term impacts of this

framework on relationships among agencies, community members, and other stakeholders.

While U.S. EPA, specifically, has based its risk communication efforts on the *Seven Cardinal Rules*, these guidelines also have provided a model of public communication for other federal agencies, including the Agency for Toxic Substances and Disease Registry [ATSDR] (ATSDR, 1994; Tinker, 1996) and the U.S. Department of Energy [U.S. DOE] (Keystone Center, 2005). That these three organizations essentially use the same framework for communicating with riskbearers has been particularly important in Superfund communities, which bear significant environmental and health burdens that sometimes require both individual and community-level actions to mitigate. In addition to being guided by the *Seven Cardinal Rules*, federal agencies often contract strategic issues management or public relations consultants to help craft risk communication primers and conduct training for employees (Keystone Center, 2005; Center for Risk Communication, 2012). As a result, agency communicative policies and procedures tend to be based on guidelines drawn from the best practices literature, including *Seven Cardinal Rules*.

Superfund communities present particularly challenging environments for enacting the *Rules.* In these settings, citizens often find themselves embedded within a complicated and confusing network of similar but disconnected governmental activities and communication efforts. By federal law, U.S. EPA investigates, designates, and oversees environmental cleanup activities associated with Superfund sites, while ATSDR investigates and reports about potential public health impacts related to contamination (U.S. EPA, 2011). Because of its role in the production of nuclear energy and waste

products since the Cold War, the U.S. Department of Energy itself is responsible for the cleanup of some 21 Superfund sites, constituting "the world's largest nuclear cleanup" (U.S. DOE, 2011). Further, a 1997 report to Congress indicated some level of environmental contamination at all ninety-six of the agency's nuclear facilities (de Saillan, 2008).

Despite increased U.S. DOE attempts to engage local communities directly in risk communication, both the large scale of the agency's environmental management efforts and numerous revelations about its prior waste mismanagement (Bruce & Becker, 2007; Taylor, B. C., Kinsella, W. J., Depoe, S. P., & Metzler, M. S., 2005) have contributed to high levels of distrust among many community stakeholders (Flynn, Slovic, Mertz, & Toma, 1990; Slovic, 2000). Even as U.S. DOE attempts to engage its publics, implement more inclusive processes, and provide assistance to affected communities, stakeholders tend to remain dubious of motives and desired outcomes (KRCEE, 2011). As Gaetke, Gaetke, and Bowen (2008) put it, "people who have been affected by Superfund sites are often, legitimately, not inclined to trust offers of help from strangers, particularly from outside of their communities" (p. 279). Further, across the U.S. DOE complex, community members have indicated that they are greatly concerned about both their inability to help set site-related priorities and the community's perceived lack of influence on U.S. DOE decision making in general (Battelle, 2003).

Among the sites that U.S. DOE currently is remediating is the Paducah Gaseous Diffusion Plant [PGDP], a National Priorities List (NPL) Superfund site in western Kentucky. Currently, the PGDP is the only operating uranium enrichment facility in the United States (Kaoutzanis, 2011). Initially charged with producing fuel for the military-

industrial complex, the PGDP transitioned in the 1960s to focus on uranium enrichment for electricity-generating commercial reactors (USEC, 2010). The PGDP was owned and operated by U.S. DOE until 1992, when operations were leased to the United States Enrichment Corporation [USEC]. Although USEC continues to manage enrichment activities, U.S. DOE retains responsibility for PGDP site clean-up and environmental management.

In 1988, technetium-99 and trichloroethylene contamination from the plant were discovered in nearby private drinking wells. Subsequently, U.S. EPA launched an investigation that resulted in the PGDP's addition to the Superfund National Priorities List in 1993 (U.S. EPA, 2007). In fulfilling its oversight duties at the facility, U.S. EPA works closely with such state agencies as the Kentucky Energy and Environment Cabinet's Department for Environmental Protection and Division of Waste Management, as well as the Cabinet for Health and Family Services' Radiation Control Branch. The Kentucky Department of Fish and Wildlife is directly affected by PGDP activities through its lease of the wildlife management area surrounding the plant. In addition, U.S. DOE established a Citizens Advisory Board, or CAB, in compliance with community right-to-know laws to "facilitate the flow of various kinds of technical information from experts to community residents and to open channels of commentary between them" (Heath & Palenchar, 2009, p. 316).

Since the PGDP's addition to the NPL, U.S. DOE has conducted numerous site-related information campaigns and community meetings; however, local stakeholders have continued to express strong distrust of the agency while voicing concerns about the goals of PGDP-related engagement projects (KRCEE, 2011). In one recent study, focus

group participants were asked to rate their preferred levels of public engagement in PGDP-related matters, as well as perceptions of their actual engagement. To gauge stakeholder opinion, researchers utilized the Arnstein Ladder (1969). This tool assesses perceived and desired participation levels via an eight point scale ranging from non-participation to citizen power, as follows:

1. Manipulation
2. Therapy
3. Informing
4. Consultation
5. Placation
6. Partnership
7. Delegated Power
8. Citizen Control

Although participants in seven focus groups indicated that their preferred level of PGDP-related engagement with agencies would be partnership, they placed their actual engagement levels between being informed and being consulted, marking a full two-point difference on the eight-point scale (KRCEE, 2011). Importantly, the KRCEE (2011) study also noted that stakeholder groups who perceived themselves as experiencing the lowest levels of participation on the Arnstein Ladder desired higher participation levels than other groups, leading the investigators to ask, "[D]o higher ideal levels of engagement negatively influence perceptions of real-world engagement activities, or do unsatisfactory past experiences increase the desire for achieving a higher ideal level of involvement" (p. 111)?

This "Arnstein Gap" (Bailey, Blandford, Grossardt, & Ripy, 2011) between experienced and desired levels of public participation, along with the lack of community trust, both in the agency's waste management practices and in the veracity of its risk communications, raises the question of whether more than twenty years of risk

communication activities derived in part from U.S. EPA's *Seven Cardinal Rules* have improved U.S. DOE's relationship with the community or if, in fact, these guidelines might have contributed to further deterioration of already-damaged relationships. The *Rules* have informed the design and implementation of numerous federal communicative actions for more than two decades; however, as Weick (1988) notes, while action can facilitate mutual understanding "action [also] affects events and can make things worse" (p. 306). In practice, has adhering to the *Rules* reified existing divisions between agencies and their stakeholders? Do the *Rules* implicitly marginalize community concerns as less valid than technical assessments of risk?

Paducah provides a fascinating case for addressing these important questions. Through the years, complex relationships among federal and state governmental agencies, community stakeholders, myriad activist and advocacy groups, and the media have presented opportunities for both communication and *mis*communication. Individuals and groups have spent decades making sense of the PGDP, of its role(s) in the community, and of the potential consequences of the plant's physical presence in the region. These sensemaking activities have contributed to a process known as "enactment," which results in an "enacted environment" (Weick, 1988, 1995).

Weick (1988, 1995) describes enactment as an ongoing, iterative process through which people shape their environment, which then constrains the very people who created that environment. In describing the enactment perspective, Weick (1988) states that "when people act, they bring events and structures into existence and set them in motion" (p. 306). Three mediating factors potentially constrain this important process. Capacity limits enactment through the number and diversity of potential actors, as when

fewer individuals are available to jointly make sense of a situation or all individuals interacting share a similar perspective; commitment affects enactment through the formation of "blind spots" in the "tenacious justification" of particular positions, as when individuals hold tightly to beliefs in spite of evidence to the contrary; expectations constrain capacity through the creation of assumptions that become "self-fulfilling prophecies," as when an individual's negative past experiences inform negative reactions to a new situation, thus creating challenges for interactions that further deteriorate in the new situation (Weick, 1988).

In short, numerous stakeholders -- ranging from residents in contaminated areas to plant employees to CAB members to environmental activists to local government and economic development leaders -- have disparate stakes in and distinct, often competing, perspectives about PGDP-related issues. The various stakeholder groups receive information about the site from numerous other site-related actors, generating frequent and often conflicting messages from which sense must be made. Further, each stakeholder group and the individuals who comprise it have differing levels of technical knowledge and emotional investment in the plant and its activities. However, current risk communication paradigms pit broad-brush characterizations of "technical hazard" against "community outrage," often missing distinct but important nuances among stakeholders in favor of a binary view that places agencies on one side of risk communication and community stakeholders on the other.

Through a sensemaking lens, this case study examines the ways in which agencies and their multiple stakeholders describe each other, as well as the ways in which individuals with disparate stakes perceive previous agency risk communication and

community engagement efforts. Using a qualitative multi-method analytic process, this study brings together models and theoretical concepts from the risk and participatory communication fields to inform strategic issues management practices for federal agencies. The findings support the development of a new communication model that balances the lived experiences of those affected directly by environmental exposures with the technical knowledge of agency personnel.

Statement of Purpose

More and more, federal agencies are seeking to adapt long-standing, prescriptive risk communication guidelines to create collaborative paradigms that promote shared understanding. If sensemaking is an interactive, situated process in which individuals work together to create shared meaning (Blumer, 1966), then it stands to reason that to be successful, new risk communication approaches should feature collaborative sensemaking activities involving stakeholders with diverse perspectives. To develop these approaches, however, we first must identify where current models might be problematic to ensure appropriate adaptation of existing practices.

This study seeks to improve our understanding of the long-term impacts of past and current federal risk communication activities on stakeholder relationships through a case study of the Paducah Gaseous Diffusion Plant National Priorities List Superfund site. Specifically, I attempt to identify constraints that agency risk communication policies place upon enactment, including the role that specific communicative practices could be playing in provoking or sustaining adversarial relationships. I do this by analyzing written and spoken communication from multiple datasets to explore the ways in which agency risk communication policies and practices could be affecting stakeholder

8

relationships. For clues, I examine how multiple stakeholders, including both community members and agency personnel, characterize previous and ongoing federal risk communication activities. I further seek to identify instances in which these perceptions of risk communication experiences influence stakeholder perceptions of other actors, both from agencies and within the community.

Thus, I analyze written and spoken communication from several quarters to address the following research questions:

RQ1: How does the enactment of accepted agency risk communication practices affect relationships among stakeholders, specifically:

- how do stakeholders (including federal agency personnel) characterize past and present agency risk communication practices, and

- how do stakeholders (including federal agency personnel) characterize each other in relation to these communicative practices?

RQ2: What are the related implications for improving agency risk communication approaches?

Exploring these questions will improve our understanding of whether and how the risk communication framework currently used by federal agencies working at Superfund sites could be creating new or reifying existing divisions between government entities and community stakeholders. After identifying the nature of the existing framework's impacts on relationships, I propose stakeholder-centered amendments to *The Seven Cardinal Rules of Risk Communication*, establishing a new model for federal agency interactions with riskbearing communities at Superfund sites. The practical issue of promoting communicative convergence is central to these recommendations.

Building a collaborative framework for risk communication requires deepening the current understanding of risk as a socially- and linguistically-constructed phenomenon. As Murdock (2010) argues, improving contemporary risk communication requires "a research effort that is resolutely interdisciplinary, that mobilizes expertise from outside the communications and risk communities, and that is matched by a policy response that 'joins up' hitherto separate domains" (p. 174). By deepening our understanding of how current federal risk communication practices create, reify, and/or challenge stakeholder perceptions, I identify spaces in which convergence may be possible, leading to policy recommendations for a collaborative, empowering model of risk communication that can be implemented jointly by agencies and risk-bearers.

Organization of Dissertation

In achieving the goals set forth for this study, I have organized the dissertation in five distinct chapters.

In Chapter One, I briefly introduce both the problem and the scene. I provide a cursory overview of federal risk communication at Superfund sites and introduce the Paducah Gaseous Diffusion Plant as the site of study. Finally, I provide the goals and research questions for the study.

Chapter Two presents the study's background and rationale. I begin with an examination of the history of risk communication, followed by an analysis of four distinct approaches to risk communication: research translation, policy-oriented, stakeholder-based, and participatory. The chapter then discusses the particular political dynamics and challenges for Superfund site communication before describing the history of the PGDP

and its status as a National Priorities List site. I close the chapter by explicating the challenges that this study addresses.

In Chapter Three, I provide an in-depth discussion of study methodology. I discuss the epistemological paradigm of the researcher, including overviews of sensemaking and symbolic interactionism. The chapter provides a detailed description of research design, including discussions of constant comparative analysis and narrative inquiry, as well as the role of crystallization in bringing these different analytical forms together. I describe data collection through a discussion of selection and sampling, as well as detailed descriptions of each of the four datasets. In the data analysis section, I provide details regarding coding activities. I then discuss specific challenges for the study, including the ways in which qualitative research specifically addresses traditional social scientific constructs like generalizability, reliability, validity, objectivity, and researcher reflexivity.

In Chapter Four, I provide study results, specifically identifying five cross-cutting themes found in the datasets: 1) The Government; 2) The Public; 3) Delays; 4) Secrecy, Deception, and Manipulation; and 5) Competing Risk Perceptions. I discuss the ways in which each theme relates to enactment, specifically how it informs and is informed by sensemaking constraints for capacity, commitment, and expectations. Each thematic section closes with a narrative vignette intended both to exemplify and to enhance the preceding constant comparative analysis.

After briefly synthesizing the evidence in Chapter Five, I delineate the study's implications for future risk communication efforts at Superfund sites. Specifically, I make recommendations regarding the rhetorical adaptation, operationalization, and

implementation of *Seven Cardinal Rules* and other best practices-oriented risk

communication guides specifically for use at Superfund sites. I also suggest a

convergence-promoting model for Superfund site communication that incorporates

elements of research translation, policy, stakeholder-based, and participatory approaches.

The dissertation closes with discussions of study limitations and future directions.

Chapter Two: Background and Rationale

A Brief History of Risk Communication

Risk communication came into its own in the late-1970s and early-1980s, an event-driven outgrowth of risk management (Murdock, 2010). These years saw a slew of domestic and international environmental crises, including illnesses related to toxic chemicals at New York's Love Canal, the partial nuclear meltdown at Pennsylvania's Three Mile Island facility, the tragic death of thousands in Bhopal, India, following a Union Carbide pesticide plant's leakage of methyl isocyanate, and massive contamination from the Chernobyl nuclear plant accident in the then-Soviet Union. With each of these events, it became increasingly clear that both government and industry officials needed to inform the public about existing and emerging environmental and health risks (Perrow, 1984; Weick, 1988; NRC, 1989; Heath & O'Hair, 2010).

As Murdock (2010) states, the field's earliest iterations "saw [risk communication] as a technical practice in which experts attempted to allay public concerns by underlining the statistical improbability of risks becoming crises and affirming that effective preventative and emergency controls were in place" (p. 160). Horlick-Jones and Farre (2010) refer to this approach as a "deficit model" in which communication efforts were "driven by an attempt to explain scientific facts about risk issues to what were seen as uncomprehending lay audiences: to 'fill up their heads', as it were, with authoritative knowledge" (p. 132). Thus, an increasingly concerned public's perceived information needs drove the development of a paradigm in which experts provided probabilistic risk information to a homogeneous public. According to Heath and O'Hair (2010), "The logic of this scientific (actuarial or epidemiological) approach is that

as people understand the causes, randomness/predictability of, and effects of risks, certain measures can be taken on a personal and societal level to alter the occurrence, impact, and magnitude of the damage" (p. 15).

As implied by this initial expert-source-to-lay-receiver model, risk communication began as what Heath & O'Hair (2010) call "a discipline whereby experts could be brought together with lay audiences to explain and compare risks" (p. 9). However, it soon became apparent that this approach was inadequate. Subsequent evolution of the field was driven in part by the continued erosion of public confidence in risk management and in part by what Murdock (2010) describes as "the emergence of new lobbying and campaigning groups that articulated popular fears around nuclear power and environmental degradation" (p. 160). As the concerns of non-technical stakeholders were brought into starker relief, the unidirectional model was increasingly found wanting. According to Sellnow and Sellnow (2010), "The general tenet of communication studies [is] that simple exposure to information does not translate to understanding" (p. 115); this tenet became a key component of the risk management dilemma. Technical information about risks seemed to influence neither attitudes about nor behaviors related to those risks, and both governmental agencies and industry were left asking what was "wrong" with their efforts.

Recognizing that better risk communication models were needed, the National Research Council (1989) weighed in on the side of communicative bidirectionality when it released *Improving Risk Communication.* Sometimes referred to as the Orange Book, the report highlights the challenges that lay audiences experienced in trying to make sense of probabilistic hazard assessments, as well as the lack of attention technical

experts paid to lay concerns that could not be incorporated into such assessments (Slovic, 1999; Thompson, 2012). The seminal NRC (1989) publication specifically called for risk communication approaches to include "democratic dialogue," to be "interactive," and to incorporate the public's "concerns, opinions, or reaction to risk messages" (p. 21). Often, the implementation of these suggestions by government agencies has focused on the development and implementation of what essentially are standard operating procedures for the conduct of risk communication.

One of the first and most enduring products in this genre is the U.S. Environmental Protection Agency's [U.S. EPA] *Seven Cardinal Rules of Risk Communication* (Covello & Allen, 1988). Released just prior to the NRC report, the *Rules* establish a laundry list of guidelines for U.S. EPA risk communicators to follow. As Tinker (1996) notes, "The *Cardinal Rules* were designed to serve as guidelines for federal efforts to define communications objectives, organize and manage decisions, and measure performance in health risk communications planning, implementation, and evaluation" (p. 201)

The U.S. EPA (1988) rules are:

1) accept and involve the public as a legitimate partner;
2) plan carefully and evaluate your efforts;
3) listen to the public's specific concerns;
4) be honest, frank, and open;
5) coordinate and collaborate with other credible sources;
6) meet the needs of the media; and
7) speak clearly and with compassion

By acknowledging the existence of public concerns, this approach represents an improvement over the sparse risk communication efforts that preceded it (Covello & Sandman, 2001). However, as Heath and Nathan (1990) point out, the *Rules* still reflect a

model that "features experts as sources, messages as information about risk, channels as media reporters and editors, and receivers [as] an amorphous public..." (p. 16). According to Boholm (2009), such approaches indicate that "the role of the [risk communicator] is to steer laypeople's (incorrect) mental models toward convergence with the scientific (correct) model" (p. 339). In essence, such critics claim the *Rules* continue to reflect a more or less persuasion-based approach to risk communication.

With high-profile events like Three Mile Island, Bhopal, and Chernobyl keeping environmental crises in the news (Kasperson, Kasperson, Pidgeon, & Slovic, 2003), it stands to reason that U.S. EPA would be at the forefront of best practices development. As Horlick-Jones and Farre (2010) note, "[T]he use of risk communication as a regulatory, policy and operational tool has become increasingly important for institutional attempts to optimize resource allocation, and to inform and influence the behaviour of target audiences" (p. 131). Thus, once a set of guidelines had been developed, numerous other agencies subsequently looked to the *Rules* for creating their own policies, procedures, and activities. Among the governmental organizations that followed U.S. EPA's lead were the US Department of Energy (Keystone Center, 2005) and numerous agencies within the U.S. Department of Health and Human Services (ATSDR, 1994; Tinker, 1996).

Examples of other government agencies utilizing the *Seven Cardinal Rules* abound. For example, early adaptations are evident in a U.S. Public Health Service [USPHS] Report on Risk Communication and Education, generated by a Subcommittee of the Environmental Health Policy Committee (Tinker, 1996). Within its report, the subcommittee defined health risk communication as "the purposeful exchange of

information about the existence, nature, form, severity, or acceptability of risks" (p. 201).

The subcommittee bounded the discipline as involving "individuals, groups,

communities, or institutions; the level, significance, or meaning of health or

environmental risks; assessments, models, and procedures on which risk estimates are

made; and decisions, actions, or policies aimed at managing or controlling health or

environmental risks" (p. 200). Tinker (1996) makes clear the linkage between US DHHS

and the *Cardinal Rules* by stating that most Public Health Service agencies "either were

familiar with or had applied in varying degrees the model standards of risk

communication developed by EPA" (p. 201).

In addition to US DHHS usage of the guidelines, a recent risk communication

primer created for U.S. DOE makes clear how the *Rules* have permeated other federal

efforts. The primer, created by the Keystone Center (2005), states:

> Do not make assumptions about what people know, think, or want done about
> risks. Recognize that people's values and feelings are a legitimate aspect of
> environmental health issues and that such concerns may convey valuable
> information. When people are speaking passionately they are responding to their
> emotions. It is both ineffective and often inappropriate to simply follow with data.
> Show respect by developing a system to both acknowledge and respond promptly
> to concerns raised by community residents without becoming 'technocratic.' (p.
> 22)

From the Department of Health and Human Services to the Department of Energy, it is

clear that U.S. EPA's groundwork provided the foundation on which many subsequent

federal risk communication policies have been built.

According to Sellnow and Sellnow (2010), the years since the *Rules* creation have

seen "risk management and crisis planning [evolve] far beyond any linear form of

communication where subject matter experts establish standards and priorities for risk

management" (p. 113). Instead, stress increasingly has been placed on communicative

bidirectionality, with many groups -- both outside and inside government -- calling for risk communication to feature "collaborative decision making that includes risk bearers, including those who can be affected by a crisis" (Heath & O'Hair, 2010, p.7).

While *Seven Cardinal Rules* and related government risk communication guidelines certainly represent improvements over the earlier unidirectional information dissemination model, this approach also carries with it its own difficulties, many centering on the inherent normatization of scientific risk and the continued conceptualization of communication almost exclusively as message transmission (Stratman et al., 1995; Boholm, 2008; Endres, 2009; Stratman et al., 1995). As Palenchar (2005) states,

> Some risk communication studies and prescriptions take an atheoretical approach … Such prescriptions, while important, do not address issues of conflict and negotiation, or see risk from the perspective of concerned members of the community who often believe they have reason not to trust any statement regarding risks. (p. 5)

In fact, Heath and Nathan (1990) have criticized the *Rules* as "a linear, source-oriented model that relies on paternalistic and platitudinous suggestions" (p. 16). In other words, while such rules as "accept and involve the public as a legitimate partner" and "listen to the public's specific concerns" appear to be more concerned with stakeholder perceptions than previous risk communication efforts, these guidelines in fact mask what essentially is a continuation of the source-receiver model without providing substantive ways in which publics can become invested in the communication process.

In contrast, some have argued that evolving models of risk communication should include a more active role for riskbearers. As Heath and O'Hair (2010) put it, "This logic suggests that infrastructures within a society arise or are specifically created to discuss,

challenge, and make decisions relevant to risk and crisis tolerance, mitigation, and communication" (p. 7). Dunsby (2004) explicitly connects these processes to risk management success by stating, "Typically, Americans are wary of investing their trust in a group of experts; thus, for a method to have legitimacy, it must be supported by a system of accountability that enables the public to judge the entrance of subjectivity or bias into the process" (p. 285-286). Through such discourse, the field of risk communication has changed substantially during the last three decades, transitioning from a positivistic approach that privileged scientific knowledge to a more nuanced approach that attempted to acknowledge non-scientific perspectives to a more recent focus on dialogue and collaborative decision-making processes (Renn, 1992; Palenchar & Heath, 2007).

Approaches to Risk Communication

Heath and O'Hair (2010) describe risk communication as an area in which "science, policy, management philosophy and culture meet, collide, and reinforce one another in what can be an unhappy confluence" (p. 7). To understand the challenges risk communicators face in sorting through potential processes and outcomes, it is helpful to begin by examining what each of these distinct perspectives brings to the field. From the scientific perspective, for example, risk communication can be thought of as a problem of research translation. Risk communication policy, in contrast, sees a challenge for dealing directly with publics regarding technical hazards. Management studies might see risk communication as benefitting from the application of stakeholder theory. Finally, the recognition of culture's role in risk communication speaks to a need for participatory and action-based approaches. Each of these perspectives points to different underlying

assumptions about the ultimate goals of risk communication, ranging from straightforward information dissemination to some level of bidirectionality to partnership-building to citizen empowerment (Chess, Salomone, Hance, & Saville, 1995; Heath & O'Hair, 2010).

Risk Communication as a Research Translation Challenge

One dominant perspective on risk communication relates directly to uncertainty management. As Heath, Bradshaw, and Lee (2002) note, "[S]cientific uncertainty about the likely occurrence and health/safety effects of a hazard can shape the risk perceptions of key publics—from regulators to affected citizens" (p. 321). Thus, many risk managers see risk communication primarily as a tool for providing risk-related information, packaged in an appropriate manner, to specific audiences most affected by the risk, reflecting a positivist-empiricist approach that relies on the transmission model of communication (Boholm, 2009). Embedded largely within this perspective, the earliest iterations of risk communication were rooted primarily in the need to provide affected populations with relevant scientific information, often to allay fears. As Heath, Bradshaw, and Lee (2002) note, "The more confident (or certain) individuals are that they can predict and communicate about a risk, the more control they perceive they have over the outcome" (p. 322). Armed with this information, some risk communicators inherently see their work as a form of research translation.

At its base, research translation is defined as the timely and efficient transfer of basic science research findings into improvements in public health outcomes (Cochrane et al., 2007). Lomas (1993) views research translation as a three-step process incorporating the diffusion of information through traditional means, the targeted

dissemination of information from source to recipient, and the implementation of findings by the recipient. In terms of risk communication, the media might be considered the traditional means of communication, targeted dissemination might involve specific riskbearing populations, and implementation of findings might be the consideration of probabilistic hazard assessments in decision-making. Parrott (2008), however, asserts that the mere application of research findings -- or, in our case, risk assessment data -- is not sufficient for gauging success; rather that "the most important criterion is whether…findings are implemented in ways that function as pathways to improve lives" (p. 1).

For such improvements to occur, it is essential that agency personnel have access to the most up-to-date information possible and that this information be transmitted by sources that encourage the acceptance of probabalistic hazard assessments. Information recipients are more likely to base decisions on findings if the recipients "speak with innovators and with each other [and]…select ideas that they would like to try out" (Berwick, 2003). Berwick further argues that individuals "learn about innovations best from local and social interactions with early adopters, [thus] organizations that foster such social exchanges may see faster dissemination of changes."

In a U.S. DOE risk communication primer produced by the Keystone Center (2005), the scientific concerns of risk management are clearly paramount. In the document, risk communication is described as involving "multiple messages related to the types and levels of the risk, or to the concerns, opinions, or reactions to risk messages, or to the legal or institutional arrangements for risk management" (p. 18).

Horlick-Jones and Farre (2010) point out that a key challenge for the research translation approach to risk communication is its embeddedness in "'deficit' thinking, the idea that lay audiences would 'behave sensibly' if only they were in possession of the technical facts"; despite numerous studies pointing to the contrary, this model "continues to figure strongly in areas as diverse as health promotion, emergency planning, and innovation associated with controversial technologies" (p. 132). The research translation perspective is associated with additional challenges, as well, including low science literacy and numeracy levels and the existence of competing data. As Heath, Bradshaw, and Lee (2002) note, "Information requires interpretation to become knowledge" (p. 325); in a similar vein, Heath and O'Hair (2010) warn against "data dumps that provide huge amounts of information in ways that make it difficult to access" (p. 19). Further complicating issues, a great deal of research indicates that information provided by government agencies frequently is not trusted by citizen recipients (Fessenden-Raden, Fitchen, & Heath, 1987; Frewer, Howard, Hedderley, & Shepherd, 1996; Kunreuther, Easterling, Desvousges, & Slovic, 1990; McCallum, Hammond, & Covello, 1991; Slovic, Flynn, & Layman, 1991; McComas, 2003; KRCEE, 2011). Thus, the mere provision of information through standard research translation approaches will be inadequate for addressing many risk-related situations.

Policy Approaches: Binaries in Risk Communication

According to Boholm (2009), the practice of risk communication "is usually defined as the intentional transfer of information about the assessment, evaluation, and management of risk, often integral to governmental steering and policy implementation" (p. 337). However, as Heath and O'Hair (2010) point out, a policy perspective also

recognizes that, in risk communication, "[f]acts blend with values and policy preferences" (p. 18). Thus a second approach to risk communication builds upon the research translation paradigm while explicitly recognizing that risk perceptions are not necessarily tied to scientific facts.

Heath and Nathan (1990) note that "risk communication must be founded on correct principles and political realities" (p. 15). Thus, the policy perspective acknowledges that risk communication is problematized by public perceptions that question expert credibility (Heath & O'Hair, 2010). Policy-oriented approaches, therefore, implicitly situate persuasion as a valid form of risk management. As Horlick-Jones and Farre (2010) put it, whether specific activities reflect "top-down," "two-way," or "consultation and engagement" designs, the processes ultimately "seek to influence the behaviour of target audiences and gather information useful for the organization" (p. 134).

As indicated in a U.S. DOE risk communication primer (Keystone Center, 2005), one goal of this policy-oriented approach is increasing public trust of experts, since "with community trust, tomorrow's problems can be averted today" (p. 41). This utilitarian motivation for bidirectional risk communication is clearly delineated in the aforementioned USPHS risk communication study (Tinker, 1996), which acknowledges that if "government agencies do not understand and deal effectively with public perceptions of health risks, public alarm about the risks and hostility toward the agencies increase" (p. 198). As Tinker (1996) argues, in such situations "agency credibility suffers and the public becomes skeptical or indifferent to the information about health risks provided by agency experts" (p.198).

Many of the established best practices for risk communication, including *Seven Cardinal Rules*, fall into this second bidirectional paradigm, which is founded in large part upon the premise that risk is a function of technical hazard and community outrage (Sandman, 1993; Covello & Sandman, 2001). This framework helps explain how multiple risk vocabularies hinder risk-related sensemaking. Sandman (1993) distinguishes between hazard and outrage as two very different sensemaking strategies. The first privileges scientific and technical expertise, while the second relies more heavily upon lived experiences. This divide can be exacerbated by contradictory messages that lead to confusion among stakeholders about exactly whom to believe. Such conflicts can make it difficult to achieve entente, or "a shared sense of reality" (Sellnow et al., 2009, p. 10), through which disputes can be mediated. As Sandman (1993) puts it, "[T]he overarching problem is that the public cares too little about the hazard, and the experts care too little about the outrage" (p. 6).

In such situations, it becomes necessary to seek convergence, which Sellnow, Ulmer, Seeger, and Littlefield (2009) define as "some degree of agreement" (p. 14). According to Sellnow et al. (2009), such convergence should be "the primary objective in risk communication" (p. 12). More than two decades ago, the National Research Council (1989) attempted to bridge the divide between hazard and outrage by calling for a switch from the dominant one-way model of risk communication to the development of dialogue among disparate stakeholders.

When Sandman (1993) states that "[a]s long as the outrage goes unmanaged, the public is unlikely to notice that the hazard is well-managed" (p. 7), he recognizes that public concerns often are marginalized in the sensemaking processes of technical and

scientific experts. Likewise, Sandman's call for technical and scientific experts "to listen better, to *hear* that outrage is high and take action to reduce it" (p. 9) is a plea for greater intersubjectivity in the process of defining, responding to, and learning from risk and crisis situations.

While the hazard/outrage paradigm can be useful for helping individuals involved in contentious situations understand that there are multiple perspectives regarding what constitutes risk, linguists and semioticians have long pointed out that such binaries are rooted in an immature view of cultural phenomena (Jackobson & Halle, 1986). As Sasseure (1983) asserts, a perspective that assumes this type of either/or stance defines a concept not by what it is, but by what it is not. In this case, risk perceptions that are not rooted in hazard *must* be rooted in outrage.

Derrida (1976) elaborates further upon the nature of linguistic binary oppositions, noting that the two terms are inherently linked as primary and secondary concepts. The first term in the binary, depicted as dominant and normative, is privileged, while the second term, depicted as other-than-the-norm, is marginalized. In this case, technical hazard is normatized, while the more emotionally-rooted outrage is aberrant, effectively defining community members' responses to risk-laden situations as less valid or important than statistical risk assessment. Discussing such oppositions, Ellingson (2009) notes that binaries ignore the universe of possible reactions that exist between the binary terms, explaining that "when we limit possibilities to only two, one will inevitably be valued over the other. It is not possible to view the world in terms of equal opposites; one side is *always already* privileged" (p. 71). Clarke (2005) goes even further, stating that "[f]ascism has many faces, and insisting upon binaries is one" (p. 21).

The binary perspective promoted within the hazard/outrage model ignores that multiple roles are played by individual stakeholders within risk-laden situations. A technical expert might live near a contaminated site, be the spouse of a plant employee, and/or serve on local civic boards. These multiple commitments problematize the simplistic hazard/outrage categories. Simply drawing a figurative line and placing one set of people on the hazard side and another set on the outrage side without recognizing the subjective and mutable nature of the boundary itself -- not to mention the power dynamics related to who draws the boundary in the first place -- is a distinct shortcoming of the paradigm. However, as Ellingson (2009) points out, "Dichotomous thinking remains the default mode of the academy" (p. 6).

Unfortunately, the language of *Seven Cardinal Rules of Risk Communication* codifies this division, positioning agency personnel distinctly on the side of hazard and affected community members on the side of outrage. Although one aside in the *Rules* makes mention of multiple "publics", for the most part the guidelines address a fairly homogenous group, with the caveat that "[r]egardless of how well you communicate risk information, some people will not be satisfied" (Covello & Allen, 1988). The power of the binary is clear in this instance, as there is no corollary stating that, regardless of how well a community member communicates her perspective about risk, some "experts" will not be satisfied. Similarly, the statement that "[i]f people are sufficiently motivated, they are quite capable of understanding complex risk information" (Covello & Allen, 1988) lacks a balancing statement indicating that sufficiently-motivated scientists are quite capable of understanding the complex value judgments that lead to community members assessing risk through lenses other than statistical probability.

By imbuing agency personnel with a binary view of relations before contact has been made with specific communities, *Seven Cardinal Rules* and similar best practices guides contribute to a distinct set of preconceptions about the ability of stakeholders to understand and respond to hazard-related information. In addition, the *Rules* could be perceived as inadvertently establishing an adversarial us/them mindset prior to agency personnel entering the field. As Weick (1988) notes, an enactment perspective would recognize that such processes create situations in which "action tends to confirm preconceptions" (p. 307).

Applying Stakeholder Theory to Risk Communication

Organizational management studies offer yet another lens through which to view risk communication. Specifically, stakeholder theory can help practitioners understand both the informational and the process needs of riskbearing parties. As the last three decades have seen stakeholders become an increasing focus for organizations, the development of corporate social responsibility models (Carroll, 1979; Wartick & Cochran, 1985; Clarkson, 1995), the creation of stakeholder theories (Donaldson & Preston, 1995; Jawahar & McLaughlin, 2001), and the generation of focused methods for identifying and classifying stakeholders (Ballejos & Montagna, 2008; Chung, Chen, & Reid, 2009) have moved to the center of management studies. Shared by all of these research areas is the importance of stakeholder satisfaction for achieving organizational goals.

In practice, the maintenance of stakeholder relationships is a key issue for management, whether corporate or governmental. As Preston (1995) argues, "It is the responsibility of managers, and the management function, to select activities and direct

resources to obtain benefits for stakeholders" (p. 85). However, situations requiring risk communication flip this paradigm on its head; rather than maximizing stakeholder benefit, agencies must attempt to minimize stakeholder harm. Thompson (2012) notes that "to mention risk is to imply that people have reason to avoid or at least to be mindful about the subject at hand... [therefore] they could have something to lose with regard to the topic under discussion" (p. 637). Such topics can raise stakeholder concerns that cut across public-private and corporate-nonprofit sectors, with the mediating role of information transfer from organization to stakeholder at the crux of the relationship.

