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## CHAPTER CONTENTS

• Introduction: Recovering the Relationship Between Communication and Nuclear Weapons	363
• The U.S. Nuclear Weapons Production Complex: A Brief History	366
• Communication Surrounding Wartime and Cold War Nuclear Weapons Production	371
• Nuclear Weapons Production After the Cold War: Material Legacies and Institutional Changes	373
• Discursive Legacies of Nuclear Weapons Production: A Three- Part Theoretical Framework	379
<i>Democracy, Participation, and the Nuclear Public Sphere</i>	380
<i>Organizational Crisis, Change, and Stakeholder Communication</i>	385
<i>Nuclear History, Memory and Heritage</i>	391
• Conclusion: Facing the Challenges of Studying Nuclear Weapons Production	397
• Notes	398
• References	400

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# 12 Nuclear Legacies: Communication, Controversy, and the U.S. Nuclear Weapons Production Complex

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This chapter engages communication surrounding the history and future of U.S. nuclear weapons production. The authors begin by arguing that these phenomena are normalized, and thus neglected, among citizens and communication scholars and respond by reviewing the history of the U.S. nuclear weapons production complex and by characterizing communication among its associated organizations and communities. They then examine the material and discursive legacies of this system, emphasizing recent changes that have opened new possibilities for communication between institutions and their stakeholders. The authors next develop three theoretical frames for analyzing communication in this dense and rapidly evolving scene: (a) democracy, participation, and the nuclear public sphere; (b) organizational crisis, change, and stakeholder communication; and (c) nuclear history, memory, and heritage. They conclude by identifying and addressing various challenges associated with adopting this research program. Throughout, the authors foreground and critique the role of communication in responding to the past and creating the future of nuclear weapons production.

## INTRODUCTION: RECOVERING THE RELATIONSHIP BETWEEN COMMUNICATION AND NUCLEAR WEAPONS PRODUCTION

**T**his chapter focuses on communication surrounding the organizations and communities involved in the production of nuclear weapons for the U.S. government. In keeping with official discourse, we will use the phrase *nuclear weapons production complex* throughout to describe this large socio-technical system.

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We emphasize at the outset that this focus differs significantly from traditional studies of nuclear communication as presidential and foreign policy rhetoric.<sup>1</sup> Instead, we focus on the overlapping spheres of organizational and public communication produced in and around the nation's nuclear-industrial infrastructure. Because this topic may be only vaguely familiar to readers, we begin with two anecdotes suggesting the opportunities and challenges that it presents for communication research.

The first anecdote is taken from a cartoon published in a 1988 issue of *the Bulletin of the Atomic Scientists*. The cartoon shows a surprised urban pedestrian, paused outside an otherwise innocuous building. There, the figure does a double take at a sign posted outside the building's entrance. Incongruously (and somewhat ominously), the sign reads, "The Bomb, Inc." The reader is left to wonder what the pedestrian will do next.

Our second anecdote is taken from a recent meeting of a nonprofit group seeking to develop a museum on the site of a former nuclear weapons production facility. In this meeting, the group heard a report from one of its members who had just attended a national conference devoted to preserving U.S. nuclear heritage. This member reported that presentations made at the conference indicated that, in U.S. culture, nuclear weapons plants built during the wartime Manhattan Project were more visible and celebrated than others built later during the Cold War. In response, another member, a retired employee of the plant, noted that this difference was "understandable." After all, he said, workers in the Manhattan Project had delivered "a concrete product," the two atomic bombs dropped on the Japanese cities of Hiroshima and Nagasaki. In contrast, at Cold War-era facilities such as his, "We worked hard so that *nothing* would happen."

Together, these two anecdotes suggest how communication contributes to popular understanding of U.S. nuclear weapons development. The cartoon depicting the baffled pedestrian plays on the banality, and hence invisibility, of nuclear weapons as corporate and industrial phenomena. Commonly, nuclear weapons are depicted in the discourse of foreign policy and military elites as a powerful, threatening, and perversely glamorous, technology. As noted above, communication scholars have traditionally engaged this particular genre of nuclear discourse. By emphasizing their prestige, however, this discourse effaces the contingency of nuclear weapons as mundane, organizational products. These weapons always come from somewhere, in other words, and this journey involves a concrete system of materials, locales, personnel, technologies, belief systems, and social practices. Looking directly at this system, even if it requires a double take, broadens our understanding of how communication constitutes and transforms the nuclear condition (Taylor, 1998a).

The second anecdote offers a related lesson. The plant retiree's suggestion that "nothing happened" as a result of Cold War nuclear weapons production signals a key article of faith in post-Cold War culture: that nuclear deterrence "worked" (Schell, 2000). In this dominant narrative, the superpowers are understood to have

developed nuclear arsenals because they were deemed necessary to inhibit enemy attack. At the same time, however, these weapons offered their developers no guarantee of military victory if they were actually used; indeed, they promised only destructive retaliation and the escalation of conflict. As a result, the significance of nuclear weapons stabilized during the Cold War around their role as props in a massive theatre of paradox. In this arrangement, the superpowers used nuclear weapons to symbolically display their capabilities and intentions (e.g., as force deployments), precisely in the hope that these intentions would never be realized. This tense, theatrical run ended partly because one of its co-producers, the Soviet Union, was bankrupted by the associated costs of nuclear weapons development and subsequently imploded.

For our purposes, it is significant that the retiree invoked apparent noneventfulness as a measure of his organization's distinctiveness and productivity (i.e., "We worked hard so that *nothing* would happen"). In making this claim about the nature of nuclear weapons production, he joined a legion of speakers who have glossed over, associated legacies: namely, massive, devastating environmental damage, and serious threats to public health and worker safety (Makhijani, Hu, & Yih, 1995). Although their scope and consequences are highly controversial (Taylor, 1997c), we view these phenomena as the undeniable "something happened" of nuclear weapons production.

These themes—cultural ambivalence, powerful mythology, ambiguous technology, and contested histories—suggest the scope of this chapter. Throughout, we pursue two related goals. The first involves demonstrating the value of a direct focus on communication in adding to scholarly knowledge of the U.S. nuclear weapons production complex. That is, we are concerned with how participants in this system have used discourse to inform and influence each other. Our discussion emphasizes the strategic and creative activities through which they have symbolically constituted this system as a meaningful social reality.

Our focus is not unrelated to those displayed in recent accounts of nuclear weapons production by scholars and journalists (discussed further, below). As a result, and in order to provide necessary context, the scope of literature reviewed in this essay is both historical and interdisciplinary. Our approach is unique, however, in foregrounding how communication expresses participants' identities and interests and affects the intense power relationships surrounding the production of nuclear weapons. As a result, we engage this literature selectively, to review studies published within the communication discipline, and to explicate, thematize, and critique evidence of communication that is presented in other accounts.

This approach offers several advantages, including leveraging communication theory to challenge unreflective claims made about the role of communication in nuclear weapons production. One example of these claims involves frequent charges that a historical lack of communication between nuclear officials and citizens has contributed to the creation of harms (Kauzlarich & Kramer, 1998, p. 115). Although this claim is certainly true in part, its framing obscures an alternate

focus on the quality of that communication and implies that a greater quantity is the solution to this problem. This premise is sustained, for example, in well-intended claims that “openness helps create informed [nuclear] citizens and policy-makers” (Weeks, 1997, p. 11). Again, this claim has considerable appeal. What it fails to problematize, however, are the discursive codes through which nuclear information is formatted, disseminated, and taken up as a resource by various groups in their local situations (Bazerman, 2001). In these situations, the quantity and clarity of official nuclear discourse are usually problematic, not universal or unambiguous, matters.

Our second goal for this chapter, then, follows from the first: To establish the evolving U.S. nuclear weapons production complex as a relevant case for applying and innovating communication-related theories. To that end, we summarize existing findings, and present an agenda for further inquiry by scholars concerned with nuclear rhetoric, discourse, and symbolism. Specifically, we believe that this essay can help those scholars to consider crucial organizational and institutional dimensions of nuclear communication (Kinsella, in press-a).

In the remainder of this chapter, we elaborate this argument. We first provide a brief history of the U.S. nuclear weapons production complex, emphasizing its characteristics as a communication system. Second, we review the material legacies and institutional conditions created by the dramatic collapse of this system during the late Cold War period. Here, we also identify key stakeholders<sup>2</sup> involved in interpreting and responding to these conditions. Finally, we develop a three-part theoretical framework that engages the uniquely discursive legacies of Cold War nuclear weapons production. Those parts include (a) democracy, participation, and the nuclear public sphere; (b) organizational crisis, change, and stakeholder communication; and (c) nuclear history, memory and heritage. In these sections, we demonstrate how these frameworks can be applied to understanding and critiquing the role of communication in shaping the future of U.S. nuclear weapons production. We conclude by noting specific challenges faced by communication scholars who respond to this call, and proposing some potential solutions.

### THE U.S. NUCLEAR WEAPONS PRODUCTION COMPLEX: A BRIEF HISTORY

Historically, the U.S. production of nuclear weapons has involved a system of more than 300 scientific and industrial sites employing approximately 650,000 people (Zuckerbrod, 2001). Although its operations and effects have been international in scope, the heart of this system involves 17 domestic facilities spread across 3,900 square miles in 13 continental U.S. states. Although these facilities are owned by the federal government, they have been run by large, prominent industrial contractors (e.g., General Electric) and academic institutions (e.g., the University of California) charged with responsibility for conducting operations

and (partly) protected from legal liability for their consequences. The political and economic interests of these organizations are aligned with those of other major defense contractors who build delivery systems for nuclear bombs and warheads (e.g., missiles, submarines, and airplanes) and the technological infrastructure of the nuclear command and control system (e.g., radar, computers, and telecommunications).

The original facilities in this complex were constructed during World War II as part of the Manhattan Project. In this effort, the U.S. successfully produced atomic bombs that were originally envisioned as a deterrent against a feared, comparable Nazi effort, but were ultimately used against the Japanese cities of Hiroshima and Nagasaki. Between 1941 and 1945, a grand drama unfolded throughout three primary sites (Hanford Reservation, Washington; Los Alamos Laboratory, New Mexico; Oak Ridge Reservation, Tennessee) and numerous support sites, as diverse government, scientific, academic, military, and industrial groups collaborated to design and manufacture a weapon of war that, to that point, had been only suggested by theoretical physics and science fiction literature. Faced with daunting technical challenges and cultural conflicts, the workers at each of these sites engaged in highly creative, complex, and risky operations. These included uranium mining, refining, and enrichment; nuclear reactor fuel fabrication and reprocessing; plutonium production; weapons design; production of nuclear and nonnuclear components; weapons testing; and weapons assembly. This effort was unprecedented in its rapid development, immense scale, potential risk of failure, and feverish intensity (Rhodes, 1986). It has since been commemorated as one of the great feats of human organization (Bennis & Biederman, 1997) and a monument of scientific and engineering achievement. As a precedent for federally funded joint ventures in technological research and development, it significantly shaped the political and economic relationships among government, science, industry, and society in the post-WWII era (Martinez & Byrne, 1996).

Following a brief postwar interlude in which its future was undetermined, the nuclear weapons production complex was institutionalized as a durable feature of U.S. society. Three developments contributed to this status. The first involved the failure of former Manhattan Project scientists and their political patrons to propose an acceptable scheme for the international control of atomic energy. As a result, the development and deployment of nuclear weapons remained a sovereign right, accountable only to limited, formal treaties negotiated by the nuclear powers. A second development involved the 1946 passage of the Atomic Energy Act, which formally established the Atomic Energy Commission (AEC) as the governing civilian body for U.S. nuclear weapons development, succeeded from 1975–1977 by the Energy Research and Development Administration, and after 1977 by the Department of Energy (DOE). Structurally, the AEC's group of five commissioners interacted with three internal committees focused on technical, security, and safety matters, and a fourth, Congressional Joint Committee on Atomic Energy (JCAE). Significantly, the AEC was charged with unprecedented,

and conflicting, responsibilities to both produce nuclear weapons and protect the public from their hazards (Makhijani 1995, p. 4). The JCAE provided nominal governmental oversight of these activities through its power to consider related bills and resolutions, to hold hearings, and to authorize appropriations. In practice, however, its members typically endorsed the mission of weapons development and exercised only limited oversight. Arguably, this structural containment of regulation inhibited larger Congressional understanding, and thus public debate, of associated policies.

