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The Bombs Bursting In Air: A History Of The Effects of Atmospheric Nuclear Weapons Testing On Washington County, Utah, 1951-1963

Paul W. Bridges II

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THE BOMBS BURSTING IN AIR: A HISTORY OF THE EFFECTS OF ATMOSPHERIC
NUCLEAR WEAPONS TESTING ON WASHINGTON COUNTY, UTAH, 1951-1963

by

PAUL W. BRIDGES II

(Under the Direction of Alan C. Downs)

ABSTRACT

This thesis explores the effects of atmospheric nuclear weapons tests conducted at the Nevada Test Site from 1951-1962 on Washington County, Utah, specifically focusing on the effects of these detonations on the local population, the local flora and fauna, and the ensuing impact of political and economic forces. While some Americans readily concede that these tests were necessary for the survival of the United States in the face of Soviet nuclear aggression, other Americans (notably, those who were most closely affected) do not share such a patriotic view of the government's conduct in performing such extensive and damaging experiments. Therefore, the historical philosophy behind the compulsion to treat the deserts of the American Southwest (and the populations that inhabit them and the surrounding areas) as expendable resources, valuable only insofar as they serve economic, militaristic, or propagandistic purposes for the Federal government is examined.

INDEX WORDS: Nevada Test Site, Atomic Energy Commission, Downwinders, Operation Divine Strake, Radioactive Fallout, Iodine 131, Cesium 137, Manhattan Project, Atomic Energy Act, Uranium Mining

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B.A., Georgia Southern University, 2007

A Thesis Submitted to the Graduate Faculty of Georgia Southern University in Partial
Fulfillment of the Requirements for the Degree

MASTER OF ARTS

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2014

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PREFACE

This project developed out of a paper I wrote for an undergraduate seminar course on the U. S. West. The original idea for the work was a general examination of how the United States' atomic weapons program embodied historical themes associated with the U. S. West. After receiving some literature regarding public outcry about a scheduled weapons experiment at the Nevada Test Site from a friend residing in the hamlet of Rockville, Utah, I began doing more extensive research into the experiences of people in downwind communities during the atmospheric testing period. The following summer of 2007, I visited Rockville, which is located in Washington County, Utah, and developed a personal connection with the area and its people. The paper I wrote led me to many more questions than answers, and the time I spent there that summer convinced me that I should continue to pursue the topic.

In a way, I am also now a downwinder, as I have had this metaphorical radioactive cloud of a research project hovering over my life for the last seven years. While the research phase of the process was exhilarating, I found the daunting challenge of composing the finished product to be depressing, frustrating, and frightening. Many changes occurred over that span, and life's challenges have a way of clarifying one's purpose, even if not making the path less strenuous. I lived the majority of the first quarter century of my existence within forty miles of a nuclear power plant. My father worked as a contract administrator at the Edwin I. Hatch nuclear plant for twenty-two years, from the time I was five years old, so I grew up with nuclear power as an unquestioned fact of life. It was not until the winter of 2006 that I began to question the tenets and origins of nuclear technology, and perhaps the disillusionment of the realizations that followed unavoidably tainted my project. Still, I found Washington County's role in the development of a national nuclear program to be compelling.

During the course of my research, I realized that there was no precedent for the manner in which I intended to tell the story, no framework which had already been built by secondary scholars. While several scholars from the fields of history, political science, journalism, and sociology have examined the topic from the perspectives of their chosen disciplines, no historians had dealt with the subject from the point of view of a specific community. Therefore, I chose Washington County, Utah, as the location upon which to center my focus.

In his 1986 book, *Justice Downwind*, Howard Ball approached the subject from an epidemiologic point of view and told the story from information revealed in the downwinders' landmark court case, *Irene Allen et al. v. United States*. Ball, then a political science professor specializing in civil rights, constitutional law, and the judicial process, cursorily dealt with St. George, but did not discuss any communities in Washington County. He examined the development of the nuclear weapons complex and the Atomic Energy Commission's (AEC) association with national security, the responses of downwinders and their cancer incidence, the medical controversy in linking radioactive fallout and cancer, and the progression and impact of the Allen trial. Ball concluded that the government had violated the civil rights of downwinders and that the judge's decision in the Allen trial was the first step in setting right the injuries they had suffered.

The same year, Constandina Titus, a political science professor at UNLV, former Nevada state senator, and current Nevada congresswoman in the U. S. House of Representatives, published *Bombs in the Backyard* in which she related the nuclear testing program to the overarching American political scene. Titus, who also worked with the National Atomic Testing Museum located in Las Vegas, Nevada, attempted to make the case that the AEC did not deceive the public through various public relations campaigns, but merely argued effectively that

experimenting with nuclear weapons on American soil was necessary even if the possibility of endangering public health was a consequence. Titus dealt only cursorily with subjects from Washington County, choosing instead to focus primarily on the southern Nevada region in relation to the testing program. While she did acknowledge the economic benefits to southern Nevada from the testing program, Titus ultimately found that the government conducted its nuclear experiments as a result of the existential threat posed by the U.S.S.R.

A few years later, after the federal government had made its judicial appeals, Philip L. Fradkin released *Fallout: An American Nuclear Tragedy*. Fradkin was a journalist who covered the Vietnam War and environmental issues for several publications including the *Los Angeles Times*, and also served as editor for *Audubon* magazine and taught writing at Stanford University and the University of California, Berkeley. Fradkin utilized the Allen trial as the framework for his telling of the story and covered issues related to the involved governmental agencies, legal defense and prosecution teams, the testing facility, individual test shots, victims, nuclear scientists, and Judge Jenkins' decision in the Allen trial. He concluded that an appeals court's decision to overturn Jenkins' decision was yet another injustice the federal government delivered upon the downwinders.

In the early 1990s, Barton C. Hacker published the second of two volumes in which he examined the history and progress of the AEC's radiological safety program, from its inception in 1946 through its dissolution in 1975. Reynolds Electrical and Engineering Company, a prime contractor of the U. S. Department of Energy's Nevada Operations Office, had contracted Hacker in 1978 to work on this project. By 1992, Hacker had accepted the position of Lab Historian for the Lawrence Livermore National Laboratory at the University of California, Livermore. Hacker attempted to tell the story of the effects of the radiological safety efforts of

the nuclear weapons testing program from both the perspective of scientists and downwinders. Hacker described the efforts he exerted in order to remain dispassionate and objective about his subject matter, and he achieved his goal in this work. Hacker was thorough in describing the fallout accidents during the Simon and Harry Shots of 1953, but his treatment of Washington County was also very limited.

Environmental sociologist Valerie Kuletz published *The Tainted Desert: Environmental and Social Ruin in the American West* in 1998, in which she examined the social and environmental impacts of what she termed “nuclearism.” The daughter of a nuclear weapons scientist who studied at the University of California, Santa Cruz, Kuletz dealt with the social and environmental costs in the desert West from the 1940s through the 1990s, focusing her work on the dichotomy between sacred homeland and sacrificial wasteland. She took into account the perspectives of Native Americans, antinuclear activists, scientists, and government officials, and, while she dealt with the problems associated with downwinders, she addressed them as a group and did not specifically focus on any particular area. Kuletz concluded that radiation contamination continues to pose a threat to humans because of water issues, and that in order to address the threat of radiation contamination humans must address their increasing alienation from nature.

Charles Loeber’s 2002 work, *Building the Bombs: A History of the Nuclear Weapons Complex*, is a history of the origins and development of the various programs and offices which comprise the cumulative atomic weapons production and testing apparatus. Loeber, a former employee of the DOE Albuquerque Operations Office and Sandia National Laboratories, composed this book in response to requests for the materials he used during presentations he gave at the Albuquerque Operations Office of the history and missions of the nuclear weapons

complex. He began with a review of Albert Einstein's Special Theory of Relativity and brought the story up to the current challenges of the new millennium in maintaining stockpiles and appropriate nuclear deterrents. It is a work of general history, and Loeber did not give much attention to the Nevada Test Site and only a passing reference in his epilogue to the experiences of downwind residents.

I have felt that I was on a ledge with this project from the moment I realized the immensity of the subject with which I intended to grapple, with no framework for writing a proper history that would do justice to both the topic and the people affected. I felt compelled to tell the story of the people who were at greatest risk of injury, and to try to understand how a community of individuals who felt they were authoring their own destinies could resign itself to the whims of ambitious politicians and scientists. I had originally intended to build the story by researching three aspects of Washington County: social structure, environment, and politics. After gathering sources and evidence, especially from the *Washington County News*, I realized that these Washingtonians had an economic motivation and were extremely patriotic, two important facets of the story which I had initially overlooked. The work that follows is my attempt to tell a complex and heart-wrenching story and to capture the spirit of the people of Washington County who lived in the shadow of the atomic weapons experiments at NTS.

WESTERN SKIES AND THREATENING CLOUDS

“Even a vast superiority in numbers of weapons, and a consequent capability of devastating retaliation, is no preventive, of itself, against the fearful material damage and toll of human lives that would be inflicted by surprise aggression.... Let no one think that the expenditure of vast sums for weapons and systems of defense can guarantee absolute safety for the cities and citizens of any nation.”—Dwight David Eisenhower¹

During the period of the United States’ atmospheric nuclear weapons tests, 1951-1963, radioactive by-products rained down on communities across the entire country. This period coincided with the onset of the Cold War, in which the American people believed that experimentation with nuclear devices would help to deter an attack on their homeland by the United Soviet Socialist Republics (USSR). This radioactive fallout, while heaviest and most dangerous in areas near the testing sites, created potentially serious health consequences for all living beings that came into contact with it. However, the communities located within a few hundred miles of the testing sites were in the most danger from radioactive contamination.

Washington County, Utah, was one such community that was hit particularly hard with radioactive fallout. Its population, predominantly members of the Church of Jesus Christ of Latter-Day Saints (LDS), was extremely patriotic in its support of America’s position during the Cold War. Primarily due to the limited public understanding of the effects of radiation, there was little concern for short-term, localized effects or the long-term, environmental effects of radiation contamination. Also contributing to the lack of public awareness was a concerted effort on the part of government officials to convince the American people, especially those living in the nearby vicinity of the testing program, that the weapons tests were crucial to thwarting an impending Soviet attack. Finally, the prevailing economic philosophy that land must in some way prove to be economically beneficial, as well as the fact that large amounts of

¹ Presidential Address Document no. 256, in *Public Papers of the Presidents of the United States: Dwight D. Eisenhower, 1953-1960* (Washington, DC: Government Printing Office, 1960). Address Before the United Nations General Assembly, December 8, 1953, p. 816. Hereafter cited as Eisenhower, *Papers*.

federal funds flowed into the area as a result of ongoing Cold War military-industrial expansion, meant that very few people thought to question the practice of testing nuclear weapons in Americans' backyards.

In many ways, the experiences of Washington County residents with radioactive fallout from nuclear weapons tests typify the historical experiences of people living in the American West. The people who lived in this area during the period of atmospheric nuclear weapons testing, like those Americans who had sought out the western frontier as a refuge a century earlier, faced unknown and unforeseen dangers; boom and bust mining, agriculture, and commercial enterprises; exploitation of the West's people and resources for large corporations in the eastern states; the presence of military personnel and installations; an influx of federal dollars intended to expand the profitability of the region's business ventures; and an increasing trend of rural western populations to urbanize. Ultimately, however, the conquest of an apparently inhospitable land for national and economic gain is the western historical theme that figures most heavily in the history of the United States' nuclear weapons testing period.²

For many Americans, the mention of the "American West" calls up fantastical images of noble cowboys, savage Indians, and a vast, untamed wilderness. This is the result of an idealized mental picture of the "Old West" which can be largely attributed to the focus placed on this timeless locale by Hollywood's motion pictures. But the American West is more than just the Old West that is dead and gone; it is also the Contemporary West, a dynamic place without explicitly defined spatial boundaries and which acts upon the inhabitants as much as they act upon it. The true, complex nature of the contemporary American West serves to propagate the

² For a more detailed exegesis of the themes which historians associate with America's Western frontier, see Richard Etulain, *Beyond the Missouri: The Story of the American West*, Albuquerque: University of New Mexico Press, 2006; Patricia Nelson Limerick, *The Legacy of Conquest: The Unbroken Past of the American West*, New York and London: W.W. Norton, 2006 (1987); and William Cronon, George Miles, and Jay Gitlin, eds., *Under an Open Sky: Rethinking America's Western Past*, New York and London: W.W. Norton, 1992.

idea that Hollywood's images are accurate; it is easier to simplify wrongly a complex situation than to work through the complexities. Yet, these perceptions do not seem to be wholly inaccurate. The concept of an untamed wilderness is true to a large extent, if one takes into account lands owned by the federal government, federally protected nature preserves, and restricted-access military installations. The truth, which is not told by the pretty pictures of a pristine wilderness painted either by Hollywood or the tourism advertisements of the National Park Service, is that the landscape has been, and still is, under attack.

The seemingly barren regions of desert that comprise much of the states of Arizona, California, Nevada, New Mexico, and Utah are homes to numerous military installations. These installations serve various functions, from U.S. Air Force bombing ranges to U.S. Department of Energy research laboratories, nuclear weapons detonation/waste disposal sites, and even a naval weapons center in the middle of the Mojave Desert. Several share at least one border with a National Wildlife Refuge (NWR): the White Sands Missile Range and Fort Bliss Military Reserve in New Mexico completely surround the San Andreas NWR and the White Sands National Monument, and the Nevada Test Site and Nellis Air Force Range adjoin the Desert National Wildlife Range in Nevada. Most of these sites have been labeled as "No Public Access" areas, and six of the bases in Nevada are simply designated as "Restricted Military Areas." Officials considered deserts to be perfect locations for these installations, as there tends to be relatively few inhabitants and very little traffic in the surrounding areas. Furthermore, the desert provides for easily-observable, strategically-defensible borders. As a region that is too foreboding for many humans to inhabit, and which serves the interests of a federal government that is seemingly in need of such military installations, the barren deserts of the American West do, in fact, offer some utility to Americans.