For an organization, successfully planning and executing information exchanges, whether risk-related or not, first requires determining exactly who the organization's stakeholders are. Many criteria for making this decision have been offered through the years, primarily focusing on how stakeholders support organizational functioning. Preston (1995) notes that one of the earliest characterizations was put forth in the 1960s by the Stanford Research Institute, which identified stakeholders as "those groups without whose support the organization would cease to exist" (p. 72). Preston (1995) further refines this designation, noting that stakeholders have "legitimate interests in procedural and/or substantive aspects of [organizational] activity" (p. 67). More recent classification efforts have attempted to create stakeholder typologies. For example, while Clarkson (1995) posits that stakeholders are "persons or groups that have, or claim, ownership, rights, or interests in [an organization] and its activities, past, present, or future" (p. 106), he distinguishes between primary stakeholders, whose role is essential to organizational survival, and secondary stakeholders, who are not essential to

organizational survival but whose actions, nevertheless, can affect, or be affected by, the organization.

Whether considered primary or secondary, stakeholders share a need for access to accurate, timely, and relevant information, particularly in high-risk situations. Managers therefore must make deliberate determinations about how to fulfill information needs. As Johnson (1996) notes, information is "a strategic asset to organizations that should be systematically incorporated in the planning of upper management" (p. 131). In today's technology-driven world, it is easier than ever to make information available and widely accessible via the internet (Lopes, 2008; Chung, Chen, & Reed, 2009); however, in environmental risk situations, unidirectional dissemination only fulfills part of the organization's responsibilities. As the Keystone Center (2005) notes in its risk communication primer for the U.S. Department of Energy,

> Those responsible for ensuring safety to the public face two key challenges. The first is to communicate risks in a manner that acknowledges the emotional content and provides information to assuage concerns. The second is to engage the public so that they become effective partners in addressing and overcoming risks. Communication and engagement are key elements of effective stakeholding. (p. 4)

Such a vision of governmental-stakeholder relations aligns with Quinn and Jones (1995) work, which emphasizes the need for managers to be guided by "agent morality" in their dealings with stakeholders, situating organizational goals within a framework of moral principles. Within this paradigm, managers must constrain their actions in relation to four ethical concerns. According to Quinn and Jones (1995), honoring agreements, being truthful, avoiding harm, and respecting autonomy must supersede all other motives. As Basu and Palazzo (2009) note, organizations rely upon three primary approaches to addressing social concerns: stakeholder-driven, which examines the needs of external

stakeholders; performance-driven, which looks to expectancy matching for evaluating the effectiveness of specific actions; and motivation-driven, which evaluates the relative roles of intrinsic and extrinsic factors in influencing stakeholder relations. These disparate approaches are key for determining the level of direct organizational engagement with stakeholder needs.

While many scholars and practitioners see effective management of stakeholder relations as a function of social responsibility, others see more utilitarian imperatives. Evan and Freeman (1996) assert that "[t]he very purpose of the [organization] is…to serve as a vehicle for coordinating stakeholder interests" (p. 254). According to Davis (1973), organizations must be perceived as responsible to be granted legitimacy. Thus, if an organization is perceived as irresponsible in its management of the essential function of coordinating stakeholder interests, legitimacy can be directly threatened and trust subsequently damaged. Additionally, failure to meet expectations can lead the organization to lose control of its external relationships (Swanson, 1995). These twin issues of past responsibility and perceived legitimacy are among the most highly contested subjects for risk communicators.

The extant stakeholder literature has important implications for describing how organizations manage and *should* manage the sharing of risk-related information with stakeholders. Of particular importance are the ways in which organizational identity orientation influences perceptions of stakeholder legitimacy, promoting or constraining an organization's willingness to share information with its stakeholders. Further, the ways that organizations approach corporate social responsibility directly affect their potential for successfully matching stakeholder information needs. Given that meeting

stakeholder expectations is key for both organizational legitimacy and success, it is important to delineate explicitly the relationships between perceived stakeholder information needs and organizational willingness to meet those information needs.

Johnson and Hoover (2013) have argued elsewhere for a coorientation approach to matching stakeholder information needs. Coorientation models first arose within social science to depict the ways in which mutual benefit affects psychological balance (Heider, 1946). Later, the field of public relations adapted coorientation approaches to help understand organization-stakeholder interactions. When discussing the relationship between stakeholder information needs and organizational willingness to meet those needs, Johnson and Hoover (2013) identified four states: satisfaction, in which high information needs are met by a strong organizational willingness to meet those needs; apathy, in which low needs are balanced with a lack of enthusiasm for information provision; inundation, in which stakeholders do not perceive strong needs for information but the organization provides vast amounts; and adversarialism, in which stakeholders desire information greatly but the organization is unwilling to provide it. All too often, the history of risk communication – particularly at Superfund sites – has exemplified one of the latter two imbalances.

Moving Toward a Participatory Perspective

Fischhoff (1995) has described the evolution of risk communication as a shift from unidirectional and information-driven activities to something more akin to partnership development. While marking a distinct improvement for stakeholder relationships, it is possible that governmental risk communication efforts need to go one step further, embracing even more collaborative approaches. As Fischhoff (1995) states,

"effective risk communication can fulfill part of the social contract between those who create risks (as a byproduct of other activities) and those who bear them (perhaps along with the benefits of those activities)" (p. 144). To meet this challenge, it is increasingly important for risk communicators to examine the potential contributions of participatory approaches for the field.

Risk communication does not happen in a vacuum. Rather, as Boholm (2009) points out, "Understandings of risks, like other experiential phenomena, are informed by socially and culturally structured and historically conditioned conceptions and evaluations of the world, what it is like, what it should or should not be like" (p. 340). Unfortunately, information-centric approaches to risk communication can miss this key point of social construction. As Heath and O'Hair (2010) note, "The problem [of risk communication] results from the need to engage others, to bring discourse to bear on shared subjectivity, the probative force of analysis of the objective and real, to give effective voice to the concerns that arise from observed and perceived uncertainties" (p. 23). Similarly, Sellnow and colleagues (2009) state that multiple parties involved in the risk discourse "can and should begin the debate by recognizing and respecting the opinions of those who hold a different frame of reference" (p. 10).

The inclusion of both complementary and competing voices in risk-related discussions reduces the opportunities for blind spots to develop. The addition of more voices from multiple backgrounds increases the capacity for dealing with a risk-laden situation. The myriad perspectives brought to the fore decrease the possibility of actors becoming trapped in a single set of expectations. Thus, participatory approaches directly address Weick's (1988; 1995) identified constraints on sensemaking.

To adopt a participatory approach to remedying challenges for risk communication is to bring the stakeholders themselves explicitly to the center of decision-making processes. As Heath and Nathan (1990) note, risk communication, at its core, is about much more than information sharing; rather, communicating about risk often involves "a rhetorical struggle by parties to decide what levels of risk and regulative or legislative control are appropriate" (p. 17). The privileging of scientific expertise that dominates the research translation and policy perspectives stands in stark contrast to the work of Peterson, Peterson, and Peterson (2005), who have criticized "magical notions of scientific objectivity" in environmental communication and who consequently have advocated for non-dualistic approaches.

In other words, by promoting stand-alone research translation and hazard/outrage approaches, governmental risk communication policies could inadvertently be deepening relational divides and further damaging trust rather than bringing stakeholders together to create mutually-acceptable solutions for complex risk-related challenges. As Palenchar (2005) points out, "Well beyond any communication model that might adequately rest on what has often been called sharing information, the sides -- and there are many -- engage in a marketplace of opinion through advocacy" (p. 3). In practice, this conflict often plays out in public meetings where, as Boholm (2009) points out, communication about risk "evolves as one long debate between conflicting social constructions of the risk objects and the values at stake" (p. 344). Explicitly recognizing the power dynamics at play, participatory approaches mandate and operationalize stakeholder roles in jointly defining, prioritizing, and solving situated, risk-related challenges.

Given the central role of communication in such processes, a valuable starting point for developing new models is participatory communication research, which "emphasizes the building of trust and rapport among all parties, along with the empowerment of individuals and communities, toward truly collaborative decision-making processes [and] outcomes that resonate with community values, culture and perspectives about the future" (Anyaegbunam, Hoover, & Schwartz, 2010).

Rooted in action research, participatory communication evolved largely in the international development realm and is built upon an iterative approach to social science that includes both researchers and participant-subjects (Lewin, 1946). Although development research in the mid-twentieth century began largely as an extractive process in which researchers from outside a community developed research questions and methods, took data away from the community, and analyzed those data elsewhere, Lewin's (1946) concept of mutual action and reflection began making its way into development practice by the mid-1970s. The earliest attempts toward more participatory processes came with the advent of Rapid Rural Appraisal [RRA], which allowed the gathering of non-survey data from a community; however, RRA still relied upon analysis from outside the community (Brown et al, 2002). Development communication continued to evolve through the creation of Participatory Rural Appraisal and Participatory Learning and Action, both of which included community members in data analysis but neither of which was specifically rooted in communication science. Participatory Rural Communication Appraisal and Community-Based Participatory Communication [CBPC] then emerged, moving communicative processes to the forefront of community-based research (Beltran, 1993; Anyaegbunam, Mefalopulos, & Moetsabi,

2004; Anyaegbunam, Hoover, & Schwartz, 2010; Ommani, 2011). These participatory approaches have much to offer the field of risk communication.

As Palenchar (2005) notes, risk-related decisions involve "the engagement of concerned and interested parties," a process he describes as "primarily communicative" (p. 5). Fischoff (1995) further explains that while community members may not bring scientific expertise to the table, they do "have some insight into where they go, how deeply they breathe, what they eat and *drink,* how long they shower, when they wash their hands, and so on" (p. 143). Such lived experience can be key for identifying exposure pathways, possible solutions, and potential roadblocks for implementation.

Whereas risk communication efforts typically are oriented toward more traditional goals of informing and persuading, participatory approaches utilize communication as a dialogic process that can empower community members in decision making. As Boholm (2009) notes, an important critique of information dissemination models for risk communication lies in their treatment of context as a variable in, rather than a constitutive element of, communication. One clear example of the context-as-variable perspective is included in a risk communication primer written for U.S. DOE (Keystone Center, 2005), which states:

> When planning the best way to communicate and engage the public, it is important to not only identify problems by their level of complexity, but also to understand the different lenses through which stakeholders view problems and possible solutions. To expand on this distinction, a *technical* definition of risk could be written as:
> [Probability of a Hazard × Impact of the Hazard Occurring]
> [but a] definition of *perceived* risk has additional factors to the technical definition, and would look as follows:
> [Technical Risk × Nature of the Hazard × Context of the Perceiver].
> (p. 14)

In contrast, participatory approaches emphasize context by foregrounding community values that ultimately impact the prioritization of challenges and identification of solutions. Thus, participatory communication not only allows but encourages stakeholders to give voice to their perceptions of reality and, ultimately, to act based on these realities (Dagron, 2001; Carey, 1989). In this way, participatory communication is closely aligned with Community-Based Participatory Research [CBPR], a methodology already recognized by both U.S. EPA and the National Institute of Environmental Health Sciences as an important pathway for investigating environmental health and environmental justice research questions (U.S. EPA, 2013). CBPR has been described variously as: 1) "inquiry with the participation of those affected by an issue for the purpose of education and for effecting change" (Green & Mercer, 2001), 2) "an approach that incorporates formalized structures to ensure community participation" (Wallerstein & Duran, 2010), and 3) a methodology that "equitably involves all partners with a research topic of importance to the community with the aim of combining knowledge and action for social change to improve community health and eliminate disparities" (Kellogg Foundation, 2013). As such, CBPR approaches have appealed in recent years specifically to agencies addressing localized, contextually-driven environmental concerns.

This existing familiarity of governmental entities, and particularly U.S. EPA, with CBPR is important for the application of participatory approaches to risk communication problems. As discussed earlier, some within federal agencies continue to see risk communication challenges as, essentially, gaps in scientific research translation. Often, such perspectives stand in direct contrast to the views of individuals who would support

multi-stakeholder participation in risk communication efforts and decision-making. However, Wallerstein and Duran (2010) argue that community-based, participatory approaches are key for addressing gaps in current research translation models. Specifically, by engaging populations who are directly affected by research outcomes -- or, in this case, by high-risk environments or situations -- agencies can: 1) improve external validity and "fit" by engaging stakeholders in context-based adaptation; 2) bring balance to power dynamics by creating space for "hybrid knowledge" that joins scientific and cultural insights while also encouraging co-learning and joint decision-making; 3) promote sustainability through capacity building; and 4) increase trust through the creation and maintenance of formalized partnerships (Wallerstein & Duran, 2010). Each of these translational benefits has clear implications for risk communication.

Participatory methodologies directly involve individuals who represent numerous stakeholder groups. These participants join together for projects in which mutual teaching and co-learning can occur. Participatory projects involve community members, organizations, government officials, and researchers, all of whom work together to develop and achieve mutual goals (Anyaegbunam, Mefalopulos, & Moetsabi, 2004). As Anyaegbunam , Schwartz, and Hoover (2010) have noted, "Done properly, [participatory communication] research benefits both community participants and government agencies by creating bridges that allow all parties to gain knowledge and experience" (p. 4).With its emphasis on the establishment or repair of trust and rapport among disparate stakeholders, participatory communication is ideal for helping heal the contentious legacies of environmental mismanagement by and inadequate or nonexistent risk communication from potentially responsible parties.

As Boholm (2009) asserts, "Today, it is often noted that [communicating about risk] involves a melee of actors engaging as experts and laypeople, decision makers and stakeholders, regulators and politicians, citizens and NGOs" (p. 336). Within this sometimes cacophonous setting, participatory communication approaches address the call of Sellnow and colleagues (2009), who believe that risk discourse should begin with "both sides...recognizing and respecting the opinions of those who hold a different frame of reference" (p. 10). As Anyaegbunam, Hoover, and Schwartz (2010) have noted elsewhere, participatory approaches emphasize "the building of trust and rapport among all parties, along with the empowerment of individuals and communities, toward truly collaborative decision-making processes that achieve outcomes that resonate with community values, culture, and perspectives about the future" (p. 4).

By helping communities become active decision-making partners in promoting culturally-appropriate, value-matched solutions to shared challenges, participatory approaches can help redress generations of power imbalances (Anyaegbunam, Mefalopulos, & Moetsabi, 1999; Wallerstein & Duran, 2006). As Palenchar and Heath (2007) assert, "Community residents who live near or work at potentially hazardous manufacturing facilities are neither spurious nor false in their reasons and desires to be safe and healthy; they are and should be sensitive to the fairness and equality of risk distribution and the resulting environmental and aesthetic implications" (p. 121). Incorporating participatory communication methods into risk communication models can help bring balance to the field, offering an action-based alternative to what Heath and Nathan (1990) call "the linear, paternalistic information model of risk communication" (p. 17). The resulting shift toward inclusion and multiperspectivity directly addresses

several communicative contexts that Boholm (2009) has identified as contributing to polarization, including

> the ontology of risk, that is, how the nature of risk is understood to be constituted in the real world; an asymmetric distribution of power, where some agents have a mandate to make decisions affecting others; and the practical rationality of the actors, deriving from their motives for communicating, their intentions and plans as embedded in practical life. (pp. 343-344)

Heath and Nathan (1990) argue that "[r]isk communicators must treat trust as a multidimensional construct intimately linked with how much control an audience sees itself being able to exert over sources of information and assessment" (p. 19). Alongside trust-building, participatory endeavors provide opportunities for multiple stakeholders with varying commitments to work together toward creating more appropriate and targeted information for the broader groups that they represent. As Sellnow and Sellnow put it, "The dialogue that is essential to risk communication provides a foundation for understanding the needs, message preferences, levels of preparation, and overall response potential of complex or diverse audiences" (p. 124). This is particularly true in Superfund communities, which may have long histories of conflict among various parties. Gaetke, Gaetke, and Bowen (2008) advise that in such situations, "[T]he content should reflect the needs and interests of the affected parties at each site rather than imposing on these parties our views of what they need to know" (p. 280).

The Politics of Superfund Sites

While risk communication is a challenging endeavor under the best of circumstances, layers of complexity are added at the nation's Superfund sites. These hazardous waste sites fall under the oversight of the US Environmental Protection Agency's Office of Solid Waste and Emergency Response, which conducts investigations

and has the authority to add sites with the most pressing needs to the National Priorities List [NPL]. Clean-up and engagement at NPL sites are assigned to U.S. EPA personnel from the appropriate regional office (U.S. EPA, 2013). Among Agency personnel who might be asked to provide risk-related information and/or public participation activities for NPL site stakeholders are Remedial Project Managers and Community Involvement Coordinators.

In addition to U.S. EPA, other federal and state agencies also play important roles at Superfund sites. For example, the Agency for Toxic Substances and Disease Registry, a branch of the Centers for Disease Control, "work[s] closely with local residents in assessing community needs and concerns and then respond[ing] to those needs by providing timely and accurate information" (Tinker, 1996, 2009). Such agencies as the U.S. Department of Energy and U.S. Department of Defense sometimes find themselves listed as potentially responsible parties (PRP), tasked with cleaning up sites contaminated through Cold War production of nuclear and other waste products (U.S. DOE, 2011). Yet another federal agency that sometimes has a presence at Superfund sites is the National Institutes of Health's National Institute of Environmental Health Sciences, which funds through its Superfund Research Program numerous extramural university and industry grants related to mitigating the health and environmental effects of contamination. State environmental protection and waste management offices, as well as state public health agencies, also actively develop projects at Superfund sites, at times even engaging in legal battles with federal facilities PRPs (deSaillan, 2008).

Specific federal environmental laws require potentially responsible parties like U.S. DOE to inform stakeholders about risks related to operations and waste (Palenchar,

2008). As a result, U.S. DOE, U.S. EPA, and ATSDR frequently see their communication initiatives overlapping, as U.S. DOE attempts to meet specific statutory public information requirements at each of its Superfund cleanup sites. These requirements derive largely from the Superfund Amendments and Reauthorization Act of 1986 (SARA), which contained within it the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). EPCRA provided specific guidance for the establishment of community advisory boards and local emergency planning bodies to work with agencies on site-related issues (Palenchar, 2008; Heath & Palenchar, 2009). Thus, federal agencies have been statutorily compelled to begin transitioning from traditional communication practices based on either a unidirectional source-receiver model (Shannon, 1948) or a nominally bidirectional model incorporating a feedback loop (Weiner, 1948) toward more stakeholder-inclusive, dialogic approaches to risk communication. The myriad governmental players, complicated legal framework, and, numerous confusing or even conflicting messages make Superfund sites a particularly difficult environment in which to engage in risk communication.

The Regulatory Framework for Superfund Site Risk Communication

To begin understanding the unusual challenges of communicating about risk at Superfund sites, it first is necessary to untangle the knot of statutory roles and obligations. Both the Superfund program and the Superfund National Priorities List were established by the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] of 1980. This landmark piece of environmental legislation charged U.S. EPA (2009) with oversight of

[l]ong-term remedial response actions...that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. (para. 2)

CERCLA -- along with numerous other federal, state, and local laws -- was enacted partially in response to such high-profile environmental crises as Love Canal, Three Mile Island, and Bhopal (Belke, 2000; Palenchar & Heath, 2007). According to Gaetke, Gaetke, & Bowen (2008), "The legislation provided for the prohibition and regulation of closed and abandoned hazardous waste sites, provided legal liability for those who allowed releases of hazardous wastes, and created a trust fund to pay for cleaning up waste sites when a responsible party could not be located" (p. 279). The Superfund process established by CERCLA involves identification of a hazardous waste site, followed by cycles of U.S. EPA investigation, hazard assessments, and public comment. Sites that are deemed priorities after investigation are placed on the NPL (U.S. EPA, 2010).

During the 1980s, additional environmental crises contribute to the growth of risk communication as a field; however, the statutory impetus for improved federal and industrial risk communication came with the enactment of the Superfund Amendments and Reauthorization Act [SARA] of 1986. In part a response to the 1984 Union Carbide tragedy in Bhopal, India (Shrivastava, 187), SARA contained within it the Emergency Planning and Community Right-to-Know Act of 1986 [EPCRA] (Heath, Bradshaw, & Lee, 2002; Palenchar, 2005; Heath & O'Hair, 2010). Heath and O'Hair (2010) note that this legislation helped "set the foundation for the concepts of community right to know and risk democracy" (p. 7).

As Heath, Bradshaw, and Lee (2002) note, "The community right-to-know portion of the SARA Title III was a direct result of a public cry for control of the risks associated with the chemical industry" (p. 319). Among SARA's stipulations, U.S. EPA received instruction to convene local emergency planning commissions and other citizens advisory groups that were to serve as forums for dialogue among public stakeholders, industry, and agencies. Unfortunately, Heath Bradshaw and Lee (2002) find that "much of the power granted by the Act has been abdicated by its executors" leaving evidence that these advisory groups "have a way to go in gaining the trust of local residents before becoming an effective vehicle for two-way symmetrical or democratic risk communication" (p. 319). As Heath and Nathan (1990) point out, SARA and EPCRA were intended to take initial steps toward making average citizens "full partners" in environmental risk management.

SARA was not the only piece of legislation to mandate public meetings or advisory groups. As one risk communication primer created for U.S. DOE (Keystone Center, 2005) explains, "government agencies are often required to conduct public hearings by law, for example, under the National Environmental Policy Act (NEPA) and the Federal Advisory Committee Act (FACA)" (p. 31). As McComas (2003) notes, the public meetings promoted through these acts "manifest democratic notions of political equality and popular sovereignty, referring to the equal right among citizens to exert influence over political actions, as well as the belief that, since government derives its authority from citizens, it must respond to the needs of its citizenry" (p. 164).

In practice, however, such meetings often have fallen short of the lofty expectations. Describing a "typical" public meeting, McComas (2003) depicts a scene in

which "an audience [is] seated before a panel of experts or officials in some sort of meeting hall, auditorium, or municipal board room [where] a brief introduction precedes a presentation, followed by questions or comments from the audience (although some public meetings do not allow audiences to ask questions)" (p. 166). Such a structure presents a highly asymmetrical power relationship. As a result, some researchers contend that public meetings do not align with the democratic principles on which they are premised and that they actually can damage relationships among those involved (Heberlein, 1976; Checkoway, 1981; Kasperson, 1986; McComas, 2003). Despite the inherent problematics, U.S. EPA alone has conducted thousands of public meetings since the implementation of SARA and EPCRA (McComas, 2003).

Heath and Nathan (1990) assert that despite U.S. EPA's efforts to position risk communication as "a subdiscipline committed to open, responsible, informed, and reasonable discussion of risks" the reality is that risk discussions take place "in an intensely political atmosphere [where] risk messages blend technical health assessments, personal and social consequences, and ethics" (p. 15). The subsequent evolution of statutory risk communication is reflected in Fischhoff's (1995) Developmental Strategies of Risk Management, which depicts the development of risk communication through eight guiding philosophies:

- All we have to do is get the numbers right
- All we have to do is tell them the numbers
- All we have to do is explain what we mean by the numbers
- All we have to do is show them that they've accepted similar risks
- All we have to do is show them that it's a good deal for them
- All we have to do is treat them nice
- All we have to do is make them partners
- All of the above

While the first six of these philosophies have been implemented in risk communication through the years, arguably the last two are still in the nascent stages of their development, particularly as they relate to long-term risk communication activities at the nation's Superfund sites.

The Paducah Gaseous Diffusion Plant

Located in western Kentucky, the Paducah Gaseous Diffusion Plant, or PGDP, is the only operating uranium enrichment facility in the United States (Kaoutzanis, 2011). Opened for operations in 1952, the plant initially produced fuel for the United States Department of Defense for use both in military reactors and in the production of nuclear weapons. In the 1960s, this mission expanded to include uranium enrichment for electricity-generating commercial reactors, eventually transitioning fully to this function (United States Enrichment Corporation [USEC], 2011). Owned and operated by the United States Department of Energy until 1992, PGDP operations currently are leased to the United States Enrichment Corporation, or USEC; however, U.S. DOE continues to manage PGDP activities related to site clean-up, infrastructure, hazardous wastes, and environmental restoration. The combined efforts of U.S. DOE and USEC currently employ approximately 1200 individuals at the site (KRCEE, 2011).

The PGDP is located in McCracken County, Kentucky, approximately three miles south of the Ohio River. The plant's footprint covers 740 acres that are bounded by a security fence. The fenced area is ringed by an uninhabited buffer zone of approximately 640 acres, which in turn is surrounded by a 2100-acre wildlife management area that U.S. DOE leases to the Commonwealth of Kentucky Department of Fish and Wildlife

Management (U.S. EPA, 2011). Beyond the wildlife management area are residential, business, and agricultural properties.

In 1988, U.S. DOE sampled private drinking wells on properties adjacent to the plant and discovered traces of the radioactive isotope technetium-99, as well as the industrial degreaser trichloroethylene. In addition, polychlorinated biphenyls, or PCBs, have been found in surface water on U.S. DOE property, as well as downstream of the facility in Big Bayou and Little Bayou Creeks, both of which run through the surrounding West Kentucky Wildlife Management Area.

With an estimated 1,400 individuals obtaining drinking water from private wells within four miles of the facility (U.S. EPA, 2011), U.S. DOE created a Water Policy to provide municipal water to affected residents at the agency's expense (U.S. EPA, 2009). In 2006, the Paducah Sun newspaper (Walker, 2006) reported that "121 plant-neighboring households and businesses…have received free municipal water from DOE since 1994 because of an estimated 10 billion gallons of contaminated groundwater" (p. 1A).

In 1993, the PGDP was proposed for inclusion on the U.S. EPA Superfund National Priorities List, or NPL (U.S. EPA, 2009). The PGDP was added to the list in 1994 following a period of investigation and public comment (U.S. EPA, 2009). Consequently, U.S. EPA provides regulatory contamination oversight in partnership with such state agencies as the Kentucky Energy and Environment Cabinet's Department for Environmental Protection and the Kentucky Cabinet for Health and Family Services' Radiation Control Branch. The Kentucky Department of Fish and Wildlife also is involved with PGDP activities due to its lease of the wildlife management area

surrounding the plant. After almost two decades of clean-up activities, in 2009 U.S. DOE reported to Congress that it expects remaining cleanup costs at the site to be between $9.5 and $16.4 billion (Paine, 2010).

In compliance with federal law and community right-to-know provisions, U.S. DOE established a Citizens Advisory Board, or CAB, to "facilitate the flow of various kinds of technical information from experts to community residents and to open channels of commentary between them" (Heath & Palenchar, 2009, p. 316). The PGDP CAB (2011) describes its mission as "provid[ing] informed recommendations on major issues regarding environmental restoration, waste management, and related clean-up activities to DOE." The CAB also asserts that "[t]he Board's membership is carefully considered to reflect a diversity of viewpoints in the affected community and region [and is] composed of people who are directly affected by DOE site clean-up activities" (PGDP CAB, 2010). In reality, eleven of twelve 2009 CAB members held bachelor degrees, while half held graduate degrees (PGDP CAB, 2009). In contrast, Kentucky's Council on Postsecondary Education (2007) reports that less than one-fifth of the population of McCracken County has earned bachelor degrees, with almost 20% lacking even a high school diploma. This disparity presents a potential site of dissension for CAB relations with the community at large.

Numerous events since the PGDP's inclusion on the NPL have affected public perceptions of the site and, at times, have strained relationships among the many stakeholders. The siting and contents of waste disposal, for example, have been points of contention between U.S. DOE and the Kentucky Department for Environmental Protection, with legal action threatened variously by each party, even as plant neighbors

have filed suit to recoup lost property values (Short, 2002; de Saillan, 2008). As Gaetke, Gaetke, and Bowen note, "People, who have suffered harm to their health, their life expectancies, their property, and the very quality of their lives, are typically and understandably interested in pursuing compensation for that harm from the parties who are responsible" (p. 279).

In addition, several residents directly blame PGDP-generated contamination for the illnesses and deaths of friends and family members; however, a community health assessment conducted by the Agency for Toxic Substances and Disease Registry did not find conclusive support for these assertions, driving some in the community to question the study's veracity (KRCEE, 2006; KRCEE, 2011). With newer, more efficient technologies emerging for uranium enrichment, the economic threat of plant closure also has loomed over the region for more than a decade (KRCEE, 2011). Further, confusion over a 2006 U.S. DOE-funded cost-benefit study to determine government expenditures could be reduced by federal purchase of adjacent residential properties generated confusion and anger in the community (KRCEE, 2006). More recently, a study of future stakeholder visions for the site following plant closure identified high levels of community distrust of U.S. DOE (KRCEE, 2011).

Today Paducah is a community of stakeholders simultaneously trying to make sense of the environmental risks of continued plant operations and the economic risks of plant closure (KRCEE, 2011). The PGDP's NPL status statutorily mandates the involvement of multiple federal- and state-level government agencies at the site, and both health and environmental advocacy citizen groups have been active in site-related matters. Stakeholders, therefore, have been the targets of numerous risk communication

activities from multiple sources for nearly a quarter of a century, making Paducah a strong case study for understanding the long-term dynamics of federal risk communication policies at Superfund sites.

Posing the Problem

This study seeks to understand the impact of past and current U.S. DOE risk communication practices on stakeholder relationships at the Paducah Gaseous Diffusion Plant National Priorities List Superfund site. Specifically, the study seeks to understand the constraints that agency risk communication policies place upon enactment, including the role that specific communicative practices could be playing in provoking or sustaining adversarial relationships. Thus, I analyze written and spoken communication from several quarters to address the following research questions:

RQ1: How does the enactment of accepted agency risk communication practices affect relationships among stakeholders, specifically:

- how do stakeholders (including federal agency personnel) characterize past and present agency risk communication practices, and

- how do stakeholders (including federal agency personnel) characterize each other in relation to these communicative practices?

RQ2: What are the related implications for improving agency risk communication approaches?

Exploring these questions will improve our understanding of whether and how the risk communication framework currently utilized by federal agencies working at Superfund sites could be creating new or reifying existing divisions between government entities and the community. After identifying the nature of the existing framework's

impact on relationships, I propose stakeholder-centered amendments to *The Seven Cardinal Rules of Risk Communication*, presenting a new model for federal agency interactions with riskbearing Superfund communities.

Chapter Three: Methods

Epistemological Paradigm

Because this study seeks to reveal existing phenomena to improve communication practice, it responds to calls for social science research that focuses on understanding rather than prediction (Blumer, 1966). Specifically, this study uses intentional analysis, which "focuses on a concrete experience itself and describes how that particular experience has been constructed" (Polkinghorne, 1983, p. 204). How have agency personnel's and stakeholders' communicative structures "been synthesized to constitute" specific meanings (p. 205), and what can we learn from that process that will help us improve our in- and inter-group communicative abilities?

The Paducah Gaseous Diffusion Plant case, like so many in the environmental risk/environmental health arena, does not present itself as an object of clear-cut risk, health, media, interpersonal, or participatory boundaries. Rather, the community and its challenges are lodged within a complex, interdisciplinary context that encompasses communication, sociology, psychology, and high levels of scientific and policy-related uncertainty. Therefore, this study is informed by theoretical perspectives that can improve our understanding of complicated communicative phenomena without constraining the pursuit of heuristically provocative theoretical avenues. For these reasons, the study is built upon the complementary metatheoretical perspectives of sensemaking and symbolic interactionism.

Sensemaking in Risk Environments

Sensemaking is the process through which human beings interpret and derive meaning from their lived experiences. Highly contextual in nature, sensemaking is tied directly to role structures and social interaction. It exists in the sphere of perpetual enactment and is rooted in the impacts that past experiences have on the conceptualization of the possible.

According to Blumer (1966), sensemaking is an interactive, situated process based on three primary tenets: 1) humans ascribe meaning to things and act on the basis of these ascribed meanings; 2) these meanings emerge from social interactions among individuals; and 3) individuals utilize an "interpretive process" to manage and modify meanings (Blumer, 1969). Not only do individuals "take the cue for their identity from the conduct of others" (Weick, 1995, p. 23), they also "create and maintain intersubjectively binding normative structures that sustain and enrich their relationships" (Weick, 2001, p. 106). Within these jointly-created and maintained structures, people determine what constitutes risk, how to respond to crises, and what can be learned from past experience. Such meaning-negotiation processes constitute the business of life.

In the course of human interaction, each individual assumes and enacts specific roles. These roles are defined and interpreted by others, then reflected back at the actor in an iterative process. The complexity of the process increases with the complexity of situational factors. According to Blumer (1966),

> In the flow of group life there are innumerable points at which the participants are redefining each other's acts. Such redefinition is very common in adversary relations, it is frequent in group discussion, and it is essentially intrinsic to dealing with problems. (p. 538)

Indeed, Nicholas and Hardy (2006) have found that communication is key for such issues as role assignment and group membership status, both of which are highly salient in the frequently conflict-riddled interactions of agency representatives and community stakeholders.

As Blumer (1966) describes, role definition involves "conveying indications to another person as to how he [sic] is to act," while interpretation is the process of "ascertaining the meaning of the actions or remarks of the other person" (p. 537). Meaning is developed not only through independent assessment of how one is or should act, but also through reflection about how others perceive one is or should act. In his analysis of sensemaking in crisis situations, Weick (1995) asserts that "sensemaking begins with a self-conscious sensemaker" (p. 22) who regularly plays out prescribed roles that help maintain structure.

When situations threaten roles, structure can disintegrate, leading to what Weick (2001) calls a "cosmological episode" in which "people suddenly and deeply feel that the universe is no longer a rational, orderly system" (p. 105). Bryant and Miron (2004) argue that the complex negotiations of sensemaking "create…temporary relations that are in constant flux despite the relative stability of the basic institutional framework that governs social relations" (p. 679). Deterioration of relations can decrease the stability of role frameworks, which can lead to loss of meaning, which can lead to further deterioration of role frameworks and on and on.

These processes all occur through constant, day-to-day social interaction. As Blumer (1966) writes,

> human group life takes on the character of an ongoing process - a continuing matter of fitting developing lines of conduct to one another…through the dual

process of definition and interpretation… The participants in [human interaction] have to build up their respective lines of conduct by constant interpretation of each other's ongoing lines of action. (p. 538)

This process of interpretation contributes to the fluidity of meaning, which is then supported or challenged through subsequent human action.

According to Weick (1995), people shape their environment, which then constrains the very people who created that environment. This concept is known as enactment, and it relies upon a two-step process. In the first step, preconceptions drive an actor to devote selective attention to specific experiences, while the second step sees the actor interpreting these experiences through the lens of the preconceptions that initially drove her or his attention to that experience, thus reinforcing those existing beliefs (Powers, 1972; Weick, 1988). This cycle creates an iterative enactment structure in which, as Weick (1988) puts it, "action tends to confirm preconceptions" (p. 307).

Three mediating factors for enactment are capacity, commitment, and expectations. Capacity constrains sensemaking through the number and diversity of potential actors. According to Weick (1988), "[P]eople see those events they feel they have the capacity to do something about" (p. 311). Individuals with a limited range of experiences upon which to draw, therefore, can recognize and respond to only a limited number of challenges. Thus, homogeneous groups that share the same set of experiences necessarily have a smaller range of responses in their sensemaking repertoire. As Weick states, "Accuracy in perception comes from an expanded response capacity" (p. 311). It follows, then, that the involvement of more individuals with varied expertise broadens the range of possibilities for sensemaking.