A final development involved growing anticommunist reaction within the U.S. to the expansionism of Stalin's authoritarian regime. In this tense political climate, U.S. officials rationalized nuclear weapons as legitimate solutions to perceived problems of national security. Military strategists subsequently called for increased development and deployment of these weapons, which increased pressure on the nuclear weapons production complex for production output. Following the successful 1949 test of a Soviet fission device, and the discovery of contributions made to that effort by Soviet spies who had infiltrated the Manhattan Project, the Truman administration resolved internal debate in 1950 by authorizing the U.S. development of a vastly more powerful thermonuclear weapon. This hydrogen bomb was successfully tested in 1952, and in 1953 the Soviets responded in kind (Rhodes, 1995).

The overtaxed nuclear weapons production complex rapidly expanded to accommodate these imperatives. Between 1948 and 1960, new scientific research and industrial production facilities were constructed in California (Lawrence Livermore Laboratory), Colorado (Rocky Flats Plant), Florida (Pinellas Plant), Idaho (Idaho National Engineering Laboratory), Kansas (Kansas City Plant), Kentucky (Paducah Gaseous Diffusion Plant), Nevada (Nevada Test Site), New Mexico (Sandia National Laboratory), Ohio (Ashtabula Extrusion Plant; Fernald Feed Materials Production Center; Mound Laboratory; Piketon Gaseous Diffusion Plant), Texas (Pantex Plant), and South Carolina (Savannah River Site). These facilities were designed to increase the capacity, rate, and sophistication of existing operations and to perform new functions required for maintenance of the growing Cold War arsenal. It was not until the 1970s, and only in response to a mounting crisis, that nuclear officials accelerated their progress in developing two permanent repositories for radioactive waste from military production: One recently opened in New Mexico (Waste Isolation Pilot Plant) and another is proposed for Nevada (Yucca Mountain Repository).<sup>3</sup>

Various indicators suggest the extraordinary scope and consequences of Cold War operations in the U.S. nuclear weapons production complex. Between 1945 and 1992, that complex produced in excess of 70,000 nuclear bombs and warheads, at an approximate cost of \$370 billion. One thousand and thirty explosive tests of these devices were conducted both above and below ground at facilities in the Pacific Islands and the continental U.S. These operations produced approximately 700,000 metric tons of radioactive metals, 104 million cubic meters of radioactive

waste, and 280 million pages of classified documents (Schwartz, 1998). During this period, radioactive and toxic wastes were routinely stored at their sites of generation in improvised and precarious systems or were discharged into the environment. As a result, underground steel tanks holding high-level liquid wastes, buried drums containing contaminated tools, equipment, and clothing, and contaminated liquids discharged into the ground have all posed enduring environmental problems (Alvarez, 2000; Cochran, Arkin, Norris, & Hoenig, 1987).

Throughout the Cold War, cultural awareness and understanding of the nuclear weapons production complex were heavily mediated by hegemonic discourses of secrecy and national security. In their repeated usage by officials, these discourses obscured, moralized and rationalized the existence of these facilities for various audiences. As a result, most workers and community members affiliated with these facilities endorsed (or at least accommodated) their operations and potential consequences as authorized, legitimate, and inevitable (e.g., by attributing an inherent human propensity toward conflict). Nonetheless, these facilities were increasingly blended with nuclear power reactors in the discourse of national and international movements protesting the ethics of nuclear weapons development and the health risks posed by emissions from plant operations and radioactive fallout from nuclear testing (Weart, 1988).<sup>4</sup> Also during this period, officials were increasingly called upon to contain local crises (e.g., fires) caused by inadequate operational controls and by the doubts and resentments of citizens toward perceived threats to their health, safety, and livelihood (e.g., indicated by mysterious increases in livestock deaths; Makhijani & Saleska, 1995; Sumner, Hu, & Woodward, 1995). In responding to these challenges, plant operators and regulators routinely dismissed public concerns and denied responsibility for creating alleged harms. Generally, they were supported in this practice by local news media, community boosters, and land developers who were motivated by patriotic pride and related economic benefits to endorse continued facility operations (Ackland, 1999). From the 1960s through the early 1990s, however, a series of five developments converged to create a legitimization crisis for the U.S. nuclear weapons production complex. Unfolding on several fronts, these developments threatened the operational viability of its facilities and the stakeholder consent their officials had traditionally enjoyed.

The first development resulted from the urgent production schedule maintained by nuclear reactor facilities in the complex during the early Cold War. By the end of the 1960s, those reactors had reached the end of their lifespans and produced a surplus of weapons-grade materials. As a result, the AEC was forced to consider scaling back these operations and either closing the facilities or converting them to new missions such as the generation of electric power. These decisions involved complex technical calculations regarding risk, safety, and economic impacts and were met with strong demands for participation by profacility residents and their elected officials.<sup>5</sup> This process was animated by a larger post-Vietnam and post-Watergate cultural transformation favoring “a greater degree of participatory



governance and . . . declining popular trust in experts and scientists” (Carlisle, 1996, p. 133). As a result, decisions that had previously been made behind a curtain of secrecy, and through the relatively simple mechanism of political patronage, shifted irrevocably to forums of conflict among and between political officials, scientific experts, and stakeholder groups.

The second development involved changes in public opinion created by crises at the Three Mile Island (1979) and Chernobyl (1986) nuclear power facilities. These events confirmed popular fears concerning the risks of nuclear reactor technology and the inadequacy of its regulation by overconfident, short-sighted technocrats, who dubiously asserted the infallibility of rationality, industry, and progress as paradigms for policy and operations (Farrell & Goodnight, 1981). Arguably, these events served as surrogates that stimulated and focused latent popular opposition to nuclear weapons and strengthened connections between the peace movement and opponents of nuclear power. In a third development, officials during the first Reagan administration revived bellicose Cold War rhetoric depicting a Soviet “Evil Empire” and enhancing U.S. commitment to actual nuclear war fighting. This trend aggravated nuclear anxiety and contributed to the formation of a briefly popular, but ultimately unsuccessful, movement to freeze nuclear weapons development by halting their production (Bjork, 1992). Fourth was the subsequent negotiation of superpower arms control treaties and the Soviet Union’s dramatic disintegration. These events signaled the ending of a stable Cold War mission and funding rationale for the nuclear weapons production complex.

The final development involved the return of repressed consequences from long-standing operational practices at complex facilities. These practices had privileged the interest of weapons production over the health and safety of workers and the public and over the integrity of the environment. Increasingly frequent and undeniable revelations associated with this tradition (e.g., the discovery of contaminated water in wells belonging to the residents surrounding facilities) coincided during this period with the development by state and federal governments of stricter environmental regulations and the failure of decrepit and overextended facilities. Subsequent media coverage, stakeholder litigation, and increased regulatory oversight combined to produce scandalous publicity about this history and generated unprecedented settlements, for example, those paid by the federal government to the owners of contaminated property. The topics of these disturbing revelations included inadequate storage of massive amounts of radioactive and toxic wastes; accidental and deliberate releases of radioactive materials into surrounding communities; medical experimentation by federal researchers with radioactive materials on vulnerable citizens without their informed consent, and the actual extent of contamination at affected facilities. These developments joined moral and political critiques of nuclear deterrence with the more mainstream warrants of environmental integrity, worker health, and public safety. As such, they affected the composition, mission, and rhetoric of existing environmental and antinuclear social movements (e.g., in producing new groups whose members

were hostile towards contractor and regulator ineptitude, but otherwise supportive of the weapons production mission).

Because of growing scandal, heightened investigation, and external criticism, most nuclear weapons production complex facilities were idled and shuttered during this period. Beginning in 1989, the production of new weapons first slowed, and then halted completely. By 1992, several facilities had shifted their mission (at least in part) to environmental remediation. Evolving estimates of the cost to decommission, demolish, and clean up these affected facilities have ranged up to \$300 billion. This work will likely require decades for completion and will involve a scale and complexity of operations exceeding the original Manhattan Project. Requirements for long-term stewardship of these contaminated sites will persist for centuries afterwards, and those deemed irrevocably damaged, or targeted for permanent radioactive waste disposal, may yet be written off as national sacrifice zones (Gray, 1995).

#### COMMUNICATION SURROUNDING WARTIME AND COLD WAR NUCLEAR WEAPONS PRODUCTION

Over the past 2 decades, a variety of journalists (Bartimus & McCartney, 1991; Broad, 1985; D'Antonio, 1993; Loeb, 1986; Mason, 2000; McCutcheon, 2002; Mojtabai, 1986; Shroyer, 1998) and scholars (Ackland, 1999; Bergeron, 2002; Canaday, 2000; Carlisle, 1996; Cohn, 1987; Dalton, Garb, Lovrich, Pierce, & Whiteley, 1999; Depoe, 2000; Edwards, 1997; Fernlund, 1998; Freer, 1994; Gerber, 1992; Gilles, 1996; Gusterson, 1996; Hales, 1997; Hardert, 1993; Hevly & Findlay, 1998; Katz & Miller, 1996; Kauzlarich & Kramer, 1998; Kinsella, 2001; Lodwick, 1993; Makhijani, Rutenber, Kennedy, & Clapp, 1995; Metzler, 1997; Pasternak, 1993; Ratliff, 1998; Reed, Lemak, & Hesser 1997; Rosenthal, 1990; Silverman, 2000; Taylor, 1990, 1993a, 1996, 1997a, 1997b; Thorpe, 2004) have examined the cultures of American organizations and host communities associated with nuclear weapons production. Consistently, these accounts emphasize particular belief systems and expressive practices. In summarizing these elements, we do not argue that they were universally distributed, or that they were unquestioned, seamless, or unchanging. Indeed, these studies indicate that relationships among and between stakeholder groups at various weapons production facilities have been marked as much by diversity and conflict as by homogeneity and consensus. Nonetheless, these elements have formed hegemonic boundaries for communication among and between the members of these groups. They have served as enduring frames for the production and interpretation of discourse considered to be normal, legitimate, authoritative, appropriate, and effective (and their opposites).

These elements may be grouped into three clusters. The first cluster involves the uniqueness of cultural ideologies and practices at nuclear weapons production facilities. Here, commentators consistently note several elements. One involves

the deep pride, camaraderie, and sometimes bravado, experienced among nuclear workers, based upon their technical expertise and craftsmanship developed in the conduct of complex and risky operations. A related element involves fascination among nuclear scientists and engineers with the compelling intellectual challenges posed by weapons design and testing. These professionals subsequently adhered to a nuclear-technological imperative (e.g., that presumed the necessity of realizing potential technological innovations both for their own sake as well as for national security; Kinsella, *in press-b*). Another element in this cluster involves patriotic dedication and, among some pre-millennial religious groups, theological endorsement of nuclear weapons production as both urgent and righteous. Among workers and community members, this element combined with another—that of economic and psychological dependence on continued operations—to create passionate identification with the weapons production mission and resistance to internal dissent and externally imposed change.

Also contained within this cluster are characteristic beliefs about the risk posed by operations to the health and safety of both workers and the public. Generally, commentators emphasize the relative disregard for those risks displayed by officials and operators (e.g., contractor failure to collect and maintain adequate documentation of worker exposure to radiation). They also emphasize rationalization of that disregard based on the perceived urgency of weapons production, the novel and evolving status of radiation science, and the general standards of the time.