In keeping with the tradition of Old West boomtowns, the U.S. government, on all levels, has treated the deserts of the American West as expendable resources, useful only insofar as they can be exploited for the economic needs or desires of American society. But, whereas people were able to re-inhabit the abandoned mining towns long after the profiteers had moved on to richer veins, it will be a very long time before the western deserts will be rid of the effects of the testing projects conducted there during the last sixty years. The conditions under which it became necessary to adopt this policy of environmental negligence were created during the Second World War. It was during this period that all facets of American society and resources were drawn upon, and not even the desert wastelands were spared a part in the war.

Prior to World War II, the U.S. West remained an industrially and economically underdeveloped region, completely dependent on the East for all financially viable activity, as it had served as a supplier of raw materials which were refined and manufactured into goods in Eastern industrial hubs.³ There had been no need to develop a large industrial base in the West, since the railroad had been built to make transportation of those raw materials to the East much easier. Furthermore, there was no labor base in the American West: as of the 1940 census, the West accounted for half of the nation's land area, but less than fifteen percent of the total population.⁴ However, when the U.S. began to mobilize for war in 1941, the West began to receive large portions of the federal funds appropriated for the production of agricultural, industrial, and military goods. With much of the country still feeling the effects of the Great Depression, people followed the money.

In particular, funds appropriated for the military led to the creation and development of manufacturing and industrial assembly plants across much of the West. As well, the needs of the

³ Gerald D. Nash, *The American West Transformed: The Impact of the Second World War*, Bloomington: Indiana University Press, 1985, p. 14.

⁴ *Ibid.*, p. 10.

military and the availability of inexpensive land helped to create an atmosphere which was conducive to the new aerospace and electronics industries. With the federal government spending large amounts of money to finance the capital required to produce the American war machine, these plants provided a multitude of new jobs in the western U.S. alone. This spurred a new westward migration of people still trying to recover from the effects of the Depression, and this new population provided the workforce for the blossoming production industries, as well as the tertiary support service industry which emerged in order to meet the demand for emerging community and cultural services.⁵

The economic impact of the \$70 billion allocated by Congress from 1941-1945 for western development was critical to the war in the Pacific.⁶ President Franklin Delano Roosevelt believed that the West had a great potential to provide support for the Allied forces in the Pacific, and he made sure that funding was adequate to actualize that potential.⁷ Those states which lacked the necessary conditions to support large urban populations (and, therefore, industry) or agricultural lands were not deprived of these funds. Rather, the federal government spent a large portion of that money to establish military “training camps, air bases, testing facilities and storage depots” which transformed the West into the primary locale for the ever-expanding military-industrial complex.⁸

The major factor for this development, the great potential which Roosevelt saw, was the impression of a barren region. While it would be erroneous to believe that these places were completely devoid of humans, such a relatively uninhabited region did not exist in the eastern half of the country. In the West, large amounts of land in remote locations could accommodate

⁵ Ibid., pp. 17-18.

⁶ Ibid., p. 19.

⁷ Etulain, *Beyond the Missouri*, p. 363.

⁸ Nash, *American West Transformed*, p. 24.

large increases in populations. Furthermore, the federal government remained the sole proprietor of most of the West. The desert wastelands, while extremely unattractive to immigrants, offered an isolation which federal and scientific administrators coveted for experiments involving technological advancements requiring immense stretches of unoccupied land.⁹ Considering the defense capability in the area, it made sense to establish the most sensitive of the nation's new scientific research facilities in close proximity to these military installations. But, it also meant that the federal government, along with the U.S. military, would establish a connection with the scientific community which it intended to exploit.

The most important of the military's wartime scientific endeavors was the Manhattan Engineer District, also known as the Manhattan Project. In 1939, physicists Albert Einstein and Leo Szilard sent a letter to Roosevelt warning of the likelihood that Germany was working toward the construction of a new military weapon capable of harnessing the power of the newly hypothesized theory of fission. Einstein and Szilard proposed that the government begin a search to find private investors to fund a similar venture in America.¹⁰ Roosevelt responded within two months that he had called together a group of officials in order to explore the prospects of building and properly funding such a weapon.¹¹ However, it was not until the summer of 1941 that President Roosevelt authorized Vannevar Bush, head of the Office of Scientific Research and Development, to begin research and development of the project. Private investors did not fund the project; the federal government tightly controlled the operation. The Manhattan Project officially became a federal program when government officials called upon

⁹ Ibid., pp. 18-9.

¹⁰ "Einstein's Letter to Roosevelt," in Michael B. Stoff, et al., eds, *The Manhattan Project: A Documentary Introduction to the Atomic Age*, Philadelphia: Temple University Press, 1991, pp. 18-9.

¹¹ Ibid., p. 20.

Brigadier General Leslie Richard Groves in the summer of 1942 to oversee the operation for the War Department.¹²

One of the features which resulted from the urgency of this top-secret project was to divide the operation into different jobs positioned in various parts of the country. This was done in order to move the operation forward at a faster pace by harnessing the capital of existing facilities and hiring corporations which could quickly build new ones. Thus, various components of the overall project found housing in such eastern locations as Tennessee and Illinois, and at Columbia and Princeton Universities. But the sites of more sensitive operations were situated in the western states of Washington, Idaho, and New Mexico. It was at Los Alamos, New Mexico, that head scientist Julius Robert Oppenheimer decided to establish the site of the on-going experiments, as well as the location of the final assembly and testing of the first atomic bomb. Under the leadership and hard work of Groves and Oppenheimer, the federal government realized that isolated facilities of vital national interest were well worth the expense of placing them in the Western desert.

With these new scientific laboratories in place and working feverishly toward their objective, the next step, to find a suitable location at which to test the final product, began in May 1944. The criteria for such a place were extremely specific: the location must be relatively close to Los Alamos in order to transport the personnel and equipment; the weather must be fair and predictable to a great degree; lands belonging to American Indians should remain untouched; and, it was necessary that the landscape be reasonably smooth in order to provide the most accurate data regarding blast effects and to extend the possible range of visual observations.¹³

Major W. A. (Lex) Stevens and Kenneth Tompkins Bainbridge reviewed the three sites that were

¹² Ibid., p. 17.

¹³ Ferenc Morton Szasz, *The Day the Sun Rose Twice: The Story of the Trinity Site Nuclear Explosion, July 16, 1945*, Albuquerque: University of New Mexico Press, 1984, pp. 27.

most promising, all in deserts, before selecting the area of the Jornada del Muerto (Spanish, “Journey of Death”) in south-central New Mexico.¹⁴ It became known as the Trinity Site, and it was here that the efforts of the massive Manhattan Project were put to the test.

On July 16, 1945, Trinity erupted in the world’s first test of a nuclear weapon. General Groves, in a memorandum to Secretary of War Henry Lewis Stimson, stated that “the test was successful beyond the most optimistic expectations of anyone.”¹⁵ The explosion sent a radioactive mushroom cloud billowing over 10,000 feet in the air before it “was sent in several directions by the variable winds at the different elevations. It deposited its dust and radioactive materials over a wide area.”¹⁶ Personnel, including doctors, were stationed in various locations around the test site to measure the levels of radiation and assist with any mishaps. But, according to Groves, “at no place did it reach a concentration which required evacuation of the population.”¹⁷ In fact, officials believed that a few cattle and sheep had been the only casualties of the experiment.¹⁸

The fact of the matter, however, is that even the scientists most closely connected with the intricacies of the experiment were unsure of the “safe” levels of radiation. Moreover, the military was only concerned with the well-being of the citizens insofar as it involved civilian leaders in politics. The administration valued the project as an instrument which would help to end a costly war and which would establish the United States as *the* world power; there was no pause for concern about the possible ruination of land because federal authorities already considered the region worthless. There was no ecological philosophy to warn that “unless we

¹⁴ Ibid., p. 28.

¹⁵ “Groves Memo to Stimson, July 18, 1945,” in Stoff, *The Manhattan Project*, p. 188.

¹⁶ Ibid., p. 189.

¹⁷ Ibid., p. 189.

¹⁸ Barton C. Hacker, *Elements of Controversy: The Atomic Energy Commission and Radiation Safety in Nuclear Weapons Testing, 1947-1974*, Berkeley and Los Angeles: University of California Press, 1994, p. 4.

can think of nature as being a source of value, and not a mere resource upon which we project our interests, we will be unable to believe in the importance of limits to our technological remaking of nature.”¹⁹ Indeed, the scientific belief in the necessity of maintaining objectivity in research, coupled with a subordinate position to the federal government, prevented the scientific community from imposing a moral culpability either upon themselves or upon the experiments which they were conducting. Because the weather was an uncontrollable variable that unavoidably affected nuclear experiments, this attitude of limited liability would prove disastrous.

When President Harry S. Truman ordered a nuclear strike on Japan in August 1945, there was some dissent among his top advisers as to the efficacy of dropping an experimental weapon of uncertain devastation, with the most notable opposition emanating from future President Dwight David Eisenhower.²⁰ The bombs dropped on Hiroshima and Nagasaki, although meant primarily as instruments for averting a land invasion of Japan and bringing about a quicker resolution to the war with Japan, were also meant to be further tests of bomb design and capability. Scientists considered the design of the bomb to be “primitive,” although within four short months, “it was estimated that 90,000 people had died in Hiroshima because of the effects of *one* atomic bomb.”²¹

Many contemporaries argued that people who questioned the ethics of using the bomb to end World War II implied that it was better to let the soldiers die than use the bomb and that those people were generally not the ones whose lives were at stake.²² However, Joshua Reuben

¹⁹ Lawrence Vogel, “Hans Jonas’s Imperative of Responsibility,” in *Minding Nature: The Philosophers of Ecology*, New York and London: The Guilford Press, 1996, pp. 167-8.

²⁰ William Lambers, *Nuclear Weapons*, n. p.: Lambers Publications, 2006 [2001], p. 7.

²¹ Jeremy Bernstein, *Nuclear Weapons: What You Need to Know*, Cambridge and New York: Cambridge University Press, 2008, pp. 4-5.

²² Paul Fussell, *Thank God for the Atom Bomb and Other Essays*, New York: Summit Books, 1988, pp. 14-15.

Clark, Jr., former Undersecretary of State to President Calvin Coolidge, disagreed with this position and argued that the

bomb was the ‘crowning cruelty’, in a war that witnessed history’s greatest onslaught [sic] against civilian populations.... If we are to avoid extermination, if the world is not to be wiped out, we must find some way to curb the fiendish ingenuity of men who have no fear of God, man or the Devil.... I protest with all the energy I possess against this fiendish activity, and call on our government to see that this terrible CURSE being proposed is stopped.²³

Most contemporaries disagreed with Clark’s position, and one of his critics claimed that “Clark could see only one side of the enigma. The bomb was not a ‘Curse’, it saved millions of lives.”²⁴

The federal government, as opposed to the scientific community, did have to be concerned with liability and public perceptions regarding its peacetime nuclear weapons testing program. At the end of World War II, U.S. officials believed that they had a monopoly on atomic weapons technology that would last for approximately one decade, and it was an advantage that they intended to exploit. The directors of the Manhattan Project determined that the Trinity Site was not an ideal setting for a nuclear proving ground, since populations were at risk from wind-blown, radioactive fallout.²⁵ A search began to find a suitable location for a nuclear testing facility; the committee assigned to the search released its findings in a report entitled “Project Nutmeg.” The committee reported that, due to geographical and political worries, the creation of a test site within the boundaries of the continental U.S. was impractical. It further recommended that the facility established at the Pacific Proving Grounds (PPG) in the Marshall Islands should be utilized unless a national emergency required the government to

²³ Quoted in Wayne Dunham Stout, *History of Utah*, vol. 3, Salt Lake City: u.p., 1971, p. 381. Stout is quoting from an article that appeared in the Salt Lake Tribune, October 6, 1946. Clark was a native of Utah Territory (born 1871), a LDS Apostle, and at the time of the quote the First Counselor in the First Presidency of the LDS. This work was found in the archives of the Utah State Historical Society during a research trip in December 2008.

²⁴ *Ibid.*, p. 381. It must be noted, however, that Stout had some problems with historical objectivity, as when he later stated (p. 680) that “Khrushakev [sic], who had denied the missiles were in Cuba, *backed down like the coward he was*, and ordered the missiles returned to Russia.” (my emphasis)

²⁵ Hacker, *Elements of Controversy*, p. 4.

establish a “CONUS” (continental U.S.) test site. Thus, project directors decided to move further testing operations to the newly acquired Marshall Islands in the North Pacific Ocean, where testing recommenced in July 1946 with two detonations aimed at experimenting with the effects of a nuclear blast on naval vessels.

