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Cover Page Footnote

The authors would like to thank Latoya Duncan for help collecting data, Bernard Goldstein and Charles Powers for support and Christopher Noah for comments on an earlier draft. Research was funded by the Consortium for Risk Evaluation and Stakeholder Participation (CRESP) through agreement with the U.S. Department of Energy (DOE). Viewpoints expressed are solely the authors' and do not necessarily reflect those of DOE or its contractors.

Hazards, Risk and the Press: A Comparative Analysis of Newspaper Coverage of Nuclear and Chemical Weapons Sites*

Karen Lowrie, Michael Greenberg & Lynn Waishwell**

Introduction

Landfills, hazardous waste dumps and heavily polluting industrial sites pose environmental, public health and occupational health risks. The facilities that have produced our nation's nuclear weapons and store our stockpiled chemical weapons are among the most feared. Yet, these places are more than just environmental hazards. They are major sources of jobs and large contributors to gross regional product.¹

In the post-Cold War era, many of these facilities prepare for future closure or reuse by undergoing significant downsizing and shifting their mission from weapons production to waste management and

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¹ See Robert D. Bullard, *Dumping in Dixie: Race, Class and Environmental Quality* (Westview Press 1990); Michael Greenberg & Richard Anderson, *Hazardous Waste Sites: The Credibility Gap* (Rutgers University Center for Urban Policy Research 1984).

environmental restoration. The largest sites in the nuclear complex, managed by the U.S. Department of Energy (DOE) employ thousands of workers and store or process large volumes of radioactive waste and other hazardous substances. Eight sites operated by the U.S. Department of Defense (DOD) in the continental U.S. and Johnston Island in the Pacific Ocean store chemical weapons, some of which are very volatile such as rockets filled with nerve or mustard gas.

Recently, both the DOE and the DOD divulged what is located at these sites by openly informing the public, including soliciting public preferences. To increase openness, it is important and timely to evaluate newspapers' emphases in their coverage of these facilities. This is because most Americans rely on mass media for information, including information about hazards.² Singer and Endreny note that "knowledge about, and even attitudes toward, certain kinds of hazards are influenced by their coverage in the press."³ Intermediary links like the media are important sources of information about technological hazards because most members of the public have little first-hand experience with them.⁴ Sociologist Paul Weaver noted that through choice of language, the news angle, the use of sources, and even sentence structure, news propagates opinion as well as information.⁵ The way that news stories cover activities at the weapons sites can influence public opinions about what is important. In a sense, the press is both a shaper of images and a mirror of the culture that surrounds it. Gamson and Modigliani called it a circular relationship, whereby the media helps individuals to construct meaning, but journalists also use public opinion to develop and frame meanings.⁶

² See Laura A. Belsten, *Community Relations Survey*, EG&G Rocky Flats Community Relations Department (1994); David B. McCallum et al., *Communicating About Environmental Risks: How the Public Uses and Perceives Information Sources*, 18 Health Educ. Q. 349 (1991); R.W. Perry & M. Lindell, *Communicating Threat Information for Volcano Hazards*, in *Bad Tidings, Communication and Catastrophe* 47 (L. Walters et al. eds., 1989); David Sachsman & William Sloat, *The Press and the Suburbs* (Rutgers University CUPR 1985); E. Witt, *Here, There and Everywhere: Where Americans Get Their News*, 6 Pub. Op. 45 (1983).

³ Eleanor Singer & Phyllis Endreny, *Reporting on Risk*, at 3 (1993).

⁴ See R. Lidskog, *In Science We Trust? On the Relation Between Scientific Knowledge, Risk Consciousness and Public Trust*, 39 Acta Soc. 31 (1996).

⁵ See Paul Weaver, *The Politics of a News Story*, in *The Mass Media and Modern Democracy* 85 (H.M. Clor ed., Rand McNally 1974).

Yet only since early 1980s does society have systematic exploration linking mass media's role in communicating about hazards and the potential risks they pose. Much of this research, spurred by the disasters at Three Mile Island, Bhopal, and Chernobyl, focused on evaluating mass communication's reporting of disaster events.⁷ There has been little systematic analysis of how the press covers hazardous or risky situations during times of no acute crisis or emergency.

In this study, we performed a content analysis of local and regional newspaper stories from the regions around two nuclear weapons sites — Savannah River Site (SRS) in South Carolina and Rocky Flats Environmental Technology Site (Rocky Flats) in Colorado — and two chemical weapons sites — Tooele Army Depot in Utah and Anniston Army Depot in Alabama.