Within weapons production facilities, nuclear workers and professionals were subject to authoritarian principles of organization, such as compartmentalization and encryption. These structures isolated them, constrained their knowledge of the nature and consequences of their work, inhibited their collective ethical reflection, and enforced their conformity to naturalized premises through a numbing discourse of euphemisms, acronyms, assertions, and directives. Commentators also note a dominant, cybernetic view of human communication operating in these facilities, drawn from the contributing cultures of science, engineering, and the military. This view presumed the legitimacy of instrumental imperatives such as efficiency, effectiveness, and conformity by system components to external control. Officially, communicators adopting this viewpoint privileged the objectivity of “facts” as message content. Covertly, they acknowledged the political importance of securing stakeholder consent to operations and developed rhetorical strategies to conceptualize and control the novel and urgent phenomena of nuclear weapons production.

A second cluster of elements includes attitudes held and practices performed toward “outsiders” by the members of these “strong,” cohesive cultures. Here, commentators emphasize members’ disdain for external surveillance and regulation. Workers and managers, for example, often viewed bureaucratic regulation (e.g., the enforcement of redundant safety procedures, pernicious budgetary “politics,” etc.) as rigid, intrusive, and unnecessary. Because regulation artificially imposed standardization and conformity on their operations, many workers also

believed that it inhibited their camaraderie and agility (e.g., by commodifying historically informal collaboration between work groups as consultation charged back to internal clients). A related phenomenon involves members moralizing and rejecting criticism by whistleblowers, activists, and news media. Because they were highly identified with the weapons production mission, many facility employees and community residents viewed this criticism as invalid, uninformed, illegitimate, disloyal, and irrelevant. Differences between facility proponents and opponents, as a result, were often moralized and vigilantly policed. There were few possibilities for neutral and dispassionate forms of membership in the affected groups.

A final cluster of elements involves characteristic practices by which officials managed stakeholders. Here, commentators emphasize successful deployment by those officials of formal position, scientific authority, and other mechanisms of exclusion (Kuletz, 1998) to discipline stakeholder dissent. Routinely, for example, those officials asserted national security as a warrant to override local and tribal property rights, to secure exemption from compliance with state regulation, and to establish immunity from prosecution for alleged harms. Additionally, they were able to obstruct, distort, and undermine oversight efforts through the practices of secrecy, deception, and co-optation.

Collectively, these elements suggest the themes and patterns that saturated communication surrounding nuclear weapons production during the Manhattan Project and Cold War eras. Having reviewed this history, we turn in the next two sections to its post-Cold War “legacies.” As we will demonstrate, this term encompasses a broad range of phenomena influencing communication among and between stakeholders in that complex.

#### NUCLEAR WEAPONS PRODUCTION AFTER THE COLD WAR: MATERIAL LEGACIES AND INSTITUTIONAL CHANGES

America’s production of nuclear weapons has resulted in a tragic material legacy of damage to human health and the environment, both within the U.S. and elsewhere. These activities have created enormous volumes of hazardous waste products, both radiological and chemical. These hazards include airborne contamination from materials processing and weapons testing, soil contamination at and around production facilities, surface water and groundwater contamination, and massive amounts of stored wastes. The storage and transportation of these wastes create unique hazards, such as criticality, a nonexplosive, high-intensity release of radiation that can result from inadvertent accumulation of critical masses of fissile materials (U.S. DOE, 1997).

U.S. nuclear weapons production facilities are, as a result, some of the most dangerous and polluted sites on the planet. Millions of Americans, ranging from plant workers and neighboring residents to regional residents living downwind

and downstream, have all been exposed to increased health risks without their knowledge or consent (Geiger & Rush, 1992; Makhijani, Rutenber, et. al., 1995). A recent study completed by the U.S. Centers for Disease Control and Prevention has established that radioactive fallout from above-ground nuclear weapons tests conducted between 1951 and 1962 exposed virtually everyone in the United States and contributed to 11,000 excess cancer deaths (“Nuke Testing,” 2003). Following the terrorist attacks of September 11, 2001, existing concerns about environmental and human health risks have been joined by increased concerns about the unauthorized diversion of radiological materials by terrorist groups, and the general crisis of international nuclear proliferation.

During most of the Cold War, the environmental and human health impacts of nuclear weapons production were neither fully acknowledged nor openly addressed by the U.S. government. Because Congress and the executive branch viewed the nuclear weapons production complex as an instrument of military strategy and foreign policy, concerns for national security trumped all others. For the greater part of the Cold War, federal environmental laws such as the National Environmental Policy Act of 1969, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the Resource Conservation and Recovery Act of 1976 (RCRA) contained few if any provisions for federal regulation of environmental or hazardous waste practices at federal facilities administered by the Departments of Energy (DOE) or Defense (DOD). This weak regulatory framework, coupled with the traditional sovereign immunity principle that encouraged federal agencies, such as the Environmental Protection Agency (EPA), to refrain from pursuing legal remedies against each other, effectively shielded the DOE from liability for its environmental and waste management practices, even as industries in the private sector faced a growing list of requirements (Applegate, 1999). Two events happened in 1984, however, that dramatically changed the environmental history of the nuclear weapons production complex, and arguably America’s environmental history as well.

First, a federal court held in *Legal Environmental Assistance Foundation v. Hodel* (1984) that the DOE’s facility in Oak Ridge, Tennessee, was in violation of the Clean Water Act and RCRA. This legal ruling forced the DOE “to acknowledge the applicability of federal environmental laws, as well as certain state and local laws, to its weapons production activities” (National Academy of Sciences [NAS], 1989, p. 35). The impact of this decision was magnified by a second event in late November 1984, when officials in charge of a DOE uranium milling and processing plant located in Fernald, Ohio, announced that the plant had experienced a series of significant dust collector losses, resulting in the release of several hundred pounds of uranium into the atmosphere. Shortly after this incident, Fernald officials informed area residents that production activities had resulted in groundwater contamination affecting the drinking water wells of a number of families who lived next to the site. In the following year, Fernald residents Ken and Lisa Crawford joined 14,000 other Fernald-area residents in a \$300 million class action lawsuit against DOE contractor National Lead of Ohio. The suit was

settled in 1989 when the DOE agreed to pay \$78 million in damages (*Crawford v. National Lead Co.*, 1989). Silverman (2000, p. 265) concluded that Fernald “was thus the first ‘domino’ in a major process of challenging and ultimately reshaping the American nuclear weapons production system.”

As described above, revelations at Fernald led to heightened media coverage of environmental problems at other DOE sites during the rest of the 1980s. Congress attempted to tighten the regulatory requirements on DOE and DOD facilities through the 1986 Superfund Amendments and Reauthorization Act (SARA), which amended CERCLA to include a section specifically pertaining to the cleanup of contaminated sites at federal facilities. In the decade following the passage of SARA, more than 20 DOE facilities were added to the National Priorities List for cleanup, to be paid for from the DOE budget instead of the superfund. Implementation of SARA also produced a number of interagency agreements between the DOE and state and federal environmental agencies concerning cleanup and removal actions at production sites. Finally, the 1992 Federal Facilities Compliance Act codified the applicability of RCRA and related laws to federal facilities (Applegate, 1999; U.S. DOE, 1996). In sum, growing public awareness of the legacy of material damage caused by nuclear weapons production led policy makers to seek greater oversight of the nuclear weapons complex, especially activities related to environmental remediation.

The DOE responded to this heightened scrutiny by instituting a variety of reforms. During the 1980s, it created an Environmental Management (EM) division to oversee cleanup operations and acknowledged in a 5-year plan that the nuclear weapons production complex should operate in compliance with environmental laws and standards that are generally applicable to the private sector (NAS, 1989). During the early 1990s, under the leadership of Secretary Hazel O’Leary, DOE headquarters initiated an ambitious “openness initiative.” These reforms included declassifying documents, expanding opportunities for public involvement, competitively rebidding contracts, increasing protections for whistleblowers, and publicly apologizing to victims for harms created by medical experimentation and unsafe working conditions (Alvarez, 2000; “Earning Public Yrust,” 1993; Gray, 1995; Weeks, 1997). At various locales, these reforms played out with varying success. At Fernald, for example, the Ohio EPA took the DOE to federal court in an effort to force compliance with provisions of RCRA and CERCLA. Throughout this process, the agency was faced with enormous communication challenges. Complying with federal environmental laws would require the agency to modify its entrenched organizational culture of secrecy if interested members of the public were to obtain adequate information about environmental and health hazards and participate in decisions about environmental remediation. In order to tackle new missions to clean up contaminated facilities, DOE personnel would be forced to communicate more openly with new groups of stakeholders with deeply felt concerns.

Early efforts by DOE personnel to interact with representatives of affected communities were largely unsuccessful, reflecting both the structural limitations of federal environmental laws and a high degree of public mistrust of the DOE in



the wake of publicized revelations about agency mismanagement (“Earning public trust,” 1993; Office of Technology Assessment, 1991). In 1993, representatives from DOE’s EM office and the EPA participated in a national policy dialogue facilitated by the Keystone Center, a nonprofit environmental conflict management group. The dialogue was aimed at developing recommendations for improving the process by which federal facility cleanup decisions are made so that decisions reflected priorities and concerns of all stakeholders. An important 1993 interim report generated from this dialogue recommended that Federal agencies such as the DOE establish community advisory boards to provide independent policy and technical advice to both regulated and regulating agencies with respect to key cleanup decisions (Federal Facilities Environmental Restoration Dialogue Committee, 1993).

The DOE responded by obtaining a charter to establish a system of site-specific advisory boards (SSABs), under authority provided by the 1972 Federal Advisory Committee Act (FACA). First obtained in 1994 and renewed biennially since, the FACA charter contained an umbrella provision that allowed the DOE to establish local SSABs across the nuclear weapons production complex. Since their formation beginning in 1994, a dozen SSABs, including boards at Hanford, Oak Ridge, Fernald, and Rocky Flats, have met more than 120 times annually (U.S. DOE, 2000). During the 1990s, these local site-specific advisory boards became a key mechanism through which the DOE attempted to regain legitimacy. The DOE used the SSABs as places to circulate information about environmental remediation activities and as vehicles for obtaining consensus-based recommendations about clean-up decisions.

How successful these boards have been in informing and involving interested parties in the policies and practices of DOE-EM programs remains an open question. Some assessments have been positive (Applegate, 1998; Bradbury & Branch, 1999; Duffield & Depoe, 1997; Williams, 2002). For example, the DOE reports that since 1994, local SSABs “have provided the Department with literally hundreds of specific recommendations” and have “saved taxpayers hundreds of millions of dollars” (U.S. DOE, 2000, p. 2). Others, however, have been less sanguine about the politicized process by which SSABs operate and the substantive impact of their recommendations on DOE decisions (Taylor & Davis, 1999; Weeks, 2000). Despite these mixed reviews, the DOE has relied on the SSABs as a centerpiece of its public participation framework.

Following this shift, a number of stakeholder groups have emerged as central players in negotiating and implementing environmental remediation and waste management decisions. Three groups in particular have been involved in sanctioned (e.g., local SSABs) and unsanctioned (e.g., lawsuits and protests) public participation activities.

The first group, affected community members, includes the hundreds of thousands of individuals who have lived in close proximity to nuclear weapons production facilities, as well as those who have lived downwind or downstream of nuclear test sites in the United States. During the 1980s and 1990s, as environmental and

health risks associated with nuclear weapons production became more apparent, a number of grassroots organizations formed in communities near DOE facilities. At first, organizations such as the Fernald Residents for Environmental Safety and Health (FRESH) and the Hanford Education Action League (HEAL) sought accurate information about levels of environmental contamination and residential exposures to radioactive and other hazardous materials. For these local groups, the agenda quickly expanded to include demands, and in some cases litigation, calling for the DOE to apply existing environmental laws and regulations to site activities, and to expand community participation in environmental decision making.