Although the provisions of the bill did not take effect until January 1947, Congress passed the *Atomic Energy Act* in late July 1946, which took control of atomic energy and weapons programs from the military and placed it in the hands of the civilian Atomic Energy Commission (AEC).²⁶ The AEC was not created to be a part of the presidential cabinet, but to be “an independent agency of the executive branch of the Federal Government.”²⁷ The military was not completely eliminated from the nuclear scene, however. The 1946 act contained a provision for the establishment of a Military Liaison Committee, which was to be updated fully on all aspects of the nuclear program which the committee thought concerned the military.²⁸ This only represented a small contingent of the military apparatus compared with the multiple agencies later created to “help” the AEC conduct its nuclear weapons tests. In the meantime, testing continued at the Pacific Proving Grounds.

A series of “emergency” situations surfaced beginning in the late summer of 1949 that ultimately led to the creation of a continental test site. On September 23, 1949, President Truman announced to the nation that the USSR had successfully detonated an atomic device, nearly one month after the test had occurred on August 29. National newspaper headlines on September 24 illustrated the shock to the national psyche, and the numerous follow-up articles on the front pages also dealt with some aspect of the crisis, although they urged U.S. citizens not

²⁶ Ibid., p.10.

²⁷ U.S. Department of Defense, *Operation RANGER, January-February 1951*, United States Atmospheric Nuclear Weapons Tests, Nuclear Test Personnel Review, DNA 6022F (1982), p. 29. Hereafter cited as *Operation RANGER*.

²⁸ Hacker, *Elements of Controversy*, p.12.

to be alarmed.²⁹ While some U.S. officials attempted to bolster national confidence by stating publicly that this was not an unexpected development, other officials openly criticized the public relations' handling of the situation.³⁰ Also, there were members of Congress and Pentagon officials, including Louis Arthur Johnson, Truman's second Secretary of Defense, who questioned the veracity of the reports of the Soviet achievement.³¹

Then, in June 1950, the United States became involved in the Korean War after the Democratic People's Republic of Korea (backed by the USSR) invaded the Republic of Korea. U.S. officials became concerned that the war would threaten shipping lanes across the Pacific Ocean. On July 13, 1950, AEC Chairman Gordon Evans Dean wrote the Chairman of the Military Liaison Committee to suggest that the AEC and DOD (Department of Defense) collaborate to find a continental test site.³² Among the possible locations under consideration, several were located along the Atlantic seaboard. One-by-one, however, officials abandoned these sites as possible testing locations "for one principal reason: the government did not own the land and did not want to wait to go through the process of acquiring it."³³ On the other hand, the federal government did own vast amounts of "barren" land in the western states, and such a location would also mean that the test site would be in closer proximity to the Los Alamos Scientific Laboratories, the main research facility for the federal nuclear weapons program.³⁴

²⁹ See, for examples, *The New York Times* (hereafter cited as *NYT*) and *The Washington Post* (hereafter cited as *WP*) for September 24, 1949.

³⁰ *NYT*, "Atomic Leaders are Reassuring," September 24, 1949, L2; *NYT*, "Public Was Deluded on Bomb, Dewey Says," September 24, 1949, L3.

³¹ Franklin D. Mitchell, *Harry S. Truman and the News Media: Contentious Relations, Belated Respect*, Columbia: University of Missouri Press, 1998, p. 63.

³² *Operation RANGER*, p.19.

³³ International Physicians for the Prevention of Nuclear War, *Radioactive Heaven and Earth: The Health and Environmental Effects of Nuclear Weapons Testing In, On, and Above the Earth: a Report of the IPPNW International Commission to Investigate the Health and Environmental Effects of Nuclear Weapons Production, and the Institute for Energy and Environmental Research*, New York: Apex Press; London: Zed Books, 1991, p. 55. Hereafter cited as IPPNW, *Radioactive Heaven and Earth*.

³⁴ *Ibid.*, p. 169.

At a meeting in December 1950, the AEC decided that a new facility should be established in Nevada.³⁵ Initially referred to as the Nevada Proving Ground, construction began on the Nevada Test Site (NTS) on January 1, 1951. Located in Nye County, sixty-five miles northwest of Las Vegas, it originally encompassed nearly 600 square miles of land and was bordered by the U.S. Air Force gunnery range (AFGR), an additional 4,000-plus square miles.³⁶ The site was chosen for several reasons, the foremost of which were the sparse population and ease of acquisition; it was mostly comprised of lands already owned by the federal government; and all additional lands were acquired either from the state or from private citizens. Prior to 1951, when construction of NTS began, the area encompassed by the installation was used for “mining, grazing, and hunting.”³⁷ By 1977, the combination of the Tonopah Test Range, Nellis Air Force Range, and the Nevada Test Site military facilities comprised one of the largest contiguous areas of land in the United States.³⁸

Officials chose a site in Nevada despite their own admission that a location on the eastern seaboard would be preferable to any location in the interior of the country, as “prevailing westerly winds over any western site would blow fallout over most of the country and despite the fact that after the Trinity test Stafford Leak Warren (Chief of Radiological Safety) had recommended that tests not be done in locations with human habitations within a 150-mile radius.”³⁹ An east coast testing site would have blown potentially hazardous fallout into the Atlantic Ocean, away from population centers. But the American West was the preferred

³⁵ Hacker, *Elements of Controversy*, p. 42.

³⁶ U.S. Energy Research and Development Administration, *Final Environmental Impact Statement Nevada Test Site: Nye County, Nevada, September 1977*, p. 2-7. Hereafter cited as U. S. ERDA, *Final Environmental Impact Statement*; “Statement of Dr. Dunning,” in U.S. Congress, Special Committee on Radiation of the Joint Committee on Atomic Energy, *The Nature of Radioactive Fallout and its Effects on Man*, 85th Congress, 1st Session, May 27-29/June 3-7, 1957, p. 179.

³⁷ U. S. ERDA, *Final Environmental Impact Statement*, p. 2-11.

³⁸ *Ibid.*, p. 2-7.

³⁹ IPPNW, *Radioactive Heaven and Earth*, p. 56.

location, as politicians and entrepreneurs have historically viewed the region as the most politically feasible and economically beneficial area of the nation to sacrifice. While officials already had experience in windblown fallout with the Trinity and Marshall Islands experiments, they still chose to situate the CONUS in a locale which would deposit fallout on population centers and the entire country.⁴⁰

Furthermore, the political climate of the early years of the Cold War between the United States and USSR contributed to this attitude that certain sacrifices were necessary to ensure the survival of the western way of life, i.e., republican capitalism. Many politicians, military officials, and influential citizens had come to believe that there existed a communist conspiracy to participate actively in the overthrow of American supremacy in world affairs. In the early years, politicians engaged in a concerted effort to express to the American public that the Soviet Union posed a very serious, existential threat. It was in this context that the AEC's nuclear weapons testing program at the Nevada Test Site began. When operations commenced at the NTS, the science behind nuclear fission was little more than a decade old. Yet, the enormous destructive power unleashed by the military application of this burgeoning new science helped to solidify Americans' belief in an inherent cultural, intellectual, and social superiority over the Soviets. This sense of superiority led many politicians, AEC officials, and citizens to reach conclusions which were not supported—or, were directly refuted—by scientific evidence and turn a blind eye to egregious violations of human rights.

Evidence from early atomic detonations pointed to the potentially devastating effects of nuclear radiation on biological populations. Following the Hiroshima and Nagasaki bombings, which are repeatedly referred to and listed as tests, a study by the Los Alamos Scientific Laboratory found that “if the bomb burst occurred relatively close to the ground, a situation

⁴⁰ Ibid., p. 169.

which would be uneconomical from the standpoint of the destructive effect, and considerable amounts of dirt and other debris were sucked into the radioactive cloud, the fall-out would have to be considered as a danger.”⁴¹ Then, following the tests on the Bikini Atoll in the Marshall Islands, research conducted jointly by the AEC and the University of Washington Applied Fisheries Laboratory showed that food sources, flora, and fauna located on the atoll were still radioactive, although the official assessment was that these levels did not pose an external contamination danger to humans.⁴² In the face of contrary evidence, a great many officials and politicians directly or indirectly attributed ““scare stories”” about the dangers of radioactive fallout to Soviet antagonists.⁴³

Once the USSR achieved atomic capability, U.S. officials and the general public came to understand the importance of maintaining nuclear superiority over their new nemesis. It became imperative to increase both the size of the nuclear arsenal and to create more powerful and efficient weapons and conveyance systems.⁴⁴ As stated in the Civil Defense Administration’s pamphlet, *Personal Preparedness in the Nuclear Age*, the government promoted the idea that the best approach to dealing with the Soviet nuclear threat was to negotiate from a position of strength, to “maintain and improve our strength on all fronts—spiritual, economic, and military—if we are to remain free.”⁴⁵ It was incumbent not only on the nuclear agency to

⁴¹ Los Alamos Scientific Laboratory, *The Effects of Atomic Weapons*, New York: McGraw-Hill Book Co., 1950, p. 35. Hereafter cited as LASL. This report declared “that casualties ascribable to the radioactive fall-out were completely absent” from Hiroshima and Nagasaki, a statement that in the short-term may have appeared correct, but which was later demonstrated to have been incorrect.

⁴² *NYT*, “Bikini Atoll Food Still Radioactive,” September 25, 1949, p. L4; *WP*, “It’s Safe to Live on Bikini But Not Eat Its Products,” September 25, 1949, p. 4.

⁴³ R. Blair Bentley, “A Study of Residual Cesium 137 Contamination in Southwestern Utah Soil Following the Nuclear Weapons Tests at the Nevada Test Site in the 1950’s and 1960’s,” Master’s Thesis, Oregon State University, 2008, p. 26. Bentley is quoting then Nevada Senator George Malone.

⁴⁴ F. Lincoln Grahls, *Voices from Ground Zero: Recollections and Feelings of Nuclear Test Victims*, New York: University Press of America, 1996, p. 37.

⁴⁵ United States, Office of Civil and Defense Mobilization, *Personal Preparedness in the Nuclear Age*, Student Manual, Washington, DC: Government Printing Office, 1959, p. 1-10. Hereafter cited as United States, *Personal Preparedness*.

maintain an effective stockpile of nuclear arms, but also on “the capability of the individual for self-protection at home and at work—in the cities and towns and on the farms. Development of this capability is the chief contribution you can make toward bringing about a worldwide decision for lasting peace.”⁴⁶ One contemporary who witnessed a nuclear test later wrote, “I was extremely ignorant about what I had seen. But,... it had given me an absurd sense of superiority.... As part of this [sense of entry into a “secret world”] I had gotten the idea that these aboveground tests were both necessary and important.”⁴⁷

When the American people elected World War II general and American hero Dwight David Eisenhower to the presidency in the fall of 1952, they voted into office a man they presumed would take a strong stance against Soviet nuclear aggression. But Eisenhower ultimately called for global harmony and for atomic energy to be utilized for beneficial purposes rather than for large-scale devastation.⁴⁸ During his famous 1953 speech, “Atoms for Peace,” at the United Nations General Assembly, Eisenhower declared that the “United States would seek more than the mere reduction or elimination of atomic materials for military purposes. It is not enough to take this weapon out of the hands of the soldiers. It must be put into the hands of those who will know how to strip its military casing and adapt it to the arts of peace.”⁴⁹ He even went so far as to assert that, “We have never, we never will, propose or suggest that the Soviet Union surrender what is rightfully theirs. We will never say that the people of Russia are an enemy with whom we have no desire ever to deal or mingle in friendly and fruitful relationship.”⁵⁰ Despite these declarations, however, it was Eisenhower who oversaw a major escalation of financial funding to experiment with new weapons, ultimately leading the United

⁴⁶ Ibid., p. 1-11.

⁴⁷ Bernstein, *Nuclear Weapons*, p. 185.

⁴⁸ Lambers, *Nuclear Weapons*, p. 15.

⁴⁹ Eisenhower, *Papers*, p. 820.

⁵⁰ Ibid., p. 818.

States to increase its nuclear arsenal immensely during his two-term presidency, and, consequently, a parallel Soviet effort.⁵¹

Late in the atmospheric testing period, the Cold War culture, which posited the Soviet Union as evil and the United States as the good nation destined to oppose the evil expansion of communism to the freedom-loving peoples of the world, produced an interesting pamphlet whose contents reveal a great deal about popular public sentiment. Entitled *Manual for Survival: How to Survive an A-Bomb Attack*, this pamphlet seems to have first appeared in 1961. The authors of the pamphlet contend that “the Russians have the power to launch an overwhelming atomic attack on the U.S. this very minute. They *can* if they want to.”⁵² Furthermore, the chance that they would attack was greater since “the rulers of Russia have no such respect for human life as we do,” and the likely result of such an attack would be that “life as we know it in America may be suspended for a while.”⁵³ While the authors admitted that the majority of laypersons in the United States did not fully understand the way in which nuclear physics worked, they asserted that “[t]he caveman of many thousands of years ago feared fire, because he did not understand it. When his ancestors learned enough about fire to use it, it became one of the most beneficial developments in human history.”⁵⁴ This message of national propaganda posited that, if there was ever a group of people prepared to face such a situation, it must surely be American citizens, since

Standing up to danger is nothing new to Americans. The first Americans braved the threat of stormy seas to come to this wild and unknown country. They endured the staggering blows of nature. They fought through the savage onslaughts of Indians. And

⁵¹ Lambers, *Nuclear Weapons*, p. 15.

⁵² Lamar Golding and Jack Burney, *Manual for Survival: How to Survive an A-Bomb Attack*, Dallas, TX: Action Press, 1961, p. 9. Hereafter cited as *Manual for Survival*.

⁵³ *Ibid.*, pp. 11, 68.