There are many reasons why these four sites are focal points of public attention in their respective regions. Recent literature on risk perception would predict that the general public rate these sites as some of the most dreaded risks — housing weapons of mass destruction, storing radioactive wastes and potentially harmful materials that cause cancer, or death within two minutes in the case of some nerve gases.⁸

Our goal was to examine how the local print media portray these facilities as hazards, risks or other types of impacts (e.g., socioeconomic, public health, environmental). We examined the sources cited in the articles because literature indicated that public trust of information is influenced by perceptions of the credibility of the sources.

Site Descriptions

Nuclear Weapons Sites

In the early 1950s, the federal government built the two nuclear facilities we included in the study, SRS and Rocky Flats. Those

⁶ See William Gamson & Andre Modigliani, *Media Discourse and Public Opinion on Nuclear Power*, 95 *Am. J. Soc.* 1 (1989).

⁷ See Singer & Endreny, *supra*; E.L. Quarantelli, *The Social Science Study of Disasters and Mass Communication*, in *Bad Tidings, Communication and Catastrophe* 1 (L. Walters et al. eds., 1989); Sharon Friedman et al., *Reporting on Radiation: A Content Analysis of Chernobyl Coverage*, 37 *J. Comm.* 58 (1987); David Rubin, *How the News Media Reported on Three Mile Island and Chernobyl*, 37 *J. Comm.* 42 (1987); L. Wilkins, *Bhopal: The Politics of Mediated Risk*, in *Bad Tidings, Communication and Catastrophe* 21 (L. Walters et al. eds., 1989).

⁸ See Paul Slovic et al., *Rating the Risks*, 21 *Env't.* 14 (1979).

facilities were built to produce basic nuclear materials that would contribute to our national nuclear arsenal. At the time of construction, both sites were located in rural places. The facilities at SRS were constructed in the center of a 310 square mile area of mostly farmland in southwestern South Carolina along the Savannah River. About one-half million people now live in the immediate surrounding counties, with the closest town, Aiken, South Carolina (population 20,000), about ten miles north of the site and the closest metropolitan area, Augusta, Georgia (population 45,000), 15 miles northwest.

The Rocky Flats site area is much smaller than SRS, occupying about ten square miles at the foothills of the Rocky Mountains about 16 miles northwest of Denver. Though rural at the time of construction, it is now at the edge of a fast-growing metropolitan region. About two million people now live within 50 miles of Rocky Flats, with residential and commercial development moving closer to the site boundary.

Both sites were major local employers in past decades, although SRS's employment represents a much larger share of the local economy than did Rocky Flats. An economic analysis determined that DOE spending accounts for over 16% of the Gross Regional Product (GRP) near SRS and about 2.5% of the GRP in the Rocky Flats region.⁹ Post-Cold War downsizing has affected both sites, as SRS has lost over one-third of its 25,000 workforce and Rocky Flats has lost one-half of its 7,500 workforce since 1994. In 1997, DOE announced that Rocky Flats is slated for complete closure within the next decade.¹⁰ SRS is also engaged in clean-up activities to stabilize and consolidate wastes and reduce risks. No plans exist to close the site yet and it is also a likely location of any new nuclear production missions.

Chemical Weapon Depots

The Desert Chemical Weapons Depot is located near Tooele, Utah, about 35 miles southwest of Salt Lake City and about 500 miles from the Rocky Flats nuclear site. The Tooele site is remote compared to Rocky Flats. Only 27,000 people live in Tooele County, and its density

⁹ See Michael Frisch et al., *A Modeling Framework for Analyzing the Economic Impacts of the Department of Energy's Environmental Management Program*, Report 11 to CRESF (Rutgers University 1997).

¹⁰ See Jacques Scott, *Flats/Fast-Track Closure Draws Praise, Boos*, Jeffco News (Aug. 8, 1997).

of less than four people per square mile testifies to the fact that much of the site sits on the Great Salt Lake Desert and is surrounded by mountains. There are no towns of 1,000 or more people within five miles of the site. The small towns of Stockton, Rush Valley and Ophir are located three to fifteen miles away. However, Tooele houses the largest volume of chemical weapons of any site on the continental U.S., about 42% by volume, including many thousands of rockets and other dangerous weapon configurations.

The military facility had almost 5,000 workers in 1988, when decisions were made to close the site as well as the Dugway proving ground located about 30 miles to the west. Jobs declined to 2,700 in 1993 and are expected to decrease to about 600. Tooele was the first site in the continental U.S. to have an incinerator to destroy these weapons, employing about 400 well-paid civilians in the destruction process.¹¹ Many of those employed will be involved in destroying the chemical weapons stockpile.

The Anniston site is located in Calhoun County, Alabama (population 110,000), which is about 250 miles west of the SRS nuclear site and adjoins the fort McClellan Military Reservation. More than 20,000 people live within 6.2 miles of the site. The nearest communities, Bynum and Eastibogu, are located on the site's southern most boundary.