In 1987, a number of local grassroots groups joined together to form the Military Production Network (subsequently renamed the Alliance for Nuclear Accountability [ANA]). The ANA is a network of more than 30 local, regional, and national peace and environmental groups representing the concerns of communities in the shadows of the U.S. nuclear weapons sites and radioactive waste dumps. For more than a decade, ANA has lobbied Congress and the Executive Branch concerning issues ranging from budget priorities for the DOE (clean-up versus military production) to the continuing role of nuclear weapons in American military policy.

At the local level, ANA-member and other activist organizations have had varying amounts of success in influencing specific DOE cleanup decisions (Ratliff, 1997; Toker, 2002). At some sites, activist leaders have chosen to participate within established institutional frameworks such as SSABs, but only after many years of fighting DOE in the courtroom and in public protests. Other sites have been characterized by disagreements among competing groups, including organizations that support ongoing DOE missions or projects, or by a lack of trust in the local SSAB as a legitimate reflection of community opinions.

The second group—workers—includes in excess of 600,000 men and women who have been employed in the nuclear weapons production complex since its inception. Without full knowledge of overall site operations or their potential health and safety consequences, workers were exposed to a variety of radiological and chemical materials and faced myriad other dangers at sites that manufactured weapons-grade nuclear materials. As the general public discovered more about the hazards associated with nuclear weapons production, America's nuclear workers began to seek their own answers. A federal lawsuit resulted in a landmark 1994 agreement in which the DOE awarded \$15 million to Fernald workers, including funds for a lifetime medical monitoring program. In 2000, the DOE acknowledged for the first time a link between occupational exposure and increased cancer rates among DOE production workers (Hebert, 2000). By the end of the year, Congress had enacted the Energy Employees Occupational Compensation Program Act, augmented by Presidential Executive Order 13179 confirming the federal government's commitment "to compensate DOE nuclear weapons workers who suffered occupational illnesses as a result of exposure to the unique hazards of building the nation's nuclear defense" ("Providing Compensation," 2000).



This legislation, which allows workers to file for compensation of up to \$150,000 for health problems resulting from exposures to radiation and toxic chemicals, has been implemented slowly and unevenly, leaving many workers' claims unfilled as their conditions deteriorate.

Domestic and international indigenes, such as those contaminated by radioactive fallout from postwar U.S. nuclear testing conducted in the Pacific Marshall Islands, make up the third important affected group. Native Americans in particular have been adversely and disproportionately impacted by nuclear weapons production. Uranium ore for the first atomic bombs was mined on tribal lands in Canada and the southwestern U.S., in many instances by native workers without proper health and safety precautions. Many of the key laboratory and production facilities in the nuclear weapons production complex, including the Los Alamos and Idaho National Labs and the Hanford Reservation, were located on or near lands either held or considered sacred by Native American tribes, a policy identified by critics as nuclear colonialism (Churchill, 1993; Kuletz, 1998). During the Cold War, aboveground nuclear explosions were detonated at the Nevada Test Site in the heart of Western Shoshone country.

For decades, interaction between representatives of the DOE and tribal groups was difficult and ineffectual, echoing historical patterns of miscommunication between the federal government and Native Americans. In 1994, President Clinton sought to improve the situation by issuing a memorandum directing all executive departments to "operate within a government-to-government relationship with federally-recognized Native American Tribes" (Presidential memorandum, 1994). The DOE has since attempted to involve Native Americans more directly in environmental management activities, including the establishment of cooperative agreements, agreements-in-principle, or memoranda of understanding with more than a dozen tribal nations concerned with activities at Hanford, Los Alamos, Idaho National Lab, and the West Valley (New York) Demonstration Project.

Recently, large parcels of land in Utah and Nevada that are considered sacred by Shoshone and other peoples have been earmarked by the DOE for potential nuclear waste disposal sites, including the huge Yucca Mountain project approved by Congress and President George W. Bush in July 2002. The Yucca Mountain project has been vigorously opposed by a number of Native American groups, including the Western Shoshone Defense Project, the Shundahai Network, the Indigenous Environmental Network, Honor the Earth, and the National Environmental Coalition of Native Americans (Indigenous Environmental Network, 2002). A few Native groups, however, have supported the siting of nuclear waste facilities in their communities for economic reasons. For example, a band of the Goshute tribe has, despite internal disagreement, expressed interest in having a repository for commercial reactor waste located on its lands in Skull Valley, Utah.

Over the past 2 decades, then, the DOE has been forced to interact in new ways with affected community members, workers, and indigenes as part of its mandate to remediate contaminated sites within the complex. During this period, all three of these groups have experienced occasional successes in influencing

policy decisions. At the same time, all three have experienced ongoing problems with the DOE, stemming from lack of trust, lack of information, and lack of access to decision makers. In many sites, communication problems have been exacerbated by fallout from 9/11, as a number of DOE field offices and contractors have reduced their public affairs budgets, and the DOE has begun to phase out a number of SSABs and related public involvement forums. As a result, the institutional changes toward more openness and accountability described above are both historically significant and precarious.

### DISCURSIVE LEGACIES OF NUCLEAR WEAPONS PRODUCTION: A THREE-PART THEORETICAL FRAMEWORK

Thus far, we have used the term “legacy” to describe the material consequences of Cold War nuclear weapons production. As indicated by our review of post-Cold War institutional conditions, however, this term also encompasses a variety of influences that structure the possibilities for communication among and between the stakeholders of nuclear weapons production. One example of these influences is reflexive and involves the way in which DOE officials have utilized the term legacy itself as a powerful trope. In foundational texts of the mid-1990’s DOE Openness Initiative (e.g., U.S. DOE, 1995), these officials constructed the material problems of the complex as unavoidable consequences of the Cold War, attributable to choices made by an earlier generation of decision makers under conditions of dire necessity. By employing images such as “closing the circle” on Cold War production through post-Cold War cleanup, DOE officials both contrasted and linked these two historical eras (U.S. DOE, 1995). This discourse simultaneously distanced present DOE managers from the appearance of responsibility for having caused, or for morally judging, the problems they inherited, and positioned them as trustworthy agents for their repair (Kinsella, 2001).<sup>6</sup>

Because this articulation locates problematic (and ongoing) issues of nuclear ethics and meaning in the past, we stress that both change and continuity characterize the evolving status of the weapons production complex. That is, to be *post-* (as in post-Cold War) is not necessarily to have transcended the organizing principles of an earlier period. It is, instead, to be deeply influenced by those principles even while assessing, interrogating, and transforming them. As we consider communication surrounding nuclear weapons production in the post-Cold War era, then, we share Taylor and Hartnett’s (2000, p. 465) goal of “problematiz[ing] this alleged successor by emphasizing how the active residues of its predecessor ‘contaminate’ its ontological bid for distinctiveness and closure.” In this way, we understand the discursive legacies of Cold War nuclear weapons production to be a site of social struggle: They are simultaneously evoked, contested, and re-constructed in communication among and between stakeholders. At stake in this struggle are nothing less than the terms and principles by which the nuclear future will be organized. The quality of our engagement as scholars and citizens with

these conditions will determine the legacies, both material and discursive, that we leave to the inhabitants of that future.<sup>7</sup>

In the following section, we review a three-part theoretical framework that we have developed to conceptualize and engage these discursive legacies. This framework configures the interdisciplinary terrain of related scholarship while emphasizing the role of communication. In each case, although space does not permit full review of the relevant literatures,<sup>8</sup> we summarize their central issues and claims, discussing exemplary studies of nuclear weapons production and posing an agenda for future communication research.

### Democracy, Participation, and the Nuclear Public Sphere

As much a theoretical construct as an empirical context, the public sphere evokes sharp debate concerning the status of participation, democracy, and deliberation in the late-modern and postmodern eras. Participants in this debate variously orient to Habermas's (1962/1989) history of the modern *bourgeois public sphere*. Many commentators, subsequently, have utilized the *critical public sphere* as a normative ideal to evaluate actual public deliberation. This ideal rests upon four conditions. First, all citizens should have access to, and competency in, the available means of expression. Second, citizens should debate openly, democratically, and rationally, deferring their preexisting differences of status and expertise. As a result, speakers should be able to reflect on the intelligibility, truthfulness, and situational appropriateness of offered claims. They should seek to reach consensus through the use of practical reasoning concerned with the quality of a shared lifeworld. Third, citizens should debate matters of general interest. These matters should be accessible to public discourse, and citizens should be sufficiently motivated and informed to engage them. Fourth, deliberation should lead not only to the formation of public opinion, but should also influence official decision making.

Used in this fashion, the critical public sphere clarifies the rhetorical practices by which matters are deliberated in the public interest. Critics utilizing this construct emphasize the ethics and politics that surround the framing of issues, the selection of speakers, and the interpretation of evidence in controversies. Responding to a variety of challenges to this ideal (e.g., concerning the colonization of public discourse by commercial or corporate interests), current public sphere scholars seek to achieve at least three goals. The first involves recovering "a multiplicity of dialectically related public spheres rather than a single, encompassing arena of discourse" (Asen & Brouwer, 2001, p. 6). In so doing, scholars reverse a declinist thesis emphasizing the disruption and fragmentation of traditional deliberation. They reframe the expansion of deliberation created by oppositional counterpublics as a potential benefit to society (e.g., Olson & Goodnight, 1994). Second, critics reconceptualize traditionally opposed entities (e.g., counterpublics and the state; technical and public spheres) to reflect their relative permeability and interdependency (Asen & Brouwer, 2001; Goodnight, 1982). Finally, they

examine the tactics used by publics and counterpublics to alternately affiliate and compete with each other and to maintain and transform the mechanisms of deliberation. In this process, critics reveal how standards of decorum and norms of deliberation mistakenly presumed to be transcendent or permanent structures are actually local, contingent accomplishments (Farrell, 1993; Phillips, 1999).

Brought to bear on the history of U.S. nuclear weapons production, this strand of critical theory reveals a public sphere constricted and degraded by technocratic domination (Fisher, 1987, pp. 57–84; Hardert, Reader, Scott, Moulton, & Goodman, 1989; Kinsella, 2002, 2004; Krasniewicz, 1992; Kuletz, 1998; Metzler, 1997; Nelson & Beardsley, 1987). A wartime climate of urgency led to the secret development of nuclear weapons and to their introduction as a *fait accompli* rather than their consideration as a potential innovation requiring public ratification. The postwar embrace by U.S. officials of nuclear weapons as a necessary evil legitimated their production under the expansive warrant of national security. Compromised structures of civilian control aligned regulation with the political and economic interests of weapons production and promoted an authoritarian model of nuclear guardianship by scientific, military, and political elites over democratic control practiced by an informed and motivated citizenry (Dahl, 1985; Nolan, 1989). Indeed, this model construed involvement by an unpredictable public as a threat to the high-stakes order of nuclear deterrence (Tannenwald, 1999).

In this context, autonomous, centralized, defensive, secretive, and security-conscious cultures developed and became entrenched at nuclear weapons production facilities. The suppression and distortion of information (e.g., through the use of jargon, euphemism, threat inflation, etc.) precluded informed consent by citizens to the consequences of operations. This process involved officials' use of technical expertise (e.g., of epidemiological science) to colonize public moral argument (Fisher, 1987), and to neutralize alternative (e.g., anecdotal) modes of reasoning. Officials also adopted authoritarian, cynical, superficial, and perfunctory approaches to public participation opportunities (e.g., public hearings). They engineered communication with citizens (e.g., through agenda setting) to minimize perceived irrelevancy and disruption, to discredit unease as irrational perception, and to remove potentially controversial topics and premises from deliberation.