⁵⁴ *Ibid.*, p. 15.

they not only survived, they built a nation destined to become the ideal of every man on Earth who yearns to call himself free.⁵⁵

The patriotic population of Washington County, Utah, believed themselves to be the natural inheritors of such stalwart determination. For the most part, they were the descendants of Mormon pioneers, people who had been persecuted in eastern states for their religious beliefs and who had resolutely braved the hardships of life in a harsh environment in order to establish their own societal enclave. By the time of the establishment of the NTS, they had become a community of people who had fully embraced the American idealism that would pervade 1950s American life. They had adopted a “total personal commitment to Church, family, and flag.”⁵⁶ These people tended to believe that, as far as nuclear testing and the USSR were concerned, the American government and people were responsible for preventing Soviet encroachment into territories where democracy ruled.⁵⁷

Thus, when AEC and other government officials told the people of Washington County that they had nothing to fear from small levels of radioactive fallout that began occurring with the first atomic detonations at NTS, the population put full faith and credit in their reassurances. Newspaper editorials from the *Washington County News* for the years of atmospheric testing reveal that while the populace expressed some anxiety, fear, and paranoia regarding the nearby tests, they conceded that the explosions conducted at NTS were essential to national security. While no one wanted to live so close to the test facility, these people accepted it as necessary, and believed that they could continue to lead lives without being hindered by the nuclear experiments.⁵⁸

⁵⁵ Ibid., p. 75.

⁵⁶ Howard Ball, *Justice Downwind: America's Atomic Testing Program in the 1950's*, New York: Oxford University Press, 1986, p. 55.

⁵⁷ Ibid., p. 55.

⁵⁸ Ibid., p. 56.

What neither they nor the rest of the American population understood, was that the *tests* were precisely that, experiments conducted in order to study in further detail the intricacies of nuclear physics, a field which scientists had barely begun to study. The AEC conducted tests both “to develop and improve nuclear weapons” and to evaluate the effects of radiation on the surrounding environment.⁵⁹ At the time, many scientists believed that radiation exposure was harmless unless a person’s exposure exceeded a certain level. Known as the Threshold Theory, it held widespread support despite the fact that there were some studies whose foundational evidence directly contradicted the basic premises of the theory. However, it was not until the waning years of the atmospheric testing program that AEC officials and scientists publicly acknowledged that exposure to low-level doses of radiation could have serious debilitating health consequences for living organisms. Even then, they tended to downplay the degree to which humans may be affected, and in many cases even implied that the dangers of radioactive fallout were limited to fallout created by enemy bombs.⁶⁰

However, friendly/enemy status did not limit the dangers of radioactive fallout. By 1964, one year after the official end of the atmospheric testing period, there had been 340 *announced* nuclear detonations by the U.S., USSR, France, and Great Britain. The result was that the “total energy released has been about 511 million tons (MT) equivalent of TNT,” which would have injected around thirty-one tons of fissionable decay material into the atmosphere by 1964.⁶¹ The people living within 200 miles downwind of testing areas were most susceptible to the

⁵⁹ United States, Department of Defense, *Report on the Search for Human Radiation Experiment Records, 1949-1994*, 2 vols., June 1997, p. 71. Hereafter Cited as *Human Radiation Experiment Records*.

⁶⁰ See United States, Atomic Energy Commission, “Atomic Test Effects in the Nevada Test Site Region,” Washington, DC: Government Printing Office, 1955, http://www.fourmilab.ch/etexts/www/atomic_tests_nevada/ (accessed March 25, 2009). This was a pamphlet distributed in schools and communities downwind of NTS. Hereafter cited as United States, “Atomic Test Effects.” See also United States, Department of Agriculture, “Defense Against Radioactive Fallout on the Farm,” *Farmer’s Bulletin*, no. 2107, Washington, DC: Government Printing Office, 1965. Hereafter cited as United States, “Fallout on the Farm.”

⁶¹ United States, Atomic Energy Commission, *Health Aspects of Nuclear Weapons Testing*, by Gordon M. Dunning, Washington, DC: Atomic Energy Commission, 1964, p. v. Hereafter cited as Dunning, *Health Aspects*.

radioactive fallout produced by nuclear detonations. Later studies have shown that these downwind populations were more likely to develop leukemia than their counterparts in other areas of the nation.⁶² Furthermore, “the psychological effects of nuclear catastrophes may be equally, if not more, prevalent than their physical health consequences,” since it is possible that a persistent state of dread of contracting some form of cancer or other terminal disease may induce certain physical maladies if these fears are “reinforced when cancers and other illnesses occur among survivors and are attributed, rightly or wrongly, to the radiation exposure.”⁶³

This is precisely the phenomena which residents of Washington County experienced from 1951 to 1963, and, indeed, in the decades since the end of the atmospheric testing period. While most residents supported the testing program and believed the AEC’s false assertions during the testing period, there were some who, from the very beginning, questioned the validity of the claims and the extent to which their health and the health of their relatives was compromised as a result of radiation exposure. There still exists in Washington County a sharp divide between those people who believe that the government falsified information and compromised the health of local residents and those who think that the claims of downwind radiation exposure is the result of a conspiratorial mindset among certain segments of the population. While these differing opinions may never receive a definitive resolution, it is indisputable that the bombs detonated in the nearby Nevada desert altered not only the landscape and environment, but also the lives of the people of Washington County, Utah.

⁶² Dale L. Preston, “A Historical Review of Leukemia Risks in Atomic Bomb Survivors,” in Leif E. Peterson and Seymour Abrahamson, eds, *Effects of Ionizing Radiation: Atomic Bomb Survivors and Their Children (1945-1995)*, Washington, DC: Joseph Henry Press, 1998, p. 114.

⁶³ Evelyn J. Bromet, “Psychological Effects of Radiation Catastrophes,” in Leif E. Peterson and Seymour Abrahamson, eds, *Effects of Ionizing Radiation: Atomic Bomb Survivors and Their Children (1945-1995)*, Washington, DC: Joseph Henry Press, 1998, pp. 283-4.

PATRIOTIC POPULACE: WASHINGTON COUNTY RESIDENTS AND THE COLD WAR

“A lot of times in St. George, Cedar City, some of those small towns up in central Utah, the teachers would take the students out to watch the blast. And we were getting the story up there [in Salt Lake City] that it was history in the making but it’s not dangerous.... And that simply wasn’t true and they knew it wasn’t true.... Intellectually and psychologically they probably could not believe that the government would, on purpose, deceive them.”—Marcel Eugene Bridges⁶⁴

Washington County, Utah, is a locale of extremes: its landscape is magnificent, its citizenry is exceedingly warm and generous, and during the early years of the Cold War, Washingtonians were intense in their patriotic support of the United States’ efforts against the Soviet Union. Content to live lives of communal interdependence, these people had a strong sense of individual self-reliance while still committing themselves to the welfare of the community as a whole. While many residents farmed or ranched for their livings, others ran local retail businesses, served in the military, staffed local offices for federal programs, and participated in local fund-raising for charitable causes. Many of these people held steadfastly to the belief that the federal government should remain as small as possible and should limit its involvement in its citizens’ everyday affairs, yet they roundly supported the federal government’s policies in foreign affairs, especially as related to the Soviet Union. This included local cooperation with Atomic Energy Commission staff whenever they visited the area or released statements regarding the effects on the local community from Nevada Test Site nuclear weapons tests. While some openly questioned the AEC’s assertions (in all likelihood, many more privately questioned these statements), general consensus seems to have been that the citizens of Washington County genuinely believed that the weapons testing program was in the best interest of national security.

⁶⁴ Nevada Test Site Oral History Project, “Interview with Marcel Eugene & Zenna Mae Bridges, June 12, 2004,” Digital Collections, University Libraries, University of Nevada Las Vegas, Las Vegas, Nevada, <http://digital.library.unlv.edu/u/?/nts,1144>, p. 48. Hereafter cited as NTSOHP—Bridges.

Located in the extreme southwestern corner of Utah, Washington County encompasses 1,553,037 acres of land, with 25,000 acres privately owned and another 66,000 acres set aside as wilderness areas; additionally, the Bureau of Land Management controls approximately 635,000 acres. The Utah Territorial Legislature formed the county on March 3, 1852, and the city of St. George became the county seat as of January 14, 1863. By 1892, territorial legislature officials had formed the boundaries of the county as they exist today.⁶⁵ Comprised mostly of small hamlets, with the city of St. George the exception, Washington County remained a relatively sparsely inhabited community into the 1950s and 1960s. County population in 1950 was 9,836, and by 1960 it had only grown to 10,271; by 2010, the population had reached 130,529.⁶⁶ In 1953, the populations of the two largest towns was 4,545 in St. George and 1,268 in Hurricane, with many of the other inhabited areas of the county recording populations around 100.⁶⁷

Most of the residents of Washington County during this period were devout members of the Church of Jesus Christ of Latter-day Saints. In fact, throughout most communities in the state of Utah, the Mormon church serves as both the center of the community and a representation of the communal spirituality.⁶⁸ It was, and largely still is, this religious facet of life that connected all members of the community. For the Mormon population in general, acceptance into mainstream American culture had not occurred by the 1950s. Therefore, in an attempt to legitimate their social standing as American citizens, the church strongly advocated total allegiance to the national agenda. One long-time Utah resident, in an interview for an oral history project, stated that “Mormon people as a group of people... from birth they are taught that

⁶⁵ Washington County Historical Society, “Washington County,” <http://wchsutah.org/towns/washington-county.htm>. Hereafter cited as WCHS.

⁶⁶ Ibid.

⁶⁷ Paul Jacobs, “Clouds from Nevada: A Special Report on the AEC’s Weapons-Testing Program,” *The Reporter*, May 16, 1957, pp. 11, 21.

⁶⁸ Ibid., p. 16.

you respect the government; you abide by the laws of the government. And you're taught that you were to be patriotic.... It was if the government said it, then that's the way it was."⁶⁹ During World War II, communities from across Utah had sent young men and women into combat with the military; thirty-one from Washington County lost their lives during the war.⁷⁰ The 1950s ushered in an era during which Washington County residents would pay a much higher price for their devout patriotism.

These patriotic people were proud of their self-sufficiency. Most had backyard gardens from which they harvested various fruits and vegetables for immediate consumption; those farmers who had large plots of cultivable land sold most of their surpluses to other locals. The variety of local crops was astounding, and the *Washington County News (WCN)* reported that county farmers won county fair awards for the following crops: grapes, peaches, apples, prunes, tomatoes, pears, pomegranates, persimmons, pecans, almonds, black walnuts, English walnuts, cucumber, pepper, cantaloupe, kohlrabi, squash, jujubes, potatoes, carrots, beets, onions, barley, wheat, and oats.⁷¹ Local ranchers raised livestock which, after slaughter, they sold locally or in adjoining counties. There were also various dairy farmers who provided milk and dairy products to area residents who did not own at least one backyard cow, although many residents did own such an animal. The result was that nearly all residents of Washington County consumed locally

⁶⁹ NTSOHP—Bridges, p. 48. Eugene, Lenna (wife), and Lonnie (deceased son), lived in Salt Lake City during the 1950s, but Eugene apparently conducted a great deal of research on the downwinder problem, as he provided correct information, dates, and sources as evidence for his claims. He also made several trips to St. George and met with others from Washington County who had been affected by fallout. There is no relation between Marcel and the author.

⁷⁰ WCHS, "People," <http://wchsutah.org/people/people.htm>. Clicking on the link, "Army and Air Force casualties from Washington County during World War II," pulls up the webpage <http://www.accessgenealogy.com/worldwar/utah/washington.htm>. This is the list to which this citation refers. Of the thirty-one, seven were non-battle related deaths.

⁷¹ WCN, "Farm and Home Notes," September 10, 1953.

raised food, a fact which created a great deal of pride, but which, as we will see, also became a detriment to the long-term health of these people.⁷²

Population growth in the county was quite slow, but with the 1950s came government programs which brought an increase in both in the number of residents and the amount of money circulating through the local economy. Federal Civil Defense Administration (Civil Defense) offices employed local residents and provided the vital public service of educating citizens on ways that they could prepare for and survive a nuclear attack from an aggressor nation (specifically, the USSR). The Washington County office also recruited volunteers to staff local observation posts for the Ground Observer Corps, a nationwide program which required several hundred thousand volunteers to monitor the skies above the United States for potential Soviet bombers.⁷³ The biggest boon to the local economy from federal programs came from the construction and operation of the Hurricane Mesa Test Facility. In 1954, the U.S. Air Force commissioned Coleman Engineering to construct and operate the facility which tested various cockpit systems for new Air Force fighter jets.⁷⁴ Not only did these programs provide jobs to Washington County citizens, they also imbued to them a sense of pride in that they were active participants in the nation's struggle against Communist aggression.

Fear of a Soviet takeover of the United States and worldwide expansion was firmly entrenched in the psyche of Washingtonians in the 1950s. The *WCN* regularly ran articles featuring syndicated columnists who promoted a conservative viewpoint and reinforced these

⁷² Philip L. Fradkin, *Fallout: An American Nuclear Tragedy*, Tucson: University of Arizona Press, 1989 [1984]; Douglas D. Alder and Karl F. Brooks, *A History of Washington County: From Isolation to Destination*, Salt Lake City: Utah State Historical Society, 1996.

⁷³ The *Washington County News* was an invaluable source for the information contained in this paper. The author meticulously searched each issue of the *WCN* from April 21, 1949 through December 31, 1963. Issues appeared weekly and typically ranged from 14 to 18 pages in length. There are a multitude of articles which the St. George Civil Defense office ran in the *WCN*, and many more which mention the activities of the local branch of the Ground Observer Corps.