Commitment, the second mediating factor, constrains enactment through the formation of "blind spots" in the "tenacious justification" of particular positions. Weick (1988) explains that "tenacious justification can produce selective attention, confident action, and self-confirmation" (p. 310). Thus, the desire to see one's self – and to be seen by others – as correct determines how an individual experiences, interprets, and rationalizes a given situation or set of circumstances. As Weick states, "Once a person becomes committed to an action, and then builds an explanation that justifies that action, the explanation tends to persist and become transformed into an assumption that is taken for granted" (p. 310).

Finally, expectations constrain capacity through the creation of assumptions that become "self-fulfilling prophecies" (Weick, 1988). As Weick (1988) explains, "People who act in an organization often produce structures, constraints, and opportunities that were not there before they took action" (p. 306). Assumptions drive interpretations, which drive actions, which drive assumptions. For Weick (1988), "the crucial assumptions focus on themes of competence, importance, and value" (p. 313). Clearly, these themes are central to risk communication outcomes.

In addition to the three primary constraints on enactment, past experiences can either enhance or hinder the perception of what is possible. When situations are familiar, individuals have a repertoire of coping tools available to them; however, when situations are entirely new or novel, responses become more problematic. Because it is "the *feeling* of order, clarity, and rationality" that sensemaking seeks (Weick, 1995, 29), the process is inherently backward-looking. As Weick (2001) puts it, "The basic idea of sensemaking is that reality is an ongoing accomplishment that emerges from efforts to create order and

make retrospective sense of what occurs" (p. 106). Thus, meaning negotiations in the present can be impacted greatly by the processes and outcomes of meaning negotiations that took place in the past.

Symbolic Interactionism

Griffin (1991) notes that symbolic interactionism [SI] is more of a metatheoretical perspective than a formal theory. SI relies upon sensemaking's interpretive approach to understanding phenomena, taking as its basic unit of analysis the meaning-making *process* between two or more individuals or meaning-making communities. Rather than focusing upon a specific cognitive state or message content, SI focuses on these constitutive interactions that (re)create meaning (Blumer, 1966). As Ellingson (2009) puts it, "[M]eaning resides not in people or in data, but between them" (p. 56).

Since symbolic interactionism posits that meaning is constructed through *all* human interaction, the metatheory provides a framework for both micro and macro level research. Thus, boundaries are not prescribed but can be drawn and re-drawn to accommodate specific studies. Given that the system state of environmental cleanup is marked by high levels of scientific, political, and personal uncertainty, this fluidity of boundaries is an important asset for examining the PGDP case.

Rather than generating hypotheses, symbolic interactionism lends itself to the formulation of research questions. Essentially, an SI lens assumes that individuals communicating about environmental and economic risk jointly construct the very reality of that risk within their community. This study reveals the ways in which current federal agency risk communication practices inform that process, with a specific focus on how

different stakeholders perceive both each other and government communication processes.

Butler-Kisber (2010) directly links symbolic interactionism to methodological choices, noting that "the nature of interaction, the importance of context and the need to understand interaction as a process rather than a product [has] forced researchers to turn to qualitative approaches to…get rich and deep understandings of the particular" (p. 4). As Blumer (1966) states, "Symbolic interactionism covers the full range of the generic forms of human association...embrac[ing] equally well such relationships as cooperation, conflict, domination, exploitation, consensus, disagreement, closely knit identification, and indifferent concern for one another" (p. 67). All of these communicative situations are evident in the Paducah case and can, I believe, be explicated clearly through a symbolic interactionist position embedded within a qualitative research approach.

Research Design

To generate as rich a description as possible of the impacts of federal risk communication practices within the Paducah community, I conducted textual analyses of four extant datasets: 85 articles published in the local *Paducah Sun* newspaper during calendar year 2005; public comments captured by the Kentucky Research Consortium for Energy and the Environment [KRCEE] during a 2007 Property Acquisition Study that analyzed potential purchase of private land in the Water Policy District; focus group transcripts from the KRCEE's 2008-2011 PGDP Stakeholder Future Vision Study, which worked with local constituencies to help identify publicly acceptable uses for the site following the plant's permanent closure; and a total of nine blogs written by a local stakeholder and environmental activist during the KRCEE Future Vision Study. As

Fursich notes (2009), textual analysis is "a type of qualitative analysis that...focuses on the underlying ideological and cultural assumptions of the text...to discern latent meaning...and implicit patterns, assumptions, and omissions..." (p. 240). The use of textual analysis involves a three-step process: 1) identification of elements, 2) construction of provisional categories, and 3) meaning deconstruction through the identification of cultural biases at play (Stern, 1996). By conducting textual analysis of each dataset, I first broke the texts into their constituent pieces, identified and categorized emergent themes related to these pieces, and subsequently evaluated the ways in which these elements inform the broader discourse. Specifically, data were analyzed using constant comparative analysis (Strauss, 1987) and narrative inquiry (Butler-Kisber, 2010). These complementary analyses were synthesized using an approach known as crystallization (Ellingson, 2009). Extensive descriptions of these analytic techniques follow.

Constant Comparative Analysis

To conduct the data analysis itself, I implemented constant comparative methods (Strauss, 1987). Butler-Kisber (2010) describes constant comparative analysis as "a thematic form of qualitative work that uses categorizing, or the comparing and contrasting of units and categories of field texts, to produce conceptual understandings of experiences and/or phenomena that are ultimately constructed into large themes" (p. 47). Constant comparative analysis is iterative, involving cycles of data coding, the inductive creation and revision of categories, the repeated comparison of data to extant literature to initial conclusions and back to the data, the collection and categorization of additional data as needed, and the restructuring of categories and conclusions as warranted (Strauss

& Corbin, 1990; Charmaz, 2000; Ellingson, 2009). Ellingson (2009) describes constant comparative analysis as an approach "using theory to explain and contextualize findings rather than using findings to test the theory" (p. 55); however, she also notes that "[p]atterns help us to digest information, and as long as we do not labor under the illusion that a set of patterns constitutes a singular, valid reality, we benefit from systematic overview of phenomena" (p. 59). Such an approach is particularly suited to this study, given the need to compare findings and conclusions both within and across datasets to recognize the broader communicative phenomena influencing -- and being influenced by – the risk communication situation. As Clarke (2005) notes, when informed by a symbolic interactionist metatheoretical lens, this type of methodological approach increases "the capacity for critical analysis...through open coding such that actions, situated perspectives, symbolism(s), and the heterogeneity of discursive positions and their relations can be discerned and creatively grasped" (p. 8).

Ellingson (2009) delineates key assets of constant comparative methods when she notes that "[s]ystematic inductive analysis…lends itself to traditional research report forms that facilitate documentation of patterns through literature reviews, explanation of method, careful explication of themes or categories buttressed with data examples, and a discussion of theoretical and practical implications of analyses" (p. 57). Because of the systematic nature of the analytic approach, Ellingson (2009) cites constant comparative methods as "a way to introduce qualitative research in disciplines characterized by statistical research" (p. 59). This connection is particularly important to make in risk communication, which involves numerous participants from such fields as engineering and toxicology. As Ellingson (2009) notes, the potential for convergence between these

contrasting scientific perspectives exists in part because the use of constant comparative analysis "enables researchers to articulate concrete arguments, to make claims and support them with data and with connections to relevant research literature" (p. 60).

Although constant comparative analysis is, perhaps, one of the more accessible qualitative methods for quantitative scientists, Clarke (2005) argues that conducting such analyses within a symbolic interactionist framework is inherently a deconstructive act, since "[o]pen coding connotes just that -- data are open to multiple simultaneous readings/codes [and] there is no one right reading"; instead, he notes, "[a]ll readings are temporary, partial, provisional, and perspectival -- themselves situated historically and geographically" (p. 8). As Ellingson puts it, "[M]eanings of words are not fixed or predetermined, nor can they be assumed to be equivalent among people" (p. 32).

Constant comparative analysis therefore implicitly recognizes the situatedness and partiality of the researcher. Rather than seeking to identify a single truth that exists on its own, this type of analysis attempts to produce what Clarke (2005) calls "distinctive analytic understandings, interpretations, and representations of particular social phenomenon" (pp. 8-9). This perspective can be reinforced by "acknowledging the embodiment and situatedness of knowledge producers" (p. 20), thus embracing the process's inherent postmodern leanings. As Ellingson (2009) points out, such "social constructionist and postmodern frameworks go a long way toward opening up [such analyses] to be combined with other forms of analysis and representation, because they highlight the partiality and culturally specific nature of all knowledge" (p. 56).

Narrative Inquiry

In addition to the more common social scientific methodological approach provided by constant comparative analysis, I also employed the arts-informed method of narrative inquiry. Chase (2005) describes narrative inquiry as "an amalgam of interdisciplinary analytic lenses, diverse disciplinary approaches, and both traditional and innovative methods [that revolve] around an interest in biographical particulars as narrated by the ones who live them" (p. 651). According to Butler-Kisber (2010), narrative inquiry "is ongoing, iterative, and fluid in an inward and outward motion from the first day in the field...transcribing field notes and interviews into field texts to construct a 'chronicled account' of what is taking place." (p. 69). A narrative approach thus allows researchers to analyze how accounts are constructed (Riessman & Speedy, 2007).

Having spent more than four years working on matters related to the Paducah Gaseous Diffusion Plant, I have generated a wide array of personal notes, field notes, analytic memos, and written and recorded reflections regarding my site-related thoughts and experiences. The extensive materials and datasets I have collected throughout this study provide the data for the study's narrative segments, informing both the form and content of the analyses. As Butler-Kisber (2010) describes it, "[Narrative inquiry] has become a hallmark of qualitative inquiry and a basis for how researchers shape their studies, carry out the work, and represent it" (p. 79). Ellingson captures the process by stating that "[n]arratives enable qualitative researchers to show rather than tell, and such narratives enhance a number of different formats" (p. 65). Put slightly differently, narratives provide a space for feeling in addition to thinking (Frank, 1995).

According to Butler-Kisber (2010), "Narrative inquirers who live the story with their participants are interested in improving individual and social conditions" (p. 66). My desire to improve risk communication practice in Superfund communities contributed directly to my selection of narrative inquiry for this study. A specific episode of *mis*communication that occurred while I was in the field particularly lends itself to narrative analysis and, as such, provided a complementary lens through which to view communicative phenomena at the site. Because the incident occurred during a focus group and subsequently was the topic of numerous blogs by one of the focus group participants, this incident spans two of the four datasets and is integral to my construction of the Paducah case.

Palenchar and Heath (2007) note that "[p]eople think and act in terms of narratives, providing form and content to connect and give meaning to events" (p. 126). Contrasting blogs and field notes provide important data for understanding how individuals differentially construct the same event. These varying constructions provide important clues for how enactment is constrained for different individuals who might be present at the same place and time but who interpret a situation very differently.

Because I was a participant in the events, my narrative analysis necessarily contains an element of autoethnography through which I provide context and, as Ellis and Bochner (2000) put it, "make [my] own experience a topic of investigation in its own right" (p. 733). As Palenchar and Heath (2007) argue, "In the marketplace of ideas there are many different stories interpreting any one event [and] the acceptance of one narrative or interpretation leads to the elimination or muting of the alternatives" (p. 126). Using my own extensive field notes as a reference, I compare and contrast the narrative

that I constructed with the blog narrative, examining how each consequently mutes the

other's perspective. As Ellingson (2009) recognizes, "the lines between narrative

ethnography and autoethnography shift continually" with a focus on "social roles and

interactions that imply relationships between the author and others" (p. 12). By exercising

this form of narrative inquiry in this study, I acknowledge both the constructedness of my

analyses and the situatedness of my interpretation of events.

Crystallization

The implementation of these different but complementary analytic approaches

contributes to a mixed-methods strategy based in Ellingson's (2009) assertion that

researchers need to "maximize the benefits of contrasting approaches...while also being

self-referential to their partiality" (p. 10). To bring together the constant comparative and

narrative analytic tools, I employed a methodological framework known as crystallization

(Ellingson, 2009), which

> combines multiple forms of analysis and multiple genres of representation into a
> coherent text...building a rich and openly partial account of a phenomenon that
> problematizes its own construction, highlights researchers' vulnerabilities and
> positionality, makes claims about socially constructed meanings, and reveals the
> indeterminacy of knowledge claims even as it makes them. (p. 4)

Thus, crystallization is closely related to situational analysis, which Clarke (2005)

describes as utilizing

> alternative approaches to both data gathering and analysis/interpretation
> [promoting] the analysis of extant narrative, visual, and historical discourse
> materials. [to enhance] capacities to do incisive studies of differences of
> perspective, of highly complex situations of action and positionality, of the
> heterogeneous discourses in which we are all constantly awash, and of the
> situated knowledges of life itself thereby produced. (p. xxii-xxiii)

Crystallization relies primarily on a middle-ground approach outlined in Ellingson's (2009) qualitative continuum, with goals of "troubl[ing] the taken-for-granted" and "generat[ing] pragmatic implications for practitioners" (p. 8). This middle-ground approach generates questions related to how participants understand and co-construct their world; implements a case study method that includes interviews, focus groups, and thematic analysis; acknowledges that the investigator's positionality actively informs the findings; and grounds studies in social constructionist and postpositivist vocabularies. However, this middle-ground approach is greatly informed by such impressionistic questions as what other ways can be imagined and what is unique about an individual's experience, as well as by applying autoethnographic methods, incorporating personal reflections into the text, and situating the researcher's experience as an equally valid focus as that of other participants (pp 8-9).

Richardson (2000) describes crystallization as providing "a deepened, complex, thoroughly partial understanding of the topic" and goes on to state that we "know more and doubt what we know [but] we know there is always more to know" (p. 934). Such a perspective aligns well with Clarke's (2005) argument for research methods "to be recast in ways that allow the explicit acknowledgement and incorporation of the complexities of situatedness, variation, and difference(s) rather than promoting their erasure through various assimilations or hopes for transcendence through shared education or shared beliefs" (p. xxx). As Ellingson (2009) notes, "Crystallization does not depart radically from other recent developments in the wide field of qualitative methodology, but rather offers one valuable way of thinking through the links between grounded theory (and other systematic analyses) and creative genres of representations" (p. 5).

Whereas the more traditional social scientific methodological approach of triangulation rests upon the premise that an independent truth exists that can be revealed and corroborated by employing multiple research methods, crystallization recognizes truth as contingent and situated, describing phenomena through the metaphor of a many-faceted crystal that can never be viewed simultaneously from all angles. As Ellingson (2009) puts it, "Unlike triangulation, crystallization is informed by postmodernism, meaning that it presupposes that no truth exists 'out there' to discover or get close to, but only multiple and partial truths that researchers (and others) co-construct" (p. 22). Crystallization, therefore, permits researchers to use multiple methods to reveal multiple truths that help elucidate complex phenomena with the realization that all possible truths will not be captured by a single situated researcher, thus meeting Clarke's (2005) call for "methods…that go beyond 'the knowing subject' as centered knower and decision maker to also address and analyze salient discourses within the situation of inquiry" (xxix-xxx).

Ellingson (2009) delineates the principles for conducting crystallization, which include:

- Offer deep, thickly described, complexly rendered interpretations
- Represent ways of producing knowledge across multiple points of the qualitative continuum
- Utilize more than one genre of writing and/or other medium
- Eschew positivist claims to objectivity…embracing knowledge as situated, partial, constructed, multiple, embodied, and enmeshed in power relations (pp. 10-11)

This crystallized approach, coupled with a theoretical grounding in sensemaking and symbolic interactionism, allows me to use both emic and etic analyses (Lindlof & Taylor, 2002). As facilitator of the focus groups that comprise one of the four datasets and as the sometimes-subject of blogs that comprise a second dataset, I bring to this study

the emic perspective of a participant-observer. I am able to explore this perspective

through narrative vignettes woven around excerpts from field notes and blogs, allowing

me to present my lived experience as an outside communicator in a risk-laden

community, using narrative inquiry to better understand both my own experience and

how a community member perceived my role as Other within his community. As a

researcher, I also bring five years of engagement with Paducah stakeholder groups, a

theoretically-informed analytic lens, and training in the conduct of qualitative data

analysis to this project. These abilities contribute to more traditional grounded analyses

of study data, which work in tandem with the narratives to provide a rich, multi-faceted

picture of communication-related phenomena at the site.

     Ellingson (2009) asserts that "[c]rystallization provides one mode

for…reveal[ing] knowledge as fragmentary, contingent, and irreducibly complex" (p.

30). By contrasting the voice of social science researcher that dominates constant

comparative data analysis with narrative vignettes that reinforce my own positionality, I

remind both the reader and myself that my perspective, although informed by

communication study and practice, is still but one view among many.

Data Collection

Selection and Sampling

     This study incorporates four extant datasets: 1) *Paducah Sun* newspaper coverage

of topics related to the Paducah Gaseous Diffusion Plant published during Calendar Year

2005; 2) written and verbal public comments from a 2006 U.S. DOE-funded economic

study of property surrounding the plant; 3) transcripts from focus groups related to the

U.S. DOE-funded PGDP Stakeholder Future Vision study; and 4) subsequent blog entries by a local activist regarding the Stakeholder Future Vision study.

Each of these datasets was collected during a three-year U.S. Department of Energy-funded project designed to assist the greater Paducah community in determining acceptable and unacceptable future uses for the PGDP environs following the plant's eventual closure and decommissioning. Upon learning in early 2008 that I would be involved as a co-investigator in the Future Vision study, I began gathering background materials to improve my own understanding of community perspectives about the site. I subsequently conducted two degree-related studies: 1) a media content analysis of previous local newspaper coverage and 2) an evaluation of the sensemaking processes evident in public comments made during a previously-conducted U.S. DOE-funded study. In addition to these two datasets, this study incorporates as a third dataset focus transcripts gathered during the Stakeholder Future Vision Study itself. Finally, the fourth dataset consists of blogs written about the Stakeholder Future Vision Study by a local stakeholder and environmental activist. Taken in combination, these datasets present a multiplicity of perspectives about the PGDP, spanning a period of six years. Specific data collection practices and their rationale for incorporation follow.

Paducah Sun Newspaper Coverage, 2005

The news media plays a complex part in the social construction of individual and community risk perceptions related to environmental health concerns. Although media outlets play an explicit role as providers of risk information (McCallum, Hammond, & Covello, 1991), coverage tends to privilege human interest above detailed analyses of public health issues (Spencer & Triche, 1994; Ader, 1995). Whether dramatizing stories

for maximum emotional impact (Kasperson et al., 2000), providing forums in which the credibility of technical hazard experts is questioned (Mazur, 1981), or relying upon inaccurate sources (Beckett, 1995), media can amplify risk perceptions within a community. Journalists' tendency to frame messages on the bases of their own personal beliefs and commitments further problematizes the media's role in risk construction (Wakefield & Elliott, 2003). Thus, specific media outlets -- and even specific journalists -- can play a complex but pivotal part in the ways in which communities think about specific environmental and health risks.

Exposure to local media coverage of relevant issues influences both social interactions and resulting community sensemaking processes. As Blumer (1966) describes, role definition involves "conveying indications to another person as to how he is to act," while interpretation is the act of "ascertaining the meaning of the actions or remarks of the other person" (p. 537). Meaning is developed not only through independent assessment of how one is or should act, but also through reflection about how others perceive one is or should act. The media thus can be quite influential by presenting specific viewpoints of how individuals *should* react to PGDP issues.

In terms of sensemaking, media coverage can greatly affect individual definitions, role assignments, and interpretations. To describe this phenomenon, Semmler (2007) has created a theory of parasocial symbolic interactionism, which examines the ways in which symbolic interactionist processes and media cultivation inform each other. According to this theory, individuals extend their own consciousness into the consciousness of others as presented through media, thus impacting beliefs about norms. As Semmler (2007) puts it, "The parasocial symbolic explanation of cultivation proposes

that [media extend consumers'] *common sense*, understood as one's taken for granted

assumptions about what is right and what is wrong" (pp. 3-4). Weick (2001) states that

"[t]he basic idea of sensemaking is that reality is an ongoing accomplishment that

emerges from efforts to create order and make retrospective sense of what occurs" (p.

106). Thus, meaning negotiations in the present can be impacted greatly by the processes

and outcomes of meaning negotiations that took place in the past, including those that

were presented by the media.

       This study analyzes the local newspaper's contributions to community

sensemaking about the PGDP. Because local newspapers must selectively determine

what topics to cover and how to cover them (Wakefield & Elliott, 2003), specific stories

contribute to the larger community-constructed narrative about the PGDP. As Bakhtin

(1981) puts it, communities are engaged in a "living discourse" (p. 259), which is

heterogeneous, dynamic, and cumulative. In this study, I analyze articles from the

Paducah Sun, the local newspaper of record with a circulation of approximately 25,000,

to determine how PGDP communication efforts are presented by the media, as well as

how stakeholders publicly characterize those communication efforts and each other.

       I selected calendar year 2005 as a rich period for analysis due to the occurrence of

several "newsworthy" events that year, many of which required agency-driven public

information exchanges. These events included: 1) the transfer of sick worker health

benefits administration from U.S. DOE to the US Department of Labor, 2) the public

release of a federal report on employee radiation exposure at the plant; 3) negotiation of

new environmental cleanup subcontracts; and 4) Department of Homeland Security drills

at the plant. In searching for 2005 *Paducah Sun* coverage of the PGDP, I carefully

examined 364 editions. [The December 13th issue was unavailable through the University of Kentucky Library archives and therefore was not included in the study.] Eighty-five articles related to the PGDP were identified and analyzed.

Property Study Public Comments

In 2006, U.S. DOE distributed to the PGDP Citizens Advisory Board, community stakeholders, and federal and state regulatory agencies a proposed "statement of work" describing a potential property acquisition study for the PGDP. According to the statement (U.S. DOE, 2006), the study would "evaluate a range of remedial alternatives, their impact on protection of public health and the environment, and their cost of implementation relative to the purchase of properties impacted or potentially impacted by contamination from the Paducah Gaseous Diffusion Plant" (p. 1). The statement of work further indicated that the study would be conducted in compliance with a dictate from the Energy and Water Development Appropriation Bill, 2006, mandating that U.S. DOE evaluate whether the potential purchase of property or easements of land near the plant would be in taxpayers' best interest. The dissemination of the statement of work was followed by media coverage (Walker, 2006a; Carroll, 2006; Walker, 2006b), multiple U.S. DOE project presentations to both the PGDP Citizens Advisory Board and the general public, and the solicitation of public comments for the record (U.S. DOE, 2007). Ultimately, the property study itself was carried out through the auspices of the Kentucky Research Consortium for Energy and the Environment at the University of Kentucky.

This study employs etic analysis (Lindlof & Taylor, 2002) of the public documents generated during the eighteen months of this property acquisition study. The dataset, much of which was included in the final property report appendices, includes the

content of study-related mailings and presentations made by U.S. DOE, media coverage of the study process, public comments drawn from meeting transcripts, and letters, emails, and other communications exchanged by stakeholders. These data provide multiple perspectives about the relationships between the agency and its stakeholders, as well as perspectives about federal communication efforts related to the site.

Focus Groups

Following the conclusion of the property study, the Kentucky Research Consortium for Energy and the Environment was again tasked with supporting a U.S. DOE effort that required broad-based engagement activities. The Stakeholder Future Vision Study, as it came to be known, attempted to identify community values and preferences related to the final disposition of the PGDP site following the plant's anticipated closure [KRCEE, 2011]. To achieve this goal, the KRCEE project team developed a unique methodology that integrated qualitative approaches derived from Community-Based Participatory Communication with quantitative approaches from the field of Structured Public Involvement. What ultimately emerged was a four-step process that involved: 1) iterative stakeholder interviews; 2) stakeholder-specific focus groups; 3) interactive public information sessions; and 4) large-scale community meetings (KRCEE, 2011).

In this study, I analyze transcripts from Stage Two, the stakeholder-specific focus groups. Butler-Kisber (2010) points out that "in dialogic exchanges, having verbatim text is invaluable" (p. 30). This study incorporates such verbatim text from each of eight focus group sessions that brought together individuals with similar commitments and perspectives to discuss PGDP-related issues. The eight focus groups were: PGDP/USEC

Employees; U.S. DOE Employees/Subcontractors; Water Policy District Residents; Ballard County Citizens; Environmental and Health Advocates; Economic Development/Local Government; Wildlife/Recreation Enthusiasts/Tourism; and Healthcare Professionals/Educators.

The IRB-approved focus group protocol [#10-0086-P4S] (see Appendix A) attempted to elicit community values, perceptions about the plant's future, and information gaps related to the site's future disposition. During the course of these discussions, conversations often turned to stakeholder perceptions of other stakeholder groups, as well as to their evaluations of U.S. DOE's past risk communication efforts and overall trustworthiness. Given the diversity of stakeholder groups involved, these transcripts provide an incredibly rich dataset for analysis.

Blogs

During the Stakeholder Future Vision focus group session with environmental and health activists, the protocol went awry, with one participant strongly objecting to a particular visual discussion trigger. This trigger was one of twelve computer-generated images depicting hypothetical future scenarios for the site. In this instance, the visualization portrayed a nuclear power plant on the current PGDP site. Attempts to clarify the image's role as a discussion trigger rather than a proposal were unsuccessful. Over the course of the two-and-a-half hour session, relations between the participant, the research team, and other stakeholders taking part in the meeting became increasingly strained, eventually devolving to the point that police were nearly called to the scene. Following that session, there was a great deal of communication traffic between the

participant and the University of Kentucky's legal department regarding demands for the release of both research materials and the names of other research participants.

The dissatisfied participant regularly writes a blog about local and national political and environmental issues. He has used this blog as a forum to write extensively about his perception of the events that transpired that evening. A total of nine blogs to date have addressed the specific focus group session and/or the project for which the focus group was created. These blogs provide a wealth of information regarding how the participant made sense of the research team, the project, and the focus group itself through the lens of his past interactions with U.S. DOE and its contractors. This dataset provides an additional perspective on the broader communicative issues related to the PGDP.

Data Analysis

The analyses of media coverage, transcripts, and blogs began with an iterative coding process using QSR NVivo 8 qualitative data analysis software. During early analytic stages, I engaged in individual provisional coding (Saldana, 2009) of each dataset, identifying first broad topic categories. During secondary coding, I identified occurrences of sensemaking constructs. In third cycle coding, I examined emergent within-dataset patterns, grouping related codes into broader categories and examining the relationships among them. By crystallizing this traditional qualitative analytic approach with narrative inquiry into my field experiences, I explicitly foregrounded the situatedness of both my initial interpretations and my subsequent analyses. I then created a detailed, yet necessarily incomplete, understanding of risk-related communicative phenomena in Paducah.

During final stages of data analysis, I explored the datasets as an aggregated set, identifying where similar themes have emerged across channels and stakeholders and noting differences that appear. As my understandings of PGDP communicative phenomena have deepened, I have shared preliminary findings with key Superfund stakeholders to determine whether my explanations resonated. Among the stakeholders who have provided feedback on this study are federal and state agency personnel, community organizers, and members of the community-based pilot stakeholder group who consulted with the PGDP Stakeholder Future Vision Project research team on protocol development. While these member checks have provided additional insights into my conclusions, forcing me to question my assumptions and contributing new perspectives to the analysis, they have not been used as validity checks in the traditional sense. Rather, the crystallization framework has encouraged me to embrace the fact that different stakeholders with different commitments hold different opinions about study findings. Instead of pointing to a central and indisputable truth, stakeholder responses have assisted me both in providing thicker analyses and in acknowledging additional perspectives as they have emerged. The crystallized study findings subsequently have informed the creation of the convergence-building, community-based model for governmental risk communication activities described in the final chapter of this dissertation.

Coding

The development of the codebook closely reflects Butler-Kisber's (2010) description of the transition from etic, literature-driven codes to emic, content-driven

codes. As Butler-Kisber (2010) notes, the first analytic phase of qualitative research involves

> close readings and rereadings…playing with some broad categories in which
>
> different portions of the field texts can be placed, at least temporarily [including]
>
> assigning names to these categories and working back and forth across the
>
> categories expanding and contracting them as the analysis proceeds. (pp. 30-31)

To this end, I read through newspaper articles, written records, transcripts, and blogs multiple times, both prior to and after entering the data into NVIVO software files for analyses. Using a grounded theory approach, I then engaged in open coding of data units, identifying key concepts that appeared within the written data (Strauss, 1987; Lindlof & Taylor, 2002). I subsequently created a first cycle codebook centered around three themes that emerged across all the datasets: communication, othering, and U.S. DOE. I created definitional criteria for placement of data units within each category, as reflected in Table 3.1, and entered this into the project codebook.

Table 3.1. First-Cycle Coding.

Code	Criteria
Communication	Discusses specific activities or materials related to agency-provided information and/or public involvement
Othering	Instances of us/them binaries
U.S. DOE	Specific mentions of the agency or its activities

After identifying these broad topic areas, I then conducted a secondary analysis of the data, looking explicitly for constructs previously identified as tied to enactment in the sensemaking literature. I created codes and criteria for data related to capacity,

commitment, and expectations. I then added this information, as seen in Table 3.2, to the

codebook.

Table 3.2. Second-Cycle Coding: Enactment

Code	*Criteria*
Capacity: Number of Actors	Discussion of number of people involved in plant-related activities and/or decisions
Capacity: Diversity of Actors	Discussion of homogeneity or heterogeneity of individuals involved in various plant-related activities and/or decisions
Commitment: Blind Spots	Language indicating an inability to see alternate perspectives
Commitment: Tenacious Justifications	Language indicating an unwillingness to consider alternative explanations
Expectations: Roles	Discussion of who does (or is perceived to do) what within plant-related activities or decisions

Finally, I conducted thematic analyses and axial coding, a process of identifying

"connections between categories" (Lindlof & Taylor, 2002, p. 220) and integrating the

categories into broader themes that run both within and across the datasets. As Butler-

Kisber notes, an important goal of coding is "moving from a descriptive categorization of

the accessed field texts to a more conceptual and interpretive level" (p. 31). I

subsequently created a third set of codes and criteria, as seen in Table 3.3, and entered

these into the codebook. This third phase was integral in teasing out some of the complex

meaning-making related to the PGDP.

Table 3.3. Third-Cycle Coding: Themes.

Code	Criteria
The Government	Blurring of the lines regarding the roles and/or goals of various federal- and/or state-level agencies
The Public	Blurring of the lines among the roles and/or goals of non-agency personnel
Delays	Discussions of postponements and bureaucratic constraints on action
Secrecy, Manipulation, and Deception	Discussions of slow- or non-disclosure; related concerns about misuse or falsification of information toward unknown ends
Competing Risk Perceptions	Discussions regarding perceived risk levels related to the site

Challenges for Qualitative Research

Richardson (2000) describes the central dilemma for the postmodernist, qualitative researcher as claiming a "position [that] allow[s] us to know 'something' without claiming to know everything" (p. 928). Within scientific inquiry, the choice of this approach, rather than seeking to develop predictive theories, is sometimes criticized. According to Butler-Kisber (2010), "Qualitative inquiry [focuses] on what, how, and why, using participant voices and experiences to interpret and explain (or in other words to present a small 't' theory) about a phenomenon…" (p. 26). By employing multiple qualitative methods toward these ends, I situate this study within what Patton (2002) calls "the pragmatist paradigm," in which the selection of methods is centered around choosing the best tools for the task. However, this methodological choice brings with it numerous challenges that are common to qualitative study in terms of my selection of the case study approach and in terms of meeting responsibilities both to the communication field and to study participants. Ellingson (2009) expands upon Fitch (1994), noting that "rigor, depth

of analysis, and reflexivity constitute important criteria for evaluating middle-ground qualitative research quality" (p. 32).

Transferability versus Generalizability

This project relies upon a case study of the Paducah Gaseous Diffusion Plant National Priorities List Superfund site. Although case studies occasionally are cited as methodological approaches in and of themselves, the case study does not provide specific guidelines for data collection or analysis and, thus, is not a true method. Rather, a case study relates specifically to the boundary conditions of the study and, subsequently, to the kinds of theories and methods that could be applicable within those boundaries. As Tinker (1996) notes, a case study "defines topics broadly and not narrowly, covers contextual conditions, and relies on multiple and not singular sources of evidence" (p. 202). VanWynsberghe and Khan (2007) argue that a case study is "a transparadigmatic and transdisciplinary heuristic that involves the careful delineation of the phenomena for which the evidence is being collected" (p. 80). Thus, according to VanWynsberghe and Khan (2007), case studies typically: 1) have a small number of subjects and a great deal of contextual detail; 2) rely upon natural settings; 3) provide detailed and explicit temporal and spatial boundaries; 4) utilize working hypotheses; 5) develop lessons learned; and 6) use multiple data sources for triangulation.

Any approach that recognizes the essentially situated nature of communication and meaning-creation must value context above prediction. As Cossette (1998) writes, "[S]ituations must be studied from within, on the basis of the representations of the individuals concerned" (p. 1368). Therefore, I have selected a case study approach that permits me to integrate multiple qualitative methods to produce a rich description of the

78

target phenomena (Scholz & Tietje, 2002). While the results of such a case study cannot be generalizable, the insights gained can be transferrable to similar communities and circumstances (Baxter & Eyles, 1999; Wakefield & Elliott, 2003). Gulbe (1981) addresses the case study dilemma when he discusses the characteristics of the naturalistic researcher, who "does not attempt to form generalizations that will hold in all times and in all places, but to form working hypotheses that may be transferred from one context to another depending upon the degree of 'fit' between the contexts" (p. 81).

Central to an audience's ability to make effective determinations about applicability of findings to other settings is the effective use of "thick descriptions" (Geertz, 1973), which Guba asserts "will permit comparison of this context to other possible contexts to which transfer might be contemplated" (p. 86). According to Butler-Kisber (2010), "Trustworthiness is enhanced when there is clear evidence that a length of time has been spent in the field and there are multiple forms of field texts that can help to corroborate explanations" (p. 14). Thus, case study researchers must commit themselves to thorough descriptions of the scene, players, and interactions to ensure clear assessments of case-by-case transferability.

Reliability and Validity

Addressing issues of reliability and validity is sometimes considered the greatest challenge for qualitative research. However, as Butler-Kisber (2010) notes, "From the point of view of qualitative inquiry, [the] realist notion of defining and describing a 'truth' to demonstrate validity has very little meaning" (p. 14). As Mischler (1990) notes, "Focusing on trustworthiness rather than truth displaces validation from its traditional location in a presumably objective, non-reactive, and neutral reality, and moves it to the

social world – a world constructed in and through our discourse and actions, through praxis" (p. 420).

Maxwell (1992) identifies three kinds of qualitative validity related to this construct of trustworthiness: descriptive validity, interpretive validity, and theoretical validity. Descriptive validity addresses whether an account is factually accurate (Butler-Kisber, 2010). This criterion can be met by utilizing numerous sources and conducting member checks, both with participants in the study and with those who have some knowledge of the situation itself. My use of multiple datasets, including newspaper accounts, is one way in which I have attempted to address the issue of descriptive validity in this study. In addition, I have engaged in direct dialogue regarding preliminary findings both with citizens of Paducah and with federal and state agency personnel. As Guba (1981) notes, such "member checks" are the "single most important action inquirers can take, for it goes to the heart of the credibility criterion" (p. 85).