Fort McClellan and the depot directly account for 5,000 to 6,000 civilian jobs and another 2,000 military personnel. Accordingly, this military complex is an important source of jobs in this poor region. This site houses approximately 7% of the U.S. chemical stockpile as well as a partially constructed incinerator expected to be the second operational site in the continental U.S.¹²

Factors That Could Explain Coverage

Literature regarding environmental news coverage indicates that the media captures the public's attention by focusing on controversial, new or unusual elements of an issue. The implication, called the "standard" explanation coverage, is stories emphasizing risk are merely reflecting event-oriented coverage.¹³ Because "newsworthy" events with risk

¹¹ See *Tooele Army Depot Site Report* (1994).

¹² See *Anniston Army Depot Site Report* (1994).

implications occurred throughout the year at all four sites, one would expect similar attention to risk at all four sites. For example, the Tooele site initiated incinerator operations and whistleblower allegations for safety violations; Rocky Flats had reports of lax security and began shipping plutonium; SRS accepted of foreign nuclear fuel rods and spilled minor radioactive materials and gas; and the Anniston site's plan for building an incinerator were in full force.

This study examines three other possibilities that modify the standard reasons for coverage (Table 1). The first alternative, the "institutional" explanation, acknowledges that the sites are owned and managed by different arms of the Federal Government: the DOD (chemical), with a reputation for accomplishing missions and the DOE (nuclear), marked by an unstable internal organization and deficits of public trust almost since its beginnings in the 1970s.¹⁴ This alternative implies that the public would be less concerned about risk at the DOD sites than the DOE sites because they would be less trusting of hazards managed by the DOE than by the DOD.

Table 1
Factors to Explain Coverage

<i>Explanation</i>	<i>Expect More Emphasis on Risk</i>
Standard	No Difference Between Sites
Institutional	Nuclear (SRS/Rocky Flats)
Economic Dependence	Chemical (Tooele/Anniston)
Geographical-Cultural	Western (Tooele/Rocky Flats)

A second explanation for deviations in coverage is "economic dependence." Most of the major nuclear weapons sites, employing tens of thousands of workers at their peak, have been more important to their regional economies than the chemical depots. Although the size of their workforce fluctuates, many view most of the major nuclear weapons sites as positive economic forces due to the large numbers of well-paid employees. In contrast, most of the chemical sites employ far

¹³ See Peter Sandman et al., *Environmental Risk and Press: An Exploratory Assessment* (1987).

¹⁴ See Secretary of Energy Advisory Board (SEAB), *Task Force on Radioactive Waste Management, Earning Public Trust and Confidence: Requisites for Managing Radioactive Waste* (U.S. Government Printing Office 1993).

fewer people and therefore play far less of an economic role. Some commentators view economic health as more politically central than the risk that accidents could cause death and injury.¹⁵ Other commentators wrote that “a newspaper in a one-industry town is unlikely to report that industry in a critical way. It will reflect community consensus about that industry through reporting socially non-controversial aspects of that industry and generally avoiding reports that would question it.”¹⁶ Prior research on the SRS region revealed that locals have been largely supportive of the site and have down-played health risks because of the large number of well-paying jobs at the site and local confidence in the site’s safety record.¹⁷ This explanation implies that the nuclear site coverage, especially of SRS, would focus less on risk and more on economics than the other sites.

A third plausible modifying factor is “geographical-cultural” differences among sites. These would result from the particular demographic make-up as well as historical and political factors that characterize certain regions. The news media tend to reflect the concerns of the local power structure and reinforce mainstream values.¹⁸ For instance, the South is generally more supportive of the U.S. military than the other parts of the country. The Southern sites are also located in less pluralistic regions because they are farther from major metropolitan areas. An analysis of newspaper coverage of risks from environmental contaminants showed newspapers in less pluralistic communities like the South are less likely to frame the situation as a problem and to link contamination to threats to human health.¹⁹ Another study regarding newspaper coverage of high-level nuclear waste repository controversy and its impact on community structure concluded that homogeneous communities like the South were less likely to write stories reflecting conflicting points of view and write

¹⁵ See Lynne Wilkins, *supra* note 7.

¹⁶ Phillip J. Tichenor et al., *Community Conflict and the Press* 220 (1980).

¹⁷ See Karen Lowrie & Michael Greenberg, *Placing Future Land Use Planning in a Regional Context: The Case of the Savannah River Site*, 8 *Fed. Facilities Envtl. J.* 51 (1997).

¹⁸ See Robert J. Griffin et al., *The Effects of Community Pluralism on Press Coverage of Health Risks from Local Environmental Contamination*, 15 *Risk Anal.* 449 (1995).