⁷⁴ WCHS, "Miscellaneous—Hurricane Mesa," <http://wchsutah.org/miscellaneous/hurricane-mesa.htm>.

beliefs.⁷⁵ After the announcement that the USSR had successfully detonated a hydrogen bomb on August 20, 1953, a cartoon appeared which portrayed Joseph Stalin as a dancing hydrogen bomb waving a Soviet flag and trumpeting a horn.⁷⁶ An article in 1954 described the possibility that the Soviets had developed “an excellent rocket” which was “capable of crossing the Atlantic to bombard the United States” as a “sober” threat.⁷⁷ A March 1957 front-page article described the concern caused “when twin vapor trails from either one or two high-flying jet aircraft came together and the area was rocked by an explosion only seconds later” which was “felt by hundreds of residents in St. George.”⁷⁸ Finally, in 1958, assistant editor Nora R. Lyman reacted to the launch of Sputnik in her weekly column, “Observations.” Lyman wrote that “Russia, with her lies, deceit, hypocrisy [sic] and desire to dominate the whole world with Communism, has recently played what, so far, is her trumpcard with the release of Sputnik.”⁷⁹ However, despite the threat posed by such a development, Lyman intimated that “What I fear more than anything else lies within our own borders. I refer to Communist infiltration—in our schools, unions, government, secret weapons plants, communication, power and transportation systems.”⁸⁰

Given these sentiments, it is not surprising that there was limited outcry from Washingtonians to the news that atomic bombs would be detonated at the newly created NTS, with its extreme northeastern border located roughly 160 miles due east of St. George. While federal officials issued formal announcements of the intention to create a test facility out of the Las Vegas Bombing and Gunnery Range on January 11, 1951, the first mention in the *WCN*

⁷⁵ *WCN*. As examples, see Alfred P. Haake, “The American Way: What Would Mr. Truman Do?,” February 15, 1951, p. 5; Lytle Hull, “Above the Hullabaloo,” April 5, 1951, p. 7, and July 26, 1951, p. 2. The *WCN* often printed articles written by authors from across the United States who evinced views that many residents shared. “The American Way” and “Above the Hullabaloo” were regular features of the newspaper, although these columns did not appear in every issue.

⁷⁶ *WCN*, September 3, 1953, p. 4.

⁷⁷ *WCN*, “Reds May Have Transatlantic Rockets,” February 11, 1954, p. 2.

⁷⁸ *WCN*, “Two Jets Cause Dramatic Tension; Speculation As Explosion Sets Vibration,” March 21, 1957, p. 1.

⁷⁹ *WCN*, “Observations,” Nora R. Lyman, January 2, 1958, p. 1.

⁸⁰ *Ibid.*, p. 1.

came on January 25. The article, printed at the behest of the AEC's Las Vegas office, stated that "the U.S. atomic energy commission will use part of the Las Vegas bombing and gunnery range for test activities, including experimental nuclear detonations for the development of atomic bombs.... For national security reasons, there will be no public announcement prior to any tests."⁸¹ While the final paragraph of the report warned of dangers which may exist to "the careless, the curious and the hard-to-reach individuals" who might wander onto the test range, it further stated that "tests can be carried out with adequate assurance of safety under the conditions and controls prevailing at the bombing reservation."⁸² Citizens felt secure in the assurance that no harmful effects would escape the testing grounds, and there was a veritable sense of pride that national efforts based in close proximity to their community were impacting the campaign against the spread of communism.⁸³

The early propensity to view the activities at NTS in this way seems to have been prevalent among Americans across the nation. Gallup poll data from early in the atmospheric testing period shows that the majority of Americans supported the testing program and did not worry about radioactive fallout.⁸⁴ Even those living in close proximity to the test site felt that it was their duty to refrain from exploiting property damage claims for personal benefit. During the first test series, citizens in the area surrounding Las Vegas filed 123 claims for property damage that totaled around \$15,000. Carrol L. Tyler, manager of the AEC office in Santa Fe, NM, reported that "It is noteworthy that the claims were almost all for actual costs of repairs and

⁸¹ WCN, "Las Vegas Bombing and Gunnery Range Closed to Unauthorized Persons," January 25, 1951, p. 10.

⁸² Ibid., p. 10.

⁸³ WCN, "Can This Be 'The Thing?'" March 1, 1951, p. 1. A cartoon appeared in the top center of the front page of WCN which depicted Joseph Stalin and Mao Tse-Tung being blown off their feet from a series of nuclear detonations emanating from an area labeled "Nevada Atomic Testing Grounds."

⁸⁴ A. Constandina Titus, *Bombs in the Backyard: Atomic Testing and American Politics*, Reno and Las Vegas: University of Nevada Press, 1986, pp. 86-7. Of course, it should also be pointed out that the majority of Americans did not live anywhere near the test site, and publicly available data did not disclose that fallout was raining down upon all parts of the country.

were justifiable cases.”⁸⁵ Furthermore, Tyler claimed that “in approximately one-tenth of the cases property owners waived all claims in the interest of national defense.”⁸⁶ Following the second test series in the fall of 1951, citizens from the area filed 161 damage claims with the AEC office, with two of those coming from Washington County for structural damage. The AEC claimed that, as with the claims following the first test series, around ten percent of residents citing damage to property from detonations had stated that they would not file claims.⁸⁷ It would seem that Washingtonians felt more connected with mainstream America as a result of their ability to make small sacrifices that contributed to a greater national cause, participate in national programs (like Civil Defense) in which they engaged to prevent such spread on the home front, and the common fear that they felt from the threat of global communism.

Throughout the 1950s, the local office of Civil Defense was instrumental in maintaining this palpable sense of fear in the minds of Washington County citizens. A late 1952 article in the *WCN* provided a good example: it reported that the “FCDA [Civil Defense] declares that the average American city would have to bury 40,000 dead within two days after one atomic bomb dropped upon it.”⁸⁸ Compounding the problem of this shocking disclosure, the article estimated that “70 per cent [sic] of any raiding force of planes probably will get past U.S. air defenses.”⁸⁹ By 1955, the Civil Defense office began running advertisements in the *WCN* asking for volunteers to operate Ground Observer Corps stations for two hours per week in order to provide advance notice of enemy planes encroaching upon U.S. airspace, thus enabling American fighter

⁸⁵ *WCN*, “Government Adjustments Made on Atomic Damage,” May 10, 1951, p. 11. Carrol L. Tyler’s name may in fact be Carroll L. Taylor, as I found an anomaly in the spelling in a later article (see *WCN*, “AEC Completes Series of Nevada Experiments,” June 12, 1952, p. 9, in which the article quotes Carroll L. Taylor). For the purposes of this study, I have elected to use the spelling I found in the article referenced because there is no way to verify that these two are the same person.

⁸⁶ *Ibid.*, p. 11.

⁸⁷ *WCN*, “St. George Bomb Damage Claims Filed with General AEC Adjustment Bureau,” December 6, 1951, p. 2.

⁸⁸ *WCN*, “40 Thousand Dead Foreseen if Bomb Hits Average City,” October 2, 1952, p. 6.

⁸⁹ *Ibid.*, p. 6.

jets to confront the attackers.⁹⁰ Local civilians undoubtedly felt that this would be a selfless act which contributed to national security with the potential for saving thousands of lives.

In October 1952, the Utah State director of civil defense held a course in St. George which spanned three days in order to educate the local population on “self-preservation” during an attack. The stated goal was to prepare all American citizens for their respective roles in the event that a major U.S. city was hit by a Soviet weapon.⁹¹ It seems that citizens heeded the call for volunteering in Civil Defense programs, as numerous related articles throughout the remainder of the atmospheric testing period cited the willingness of Washingtonians to assist with various maneuvers. Nora Lyman wrote of the importance of Civil Defense operations in her Observations column in September 1954. This highly subjective account of the importance of the Civil Defense program claimed that participation could prevent “a hundred atomic Pearl Harbors;” would provide “training for those of us who live in the wide, open spaces to accept and care for the hordes who will flee in terror from the stricken city areas” after a nuclear strike; and would impart to citizens “the confidence to face whatever may come and the knowledge we need to protect ourselves.” Furthermore, Lyman warned that “Without it, we may not survive an attack.... Why not prepare for the worst and hope for the best?”⁹² Echoing these sentiments, Marilyn Daniels, a Home Demonstration Agent for 4-H, claimed that Civil Defense programs were “a way of saving your life and property.”⁹³ According to Washington County’s Civil Defense director in February 1958, the county was “well organized and prepared to act as a reception center for 30,000 people in case of attack.”⁹⁴

⁹⁰ WCN, “Plane Spotters Essential to Air and Civil Defense,” May 5, 1955, supplement page.

⁹¹ WCN, “Three-Day Civil Defense School held in St. George,” October 16, 1952, p. 1.

⁹² WCN, “Observations,” September 30, 1954, p. 1.

⁹³ WCN, “Farm and Home Notes: Civil Defense and You,” November 24, 1955, p. 2.

⁹⁴ WCN, “Civil Defense Meeting is Held in Cedar City,” February 13, 1958, p. 2.

When one compares Civil Defense press releases with those prepared by the Atomic Energy Commission, one cannot help but notice the change from negative language used to describe the potential effects of a Soviet weapon to the decidedly positive language used when referring to experiments with nuclear weapons at NTS. From articles describing the death and destruction resulting from enemy attack to articles lauding the ways in which U.S. nuclear tests “contributed to the development and to the utilization of atomic weapons,” the degree to which the narrative shifts is telling.⁹⁵ In articles describing bomb blasts, the AEC press releases included euphemistic phrases such as “the most powerful and brilliant,” “new and improved nuclear devices,” and “tremendous power and energy released by the atomic explosion dwarfed the sound and power of conventional shells.”⁹⁶ Yet another article which reported the recent test of a nuclear device claimed that “Early rising Utahns in St. George and other sections of Washington County... were rewarded by the ruddy glow that signaled the blast.”⁹⁷ The AEC also made sure always to declare that their experiments had not “resulted in any hazard to humans.”⁹⁸ However, the commission did warn that there existed the possibility that citizens could be harmed—from broken glass hurtling through the air after the shock wave from a blast passed through the area, potentially breaking windows.⁹⁹ The overall effect then is that language used in reports of the AEC’s activities portrayed its nuclear devices as benign experiments compared to the malicious intent and destructive capabilities of Soviet weapons.

Despite the use of such mild psychological manipulation, the AEC encountered problems in the public relations area from the outset of its experimental program. This resulted from

⁹⁵ WCN, “AEC Completes Series of Nevada Experiments,” June 12, 1952, p. 9.

⁹⁶ WCN, “Giant Atomic Bomb Gives Greatest Shock of Series in Washington County,” November 8, 1951, p. 1; WCN, “Atomic Artillery Test is Scheduled in Nevada,” March 12, 1953, p. 6; WCN, “Eye Witnesses Report Detonation of Atomic Rifle at Frenchman Flat,” May 28, 1953, p. 1.

⁹⁷ WCN, “Utahns See Horizon Painted by Blast; Atomic Device Explodes at Yucca Flat,” March 19, 1953, p. 1.

⁹⁸ WCN, “AEC Completes Series of Nevada Experiments,” June 12, 1952, p. 9.

⁹⁹ WCN, “AEC Warns Citizens of Blast Effects; Urges All to Cooperate During Test,” April 23, 1953, p. 1.

stories told by local ranchers and mining speculators who owned Geiger counters. Some local ranchers began reporting that “strange burns” were afflicting them and their horses and that unexplained ailments were killing their cattle and sheep. Men who had been or were currently searching for large uranium deposits reported that “geiger [sic] counters... registered off the scale.”¹⁰⁰ When local citizens expressed anxiety over these occurrences, the AEC was quick to dismiss such concerns, claiming that local laypersons lacked the scientific background to make such determinations. AEC officials were also quick to release official statements refuting the occurrence of readings which indicated that radioactivity levels were unusually high.¹⁰¹ The AEC attempted to discredit the Geiger counter phenomena by pointing out that the devices were prone to malfunction and hyper-sensitivity.

When Operation UPSHOT-KNOTHOLE began at NTS in March 1953, the AEC was still formulating safety standards and emergency procedures; worse, the administrators chose to ignore certain facts and warnings that could have prevented future accidents, as delays to already scheduled programs would be costly. During the series, which lasted from March 17 to June 4, 1953, monitors did not operate “farther than 200 miles from the proving ground borders.”¹⁰² The rapidity with which observation personnel reached their maximum radiation exposure further contributed to the limited monitoring, and caused the AEC to increase the maximum “safe” level.¹⁰³ Procedural precedents would have to be sacrificed in order to complete the operation successfully.

¹⁰⁰ Ball, *Justice Downwind*, p. 70.

¹⁰¹ *Ibid.*, p. 70.

¹⁰² Hacker, *Elements of Controversy*, p. 101.

¹⁰³ *Ibid.*, p. 100.