Interpretive validity is concerned with whether findings reflect a multiplicity of participant perspectives. As Guba (1981) asserts, "naturalistic inquirers are most concerned with testing the credibility of their findings and interpretations with the various sources (audiences or groups) from which data were drawn" (p. 80). I have relied upon multiple datasets and extensive member checks to address this criterion, as well. This approach aligns well with Richardson's (2000) conceptualization of qualitative validity, for which "the central image is the crystal, which combines symmetry and substance with an infinite variety of shapes, substances, transmutations, multidimensionalities, and angles of approach" (p. 934).

Theoretical validity is tied to whether findings actually explicate the phenomenon under investigation. In the background, rationale, and epistemological commitments portions of this study, I explicitly set forth the sensemaking underpinnings of the project, a choice informed both by several years of engagement at the site of study and by a career rooted largely in conducting research translation and engagement activities at Superfund sites. I further strove for theoretical validity during second cycle coding by looking specifically at whether the constructs identified in the literature were reflected within the transcripts, articles, and blogs themselves.

Credibility versus Objectivity

Butler-Kisber notes that "[a] rigorous or trustworthy study indicates its persuasiveness by including a coherent and transparent research process and illustrating an adherence to researcher reflexivity and reflection" (p. 14). Guba (1981) asserts that this is brought about, in part, by "triangulation, member checks, providing an audit trail, and employing researcher reflexivity" (p. 88). As Butler-Kisber states, such "[t]ransparency permits a clear understanding of the inquiry process which persuades the reader/audience of the trustworthiness or rigor of the study and allows other researchers to build on or adapt processes that are revealed in the work" (p. 16).

According to Golden-Biddle and Locke (2007), the construction of a qualitative account is problematized from the beginning.

> The very act of developing theorized storylines from the field story generated through our engagement with particular social settings automatically raises the question of whether we 'were there,' and while there, whether we were able to experience and learn enough to allow us to understand and interpret what went on… Did we engage the research setting sufficiently intensively and extensively to understand the events, situations, and people we engaged? Did we observe and

record in sufficiently fine detail to warrant an insightful and competent understanding of the situation studied? (pp. 76-77)

These questions are central to the credibility of study findings. As Butler-Kisber notes, key factors that support credibility include "prolonged engagement in the field or interviews that take place over time; persistent inquiry that produces rich field texts; triangulation or the convergence of field texts from different sources; the search for and explanation of negative cases or outliers; referential adequacy or interpretation that is grounded in the field texts; the inclusion of insider/emic perspectives; and participant checks and debriefings" (p. 46). To the extent possible, I have attempted to make these factors central in the design and conduct of this study while also embracing my own positionality within the scene.

Researcher Reflexivity

Nightingale and Cromby (1999) describe researcher reflexivity as "awareness of the researcher's contribution to the construction of meanings throughout the research process, and an acknowledgment of the impossibility of remaining 'outside of' one's subject matter while conducting research" (p. 228). Thus, it is key for qualitative inquirers not only to recognize but, as necessary, to foreground their biases in recognition of the ways in which individual experiences influence all aspects of the research endeavor. Medved (2011) notes that "[r]igorous and worthwhile qualitative research begs meaningful and, at times, uncomfortable self-analysis" (p. 109). The extensive use of such self-analysis is particularly important for studies that employ crystallization. As Ellingson (2009) notes, "[C]rystallized texts feature a significant degree of reflexive

consideration of the researcher's self in the process of research design, data collection, and representation" (Ellingson, 2009, p. 12).

Having spent five years working on site-related issues, nearly three of those interacting directly with stakeholders in and around the Paducah community, I recognize explicitly my own positionality in relation to the generation and analysis of the datasets in this study; however, my interest in the issues I investigate in Paducah was formulated long before I knew of the PGDP. A native Appalachian, I am familiar both with the exploitation of local resources by external entities and with the marginalization of local populations in decision-making. As communication liaison for the University of Kentucky Superfund Research Program for nearly ten years, I also have had opportunities to work with stakeholders to address social justice issues professionally. Through these experiences, I have repeatedly noted high levels of stakeholder distrust of government agencies and their associates, including universities. Such perceptions can be particularly problematic in communities like Paducah, where a federal agency has been designated the potentially responsible party (PRP) in a major contamination incident.

As a communication practitioner embedded within an academic setting, I also have listened at length to researchers and agency personnel discuss their own work. At times, these discussions have pushed riskbearing communities to the margins, making assumptions about what should be most important in a community based almost exclusively on scientific risk assessments, with little consideration given to the values or wishes of residents.

Clearly, these experiences have affected my perception of governmental risk communication policies and procedures, as well as my assessment of their

implementation in Paducah. During extended periods of formative research and data collection, I have written numerous reflective memos, have composed personal notes, and have even made audio recordings of my reflections about field experiences during the long drives between Paducah and Lexington, Kentucky. These reflections, in addition to field notes and transcripts, have been valuable in helping me select key events to incorporate into the narrative inquiry portions of this dissertation. What moments made the greatest impact upon me in the field? What moments have stuck with me through time? Why these moments and not others? What can these recollections tell readers about the contested role of researcher, about field relationships with stakeholders, about stakeholder perceptions of the complicated relationships between researchers and the government agencies that fund them? By practicing reflexivity throughout the study, I am better equipped, as Ellingson (2009) puts it, "to show rather than tell" (p. 65) readers about PGDP-related communicative phenomena, depicting the multivocality involved when stakeholder perceptions compete, and ultimately contributing to a richer, more nuanced picture of the challenges stakeholders face in trying to make collective sense of the issues.

After more than decade of working in academia, I have come to understand that, sometimes, the very people who live with risks have been pushed to the periphery of decision-making processes. While these stakeholders have been informed as applicable laws require, they rarely are truly engaged in determining their own fates. It is my sincere hope that this study and the proposed convergence-building, community-based model of risk communication will help bridge these gaps, providing a starting point for improving

relations among the numerous stakeholders impacted by environmental contamination.

<div style="border: 1px solid black; padding: 1em;">

<u>Barriers</u>

I drove back to Paducah to prepare for the Environmental/Health Focus Group, stopping to check my email for additional RSVPs. I was very concerned that we had only one RSVP accepting the invitation; however, I was hopeful that individuals from the listening tour would attend... Unfortunately, there were no additional RSVPs in my inbox... When we arrived onsite, the room was arranged with tables and chairs facing the front, classroom style. To promote dialogue, we immediately set about rearranging things into a u-shape. We arranged the table so that the opening of the "u" faced the computer screen. There was a table with a podium in the front left. I hoped that our team wouldn't use the podium. The last thing I wanted us to do was introduce real or perceived barriers between ourselves and the participants.

--Field Notes, May 4, 2010

Even before our KRCEE Future Vision research team arrived in Paducah for the first time, I was keenly aware that some members of the community already held perceptions of us as "other." Colleagues from the university's Superfund Research Program had shared stories of some Paducah constituencies -- particularly environmental and health activists -- angrily opting out of activities. I also knew from prior public meeting comments, official reports, and our own listening tour that some stakeholders resented monies being spent on university-led studies rather than on either site cleanup or compensation for those who felt they had been sickened through PGDP-related hazardous exposures. As a participatory researcher, I wanted to ensure

</div>

that the voices of these segments of the community were included in our work, but I feared that our research team would inherit some existing frustration.

My field notes throughout the project depict my internal struggle to dissociate our research team from these pre-existing frustrations while also achieving specific personal goals. Because this was my first time in the field, I wanted badly to do things "right" from a methodological perspective, particularly as my doctoral committee chair also was a member of the research team. As a long-time university employee, I also wanted to do my job well, particularly as my supervisor was the project's principal investigator. Finally, as a native of a community near the Oak Ridge, Tennessee, Department of Energy facilities, I had deep empathy for the people of Paducah and genuinely wanted to serve them well. From painstakingly drafting focus group invitations to laboring over slide content to trying to ensure that the physical focus group space was as open and collaborative as possible, I nervously tried to remove any and all barriers to constructive dialogue and full participation. Little did I know that one of the greatest barriers to effective communication would arise from blind spots formed through my own commitment to the research.

Chapter Four: Results

Talking about the PGDP

According to Congressman Ed Whitfield, "From the anticipated closure to public safety to expedited cleanup, the issues surrounding the [Paducah Gaseous Diffusion Plant] are complex and endless" (*Paducah Sun*, Dec. 2005). Such complexity poses difficult challenges for sensemaking processes that attempt to construct understandings of a phenomenon, often through simplification to its most basic parts. As Weick (2010) puts it, "[T]here are...times when, despite or because of that simplification, situations become less comprehensible, more interactively complex, and harder to control" (p. 538). As numerous constituencies have attempted, through their own prisms, to understand the complicated statutory, political, risk, interorganizational, and interpersonal facets of the Paducah Gaseous Diffusion Plant story, they have interacted with each other, staking out positions, forming and disbanding alliances, and jointly adding to a body of actions and events that require additional sensemaking efforts to interpret.

The data gathered through this study exist at the intersection of these sensemaking processes and help to identify areas in which communicative actions are implicated in the development of relationships. As Palenchar and Heath (2007) note, "It is becoming increasingly clear that the main product of risk communication is not informed understanding as such, but the quality of the social relationship it supports" (p. 127). Through an exploration of both the sensemaking processes and the relational outcomes of PGDP risk communication, this chapter directly responds to the study's first research question, i.e. how does the enactment of accepted agency risk communication practices affect relationships among stakeholders?

The strength of building this study's methodological approach on crystallization lies in the researcher's ability to approach these complex issues from myriad directions, to continually turn the problem back on itself, and to find new ways of exploring the ever-emerging angles. While intellectually invigorating, such an approach brings with it the inherent challenge of knowing that all angles can never be explored fully. Situating the researcher within this puzzle, determining starting points and -- of practical necessity -- ending points, is both time-consuming and doubt-reinforcing. However, the process also provides numerous opportunities to realize the linkages among data and how they inform each other.

To begin answering the research questions posed in this and the next chapter. I examined four extant datasets: 85 *Paducah Sun* newspaper articles about the Paducah Gaseous Diffusion Plant that were published in Calendar Year 2005; the assembled public comments collected by the Kentucky Research Consortium for Energy and the Environment [KRCEE] during its 2006-2007 PGDP Property Study; eight focus group transcripts generated in 2010 during the KRCEE Stakeholder Future Vision Study; and nine online blogs published by a local activist during the latter study. Through constant comparative analysis, I identified emerging themes across the datasets. Throughout this chapter, these findings are complemented by narrative interludes that depict the ways in which the themes interact to create communicative barriers that inhibit the possibilities for convergent communication among site stakeholders.

The findings in this chapter illustrate how the ways in which people and agencies talk about and describe previous interactions with each other in Paducah point to sensemaking challenges that have been erected over decades. More specifically, capacity,

commitment, and expectations are constrained, as exemplified in each of four emergent themes that dominate the discourse: 1) The Government, 2) The Public, 3) Bureaucratic Delay, and 4) Secrecy, Deception, and Manipulation. Stakeholder sensemaking about these themes further complicates existing disagreements about probabilistic risk at the site, creating a fifth theme, Competing Risk Perceptions.

The Government

In Paducah, as at other Superfund sites, conceptualizations of "the government" are fraught with complexity. Numerous federal, state, and local agencies take on diverse roles, most of which are statutorily compelled. Among the federal actors currently or previously involved in some way with the PGDP site are the United States Environmental Protection Agency, the Agency for Toxic Substances and Disease Registry, the United States Department of Energy, the United States Department of Labor, the National Institute of Occupational Safety and Health, and the National Institute for Environmental Health Sciences. At the state level, the Kentucky Energy and Environment Cabinet, through the Superfund Branch of its Department for Environmental Protection, and the Kentucky Cabinet for Health and Family Services, through its Radiation Control Branch, also have some presence at the site. Locally, both the McCracken and Ballard County governments are implicated in plant-related decision-making, as are such government-business coalitions as local chambers of commerce, the Paducah Area Community Reuse Organization, and the Paducah Uranium Plant Asset Utilization Task Force.

At various times, all of these organizations have issued official statements and press releases, have conducted or participated in public meetings, and have been featured in local newspaper coverage of PGDP-related issues. The sheer number and variety of

organizational actors can generate difficulty for those trying to understand which agencies or agency-related organizations are responsible for which actions. Thus, plant-related discourse frequently groups all government-affiliated organizations into one overarching, monolithic organization, generally referred to as The Government. This simplification problematizes sensemaking greatly by: 1) reducing the perceived, if not the actual, number of actors, 2) rhetorically establishing adversarial us/them community/agency binaries that fail to distinguish roles and positions within and across groups, and 3) supporting erroneous conclusions about one agency's motives or actions based on retrospective sensemaking that draws on an unrelated agency's past actions.

Capacity: The Number and Diversity of Actors

As Atkinson (2005) notes, "In the social arena, group identity negates 'that which it is not,' by creating false unities among group members which deny the complex multiplicities of which 'the group' is composed" (p. 81). Thus, when diverse organizations are grouped under a single term like The Government, sensemaking is threatened through a reduction in the perceived number of distinct actors and viewpoints. In the case of Paducah, the blanket term The Government is used by a number of sources across multiple channels as a proxy for diverse agencies. Such rhetoric encourages non-agency stakeholders to assume that there is, in fact, a single Government point of view on plant-related issues rather than numerous viewpoints that differ based on a specific agency's or individual's role. Therefore, stakeholders who view The Government as representing a lone, distinct perspective may expect little benefit from engaging multiple agencies in dialogue.

Examples of this reductionist terminology abound in both local media and interpersonal discourse. Textual analysis of 85 *Paducah Sun* articles published in the year 2005 identified 21 instances of the conflation of agencies under The Government signifier, often with accompanying confusion about agency roles and responsibilities. One area in which this approach proved particularly problematic was the transition of a backlogged worker compensation program from the Department of Energy to the Department of Labor. Although the transition and subsequent program implementation involved at least three federal agencies, references to a singular Government abound.

An excerpt from a front-page *Paducah Sun* article illustrates this dilemma. "Robert Pierce has always believed that exposure to deadly substances while working at the Paducah Gaseous Diffusion Plant robbed him of his health and livelihood. Now the government confirms it" (Walker, 2005h, p. 1A). The program under which Mr. Pierce had first applied for compensation was administered by the Department of Energy. After a backlog of more than 25,000 claims had built up, with some remaining unaddressed for more than four years, Congress passed legislation to transfer program administration to the Department of Labor. The National Institute of Occupational Safety and Health, a division of the Centers for Disease Control, was charged with evaluating individual worker exposures and determining whether compensation was warranted. Some of the data used for those evaluations came from decades-old DOE reports. Thus, a complex array of agency actors were involved at various stages, from processing to evaluating to paying specific claims. The *Paducah Sun*'s statement that "the government confirms" that Mr. Pierce's illness is work-related presents a tidier but far less accurate image of the process.

Such simplification contributes to confusion about the number of governmental actors and the possibilities for varying perspectives among them. In an article two months later, the adult child of a deceased nuclear worker questioned the motives of all of the agencies involved, perhaps inadvertently, by stating, "I think the government is trying to get out of paying what it owes" (Walker, 2005m, 2A). In a follow-up article the next day, the adult child of another worker appeared perplexed by the claims process. The newspaper reported that "she doesn't understand how the government can pay some people and not others in compensation for essentially the same diseases" (Walker, 2005n, 1C). Again, the complex process involving legislation passed by Congress and its subsequent impacts on policies, procedures, and payments involving three distinct agencies is clustered under a single motive attributed to a single entity, in this case The Government attempting to "get out of paying what it owes" by inequitably, perhaps arbitrarily, making decisions that benefit itself. The resulting connotation is that all agency employees, regardless of department or division, are working toward a clearly defined, shared goal that disadvantages a portion of the affected population. Thus, the perceived capacity for sensemaking dialogue among stakeholders and agencies is greatly constrained.

At other times, agencies themselves invoke the image of The Government, often as a means of contextualizing their own actions as driven by forces outside their control. In one situation, DOE elected to rebid a cleanup contract in response to several competitors protesting an announced contract award. In justifying its actions, the agency stated that it was determined to act in "the best interests of the government to take corrective action and reopen the competition" (Walker, 2005j, 1A). As Brinson and

Benoit explain, "[W]hen a reputation is threatened, individuals and organizations are motivated to present an image defense: explanations, justifications, rationalizations, apologies, or excuses for behavior" (p. 30). For DOE, the involvement of other governmental entities in site-related decisions has sometimes been invoked to explain or justify an action, particularly an action that might prove unpopular with various stakeholders. Thus, in addition to media and stakeholder attempts to simplify the multi-actor web, agencies themselves sometimes intentionally blur the lines.

Another example of DOE's use of this strategy took place during a federally-funded Property Acquisition study to evaluate the costs of buying private property adjacent to the PGDP. From the earliest stages of the study, the Department of Energy attempted to define and assert its role in the process: the agency was Congress's servant – no more, no less. The initial "statement of work" draft that stakeholders received clearly stated, "This project will be performed in order to meet the requirements established in Energy and Water Development Appropriation Bill, 2006 (Senate Report 109-084)" (U.S. DOE, 2007, p. H-10). The first bullet on the first slide of subsequent U.S. DOE presentations to the PGDP Citizens Advisory Board reinforced that the study responded to a Congressional mandate (U.S. DOE, 2007, p. H-32). During two separate public meetings, multiple introductory slides featured the following statement in boldface type: "The study is being conducted in accordance with a Congressional Directive to DOE in the 2006 Energy and Water Development Appropriations Act" (U.S. DOE, 2007, p. H-53-H-55; U.S. DOE, 2007, p. H-129-H-132). Repeatedly, DOE attempted to contextualize itself as an executor of, rather than a leader in, The Government's decision-making.

In other circumstances, The Government is accompanied by a key modifier and becomes The Federal Government. When this juxtaposition occurs in the *Paducah Sun*, the word "federal" becomes almost a pejorative term. Among non-media stakeholders, as well, The Federal Government is an object of disapproval. The most frequent and fervent criticisms relate directly to agency communications, with stakeholders citing excessive use of confusing acronyms. For instance, when asked about the kind of information stakeholders require to make sound decisions about the plant, one focus group participant recommended that the Future Vision research team "try not to use those acronyms that DOE uses -- spell it out." Another participant quickly interjected, "The federal government is notorious about doin' that. If you've ever tried to read a federal government document..." Thus, The Federal Government is perceived as an ineffective communicator, which subsequently colors stakeholder perceptions of all related agencies and their employees.

The reality, however, is that federal agencies often perceive themselves as operating at cross-purposes and, therefore, send very different messages. In 2006, as the Department of Energy discussed the Property Acquisition study during a PGDP Citizens Advisory Board meeting, Environmental Protection Agency representatives registered concern about past attempts by other federal entities to use property purchases as a means of circumventing regulatory statutes. According to one U.S. EPA staff member,

> This issue is not new to EPA. It is an issue that we have gone around with various federal facilities and projects for years. The question is if I never sell this property then that means I do not have to remediate the plume and the answer is no. You still have to remediate the plume. This is just a land use control. (U.S. DOE, 2007, p. H-41)

Community members directly associated with the plant by employment -- whether through DOE, USEC, or a contractor -- espouse a more nuanced view of government that recognizes multiple players. In one Future Vision focus group, a contractor described his experiences trying to influence Congressional action: "I spent a year and a half working on Capitol Hill with legislation to try to re-feed a large segment of those higher asset tail cylinders... And we could not get Congress to move those... [T]here were just too many competing interests as to who was gonna get the money, and what—how the money was gonna be dispersed..."

Within the PGDP discourse, Congress holds an interesting position as a potential bridge between the perceived conformity of The Government and a diversity of state/local interests. While Congress, as a whole, often is rhetorically grouped within The Government, individual elected officials frequently are portrayed as separate and distinct, thus expanding the perceived field of participants for sensemaking activities. Whether a function of the geographic proximity of congressional field offices or attributable to close political alignment with the *Paducah Sun*'s editorial board, Senators Mitch McConnell and Jim Bunning, along with Congressman Ed Whitfield, tend to be portrayed favorably by the local newspaper as public servants who are doing their best to control the perceived shortcomings of The Government. For example, the newspaper asserts that Kentucky's "congressional delegation has been scrutinizing the elongated Paducah contract situation" (Walker, 12/28/2005, p. 12A). Bunning is explicitly recognized for convening Senate oversight hearings to investigate PGDP cleanup delays; he is quoted as saying that "those living and working in and around Paducah deserve a better environment" and that he wants to "bring accountability to the process" (Walker, 2005x,

95

p. 12A). Similarly, Whitfield is acknowledged for his "ongoing concerns about cost increases and delays in Paducah plant cleanup" (Walker, 2005c, p. 8A).

While newspaper coverage tends to present the involvement of the Kentucky Congressional delegation as positive, other constituencies in the community disagree. A blog authored by a participant in a Future Vision focus group noted, "At the beginning, it was explained that this study was the result of a 'federal earmark facilitated by Sens. McConnell, Bunning, and Rep. Whitfield.' That said a lot to me" (Donham, 2010a, para. 2). Regardless of the way in which these elected officials and their actions are framed, both the newspaper and the blog rhetorically separate these specific actors from The Government.

Similarly, the newspaper sometimes segregates state government from federal, often depicting state officials as criticizing The Federal Government, whether for its poor environmental practices or for attempting to avoid its cleanup responsibilities. For example, in an article about the Property Acquisition study, the *Paducah Sun* notes that "[t]he proposal has critics, including those who say a buyout would limit the government's future liability for cleaning up the contamination"; the article then quotes an assistant director of the Kentucky Division of Waste Management, who says that he cannot see how a federal government land buyout would be "fitting into any type of remedy" for getting rid of the contamination" (Associated Press, 2005, p. 12A).

Whether depictions of individual government officials at either the federal or state level are positive or negative, segregation of the actors points to important implications for sensemaking. When the "The Government" is broken down into its constituent parts,

a convergent space is made in which individual efforts can be acknowledged and appreciated, as well as criticized. For example, the sick nuclear worker who "doggedly called and wrote government officials about his case" also "thanked the local Labor Department claims staffers for their help" (Walker, 2005h, p. 14A). Thus, while increasing the number of perceived actors available to participate in joint sensemaking, the rhetorical separation of The Government into its component parts also personalizes the actions of the individuals working to implement agency policies and procedures.

Commitment: Adversarial Binaries

Unfortunately, the depersonalization that occurs through the use of blanket terms like The Government can exacerbate already-tense situations by contributing to binary thinking. Were a stakeholder to make negative public statements about an individual or agency, that public commitment could contribute to blind spots and tenacious justifications about that specific targeted individual or agency. However, when the negative public statements extend to The Government, numerous actors involved in site decisions are rhetorically implicated, thus creating the possibility that negative opinions of one actor are transferred to others. This is particularly problematic when the negative opinion relates to distrust of an agency, as often happens at Superfund sites.

During the Future Vision study, the research team asked the same basic question of eight focus groups: who is considered a credible source of information for issues related to the Paducah Gaseous Diffusion Plant? While answers varied across the groups, a common response was that the Department of Energy is not a trusted information source for many stakeholders (KRCEE, 2011). While such a perspective is understandable in light of DOE's historic role in site contamination and, according to

97

some, subsequent cover-ups, the distrust at times extended beyond the agency to encompass all governmental entities engaged at the site. As one focus group participant put it, "I would not want [information from] anybody affiliated with the government in any way... I wouldn't trust anything that people that have been connected with that place have to say." In this way, use of the phrase The Government extends distrust of DOE to negatively affect relationships among stakeholders and other agencies, as well.

Local newspaper coverage also plays an important role in the creation and reification of an adversarial view of The Government, and particularly of federal entities. The editorial page provides a key venue for promoting animosity, whether explicitly or implicitly. In one instance, a letter to the editor raises questions about the motives for delayed payments to sick nuclear workers by stating that "the federal agencies continue to miss the point…or do they" (Sparkman, 2005, 4A)? The author describes a situation in which those deserving of compensation die before receiving it, leaving their adult children ineligible for benefits. Her implication is clear: The Federal Government values cost savings over fairness.

In addition to such stakeholder acrimony toward The Federal Government, the *Paducah Sun* (2005) editorial board also promotes an intergovernmental adversarial relationship by rhetorically pitting state and federal agencies against each other, particularly on the editorial page, where it credits state officials with forcing federal cleanup action. "Over the past six years," the editor writes, "the federal cleanup operation has moved in fits and starts [but the] cleanup seems to have gained momentum since the state imposed timetables in the 2003 cleanup agreement" (p. 4A). The editor adds that the site cleanup agreement is the state's "legal club in holding DOE to its

cleanup commitments" and urges Kentucky state officials not to "hesitate to take DOE to court, if the agency doesn't follow through on its obligations to Paducah" (p. 4A). Through such statements, the *Paducah Sun* reifies existing tensions between state and federal entities -- tensions that previously had threatened to erupt into multiple lawsuits and countersuits (Short, 2002; de Saillan, 2008).

The newspaper also promotes intergovernmental hostility between Congress and the executive branch, often along party lines. For example, a series of articles frames federal policies that restrict contaminated nickel recycling as detrimental to both cleanup and the Paducah economy. The paper's editorial page discounts the restriction and places the blame squarely upon the executive branch under the leadership of former President Bill Clinton who was "swayed by such Democratic interest groups" as organized labor and environmentalists. However, one editorial anticipates "light at the end of the tunnel" for overturning the restriction, as "[i]t's a logical assumption that the agency eventually will lift the politically motivated ban, given that a Republican administration is calling the shots in the executive branch of federal government." (Walker, 2005a, p. 4A).

Ironically, the newspaper is joined in its reinforcement of negative images of The Government by stakeholders who hold vastly different political commitments. Local environmentalists, in particular, have a strained relationship with The Government. In one Future Vision focus group, a local activist expressed his anger by proposing that an acceptable future for Paducah would meet one key criteria -- it would "just get the government the hell out… I think Washington, D.C. would be a good place to store [the hazardous waste]." He continued, "I think we were doing a really good job before they came…in and disrupted everything." Another activist expressed his doubt about the

motives and potential outcomes of the Future Vision study, relating it directly to his dismay at existing stakeholder-governmental relations by stating, "I have spent a good deal of the last twenty-five years of my life going through the process with the government on environmental issues, so you know, I know some things about the process." Again citing his past interactions with The Government, he asserted, "I don't feel like I've ever really had any real influence on a governmental decision unless I took some really strong action, like got involved in a lawsuit," before again questioning the research team's "real" motives.

In this case, a stakeholder's very public distrust of governmental processes extends beyond agencies to include university-based researchers who had received pass-through funding from an agency. The subsequent suspicion illustrates a central challenge related to rhetorical groupings of multiple entities under The Government construct. Specifically, stakeholders who have taken high-profile stances, and thus are deeply committed, against specific organizational actions can have tremendous difficulty separating the perceived at-fault agency from other entities that they also perceive as falling under The Government umbrella.

This lack of organizational distinctions points to a significant shortcoming of *Seven Cardinal Rules* and other best practices approaches to risk communication. While encouraging cross-organizational collaborations, these guidelines do not explicitly recognize that, from a stakeholder sensemaking perspective, an individual organization may be perceived as part of a larger entity that comes with its own baggage. Rather than understanding that a particular agency is addressing its specifically mandated activities in fulfilling its own defined role, independent of or loosely collaborating with other

agencies in the scene, some constituents see only a puzzling web of federal and state entities, making it difficult to parse just who is responsible for what -- a dilemma that has important repercussions for managing expectations.

Expectations: Retrospective Sensemaking

The depiction of The Government as a single entity in the Paducah discourse seriously constrains agencies that are new to the scene. Such constraints are particularly challenging for organizations whose roles involve assuming responsibilities formerly belonging to another entity. A particularly stark example of this type of difficulty in sensemaking arose in 2005, when the U.S. Department of Labor [DOL] assumed administration of a workers' compensation program previously managed by the Department of Energy. This program was designed to provide benefits to workers who had become ill due to work-related exposure to hazardous chemicals. Under DOE management, a backlog of approximately 25,000 claims had built nationwide, with some applicants waiting more than four years for responses. To address the situation, Congress passed legislation transferring program administration to DOL. According to the *Paducah Sun*, the law "gave the department 210 days to May 26 to issue regulations and have staffing and procedures in place to compensate workers sickened from toxic exposure" (Walker, 2005l, p. 1A).

Unfortunately for the Department of Labor, the time required to set up these new policies and procedures became conflated with the long waits applicants had already experienced under DOE management of the program. In this way, the same sensemaking strategies that conceived of both entities as part of The Government quickly promoted the transfer of existing stakeholder frustrations from DOE to DOL. This relationship was

reified through numerous *Paducah Sun* articles featuring such headlines as "Frustration Grows as Sick Workers Wait for Benefits" (Walker, 2005s) and "Sick Workers Seek Responses to Their Claims" (Walker, 2005t), along with articles profiling the illnesses of both living and deceased claimants (Walker, 2005h; 2005m; 2005n).

The Department of Labor responded to this situation with a letter to the editor in which it acknowledged frustration over previous U.S. DOE management of worker claims but stated that DOL was, in fact, ahead of schedule on many aspects of payment. "We honor the dedication of those who gave their service to our nation, and fully appreciate the frustration they may feel over the past years of delay," the DOL official wrote. "And that's why we are working hard – and achieving great progress – in getting help to these workers and their families" (Lipnic, 2005, 4A).

Another agency that dealt with problematic understandings of its specific site role was the Agency for Toxic Substances and Disease Registry. After the PGDP was added to the U.S. EPA Superfund National Priorities List, ATSDR began developing a work plan and conducting its Public Health Assessment, visiting the community multiple times between 1994 and 2000, including participating in six DOE public meetings. The Agency's final report concluded: 1) that the site "currently poses no apparent public health hazard to the off-site community"; 2) that a future rupture of any of the more than 33,000 depleted uranium cylinders on site "would create an urgent public health hazard for anyone" nearby; 3) that previous TCE exposure through consumption of water from four of the contaminated private wells had been "a public health hazard for children"; 4) that "future exposures to maximum concentrations of contaminants in the groundwater plumes" through new private wells would constitute a public health hazard; and, finally,

5) that the Agency did not have enough information to determine the levels or impacts of past acute uranium hexafluoride exposures. The Public Health Action Plan included recommendations for continued clean-up, emergency preparedness planning, and monitoring of the site, also offering the community ATSDR's support as a source of risk-related information.

As Tinker (1996) explains,

ATSDR is faced with challenges in health risk communication in...subject [communities] on two major fronts: (a) explaining to local residents the complex nature of the health studies of their community; and (b) changing strongly held assumptions and attitudes in the community about alleged government malfeasance, the role of big business and environmental racism, the right to health and health care, and a host of related concerns. (p. 209)

Entrenched distrust of the Paducah Public Health Assessment in some corners supports this contention. As one community member mentioned during the PGDP Future Vision research team's listening tour, "[T]here's been recent testimony that the ASTDR *[sic]* report was biased. These people were intimidated by the past administration." Another community member further highlighted the ways in which role confusion can feed distrust by asking, "[W]hy didn't ASTDR *[sic]* do an epi study? They [i.e., 'the government'] never do any honest stuff."

According to Tinker (1996), this type of reaction is not uncommon in Superfund communities responding to ATSDR health assessments. He cites a specific case in which both a preliminary ATSDR Public Health Assessment and a follow-on second study were met with community skepticism, largely because the investigations "were based primarily on environmental information provided to EPA by the manufacturer of the wood preservative" (p. 209). Even when the second study attempted to partner with the state department of health, distrust continued.

Despite distrust of the report itself, some local activists have found value in the ATSDR report, primarily in the Agency's collection of community comments during the Public Health Assessment process. Confirming McComas's (2003) assertion that "individuals sometimes base their opinions about government agencies on other people's experiences" (p. 169), one focus group attendee who expressed some of the strongest doubts about the ATSDR report's accuracy also cited as fact an anecdotal comment that is archived on Agency's website. "[I]t's all on the ATSDR/CDC site," he said. "And we even had a sick worker get up at one of the meetings and talk about some of this stuff. They never told anybody anything. And they're still not doing it."

<div style="border:1px solid black;padding:1em;">

<p align="center">Government People</p>

There were…7 or 8 government people in attendance. They had all kinds of fancy technical stuff set up, and supposedly the entire evening was recorded. They had the process all planned on how they were going to guide us through getting our opinions.

<p align="right">*--Rural Thoughts Blog, May 5, 2010*</p>

As I set the room for the May 4th Future Vision Environmental/Health Focus Group, I was aware that this set of stakeholders, in particular, might be somewhat distrusting of our research team. We were, after all, academics from a different part of the state with no direct vested interest in the site's future. The same qualities that could make us seem unbiased to some constituencies also could render our motives suspect to others. However, in considering our outsider status, it did not occur to me that someone might think of us as direct government operatives. After all, weren't we

</div>

opening every session reviewing detailed, IRB-approved informed consent documents

that, I thought, clearly delineated our roles as university researchers?

When I saw a focus group participant's blog on the morning of May 5th, I

knew how wrong I had been not to consider the possibility that our work would be

conflated with that of government agencies already at the site. Our team's commitment

to the research -- our very embeddedness in the process of creating informed consent

documents and promoting what we thought was an inclusive, participatory project --

had contributed to the development of our own gaping blind spot regarding how we

might be perceived. When that blind spot collided with the focus group participant's

tenacious justifications about The Government based on prior Department of Energy

activities at the site, the stage was set for confusion and antagonism.

The Public

If The Government constitutes the first piece of a problematic rhetorical binary in

Paducah, the other piece is The Public. Comprising myriad local and state interest groups

and individuals, the concept is both omnipresent in site-related discourse and codified in

risk communication best practices approaches like *Seven Cardinal Rules*. In fact, two of

the first three *Rules* explicitly address agency relations with The Public: "accept and

involve the public as a legitimate partner" and "listen to the public's specific concerns"

(Covello & Allen, 1988).

It is worth noting that a single bullet point embedded within the *Rules* narrative

states that "[t]here is no such entity as 'the public'; instead, there are many publics, each

with its own interests, needs, concerns, priorities, preferences, and organizations."

However, this statement exists as one of several "Points to Consider" in the document and is both graphically and textually marginalized in relation to the bright, bold rules that employ language specifically addressing The Public as a single entity. Further, while the *Rules* do include this lone mention of multiple publics, the singular phrase "the public" appears nine times, both in the rules themselves and in the accompanying narrative. The rhetorical balance, therefore, clearly points to The Public as a single audience.

As with the blanket conceptualization of The Government, the whole-cloth grouping of numerous constituencies under The Public banner contributes to a number of challenges for sensemaking. These challenges have played out in various ways over the years in relation to the PGDP, further embedding The Public as the primary audience for risk-related information. An examination of interpersonal talk about and media coverage of the plant implicates this rhetorical simplification in three areas of sensemaking constraint: 1) contested membership in and responsibility to The Public that creates challenges for capacity; 2) adversarial binaries and resulting commitments that foster blind spots; and 3) expectations rooted in a discourse of deficiency.