¹⁹ *Id.*

issue-oriented pieces.²⁰ This factor suggests that the two southern sites (SRS and Anniston) would be less concerned about risk than their western counterparts (Rocky Flats and Tooele).

We asked three research questions to measure the importance of these three explanations of coverage:

1. How does attention to risk differ in articles about nuclear weapons and chemical weapons sites?
3. How do the types of economic and other impacts mentioned differ in articles about nuclear weapons and chemical weapons sites?
3. How do the types of sources used differ in articles about nuclear weapons and chemical weapons sites?

We conclude by assessing the policy implications of these findings, especially issues of public involvement.

Methods

Sampling

Newspaper Titles: For each site, we included three newspapers: two major regional newspapers and a smaller daily local paper from the closest town or city (Table 2). We did not find direct equivalents in terms of circulation or proximity to the site in all of regions.

Dates: We chose a one-year period with publication dates between July 1, 1996 and June 30, 1997. This time frame was recent enough to provide a current view of press coverage of the sites as well as long enough to cover any seasonal differences in coverage and to provide a large enough number of articles to analyze. Although no major incidents occurred at any of the sites during this period, several minor accidents occurred, as well as changes in activities brought about by downsizing. Therefore, our sample should reflect coverage across a broad range of possible subjects (i.e. employment and budget issues, environmental management activities, etc.) without a large number of alarming reports about the specifics of a major accident which would have created comparability problems.

²⁰ See Sharon Dunwoody, & M. Rossow, *Community Pluralism and Newspaper Coverage of High-Level Waste Siting Issue*, in *Environmental Activism Revisited: The Changing Nature of Communication through Organizational Public Relations, Special Interest Groups and the Mass Media*, at 5 (L.A. Grunig ed., NAAEE 1989).

Table 2
Newspapers and Articles Included in Study

<i>Region</i>	<i>Newspaper Title</i>	<i>Circulation Daily (Approx. 1998)</i>	<i>Number of Articles</i>	<i>Percent of Sample</i>
SRS	Augusta Chronicle	82,000	120	23.0
	The State (Columbia, SC)	130,000	30	6.8
	Atlanta Constitution	313,000	8	1.8
Rocky Flats	Boulder Daily Camera	38,500	15	3.4
	Denver Post	354,000	33	7.4
	Rocky Mountain News	332,000	32	7.2
Tooele	Salt Lake City Tribune	135,000	49	11.1
	Deseret News	65,000	53	11.9
	Tooele Transcript	7,500 (2X/week)	47	10.6
Anniston	Birmingham News	192,000	13	2.9
	Birmingham Post-Herald	192,000	5	1.1
	Anniston Morning Star	27,800	57	12.8
	Total		462	100.0

Articles: We selected every article that was primarily about an event, process, operation or activity that has been or is occurring either on or with regard to the site. By the end of the study period, all of the newspapers but one (Tooele Transcript) became available through electronic indexing. We searched articles for references to the site names anywhere in the article or headline. For the Tooele Transcript, a clipping service provided most of the articles and we ordered additional articles directly from the newspaper office. From this master set of articles, we excluded articles that may have mentioned the site name, but were primarily about another event or person (e.g. obituary of site worker, etc.). We also excluded editorials and letters to the Editor because a reader would not view them as objective journalism. From the twelve newspapers, a total of 462 articles containing 6,762 total paragraphs met the criteria for inclusion.

Coding Categories and Process

We coded articles according to main subject (10 categories) and other article information such as publication name, date, and page number. Next, we coded each article the paragraph level for three variables: the source of the information²¹ (14 categories); the type of

²¹ We defined "source" as the affiliation of the person, company or written document that supplied the reporter with the information contained in the paragraph. If no source was indicated explicitly or by inference from a prior or subsequent paragraph, we coded the paragraph as "Unattributed."

impact mentioned²² (9 categories), and references to hazard or risk (7 categories) (Table 3).

Table 3
Article Coding Categories

<i>Paragraph - Source of Information</i>	<i>Paragraph - Impact (Who Affected)</i>	<i>Paragraph Presence of Hazard/Risk</i>	<i>Article - Main Subject (Headline)</i>
Site Official - Contractor	Economic - Local	Claims Hazard Present	Environmental Management
Site Official DOE/DOD	Economic - National	Denies Hazard Present	\$/Cleanup Relationship
Site Official - Can't Tell	Cost - Effectiveness	Mixed Opinion if Present	Accident/Pollution Event
DOE/DOD - HQ	Human Health	Claims Risky	Other Site Land Use
Federal Government-Other	Occupational Health	Denies Risky	Security
Other Government (State/Local)	Environment	Mixed Opinion if Risky	Stakeholder Participation
Business -Industry	Stakeholder Involvement	None	Budgetary Issue
Workers & Unions	Multiple		Employment/Downsizing
Advocacy/ Environ./Citizen Groups	No Impacts		Violations/Legal/Regulatory
Individual Citizens			History
Experts (Not Involved)			Other
Mixed Attribution			
Other			
Unattributed			

We also coded each headline as a paragraph because readers are most likely to be influenced by headlines. We coded articles by manifest content, not underlying assumptions, implications or “hidden meanings,” presuming that average readers have little background knowledge about nuclear weapons sites and, thus, would be likely to take information at face value. Also, decreasing the number of subjective assessments improves the coding’s reliability.