The level of public concern dramatically increased beginning in April 1953, the same time that the AEC began detonating higher-yield nuclear weapons at NTS.¹⁰⁴ The Simon and Harry Shots went horribly wrong when their respective fallout clouds were carried swiftly away from ground zero. A 43-KT explosion, fallout from Simon (detonated April 25) resulted in the Test Director ordering roadblocks to be erected offsite after the monitors discovered “several trucks, a Greyhound bus, [and] private cars,” which were contaminated to the east.¹⁰⁵ Never before had the administrators had to order such offsite activities. Although they did not find any locations where radiation levels were above 0.46 roentgens, safety teams inspected close to “400 vehicles in all and sent 40 for washing,” and the AEC denied that there were any reports of significant ill health effects.¹⁰⁶

In St. George, local service station employees and proprietors reported washing “approximately 75 cars and trucks.”¹⁰⁷ The AEC did not respond to *WCN* inquiries “as to whether the unprecedented check of cars and trucks indicated unusual concentrations of radioactive dust from Saturday morning’s blast had been blown down to the highway.”¹⁰⁸ Vehicles stopped for cleaning were travelling north on Highway 91 into Utah from Nevada. Cleaning operations appear to have been conducted throughout the day, as the article states that “One service station operator... said he had 14 cars waiting for washing at one time between 5 and 6 p.m.”¹⁰⁹ The concern the AEC officials expressed in cleaning the cars of radioactive

¹⁰⁴ Viktor Nikitovich Mikhailov, ed., *Catalog of Worldwide Nuclear Testing*, New York: Begell-Atom, 1999, pp. 14-16. This document is a comprehensive listing of all known nuclear weapon detonations. The editor notes that the work relies upon both official and unofficial sources in creating the list. According to the list, NTS experiments included only four devices with yields over 20-KT (and none more than 31-KT) prior to Operation UPSHOT-KNOTHOLE, which accounted for an additional six (four of which were greater than 31-KT).

¹⁰⁵ Hacker, *Elements of Controversy*, p. 103; U.S. Department of Defense, *Operation UPSHOT-KNOTHOLE, 1953*, United States Atmospheric Nuclear Weapons Tests, Nuclear Test Personnel Review, DNA 6014F (1982), p. 7.

¹⁰⁶ Hacker, *Elements of Controversy*, pp. 103-4.

¹⁰⁷ *WCN*, “Atomic Dust Discovered on Cars Near St. George as AEC Sets Roadblock,” April 30, 1953, p. 1.

¹⁰⁸ *Ibid.*, p. 1.

¹⁰⁹ *Ibid.*, p. 1.

debris does not seem to have been extended to the service station employees attending to the contaminated vehicles. There is no mention in the sources that these employees used any sort of special protection to prevent radioactive contamination to their bodies; neither is there a report that suggests they failed to employ preventative measures.

The Greyhound bus in question had apparently been travelling south on Highway 91, as it was cleaned at a roadblock in North Las Vegas, according to the article. The report of the contaminated Greyhound bus is significant in that it seems to have been a basic means of travel during this time period, as advertisements for Greyhound fares appeared regularly in the *WCN* from April 1951 through 1958, when advertisements for automobile dealerships dramatically increased. It is likely that Washingtonians were aboard the bus, as there was a hub in St. George. What is perhaps more alarming, though, is that persons from across the U.S. with limited knowledge of the frequency and effects of NTS experiments were unknowingly contaminated with radioactive fallout, especially considering that these busses did not have an interior cooling system and the windows likely would have been down for the trip across the hot desert. In customary fashion, however, the AEC office did declare “that persons, animals, or crops exposed to the material were in no danger.”¹¹⁰

However, there is no evidence to suggest that the AEC monitor in St. George inspected the car wash. Where did the radiation being scrubbed from the vehicles accumulate? Did service station employees receive higher than normal radiation doses from their proximity to the radioactive dust? Apparently, in their haste to reassure the populace that there was no danger, AEC officials ignored the very real dangers from radiation exposure in this and numerous other instances. As before, the AEC did not abandon the operation or its schedule following these two

¹¹⁰ Ibid., p. 1.

incidents. It did, however, develop a new “‘Highway Rad Safe Plan,’ ... a formal plan to deal with any future crisis of the same nature,” which was released in mid-May.¹¹¹

Despite the scare, there were no comments on the effects of Shot Simon in the *WCN* until the second issue after this alarming incident. Even then, it was assistant editor Nora Lyman remarking that “Atomic detonations are becoming so commonplace with us now that few of us in this area even raise an eyebrow” when an explosion was seen or felt.¹¹² However, in the following issue, a front-page article appeared with the headline “Bomb Sears Nevada Area in Largest Atomic Test; St. George Opinions Vary.” This article announced the previous week’s test, Shot Encore, and described the experiments the AEC and military conducted during the exercise. It also stated that the AEC had disclosed that Encore was “the largest military and civilian effects nuclear test ever held in this country.”¹¹³ While the text of the article failed to clarify further the assertion that opinions in St. George varied, Nora Lyman addressed the concern in her weekly column. She quoted Clarence N. Stover, research administrator of the radiobiological laboratory at the University of Utah, as stating that “the cloud... was traveling so high and so fast that there was little or no fallout.”¹¹⁴ Lyman suggested that

the reason for so much agitation and excitement was that the wind was extremely high, and the thermometer kept jumping around without rime or reason. We are accustomed, more or less, to an occasional dust fury early in spring, but the temperature is usually stable. Friday, the combination of black clouds, threatening rain, cold, dust and an atom detonation resulted in all sorts of wild rumors.¹¹⁵

It seems that residents had become a bit more concerned than previously about the effects the detonations were having on their community.

¹¹¹ Hacker, *Elements of Controversy*, pp. 103-4.

¹¹² *WCN*, “Observations,” May 7, 1953, p. 1.

¹¹³ *WCN*, “Bomb Sears Nevada Area in Largest Atomic Test; St. George Opinions Vary,” May 14, 1953, p. 1.

¹¹⁴ *Ibid.*, p. 1.

¹¹⁵ *Ibid.*, p. 1.

A few weeks after the Simon Shot, on May 19, a wind shift at the time of detonation sent the radioactive cloud from Shot Harry, a 32-KT device, moving over areas of Nevada and Utah. Despite the fact that test managers had determined that the weather was “perfectly satisfactory for this shot,” fallout rained particularly hard on the communities of Cedar City, Utah, and St. George.¹¹⁶ The AEC’s Health and Safety Laboratory offsite personnel wasted no time implementing the formal offsite safety procedures. However, since the yield of Harry was considerably less than Simon, administrators believed that the radiation levels would not surpass those which occurred during Simon. When radiation readings in St. George reached 0.3 roentgens per hour, the AEC again conducted its roadblock and free car-wash service along affected highways and warned the population of St. George to stay indoors from shortly after 9 a.m. until noon.¹¹⁷

According to reports of the incident, only residents within the St. George municipality were warned of the impending danger. It seems that citizens of other parts of Washington County were oblivious to the radioactive threat. Since the AEC still claimed publicly that radiation did not pose harmful effects in cumulative doses, but, rather, wore off after a short time, it continued to assert “that ‘radiation had not reached a hazardous level’” and even children in public schools “were allowed out by lunchtime.”¹¹⁸ The mishap was so dramatic that the AEC announced in August 1953 that it would begin “work on a documentary film record.... including efforts to keep St. George residents indoors” while the radioactive cloud passed over the area.¹¹⁹

¹¹⁶ United States, Department of Energy, Office of History and Heritage Resources, *Atmospheric Nuclear Weapons Testing, 1951-1963*, by Terrence R. Fehner and F.G. Gosling, vol. 1 of *Battlefield of the Cold War: The Nevada Test Site*, Washington, DC: U.S. Department of Energy, 2006, p. 105. The text quotes an internal AEC document. Hereafter cited as United States, *Battlefield*.

¹¹⁷ WCN, “St. George Gets Publicity From Radioactive Pall After Atomic Detonation,” May 21, 1953, p. 1.

¹¹⁸ Ibid., p. 1; Hacker, *Elements of Controversy*, p. 104.

¹¹⁹ WCN, “AEC Fall Out of May 19 in St. George Area to Be Enacted, Photographed,” August 20, 1953, p. 1.

Ironically, the *WCN* issue which followed this latest AEC miscalculation featured a letter to the editor from a University of Utah student and resident of St. George. Ralph J. Hafen wrote that he had conducted “considerable research into the problem of radiation” and felt “morally obligated to warn people of the irreparable damage that may have occurred or may in the future occur.”¹²⁰ Mr. Hafen claimed that scientific interpretation of available data had resulted “in sharp dispute” among members of the scientific community as to the possibility of “physiological injury” to humans from radiation exposure.¹²¹ Further asserting that “Your health, your children’s health and the health of generations yet unborn are at stake,” Hafen pointed out four problem areas which AEC officials had not addressed: inhalation of fallout debris, effects of beta radiation (as opposed to gamma radiation), the amount of radiation contamination in areas outside the St. George area, and the potential for radiation to cause hereditary mutations.¹²²

Hafen concluded by stating that the AEC was “morally obligated to clear up [these issues] before continuing with their tests in Nevada.”¹²³ Evidently, Mr. Hafen’s letter was not well received by the Health Division of the Utah State Civil Defense Administration, as it sent a letter to the editor which appeared two weeks later. Without citing Mr. Hafen’s letter directly, the department claimed that “We feel that every citizen has the right to know the truth about this situation, and would like to avoid any undue anxiety which might have been caused by wild rumors.”¹²⁴ It further stated that it had sent two physicians to the area to investigate, who had found “that it was highly improbable that any person could receive damage from the recent ‘fall-

¹²⁰ *WCN*, “The Forum,” May 21, 1953, p. 7.

¹²¹ *Ibid.*, p. 7.

¹²² *Ibid.*, p. 7.

¹²³ *Ibid.*, p. 7.

¹²⁴ *WCN*, “The Forum,” June 4, 1953, p. 2.

out.”¹²⁵ Then, in August, the AEC increased its public relations efforts when it sent two representatives to the St. George area in order “to discover the feelings of the public regarding the tests and to uncover possible misconceptions.”¹²⁶

Despite the two experimental debacles, the AEC continued with its final two scheduled detonations, and even detonated the largest device yet at NTS on June 6. Shot Climax yielded 61-KT, yet there are no reports in the *WCN* regarding fallout scares or damaged property in Washington County. Still, the spring 1953 mishaps had taken their toll on the AEC’s public image, and the commission made the decision to relocate all 1954 experiments to its Bikini facility. After more than a year away from the NTS, the AEC scheduled a new test series to begin in February 1955. Before firing the first shot, however, a conference of AEC officials and health officials from Utah convened to discuss the myriad ways in which AEC test coordinators attempted to protect public health. The measures included giving “great consideration... as to where the wind will carry the particles,” evaluating “water and milk samples... for the presence of radio activity in the area,” and posting personnel at both “fixed stations” and “mobile units... in all communities adjacent” to the testing grounds.¹²⁷ Test directors fired the first shot of the new test series less than a week later on February 18.

The inception of the new series sparked a new wave of concern among Washingtonians. St. George city officials attempted to calm the citizenry by reiterating the AEC’s public safety claims. The *WCN* reported that “the mayor and city officers feel there is no danger, as the fallout is not great enough to cause danger.”¹²⁸ Apparently, city officials had consulted AEC officials who had compared the amount of radiation received from fallout to the amount one

¹²⁵ *Ibid.*, p. 2.

¹²⁶ *WCN*, “Public Reaction Sought on Atom Bomb Tests by Visiting AEC Officials,” August 13, 1953, p. 1. There is no indication of the officials’ findings in the *WCN* or other consulted sources.

¹²⁷ *WCN*, “Public Health, Safety View on Nuclear Tests Meeting Well Attended,” February 17, 1955, p. 1.

¹²⁸ *WCN*, “A-Bomb Fallout Inquiry Explained by City Office,” March 3, 1955, p. 1.

received from an X-ray, “so they felt there was no cause for worry.”¹²⁹ Nora Lyman helped to perpetuate this explanation three weeks later in her weekly column, writing that “doctors and officials... say that radiation is about one-twentieth of that experienced in an X-ray.”¹³⁰ Lyman went on to claim that readers who were concerned should feel thankful that they were not one “of the three men who left St. George in an airplane the day of the explosion and, inadvertently, flew right through the cloud.”¹³¹

Despite the admonishments not to worry, fears continued, even if not in the public view. In October 1957, an article appeared which reported the highest fallout readings for St. George (0.5 roentgens), Veyo (0.63 roentgens), and Shivwits Indian Reservation (0.54 roentgens), all communities located in Washington County. The article further claimed that the Utah State Department of Health had initiated “a study of the effects on Utah residents of fallout from the atomic bomb tests in Nevada,” and quoted Dr. Joseph P. Kesler of the Utah State Department as saying that “there is now... ‘a danger only in potential,’” and that “the present accumulation of radioactive materials resulting from the annual tests has probably not caused any injury.”¹³² The article concluded by claiming that some officials feared that “continued testing could possibly raise the radioactive level past the danger point.”¹³³

Still, a local observer claimed that during the period surrounding Shot Harry, “People in St. George... were relatively unconcerned. The common reaction was that, if the United States tests were needed, then they had to be conducted.”¹³⁴ Even after a fallout scare from large detonations in the Soviet Union in 1961, and despite resumed testing at NTS following a nearly

¹²⁹ *Ibid.*, p. 1.

¹³⁰ *WCN*, “Observations,” March 24, 1955, p. 1.

¹³¹ *Ibid.*, p. 1.

¹³² *WCN*, “Radioactive Fallout is Measured in Utah; Study,” October 17, 1957, p. 1.

¹³³ *Ibid.*, p. 1.