Capacity

In contrast to the homogenized depiction of The Public outlined above, the KRCEE (2011) PGDP Future Vision research team identified at least 16 groups with distinct stakes in plant-related decisions:

- Water Policy District Residents
- Economic Development Representatives
- United States Enrichment Corporation (USEC) Employees
- Environmental/Health Advocates
- Healthcare Providers
- Educators
- Media

- Religious/Spiritual Community Members
- Wildlife/Recreation Enthusiasts
- Tourism Interests
- Ballard County Stakeholders
- U.S. DOE
- U.S. DOE Subcontractors
- McCracken/Paducah Government
- PGDP Citizens Advisory Board
- Regulatory Agencies

With the possible exceptions of U.S. DOE, McCracken/Paducah Government, and Regulatory Agencies, all of these groups could be seen as components of The Public; however, real-world communications belie such an assumption and indicate disputes over both the make-up of The Public and the construct's implications for PGDP decision-making.

For some local activists, inclusion in The Public seems to relate inversely to one's perceived economic status in the community. One environmentalist who participated in a Future Vision focus group later blogged that he had requested a list of project "advisory board" members and that he was certain it consisted of "a bunch of names of 'influential' folks in Paducah. I certainly wasn't on it. But I think it's important for the public to know" (Donham, 2010d, para. 1). As expressed, the author's assumptions about "advisory board" membership implied that group was other-than-public, a conclusion underscored by his belief that The Public was in need of information about the board. In this way, the sentence structure seems to support a vision of "influential" members of the community as being outside of, rather than members of, The Public.

A similar issue of authenticity in relation to membership in The Public arose during two separate studies funded through DOE. The Property Acquisition study, which

evaluated potential costs and benefits of DOE purchasing private properties adjacent to the plant, was recommended to the Kentucky congressional delegation by local business leaders during an annual Chamber of Commerce visit to Washington, D.C. (KRCEE, 2007). Similarly, the Stakeholder Future Vision study was first recommended by the PGDP Citizens Advisory Board to support decision-making related to the site's future (KRCEE, 2011). In both cases, local stakeholders exhibited concerns about the origination and expense of the studies. During a public meeting for the property study, one attendee submitted the written question, "Who started all these studys [sic] and went to Congress to ask for these studys [sic]" (U.S. DOE, 2007, p. H-67), while another attendee asked, "Don't you think it is a waste of taxpayers [sic] money to study the studies that has [sic] already been done by DOE" (U.S. DOE, 2007, p. H-67)? Later, during the Future Vision study, a local activist complained on his blog, "God only knows how many hours, paid for by the public, went into these graphics" (Donham, 2011b, para. 6).

Such concerns about public monies often are included in *Paducah Sun* coverage of site-related matters, particularly through various government officials' repeated invocation of a subset of The Public -- The Taxpayers. Frequently, The Taxpayers and their "interests" provide a rhetorical foundation upon which to justify or explain specific agency actions. For example, Energy Secretary Samuel Bodman defended changing plant cleanup plans as representing "a reasonable stewardship to the taxpayers' money that we've been given to spend" (Walker, 2005d, 1A); he subsequently commented that DOE would make contract decisions that "provide value to the taxpayers and contribute to the cleanup of our Cold War legacy" (Walker, 2005g, 11A). This stance was adopted across

the agency, as illustrated by a DOE spokesman's comment that the agency continued "to believe that this contract represents the best value for both the taxpayers and the community" (Walker, 2005k, 1A).

Later attempts by the agency to situate the Property Acquisition study similarly as an activity designed to benefit taxpayers, however, were rejected by some local stakeholders. One resident interviewed by the *Paducah Sun* (Walker, 2006b) called the study "another example…of a waste of money" (p. 11A), while the vice-president of Taxpayers for Common Sense remarked to Louisville's *Courier-Journal* that "[the study] sounds…like cut and run" (Carroll, 2006). In a letter to the House of Representatives Subcommittee on Energy and Water Development, the Active Citizens for Truth president flatly rejected the taxpayer-as-client construction, reminding members of Congress that

> I am a taxpayer along with other families who are United State citizen's [sic] and have been living on top of these plumes for over 50 years, paying tax dollars for companies and federal agencies that were allowed to dump hazardous waste down drains, through the air, and operate in a shroud of secrecy. When you talk about best interest of tax payer dollars, then we need to consider the enormous amount of monies that the tax payers have paid for clean-up of contaminated groundwater at the Paducah Gaseous Diffusion Plant, which cannot be cleaned up. Let's talk about the $300,000 the University of Kentucky received to do this study which shows there was never any intention to buy private property that the PGDP contaminated… So you see monies are not being wasted on the residents, but millions have been wasted by the DOE to contractors knowing there was not an effective technology that would clean-up contaminated groundwater. (U.S. DOE, 2007, p. H-160)

Nearly identical concerns were raised during the Stakeholder Future Vision Study. In a blog post that followed one of the focus group meetings, a local participant wrote,

They sure know how to spend money. And let's not forget, this money came from one of those infamous 'earmarks' by non-other than now 'earmark' killer U.S. Sen. Minority leader Mitch McConnell. This is public money - not private money - funnelled through DOE. (Donham, 2011b, para. 3)

Such arguments concerning both which individuals may claim membership in The Public and how The Taxpayers' money should -- or should not -- be spent constrain the possibility for dialogue among those with competing perspectives, thus reducing the capacity for joint sensemaking.

Commitment

As in-group/out-group lines get drawn in reference to membership in The Public, stakeholders commit themselves to very distinct positions related to their perceived inclusion or exclusion. For example, one USEC staffer reminded the Future Vision research team that they were "not talking to the public right now. We all work here, and we know what's out here, but the general public still has a very vague idea of what's out here." He continued, "The general consensus is it's already at nuclear power plant levels of contamination. That's what the general public already thinks. So no matter what scenario you go with, that's going to be a factor with the general public." In this way, the employee not only separated himself and his colleagues from The Public, he also committed a key act of othering by defining The Public as a group that tenaciously clings to misinformation. However, he failed to recognize his own blind spot about non-employees' ability to understand and interpret relevant risk information.

Non-employees also make this distinction regarding The Public. During a different focus group, a plant subcontractor and an environmentalist engaged in dialogue about the site. In a subsequent exchange in the comments section of an online blog, the

environmentalist firmly drew membership lines for The Public: "I found you in the know about things that have public interest, and I think you should make more efforts to share what you know with the public in general" (Donham, 2010c, para. 6). Thus, in the environmentalist's view, the subcontractor's relationship with the plant precluded his inclusion in The Public construct.

Interestingly, the environmentalist in this case falls into the same rhetorical trap as *Seven Cardinal Rules* and other best practices-oriented guidelines. He portrays The Public as ignorant of particulars and in need of information it does not have. Just as The Public needs protection from misspending of The Taxpayers' dollars, so The Public needs outside entities to educate it about key facts that it lacks. Both assertions build expectations of The Public that are based, by definition, on its perceived deficiencies.

Expectations

The portrayal of The Public as lacking both control and information is pervasive in the PGDP discourse. Rather than promoting an image of stakeholders as diverse actors within the situation, this construction situates The Public as an object. In some situations, it is depicted as an audience for information. In others, it is described as a group to be persuaded. Often, The Public indicates a faction to be protected, whether from The Government or from itself. These images arise through a discourse of deficiency.

The Department of Energy's approach to public communication is grounded in best practices guidelines that strive to fulfill statutorily-mandated responsibilities. This often is done by hosting public meetings at which information is shared with The Public. Such meetings are designed to help address suggestions that agency personnel "[d]emonstrate your respect for the public and your sincerity by involving the community

early, before important decisions are made, and return to the public often" (Keystone Center, 2005, p. 21). The statement that DOE should "return to the public" underscores an asymmetry in which the public involvement process is led entirely by the agency, which chooses the points of communicative intervention.

Some stakeholders feel that this process is flawed, with the agency sharing only the information it absolutely must and citizens having little to no input in decision-making. As one Future Vision focus group participant stated,

> Those meetings they had two or three years ago, I felt like I was just sitting there waiting for them to put a big ol' pacifier in my mouth. That's all in the world they was doing. We had to stare at the goofy guy from up yonder. Whatever his name was. I just felt like a total idiot because he was up there doing that, sticking that pacifier in my mouth, and I've been out of that stage for a long time.

This assertion echoes the concerns of social scientists who note that most public meeting implementation strategies actually minimize stakeholder influence on agency decisions (Berry, Portney, Bablitch, & Mahoney, 1997; McComas, 2003; Bailey, Blandford, Grossardt, & Ripy, 2011; KRCEE, 2011).

Such public meetings often are conducted in adherence to *Seven Cardinal Rules* or similar best practices documents. As Heath and O'Hair (2010) note, "Prescriptive guidelines such as those by the Environmental Protection Agency and the Chemical Manufacturers Association [seem] to feature what the source in the risk communication process wanted to say rather than what the receivers wanted to know and say" (p. 13). When participants recognize this dynamic at play, their frustration grows. As the Keystone Center (2005) notes in its risk primer for DOE personnel,

> In the United States, government agencies and private companies tend to anger the public by not involving them in decision making when the stakes or impacts are perceived to be high... However, there is one thing that is guaranteed to anger

the public even more than not involving them—involving them with no real intention of listening. (p. 31)

An upshot of public involvement activities that are not perceived as truly engaging stakeholders has been the popular conceptualization of The Public as a target of persuasion and grudging appeasement. This portrayal echoed throughout the PGDP Stakeholder Future Vision focus groups. In evaluating a particular hypothetical scenario for the site's future, one participant stated, "This [scenario] seems to be one of the easier ones for the public to swallow," while a participant in another focus group remarked, "We thought it was one of the easier ones for maybe the public to accept." During another session, a local business leader remarked that the addition of recreational facilities to the site would "be a tough sell for the public." Again, The Public plays a passive role, but it also is vulnerable to persuasion under the correct set of circumstances.

This perceived vulnerability is, perhaps, one of the driving motivations behind discourse about protecting The Public. Following a Future Vision focus group, one participant depicted himself as offering just such protection. In the comments section of a blog entry, he wrote,

> A heck of a lot of public money has been spent out there, but the biggest, most expensive problems still remain. A lot of people in the community know that I had paid attention to these issues for decades, and they count on me to give them an oversight view of what I think is going on. (Donham, 2010c, para. 5)

He also used the blog to assert that "[p]eople who deal with the public need to know the laws and regulations. You can't just make them up as you go, and you better be able to answer relevant questions that the public has" (Donham, 2010a, para. 14). By homogenizing stakeholders as The Public and rhetorically positioning that Public as being in a chronic state of deficiency, the discourse lowers governmental expectations of

stakeholders' ability to interpret complex information and, consequently, places these same stakeholders in a defensive position that further constrains sensemaking.

<div style="border: 1px solid black; padding: 1em;">

Demarcating The Public

There was only one other person from the "public" who turned out not really to be from the public... He was from one of the DOE cleanup contractors, Paducah Remediation Services, who, according to his own statement, was there "at the request of the congressional delegation." He had some interesting comments over the course of the evening, but he spent a lot of the night texting, especially when I was talking. I wonder what was going over those text messages.

--Rural Thoughts, May 5, 2010

Whether an actor is recognized as a member of The Public has important implications for his or her credibility with others in the room, and the identities of the others in that room matter tremendously. If The Public is widely seen by government officials as lacking information or the ability to sufficiently process information, then not being perceived as a member of The Public can be beneficial for those dealing with agencies, legislators, and other government personnel. Thus, explicitly connecting one's self to such entities can be important for building credibility in those interactions. During the Future Vision Environmental/Health focus group, a PGDP contractor did exactly this, offhandedly mentioning his connection to Kentucky's congressional delegation and later describing lobbying activities he had undertaken on behalf of the plant.

</div>

This governmental connection, which might have helped establish his credibility in a focus group for employees, regulators, or even economic development officials, had the opposite effect in the Environmental/Health focus group session. It marked him as an object of distrust and suspicion, as *other* than The Public, for one local environmentalist. Despite the contractor's roles as a citizen of the community and a former labor union officer, his acknowledged relationship with elected officials fed directly into the Government/Public adversarial binary that dominates PGDP discourse and contributed to further devolution of the meaning-making process.

Delays

Although contaminated private wells near the plant were first discovered in 1988, the subsequent investigation and public comment process lasted almost six years, ending with the site's addition to U.S. EPA's National Priorities List of Superfund sites in 1994. In the nineteen years since, the community has continued to see numerous delays -- delays in providing process-related information to stakeholders, delays in awarding contracts, delays in cleanup activities, and delays in compensating sick workers. Such delays have helped create and sustain a pervasive narrative of governmental sluggishness and disinterest in the Paducah community. Consequently, the embedding of this narrative within the discourse has negatively affected sensemaking in three distinct ways: 1) the lack of timely information has limited the number and diversity of truly informed stakeholders available to jointly make sense of process-related challenges; 2) contract setbacks have created confusion for numerous constituencies within both the community

and the government, leading to very public criticism of DOE; and 3) cleanup and compensation delays have prompted both stakeholder frustration with the agency and doubt about its motives.

Capacity

Delays at Superfund sites affect a variety of stakeholders. While postponement of contract execution creates uncertainty for individual employees and can negatively impact the broader economy, prolonged cleanup also causes environmental groups to question an agency's commitment to repairing past damage. Such cleanup delays also contribute to longstanding health concerns among residents who live near sites. Similarly, slow or non-existent compensation for sick workers can put families in difficult financial and emotional binds. Unfortunately, all individuals affected by such delays do not necessarily receive timely or adequate information about causes or potential remedies, thus reducing the number and diversity of knowledgeable stakeholders available to help identify actionable solutions.

According to the *Paducah Sun,* DOE delays in bidding and awarding contracts "baffled public officials and local firms competing for the contracts" (Walker, 2005a, 2A). These confused officials were not restricted to local or state government offices. Even Kentucky's Congressional delegation found itself in the dark, prompting Senate, House, and public hearings to help understand and address the causes of the holdups. At one point, Senator Jim Bunning acknowledged that official policies and procedures can negatively impact timelines but also attempted to personalize the problem. He reminded DOE, "I have a community, workers and an environmental cleanup program that have

been waiting in limbo for over two years for something to happen. I want this fixed quickly" (Walker, 2005j, 1A).

Concern about lack of available information related to delays also existed within the sick workers compensation program, which was transferred from the Department of Energy to the Department of Labor in 2005. Just three months after DOL established new policies and procedures for administering the program, local workers who had waited years for DOE to address their claims expressed concern that DOL was continuing the pattern of slow response without explanation. As the *Paducah Sun* reported, "Bill Boucher and other sick former Paducah nuclear workers are still waiting, three months after the U.S. Department of Labor announced it was ready to start processing toxic exposure claims. 'I haven't heard a thing,' said Boucher, of Paducah" (Walker, 2005s, pp. 1A, 15A).

Commitment

The compensation delays were accompanied by public expressions of high levels of claimant frustration. Some continued to question the motives of the original program administrator, the Department of Energy. As the *Paducah Sun* reported, one claimant battling bone cancer "said he's glad the Energy Department was replaced because it had no reason to expedite claims, considering that the agency owns the plant and covered up past worker exposures" (Walker, 2005i, 1A).

As the Department of Labor worked to assemble staffing, policies, and procedures to begin processing the existing backlog of more than 25,000 claims, the newspaper continued to cover "sick worker" frustration, as expressed in public meetings (Walker, 2005t) and through media interviews (Walker, 2005h). Most of these articles were

accompanied by photos of elderly, ill claimants, further personalizing the disappointment and concern. Such coverage prompted DOL leadership to defend the agency's efforts in a September letter to the editor, noting that the Department not only had met all deadlines since assuming program administration but also had completed some tasks ahead of schedule (Lipnic, 2005, 4A). In response, the adult daughter of a deceased worker submitted her own letter, in which she remarked that "[t]he delay and transfer to a more efficient agency still results in workers dying before anyone looks at their claims" (Sparkman, 2005, 4A). Thus, through retrospective sensemaking about an incredibly time-sensitive issue, the Department of Labor's efforts were conflated with years of DOE compensation delays.

The same year, another media narrative was driven by Department of Energy delays. In this case, the long-awaited awarding of a multimillion dollar cleanup contract experienced a setback when numerous bidders protested the process's outcome. By filing complaints with the Government Accountability Office, these potential contractors set in motion bureaucratic procedures that included extensive process reviews by both GAO and DOE, led to the re-bidding of the contract, and ultimately held up transfer of cleanup responsibilities for nearly a year.

Although these events were instigated by private companies who filed formal protests, *Paducah Sun* coverage laid the blame squarely at the feet of the Department of Energy, publishing such headlines as "DOE Again Delays Plant Cleanup" (Walker, 2005j). In light of such tenacious justifications, DOE struggled to mount a defense. Battling a media narrative that portrayed the agency as overly-bureaucratic and prone to delays, DOE asserted that it was, in fact, expediting the process by rebidding the contract.

According to agency spokesman Mike Waldron, when faced with a formal GAO hearing, the Department "decided to re-evaluate the bids in an effort to make a selection as quickly as possible...to ensure that quality cleanup continues" (Walker, 2005j, 1A). Despite this assertion, frustration with the continued delays eventually led Senator Jim Bunning to protest a nomination for the agency's new undersecretary from the Senate floor (Walker, 2005k, 10A).

Businesses and elected officials were not the only stakeholders angered by the cleanup delays. In a March 2007 letter collected during the public comment period of the Property Acquisition study, one resident wrote to U.S. DOE:

> We need this fiasco over with. I personally, [sic] do not wish to leave my daughter a contaminated piece of crap… I'm old, uneducated and perhaps don't comprehend all that's being considered, but I do recognize gobbledegoop when I hear it. (U.S. DOE, 2007, pp. H-195-H-196)

Such statements reflect the high levels of distrust and anger that had accumulated during years of delays.

Expectations

The cleanup contractor procurement protests exemplify the ways in which lack of information can combine with frustration and negative prior experiences to affect sensemaking. According to the *Paducah Sun*, bidder protests provided only "the latest of several delays since DOE announced in 2003 that it would seek bids... With little explanation, the bid process was twice delayed before [the contractor] was selected" (Walker, 2005b, 1A). As the newspaper pointed out, such postponements can "breed [economic] uncertainty" (Walker, 2005v, 1A); however, the *Sun* also noted that prior cleanup contract changes had resulted in employees from the old contractor simply

transferring to the new, indicating that the same outcome would be probably occur when

a new contract was finally awarded. In this way, the newspaper explicitly promoted

retrospective sensemaking to help readers make determinations about the employees'

future.

Of course, the *Sun* also was careful to point out that the procurement delays did

not occur in a vacuum. One editorial flatly stated, "For the bureaucrats at the U.S.

Department of Energy, time is a very elastic concept," further explaining that "[i]n the

world of DOE, a time frame could last for years, perhaps even decades." The author

based this conclusion on a history of slow cleanup progress at the PGDP site. He went on

to explain the context:

> Officials at DOE clearly are in no hurry to help Paducah or to remove
> contaminated material from the plant. In the late 1980s, DOE began studying and
> categorizing contaminated waste at the plant. A decade passed before the agency
> removed a single barrel of waste... The Paducah area is trapped in DOE's
> bureaucratic time zone, which is years behind even the normal pace of
> government work. (*Paducah Sun* Editor, 12/28/2005, 4A)

Interestingly, this hard-hitting editorial was published in response to a news article that

had run the previous week in which state regulatory officials remarked that DOE's

cleanup efforts had markedly improved during the preceding two years (Walker, 2005v);

thus, the *Sun* editor invoked prior experiences to discount public reports of more recent

agency progress.

Similar levels of frustration were expressed by claimants awaiting compensation

through the federal sick workers program. With information slow to reach individual

applicants directly, some relied on anecdotal evidence to determine the extent of

continued delays. In one example, a claimant suffering neuropathy induced by exposure

to lead-based industrial cleaners told the *Paducah Sun*, "I talked to someone at the union

hall and he said he knew of four or five [employees] who have lead poisoning and haven't been paid" (Walker, 2005s, 15A). At public meetings, a number of program applicants expressed additional concern that their claims were being evaluated through exposure reconstructions developed by the National Institute of Occupational Safety and Health, which relied on old, inaccurate, or incomplete DOE records. After years of waiting for compensation under DOE administration, one sick worker remarked, "I'm really going downhill and all they can do is think up different ways to postpone things" (Walker, 2005s, 15A).

<div style="border:1px solid black; padding:1em;">

Problems Still Remain

I'm not worried at your view of my credibility. But if I was a "cleanup contractor" at PGDP, I'd be very careful about statements of credibility. A heck of a lot of public money has been spent out there, but the biggest, most expensive problems still remain... [Q]uestions about my credibility from one of these "cleanup contractors" rate really low on my scale of concerns.

--Rural Thoughts, May 9, 2010

As the tension between the environmentalist and the plant contractor in the Environmental/Health Future Vision focus group spilled over into the blogosphere, the activist raised the specter of delays in plant cleanup to further question the contractor's credibility. By constructing his argument around the incomplete plant cleanup process and a history of delays, the environmentalist attacked the contractor's

</div>

competence directly. By invoking the expenditure of public money without adequate results, he also implied that the contractor was complicit in wasting taxpayer dollars.

Positioning himself as the hero of his narrative, the author took a stance directly opposing ongoing cleanup delays and the perceived misuse of public funds. Unfortunately, this also laid the groundwork for personal animosity with the contractor, whom the author rhetorically implied was directly involved in the negative aspects of the cleanup process. Rather than establishing a basis for building convergent discourse, this adversarial relationship became part of a broader narrative that centered on incompetence and dishonesty.

Secrecy, Deception, and Manipulation

According to Heath and Palenchar (2007), "Research has demonstrated that industry and government regulatory officials are not considered the most trusted sources of risk information" (p. 124). In the face of long-term adversarial binaries pitting The Government against The Public, relational deterioration therefore should not be surprising. However, lengthy delays coupled with a history of slow- or non-disclosure by DOE and other agencies have created additional opportunities for accusations of secrecy, deception, and manipulation to become embedded in the PGDP discourse. Such accusations are deeply problematic for risk-related sensemaking. As Heath and Nathan (1990) note, "When publics believe they lack access to information, they are prone to seek it and interpret it idiosyncratically as well as evaluate risk conditions negatively" (p. 18).

Lack of disclosure can adversely affect trust in ways that are difficult to overcome. As Fischhoff (1995) puts it, "[I]n risk (or other) communication, the damage can be irreversible if relations with one's communicants are poisoned. A shadow of a doubt can be difficult to erase" (p. 137). Low levels of accessible information over a prolonged period of time can combine with minimal lay expertise in technical areas to reduce sensemaking capacity within a community. Continuous exposure to angry comments about both agency motives and competence can create blind spots that promote assumptions of duplicity while impeding communicative convergence. Past experiences indicating an agency's reluctance to disclose can leave stakeholders wondering what is being "hidden" from sight. As Dunsby (2004) puts it, "[T]he short-term benefit of suppressing negative information may be outweighed by the long-term costs of a loss of trust in the institutions" (p. 286).

Capacity

In a situation fraught with high levels of uncertainty, PGDP stakeholders are aware of their need for information to support decision-making. As one Future Vision focus group participant put it, "I'm not a nuclear physicist or an engineer; you know. What's the life expectancy of that stuff? How is it affecting the environment? [I]s there severe contamination out there?" Recognizing the potential sensitivity of site-related information for national security, a participant in another session noted that

> you don't have to get specific, but give generals -- hey, this is what you're really dealing with in actuality, you know... Just a better idea of what's there, so you know better what they could and couldn't do with it. Physically, what's there?

Many stakeholders, however, feel that even such general information frequently is unavailable, with one focus group attendee asserting, "DOE's not very good at keeping you informed."

Distrust of the Department of Energy is compounded in some sectors by distrust of local media. Numerous Future Vision focus group participants from the environmental, health, and education sectors emphatically criticized the *Paducah Sun* for promoting a distinct editorial stance that, they felt, stood in direct opposition to the free flow of information. Skepticism about the newspaper's credibility bubbled over when one focus group participant remarked, "There's memos that prove that local media would not allow [exposure-related] information to get out until it finally broke in the, was it the *Washington Post* or something?"

With a limited number of sources perceived as credible, some stakeholders have elected to disengage entirely from formal communication processes. At one point, several members of the statutorily-mandated PGDP Citizens Advisory Board -- including the chair -- resigned, "claiming DOE was not listening to members and was withholding information" (Walker, 2005d, p. 12A). Later, members of the local advocacy organization Active Citizens for Truth also opted out of both the Property Acquisition and the Future Vision studies. By disengaging from the formal discourse, these constituencies have further reduced the number and diversity of perspectives available to jointly make sense of site-related matters.

Commitment

As more and more stakeholders have withdrawn from communication activities, perceptions of DOE and other agencies have continued to deteriorate in some segments of the community. Newspaper coverage has described a federal whistleblower lawsuit in which former DOE contractors were charged with deliberately underreporting employee exposures to maximize contractor performance fees from the agency. Many sick workers and their families thus have laid blame for the incomplete and erroneous exposure data primarily at DOE's feet. According to the *Paducah Sun*, claimants felt that the NIOSH exposure assessments on which compensation decisions were based were "flawed" specifically because they relied "heavily on exposure data, or lack of it, from the U.S. Department of Energy and its partner contractors that ran the plant until six years ago" (Walker, 2005e, pp. 1A, 10A).

The newspaper reported that claimants attending a NIOSH-led public meeting described the DOE documentation as "incorrect, inaccurate, and incomplete," citing recently-declassified memos that describe such previously-unreported events as the 1974 dumping of worker radiation-monitoring badges into a landfill. Such reports prompted emotional responses in some corners of the community, with one public meeting participant calling the exposure of workers to hazardous substances without their knowledge "a human rights violation" (Walker, 2005e, 10A). This anger was echoed by a local educator who participated in a Future Vision focus group and remarked that "[t]hose responsible for doing this should be held accountable. So far I don't think anybody's ever been held accountable for what went on out there." The educator explicitly linked DOE's perceived culture of secrecy to negative environmental and health

impacts from the PGDP, saying, "When it was built, it was a top secret facility. It was built. Never mind the contamination and the disease and everything else that facility's caused."

Discoveries of agency non-disclosures have continued to fan stakeholder concerns about deliberate exposure-related misinformation and the consequences for environmental and public health. Some individuals have attempted to allay these fears through the use of humor. As one Future Vision focus group participant remarked, "[T]he local joke around here is all the deer and animals on that wildlife refuge glow in the dark." However, other stakeholders see no humor in the situation. Instead, they see a troubling pattern indicating that both DOE's motives and its information should always be questioned. According to one local environmental activist, "DOE has a sordid history of experimentation on people without their knowledge or consent. Who knows what is really going on" (Donham, 2005b, para. 7)?

Once committed to a perception of DOE as duplicitous and manipulative, some stakeholders extend that assessment to any organization or individual seen as connected to the agency. Even university-based research teams are not immune to this guilt-by-association phenomenon. For example, the "real" motives behind the Stakeholder Future Vision Study were questioned extensively and repeatedly by one local activist, who believed that the hypothetical site scenarios were designed to trigger and document support for pre-determined options that served DOE's secret "plans" for future site use. Upon contacting the university's Office of Research Integrity to register his concerns, he was read an excerpt from the narrative that the team had submitted to the Institutional

Review Board describing, in part, the Community-Based Participatory Communication

[CBPC] methodology on which portions of the project protocol were built:

> CBPC thus favors decentralization and democracy, people involvement and
> dialogue, interpretative, horizontal, and bottom-up perspectives. It posits an
> alternative and, to some, a complementary conceptualization of communication
> that does not model the process as a linear, one-way, top-down transmission of
> information and persuasive messages. (Appendix A)

Already believing the study to be corrupt and deceptive, the activist tenaciously grasped

on to one word in the description: "persuasive." He later wrote a blog asserting that a

staff member at the Office of Research Integrity had told him that the study "was about

using these 'visualizations' and how they worked in persuading people, at least that's how

I remember it" (Donham, 2010b). He went on to argue that

> one thing is clear - this is an attempt to get a lot of momentum to build a nuclear
> power plant at the PGDP site - without making much of an effort to involve the
> community at large. And, Mitch McConnell's name is all over it. But it's all over
> now, because they have been "outed." So, the best thing these folks can do is
> come clean about what they are really up to in their so-called "study" in Paducah.
> I'm pretty sure that the whole project is based in serious deception, secrecy, and
> manipulation. (para. 5)

Thus, existing negative perceptions about and distrust of DOE were extended to include

even newcomers to the scene.

Expectations

When Paducah and the nation learned about DOE's lack of disclosure regarding

past worker exposures, both at the PGDP and nationally across the nuclear complex, the

agency's credibility was seriously damaged (Bruce & Becker, 2007). Even after

Department of Energy Secretary Bill Richardson issued a public apology on behalf of the

agency in 1999, investigative articles in the *New York Times* and the *Washington Post*

continued uncovering evidence of prior DOE bad acts, including refusal to compensate former employees for their work-related illnesses. It is on this shaky foundation that stakeholders must engage in PGDP-related sensemaking.

In such an atmosphere, anecdotal evidence can be very important for making credibility judgments, and public meetings have provided opportunities for workers to share such anecdotes. At one NIOSH meeting, a former employee described using "white lead" lubricant at the plant, saying,

> It slung the oil all over everything, including the operators. You might as well say we took a bath in it... But they didn't tell us it would cause health problems. (Walker, 2005l, 11A)

In late 2005, breaking news seemed to confirm suspicions about continued DOE secrecy when a memo from the agency's Inspector General's Office warned that the hazardous chemical phosgene could be present in some depleted uranium cylinders stored at the PGDP site. This news was particularly troubling to many in the community as construction had just begun on a uranium hexafluoride recycling plant that would be charged with reopening the cylinders. According to the *Paducah Sun*, the memo notes that the "introduction of phosgene into the recycling process could be 'catastrophic'"; however, DOE had not advised the recycling facility of the issue, although the department had been aware of the potential problem for five years (Walker, 2005u, pp. 1A, 10A). Yet again, the agency seemed to have put its own interests ahead of health and safety concerns.

In view of such developments, low agency credibility in the community is understandable. During the Future Vision study, the research team asked participants in

eight different stakeholder focus groups to identify trustworthy organizations and individuals who could serve as sources of site-related information. With the exception of one session conducted with PGDP employees, the answer almost across the board was "anyone but the Department of Energy" (KRCEE, 2011). A participant exchange during a focus group for residents who live near the plant perhaps best captures the feeling, as one attendee stated that she would accept "[n]othing from DOE because the community around here isn't going to trust a single solitary thing they say." Another participant commiserated, "Well, we've been lied to a lot over the years. We don't know who we can trust."

One of the Worst Abuses of Government Manipulation

[A]fter over 2 ½ hours of discussion...the meeting started to come to an end. I picked up a notebook which had been provided, a couple handouts, and the white envelope with the three graphics of scenario 2, build a nuclear power plant at the site, and started to turn to walk out of the room.

At that point, a large government/university man...stood up and physically blocked me from leaving. He asked me for the envelope with scenario 2. I said, politely, no, I want to take it with me. He said, no, that I had to give it back, that it was a "research instrument." I said, "but this is a public meeting, funded by federal dollars, and you have given out this document in a public meeting, and I want to take it with me." He said, very threateningly, still blocking my way, that I couldn't take it, and if I tried to, they would call the police. I said, "are you claiming this is a privileged document?

Documents lose their privilege when they are handed out in public." He said that they needed it for their research...

[A]fter thinking about it over night and after having been physically intimidated and basically mugged for the documents which were rightfully mine, I have to say that this process is one of the worst abuses of government manipulation of the public that I ever experienced in my 25 or more years of public involvement in environmental issues.

--Rural Thoughts, May 6, 2010

Weick (2001) has written extensively about what he calls "cosmological episodes" that occur in crisis situations. During these episodes, "people suddenly and deeply feel that the universe is no longer a rational, orderly system" (p. 105). As structures and role frameworks deteriorate, a cascading effect occurs in which meaning is lost, causing additional deterioration of role frameworks, which leads to further loss of meaning, and on and on. It can be incredibly difficult to re-establish order in the midst of such a spiral.

On May 5, 2010, I learned first-hand that the principles of cosmological episodes not only apply to forest fires and terrorist attacks but also can wreak havoc within an event as seemingly simple as a research focus group. The existing Government/Public binaries, and the manner in which others situated our research within that discourse, destabilized role structures in a way I did not foresee. At the beginning of the evening, I simply could not have envisioned a situation in which

committed participatory researchers would be perceived as threatening governmental puppet masters. However, our team found itself in the midst of a cosmological episode without the necessary contextual knowledge to escape.

Our attempt to protect focus group discussion triggers from being misrepresented and biasing the study was perceived as just another Government-supported manipulation. As subsequent exchanges between the activist and the university's legal department dragged on for months and expanded to include requests for the release both of visualizations and of the names of research participants, institutional barriers ensured that the study – at least for this activist – became embedded in the existing discourse of delays and secrecy. While we had entered the field with a tremendous amount of knowledge about PGDP-related technical and statutory matters, our research team lacked insight into the communicative context that might have helped avoid this cosmological episode before it spiraled out of control.

Competing Risk Perceptions

In the midst of role confusion promoted by adversarial binaries, frustration regarding slow-moving processes, and anger related to absent or erroneous information, individuals can find it difficult to make sense of technical risks. Further complicating matters at Superfund sites, the risks are chronic and often multi-faceted. National Priorities List sites can require decades for thorough cleanup. In addition, the environmental, public health, and economic risks often compete in decision-making.

Paducah provides a prime example of just such a site. First posted to the NPL in

1994, the site is years – if not decades – from being thoroughly remediated. As the *Paducah Sun* noted in 2005, "The cleanup will take at least 14 more years and additional work will be needed after that to make the site suitable for reuse" (Walker, 2005w, p. 4A). DOE site management has publicly recognized the challenges and has tried to manage remediation expectations, describing extensive groundwater cleanup efforts by saying that "[y]ou can't guarantee treating every nook and cranny"(Walker, 2005r, p. 1C).

Some in the community doubt that the PGDP environs can ever fully be remediated. One Future Vision focus group participant argued for complete site closure and the implementation of institutional controls, stating,

> It doesn't matter what you do to it. It's going to be contaminated. It can't be cleaned up… You're not going to be able to remove those materials in any way that will leave it clean… I think we ought to admit we're never going to be able to clean this up. I don't know what you do to it. Glass, concrete, iron, lead. Whatever you have to do to try to just hold it there.

At the same time, some plant employees hold a very different perspective that heavily weighs such recommendations against the economic risks of implementing them. These individuals cite the plant's history as a major regional economic driver as reason either to continue operations or to remediate the site for future industrial use. According to one employee focus group participant, people need to

> learn the history of what's been done here, gaseous diffusion. There's not just negative spin towards that. I think generally most people think that's negative… I think also they need to understand the billions of dollars that's put into the economy here, and the homes and families it's created here... It started as the secret city behind the fence, and that secret city's now a lot of nice homes. So I think they need to understand the history, positives and of course the negatives, of why this is no longer virgin dirt.