²² We defined “impacts” as whom or what is affected by an activity or situation (past, present or future). For example, a sentence that reads, “the cleanup plan would create more jobs for the region,” would be coded as a local economic impact. Likewise, one that reads, “the spill may have exposed workers to increased radiation levels,” would be coded as an occupational health impact. If no impacts are mentioned, we coded the paragraph “No Impact.”

The hazard/risk variable is derived from prior studies of environmental risk stories.²³ We coded each paragraph depending whether it mentioned a hazard (affirming or denying its presence), a risk (affirming or denying), or made no reference to hazard or risk (Zilch). For the coder, we defined “hazard” as either a certain pollutant (radioactive or hazardous material) or a situation that might be hazardous (e.g. gases that might ignite). We defined “risk” as whether the substance is dangerous (e.g. causes cancer, could result in human illness or death, or deals with the likelihood that harm could occur). If a paragraph mentioned both the presence of a hazard (e.g. radioactive materials) and a risk associated with it (e.g. are likely to result in increased levels of cancer for nearby residents), we coded it as a risk.

Reliability

The study employed one coder and we performed reliability checks throughout the coding. We measured inter-coder reliability — the degree by which the process can be recreated under different circumstances — with different coders. We chose a systematic sample of 11% of the articles in which to perform a reliability test. The researchers served as the second coders, and agreement with the original coder was 91% overall.

Results

To answer the research questions, we compared results from all the articles about the nuclear sites to those about the chemical weapon facilities. Many of the observed differences were statistically significant because of the large number of total paragraphs. We focus on those presenting the greatest absolute differences and/or those revealing the most interesting comparisons. We also compared results of the analysis along other possible lines of separation, such as small versus large papers, and pairings of the sites in other combinations.

Description of Sample

The Augusta Chronicle had the most articles (23% of the sample), averaging roughly two articles per week (Table 2). The local papers near the Tooele and Anniston sites (Transcript and Morning Star) averaged about one article per week, while the Columbia, South Carolina and

²³ See Sandman et al., *supra*.

Denver, Colorado papers averaged about two to three articles per month. Boulder papers, much smaller than the Denver papers, and Atlanta and Birmingham papers, further from the site than Tooele or Anniston papers, respectively, averaged only one or fewer articles per month. Although the split of articles was roughly even between nuclear ($n = 220$) and chemical ($n = 224$) sites, the sample has greater proportions of articles about the SRS and the Tooele sites (31.6% and 33.6%) than about the other two sites. For the chemical sites, there are twice as many articles about Tooele than Anniston.

The greatest proportion of articles ranged from 11 to 15 paragraphs in length (35.6%), although more of the chemical weapons sites' articles (45%) than the nuclear site articles (19.6%) exceeded over 16 paragraphs. This resulted in more total paragraphs about the chemical depots (3,816) than about the nuclear sites (2,946).

Environmental management activities at the site represented the main subject for the greatest proportion of articles about both the nuclear (40%) and chemical (67%) sites (Table 4). This includes activities related to waste clean-up or weapons destruction.

Table 4
Main Subject by Type of Site (Articles)

<i>Main Subject</i>	<i>% of Nuclear Articles (n = 220)</i>	<i>% of Chemical Articles (n = 224)</i>	<i>% of All Articles (n = 444)</i>
Environmental Management	40.0	67.9	54.1
\$/Cleanup Relationship	6.4	-	3.2
Accident/Pollution Event	9.1	9.4	9.2
Other Site Land Use	6.4	-	3.2
Security	5.5	.4	2.9
Stakeholder Participation	1.8	6.7	4.3
Budgetary Issue	6.4	-	3.2
Employment/Downsizing	12.7	1.3	7.0
Violations/Legal/Regulations	5.9	7.6	6.8
History	.5	1.3	.9
Other	5.5	5.4	5.4
Total	100.0	100.0	100.0

Articles about the nuclear sites covered a greater variety of subjects other than environmental management. Nuclear site articles were about 20 times more likely to be about economic issues like efficiency,

budget, and employment and downsizing issues than the chemical weapon articles. Chemical site articles, however, had more than three times the proportion of articles about stakeholder involvement.