¹³⁴ *WCN*, “Fallout Report,” November 23, 1961, p. 4.

three year moratorium, “worry here [in St. George] is at a minimum.”¹³⁵ An article appearing in the *WCN* just before Christmas 1961 responded to the newly raised concerns. The article, “Don’t Worry About Fallout,” cited an interview with Dr. Ralph E. Jorgenson, the president of the Utah State Medical Association, in which he conceded that scientists were not fully in agreement with one another on the health effects of radioactive fallout. He then asserted that “there isn’t very much that us average folks can do about it anyway.... If there is radioactive fallout in the air, we’ll get some of it, and there’s nothing we can do about it.”¹³⁶ According to the doctor, “the best tonic for good health is to be happy, [so] let’s be happy this Christmas season.”¹³⁷

An advertisement taken out in the *WCN* in August 1963 by Lloyd E. Howard of La Verkin provides further evidence that concern had not turned to paralytic fear even more than a decade removed from the first NTS tests. Mr. Howard admonished readers to “ACT NOW FOR FREEDOM” by writing Utah’s federal Senators and recommending that they vote against the proposed Limited Test Ban Treaty (LTBT).¹³⁸ Mr. Howard claimed that the LTBT would threaten U.S. national security and be “meaningless as a restraint on Soviet aggression,” and argued that the Soviets “used the last test ban moratorium to secretly prepare for nuclear testing.”¹³⁹ Despite the passage of the LTBT by both countries and the USSR’s adherence to its stipulations, Washingtonians remained convinced that atmospheric nuclear detonations were a vital part of the nation’s security.

It is clear that throughout the atmospheric weapons testing period, patriotism trumped anxiety over potential adverse health effects among Washington County’s population. While

¹³⁵ *Ibid.*, p. 4.

¹³⁶ *WCN*, “Don’t Worry About Fallout,” December 21, 1961, p. 3.

¹³⁷ *Ibid.*, p. 3.

¹³⁸ *WCN*, “Citizens of Washington County ACT NOW FOR FREEDOM,” August 8, 1963, p. 7.

¹³⁹ *Ibid.*, p. 7.

many citizens did openly express their apprehension at the fallout raining down upon their heads, town officials and newspaper editors made sure that they parroted the AEC declarations that radiation exposure had not resulted in any danger to the human population. Furthermore, appeals to their status as average Americans, rather than viewed as condescension of their intellectual capabilities, likely caused this small Mormon community to feel more accepted by mainstream society. It is also likely that it served to prevent many Washingtonians from conducting any independent research into the problem of nuclear radiation, although, even if they had committed to doing such research, the available, publicly accessible published sources would have only served to reinforce the AEC's faulty assertions. The phenomenon which both the AEC and the citizens of Washington County failed to recognize was the effect of radiation on the surrounding environment, both biological and geological.

THE UNSEEN ENEMY: FARMING PRACTICES, RADIATION, AND ENVIRONMENTAL IMPACT

“The history of life on earth has been a history of interaction between living things and their surroundings.”—Rachel Carson¹⁴⁰

AEC scientists gave little thought or effort in the early years of atmospheric testing to studying the effects of fallout particles absorbed or ingested by flora and fauna in the paths of the radioactive clouds which passed over communities like Washington County. As late as 1959, Dr. John N. Wolfe, the chief scientist of the Environmental Sciences Branch of the Division of Biology and Medicine at the AEC, testified before the Joint Committee on Atomic Energy (JCAE) that “the major problems confronting man in atomic energy are ecological. Fallout, whatever its intensity, needs study as to its distribution and redistribution by wind, water, ice, food chains, biotic migration, and abscised plant parts. Disposal of radioactive by-products presents a continuing problem of an environmental nature....”¹⁴¹ The AEC was not, however, an agency which placed a premium on continuity.

Five years after Wolfe’s testimony, Dr. Gordon M. Dunning, head of the Division of Biology and Medicine at the AEC, published a work in which he claimed that “fallout particles consisting of inert materials together with the associated radioactive materials settle to the earth’s surface where most of them remain and thus never get inside our bodies.”¹⁴² Dunning seemed to be assuming, counter to the previous suggestions made by one of his subordinates, that wind would not move the particles, human activities such as mining or farming would not disturb the particles, and that these particles would not land on animals or plants for human consumption. It

¹⁴⁰ Rachel Carson, *Silent Spring*, Boston and New York: Mariner Books, 2002 [1962], p. 5.

¹⁴¹ “Ecological Aspects,” by John N. Wolfe, Chief, Environmental Sciences Branch, Division of Biology and Medicine, U.S. Atomic Energy Commission, in United States, Joint Committee on Atomic Energy, *Fallout from Nuclear Weapons Tests: Hearings Before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy*, 86th Cong., 1st sess., May 5-8, 1959, vol. 1, p. 145. Hereafter cited as Wolfe, “Ecological Aspects.”

¹⁴² Dunning, *Health Aspects*, p. 4. Here, Dunning seems to be referring to long-lived radionuclides, as a few pages later he begins discussing the instances of short-lived radionuclides entering the human body.

proved to be an issue which received attention too late, however, as Washington County, known as Utah's Dixie for its abundant variety of agricultural products, was above all else an agricultural community in the 1950s.

An April 1959 article in the *Washington County News* cited "the long growing season, mild winters and favorable grazing conditions" of the region as the primary factors in making Washington County a prime area for agricultural industry.¹⁴³ In June 1951, county agent Melvin S. Burningham reported that he had obtained the 1950 agricultural census records for Dixie's farming industry. As of 1949, there were 706 farms with 17,898 acres of irrigated land, and an additional 19,042 acres of pasture land; of the irrigated land, farmers devoted 7,000 acres to winter wheat, 6,000 acres to alfalfa, and 2,500 acres to barley production.¹⁴⁴ By the time of the 1954 agricultural count, the county's agricultural production grossed nearly \$800,000: eighty-three percent of this total came from the field crops of winter wheat, alfalfa, and barley; thirteen percent came from fruit crops; and the remaining four percent came from vegetable crops and "horticultural specialties."¹⁴⁵ In 1958, a series of storms wreaked havoc on area farms, dealing an estimated \$100,000 in damages to crops previously listed, as well as cherry, apricot, quince, plum, and strawberry crops.¹⁴⁶ Agricultural enterprises were so prevalent in the county that even in the 1950s and 1960s Washington County was hosting foreign exchange students through the international farm youth exchange program and agricultural delegates from foreign nations.¹⁴⁷

Another important aspect of Dixie's agricultural industry was its livestock production, including cattle, sheep, and turkeys, as well as dairy and feed products associated with the

¹⁴³ *WCN*, "Basic Economic Industries of Washington County...", April 30, 1959, p. 1.

¹⁴⁴ *WCN*, "Farming in Washington County," June 7, 1951, p. 12. Mr. Burningham did not elaborate on which crops constituted the balance of the acreage, and while he noted that the acreage devoted to fruit production had not changed significantly, he did not cite the specific acreage for fruit orchards.

¹⁴⁵ *WCN*, "Farm Census Now Being Tabulated," November 12, 1959, p. 1.

¹⁴⁶ *WCN*, "Savage Rain, Wind Storm Damages Dixie Fruit Crop," May 15, 1958, p. 1.

¹⁴⁷ *WCN*, "Foreign Youth to Study County Agriculture on Student Exchange Basis," July 30, 1953, p. 3; *WCN*, "Iranian Agriculture Officials Visit Washington County," April 11, 1963, p. 3.

industry. In 1950, ranchers had more than 20,000 cattle and 55,000 sheep grazing on the lands comprising the Dixie national forest, and the numbers stayed roughly the same for 1951 and 1952.¹⁴⁸ The 1954 agricultural census revealed that the total worth of livestock and livestock products exceeded \$2.7 million, with \$1.168 million in poultry, \$1.120 million in cattle, and \$422,840 in dairy products.¹⁴⁹ By 1959, there were in excess of 30,000 cattle valued at more than \$6 million in Washington County, and Barlocker Farms, Inc., a company based in the small community of Enterprise, sold more than one million turkeys annually.¹⁵⁰

Perhaps the single-most important agricultural enterprise in Washington County, relative to the atmospheric weapons testing period, was the dairy industry. Many people in the area believed that milk was a critical part of healthy diets, and one local even proclaimed that “nature undoubtedly intended milk to be an excellent food, as it falls so little short of perfection.”¹⁵¹ Many residents, especially in rural areas of the county, owned a backyard cow from which they derived their supplies of milk and butter. According to a 1981 DOE publication that had surveyed residents from 1951-1962, “55 percent obtained milk from their own cow, 44 percent drank milk with every meal,” “22 percent fed their children fresh cow’s milk, 56 percent obtained their drinking water from a spring, and 65 percent grew leafy vegetables.”¹⁵² In most cases, these home-grown dairy products were unpasteurized, as evidenced by articles in the local newspaper promoting buying pasteurized milk and home pasteurization methods.¹⁵³ Even by late 1959, an investigation was under way that had already “found that many people are still

¹⁴⁸ WCN, “Dixie Forest Reports Grazing Use of Lands,” February 8, 1951, p. 3; WCN, “Dixie National Forest Supervisor Tells Grazing,” February 12, 1953, p. 6.

¹⁴⁹ WCN, “Farm Census Now Being Tabulated,” November 12, 1959, p. 1.

¹⁵⁰ WCN, “Basic Economic Industries of Washington County...,” April 30, 1959, p. 1.

¹⁵¹ WCN, “Food Marketing Information on Milk,” February 15, 1951, p. 6.

¹⁵² Quoted in Fradkin, *Fallout*, p. 11. Fradkin cites United States, Department of Energy, “Survey of Life-styles, Food Habits, and Agricultural Practices,” Nevada Operations Office, 1981.

¹⁵³ WCN, “Food Marketing Information on Milk,” February 15, 1951, p. 6; WCN, “Home Pasteurization of Milk,” August 14, p. 2.

selling raw milk without a permit.”¹⁵⁴ In 1953, the Washington County Dairy Herd Improvement Association reported that the average output for association cows was 9,779 pounds of milk and 386 pounds of butterfat per cow; this was more than 3,000 pounds of milk and 140 pounds of butterfat per cow above the state average for Utah.¹⁵⁵ By 1956, Nora Lyman reported that, in the fourteen year existence of the Washington County Dairy Herd Association, the local industry had grown from supplying 100 gallons of milk per day to 3,300 gallons.¹⁵⁶

Dairy producers in Dixie supplied not only the local population with milk, butter, and cheese, but by the mid-1950s were also shipping a large portion of their unpasteurized dairy to distributors in Utah and Las Vegas.¹⁵⁷ Hi-Land Dairy’s ad lauded itself as “Utah’s First and Finest Carton Milk,” while the Washington County Dairy Association was promoting Anderson Dairy Products out of Las Vegas because it processed the area’s unpasteurized dairy goods before returning them to Washington County as pasteurized milk, cheese and butter.¹⁵⁸ Furthermore, the ad claimed that “over one-half million dollars a year [are] sent into Washington County by Anderson.”¹⁵⁹ The Washington County Dairy Association secured the contract with Anderson sometime in late 1952 or early 1953, and contracted with Anderson in October 1956 to have their own milk distributed within the county.¹⁶⁰

This was significant for Washingtonians because radioactive fallout from near-earth blasts carries high concentrations of short-lived radionuclides, including the radioactive isotope

¹⁵⁴ WCN, “Milk Safety,” November 19, 1959, p. 3. There was no mention of the possibility of radioactive contamination in this lengthy article on maintaining strict safety standards in milk production.

¹⁵⁵ WCN, “Washington County Dairy Herds Average High,” April 22, 1954, p. 8.

¹⁵⁶ WCN, “Observations,” April 25, 1957, p. 1.

¹⁵⁷ WCN, “Third Grade Takes Excursion to Cinder, Milk Plants; Play,” October 18, 1951, p. 3; A third grade class visited the St. George ice plant and witnessed the process of milk being pasteurized for the school lunch program.

¹⁵⁸ WCN, Advertisement for Hi-Land Dairy, June 4, 1953, p. 2; WCN, Advertisement for Anderson Dairy Products, October 18, 1956, p. 4.

¹⁵⁹ WCN, Advertisement for Anderson Dairy Products, October 18, 1956, p. 4.

¹⁶⁰; WCN, “Washington County Dairy Association Elect 1953 Slate; Report Progress,” March 12, 1953, p. 5; WCN, “Observations,” April 25, 1957, p. 1.

of iodine (I-131), which, Dr. Dunning conceded, “will be deposited relatively quickly and can enter the food chain.”¹⁶¹ This entry comes primarily through the consumption of milk, and about thirty percent of the I-131 is then deposited in the thyroid gland regardless of organ size. According to Dunning, “an infant’s thyroid gland of about two grams weight would receive 10 times more radiation dose than the 20 gram adult’s thyroid for the same amount of iodine 131 ingested.”¹⁶² He went on to admit that “direct measurements of iodine 131 in milk were not made around the Nevada Test Site during earlier times of testing since it was the consensus of scientists within and outside the AEC and Government at that time that the limiting factor was the potential external whole body exposure.”¹⁶³ In fact, the AEC did not measure ingested radioactive contaminants which had entered the food chain from 1951 through the completion of the 1958 test series.¹⁶⁴

The agency did, however, understand the dangers associated with exposure to radioactive I-131 prior to Shot Harry, as Frank Butrico, the AEC monitor stationed in St. George during the event, had orders to test the local milk for I-131.¹⁶⁵ It is unclear whether Butrico was acting on his own volition or under orders when he chose to collect his sample from “several purchases from stores so as not to create alarm,” but his measurements could not have been accurate since he chose not to acquire samples from local sources as Washingtonians would have done.¹⁶⁶ According to the DOE report, Butrico had become “concerned that radioactivity might get into the milk supply from cows eating contaminated vegetation.”¹⁶⁷ Later studies indicated that there

¹⁶¹ Dunning, *Health Aspects*, p. 11.