Such competing perspectives, often expressed in the pages of the local newspaper or verbally in public meetings, further problematize risk-related sensemaking across the

community and leave some stakeholders confused. As Heath, Bradshaw, and Lee (2002) note, "Scientific uncertainty…exacerbates risk communication problems, creates conflict, and heightens cognitive uncertainty" (p. 321). In Paducah, the lack of opportunities for convergent discourse, high levels of public anger and animosity, and a history of balancing and addressing different kinds of risk have left the communicative space dominated by competing risk perceptions.

Capacity

A key challenge for sensemaking can occur when individuals choose to communicate only with those who have similar opinions and commitments to their own. This form of self-selection not only reduces an individual's direct access to conflicting information but also deprives other sensemaking groups of his or her perspective. According to Weick (2001), "A partner makes social construction easier [and] enlarges the pool of data that are considered" (p. 114). However, the development of sensemaking factions encourages polarization and, depending on the context, can marginalize some points of view. One Future Vision focus group participant alluded to such a situation in Paducah when she declared that the ideal community would be "a city or town where all the communication…was not controlled by one group of people."

One sensemaking group in Paducah assumes general ignorance about technical hazards and places its focus on better defining such hazards for others. These individuals typically are more directly connected to the plant, to local government, or to the economic development community. When asked about the kinds of information other stakeholders need to make the best decisions about the site's future, many members of this group cite education. One plant employee participating in a Future Vision focus

group stated that the community needs "an educational process of what has or has not been done out here through the years," while another noted the need

> to have a very clear and very frank statement of the absolute worst level of toxicity and…maybe even get into just letting people know the difference…that it's not the radiation that's gonna get 'em, it's the toxicity of things. You know, maybe folks can handle some level of conversation about that.
> When federal agencies have attempted to provide such technical information,

however, some community stakeholders have questioned their findings. The ATSDR Public Health Assessment has particularly come under fire. During the Future Vision study listening tour, one local health activist remarked that,

> What you're seeing in their ASTDR [sic] reports is a lot of good information, and they do capture a lot of things in the buildings. But then it's almost like I've got the real facts of the workers, and it's not matching what you're assessing here… When one of the investigating officials, a federal level investigator, looked at this very issue he said, "There's something weird here." He goes, "There's just too much sickness in this area."

In this way, technical information provided by federal agencies is trumped by anecdotal evidence from other constituencies. This phenomenon was made explicit in a *Paducah Sun* letter to the editor in which the surviving child of a deceased plant employee remarked, "During public meetings, sponsored by DOE and DOL, the most informative data came from workers or family members who relayed stories of exposure. Meetings were a reunion for many and validation of the exposure-related illnesses" (Sparkman, 2005, 4A).

Such conflicting sources and types of information render sensemaking challenging for those stakeholders who sit in the middle. As one local physician noted in a Future Vision focus group,

> You hear all kinds of war stories around here. I hear them in the emergency room about the contaminated water out there and the amount of cancer that we see, and we do see a lot of cancer in the Paducah area. I think it's kind of a high risk area

for cancer. To say that's causing it, I'm not sure we can say that, but it certainly makes you nervous about it.

In a community that sees myriad plant-related public meetings conducted by numerous federal, state, university, and local actors, such confusion may reflect what one PGDP employee calls "low turnout and public involvement" regarding site issues. Several stakeholders have noted that only individuals directly invested in making a specific argument participate in most of the meetings. Consequently, the foregrounding of discord at public meetings has encouraged some more moderate community members to opt out of the process, leaving them to note, as the physician did, "I guess I'm not really aware of how dangerous all that stuff is out there, except I just hear the scuttlebutt around the community about it, and I hear…talk about how it's just awful, and it may be just awful."

Commitment

As disputes about risk levels have continued through the community over more than two decades, some stakeholders have very vocally asserted that hazard levels are higher than reported assessments have indicated. Via interpersonal interactions, blogs, and community meetings, these individuals have acted as modern town criers, trying to keep the community informed of perceived threats to its well-being and to urge protective and compensatory actions. Meanwhile, other interests have been equally vocal in promoting perceived economic advantages provided by the plant and in attempting to avoid feared fiscal devastation from its pending closure. Such tenacious public justifications of positions have potentially contributed to blind spots that ignore competing perspectives, particularly in the areas of environmental stewardship, public health threats, and economic risks.

According to some stakeholders, billions of dollars and more than twenty years of cleanup activities have yielded little in terms of environmental restoration. As one local activist and blogger notes, "Unfortunately, the worst problems at the site, which are numerous, are yet to be addressed" (Donham, 2011a). Another local activist is equally concerned about plans to dispose of future site-related waste, stating in a Future Vision focus group discussion,

> Twenty million to build a hole—to dig a hole, and get it ready for waste. So, even the waste of the federal government, if they can't make a hole safe for radiation with twenty million dollars, you gotta wonder.

In addition to waste disposal, this stakeholder also expressed concern about suggestions by some in the community that, upon ceasing operations, the PGDP be replaced with a nuclear power plant. "When God built a nuclear reactor, he put it 63 million miles away," he said, adding, "That's where they ought to be."

Stakeholders who live near the site have questioned whether government agencies or their contractors can ever truly understand the nature of the site's environmental impacts and the associated resident anger. One public meeting attendee during the Property Study put it this way:

> I'm just tired of people being run over in this area. And you know all of you other people you come in from other places. You all don't live out here. Come and live in our houses. Come and live in our spots. Get out there for 35 years and drink and walk over the stuff that we've walked through. Then you go back and you bring your families. Would you…build a house out here and bring your family down here to live knowing what contamination is out here? Be honest. I know you wouldn't… [N]one of you all. (U.S. DOE, 2007, p. H-157)
> Clearly, concerns about environmental cleanup are closely linked with concerns

about the contamination's potential effects on human health. During a March 2007 public briefing about the Property Acquisition study, one attendee explicitly linked health problems experienced by members of the community with DOE environmental practices:

"[A] lot of you people that I know have medical problems. I have medical problems…
We are no closer to the plumes being cleaned up now than it was in 1988" (U.S. DOE,
2007, p. H-157). Another attendee at the same meeting asserted, "All of us that live on
Metropolis Lake Road, there's, I would say, 80% all have cancer of one kind of [sic]
another" (U.S. DOE, 2007, H-157). Such concerns have spilled over into litigation, with
the filing of a class action suit against U.S. DOE (Walker, 2006a). As Gaetke, Gaetke,
and Bowen (2008) note, such litigation can greatly constrain Superfund community
members' involvement in educational and capacity-building activities that could support
improved sensemaking processes.

As the media have pointed to the potential for higher-than-reported risk levels at
the PGDP, some stakeholder fears have continued to grow. For instance, a 2005 report
was filed with the Nuclear Regulatory Commission by the Nuclear Information and
Resource Service, "a networking center for citizens and environmental activists
concerned about nuclear power" (NIRS, 2013). This report stated that "uranium may
cause or contribute to genetic mutations, tumors, birth defects, neurological damage, and
cellular level toxicity" (Walker, 2005f, p. 1C). Although PGDP personnel responded that
the uranium stored at the plant "poses no risk to employees or nearby residents," the
statement did little to allay the concerns of some stakeholders.

Community members have continued to voice both these concerns and their
dissatisfaction with previously-conducted health assessments. During a June 2006 public
meeting, one attendee asked why "a health study of this area" had not been conducted
(U.S. DOE, 2007, H-69). A former Citizens Advisory Board chair elaborated when he
asked the Courier-Journal (U.S. DOE, 2007),

How do you value two decades or more of living in a toxic environment, having family members getting ill, and seeing the value and heritage of your property go downhill? (p. H-80)

In response to the ATSDR health assessment, fifteen residents of the Water Policy district signed a statement to U.S. DOE that the report "lacks human health data. Even worker health data was not available at the time the document was published. Confidence in the document is very low" (U.S. DOE, 2007, p. H-202). The letter angrily asks,

Who – is – kidding – who? Eloquent requests for Congressional funding to protect the health of residents immediate to PGDP are delivered on a near annual basis. Huge amounts of money is allocated [sic]. Studies abound, Removal [sic] actions (dumping their junk on others) 'make it pretty and seem nice and clean.' Congress should be as enraged as we are! WE WANT YOU TO KNOW THAT WE ARE SICK AND DYING OUT HERE AND NO RELIEF IS IN SIGHT. (U.S. DOE, 2007, p. H-201-H-202)

Such skepticism about government risk assessments and subsequent cleanup actions bled over into Future Vision focus group meetings, where one participant remarked, "The government is payin' the families a hundred and fifty thousand dollars a piece for workin' in these jobs, so I guess there is some risk... You know, they've got these illnesses." He further asserted, "[I]t's hard for me to listen to [former employees] telling those kinds of stories and not get emotional about it," adding,

My God, I hate that that thing's there, but what do you do? It's there. I think the site ought to be made into a memorial, something like Auschwitz. It ought to be a reminder to hopefully prevent anything like that from ever happening again.

Such emotional commitment and strong metaphors underscore the deep commitment of some stakeholders to an image of the PGDP as a lethal threat to their community.

In contrast to these stakeholders, others see the plant primarily as a community economic asset that is being threatened with closure. With approximately 1,200 employees and a $121 million payroll, plant operations play an important role in the

regional economy (KRCEE, 2011). Local business leaders have long recognized the importance of recruiting new industry to replace the employment vacuum that will be created when the plant closes, while also noting the danger of allowing blind spots to prevent such strategic planning efforts. As a former director of the Greater Paducah Economic Development Council told the *Paducah Sun*, "I, for one, would hate to think we just sat here and let these next five years go by on the basis of, 'well, that'll never happen'" (Walker, 2005p, p. 1C).

One U.S. Senator, Jim Bunning, actually promoted this blind spot within the community by asserting that the PGDP "may well stay open longer than the projected five years" (Walker, 2005q). A subsequent *Sun* editorial warned the Senator and others against tenaciously justifying the plant's continued operations in light of overwhelming evidence to the contrary. The *Sun*'s editor wrote,

> Sen. Bunning's assessment of the situation simply is not persuasive enough to sidetrack the community's efforts to prepare for the closing of the plant in 2010 or 2011… No one in this area relishes the thought of losing such an important regional employer. But pragmatic concerns should take precedence [and] leaders should resist the understandable temptation to indulge in wishful thinking when they contemplate the eventual demise of the Paducah Gaseous Diffusion Plant. (p. 4A)

Expectations

Risk-related expectations at the PGDP NPL site are rendered problematic on a number of levels. The Government/Public binary has constructed a legacy of confrontational communication concerning the plant. Delayed information and actions related to cleanup and compensation have confused and frustrated many stakeholders.

Historic lack of disclosure about exposures and risk has fostered a discourse rooted in suspicion and anger. It is in this environment in which people must make risk-related judgments to inform key decisions.

One Future Vision focus group participant expressed his concern about trusting government and related assessments of technical hazard, stating there has been "an attitude about the environment, like, basically, that the risks that were real didn't really exist, and so people were thrust into really high-risk areas and there wasn't consideration given to it." However, the compensation of nuclear workers for job-related illnesses, along with the fact that the Department of Energy has spent approximately $70,000 a year providing free municipal water to residents who live near the plant, have proven this attitude erroneous in the past, leading stakeholders to question current DOE assurances about risk levels. As the Keystone Center notes, "Fear of potential dangers is a completely rational response to our survival instinct" (p. 17).

On one level, U.S. DOE personnel have accepted responsibility for the agency's lack of credibility with the public, with one plant manager telling the *Paducah Sun* that previous PGDP groundwater contamination "doesn't speak well of DOE's past practices" (p. Walker, 2006b, 11A). Rank-and-file employees, however, have expressed some concern that the ways in which previous cleanup management has contributed to erroneously-heightened risk perceptions. As one plant worker said in a Future Vision focus group,

> [B]y putting controls you're giving the whole area such a stigma that, I mean we already see it already. We've got institutional controls and outlaws that to me greatly exaggerate the risks involved with them anyway when you go up Little Bayou and Big Bayou…You're holding the stigma.

The communicative devolution from such drastically competing risk perceptions can occur in two stages. First, discord arises through legitimate disagreement about risk levels, which sometimes relate to the differential prioritization of personal and community values that help determine risk tolerance. Secondly, these disagreements can further escalate when "risk" becomes a secondary construct through which other battles are waged. As Fischhoff (1995) notes, "Often controversies over risk are surrogates for concern over process. People feel that they have been treated shabbily. However, they discover that being disgruntled does not have legal standing, while complaining about risks does" (p. 143)

When the sensemaking environment has been constructed on adversarial binaries, frustration about bureaucratic delays, and anger over perceived secrecy and manipulation, the foundation is laid for conflict. As the Keystone Center (2005) notes, "[T]he causes of the controversy are often not the facts of the risk exposure, but rather what is being done (or not being done) to safeguard the public, and who is taking responsibility" (p. 26). In Paducah, threats to capacity, commitment, and expectations have made it difficult to find communicative space in which the joint identification of problems and the co-construction of solutions can occur. To improve sensemaking at this and other Superfund sites, new processes are needed that increase the number and diversity of actors, minimize the effects of blind spots, and better define roles, responsibilities, and expectations in ways that promote communicative convergence.

I believe that this is a DOE funded study of how they can manipulate "public opinion." It is a mind control experiment in the guise of a scientific study. They are seeing if they can create these computerized images of the future and then get people to push certain buttons on their remote controls right after looking at these images.

...Back when Hazel O'Leary was Sec. of Energy under Pres. Clinton, before 911, there was a push to open up the DOE and lots of information was released about things that DOE had done in the past. Among other things they had done, revealed by documents obtained by the Louisville Courier Journal, they had purposefully released UF6 gas on our region to see what it would do in the environment, among other things. I pointed out to the CAB that once again DOE is experimenting on our community...

As I drove home, I thought, what an absurdity that this ridiculous, meaningless, non-transparent, manipulative so-called "study" is getting well funded while actual on-the-ground clean-up of the environment is being significantly cut. But that's DOE for you. It shows what their real priorities are.

--Rural Thoughts, March 20, 2011

Nearly a year after the cosmological episode in the Environmental/Health focus group, the local activist had become even more entrenched in his beliefs about study motives. As human subjects protections prevented the naming of research participants, he was even more certain that the project was managed by U.S. DOE,

along with other governmental and economic interests. Even as the research team prepared to move into the final phase of the study, which included public meetings featuring the scenarios that he had previously deemed the team deceptive for not releasing, he doubled-down on his assertion that the project was manipulative and designed to reach a predetermined outcome.

For my part, I learned many important lessons during the Paducah Future Vision Study, but perhaps none more important than the complicated ways in which sensemaking strategies are negatively affected by capacity, commitment, and expectations. During the cosmological focus group episode, I found myself constrained by the homogeneity of my own life experiences; my commitment to my roles as researcher and employee blinded me to the idea that I could be seen as anything else; and my expectations of a positive, engaged experience rendered me tongue-tied as the events unfolded. I left the field asking myself two questions: If such a disintegration of relations can occur during an explicitly participatory process, what must more traditional communicative venues be like, and how can we improve communicative processes for Superfund communities to reduce the chances of this type of incident occurring elsewhere?

Chapter Five: Toward a New Model

Synthesizing the Evidence

By implementing sensemaking theory as a diagnostic tool, this study extends our ability to identify and address key challenges for sustained communication in chronic risk communities that require the intervention of multiple governmental actors. At this writing, agencies have relied upon *The Seven Cardinal Rules* and related best practices for more than two decades. During this time, the implementation of these practices has played an important role in the ways in which those most affected by contamination make sense of risk, not only through the explicit sharing of information but through ongoing interpretation of the processes by which that information is provided. Therefore, it is increasingly necessary to evaluate not only whether the approaches have been effective for information sharing but if, in fact, they have had consequences in terms of relationships among site actors. The novel application of sensemaking theory through this study provides one avenue through which such evaluation might occur.

The myriad risks -- including environmental, health, and economic -- associated with the Paducah Gaseous Diffusion Plant Superfund site have affected numerous stakeholders for decades. These stakeholders rely upon complex sensemaking strategies that contribute to and are reified through enactment, an ongoing, iterative process through which people create and reify the very environments that then constrain them. As Weick (1988, 1995, 2001) points out, enacted sensemaking is constrained in three key areas: capacity, commitment, and expectations. When capacity is limited due either to a small number of individuals or to a homogeneity of perspectives, sensemaking is challenged. Further, an individual's or group's commitment to a specific perspective constrains

sensemaking through the formation of blind spots, which can contribute to attempts to tenaciously justify the correctness of the existing perspective, even in the face of evidence to the contrary. Finally, when prior experiences inform interpretations of current actions, retrospective sensemaking can lead to confusion regarding the motives of specific actors or the efficacy of potential solutions. In the case of the Paducah Gaseous Diffusion Plant, all three of these sensemaking constraints are implicated across five themes: 1) The Government; 2) The Public; 3) Delays; 4) Secrecy, Deception, and Manipulation; and 5) Competing Risk Perceptions.

Within each identified theme, capacity is constrained in one of three ways. First, the perception of capacity is constrained by the reduction of diverse perspectives into overarching constructs, such as The Government or The Public. Second, actual capacity is constrained through the withdrawal of constituencies from the collaborative sensemaking field, as when activists opt out of public processes after making accusations of secrecy or deception. Third, capacity is constrained when the number of knowledgeable stakeholders is lessened due to lack of necessary information to support decision-making. Each of these capacity-lowering mechanisms reduces the number and diversity of actors available to contribute to the collective sensemaking that could promote convergent understandings of previously discordant concepts. Consequently, siloed sensemaking groups reaffirm their own distinct sets of risk perceptions, which then come into conflict in the broader discourse.

Commitment is a sensemaking constraint that similarly appears across all five themes. Stakeholders sometimes commit to depictions of all agency personnel, and even those with only tangential relationships to agencies, as members of the monolothic The

Government. Conversely, agency officials – and even community members themselves -- sometimes group all non-agency stakeholders together as members of the homogenized The Public. Personal commitment to one or the other of these roles can contribute to blind spots regarding the motives of others. In addition, delays and lack of information can lead stakeholders to very publicly justify their specific stances for or against certain risk perceptions, which can make it difficult to engage in the kinds of convergent communication that could encourage stakeholders to build "some degree of agreement" about risk-related concepts (Sellnow, Ulmer, Seeger, & Littlefield, 2009, p. 14).

Finally, expectations constrain sensemaking across the five themes by influencing perceptions of roles, responsibilities, motives, and actions. Past activities by The Government, including perceived delays and secrecy, have promoted distrust among some PGDP stakeholders. Similarly, stakeholder expressions of fear and anger, as well as risk perceptions rooted in values other than technical hazard, have colored agency interpretations of The Public. When combined across themes, these constraints contribute to a discourse that often is rooted in frustration and distrust, rendering convergent communication extremely difficult.

In many ways, the constructs of The Government and The Public closely align with the *Seven Cardinal Rules* approach to risk communication, through which *an* agency must help *a* public fill some perceived gap, whether that gap is based in lack of information or lack of understanding. By conceptualizing the numerous governmental and community risk perspectives as simply The Government and The Public, the language encourages each "side" to view the other as having a far more limited range of points of view and potential responses than actually exist. Delays and perceived secrecy

subsequently are cited as affirming this relational divide, further inhibiting the possibility for multiple stakeholders to work together to create shared understandings.

In light of these findings, this chapter directly addresses the study's second research question: what are the related implications for improving agency risk communication approaches? I suggest that a reconceptualization of risk communication is needed that moves stakeholders to the center of the paradigm. By acknowledging the multiplicity of stakes in site-related risks and decisions, this model increases the capacity for shared sensemaking while decreasing the likelihood of adversarial interactions that contribute to the formation of blind spots. Over time, this model should promote increased levels of trust, which would improve expectations and create a more positive framework within which to make retrospective sense of risk-related issues.

This paradigmatic shift needs to occur on two levels: linguistically and processually. First, the language of *Seven Cardinal Rules* should be amended to highlight agencies' collaborative roles as fellow stakeholders rather than asserting their dominant roles as regulators or potentially responsible parties. Second, the context-specific operationalization of these new guidelines, along with subsequent risk communication activities, should take place within a new framework that builds specifically upon processes promoting convergent communication. To this end, I propose a stakeholder-driven model that encourages participatory processes for designing, implementing, and evaluating risk communication activities at Superfund sites. This chapter closes with a discussion of model limitations and the identification of future research directions.

Implications

Adapting *Seven Cardinal Rules* to Increase Sensemaking Capacity

As Weick (1988) notes, "If action is the means to understanding, then the number and quality of actors available to do that acting and interpretation become crucial variables" (p. 312). Thus, increasing the diversity of sensemaking participants can help agencies avoid situations in which "[s]mall events are carried forward, cumulate with other events, and over time systematically construct an environment that is a rare combination of unexpected simultaneous failures" (Weick, 1988, p. 309). Unfortunately, the current language through which the *Seven Cardinal Rules* are explicated constrains the perceived number and diversity of actors available for sensemaking.

Atkinson (2005) notes that "[i]n the social arena, group identity negates 'that which it is not,' by creating false unities among group members which deny the complex multiplicities of which 'the group' is composed'" (p. 81). Thus, when diverse individuals and organizations are grouped under a single term like The Public, sensemaking is threatened through a reduction in the perceived number of distinct actors and viewpoints. In the case of Paducah, the blanket term The Public is used by a number of sources across multiple channels as a proxy for diverse stakeholders. Despite a small aside within the *Seven Cardinal Rules*, the dominance of The Public phrasing encourages agency personnel to perceive a single non-agency point of view rather than recognizing that numerous viewpoints differ widely. Therefore, officials who view The Public as representing a lone, distinct perspective may anticipate little benefit from engaging multiple groups and individuals in dialogue.

In addition to decreasing sensemaking capacity, the binary of The Government/The Public that is reified through the *Seven Cardinal Rules* also promotes adversarial relationships through acts of othering. Johnson et al. (2004) have described othering as an identity construction device through which "one magnifies and enforces projections of apparent differences from oneself," further noting that "persons who are treated as other often experience marginalization, decreased opportunities, and exclusion" (p. 254). McCarthy and Dimtriades (2000) go even further, stating that by engaging in othering a "social actor consolidates his identity by a complete disavowal of the merits and existence of his social other. Here, one becomes 'good' by constructing the other as 'evil'" (pp. 173-174). The Paducah case provides numerous examples of such processes at work, with The Government frequently portrayed as slow, bureaucratic, secretive, or even deceptive, while The Public is often depicted as lacking either technical knowledge, the ability to adequately apply technical information to decision-making, or the control that would allow The Public to bear real influence on governmental decisions. Such depictions underscore McCarthy and Dimitriades's assertion that "[r]esentment enters normatively into" such spaces, where alignment- and realignment-commitments are made (p. 174).

To directly address this problematic binary, I suggest that the language of *Seven Cardinal Rules* be adapted to situate an agency as one among many stakeholders, along with residents, employees, activists, the media, and others. Such a change would foreground the diversity of perspectives rather than referring to a singular The Public. On the surface, this goal could be accomplished rather easily, simply by changing all appearances of The Public to "stakeholders," thus diversifying the frame within which

non-agency participants are viewed. In practice, however, potential implementation challenges will need to be addressed, as discussed later in this chapter.

In addition to breaking down the existing Government/Public binary, the *Rules* should go beyond advising honesty to promoting transparency through participatory processes. As the data in this study reveal, agencies' actions and public statements are interpreted through complex sensemaking techniques that color perceptions regarding the veracity of individual and organizational actors. Thus, the communication process that agencies support should be considered as part of the organizational messages being interpreted, in much the same way that non-verbal communication is recognized as central to the interpretation of verbal messages. To this end, the *Rules* should explicitly provide for engaged, participatory communicative processes that provide sufficient information for stakeholders to judge for themselves the levels of honesty and openness an agency is providing.

Revised to reflect these adjustments, the *Seven Cardinal Rules* would become *Guidelines for Superfund Site Communication* and would read:

1. Accept and involve other site stakeholders as legitimate partners in both the operationalization of these guidelines and the creation and evaluation of subsequent communication-related activities.

2. Jointly plan and evaluate specific risk communication efforts with other stakeholders.

3. Listen, respond, and incorporate stakeholder-specific concerns into messages and engagement protocols.

4. Engage diverse stakeholders to develop and implement open, transparent processes that affirm honesty and multiperspectivity as central tenets for communication activities.

5. Coordinate and collaborate communication and engagement activities with relevant groups, including community-based, governmental, and media stakeholders.

6. Work with stakeholder groups, including the media, to meet information needs in appropriate, targeted ways.

7. Engage in clear, compassionate, respectful dialogue with diverse stakeholders.

Operationalization

Boholm (2009) has called for risk communication researchers to "stop bracketing context and systematically account for the role and importance of context in how risk is defined and communicated, and in how this communication is received" (p. 349). Similarly, the data in this study point to a need for agencies to engage those with the greatest contextual knowledge – i.e., a diversity of local stakeholders -- directly in the definition and evaluation of risk-related communication efforts. To involve disparate voices in this process, however, will require agencies to engage in formative research upon entering a Superfund community.

As Palenchar and Heath (2007) note, such formative efforts allow "program planners to hear and learn from a myriad of stakeholders and stakeseekers, including local residents, employees, health care providers, government officials, emergency personnel, and vendors and contractors to name some major categories" (p. 123). During

the initial stages of the PGDP Stakeholder Future Vision Study (KRCEE, 2011, p. 18),

the research team met with more than 80 individuals to help identify the multiplicity of

distinct stakeholder groups in the area, ultimately recognizing sixteen distinct stakeholder

clusters for the site:

- Water Policy District Residents
- Economic Development Interests
- United States Enrichment Corporation Employees
- Environmental/Health Advocates
- Healthcare Providers
- Educators
- Media
- Religious/Spiritual Community
- Wildlife/Recreation Enthusiasts
- Tourism Interests
- Ballard County Stakeholders
- U.S. DOE
- U.S. DOE Subcontractors
- McCracken/Paducah Government
- PGDP Citizens Advisory Board
- Regulatory Agencies

The research team then recruited a representative from each of these

constituencies to serve on a community consultation panel, helping ensure the relevance

and context-appropriateness of subsequent communication efforts for their specific

targeted groups. This panel pre-tested all focus group and public meeting protocols, as

well as all specific communication instruments, working with the research team to create

targeted activities that met the information needs of a variety of stakeholders. Ideally, a

revised Superfund risk communication infrastructure would include just such formative

activities, from listening tours to ensure that all constituencies are at the table to the

recruitment of representatives to help inform both process and message development to

the multi-level evaluation of subsequent activities. This formative work would result in

the establishment of a Stakeholder Consultation Core. Minkler (2005) notes that such groups are commonly used in community-based research projects to "improve measurement instruments by making sure that questions are worded in ways that will elicit valid and reliable responses" (p. ii3); In this case, the Core would play an even more central role in risk communication efforts, supporting context- and stakeholder-appropriate activities at every stage.

Among the first convergence-building duties for this Stakeholder Consultation Core should be the operationalization of specific terminology contained within the *Guidelines for Superfund Site Communication.* In its present form, *Seven Cardinal Rules* includes taken-for-granted terminology that can be problematic when expectations differ among stakeholders. For example, what do the words "accept and involve" mean to different individuals? Although existing mechanisms, such as agency-sponsored public meetings and PGDP Citizens Advisory Board activities, ostensibly support public participation and bidirectional communication between community members and agencies, these mechanisms do not appear to have been fully effective in Paducah. In some cases, these mechanisms instead have been used as evidence of exclusion, as when one local blogger wrote, "The thing that really is awful is they try to make it seem like they want your opinion, when in reality, it's the last thing they want" (Donham, 2011a, para. 5).

Fischhoff (1995) argues that "[p]eople want to be treated respectfully, in addition to being leveled with" (p. 142). Moving stakeholders to the center of the risk communication process – making them an integral part of defining terminology and setting expectations – indicates such respect. For instance, the current *Rules* state that an

agency should "[a]ccept and involve the public as a legitimate partner"; however, the expectations for partnership are set by the agency itself, ignoring a key question – what are the qualitative and quantitative expectations for such partnerships? By working with a Stakeholder Consultation Core, the members of which simultaneously engage in dialogue with their own constituencies, agencies can better set both the parameters and the expectations for partnerships, thereby generating a more transparent, engaged process that promotes shared understanding. In addition to promoting convergent communication, such a process could help reduce the Arnstein Gap (Bailey, Blandford, Grossardt, & Ripy, 2011) between citizens' ideal levels of public involvement, which participants in the Stakeholder Future Vision Study identified as partnership, and their actual experienced levels of participation, which the same participants identified as between being informed and being consulted (KRCEE, 2011).

Further, through this process of participatory operationalization, the Stakeholder Consultation Core will play a key part in designing and implementing context-specific evaluation plans. As Heath and Nathan (1990) note, "[F]actors of evaluation entail power, uncertainty, understanding, and agreement" (p. 19) Thus, it is essential for stakeholders to be included in both process and outcome evaluations. During the Stakeholder Future Vision Study (KRCEE, 2011), two distinct, Likert-like evaluative tools were used. The Arnstein Ladder (1969) provided an instrument through which all project participants could gauge their desired levels of public involvement against their actual experiences, while a standard process evaluation presented an opportunity to assess the study itself. Other studies and efforts have used different evaluative tools. For example, the National Institute of Environmental Health Sciences (2012) recommends the use of logic models

for community engagement to help "understand the expected goals and the activities that will move…toward those goals" (p. 6). By introducing stakeholder-centered language, the new *Guidelines* specifically provide space for negotiation regarding the most context-appropriate evaluation strategy – or combination of evaluation strategies – for each site.

Finally, by providing equal footing for all site-related stakeholders, including agencies, the new language explicitly supports increased coordination and collaboration among constituencies. As currently structured, agency-specific Superfund site risk communication efforts at times create confusion in affected communities. In addition to the various messages and activities generated independently by the myriad agencies involved at a site, agencies sometimes create challenges for themselves through their own competing messages and activities. For example, while the Future Vision Study worked with local communities to help define acceptable future uses for the PGDP site, part of which involved delving into questions regarding future waste disposal, U.S. DOE also conducted unrelated public meetings specifically addressing future site waste disposal issues, often without notifying Future Vision researchers of the activities. Some community members consequently became confused by the similarities and differences between the two sets of activities (KRCEE, 2011). Thus, by encouraging frequent, horizontal communication among a variety of stakeholders at all stages, the new *Guidelines* language reduces the possibility of commitment to an agency's own activities creating a blind spot that negates the existence of simultaneous activities being conducted by other stakeholders, thereby creating opportunities for greater collaboration and clarity.

Implementation: Toward a New Convergence Model

To implement the newly-formed *Guidelines for Superfund Site Communication*, agencies need to work with stakeholders to create a process that improves upon the current, largely siloed risk communication approach frequently taken at Superfund sites. While ad hoc approaches to risk communication might be more appropriate for addressing quickly-emerging risks, a more robust communicative infrastructure is needed to support stakeholders facing the kinds of long-term, chronic risks present at Superfund sites. As Heath, Bradshaw, and Lee (2002) note, "When risk communication infrastructures are not in place, citizens will have less knowledge, as well as feel less control, higher cognitive involvement (concern), lower behavioral involvement (information seeking and concern voicing), more problem recognition, and more uncertainty" (p. 346). In the long term, such lowered involvement and heightened uncertainty can problematize sensemaking through reduced capacity and tenacious justifications.

In its present form, *Seven Cardinal Rules* encourages a fairly traditional, message-centered approach to risk communication that relies largely upon the first three unidirectional models of public relations identified by Grunig and Grunig (1992): press agentry and two-way asymmetrical, both of which focus on persuasion to achieve organizational goals, and public information, which simply distributes organizational information to an identified audience (Grunig & Grunig, 1992). Such approaches often begin with the identification of information needs, progress through the prioritization, design, testing, and implementation of specific messages or communicative interventions, and end with an evaluation of the effort (see Figure 4.1). With this approach's focus on

the message or intervention, individual actors – along with their disparate perspectives and commitments – are removed from the equation.

Figure 4.1. Traditional Communication Process Model.
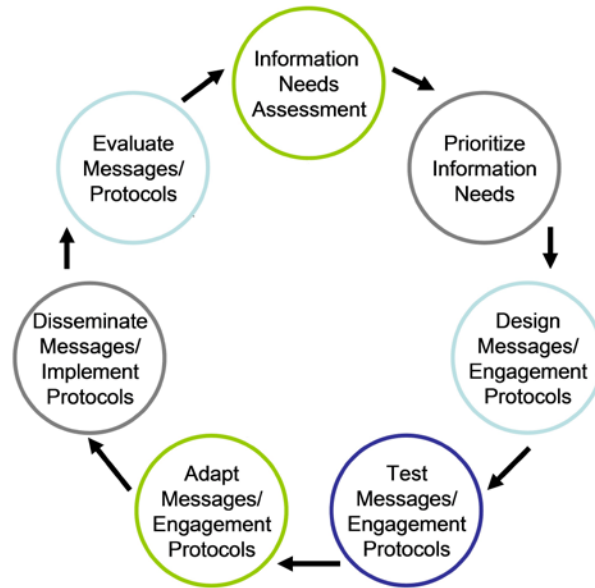
Palenchar and Health note that "both the process and content of communication are integral factors in increasing awareness, knowledge, positive attitudes and positive behavioral intentions" (p. 123). Thus, a process is needed that promotes iterative, multilateral engagement among stakeholders, ensuring that the transparency of the process itself becomes embedded in understandings of specific messages. As the Keystone Center (2005) notes in its risk communication primer for U.S. DOE employees, "Participants should feel that they were adequately consulted and that they had adequate opportunities to offer concerns or ask questions" (p. 22).

By pointing to challenges in sensemaking capacity, commitment, and expectations, this case study indicates a need to increase the number and diversity of perspectives at the table, to encourage constructive dialogue that informs while reducing blind spots, and to build trust among the numerous parties affected by Superfund sites.

Through dialogue, deliberation, and action, such a convergence-building approach would work toward constructing shared meanings by co-creating, implementing, and evaluating both risk messages and communication protocols. By moving stakeholders to the center of the process, the new model would help address the call for boundary spanning, collaboration, and shared management of risk knowledge (O'Hair, 2009).

In practice, adapting the existing communication process to include stakeholders is deceptively simple, a matter of adding just one component, in fact. The new model (see Figure 4.2) moves toward Grunig and Grunig's (1992) fourth model of public relations, two-way symmetrical, by placing the Stakeholder Consultation Core at the center of the process and providing for its input at every stage of risk communication. Under such a model, the Stakeholder Consultation Core would influence the development of needs assessment tools, help prioritize identified information needs, play a key role in designing and testing specific messages and engagement protocols, collaborate in adapting and disseminating messages or implementing protocols, and be central to both process and outcome evaluations.

Admittedly, the recruitment, establishment, and maintenance of the Stakeholder Consultation Core could prove challenging, as agencies already are required to fulfill myriad statutory obligations with very limited staff and resources. Under most circumstances, an outside party deemed neutral by the majority of stakeholders, including agencies and community members, might best develop and facilitate the site-specific Consultation Core. This individual could serve as a catalyst communicator, whose primary role White (1999) describes as "[c]reating an environment for dialogue, learning and transformation" (p. 39). Given the complex statutory and fiscal constraints present at

Superfund sites, whether this embodied communicative bridge among stakeholders was recruited from a local college or university, an outside consulting firm, or another entity, she or he would need to meet the many competencies required of a catalyst communicator (White, 1999), including interpersonal communication, investigative reporting, facilitation, problem-solving, participatory action, mediation, and educational skills, while also holding particular expertise in the field of risk communication.