Mentioning of Hazard/Risk

We coded a paragraph as mentioning a hazard if the article mentioned words like “contamination,” “pollution,” specific contaminants (e.g. “plutonium” or “nerve gas”), or a dangerous situation (e.g. “explosion” or “terrorist threat”). If the hazard is characterized as a risk (e.g. “posing a threat to public health” or “with the potential to destroy buildings”), it was coded instead as one of the “risky” categories, depending if it was an affirmation, denial or mixed assessment of that risk. Overall, only 39% of all paragraphs about the sites mention hazard or risk (Table 5).

Table 5
Hazard/Risk Presence by Type of Site

<i>Risk Category</i>	<i>% of Nuclear Paragraphs (n = 2946)</i>	<i>% of Chemical Paragraphs (n = 3816)</i>	<i>% of Tooele/RF Paragraphs (n = 3965)</i>	<i>% of Anniston/SRS Paragraphs (n = 2797)</i>	<i>% of All Paragraphs (n = 6762)</i>
Claims Hazard Present	26.0	25.2	28.8 ^b	20.9	25.5
Denies Hazard Present	4 ^a	2.9	2.6 ^b	.7	1.8
Mixed Opinion if Present	.4	.5	.6	.3	.5
Claims Risky	4.9 ^a	8.7	8.7 ^b	4.7	7.1
Denies Risky	2.6 ^a	4.4	4.7 ^b	2.1	3.6
Mixed Opinion if Risky	.4	.6	.5	.5	.5
No Hazard/Risk Information	65.3 ^a	57.8	54.1 ^b	70.8	61.0
Total	100.0	100.0	100.0	100.0	100.0

^a Proportion different from Chemical at $p < .05$

^b Proportion different from Anniston/SRS at $p < .05$

We also found that the Tooele and Rocky Flats paragraphs were more likely to contain references to hazards than were the Anniston and SRS paragraphs. The number of paragraphs denying hazards were uniformly low, although we noted the greater difference between all of the chemical site paragraphs (2.9%) than the nuclear site paragraphs

(0.4%). This is probably attributable to chemical sites stories using more “alternative” sources — more apt to present counter views.

Types of Impacts Emphasized

We coded a paragraph as mentioning an impact if it made reference to whom or what would be affected by a certain activity or decision regarding the site. We coded a paragraph as “No Impact” no such impact was mentioned. Overall, about one-fifth of the paragraphs mentioned an impact of some type (Table 6).

Table 6
Impacts by Type of Site (Paragraphs)

<i>Impacts</i>	<i>% of Nuclear Paragraphs (n = 2946)</i>	<i>% of Chemical Paragraphs (n = 3816)</i>	<i>% of Tooele/RF Paragraphs (n = 3965)</i>	<i>% of Anniston/SRS Paragraphs (n = 2797)</i>	<i>% of All Paragraphs (n = 6762)</i>
Economic-Local	8.7 ^a	1.5	.9 ^b	9.9	4.6
Economic-National	4.2 ^a	3	1.3 ^b	3.0	2.0
Cost Effectiveness	2.7 ^a	.0	.6 ^b	2.1	1.2
Human Health	2.4 ^a	3.6	2.9	3.2	3.1
Occupational Health	4.2 ^a	1.6	1.9 ^b	3.8	2.7
Environment*	3.7 ^a	.6	1.5 ^b	2.6	1.9
Stakeholder					
Involvement	1.5 ^a	5.1	3.4	3.6	3.5
Multiple	1.8	2.2	2.3	1.7	2.0
No Impacts	71.0 ^a	85.0	85.3 ^b	69.8	78.9
Total	100.0	100.0	100.0	100.0	100.0

* Environment impacts, as shown here, is a sum of the original categories “environment-general,” “water quality,” “ecological,” and “off-site land use.”

^a Proportion different from Chemical at $p \leq .05$

^b Proportion different from Anniston/SRS at $p \leq .05$

Comparisons across the four sites reveals paragraphs written about SRS are far more likely to discuss impacts (34.7%) than those written about Tooele (13.3%), with the others falling in between. Also, all articles rarely mentioned effects on human, occupational health, or the environment (combined 7.7% of paragraphs). This latter finding was especially surprising because many articles about these sites addressed management of highly hazardous, radioactive and chemical materials.

The most frequently mentioned impact was local economics such as, effects of site decisions on jobs, income and the health of the local

economy. Inclusion of local economic impacts, however, is very unbalanced among the four sites. We observed the most pronounced difference between SRS and Anniston articles and Rocky Flats and Tooele articles. Coverage of SRS, located in a more economically stressed and dependent region, stressed local economic impacts to a much greater degree than coverage of the other three sites, with more than 12% of its total paragraphs. Coverage of the Anniston site, the potential site for an employment-generating weapons incinerator, mentioned local economic impacts in 5% of its paragraphs. The other two sites (Rocky Flats and Tooele) barely mentioned the local economy at all.