Although powerful, this domination was not monolithic or constant. For example, Dalton, et al. (1999) argued that the strong democracy, weak state structure of U.S. politics (e.g., that mandates agency compliance with Freedom of Information Act requests) has facilitated relative democratization of the post-Cold War nuclear public sphere, at least in comparison to Russia. Similarly, Glass (1993) argued that because the Cold War lifeworld was too complex for total colonization, pockets of critical instability (e.g., created by regional particularity) remained through which citizens could fashion alternate definitions of security and loyalty. Because they could not supplant the totemic warrant of national security, however, these successes were ultimately partial, "fragile, hard to predict, and even harder to repeat" (Glass, 1993, p. 106). Analyses of movements such as the Nuclear Freeze (Bjork, 1992; Hogan, 1994; Rojecki, 1999) and women's peace encampments

(Couldry, 1999; Krasniewicz, 1992) additionally confirm that counterpublics opposing the Cold War nuclear state faced formidable challenges. These challenges included skillful appropriation of their rhetorical visions by officials, ambivalent coverage by news media identified with state power over citizen participation, and inevitable tradeoffs between the adoption of technically substantive and popular-appealing rhetorical strategies.

Here, we are concerned with the transformation of these structures by the controversy surrounding the nuclear weapons production complex. As described above, citizen activism has partly succeeded in revising dominant narratives of the history of the weapons complex, and in restructuring relationships between officials and stakeholders (Blain, 1991; Charles, 1988; Depoe, 2000; Kaplan, 2000; Kinsella, 2001; Metzler, 2001; Ratliff, 1997; Sheak & Cianciolo 1993; Weeks, 1997). Kinsella (2001) conceptualized this moment of instability as one of discursive containment, in which possibilities for citizen participation and deliberation are configured by the rhetorical boundary work of influential actors. During the Manhattan Project and Cold War eras, he argued, officials primarily employed boundaries (e.g., the principle of secrecy) to contain information, restricting its circulation within a narrow community of authorized actors. By the end of the Cold War, however, the effectiveness and perceived legitimacy of secrecy had decreased, and public access to information had increased. Subsequently, officials have shifted tactics to contain the meaning of that information (e.g., by asserting preferred frames of technical expertise over vernacular forms of knowledge).<sup>9</sup> In practice, discursive containment often operates on the premise that public participation is a potential hazard to official interests and should be minimized and controlled. The range and quality of voice in deliberation is, as a result, significantly attenuated.

These conditions suggest a number of topics for further investigation by communication scholars. Here, we outline two related examples of social construction. The first concerns public involvement and participation. The second involves risk as a putatively objective, but in fact, highly selective, organizing principle for public deliberation and institutional decision making.

*Public involvement and participation.* First, further research is warranted regarding the rhetorical practices by which stakeholders are hailed (both by officials and each other) to participate in policy making (Boiko et al., 1996) and are subsequently enabled and constrained. Crucial here are institutional dynamics that function pragmatically to shape the terms of discussion, the scope of actors' involvement, the legitimacy of particular speakers and speech acts, the rate, sequence, and duration of decision making, and the ways in which technical and nontechnical discourses are articulated (Fiorino, 1996; Kinsella, 2001, 2002, 2004; Laird, 1993; Mehta, 1998). Research with this focus would engage the micropractices of participants: How do officials manage public meetings and respond to hostile questions (Campbell, Follender, & Shane, 1998; McComas, 2001, 2003a, 2003b)? How appropriately do facilitators summarize the discourse of focus groups? How do opponents succumb to or resist capture and the subversion of their

alternate values by expert nuclear discourses (Cohn, 1987)?<sup>10</sup> This focus recovers nuclear democracy as a local, communicative accomplishment, whose forms and practices may vary widely from one scene to another, based on the structures and cultures of particular decision-making and advisory groups (Bradbury & Branch, 1999; Weeks, 2000).

A related issue concerns the integrity of communicative practices suppressed in vernacular criteria used by officials to manage, and by researchers to assess, public participation programs. Stakeholders, for example, commonly perceive particular attributes as necessary for successful programs (e.g., the decision-making process allows full and active stakeholder participation; Carnes, Schweitzer, Peelle, Wolfe, & Munro, 1998; Hanford Advisory Board, 2002). They often lack, however, sufficient resources for understanding how actual (as opposed to hypothetical or idealized) communication accomplishes these outcomes. This focus recovers the practices that saturate nuclear decision making in local, concrete situations (Mehta, 1998) and enables the development of associated practical theory (Cronen, 1995).

Potentially, this research clarifies how affected groups may successfully self-organize to emerge as effective counterpublics, developing and using multipronged, multimodal opposition to engage the complexities of nuclear weapons production and its persistent culture of secrecy. At sites such as Fernald and Hanford, for example (Metzler, 1997; Ratliff, 1998), liminal actors such as whistleblowers, independent scientists, and downwinders (Kinsella, 2001) have effectively challenged the DOE by deploying alternative discourses and forms of knowledge.

*Risk as a deliberative organizing principle.* Another topic that warrants further examination is the use of “risk” as a key trope in deliberations regarding nuclear policy and operations. As Carlisle (1996) observed, risk has long served as a frame for decision making within the nuclear weapons production complex. Regulatory agencies have also relied heavily on the concept in setting standards for environmental protection and cleanup. Most recently, the DOE has adopted an approach known as risk-based end states as a centerpiece of its efforts to determine appropriate levels of environmental remediation for its former weapons production sites (U.S. DOE, 2003). However, there is little clarity within the department or among stakeholders regarding what is meant by risk, or how to operationalize that polysemic term. A representative anecdote comes from a recent experience of one of the authors, who participated in a citizen advisory board workshop on risk at the Hanford site. After a series of presentations on risk models in use at the site, the author learned that none of these models was the same as the one being used by DOE headquarters as the basis for its controversial risk-based end states initiative. Furthermore, a member of the consulting organization that produced the model in use at headquarters had expressed concern that this model was not sufficiently developed to serve as a standard. These two points became evident only during a private conversation at lunch and were invisible to many of the meeting participants. This episode illustrates how actors can coordinate in completing tasks without necessarily sharing common goals or understandings. Such conditions can



easily lend themselves to the use of strategic ambiguity (Eisenberg, 1984) by officials to preserve privileged positions and foster institutional change agendas without the full awareness of stakeholders.

The academic literature on risk is broad, diverse, and interdisciplinary, spanning perspectives that have been characterized as technical, economic, systems, psychological, organizational, social, cultural, and democratic (Krimsky & Golding, 1992; Renn, 1992). These divergent perspectives are reflected in the literature on risk communication that informs both communication scholarship and standard stakeholder relations practice (e.g., Fischhoff, 1987; Hance, Chess, & Sandman, 1989; Rowan, 1991, 1995). With the exception of a more democratic approach temporarily adopted by the DOE during its 1990s openness initiative, technical and organizational approaches have dominated deliberations regarding the nuclear weapons production complex. These approaches privilege objectives such as legal compliance with regulations, accomplishing tasks efficiently and within budget, and limiting community interference with organizational operations (Fischhoff, 1987). As Needleman (1987) pointed out, such approaches too often “sidestep the public health and human rights goals usually presented as the moral rationale for risk communication—empowering those at risk to make informed decisions” (p. 20). Such empowerment is the goal of the democratic focus, exemplified by calls for an approach to risk communication “that describes the social conditions most likely to secure the best possible technical knowledge about hazards and the best possible methods of addressing stakeholders’ concerns” (Rowan, 1995, p. 304). Democratic approaches seek to integrate expert knowledge about risk with values, which are important to communities and stakeholders, ideally producing decisions that are superior both technically and socially.

Recent work in European sociology offers a promising foundation for further scholarship on risk communication. This work is largely motivated by the risk society paradigm originated by Beck (1992), in which modernization is inevitably accompanied by the production of hazards. Beck suggested that the distribution of risks has emerged as a central problem for late-modern society, analogous to the more familiar social problem of distributing limited resources. His concept of reflexive modernization incorporates the dual reflexive principles that risk is both a product of social action and a problem to be solved by further social action, and that contemporary societies must examine their own practices in the light of risk. Both principles invite the attention of communication scholars, who are well positioned to consider how such reflexive activities can be accomplished (Kinsella, 2002). Complementary to Beck’s paradigm is the work of Luhmann (1993), who placed communication more centrally in the risk problematic. Identifying communication as the autopoietic “operation by which society as a system produces and reproduces itself,” Luhmann argued that it is a mistake to attribute risk to technology itself. Instead, he argued, “only communication about technology and—above all—the communication of decisions about the deployment or non-deployment of technology is risky” (Luhmann, 1993, pp. xii–xiii). In this context, Luhmann viewed risk as a time-binding principle that links the future to choices

made in the present. Communication scholarship can make important contributions to understanding how such choices are envisioned, articulated, deliberated, and enacted in the evolving nuclear public sphere.

### Organizational Crisis, Change, and Stakeholder Communication

Scholars of organizational crisis and change examine how organizations cope with inevitable conditions that threaten the viability of their continued operations and of stakeholder perceptions of their legitimacy and authority (Seeger, Sellnow, & Ulmer 1998). Although these are both contexts that compel organizational response, crisis may be distinguished from change by its singular, sudden, and severe occurrence (i.e., all crisis is a form of change, but not vice versa). Additionally, whereas they both result from interaction between organizations and their environments, crisis foregrounds the role of organizational mistakes and failures in producing unexpected and traumatic change. Crisis may also be distinguished by the high-stakes organizational responses that its urgency provokes (e.g., apology, justification, excuse, intimidation, ingratiation, and denouncement; Allen & Caillouet, 1994). In this way, crisis and change are not objective conditions, but contested discursive constructs (Hay, 1995, p. 65, in Venette, Sellnow, & Lang, 2003, p. 224). As such, they are inherently compelling to communication scholars because they can dramatically alter how organizations and stakeholders identify each other, conceptualize their respective interests, and represent those interests in various forums of conflict and decision making (Deetz, 1995). This focus emphasizes the politics of voice as a deeply human and moral process through which affected stakeholders develop and perform narratives intended to garner organizational attention and justify their inclusion and consideration in organizational processes.

Scholars distinguish several types of crisis and change (e.g., evolution versus revolution) characterized by the relative pervasiveness, magnitude, rate, and duration of their effects. These effects are created as the triggers and consequences of change ripple across an organization's social reality. Crisis and change thus form dangerous opportunities: Organizational equilibrium is disturbed, stakeholders become anxious and agitated, and the future waits to be born. Much of this literature emphasizes the role played by organizational leaders as they assess the causes of crisis and change, and as they design and implement programs intended to exploit their opportunities and foil their threats. As such, this literature is filled with dramatic stories of heroic success, subcultural obstruction, and disastrous failure (Ulmer, 2001).

These efforts at leadership appear to involve as much art as science. Affected leaders must not only skillfully interpret ambiguous and turbulent environments, but also create (and perform) new narratives. In the case of change, these narratives must adequately bridge a familiar, even if problematic, past and an uncertain and unavoidable future. In the case of crisis, they must remedy immediate harms, resolve to prevent recurrences, and restore compromised legitimacy. In



both cases, these narratives must unite and sustain stakeholders, motivating them to change old habits, create new patterns in production and consumption, and, in a very real sense, become new kinds of people. With luck, skill, and resolve, stakeholders may respond to these narratives by collaborating in the development of reflective, ethical, and adaptive organizations (Ross & Benson, 1995).