Figure 4.2. Convergence-Building Communication Model.

While this catalyst communicator would be charged with long-term coordination of the Stakeholder Consultation Core, a lead organization would be charged with requesting the Core's involvement for specific areas of concern. For example, assistance with the design of cleanup-related information activities might be requested by U.S. EPA, while support for the development of engagement protocols concerning future site disposition might be requested by U.S. DOE; however, regardless of the specific area of informational need or the organization most able to fill that need, the Stakeholder

Consultation Core would be a central resource engaged for the design, implementation, and evaluation of the specific communicative projects.

As Palenchar and Health note, "An organizational culture of transparency acknowledges and respects the information, communication and decision-making expectations and demands of all its stakeholders and stakeseekers, and does not stage-manage them by limiting access to, propagandizing information about or manipulating decision-making regarding risk" (p. 124). By ensuring a multiplicity of constituencies is engaged in the risk communication process, the new model promotes exactly this kind of transparency. Such an approach breaks down the Government/Public binary. It provides broader understanding of processes related to bureaucratic delays, along with the distinct roles of specific agencies involved in such delays, which could reduce frustration levels. It supports open and honest communication among multiple constituencies, thus promoting regular information sharing and reducing perceptions of secrecy.

Fischhoff notes that "avoiding all conflict is not a realistic, or even a legitimate, goal for risk communication," continuing that, "[t]he best-case scenario for risk communication (and, indeed, risk management) is having fewer, but better conflicts" (p. 144). Similarly, while no process will ever create a situation in which all participants share a single perception of risk, a stakeholder-centered process can increase mutual understanding of differing risk perceptions, thus opening up a convergent space for dialogue, debate, and joint decision-making. By involving numerous participants with diverse perspectives at every stage, this model increases capacity for sensemaking while also building upon an iterative, dialogic approach intended to defuse adversarialism. As the Keystone Center (2005) notes, such "collaborative dissemination of knowledge helps

assuage fears that a particular locality is somehow being hoodwinked" (p. 25), thus decreasing distrust and laying the groundwork for improved future sensemaking. This model directly addresses Heath and O'Hair's (2010) concern that "dialogue regarding risk sufficiently include all interested parties and deal productively with their concerns and suggestions" (p. 20). Thus, the model is designed to help stakeholders identify and develop points of convergence (Sellnow, Ulmer, Seeger, & Littlefield, 2009).

Linking Risk Communication Approaches

In addition to building communicative convergence among site stakeholders, this model brings together the four approaches to risk communication: research translation, policy-oriented, stakeholder-centered, and participatory. Each of these perspectives adds value to the process. Research translation promotes the sharing of information and the education of stakeholders, while the policy perspective acknowledges both emotions and political realities present in the discourse. Stakeholder theory provides suggestions for ensuring that the people who most need information receive it on their timetables, while participatory approaches emphasize the establishment or repair of trust and rapport, thus helping heal the contentious legacies of environmental mismanagement by and inadequate or nonexistent risk communication from responsible parties.

With agencies included as fellow stakeholders, this convergence-building model provides directly for access to needed technical and scientific information. Explicit recognition of and respect for differing values and their impacts on risk perceptions provides an environment for productive risk policy discussions. By including representatives from a multiplicity of stakeholder groups in the Stakeholder Consultation Core, the model provides mechanisms for determining which stakeholders are most

affected by or most desire specific types of information and through which channels, thus opening avenues for distinct, targeted communication efforts. By involving stakeholders directly not only in the design, implementation, and evaluation of specific communication efforts but also in the operationalization of the *Guidelines for Superfund Site Communication* itself, the model provides transparent, open mechanisms to help build trust and rapport among diverse constituencies.

Weick (1988) notes that "[a]ccuracy in perception comes from an expanded response capacity" (p. 311). When individual stakeholders engage in communication at a Superfund site, they bring to the table their own specific perceptions; however, when a multiplicity of stakeholders participate, each representing a different point of view, the capacity for diagnosing and solving emerging communication problems is increased. As Weick (1988) puts it

> If more people are in constant touch with the system, this will make it easier to detect and correct anomalies and also to implant more reliable environments. These outcomes should be especially likely when the people doing the enactment have diverse experience, novel categories and justifications, and diverse activities at which they are skilled and in terms of which they perceive the world. We are not talking about specialists isolated from one another. Instead, we are talking about heterogeneous teams of diverse people with sufficient mutual respect that they maintain dense interaction with one another. (p. 313)

During the Stakeholder Future Vision Study, the importance of diverse perspectives for sensemaking was brought into relief following a particularly contentious focus group session. The meeting began with just two attendees, a plant employee and an environmental activist, both of whom were very knowledgeable about different aspects of the Paducah Gaseous Diffusion Plant. Shortly into the meeting, the group was joined by a third participant, a newcomer to the community who knew very little about the plant. For more than two hours, the employee and the activist debated the pros and cons of future

site uses for the plant, at times agreeing on key points and at other times disagreeing. Generally speaking, the discussion between the two was respectful. At the end of the evening, the late-comer told the research team, "I just learned a whole bunch." Thus, the back-and-forth between those with different site perspectives had been instructive, providing someone less familiar with the site with both facts and diverse opinions and helping him build a broader base on which to make sense of site issues. Providing support for such dialogic, collaborative sensemaking is the ultimate goal of this convergence-building model.

Limitations

The many challenges of drawing conclusions and making suggestions based upon a case study are exacerbated when these conclusions and suggestions have been derived through a crystallized framework that "presupposes that no truth exists 'out there' to discover or get close to, but only multiple and partial truths that researchers (and others) co-construct" (Ellingson, 2009, p. 22). I recognize that, as a communication researcher and practitioner working at Superfund sites, my own positionality is implicated throughout this work. In fact, I have attempted to make this recognition explicit through the use of narrative inquiry to complement constant comparative analysis.

However, given that one of the goals of this study is to develop an improved model for communication at these sites, I have attempted to ensure that study findings resonate with the people most affected by them. During the development of this dissertation, I have engaged in lengthy dialogues about emerging results and my subsequent conclusions with a number of constituencies, including participants in the Stakeholder Future Vision Study, personnel from both the U.S. Environmental Protection

Agency's Office of Solid Waste and Emergency Response and the National Institute of Environmental Health Sciences Partnerships for Environmental Public Health, leadership of the Kentucky Environmental Quality Commission, and university-based community engagement and research translation directors at other Superfund sites around the country. At each step, I have been reassured that the communicative dynamics identified within this study are experienced frequently at numerous sites, and I have received important feedback, including requests from multiple parties that the model explicitly involve stakeholders in developing and implementing communication evaluation activities.

In addition to questions about the transferability of these findings to other Superfund sites, additional limitations relate to statutory and fiscal constraints for the model's implementation. As has been noted, a number of governmental actors are involved at Superfund sites, including U.S. DOE, U.S. EPA, and ATSDR, along with state departments for environmental protection and health and family services. Under complex existing Superfund laws, which agency – if any -- should take the lead in formulating a Stakeholder Consultation Core? Would U.S. EPA's Community Involvement Coordinators be best positioned to begin this work through the agency's initial site investigations? Would it be a logical – or even sanctioned – role for the ATSDR site representative? Or would it be best to identify a local or regional stakeholder, such as a college or university, to undertake the necessary formative research? Are there specific statutory limitations that would stand in the way of model implementation? From where would the funding to support the prescribed interactions be

derived? These are questions that, in and of themselves, require extensive dialogue and negotiation to answer.

A third limitation for model implementation relates to the significant amount of time it can take to engage stakeholders directly and to conduct the formative research necessary to ensure inclusivity. While the expanded timeframe might prove problematic in crisis situations, the long-term, chronic risk environments at Superfund sites provide more temporal flexibility for work that could reap long-term relational dividends. Although time-intensive, the effort put into ensuring both transparency of process and participation of multiple constituencies in the risk discourse could play an important role in increasing trust among diverse stakeholders.

Future Directions

This study raises numerous questions about complex risk communication processes at Superfund sites, and as such, it opens many doors for future studies. Superfund sites are heterogeneous in terms of contaminants, demographics, socioeconomic factors, and many other relevant components, all of which feed into varying communicative dynamics across different sites. Thus, an analysis comparing sensemaking in communities that feature some participatory communication mechanisms with sensemaking in communities that rely primarily on more traditional risk communication activities could help elucidate the potential efficacy of the proposed convergence-building model, as well as identify areas of concern prior to model implementation.

A second area of particular interest is the community-based development of evaluation processes and instruments. While the Arnstein Ladder (1969) used in the

Stakeholder Future Vision Study provides a useful heuristic through which stakeholders can think about public involvement, the Ladder itself was created by an academic for use by academics. As such, the terminology has not always proven clear to stakeholders, with constructs like "therapy" particularly problematic for shared understanding. In the future, I hope to work directly with Superfund stakeholders to adapt and validate an evaluation instrument that more closely resonates with both their own experiences and language.

Finally, a key area for applied research would involve working with federal agencies to determine the extent to which the convergence-building model could be implemented and tested at Superfund sites. How would agency communicators make sense of their own and Superfund stakeholders' evolving roles within the new model? To what extent might agency personnel be constrained by their own organizational capacity, commitments, and expectations? Such potential research questions hold promise for future studies.

Sensemaking at Superfund sites is a complex process that involves many actors representing diverse perspectives, at times leading to adversarial relations that render convergent understanding extremely problematic. Only by engaging in systematic research and evaluation of existing communicative constraints can we help site stakeholders move toward shared understandings of risk-related phenomena. I hope that this study has contributed, in some small part, to this process.

References

Adler, C.R. (1995). A longitudinal study of agenda setting for the issue of environmental pollution. *Journalism and Mass Communication Quarterly, 72*, 300-11.

Adler, P.S., & Kranowitz, J.L. (2005). *A primer on perceptions of risk, risk communication and building trust.* The Keystone Center. Retrieved September 9, 2011 from http://www.netl.doe.gov/technologies/carbon_seq/refshelf/reg-issues/TKC%20Risk%20Paper.fin.pdf.

Altheide, D. (2010). Risk communication and the discourse of fear. *Catalan Journal of Communication & Cultural Studies, 2*(2), 145-158.

Agency for Toxic Substances and Disease Registry. (1994). *A primer on health risk communication principles and practices.* Retrieved February 6, 2013 from http://www.atsdr.cdc.gov/risk/riskprimer/vision.html.

Anyaegbunam, C., Hoover, A.G., & Schwartz, M. (2010.) Use of community-based participatory communication to identify community values at a Superfund site. Providence, RI: American Society of Civil Engineers Annual Meeting.

Anyaegbunam, C., & Kamlongera, C. (2002). Writing with the people: An empowering communication approach to sustainable rural development. *Journal of Development Communication, 13*, 1-14.

Anyaegbunam, C., Mefalopulos, P., & Moetsabi, T. (2004). *Participatory Rural Communication Appraisal: A handbook for rural development practitioners* (2nd ed.). Rome: UN FAO.

Anyaegbunam, C., Mefalopulos, P., & Moetsabi, T. (1999). Facilitating Grassroots Participation in Development: New training models and techniques. In White, S. (Ed.). *The art of facilitating participation: Releasing the power of grassroots communication*. New Delhi: Cornell University and Sage.

Arnstein, S. (1969). A ladder of participation. *Journal of the American Institute of Planners, 5,* 216-224.

Associated Press. (2005, July 11). Congress considers buying property near Paducah plant. *Paducah Sun*, p. 12A.

Atkinson, E. (2005). Equality, diversity, and othering: What happens to identity in a globalized world? In Satterthwaite, J., & Atkinson, E. (Eds.), (79-94), *Discourses of education in the age of new imperialism*. Sterling, VA: Trentham Books Ltd.

Bailey, K., Blandford, B., Grossardt, T., & Ripy, J. (2011). Planning, technology, and legitimacy: Structured public involvement in integrated transportation and land-use planning in the United States. *Environment and Planning B: Planning and Design, 38*(3), 447-467.

Bakhtin, M. (1981). The dialogic imagination: Four essays. M. Holquist (Ed.) (C. Emerson & M. Holquist, Trans.) Austin: University of Texas Press.

Bakir, V. (2006). Policy agenda setting and risk communication: Greenpeace, Shell, and issues of trust. *The Harvard International Journal of Press/Politics, 11*, 67-88.

Ballejos, L.C., & Montagna, J.M. (2008). Method for stakeholder identification in interorganizational environments. *Requirements Engineering, 13,* 281-297.

Basu, K., & Palazzo, G. (2008). Corporate social responsibility: A process model of sensemaking. *Academy of Management Review, 33*(1), 122-136.

Battelle. (2003). An evaluation of DOE-EM public participation programs. Pacific Northwest National Laboratory for U.S. Department of Energy. Retrieved January 18, 2011 from: https://www.pnl.gov/main/publications/external/technical_reports/PNNL-14200.pdf.

Baxter, J.W., & Eyles, J.D. (1999). The utility of in-depth interviews for studying the meaning of environmental risk. *The Professional Geographer, 51,* 307-20.

Beierle, T.C., & Cayford, J. (2002). *Democracy in practice: Public participation in environmental decisions*. Washington, D.C.: Resources for the Future.

Belke, J. C. (2000). Chemical accident risks in U.S. industry – a preliminary analysis of accident risk data from U.S. hazardous chemical facilities. Washington, DC: U.S. Environmental Protection Agency.

Blumer, H. (1966). Sociological implications of the thought of George Herbert Mead. *American Journal of Sociology, 71*(5), 535-548.

Blumer, Herbert (1969). *Symbolic Interactionism: Perspective and Method*. Berkeley: University of California Press.

Boholm, P. (2008). The public meeting as a theatre of dissent: Risk and hazard in land use planning. *Journal of Risk Research, 11*(1), 119-140.

Boholm, A. (2009). Speaking of risk: Matters of context. *Environmental Communication, 3*(3), 335-354.

Bradbury, J., & Branch, K.M. (1999). *An evaluation of the effectiveness of local site-specific advisory boards for the U.S. Department of Energy environmental restoration programs.* Richland, WA. Retrieved January 8, 2011 from http://www.osti.gov/bridge/servlets/purl/4269-c1tCdi/webviewable/ (accessed January 8, 2010.

Brinson, S. L., & Benoit, W. L. (1996). Dow Corning's image repair strategies in the breast implant crisis. *Communication Quarterly, 44*, 29-41.

Brown, D., Howes, M., Hussein, K., Longley, C., & Swindell, K. (2002). *Participatory methodologies and participatory practices: Assessing PRA use in Gambia* (Network paper No. 124).

Bruce, A.S., & Becker, P.J. (2007). State-corporate crime and the Paducah Gaseous Diffusion Plant. *Western Criminology Review, 8*(2), 29-43.

Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research, 6*(1), 97-113

Buchholz, R.A., & Rosenthal, S.B. (2005). Toward a contemporary conceptual framework for stakeholder theory. *Journal of Business Ethics, 58*, 137-148.

Butler-Kisber, L. (2010). *Qualitative inquiry: Thematic, narrative and arts-informed perspectives*. Los Angeles: Sage.

Carey, J. (1989). *Communication as Culture: Essays on media and society*. NY: Unwin Hyman.

Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review, 4,* 497-505.

Carroll, J.R., & Malone, J., (2000, June 26). Cold War poison: The Paducah legacy. *The Louisville Courier Journal*

Center for Risk Communication. (2012). *Our Clients.* Retrieved from http://centerforriskcommunication.org/our-clients/. (2012, May 23).

Chan, C., Hughes, T., Muldoon, S., Aldrich, T., Rice, C., Hornung, R., Grion, G., Tollerud, D. (2010). Mortality patterns among Paducah Gaseous Diffusion Plant workers. *Journal of Occupational and Environmental Medicine, 52*(7), 725-732.

Chase, S.E. (2005). Narrative inquiry: Multiple lenses, approaches, voices. In N.K. Denizen & Y.S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed.) (651-679). Thousand Oaks, CA: Sage.

Chess, C., Salomone, K.L., Hance, B.J., & Saville, a. (1995). Results of a national symposium on risk communication: Next steps for government agencies. *Risk Analysis, 15*, 115-125.

Chung, W., Chen, H., & Reid, E. (2009). Business stakeholder analyzer: An experiment of classifying stakeholders on the web. *Journal of the American Society for Information Science and Technology, 60*(1), 59-74.

Clarke, A.E. (2005). *Situational analysis: Grounded theory after the postmodern turn.* Thousand Oaks, CA: Sage.

Clarkson, M.B.E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review, 20*(1), 92-117.

Cornwall A, & Jewkes R. (1995). What is participatory research? *Social Science Medicine*, *41*(12), 1667-76.

Cossette, P. (1998). The study of language in organizations: A symbolic interactionist stance. *Human Relations, 51*(11), 1998.

Covello, V., & Allen, F. (1988). *Seven Cardinal Rules of Risk Communication*. U.S. Environmental Protection Agency, Office of Policy Analysis: Washington, D.C.

Covello, V., & Sandman, P.M. (2001). Risk communication: Evolution and revolution. *Solution to an Environment in Peril*, 164-178.

Dagron, A. G. (2001). *Making waves: Stories of participatory communication for social change*. The Rockefeller Foundation.

Dantico, M.K., Mushkatel, A.H., & Pijawka, K.D. (1991). *Public response to the siting of the high-level nuclear waste repository in Nevada: Analysis of risk and trust perceptions*. Tempe, AZ: Arizona State University, Office of Hazard Studies.

Davis, K. (1973). The case for and against business assumption of social responsibilities. *Academy of Management Journal, 16,* 312-322.

Derrida. J. (1976). *Of Grammatology.* (G.C. Spivak, Trans.). Baltimore, MD: Johns Hopkins University Press.

de Saillan, Charles. (2008). Use of imminent hazard provisions of environmental laws to compel cleanup at federal facilities. *Stanford Environmental Law Journal, 27*(1), 43-208.

Dietz, T., & Stern, P.C. (Eds.). (2008). Panel on public participation in environmental assessment and decision making: Public participation in environmental assessment and decision making. Washington, D.C.: National Research Council.

Donaldson, T., & Preston, L.E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review, 20*(1), 65-91.

Donham, M. (2010a, May 5). Mugged by University of Kentucky "researcher" - and then he calls the police on me! *Rural Thoughts.* Retrieved from http://www.ruralthoughts.net/?q=node/409. (2011, February 15).

Donham, M. (2010b, May 6). Followup on mugging by UK "researcher". *Rural Thoughts.* Retrieved from http://www.ruralthoughts.net/?q=node/411. (2011, February 15).

Donham, M. (2010c, May 9). Re: Rebuttal to rebuttal. *Rural thoughts.* Retrieved from http://www.ruralthoughts.net/?q=node/409. (2011, February 15).

Donham, M. (2010d, May 13). University of Kentucky dragging feet on advisory board members. *Rural Thoughts.* Retrieved from http://www.ruralthoughts.net/?q=node/411. (2011, February 15).

Donham, M. (2010e, August 10). The UK "researchers" respond to my email. *Rural Thoughts*. Retrieved from http://www.ruralthoughts.net/?q=node/435. (2011, February 15).

Donham, M. (2011a, March 19. Paducah Dept. of Energy Citizen's Advisory Board meeting. Rural Thoughts. Retrieved from http://www.ruralthoughts.net/index.php?q=node/512. (2011, March 20).

Donham, M. (2011b, March 20). Paducah Dept. of Energy Citizen's Advisory Board meeting continued. *Rural Thoughts.* Retrieved from http://www.ruralthoughts.net/?q=node/513. (2011, March 20).

Douglas, M., & Wildavsky, A. (1982). *Risk and culture: An essay on the selection of technological and environmental dangers.* Berkeley and Los Angeles: University of California Press.

Douglas, M. (1992). *Risk and blame.* London: Routledge.

Downey, L., Anyaegbunam, C., & Scutchfield, F.D. (2009). Dialogue to deliberation: Expanding the Empowerment Education Model. *American Journal of Health Behavior, 33*(1), 26-36.

Ellingson, L. L. (2009). *Engaging crystallization in qualitative research: An introduction.* Los Angeles: Sage.

Ellis, C., & and Bochner, A.P. (2000). Autoethnography, personal narrative, reflexivity: Researcher as subject. In N.K. Denzin and Y.S. Lincoln (Eds.), *The handbook of qualitative* research (2nd ed.), (733-768). Thousand Oaks, CA: Sage.

Endres, D. (2009). Science and public participation: An analysis of public scientific argument in the Yucca Mountain controversy. *Environmental Communication*, 3(1), 49-75.

Energy Communities Alliance [ECA]. (2007). *The Politics of Cleanup – Lessons Learned from Complex Federal Environmental Cleanups*. Energy Communities Alliance, Inc.

Evan, W. M., & Freeman, E. *(*1996). A stakeholder theory of the modern corporation: *Kantian capitalism.*, *In* Chryssides, G. D., & Kaler, J. H., (Eds.), *An Introduction to Business Ethics*. *London: Thomson Business Press, pp*. 254–266.

Fischhoff, B. (1995). Risk perception and communication unplugged: Twenty years of process. *Risk Analysis, 15*(2), 137-145.

Fisher, F. (2000). *Citizens, experts, and the environment: The politics of local knowledge*. Durham, NC: Duke University Press.

Flynn, J., Slovic, P., Mertz, C.K., & Toma, J. (1990). *Evaluations of Yucca Mountain: Survey findings.* (Report No NWPO-SE-029-90). Carson City, NV: Nuclear Waste Project Office.

Freeman, J., & Godsil, R. (1994). The question of risk: Incorporating community perceptions into environmental risk assessments. *Fordham Urban Law Journal, 21*(3), 547-604.

Furisch, E. (2009). In defense of textual analysis: Restoring a challenged method for journalism and media studies. *Journalism Studies, 10*(2), 238-252.

Futrell, R. (2003). Technical adversarialism and participatory collaboration in the U.S. chemical weapons disposal program. *Science, Technology, and Human Values, 28*(4*)*, 451-482.

Fox, C. (2008). Postcolonial dilemmas in narrative research. *Compare, 38*(3), 335-347.

Gaetke, L., Gaetke, K., & Bowen, C. (2008). Challenges to Superfund community nutrition programs in Kentucky. *Environmental Toxicology and Pharmacology, 25*, 277-281.

Golden-Biddle, K., & Locke, K. (2007). *Composing qualitative research*. Thousand Oaks, CA: Sage.

Green, L.W., & Mercer, S.L. (2001). Can public health researchers and agencies reconcile the push from funding bodies and the pull from communities? *Americal Journal of Public Health, 91*(12), 1926–1929.

Grunig, J. E., & Grunig, L. A. (1992). Models of public relations and communication. *Excellence in public relations and communication management*, 285-325.

Guba, E.C. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal, 29*(2), 75-91.

Guba, E.C., & Lincoln, Y.S. (1989). *Fourth generation evaluation.* London: Sage.

Heath, R.L., Bradshaw, J., & Lee, J. (2002). Community relationship building: Local leadership in the risk communication infrastructure. *Journal of Public Relations Research, 14*(4), 317-353.

Heath, R.L., & Nathan, K. (1990). Public relations' role in risk communication: Information, rhetoric, and power. *Public Relations Quarterly, 35*(4), 15-22.

Heath, R.L. & O'Hair, H.D. (2010). The significance of risk and crisis communication. In R.L. Heath and H.D. O'Hair (Eds.), *The handbook of risk and crisis communication.* New York: Routledge.

Heath, R.L, & Palenchar, M.J. (2009). *Strategic Issues Management: Organizations and public policy challenges.* Thousand Oaks, CA: Sage Publications.

Horlick-Jones, T., & Farre, J. (2010). On the communicative constitution of risk objects in mediated times. *Catalan Journal of Communication & Cultural Studies, 2*(2), 131-143.

Iverson, J.O., & McPhee, R.D. (2008). Communicating knowing through communities of practice: Exploring internal communicative processes and differences among CoPs. *Journal of Applied Communications Research, 36*(2), 176-199.

Jakobson, R., & Halle, M. (1956). *Fundamentals of language*. The Hague: Mouton.

Jawahar, I.M., & McLaughlin, G.L. (2001). Toward a descriptive stakeholder theory: An organizational life cycle approach. *Academy of Management Review, 26*(3), 397-414.

Johnson, J.D. (1996). *Information-seeking: An organizational dilemma.* Westport, CT: Quorum.

Johnson, J.L., Bottorff, J.L., Browne, A.J., Grewal, S., Hilton, B.A., & Clarke, H. (2004). Othering and being othered in the context of health care services. *Health Communication, 16*(2), 253-271.

Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R., Kasperson, J.X., & Ratick, S. (2000). The social amplification of risk: A conceptual framework. In P. Slovic (Ed.), *The Perception of Risk.* London: Earthscan Publications, Ltd.

Kaoutzanis, C. (2011). "Megatons to megawatts": A mega-player of U.S. nuclear enrichment. *Georgetown International Environmental Law Review, 24*(1), 1-22.

Keeney, R., D. Von Winterfeldt, & T. Eppel. (1990). Eliciting public values for complex policy decisions. *Journal of Management Science, 36*(9), 1011–30.

Kellogg Foundation. (2013). Kellog Health Scholars overview. Retrieved from Jan. 15, 2013 from http://www.kellogghealthscholars.org/about/community.cfm.

Kentucky Research Consortium for Energy and the Environment [KRCEE]. (2007). *Property acquisition study for areas near the Paducah Gaseous Diffusion Plant, Paducah, KY* (Document No. P24.1 2007). Lexington, KY: UK/KRCEE.

Kentucky Research Consortium for Energy and the Environment [KRCEE]. (2011). *Community visions for the Paducah Gaseous Diffusion Plant Site.* (Document No. P25.1 2011). Lexington, KY: UK/KRCEE.

Keystone Center. (2005). A primer on perceptions of risk, risk communication, and building trust. Retrieved from http://www.pgdpcab.energy.gov/ (2010, May 20).

Kinsella, W.J. (2007). Heidegger and being at the Hanford reservation: Standing reserve, enframing, and environmental communication theory. *Environmental Communication, 1*(2), 194-217.

Kitzinger, J., & Barbour, R. S. (1999). Introduction: The challenge and promise of focus groups. In (Eds.) Barbour, R. S., & Kitzinger, J. *Developing focus group research: Politics, theory and practice*. London: Sage.

Laurian, L. (2004). Public participation in environmental decision making: Findings from communities facing toxic waste cleanup. *Journal of the American Planning Association, 70*(1), 53–66.

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues, 2,* 34-46.

Lindlof, T.R., & Taylor, B.C. (2002). *Qualitative communication research methods* (2nd ed.). Thousand Oaks, CA: Sage.

Lopes, I.T. (2008). Towards an Electronic Knowledge Management Culture. *The Icfai University Journal of Knowledge Management, 6*(4), 7-24.

McCallum, D.B., Hammond, S.L., & Covello, V.T. (1991). Communicating about environmental risks: How the public uses and perceives information sources. *Health Education Quarterly, 18*(3), 349-61.

McCarthy, C., & Dimitriades, G. (2000). Governmentality and the sociology of education: Media, educational policy, and the politics of resentment. *British Journal of Sociology of Education, 21*(2), 169-185.

McComas, K.A. (2003). Citizen satisfaction with public meetings used for risk communication. *Journal of Applied Communication Research, 31*(2), 164-184.

Maxwell, J.A. (1992). Understanding and validity in qualitative research. *Harvard Educational Review, 62,* 1996.

Medved, C.E. (2011). Qualitative research: Practices and practicing reflexivity. *Women and Language, 34*(2), 109-113.

Minkler, M. (2005). Community-based research partnerships: Challenges and opportunities. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 82*(2), ii3-ii12.

Mishler, E.G. (1990). Validation in inquiry-guided research: The roles of exemplars in narrative studies. *Harvard Educational Review, 60,* 415-442.

Murdock, G. (2010). Shifting anxieties, altered media: Risk communication in networked times. *Catalan Journal of Communication & Cultural Studies, 2*(2), 159-176.

National Institute of Environmental Health Sciences. (2013). *Superfund Research Program*. Retrieved February 2, 2013 from http://www.niehs.nih.gov/research/supported/dert/cris/programs/srp/index.cfm.

National Research Council. (1989). *Improving Risk Communication.* Washington, DC: National Academies Press.

Nightingale, D.J., & Cromby, J. (1999). *Social constructionist psychology: A critical analysis of theory and practice*. Buckingham: Open University Press.

Nuclear Information and Resource Service. (2013). *About NIRS*. Retrieved March 6, 2013 from http://www.nirs.org/about/nirs.htm.

O'Hair, H.D. (2009). Managing community risks through a community-communication infrastructure approach. *Conference papers: International Communications Association 1.*

Ommani, A.R. (2011). Application of Participatory Rural Communication Appraisal (PRCA): A new tool for rural development. *Life Science Journal, 8*(1), 352-355.

Ormsbee, L., & Hoover, A. (2010). End state vision process for the Paducah Gaseous Diffusion Plant. *Proceedings of World Environmental and Water Resources Congress 2010.* Providence, R.I: American Society of Civil Engineers.

Paducah Area Community Reuse Organization. (2010). *Who we are.* Retrieved September 18, 2010 from http://www.purchaseadd.org/paducah_area_community_reuse_organization_ (pacro).

Paducah Gaseous Diffusion Plant Citizens Advisory Board [PGDP CAB]. (2010). *About us.* Retrieved September 18, 2010 from http://www.pgdpcab.energy.gov/.

Paducah Gaseous Diffusion Plant Citizens Advisory Board. (2009). *CAB Mission Statement*. Retrieved April 15, 2009, from www.pgdpcab.org/mission.html.

Paducah Sun Editor. (2005a, September 25). DOE still stalling cleanup work. *Paducah Sun,* p. 4A

Paducah Sun Editor. (2005b, December 8). Slow progress: DOE has a long way to go on cleanup. *Paducah Sun*, p. 4A.

Paine, C.E. (2010). The nuclear fuel cycle, global security, and climate change: Weighing the costs and benefits of nuclear power expansion. *University of Richmond Law Review, 44*(3)*,* 1047 - 1114.

Palenchar, M.J. (2005). *Social construction of risk roles, risk perceptions, and emergency response procedures: An ethnographic case study of two near neighbor chemical manufacturing communities*. (Unpublished doctoral dissertation). University of Florida, Gainesville.

Palenchar, M.J. (2008). Risk communication and community right to know: A public relations obligation to inform. *Public Relations Journal, 2*(1), 1-26.

Parrott, R. (2008). A multiple discourse approach to health communication: Translational research and ethical practice. *Journal of Applied Communication Research, 36*(1), 1-7.

Patton, M.Q. (2002). *Qualitative research & evaluation methods.* (3rd ed.) Thousand Oaks, CA: Sage.

Perrow, C. (1984). *Normal accidents*. New York: Basic Books.

Pinkleton, B.E., & Austin, E.W. (2004). Media perceptions and public affairs apathy in the politically inexperienced. *Mass Communication and Society, 7*(3), 319-337.

Polkinghorne, D. (1983). *Methodology for the human sciences: Systems of inquir*y. Albany, NY: State University of New York Press.

Powers, W.T. (1973). *Behavior: The control of perception*. Chicago: Aldine.

Preston, L.E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review, 20*(1), 65-91.

Quinn, D.P., & Jones, T.M. (1995). An agent morality view of business policy. *Academy of Management Review, 20*(1), 22-42.

Renn, O. (1992). Concepts of risk: A classification. In S. Krimsky & D. Golding (Eds.), Social theories of risk (pp. 53–82). Westport, CT: Praeger.]

Richardson, L. (2000). Writing; A method of inquiry. In N.K. Denzin & Y.S. Lincoln (Eds.), *Handbook of qualitative research*. (2nd ed., pp. 9230943(. Thousand Oaks, CA: Sage.

Riessman, C.K., & Speedy, J. (2007). Narrative inquiry in the psychotherapy professions: A critical review. In D.J. Clandinin (Ed.), *Handbook of narrative inquiry: Mapping a methodology* (426-456). Thousand Oaks, CA.: Sage.

Rogers, E., & Kincaid, D.L. (1981). *Communication Networks.* New York, NY: Free Press.

Rowan, K.W. (1994) Why rules for risk communication are not enough: A problem-solving approach to risk communication. *Risk Analysis, 14*, 365-374.

Rowe, G. & Frewer, L. (2004). Evaluating public participation exercises: A research agenda. *Science, Technology and Human Values, 29*(4), 512-556.

Rowe, G. & Frewer, L. (2000). Public participation methods: A framework for evaluation. *Science, Technology, & Human Values, 25*(1), 3-29.

Sandman, P. M. (1993). *Responding to community outrage: Strategies for effective risk communication.* Fairfax, VA: American Industrial Hygiene Association.

Saussure, F.D. (1983). *Course in General Linguistics.* (R. Harris, Trans.). London: Duckworth.

Scholz, R. W., & Tietje, O. (2002). Embedded case study methods: Integrating quantitative and knowledge. Thousand Oaks, CA: Sage.

Seawright, J., & Gerring, J. (2008). Case selection techniques in case study research: A menu of qualitative and quantitative options. *Political Research Quarterly, 61*(2), 294-308.

Sellnow, T.L., & Sellnow, D. (2010). The instructional dynamic of risk and crisis communication: Distinguishing instructional messages from dialogue. *The Review of Communication, 10*(2), 112-126.

Sellnow, T. L., Ulmer, R. R., Seeger, M. W., & Littlefield, R. S. (2009). *Effective risk communication: A message-centered approach*. New York: Springer Science+Business Media, LLC.

Shannon, C. E. A. (1948). Mathematical theory of communication. *Bell System Technical Journal*, *27*, 379-423.

Short, D.C. (2002). Survey of Kentucky environmental law. *Northern Kentucky Law Review, 29*(1), 1-34.

Shrivastava, P. (1987). Bhopal: Anatomy of a crisis. Cambridge, MA: Ballinger.

Slovic, P. (2000). *The perception of risk.* London: Earthscan Publications Ltd.

Slovic, P. (1993). Perceived risk, trust and democracy. *Risk Analysis, 13*(6), 675–682.

Spencer, J., & Triche, E. (1994). Media constructions of risk and safety: Differential framings of hazard events. *Sociological Inquiry, 64*, 199-213.

Stern, B. (1996). Textual analysis in advertising research: Construction and deconstruction of meaning. *Journal of Advertising Research, 25*(3), 61-73.

Stirling, A. 2008. "Opening up" and "closing down": Power, participation, and pluralism in the   social appraisal of technology. *Science, Technology, and Human Values 33*(2), 262-294.

Stratman, J. F., Boykin, C., Holmes, M. C., Laufer, M. J., & Breen, M. (1995). Risk communication, metacommunication, and rhetorical stases in the Aspen-EPA Supefund controversy. *Journal of Business and Technical Communication, 9*(5), 540.

Strauss, A.L. (1987). *Qualitative analysis for social scientists*. Cambridge: Cambridge University Press.

Swanson, D.L. (1995). Addressing a theoretical problem by reorienting the corporate social performance model. *Academy of Management Review, 20*(1), 43-64.

Taylor, B. C., Kinsella, W. J., Depoe, S. P., & Metzler, M. S. (2005). Nuclear legacies: Communication, controversy, and the US nuclear weapons production complex. Communication Yearbook , 29, 363-409.