For all other impacts, the most significant differences occurred between nuclear sites and chemical sites. Chemical site paragraphs mentioned stakeholder involvement and impacts to human health (often the catalyst for stakeholder concern) more often. We did not find this surprising because the types of health threats posed at the chemical sites are more immediate (e.g. explosion of rockets) than those at the nuclear sites (e.g. long-term exposure to radiation). It is less clear why nuclear site paragraphs were far more likely to mention occupational health and general environmental issues than chemical site paragraphs. We found the five paragraphs about these impacts at the Anniston Depot surprising because many articles discussed the pros and cons of operating an incinerator at the site — an activity likely to have major impacts in both of these areas. It appears the media framed paragraphs more as an economic issue than as a health and environmental issue. These findings, then, seem to support the economic dependence explanation-coverage of SRS, the most economically dependent region of the four sites, emphasized economics and de-emphasized human health hazards. However, because Anniston coverage also stressed local economics, there may some evidence to support the standard and geo-cultural explanations as well.

We also found that of all paragraphs coded, only those about the nuclear sites, almost exclusively, mention impacts of site activities on the national economy (e.g. Federal budget) and on cost-effectiveness (e.g. ability to accomplish tasks with the least amount of money). In fact, only one paragraph out of over 3,800 coded written about the two

chemical sites mentioned cost-effectiveness. A possible explanation is the DOE sites are tied to a larger nuclear weapons complex with a projected total clean-up cost of \$100 to over \$300 billion compared to an approximate cost of \$16 billion for the clean-up of the chemical weapons sites. Accordingly, the local press devotes more attention to budget-related issues there because the nuclear sites are competing for their share of the much larger “environmental management” pie.

Use of Sources

Overall, we attributed slightly fewer than one-half of all paragraphs in the articles to a source. This proportion varies little between the different sets of articles (Table 7). As literature would predict, the most frequently cited sources across articles covering all sites were official sources, such as, officials from the sites or from DOE or DOD headquarters. These sources are most likely to present a cautious, conservative interpretation of any risks posed by the sites.

The articles about the nuclear sites relied heaviest on these official sources as their informational source, with over a quarter of all paragraphs, and more than 60% of all attributed paragraphs coming from those sources. The articles about the chemical sites relied to a greater degree on non-official sources, or counterpoint opinions, such as other government (local, county and state), and individual citizens, than do the nuclear articles.

When comparing Tooele/Rocky Flats articles to Anniston/SRS articles, two differences stand out. One is that the Anniston/SRS articles used more business/industry representatives than Tooele/Rocky Flats. When broken out individually, it appears that articles about Anniston are at least ten times more likely to cite business representatives than articles about Tooele. The difference is less pronounced between the two nuclear sites. Second, Tooele/Rocky Flats articles were almost twice as likely to use advocacy or citizen groups as sources than are Anniston/SRS. Previous research has shown that advocacy groups were most likely to be critical of site activities in news reports. We surmise that coverage of these sites is more likely to include views and charges of local citizen groups against the sites because both the Tooele and Rocky Flats sites have been fraught with more controversy and more allegations of mismanagement in their recent

operations. These findings most strongly support the geographical-cultural factor.

Table 7
Sources by Type of Site (Paragraphs)

<i>Sources</i>	<i>% of Nuclear Paragraphs (n = 2946)</i>	<i>% of Chemical Paragraphs (n = 3816)</i>	<i>% of Tooele/RF Paragraphs (n = 3965)</i>	<i>% of Anniston/SRS Paragraphs (n = 2797)</i>	<i>% of All Paragraphs (n = 6762)</i>
Site Official Contractor	7.8 ^a	1.9	2.6 ^b	7.1	4.5
Site Official-DOE/DOD	2.9 ^a	.9	1.2 ^b	2.6	1.8
Site Official-Can't Tell	8.0 ^a	10.1	10.5 ^b	7.3	9.2
DOE/DOD-HQ	8.5 ^a	6.6	8.3 ^b	6.2	7.4
Federal Gov't-Other	4.7 ^a	3.5	3.5 ^b	4.8	4.0
Other-Government	2.3 ^a	8.5	7.2 ^b	3.7	5.8
Business/Industry	1.9 ^a	.6	.7 ^b	2.0	1.2
Workers & Unions	1.7 ^a	.7	1.0	1.4	1.1
Advocacy/Citizen Groups	3.8 ^a	7.9	7.6 ^b	3.9	6.1
Individual Citizens	1.2 ^a	4.3	2.4 ^b	3.8	3.0
Experts (Not Involved)	1.5	2.0	1.6	2.0	1.8
Mixed Attribution	.6	.5	.7	.4	.6
Other	.9 ^a	1.5	1.9 ^b	3	1.3
Unattributed	54.1 ^a	51.0	50.8 ^b	54.5	52.4
Total	100.0	100.0	100.0	100.0	100.0