Communication scholars are uniquely concerned with the discursive dimensions of crisis and change. Their studies depict change agents and stakeholders manipulating symbolic resources (artifacts, metaphors, jargon, genres, rituals, myths, and vision statements) in new ways to express their experience and accomplish their goals (Deetz, Tracy, & Simpson, 2000; Lewis & Seibold, 1998). Crisis and change subsequently become contexts that clarify how discourse constitutes and accomplishes (re-) organization, and does not simply reflect it (Feldman, 1990). One benefit offered by these studies is increased sensitivity to the power of communication as it engages and frames events to create both planned and unplanned consequences. Organizational responses to crisis and change are developed by organizational actors engaged in improvisation, compromise, and imperfect analysis. These actors produce polysemic texts that circulate among diverse subcultures and generate multiple, and potentially conflicting, interpretations. These interpretations in turn produce responses ranging from desired mobilization to confusion and resistance (O'Connor, 1995). In a series of studies conducted at the DOE's Fernald site, for example, Fairhurst and her colleagues (Fairhurst, Cooren, & Cahill, 2002; Fairhurst, Jordan, & Neuwirth, 1997) examined the disorientation and ambivalence experienced by post-Cold War workers as they decommission a core symbol of their identity and by management tasked with motivating this workforce. Contractor downsizing at Fernald has been an especially difficult process, exposing stakeholder differences over appropriate industrial paradigms for conducting operations (e.g., manufacturing vs. construction), organizational politics threatening managers who, in satisfying one group of stakeholders, inevitably alienate others, and lessons from initial downsizing that roll forward uncontrollably to undermine subsequent reorganization.

Regarding the nuclear weapons production complex, then, we see several opportunities for extending these findings. The most obvious involves the unprecedented scale of change efforts directed at organizational entities that have, either actively or by default, created harm. As Kauzlarich and Kramer (1998) argued, these radical efforts seek to change deeply ingrained motivations, opportunities, and control structures that have in the past enabled organizational actors to rationalize the commission of criminal acts. In the process, organizational representatives must also overcome an extraordinary credibility deficit in that they have not historically sought meaningful dialogue with stakeholders.

Additionally, many characteristics of these organizations create contingencies that potentially diffuse and undermine planned change efforts. They are geographically dispersed, for example, and range in type from high-tech, scientific research facilities to unglamorous manufacturing plants. Each organization possesses, in

turn, a distinct mixture of regional, professional, and occupational subcultures. Following the end of the Cold War, these organizations experienced increased turnover in membership that, in turn, has affected the coherence and reliability of their collective knowledge and memory. These members (e.g., generational workforce cohorts) have oriented differently to the traditional weapons production mission (Loeb, 1986) and to the apparent ending of the Cold War. They have done so partly by drawing on a volatile mixture of emotions, including relief, denial, nostalgia, resignation, pride, and ironic appreciation (e.g., for predecessors whose mistakes have, at least temporarily, enabled their continued employment). Some of these sites have been targeted for complete closure and cleanup; others have been slated for ongoing weapons development and production; still others will pursue both these missions simultaneously. Some sites were severely constrained in their potential responses to the end of their Cold War mission. Others, such as the DOE's National Laboratories, were encouraged to develop entrepreneurial identities as centers of broad-based research and development. Some sites fashioned relatively deep and consistent support among local stakeholders for the pursuit of these missions; others developed (at best) partial, thin, and fleeting support.

These conditions complicate traditional assumptions about communication surrounding organizational crisis and change. They defy, for example, conventional wisdom that crisis has a discrete, sharp onset. Alternately, we may conceptualize the DOE's legitimization crisis during the late- and post-Cold War period as the result of inexorable convergence between geographically dispersed and initially ambiguous events. This convergence was facilitated by the use of discursive strategies among stakeholders (e.g., displayed in news media coverage) that framed otherwise local and isolated events as elements of a larger, coherent phenomenon. As well, the emergence of this crisis has served for many stakeholders as a (re-) introduction to the existence and operations of these facilities. Because those operations were historically obscured by the warrants of security and secrecy, organizational actors were not able to draw on a history of explicit, undistorted, and consensual relationships with stakeholders to restore legitimacy. Instead, they were required to simultaneously reassert and defend their continued presence.

Additionally, these conditions deflate the romantic myth of unilateral, top-down change imposed by heroic figures. The most likely candidates for this role, the DOE secretaries and their deputies, have consistently expressed humility and frustration with the enormity of their reform charge, the impediments to its implementation, and the resistance it has generated among stakeholders (Lanouette, 1990; Owendorf, 1996). As a large, Byzantine government bureaucracy, the DOE has coped with continuous, turbulent change since its creation in 1977 (Schaffer, 1994). Those changes stem from several sources, including the agency's extraordinarily broad mission, which includes the promotion of commercial nuclear power; the geographic dispersal of its operations, which promotes weak centralized control over local fiefdoms; the instability of its associated economic and

political environments; and routine turnover among its politically appointed staff. Its frequent restructurings have produced fatigue, anxiety, confusion, and defensiveness among employees and have exacerbated the weakness of DOE's culture relative to the strong cultures of its contractors on whom it depends for achieving operational success (Stelzer, 1996).

Since the end of the Cold War, successive DOE secretaries have attempted to institute multiple planned change programs (Bergeron, 2002, pp. 95–118; Carlisle, 1996, pp. 195–218). Both within and across different administrations, these programs have varied widely in their scope, goals, and ideologies (e.g., in seeking to improve operational effectiveness vs. increasing public accountability). In different sites and moments, these programs have confronted numerous, formidable sources of opposition. These include Cold Warrior staffers intransigently aligned with the ideology of weapons production; field-office employees who identify more with local contractors than with headquarters; regulators who are inadequately trained, thoroughly outnumbered by contractor employees, and challenged by the task of tailoring rigid and competing statutes to the unique needs of specific sites; industrial contractors accustomed to minimal accountability, unqualified and inexperienced in conducting a massive environmental cleanup, and resistant to adopting new performance contracts; Congressional lawmakers with alternate, competing reform agendas that are performed in a high-stakes theater of budgetary politics; and cynical, wary stakeholders unwilling to (re-)invest trust or confidence in DOE and contractor operations. Given these challenges, it is remarkable that the DOE and its contractors have been at least partly successful in increasing the openness, accountability, and perceived legitimacy of their operations.

As we have discussed above, these outcomes resulted in part from the cumulative use by various organizational actors of narrative (Venette, et al., 2003) and impression management strategies (Allen & Caillouet, 1994). These strategies responded to problematic narratives emerging in stakeholder discourse and media coverage of the weapons production complex and addressed the perceived needs of stakeholders. Viewed using Benoit's (1995) scheme, they included *denial* (e.g., shifting responsibility for current conditions to predecessors); *evasion of responsibility* (e.g., claiming to lack information about or control over key elements of situations and that negative consequences were unforeseen and unintended); *reduction of offensiveness* (e.g., minimizing negative consequences, directing audiences to higher values that justified operations, counterattacking accusers, and offering compensation to victims); *corrective action* (e.g., promising to repair damages), and *mortification* (e.g., accepting limited responsibility for specific actions, and apologizing to affected stakeholders).

Collectively, these conditions indicate that we should view any particular nuclear weapons production facility as the site of simultaneous, multilateral change efforts initiated by stakeholders using various influence strategies and pursuing alternately complementary and competitive agendas. Contractor employees engaged in dismantling plant facilities, for example, are subjected to both the resurgent health

and safety culture of the post-Cold War DOE and also the unofficial (but no less forceful) culture of efficiency imposed by management attempting to maximize their productivity and profitability. Thus, these organizational scenes are dense with the cognitive, emotional, and discursive labor of stakeholders performing the shifting, tactical identifications that suit their situated, evolving purposes. At the Hanford site, for example, some former critics of its operators, such as environmental and public interest groups, are now vocal advocates for adequate federal funding and oversight to ensure a successful cleanup (Dalton et al., 1999). In this process, new alliances between stakeholders have partly replaced old rivalries.

The DOE and its contractors have achieved some success, then, in changing from insular, arrogant bureaucracies to more engaged and responsible organizational citizens (Reed, et al., 1997). Communication researchers should continue to study, however, the powerful and inertial forces that currently threaten those reforms. Here, we identify five of these forces. The first involves the existence of inadequate and uncertain funding for implementing necessary initiatives. The second involves strong motivation among stakeholders to pursue self-interest at the expense of a common good. Workers, for example, may slow down the cleanup of facilities to extend their employment. Officials may advocate cleanup criteria and end-use scenarios that limit continued responsibility. Congress and the executive branch may seek to fund a rapid, but potentially inadequate, cleanup. A third force involves the development of public participation processes that are nominally designed to produce dialogue and learning, but are actually deployed in ways that preserve existing practices and secure officially preferred decision alternatives (Bergeron, 2002, p. 121; Cheney & Christensen, 2001). A fourth force involves the fatigue, disillusionment, and burnout experienced by organizational change agents (e.g., public involvement specialists) as they trade the permanent emergency of Cold War nuclear weapons production for the permanent controversy of seemingly intractable stakeholder conflict surrounding the decommissioning, demolition, and cleanup of facilities.

A fifth, and perhaps most alarming, force involves the reemergence of national hyper-security and obsessive secrecy as organizing principles following recent allegations of nuclear espionage conducted at Los Alamos and the terrorist attacks of September 11, 2001 (Masco, 2002). The consequences of these events include the reorganization of the DOE's weapons design laboratories under a more restrictive National Nuclear Security Administration and the removal of putatively sensitive documents from public access on agency and contractor websites. Combined with the imminent revival of nuclear weapons production within the U.S.,<sup>11</sup> the mounting pressure on stakeholders to resolve the conflicting priorities of cost and effectiveness in cleaning up contaminated facilities, and the elimination of forums for this deliberation, these developments suggest the persistence of a highly controversial issue (and one that has been largely suppressed in order to preserve the fragile stakeholder coalitions surrounding cleanup of the complex; Taylor & Davis, 1999). That issue is this: To what extent will post-Cold

War reforms instituted by the DOE be sustained? If they are sustained, to what extent will they be contained within the DOE's EM program, thus exempting the agency's defense programs (and their contractors) from significant change and the lasting implications of lessons learned?

Put another way, we may distinguish here between organizational commitments to taking corrective action for harms committed and to preventing the recurrence of those offensive acts (Benoit, 1995). The former does not necessarily imply the latter, and there is no guarantee that the powerful warrant of national security will not compel future generations of facility operators to repeat their elevation of nuclear weapons production over the values of environment, health, and safety. Bergeron (2002, 2004), for example, argued that the U.S. government has compromised both safety concerns and a precarious international nonproliferation regime in its rush to convert existing civilian power reactors to produce tritium gas allegedly needed to maintain the nuclear arsenal.

In summary, the nuclear weapons production complex represents a compelling opportunity to examine how planned change programs alternately promote, sustain, and defeat effective organizational change and adaptation (Reed, et al., 1997, p. 632). In this case, the overriding issue is whether and how organizations historically steeped in secrecy and deception can ever change their fundamental cultures and traditions of stakeholder management (Dalton et al., 1999). Communication researchers, subsequently, may provide significant and useful knowledge about this process by examining the following four issues.

First, what are the specific elements and processes that characterize communication surrounding planned change in nuclear weapons production organizations?<sup>12</sup> Potential topics here include message design, selection of audiences and channels, designation of sources for the dissemination of information; practices of soliciting and utilizing input; and the active reception, and subsequent use, by stakeholders of organizational messages (Lewis, 1999; Patterson & Allen, 1997). This focus would move beyond summarizing controversial issues (Lowrie & Greenberg, 1999) to foreground the communicative practices through which controversy is produced and resolved. It would also transcend describing the structures of stakeholder involvement (Boiko et al., 1996) to interpret and critique them. Second, what are the impression management strategies used by actors in nuclear weapons organizations to maintain legitimacy in a rapidly changing institutional environment (Allen & Caillouet, 1994; Benoit, 1995)? How do actors perform these strategies in particular scenes? With what consequences? Conversely, how do stakeholders of nuclear weapons production design and perform influence strategies (e.g., by utilizing resources of power, legitimacy, urgency, and network centrality and density) to claim attention from associated organizations (Frooman, 1999; Mitchell, Agle, & Wood, 1997)? How do these organizations subsequently identify, recruit, and prioritize these stakeholders (Boiko et al., 1996)? How should they? Third, how effective and ethical are these organizations in producing secondary- and meta-narration that responds to primary media coverage of crisis (Venette et al., 2003)? Research here should include both organizational

responses to immediate crisis and long-term narrative development designed to reestablish legitimacy and authority.