Thomas, C. (1998). Maintaining and restoring public trust in government agencies and their employees. *Administration and Society, 30*(2), 166-193.

Thompson, P.B. (2012). Ethics and risk communication. *Science Communication, 34*(5), 618-641.

Tinker, T.L. (1996). Recommendations to improve health risk communication: Lessons learned from the U.S. Public Health Service. *Journal of Health Communication, 1*, 197-217.

United States Department of Energy. (2011). *Office of Environmental Management: Projects.* Retrieved Sept. 10, 2011 from http://www.em.doe.gov/Pages/projects.aspx.

United States Enrichment Corporation. (2010). *Overview: Paducah Gaseous Diffusion Plant*. Retrieved November 16, 2010, from www.usec.com/gaseousdiffusion_pad_overview.htm.

United States Environmental Protection Agency. (2007). NPL site narrative for Paducah Gaseous Diffusion Plant (U.S. DOE). Retrieved Jan. 12, 2009, from http://www.epa.gov/superfund/sites/npl/nar1383.htm.

United States Environmental Protection Agency. (2009). *U.S. DOE Diffusion Plant.* Retrieved March 17, 2009, from http://www.epa.gov/Region4/waste/npl/nplky/paducaky.htm.

United States Environmental Protection Agency. (2011). *Superfund: Cleanup Process*. Retrieved Sept. 10, 2011 from http://www.epa.gov/superfund/cleanup/index.htm.

United States Environmental Protection Agency. (2012). *Catalog of Environmental Programs 2012: Environmental Justice & Community-Based Participatory Research.* Retrieved January 6, 2013 from http://www.epa.gov/oig/catalog/programs/165.html.

United States Environmental Protection Agency. (2013). *Superfund: Basic information.* Retrieved January 12, 2103 from http://www.epa.gov/superfund/about.htm.

VanWynsberghe, R., & Khan, S. (2007). Redefining case study. *International Journal of Qualitative Methods.*

Viswanathan, M., Ammerman, A., Eng, E., Gartlehner, G., Lohr, K.N., Griffith, D., Rhodes, S., Samuel-Hodge, C., Maty, S., Lux,, L., Webb, L., Sutton, S.F. Swinson, T., Jackman, A., & Whitener, L. (2004). Community-Based Participatory Research: Assessing the evidence. Evidence Report/Technology Assessment No. 99. (Prepared by RTI–University of North Carolina Evidence-based Practice Center under Contract No. 290-02-0016, (AHRQ Publication 04-E022-2). Rockville, MD: Agency for Healthcare Research and Quality.

Wagner, T. Lutz, R.J., & Weitz, B.A. (2009). Corporate hypocrisy: Overcoming the threat of inconsistent corporate social responsibility perceptions. *Journal of Marketing, 73,* 77-91.

Wakefield, S.E., & Elliott, S.J. (2003). Constructing the news: The role of local newspapers in environmental risk communication. *The Professional Geographer, 55*(2), 216-26.

Walker, J. (2005a, January 11). New plant cleanup firm plans to keep workers. *Paducah Sun*, pp. 1A, 2A.

Walker, J. (2005b, January 28). New cleanup firm delayed by challenge. *Paducah Sun*, pp. 1A, 14A.

Walker, J. (2005c, February 3). Second protest of North Wind Paducah cleanup contract. *Paducah Sun*, p. 8A.

Walker, J. (2005d, February 8). Bush budget cuts river lock, plant cleanup. *Paducah Sun*, 1A, 12A.

Walker, J. (2005e, February 11). Nuclear workers fault report. *Paducah Sun*, pp. 1A, 10A.

Walker, J. (2005f, February 27). Author raises safety questions over rush to build nuclear fuel plants. *Paducah Sun*, pp. 1C, 3C.

Walker, J. (2005g, March 17). Swift and Staley lands big contract. *Paducah Sun*, 1A, 11A.

Walker, J. (2005h, March 26). Compensating sick workers: Cancer victim finally nears settlement in plant exposure. *Paducah Sun*, pp. 1A, 14A.

Walker, J. (2005i, March 30). Sick workers get first chance to talk of Labor payouts. *Paducah Sun*, pp. 1A, 10A.

Walker, J. (2005j, April 14). DOE again delays plant cleanup. *Paducah Sun,* pp. 1A, 16A.

Walker, J. (2005k, April 19). DOE moves ahead with Paducah infrastructure pact. *Paducah Sun*, pp. 1A, 10A.

Walker, J. (2005l, May 19). Labor says sick worker date holding. *Paducah Sun,* pp. 1A, 11A.

Walker, J. (2005m, June 7). Coverage sought for all children of sick workers. *Paducah Sun*, p. 2A.

Walker, J. (2005n, June 8). Adult survivors of sick workers protest. *Paducah Sun,* pp. 1C, 2C.

Walker, J. (2005o, June 24). Bidding reopened to replace Bechtel. *Paducah Sun*, pp. 1A, 14A.

Walker, J. (2005p, July 24). Changing focus: Chairman leaves GPEDC on solid ground and sets his sites on preserving nuclear jobs. *Paducah Sun,* pp. 1C, 5C.

Walker, J. (2005q, August 2). Bunning, Bodman to tour Paducah plant. *Paducah Sun*, p. 6A.

Walker, J. (2005r, August 10). Water cleanup good, but not foolproof. *Paducah Sun*, pp. 1C, 2C.

Walker, J. (2005s, August 26). Frustration grows as sick workers wait for benefits. *Paducah Sun,* pp. 1A, 15A.

Walker, J. (2005t, September 14). Sick workers seek responses to their claims. *Paducah Sun*, pp. 1A, 9A.

Walker, J. (2005u, October 26). DOE checks presence, impact of cylinder gas. *Paducah Sun*, pp. 1A, 10A.

Walker, J. (2005v, December 4). Past two years of DOE cleanup win praise as improvement. *Paducah Sun*, pp. 1A, 9A.

Walker, J. (2005w, December 8). Slow progress: DOE has a long way to go on cleanup. *Paducah Sun*, p. 4.

Walker, J. (2005x, December 28). DOE plant site gets new cleanup firm. *Paducah Sun*, pp. 1A, 12A.

Walker, J. (2006, April 16). Neighbors of plant again hear talk of DOE land buyouts. *The Paducah Sun*, p. 1A).

Wallerstein N. A. (2000). Participatory evaluation model for Healthier Communities: Developing indicators for New Mexico. *Public Health Rep., 115*(2-3), 199-204.

Wallerstein N. A, & Duran B. (2006). Using community-based participatory research to address health disparities. *Health Promotion Practice, 7*, 312–23.

Wallerstein, N.A., & Duran, B. (2010). Community-Based Participatory Research contributions to intervention research: The intersection of science and practice to promote health equity. *American Journal of Public Health, 100*(S1), S40-S46.

Warrick, J. (1999, August 22). Evidence counts in Paducah. *The Washington Post*, p. A1.

Wartick, S. L., & Cochran, P. L. 1985. The evolution of the corporate social performance model. Academy of *Management Review, 4*: 758-769.

Weick, K. E. (1988). Enacted sensemaking in crisis situations. *Journal of Management Studies, 25*(4), 305-317.

Weick, K. E. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.

Weick, K. E. (2001). The collapse of sensemaking in organizations: The Mann Gulch disaster. In K.E. Weick (Ed.), *Making sense of the organization* (100-124). Oxford, UK: Blackwell Publishers, Inc.

Weick, K.E. (2010). Reflections on enacted sensemaking in the Bhopal disaster. *Journal of Management Studies, 47*(3), 537-550.

Weiner, N. (1948). *Cybernetics or control and communication in the animal and the machine.* New York: Wiley.

White House. (2009). Open Government Directive. Retrieved February 24, 2010 from http://www.whitehouse.gov/the_press_office/Transparency_and_ Open_Governent.

White, S.A. (1999). The catalyst communicator. In S.A. White (Ed.), *The art of facilitating participation: Releasing the power of grassroots communication*. Thousand Oaks, CA: Sage Publications Inc.

Appendix A: Focus Group Protocol

Focus Group Discussion Protocol

PGDP Future Use Vision Project

Expected Knowledge/Info Outputs

1. The preferred and the unacceptable future use scenarios/combinations of scenarios for the PGDP and its environs among various community groups.

2. How the various groups in the community name and frame the following issues related to future use scenarios/combinations of scenarios for the PGDP and its environs:

   - Opportunities,
   - Strengths,
   - Challenges,
   - Weaknesses,
   - Threats,
   - Fears,
   - Risks,
   - Concerns, and
   - Solutions.

3. The overall quality of life goals, values of the community and, specifically, the priority quality of life goals and values that influence the decisions of various groups in the community regarding future use scenarios for the PGDP and its environs.

   - What is valuable to the community?

4. Any additional information the various community groups need to make the best decisions about the future use scenarios for the PGDP and its environs.

   - The most accessible and trusted channels for receiving such information.

PREPARATION

Checklist of items to bring:

To prepare facility for focus group: To conduct focus group:

_   Digital Tape recorders   _ **Form A:** Why are we here: Format for oral presentation of informed consent

_   Blank name tents   _ **Form B:** Informed consent form/project description

_   Markers (various colors)   _ **Form C:** Demographic survey forms

_	Food	_	**Form D:** Scenario preference polling questions (using keypads)
_	Signs (directions to room)	_	**Form E:** Evaluation of Focus Group Discussion process (using keypads)
_	Pens/pencils	_	PGDP Future Use Visualization packets & trigger questions
_	Tape (to post signs)	_	Copies of the executive summaries of "The Politics of Cleanup" and DOE "Risk-Based End State"
_	Laptop, LCD projector, screen	_	Keypads
_	Minimum of 5 flip charts	_	2 easels for flip charts

Prior to Arrival of Participants

Arrive 20-30 minutes early to assure that the facility will be ready on time (you may be in the position of using the room directly after someone else) and to prepare the facility for your group. For instance, you may need to make adjustments to make the best use of the room and furnishings to facilitate discussion. (1) Put out signs to help the respondents find the appropriate room. (2) Arrange furnishings for discussion format, place blank name tents and writing materials for participants, reserve moderator and note taker locations with name tents. (3) Arrange how food service should take place. (4) Set up tape recorders. (5) Set up laptop, screen and LCD system.

INSTRUCTIONS FOR RUNNING THE GROUP

A. As Participants Arrive

(1) Welcome participants and invite them to select some food/beverage and take a seat. (2) Tell them where the restroom is.
(3) As soon as all the participants are done eating, explain the project and the Informed Consent form using **Form A**: "Why Are We Here?" Reiterate that participation is voluntary and that any participants who do not want to continue the study can leave
(4) Distribute **FORM B**: The Informed Consent and Project Description
(5) Briefly describe the project for participants using a PowerPoint of the Project Description in **FORM B.**
(6) Ask participants to write their nicknames, first names or pseudonyms on both sides of the tent so that all participants can see each other's names or nicknames--this encourages discussion.
(7) Ask participants to introduce themselves,
(8) Request participants fill out **FORM C**: The Demographic Survey.

(9) Administer the first page of FORM E using key pads; describe the Arnstein Ladder conceptualization of public involvement and ask participants to anonymously register where they feel their past levels of public involvement in PGDP-related issues has fallen.
(10) Begin the discussion.

B. Warm up

1. First, please ensure that you've written your first name or a nickname on both sides of the tent so we all can see everyone's name. Thanks. I'd like to begin by finding out what you like and what you dislike about living in the Paducah area with PGDP as your neighbor. For example, what is your favorite thing about living in the area?

Sometimes, you'll need to prompt further by offering alternatives. This is a discussion training exercise. Call on people by first name, and ask one follow-up question about whatever they say. The follow-up question can be anything that makes it clear that you have been listening and that encourages the respondent to add something more. This helps get the respondents used to the idea of probing for more info. As you conduct this exercise, also look for information that naturally leads into our discussion.

Call on people in a seemingly random order, rather than moving around the table, because the randomness better approximates how discussions happen. Moving around the table sets a different tone and could lead to people patterning their comments only after their neighbor has spoken.

2. If you go outside this building and ask someone "what is the temperature right now at this spot?" there is a right answer and a wrong answer that you can check with a thermometer. However, what we are discussing today is how you and your friends feel about things, and there could be as many different opinions as there are people in this room. Guess what? Every one of those opinions is right! Remember, we aren't here to convince anyone of something in particular or to change anyone's mind. We are here to discuss things and to hear what each and every one of you has to say.

Sometimes, you will find that many people in the room have your opinion, and other times you will be the only one with that opinion. But it is important for us to learn about all the opinions because even if you are the only one in this room who holds that opinion, there may be thousands of other people in your community who feel just as you do. Most importantly, every opinion counts -- so please feel free to share your thoughts.

C. DISCUSSION OF PARTICIPANTS' OVERALL QUALITY OF LIFE GOALS AND VALUES

Participants' descriptions of their ideal city of residence

This activity is designed to elicit the overall quality of life goals and values of participants

OBJECTIVE

1.   Identify what is valuable to participants

Facilitator explains the objective of this activity.

*Now that we have discussed what makes this area a desirable place to live, let's carry that a bit further and imagine the **ideal** place to live. Try to visualize a community that would meet all of your needs and wants. Now, let's try to describe that community in as much detail as possible.*

Ask participants to describe in as much detail as possible three factors that would influence his/her choice of an ideal city of residence. These factors are written out on a flipchart.

After listening to the individual descriptions, the facilitator asks the following questions to generate discussions:

1. How does this region measure to these ideal regions we've heard about today?
2. Which of the ideal city characteristics are the most important to you and why?

D. Discussion of Visualizations of Sample future use scenarios

The preferred and the unacceptable future use scenarios/combinations of scenarios for the PGDP and its environs among various community groups

Visualizations of Sample Scenarios

This activity uses computer-generated visualizations of sample future use scenarios.

Objectives

Seeing and discussing these visualizations can help the community members:

- Think about the various possible future use scenarios.
- Share their knowledge and experiences about additional possible scenarios.
- Evaluate and appreciate the various issues related to various possible future use scenarios.

The activity is most effective if focus group participants work in small groups to examine and discuss the visualizations that they receive. After each small group has examined their visualization, they should explain to the whole group what they think the visualization represents and the issues related to the visualization such as opportunities, strengths, challenges, weaknesses, threats, fears, risks, concerns, and solutions. The group presentations can help to engage participants in a dialogue about various scenarios and their possible effects on their community. This activity is also an icebreaker that immediately engages the participants in sharing their ideas and perceptions at the beginning of the focus group.

Materials: Visualizations of Sample future use scenarios (four scenarios to be Selected Randomly from among eight unmarked visualization packets)

How to conduct this activity

Introduce the activity by asking the participants to form small groups of 3 to 4 people.

Then assign one visualization packet to each small group. Display the three questions listed below on an easel pad that is visible to all participants:

1. *What do you think this represents?*
2. *Do you think this is a good or bad future use scenario for the PGDP site? Why?*
3. *What do you think the consequences of this scenario may be for you, your family and your community? Explain.*

Explain the scenario visualizations as just a sample of what is possible for the future use of the plant site. Give the following instructions to the participants

"Please look carefully at the visualization that has been assigned to your team. Then discuss the questions listed on the easel pad. Make sure everyone in your group has a chance to look at the visualization and has an opportunity to express his or her ideas. When you finish, your group will be asked to make a two-minute oral report about your observations and ideas, while the visualization is shown to the rest of the group."

After a maximum of ten minutes, ask each group to tell the whole group what they think the visualization represents and what the consequences will be for the community. ***As each group is presenting their visualization, you should also display the same visualization for the entire group.***

Probes:

After each group has made its brief report, engage all present in a whole group discussion using the following probes

1. What do these scenarios mean for the community?
2. How do these scenarios relate to your lives? Your families? Your communities?
3. What are the most important issues related to these scenarios: opportunities, strengths, challenges, weaknesses, threats, fears, risks, concerns, and solutions?
4. What are the barriers to implementing these scenarios?
5. In what ways can these barriers be overcome?
6. What other scenarios/combinations of scenarios can we consider for the plant site and why?
7. Think back to our earlier discussion about what makes this area a special place to live and what characteristics would define the ideal place to live. (Review these on the flip chart.) Now, which of the scenarios discussed today would reinforce what makes this area special? Which would bring this region closer to the ideal characteristics described by participants? Why?

Use keypads to poll participants' scenario preferences.

E. Identifying knowledge gaps and community trusted information channels

This activity should help us to understand participants' information-seeking behavior and information use, both of which are crucial to effectively meeting their information needs. This activity may also lead to the discovery of novel information behavior and user profiles that can be used to enhance existing information models or even develop new ones.

HOW TO CONDUCT THIS ACTIVITY
Use questions and probes to discover participants' information needs and their sources of credible information about issues in general and specifically about the plant and its operations.

DISCUSSION QUESTIONS
1. What types of information do you usually seek about the PGDP and its operations?
2. What sources do you consult for this type of information? *[Let people volunteer responses first then probe with these choices.]* Do you ask friends, neighbors, go to the library, watch television, read it in magazines, go on the Internet?
3. Why do you use these sources? What problems have you had getting information that you want (examples: hard to find, too technical, didn't relate to my situation, confusing navigation online etc.)?
4. Which is the most credible source of information about PGDP?
5. Which sources of information about PGDP are the easiest to understand and most helpful to you?
6. Which sources of information about PGDP are the hardest to understand and least helpful to you?
7. What information do you think is most important to the community about PGDP and its activities?
8. What are the best ways of delivering information about issues related to PGDP to your community? *[Let people volunteer responses first then probe with these choices.]* Printed materials like brochures? Video? Extension officers? Etc.
9. If we could develop a web site where you could obtain information about the PGDP, what type of information would you like to have? How would you like to see the information presented?

Use keypads for evaluations of the focus group process Using Forms D and E (use both sides)

Conclusion
We have had a great discussion and you have offered very valuable insights and opinions.

Is there anything we missed during this discussion on the future use of PGDP you would like to add?

I want to thank all of you for coming and participating in our discussion. Please remember that we agreed at the start of our discussion that everything that was said in this room is confidential.

Once again, thank you.

Informed Consent Procedures for the PGDP Future Use Vision Meetings

We are doing an interesting study for which we need your help. In order to proceed we need your verbal consent.

I am going to ask 10 questions to explain the purpose of the study. I will then answer each of these questions. We will get into more detail about the project as we go through the evening; however, the University of Kentucky Institutional Review Board, which guides research projects, mandates that we cover this material and gain your consent to participate in this focus group prior to discussing the project in more depth. Please feel free to ask questions about the focus group process at any time. Your questions about the overall Future Vision process will be addressed later in this presentation.

1. Who are we?
   We're a team of researchers from the Kentucky Research Consortium for Energy and the Environment located at the University of Kentucky. We are conducting this study to assist the local community in identifying a vision for the future use of the Paducah Gaseous Diffusion Plant site.

2. Why are we here?
   We're here to explain the study to you and to ask you to be involved in this important project. If you agree, you will participate in a discussion about what should be done with the plant and surrounding areas when the plant is decommissioned and about the best means of achieving the objectives for the greater benefit of your community. The information you provide to us today will help us learn more about what the community thinks and wants for the plant and its surrounding areas and how best to achieve these wishes. We also want to find out what additional   information you need about the process and what the best means of getting that information to you is. During this meeting, we will discuss the concerns and major issues that are important to your community in relation to PGDP and the best use of the plant in the future. I will guide the discussion, listen to, and record your ideas.

3. What are we asking you to do and why?
   During the past few years, several groups of people from your community and from many organizations, including the DOE, have suggested numerous future uses for the PGDP and the land surrounding it.   We'll show you a sample of these suggestions and ask you to evaluate them based on what you think will be in the best interest of your family and the community
   - *Which suggestions do you think make sense, are worth doing, and would you support and why?*
   o *Which suggestions do you think don't make sense and why?*
   o *What are your recommendations and why?*

4. Why were you asked to participate in this study*? (ADAPT FOR OTHER CLUSTERS, e.g. EMPLOYEES OF THE PLANT)*
   You are members of the Paducah community and you and your family live close to the Plant. You and people like you are the group most affected by the plant and its operations.

5. Why do we need your permission and how will you grant us permission to participate?
   All studies of this type require that the participants be told what the study is about and what they are being asked to do. That is what we are doing now. We will also give you a two-page description of the project goals and your role in the project. If you agree all you need to do is to take part in a discussion.. During the discussion you can choose to participate or not participate at any time, or to leave at any time.

6. What are the risk/benefits for you if you decide to participate in this study?
   As far as we know there are no risks from participating in this study. There are a number of benefits. By participating in this study, your views may affect the decisions about what should be done with the plant and its environs, when current operations end. By sharing your ideas and experience with us, you will be part of a sample of about 90 community members from Paducah and surrounding counties who are working with the project team to ensure that the voice and opinions of all community segments are taken into consideration when a decision is made about the future of the plant and its surroundings.

7. Will you receive any rewards for participating in this study?
   You will receive no rewards for participating in this study other than a free meal. You will receive the free meal whether of not you chose to participate in the study.

8. What will it cost you to participate in this study?
   The only cost to you is the time required to travel to and from the meeting and the time involved for the discussion.

9. Will your identity and statements remain confidential?
   Yes. No one outside of our group will know exactly what you said. We never use names when we review your comments. We will also ask you to complete a two-page questionnaire about your connection to the PGDP. Do not write your name on the questionnaire. That way your comments and identity will remain anonymous.

10. If you have questions, whom do I contact?

    If you have questions about the study you can ask them now or at any time during the meeting. You can also call Dr. Lindell Ormsbee, the principal investigator of this study at any time at 859-257-1299, or email Dr. Ormsbee at lormsbee@engr.uky.edu. You can also call the University of Kentucky Office of Research Integrity at 859-257-9428 or toll free at 1-866-400-9428.

Consent to Participate in a Focus Group Discussion of PGDP Future Use Vision

You are invited to take part in this study that will assist the local community to identify a vision for the future use of the Paducah Gaseous Diffusion Plant site. A Federal earmark facilitated by Senators McConnell and Bunning and Representative Whitfield supports the Study. The person in charge of this study is Dr. Lindell Ormsbee from the Kentucky Research Consortium for Energy and the Environment, located at the University of Kentucky. The other people on the team are Drs. Ted Grossardt and Chike Anyaegbunam, Ms. Anna Hoover and Mr. Mitchael Schwartz, all from the University of Kentucky.

You were selected to take part in this study because you are in some ways connected to the PGDP either because you live in Paducah, near the plant or work in the plant. You are one of about 90 people to participate from the communities in Paducah and nearby counties. The group discussion will take about two hours of your time.

By doing this study, we hope to learn what the Paducah community thinks should be done with the plant and surrounding areas when the plant is decommissioned, as well as the best means of achieving these objectives to the greater benefit of the community. The information you provide us today will help us to learn more about what the community thinks and wants for the plant and its surrounding areas and how best to achieve these wishes. We also want to find out what additional information you need about the process and the best means of getting that information to you. During this meeting, we will discuss the concerns and major issues that are important to your community in relation to PGDP, along with the best use of the plant in the future.

The discussion will be audio recorded so that the researchers can review all of the comments more thoroughly. This recording will be kept secure until information can be collected from it and then the recording will be destroyed. You are encouraged to voice your opinions; however, your participation in the discussion is voluntary. Your opinions are very valuable to us, but you are free to leave the discussion at any time. Your responses will be added to the responses of other participants for reporting purposes, and every effort will be made to protect your confidentiality. All the information you give us will be kept secure and will only be accessible to project personnel. Several faculty members at the University of Kentucky will listen to the recording of this discussion. Of course, the other individuals participating in today's focus group will know what was said and by whom during the session.

There are no known risks to you or your family if you participate in this study. By participating in this study, your views may affect the decisions about what should be done with the plant and its environs when current operations cease. By sharing your ideas and experience with us you will be part of a sample of about 90 community members from Paducah and surrounding counties who are working with the project team to ensure that the voice and opinions of all community segments will be taken into consideration when a decision is made about the future of the plant and its environs. You will not be paid for your participation although a meal will be provided. There are no costs to participate other than the two hours you will spend with others in the discussion.

If you decide to take part in the group discussion, it should be because you really want to volunteer. You will not lose any benefits or rights that you would normally have if you choose not to volunteer. You can stop at any time during the study. If you do not want to be in the study, you may choose not to participate in the study.

If you have questions about the study, you may contact Dr. Lindell Ormsbee at 859-257-1299, or email lormsbee@engr.uky.edu. If you have any questions about your rights as a volunteer in this research, contact the staff in the Office of Research Integrity at the University of Kentucky at 859-257-9428 or toll free at 1-866-400-9428.

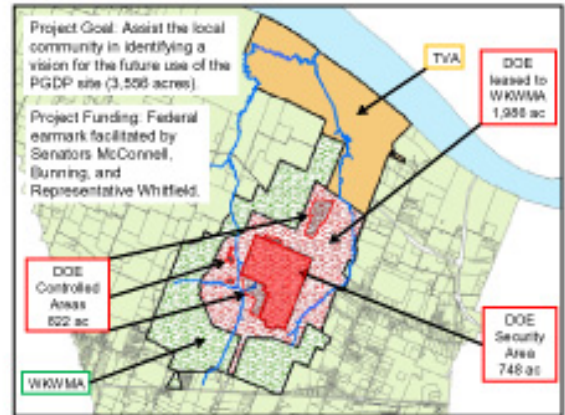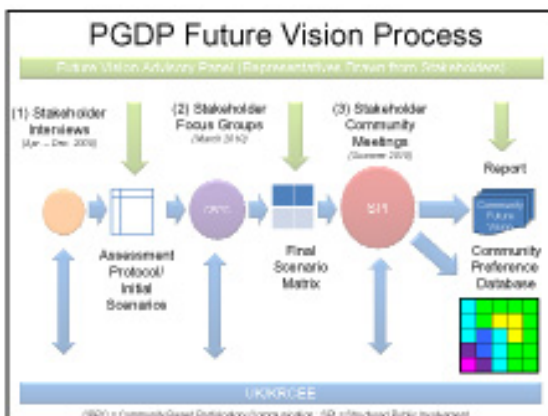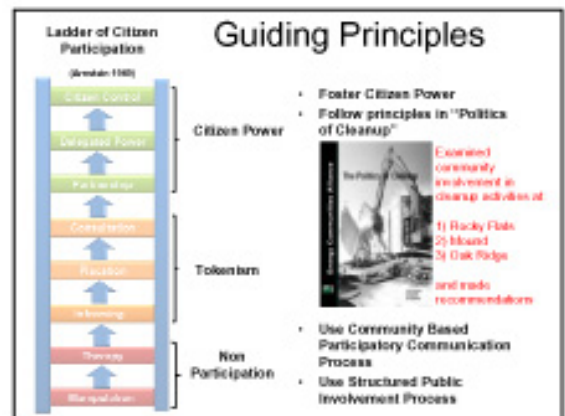**PGDP Future Vision Project:**
Brief Project Description

FORM C: DEMOGRAPHIC SURVEY FOR PGDP FUTURE VISION FOCUS GROUP PARTICIPANTS

You are invited to take part in this study that will assist the local community to identify a vision for the future use of the Paducah Gaseous Diffusion Plant site. The information you provide us today is very crucial and will help us to learn more about what the community thinks and wants for the plant and its surrounding areas, as well as how best to achieve these wishes.

1) In what ways are you connected with PGDP? Check all that apply

Live in Paducah? _____

Live near the plant? _____

Work in the plant? _____

Have relatives who work/worked in the plant? _____

Have clients or customers who work in the plant? _____

Others (Describe) _____

2) Your age _____

3) Your sex
_____ M
_____ F

4) Ethnicity/Race?

__Hispanic or Latino

__White

__ Black or African American

__American Indian/Alaskan Native

__Asian

__Native Hawaiian or Other Pacific Islander

__ More than one race

__ Other

5) Occupation _____

Form D: Sample Scenario Preference Polling Questions (using keypads)

Please make brief one or two line comments after each item below.

1.   Which scenario makes the most sense to you? Why?
_____
_____
_____

2.   Which scenario makes the least sense to you? Why?

_____
_____
_____

3.   Which parts of the scenarios would you support? Why?

_____
_____
_____
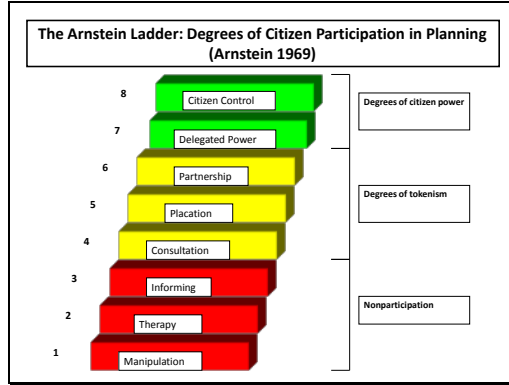

4.   This fourth question is something we'll like you to discuss with us now and also take home and share with people in your community. Here is the question: *What would you and others in your community need to move forward on identifying the most optimal future use scenario for the plant site you feel should be implemented?*

**FORM E
(DRAFT)**

The Arnstein Ladder: Degrees of Citizen Participation in Planning
(Arnstein 1969)

8 Citizen Control	Degrees of citizen power
7 Delegated Power	
6 Partnership	Degrees of tokenism
5 Placation	
4 Consultation	
3 Informing	Nonparticipation
2 Therapy	
1 Manipulation	

COMMENTS

_____

_____

_____

_____

_____

_____

Where are we now?

1. Manipulation
2. Therapy
3. Informing
4. Consultation
5. Placation
6. Partnership
7. Delegated Power
8. Citizen Control

_____

_____

_____

_____

_____

_____

_____

Where should we be?

1. Manipulation
2. Therapy
3. Informing
4. Consultation
5. Placation
6. Partnership
7. Delegated Power
8. Citizen Control

_____

_____

_____

_____

_____

_____

_____

_____

How Satisfied Are You With the
Meeting Processes Used Here?

1. Very Unsatisfied
2. Unsatisfied
3. Somewhat Unsatisfied
4. Slightly Unsatisfied
5. Neutral
6. Slightly Satisfied
7. Somewhat Satisfied
8. Satisfied
9. Very Satisfied

_____

_____

_____

_____

_____

_____

_____

Appendix B: IRB Approval Letter for Focus Groups

UK.
UNIVERSITY OF
KENTUCKY®

Initial Review

Approval Ends	Project Ends	IRB Number
March 11, 2011	November 15, 2010	10-0086-P4S

TO: Lindell Ormsbee, Ph.D.
          Unassigned
          Kentucky Water Resources Research Institute
          233 Mining & Mineral Resources Building 0107
          PI phone #: (859)257-1299

FROM: Chairperson/Vice Chairperson
          Non-medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol Number 10-0086-P4S

DATE: March 15, 2010

On March 12, 2010, the Non-medical Institutional Review Board approved your protocol entitled:

> *Paducah Gaseous Diffusion Plant (PGDP) Stakeholder End State Vision Project (Designated as "Task 1: Public Outreach" in US Department of Energy/Kentucky Research Consortium for Energy and the Environment FY 2009-2010 Statement of Work)*

Approval is effective from March 12, 2010 until March 11, 2011 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, attached is the IRB approved consent/assent document(s) to be used when enrolling subjects. [Note, subjects can only be enrolled using consent/assent forms which have a valid **"IRB Approval" stamp unless special waiver has been obtained from the IRB.**] Prior to the end of this period, you will be sent a Continuation Review Report Form which must be completed and returned to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

Please note the IRB also revised your expedited application to reflect the research also meets the criteria for Category 6 on the Expedited Certification Form (Form A-1.)

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigators responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's Guidance and Policy Documents web page [http://www.research.uky.edu/ori/human/guidance.htm#PIresp]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [http://www.research.uky.edu/ori]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

N. Van Iusbergen, Ph.D./kg
Chairperson/Vice Chairperson

Author
Anna Goodman Hoover

Birthplace
Oneida, Tennessee

Education

Master of Arts in Communication Science – College of Communication and Information
University of Kentucky
December 2007

Bachelor of Arts in History and Theatre
Centre College
May 1994

Professional Positions

Deputy Director
Public Health Practice-Based Research Networks National Coordinating Center
University of Kentucky
Lexington, KY
2012-present

Research Assistant Professor
Department of Health Services Management, College of Public Health
University of Kentucky
Lexington, KY
2012-present

Communication Director
Kentucky Water Resources Research Institute
University of Kentucky
Lexington, KY
2003-2012

Resident Manager
Carnahan Conference Center
University of Kentucky
Lexington, KY
2002-2003

Assistant to the Managing Director
MacLellan Integrated Services, Inc.
Lexington, KY
2000-2002

Marketing and Events Coordinator
Lexington Arts and Cultural Council
1997-2000

News/Sales Assistant
WBNT-FM/OCV-TV
Oneida, TN
1996-1997

Communications Assistant
Centre College Office of Communications
Danville, KY
1995

Honors and Awards

Trustee Scholar
Centre College

Phi Alpha Theta
Centre College

Phi Beta Kappa
Centre College

Breckenridge Jones Award for History
Centre College

West T. Hill Dramatic Arts Prize
Centre College

John C. Young Research Grant
Centre College

Risk Sciences Research Fellow
College of Communication and Information
University of Kentucky

Bruce H. Westley Memorial Scholarship for Excellence in Mass Communication
Theory and Research
College of Communication and Information
University of Kentucky

U.S. Conference of Mayors 2006 National Aluminum Recycling Challenge
Most Innovative Ideas for Marketing
Chair, Bluegrass Partnership for a Green Community Outreach and Communication

Publications

Proceedings.

Anyaegbunam, C., Hoover, A.G., and Hartman, C. (2011). Engaging the community in future-use visioning of a Superfund site: The Paducah Gaseous Diffusion Plant case study. Palm Springs, CA: American Society of Civil Engineers Annual Meeting.

Anyaegbunam, C., Hoover, A.G., and Schwartz, M. (2010). Use of Community-Based Participatory Communication to identify community values at a Superfund site. Providence, RI: American Society of Civil Engineers Annual Meeting.

Ormsbee, L., and Hoover, A.G. (2010). End state vision process for the Paducah Gaseous Diffusion Plant. Providence, RI: American Society of Civil Engineers Annual Meeting.

Publications.

Johnson, J.D., and Hoover, A.G. (2013). When people outside the organization need information: Strategically communicating with external stakeholders. In J. Wrench (Ed.), *Workplace communication for the 21st century: Tools and strategies that impact the bottom line* (Vol. 2, pp. 305-332). Santa Barbara, CA: Praeger.

Hoover, Anna Goodman (2013) Commentary. Changing the channel: Public health communication in the 21st century. *Frontiers in Public Health Services and Systems Research,* 2(1), Article 6.

Research Translation Publications.

Gaetke, L., Hofe, C., Hoover, A.G., Jenkins, S., Ormsbee, L., and Osborne, A. (2008). Hazardous chemicals and your body: Eating right for a healthier you (general audiences booklet). Lexington, KY: University of Kentucky Cooperative Extension Service.

Gaetke, L., Hofe, C., Hoover, A.G., Jenkins, S., Ormsbee, L., and Osborne, A. (2008). Hazardous chemicals and your body: Eating right for a healthier you (technical document). Lexington, KY: University of Kentucky Cooperative Extension Service.