^a Proportion different from Chemical at $p \leq .05$

^b Proportion different from Anniston/SRS at $p \leq .05$

Conclusions

This analysis of routine newspaper coverage over the course of a year of four hazardous facilities, two former nuclear weapons production sites and two chemical weapon depots, resulted in several noteworthy findings. We confirmed the results of other studies of environmental risk in the press in finding a heavy reliance on official and government sources for information, and in low overall reference to risk throughout the articles.²⁴ Indeed, the relatively low emphasis on risk across all articles may stem from reporters' reliance on sources as "surrogate observers" and their dependence on institutions as the most available and suitable sources.²⁵ Industry and government officials tend to de-

²⁴ *Id.*

²⁵ See T.M. Counts, *The Influence of Message and Source on Selection of Statements by Reporter*, 52(3) *Journalism Q.* 443 (1975); Herbert Gans, *Deciding*

emphasize the possibility that local populations are at risk.²⁶ Alarming statements are more likely from Congress members, watchdog groups, experts and citizens.

However, stronger and more interesting differences occurred regarding what we labeled as “geo-cultural” explanations of coverage. A possible explanation for coverage similarity in Tooele and Rocky Flats versus that in SRS and Anniston has to do with the cultural differences between these regions. Also, matters such as the degree of heterogeneity in demographics and political views of regional populations influence the framing of newspaper stories as well.

There was also evidence that the role of the site in maintaining local jobs becomes more important in coverage than potential human health impacts. That is the “economic dependence” factor in newsworthiness. There was the least amount of evidence that our “institutional trust” influenced media coverage, because we did not observe that DOE-owned sites receiving coverage that emphasized associated hazards and risks. In addition, we found that coverage of the DOE-owned nuclear sites was more likely to place activities at those sites in relation to the national budget context, than was coverage of DOD-owned chemical depots. Also, DOD sites, with personnel presumably better trained to seek alternate views, had more references to stakeholder involvement and used citizen groups more as sources.

We cannot, however, dismiss alternative explanations for these findings, such as the fact that the Rocky Flats and Tooele sites were both in a “high stage of activity” during the period of the study, whereas the SRS and Anniston sites were in a relatively lower stage of activity. In other words, it is possible that if some action is occurring there, it will yield coverage that includes more discussion of hazard and risk. However, if relatively little is changing at the site, even though it has the same types of hazardous substances as a more active site, coverage is likely to down play hazards and risks. Formal hypothesis tests of those and other possible factors, holding other variables constant, would be required to state conclusions with certainty. This study provides some evidence to suggest that further studies that study

What’s News (Pantheon 1979); see also Singer & Endreny, *supra* at 128.

²⁶ See David Rubin, *supra* note 7.

more than four sites, including multiple sites of different types in different regions of the country, are warranted to test these hypotheses.

It is important to note that a content analysis study of a single mass medium during one time period has inherent limitations. First, we realize that any single communication channel does not meet the information needs of the entire community, or even of any individual in the community. A parallel study of radio and television stories about the weapons sites, for example, would more accurately reflect an average individual's media consumption and allow comparison between types of media. It is also unfortunate that the number of articles appearing over the chosen year about the sites was lopsided in favor of the SRS and Tooele sites, in the *Augusta Chronicle* in particular. We could have sampled from those publications that were over-represented, but chose not to lose the content contained in all the articles. Monitoring coverage over time would also help to control for the occurrence of particularly newsworthy events that will influence coverage during short time periods. Second, we also have no proof that these specific newspapers are necessarily the most trusted sources of information on the weapons sites in the community. A matching empirical study of residents during the same time period about the use and trust of these newspapers would be necessary to examine this. Third, we cannot assume that the media has a guiding effect upon behaviors or attitudes without careful establishment of a relationship between content and effect.

Finally, a limitation of the content analysis method is that it only analyzes what is said and not why it was said (i.e., motives). Do editors guide and reporters write with the nature of their readers in mind or do they present information through a filter of personal or organizational values? We did not aim to measure the intentions of the reporters and editors of the newspapers directly. In this study, we identified four possible factors to explain the emphases of newspaper coverage at these four sites. Further research is needed to explore other dimensions of how hazardous facilities are presented in the media in routine coverage, not just in disaster or accident situations.