Finally, what are the political dimensions of organizational/stakeholder communication (Deetz, 1992, 1995; Mitchell, et al., 1997) surrounding nuclear weapons production? These elements include the general practices by which stakeholder participation is conceptualized and conducted by organizations (e.g., in selectively defining potential stakeholders as a sign of regard for their relevance and prominence; conducting public meetings in ways indicating either cynical, perfunctory compliance with regulatory requirements, or genuine commitment to mutually transformative dialogue). They may also include the use of specific power tactics by participants, such as allocating resources, controlling agendas, controlling decision-making criteria, rationalization, brinkmanship, co-optation, forming coalitions, using surrogates, and using outside experts (Fairholm, 1993). The use of these tactics may be especially prevalent, for example, among meta-stakeholder groups (e.g., citizens' advisory boards and community reuse organizations), whose mission is to solicit and resolve participation from multiple (and often conflicting) groups.

### Nuclear History, Memory, and Heritage

Communication about nuclear weapons production is energized by attempts to define and enforce the legacies of wartime and Cold War-era activities. This process establishes relationships between the discourses of nuclear history, memory, and heritage. These three discourses are similar in that they are all produced when cultural members use symbols to forge meaningful relationships between their experience of the past, present, and future. Because of their apocalyptic potential to rupture the continuity of human experience, nuclear weapons have always posed a radical challenge to these practices (Derrida, 1984; Williams, 1989). Nonetheless, nuclear history, memory, and heritage are unique genres of discourse with important differences. That is, they are each subject to rules that define the legitimacy and authority of their speakers; that specify their appropriate form, content, and meaning; and that constrain the venues of their circulation. These rules shape the potential of each discourse to produce particular effects for the hegemony of nuclear narratives. Cumulatively, these effects shape evolving relationships between the stakeholders of nuclear weapons production facilities.

History is the generic, vernacular term commonly used to designate both past events and the efforts of cultural members to determine their meaning. As a discourse, history is dedicated to exploring and recovering the past as a field of lost, unknown, and perhaps unknowable, events. Represented through historical discourse, past events potentially become "consensually known, open to inspection and proof" (Lowenthal 1998, xi). In this discourse, events are typically considered along an axis of irreversible, linear temporality, with the goal of understanding their causes, natures, and consequences. The discourse produced by historians is inevitably literary and rhetorical. It utilizes discursive conventions to select,



emphasize, and interpret the relationships between events in order to produce accounts that inform and influence audiences (Gronbeck, 1998; White, 1980). In its formats and purposes, this discourse serves simultaneously as both a narrative of and argument about past events. The broad genre of historical discourse divides into multiple subgenres, including arcane and specialized academic histories, and more accessible and entertaining popular histories. Academic histories invoke a relatively intellectual, professional, and objectivist discourse, appropriating the rational criteria of argument to support their claims. Their narratives value precision and explanation and are rigorously evaluated by other academic historians for their conformity to these criteria. This process of peer review, and the ongoing competition between academic and popular histories for the allegiance of readers, encourage the production of multiple histories. These accounts circulate continuously within the cultural sphere, auditioning for authority and legitimacy as communally sanctioned accounts of the past. In the field of nuclear history, for example, Krupar (1998) has criticized the complicity of traditional accounts in maintaining (at least until the publication of Hales, 1997) an official Manhattan Project narrative that characterized local lands acquired for the Hanford Reservation as uninhabited and worthless. This narrative effaced the actual history of that region's small but hardy farming culture, which had itself displaced Native Americans, and minimized a variety of burdens created for Hanford, Oak Ridge, and Los Alamos-area residents by the U.S. military's seizure of their property. As its narratives contact, interrogate, and displace each other, history can appear rudely dispassionate in challenging popular, preferred beliefs about the nuclear past.

Memory, alternately, designates partial and interested recollections of the past performed by both individuals and collectives. Although memory is always, to some extent, experienced as an individual phenomenon, it does not necessarily originate in private reflection. Individuals commonly document and interpret their evolving identities through private practices of personal memory (e.g., the use of snapshots and scrapbooks by the members of Manhattan Project communities; Fermi, 1995). These practices alternately parallel and intersect with the public practices through which larger collectives construct, share, and contest their narratives of group identity. In this process, those group narratives are often depicted as if they were derived from a common past (e.g., in commemorative discourse surrounding the dedication of monuments). Ritualistic and populist discourses of memory alternately compete with and complement those of history. For audiences, the claims generated by memory (e.g., in the oral histories of nuclear protestors and workers; Sanger, 1995) are enhanced by the immediacy and authenticity of speakers recounting their lived experience. As a frame for evaluation, the verisimilitude of personal narrative displaces the validity produced by rigorous objectivity. Audiences often value such recollection because it recovers the rich details of personal experience effaced by the grand sweep of historical narrative.

As a vehicle for cultural myth and ideology, memory can also be used to mobilize social and political interests to align in particular ways with dominant institutions (Popular Memory Group, 1982). Potentially, this mobilization can be directed against a dominant regime of history, alleging and prosecuting gaps and distortions in its narratives. This approach was certainly the case, for example, in a recent controversy surrounding a proposed exhibition of the Enola Gay aircraft at the Smithsonian Institution's National Air and Space Museum in Washington, DC. In that controversy, powerful interests pitted the partial, visceral memories of World War II veterans against the more comprehensive and detached narratives of museum curators, with tragic results (Hubbard & Hasian, 1998). Ideally, history evolves as a steady and rational project through the confirmation and revision of explanations. In contrast, memory is both more volatile and obdurate, evolving unpredictably based on the ability of its stewards to recruit and maintain adherents, who need not have directly experienced events in order to support particular, preferred recollections, and to secure and defend sacred sites of its performance (e.g., museums). Like history, memory is inevitably plural and potentially agonistic, as different groups maneuver to privilege their recollections over those of competitors (Zelizer, 1995).

Heritage, finally, designates popular movements that are concerned with preserving and interpreting the past during periods of intensive social, political, and economic change. In such climates, nostalgia and anxiety regarding the integrity of a group's historical roots and preferred myths are particularly high. Heritage movements subsequently operate to collect and exhibit valued knowledge, performances, and artifacts from a group's past to ensure the continued viability of its dominant narratives. In this process, heritage discourse promotes a past that fixes the fluctuation of precarious identities and "enhance[s] the well-being of some chosen individual or folk" (Griffiths, 1996, p. 218). To some extent, heritage reflects the intersection of memory and history. Its movements create

sites of memory which are charged with a particular persuasive task of representing the past . . . [and] fulfill their rhetorical mission by merging the authenticating force of memory and the objectifying thrust of history in a compelling, culturally legitimate idiom. (Katriel, 1993, p. 75)

Like history and memory, heritage is a promiscuous phenomenon practiced by virtually all nuclear weapons production stakeholders when confronted with traumatic change. It may also be professionalized: DOE contractors occupying former Native American tribal lands, for example, employ cultural resource managers trained in a variety of archaeological and anthropological methods. These personnel are charged with identifying and preserving artifacts from those civilizations and with overseeing their disposition. Heritage may also, finally, be a site of intense political struggle between stakeholders seeking justice for grievances associated with the history of nuclear weapons production. The Nuclear Claims



Tribunal created to adjudicate claims by Pacific Islanders poisoned and displaced by postwar U.S. nuclear testing, for example, was recently forced to consider whether (and how) the lost knowledge and practices of those indigenous groups should be commodified as part of a financial settlement (Kirsch, 2001).

Distinguishing the discourses of nuclear history, memory, and heritage allows us to develop three claims about their role in shaping public understanding of nuclear weapons production. The first is that, as a field of cultural discourse, the history of U.S. nuclear weapons production is extraordinarily dense and agitated (Hubbard, 1998; Kane, 1988; Newman, 1995; Prosis, 1998). It is suffused with public struggle conducted between groups holding widely divergent, and highly moralized, orientations to the related figures, events, organizations, technologies, and policies constituting that actual history. Typically, these orientations pivot around two, deeply opposed, ideological narratives. In the dominant narrative promoted by Cold War patriots and triumphalists, the bomb is depicted as a heroically constructed technology that was justly used against a vicious wartime enemy, that successfully inhibited Soviet expansionism during the Cold War, and that is still required to deter evolving threats to U.S. national security (Engelhardt, 1998). In a second, less popular, but also persistent narrative (e.g., promoted by New Left historians), the bomb is framed as an unnecessary, and perhaps barbarous, device whose wartime use against Japan commenced a profoundly irrational and dehumanizing chapter in the evolution of military strategy and international politics and whose compulsive production has significantly damaged the global economy, public health, and the environment (Makhijani, et al., 1995; Stegenga, 1991).

Although this characterization obscures a significant middle ground of narratives characterized by ambivalence (e.g., among native peoples modernized by the creation of nuclear weapons production sites; Masco, 1999), it partly maps the heteroglossia of nuclear-cultural history. Because of this condition, visceral conflict frequently erupts around official and popular-cultural sites of nuclear-historical rhetoric, such as Hollywood films and museum exhibitions (Taylor, 1993b; 1998b). In these conflicts, participating groups invoke various, overlapping combinations of historical, memory, and heritage discourses to articulate their interests and discredit their opponents. Frequently, this conflict sustains a history of struggle in which nuclear officials have used and abused the rational discourses of science and bureaucracy in communicating with U.S. citizens. For example, nuclear weapons production officials have employed objectivist discourse in insisting that alternate historical narratives (e.g., those promoted by antinuclear activists) conform to the established (and, implied, self-apparent and consensual) facts of nuclear history. Opponents of orthodox nuclear history, as a result, are most effective (and controversial) when they expose and challenge the taken-for-granted processes by which apparent facts are selected, interpreted, and represented as evidence for historical claims (Taylor, 1996, 1997a).

Secondly, we note the cultural politics through which various elements of the nuclear weapons production complex are selected and emphasized within these

controversies. When it is performed as a public affair, nuclear-historical conflict typically invokes the institutional and operational practices through which the Cold War was planned and conducted. These are frequently matters of organizational history. At the same time, however, the unique histories of some weapons production facilities have been minimized by two narrative conventions. These conventions, which may be partly attributed to the conditions of official secrecy and popular anxiety in postwar culture, misrecognize these facilities in two ways. The first convention involves aggregating DOE facilities as an undifferentiated, monolithic apparatus. In this perspective, speakers attribute nuclear weapons to vague and moralized abstractions such as the military-industrial complex, while failing to distinguish the diverse missions and functions of specific agencies and organizations that interact to produce them. The second form of misrecognition involves selectively emphasizing actors within these networks. For example, histories of tribute circulating in popular culture commonly highlight the elite figures (e.g., Robert Oppenheimer), professional communities (physicists), sites (Los Alamos), and events (the Trinity Test) associated with *scientific* research and development of nuclear weapons during World War II. In this process, less glamorous but equally important stories involving the hard hats and smokestacks of wartime and Cold War-era production facilities have been neglected. Those elements are frequently minimized in dominant historical narratives as mere vehicles for the attainment of larger policy goals (e.g., maintaining nuclear deterrence; Findlay & Hevly, 1995).

As a result, communication scholars can bear witness to the potential transformation of these conventions in an emerging nuclear heritage and tourism apparatus (Gusterson, 2004; Molella, 2003; Taylor, 2003a). Although this apparatus is not centrally organized or funded, enterprising stakeholders at several nuclear weapons production facilities have responded to the close-out of their Cold War mission by developing projects aimed at these markets (e.g., preserving structures, collecting oral histories of facility workers and community residents; Barnes-Kloth, Depoe, Hamilton, & Lombardo, 1999). Here, practical and ideological purposes converge. At the DOE National Laboratories, for example, preserving the informal, tacit knowledge of aging designers currently deprived of the opportunity to test nuclear weapons is viewed by officials as an urgent, as well as historically rich, project. At another level, preserving documents and artifacts from Cold War weapons production sites may ultimately serve the emerging needs of their long-term stewards several generations hence. As these projects unfold, they become opportunities for stakeholder interaction ranging from enthusiastic collaboration to sharp conflict. This interaction determines the appropriate form, content, and significance of historical narratives as viable commodities in the economies of heritage and tourism.

Further research should consider how these narratives (temporarily) resolve the ambiguity and paradox associated with nuclear history and mediate the ambivalent embrace by traditionally proud and insular communities of unpredictable and critical outsiders (Barnes-Kloth, Depoe, & Hamilton, 1999; Taylor & Freer,

2002). The discursive processes by which these relationships are conceptualized and conducted (and which have grown only more conflicted following the events of 9/11; Molella, 2003, p. 224) should be of particular interest.

Finally, we note the temporal politics surrounding stakeholder representations of the relationship between their Cold War and post-Cold War identities and missions. The discourses of history, memory, and heritage are necessary but volatile resources that are appropriated and performed by stakeholders to depict the past in order to influence present and future conditions (Taylor & Freer, 2002). For example, we have argued above that a discourse of containment suffuses both the material projects of DOE speakers (e.g., in stabilizing and storing radioactive waste) and also their predominant punctuation of the Cold War as a finished operation, whose social, political, and environmental residues are currently problematic but ultimately manageable (e.g., they will eventually be cleaned up; Kinsella, 2001).

Communication scholars can trouble this conventional wisdom by three means. The first is to foreground the unprecedented challenges associated with remediating the harms of Cold War weapons production and with managing radioactive wastes whose risks will endure across truly glacial rates of decay (e.g., the half-life of plutonium is 24 millennia). Significantly, the individuals, organizations, and cultures involved in designing long-term stewardship, and the more recently christened program of legacy management, must confront a renewed nuclear challenge to their mortality: They must rhetorically transcend their own deaths to envision the future. The psychological and logistical challenges associated with producing this kind of long-range planning discourse are widely underestimated (Brand, 1999).

The second means is to establish how the current revival of nuclear weapons production by the U.S. government suggests the continuation and renewal—not the completion or transcendence—of Cold War institutional cultures and operations that have produced the current crisis. Here, it seems urgent that critics examine how the discourses of history, memory, and heritage (e.g., surrounding the detection and prosecution of nuclear spies; Masco, 2002; Taylor, 2002) serve as resources for punctuating the relationship between the first and second nuclear ages (Schell, 2000).

The final means involves clarifying the contingencies surrounding the production and reception of nuclear discourse. This critical practice establishes that stakeholders engaged in periodizing and thematizing nuclear history are involved in a dialectic of remembering and forgetting. It also establishes that, contrary to the discourse of some heritage advocates, the issue is not that the nuclear past will be forgotten, but rather which and whose narratives of that past will be preserved, and how they will be enforced as resources for nuclear citizenship and governance in future generations. In this process, just as scholars have recently challenged official views of space that undergird nuclear hegemony (e.g., as a remote, uninhabited resource readily available for appropriation by authorities; Hales, 1997; Kuletz, 1998), they should also critique the historiography of nuclear weapons production (e.g., in narratives implying that time is a neutral and otherwise empty

container for operations). Here, they can consider the following issues: Will the emerging narratives of nuclear history, memory, and heritage encourage accommodation of nuclear hegemony, or heightened resistance (Cable, Shriver, & Hastings, 1999)? Which group's narratives will be privileged as necessary fact? Which will be forgotten, rejected, or marginalized as (mere) nostalgia (Smith, 2000)?

### CONCLUSION: FACING THE CHALLENGES OF STUDYING NUCLEAR WEAPONS PRODUCTION

In this chapter, we have pursued several goals. We have recovered a compelling yet understudied site of communication, reviewed its history and culture, and proposed a three-part framework for extending research. In this process, we have pursued the implications of the two anecdotes used to open this essay. We have encouraged communication scholars to perform a double take at the institutions of nuclear weapons production and to explore the discourse waiting behind the door marked "The Bomb, Inc." Beyond that door, we do indeed find that something happened and that a heightened appreciation for the ethics and politics of communication empowers responsible nuclear citizenship and scholarship.

In proposing this research program, however, we have not failed to appreciate the associated challenges. Our own experience has sensitized us to four, specifically. First, the daunting, technocratic complexity of this site discourages researchers through its generation of associated opportunity costs (e.g., the labor of reading dense, legalistic, and technical reports). Second, the inherently morbid aura surrounding the production of nuclear weapons encourages researchers to adopt safer and more pleasant topics. Third, the discourse of nuclear weapons production is often polarized, constricted, agitated, and moralized. These qualities continually challenge scholars to reflect on their own affiliations (e.g., as citizens of a government willing and able to use weapons of mass destruction), to develop more subtle and innovative forms of analysis, and to bear the brunt of stakeholder reaction to analysis that does not conform to preferred scripts. Finally, intradisciplinary specialization has led communication scholars to allocate the study of nuclear communication in a fragmented, partial, and exclusive manner (Taylor, 1998a). We conclude, as a result, by addressing each of these challenges in turn.

First, we hope that we have partly reduced the opportunity costs of this research program by providing this very review. That is, although it cannot serve as a sole or exhaustive account of this site, we hope that this essay has distilled its relevant features and provided an initial resource for formulating and grounding communication research agendas. Second, although we have each wrestled with the frustrating and frightening dimensions of this research topic, we have also experienced significant satisfaction in our related research and service activities.<sup>13</sup> That experience has resonated for us in noting recent calls for communication

scholars to move from the relatively protected spheres of academic life to address the messy and compelling needs of citizens engaged in ongoing struggles for dignity and justice. We have found complex and urgent problems associated with this site whose deliberation is potentially enhanced by our sustained attention. As a result, we invite scholars seeking sites for applied communication and social justice research to consider this one. This observation links in turn to the third challenge, in which communication scholars at this site must navigate its stormy waters of visceral emotions, oppressive hierarchies of professional and technical expertise, and morally righteous vernacular. These elements frequently combine to shape the perceived authority and legitimacy of our contributions among stakeholders, who may possess strong affiliations with existing institutions. Nonetheless, we believe that communication scholars are uniquely poised to engage this dilemma in that they are predisposed to both analyze and artfully intervene in scenes of distorted and frozen discourse. Studying the nuclear weapons production complex, in other words, sharpens our practices of observation and rhetorical invention as we seek to produce adequate, ethical, and effective research.

Finally, the very form of this essay reflects what we view as one solution to the fourth problem cited above. That is, we have avoided presenting this site as inherently owned by (only) one of our discipline's subfields. We recognize that there is benefit in pursuing nuclear communication research that neatly conforms to the existing categories and agendas of rhetorical criticism, organizational communication, environmental communication, political communication, or group communication. Nonetheless, our experience with this site has led us to adopt a relatively holistic approach to its analysis. Simply put, we believe that we need all of our tools and voices to make effective claims about communication surrounding nuclear weapons production. As a result, we encourage communication scholars to respond to the complexity of this site by integrating theories and concepts in innovative ways. We do not assume, in this process, that all innovations will be equally effective. Instead, we wish to create the space that is required to make and evaluate these attempts.

We hope that this chapter has succeeded in opening this space and that in coming years a growing number of communication scholars will expand and refine it. In this process, "The Bomb, Inc." may yet become the familiar object of our curious and unflinching gaze. With luck, our research could contribute to reinvigorating the freedom and democracy that, we are told repeatedly, are protected by nuclear weapons. If it can be imagined and represented in new ways, the nuclear future may yet follow a path other than tragic repetition.

## NOTES

1. For a review, see Taylor (1998a). More specifically, the study of communication surrounding nuclear weapons production is neglected in, but not incompatible with, rhetorical criticism. In theorizing

identification and consubstantiality, for example, Kenneth Burke observed that the nuclear condition was supported by rhetoric of organization: “Modern war characteristically requires a myriad of constructive acts for each destructive one; before each culminating blast there must be a vast network of operations, directed communally” (quoted in Tietge, 2002, p. 6).

2. We use the term “stakeholder” throughout this chapter in a manner consistent with ongoing development of associated theory in organizational (Clarkson, 1995; Donaldson & Preston, 1995; Frooman, 1999; Mitchell, et al., 1997; Rowley, 1997; Scott & Lane, 2000) and communication studies (Deetz, 1995; Lewis, 1999; Lewis, Richardson, & Hamel, 2003). That theory seeks to adequately conceptualize, identify, and inform communication involving groups, both internal and external to an organization, who are affected (e.g., as a result of claim, ownership, right, or interest) by the outcomes of its past, present, or future operations. We provide a description of principal stakeholders of nuclear weapons production below.

3. Space does not permit adequate treatment of communication surrounding the development of nuclear waste storage facilities. For an overview, see Taylor (2003b). For studies of these two facilities, see Kuletz (1998) and McCutcheon (2002).

4. This blending did not result only from the nuclear symbolism that linked both military production reactors and their technological cousins, commercial power reactors. The two types of facilities are linked at a material level in their production of commonly needed nuclear fuels and a convertible, multipurpose reactor that produced both weapons-grade material and electric power developed at Hanford between 1957 and 1966 (Bergeron, 2002; Carlisle, 1996).

5. It is significant here that the first grassroots movement that transformed official procedures for public involvement in nuclear weapons development was not—as one might expect—antinuclear.

6. An ethnographic anecdote from Taylor and Davis’s (1999) study of public involvement at the post-Cold War Rocky Flats facility illustrates how this discourse operates. There, they witnessed an unsettling event that occurred at an annual State of the Flats meeting. In this ritual forum for exchange between DOE officials and stakeholders, a long-time, local antinuclear activist challenged the site’s DOE manager publicly to judge the site’s previous (and infamous) contractors. “Would you agree that they were evil?” he demanded. The manager, a calm and formidable woman, paused, and looked around the banquet hall filled with the site’s current contractors and representatives from local governments. On her face, civility wrestled disdain to a tie. “You know,” she said emphatically, “I don’t spend a lot of time second-guessing the motives of my predecessors.” The room erupted in applause.

7. The bizarre persistence of Cold War-era practices in nuclear weapons strategy has been noted elsewhere (see Taylor, 2003a). Here, we are concerned with associated practices in the sphere of nuclear weapons production. For example, we have observed the persistence of a particular trope of organizational communication dating from the Manhattan Project and Cold War eras: namely, compulsive conformity to arbitrary schedules (e.g., displayed in contractor urgency to meet cleanup project milestones). This observation does not imply that schedules are inherently useless or whimsical. Instead, it foregrounds how they may be enforced in ways that promote unreflective pursuit of preferred means to achieve preferred goals (e.g., securing bonuses) and that minimize collaborative and undistorted reflection about those elements. As a result, the possibilities for ethical dissent to operations and the related interests of health, safety, and the environment potentially are minimized (see Thorpe, 2004).

8. The authors will provide an expanded reference list on request.

9. In practice, nuclear officials have simultaneously contained both the circulation and meaning of information. The nature of those efforts and their relative proportions, however, vary across eras.

10. The term *capture* has also been used to refer to the reverse case, in which regulatory agencies come to be dominated by the groups that they ostensibly oversee.

11. Here, we refer to converging ominous trends involving the conversion of civilian power reactors to produce weapons materials, the design of robust, low-yield nuclear weapons capable of penetrating and destroying hardened, buried targets, the potential resumption of nuclear testing, and the planned construction of a new facility for producing plutonium weapons components (see Ackland, 2003; Bergeron, 2002, 2004; Simon, 2004).

12. Here, it is important to remember that, although they are both a type of organization, the government agencies and industrial contractors involved have very different structures and cultures (see Wilson, 1989). These contexts uniquely shape their respective communicative practices.

13. Three of the authors have served on DOE SSABs.

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