¹⁶² *Ibid.*, p. 11.

¹⁶³ *Ibid.*, p. 11.

¹⁶⁴ Ball, *Justice Downwind*, p. 108.

¹⁶⁵ Fradkin, *Fallout*, p. 21. Butrico’s name only comes from Fradkin’s work, as far as I have been able to determine. His actions are mentioned in DOE documents, but his name is never given in them.

¹⁶⁶ United States, *Battlefield*, p. 106; Fradkin, *Fallout*, p. 21.

¹⁶⁷ United States, *Battlefield*, p. 106.

was a significant potential for “thyroid abnormalities” in children as a result of ingesting milk which had been contaminated with I-131.¹⁶⁸

Dunning’s claims of scientific consensus were disingenuous, as the National Committee on Radiation Protection had come to the conclusion nearly twenty years earlier that the “tolerance dose” theory of radiation damage, which proposed that radiation exposure below a certain threshold was typically not dangerous, was incorrect.¹⁶⁹ Following Polish physicist Marie Curie’s discovery of radium in 1898, physicians began using the element as a treatment for cancer patients, although some scientists soon warned that there were potentially serious health consequences which may result from exposure to radium.¹⁷⁰ Despite the early warnings, radium was popularized as a medicinal supplement in the patented Radithor water manufactured by Bailey Radium Laboratories, and was also used in everyday products such as toothpaste and hair creams, as well as luminescent paints. It was not until the 1920s that the effects of the radioactive element received proper attention in regard to its potential damage to the human body.

Dr. Harrison Stanford Martland’s 1925 article in the *Journal of the American Medical Association* presented critical evidence that the practice of consuming radium was indeed harmful and potentially fatal.¹⁷¹ By 1932, the American Medical Association had disqualified radium from its index of substances “approved for internal administration.”¹⁷² From 1928 to 1929, both the International X-Ray and Radium Protection Committee (1928) and the American X-Ray and Radium Protection Committee (1929) had established their safety dose guidelines on

¹⁶⁸ Ibid.

¹⁶⁹ J. Samuel Walker, *Permissible Dose: A History of Radiation Protection in the Twentieth Century*, Berkeley and Los Angeles: University of California Press, 2000, p. 10.

¹⁷⁰ Ibid., p. 4.

¹⁷¹ Ibid., p. 5.

¹⁷² Ibid., p. 7.

admittedly deficient proof of the effects of radiation. While neither committee declared “that its tolerance dose was definitive” and both conceded that injury may result from exposure to any amount of radiation, both “considered levels below the tolerance dose to be generally safe and unlikely to cause permanent damage to the ‘average individual.’”¹⁷³

In 1965, the U.S. Department of Agriculture published an article in *Farmer’s Bulletin* entitled “Defense against Radioactive Fallout on the Farm,” in which the government gave advice for protecting America’s farmlands from suffering catastrophic damage in the event of a foreign nuclear attack.¹⁷⁴ It asserted that “early fallout consists of heavy particles that are deposited within 24 hours after a nuclear explosion and usually within a few hundred miles from the explosion.”¹⁷⁵ Of the tests which resulted in radiation clouds dumping fallout in the Washington County area, wind pattern reports show that fallout from the clouds arrived between six and twelve hours from the time of detonation.¹⁷⁶ This time frame meant that Washington County received fallout from the passing clouds during the period in which the heaviest and most radioactive particles fell back to earth from the force of the explosion. However, there was no monitoring system in place for detecting long-range fallout at the first NTS test shot. Only after fallout was detected at the Eastman Kodak plant in Rochester, New York, did the AEC recognize the need for off-site fallout monitoring. To that point, AEC scientists claimed to believe that

¹⁷³ The American X-Ray and Radium Protection Committee became the Advisory Committee on X-Ray and Radium Protection Committee in 1929, and this body subsequently formed the basis for the reorganized National Committee on Radiation Protection in 1946. National Council on Radiation Protection & Measurements, “Our Mission,” http://www.ncrponline.org/AboutNCRP/About_NCRP.html [accessed December 12, 2012]; Walker, *Permissible Dose*, p. 8.

¹⁷⁴ In the author’s opinion, it is no small matter that it was only in discussing the effects of enemy nuclear weapons that the AEC disseminated accurate information regarding the potentially wide-ranging effects of radiation on humans.

¹⁷⁵ United States, “Fallout on the Farm,” p. 1.

¹⁷⁶ United States, Department of Energy, Environmental Measurements Laboratory, *Estimates of Fallout From Nevada Weapons Testing in the Western United States Based on Gummed-Film Monitoring Data*, by Harold L. Beck, New York: U.S. Department of Energy, 1984, pp. 123-136.

offsite monitoring was unwarranted and, therefore, had not implemented such a system to track radiation outside the boundaries of NTS.¹⁷⁷

In examining the question of the length of time radioactive fallout would contaminate agricultural lands, the USDA article indicated that the contamination period was dependent on the amount and kinds of radioactive debris in a specific location.¹⁷⁸ The authors were very clear, however, in stating that “fallout can contaminate food, water, buildings, yards, and fields, and make them unsafe to use for varying periods of time. Generally, food and water are not difficult to decontaminate, nor are buildings or paved areas. Yards and fields may be very difficult.”¹⁷⁹ As well, the article asserted that “vegetables that are exposed to heavy fallout may become highly contaminated. Leaves, pods, and fruits that retain fallout material should be cleaned before being eaten. Washing is probably the most effective measure.”¹⁸⁰ Unfortunately for those prepared farmers who had thoroughly studied this document, there was no precise description as to *how* water could be decontaminated, as food was to be washed with water to help decontaminate it. Where in the desert environs of Washington County was uncontaminated water to be obtained when the entire county had been irradiated by nuclear fallout?

Furthermore, the revelation that whole fields and pastures could be irreparably contaminated was a real threat, since the result of farm animals consuming polluted food necessarily meant they would ingest and absorb some amounts of radiation. When farmers slaughtered these animals for food, radioactive elements would have contaminated the local food supply.¹⁸¹ Despite these revelations, the federal government continued to deny through the

¹⁷⁷ Harold L. Beck and Burton G. Bennett, “Historical Overview of Atmospheric Nuclear Weapons Testing and Estimates of Fallout in the Continental United States,” *Health Physics* 82, no. 5 (May 2002): 596. Hereafter cited as Beck & Bennett.

¹⁷⁸ United States, “Fallout on the Farm,” p. 9.

¹⁷⁹ *Ibid.*, p. 2. Underline appears in the original text.

¹⁸⁰ *Ibid.*, p. 10.

¹⁸¹ *Ibid.*, p. 5.

1980s that sheep ranchers and farmers in southwestern Utah had been exposed to excessive amounts of radiation during the early years of NTS testing activities. The article went on to state that “radioactive iodine is secreted in the milk of cattle; it thus is a particular threat to young children drinking milk from cows grazing on contaminated pasture during the first few weeks following a nuclear attack.”¹⁸² The fact that a government agency unaffiliated with the AEC disseminated this information so soon after the abolition of atmospheric nuclear weapons testing in 1963 leads to devastating questions regarding how the science related to the hazards of radiation contamination of food and water supplies had developed so rapidly in less than two years. Despite the AEC’s assertions that it would in no way continue with operations at its continental test site if a legitimate threat from radioactive fallout existed, the scientific evidence which directly refuted AEC reassurances had existed for many years, and was only publicly acknowledged in the context of the potential destructive capabilities of Soviet weapons and following the conclusion of the 1963 Limited Test Ban Treaty.

Again, however, the brief history of atomic experimentation prior to the 1951 continental testing program proves that the AEC was terribly short-sighted in light of ongoing scientific observation. Three years following the July 1946 detonation of the Baker device on the southeast cape of Bikini Atoll, the AEC and the University of Washington’s Applied Fisheries Laboratory jointly produced a report which determined that their three years of exhaustive research had not yielded conclusive solutions to the continuing problem of radiation in local food sources. The report concluded that radioactive elements persisted in both native plants and animals, even though the military had detonated the weapon more than ninety feet underwater.¹⁸³

¹⁸² *Ibid.*, p. 3.

¹⁸³ *WP*, “It’s Safe to Live on Bikini But Not Eat Its Products,” September 25, 1949, p. 4; *NYT*, “Bikini Atoll Food Still Radioactive,” September 25, 1949, L4. These articles covering the same report contain the same misinformation, stating that the detonation occurred “‘some 200 feet below the surface’ at the spot where the bomb

The national press sensationalized the story, with such titles as the *Washington Post*'s article, "It's Safe to Live on Bikini But Not Eat Its Products." However, the articles explicitly stated that "scientists still can't say when—or whether—the natives will be able to return to the Pacific atoll" which was formerly their homeland.¹⁸⁴ That these articles appeared in major national newspapers "a day after President Truman's announcement that the Soviet Union apparently had developed an atomic weapon of its own" provides grim evidence that officials involved in locating a continental testing site would not permit data gathered through objective scientific observation to deter plans for the facility or the furthering of U.S. nuclear ambitions.¹⁸⁵

From the perspective of thirty-three years post-Trinity, twenty-seven years following the first detonation at NTS, and twenty-six years following the first detonation of a thermonuclear weapon, the United States Environmental Protection Agency (EPA) could reasonably claim that the Trinity explosion "had a nominal explosive yield of 20 kilotons."¹⁸⁶ A 1978 EPA report showed that the fallout cloud from the Trinity explosion moved northeast from the detonation site in conjunction with the prevailing winds. By examining "the intensity of beta-gamma radiation from fission product deposition," officials had estimated the distribution of ground-level radioactive fallout within a few weeks of the experiment.¹⁸⁷ Even thirty-three years after the Trinity test, "the highways and major unpaved roads" surrounding, but outside the boundaries of the White Sands Missile Range, held "detectable amounts of Trinity plutonium in

was set off in the water." Mikhailov provided the depth measurement of 27.5 meters; I utilized an internet conversion calculator and the measurement of 27.5 meters below the surface to reach a calculation of 90.22 feet, a calculation supported by Jonathan Weisgall, *Operation Crossroads: The Atomic Tests at Bikini Atoll*, Annapolis, MD: Naval Institute Press, 1994, p. 207. Two likely explanations for the mistake are that the force of the detonation created an underwater crater, or that the bomb was not resting on the ocean floor at the time of detonation.

¹⁸⁴ *WP*, "It's Safe to Live on Bikini But Not Eat Its Products," September 25, 1949, p. 4; *NYT*, "Bikini Atoll Food Still Radioactive," September 25, 1949, L4.

¹⁸⁵ *NYT*, "Bikini Atoll Food Still Radioactive," September 25, 1949, L4.

¹⁸⁶ United States, Environmental Protection Agency, *Levels and Distribution of Environmental Plutonium Around the Trinity Site*, Las Vegas: Office of Radiation Programs, 1978, p. 1. Hereafter cited as EPA, *Trinity*.

¹⁸⁷ *Ibid.*, p. 1.

the surface 5 centimeters of soil.”¹⁸⁸ Although the Trinity Site is far to the east-southeast of Washington County, a 1983 study by a group of University of California—Los Angeles scientists revealed that Cesium-137 (Cs-137) had remained in the local topsoil between “5-7 centimeters because of the arid climate and was easily absorbed into local vegetation and thereafter passed to the animal population.”¹⁸⁹ These reports demonstrate that officials knew, at the latest within a few months of the Trinity detonation, that radioactive fallout from a western desert testing site had the potential to blow to the northeast and outside the boundaries of the established testing grounds. Yet, AEC officials chose to ignore the data which could have prevented unnecessary contamination of population centers.

The elevation at which a nuclear weapon explodes is a significant factor in the amount and size of fallout particles which are then deposited locally and regionally.¹⁹⁰ As a result, the types of experiments conducted at NTS had a significant impact on the region surrounding the test site. When nuclear detonations occur close to ground level, the explosive power lifts a huge amount of macerated soil into the mushroom cloud and transports it around 15 miles into the atmosphere.¹⁹¹ Weapons detonated near the earth’s surface produce radioactive fallout which falls back to the ground relatively quickly, dropping around half of the material created within a few hundred miles of the detonation. Of the NTS atmospheric tests from 1951-1963 which produced more than one kiloton of explosive force, only three occurred above 1,000 feet; thirteen

¹⁸⁸ *Ibid.*, p. 2.

¹⁸⁹ Bentley, “Residual Cesium 137,” p. 25. Bentley cites E. M. Romney, R.G. Lindberg, J.E. Kinnear, and R.A. Wood, “Sr 90 and Cs 137 in Soil and Biota of Fallout Areas in Southern Nevada and Utah,” *Health Physics* 45, no. 3 (Sept 1983): 643-650. Bentley summarizes the findings of this study in two brief paragraphs. According to the author’s reading of the Romney, et al. study, there are serious problems inherent in the methodology and conclusion. Romney, et al. utilized data collected at four different times over a fifteen-year period at seven different locations. While there were three sites sampled in Washington County, the St. George site only had complete data collection and analysis from the 1980 sampling survey; for the 1968 survey, scientists either failed to analyze or failed to collect samples; and the 1972 survey results indicate that a portion of the samples were lost.

¹⁹⁰ Beck & Bennett, p. 595.

¹⁹¹ United States, “Fallout on the Farm,” p. 2.

detonations occurred within 100 feet of ground level, and an additional fifty-five occurred between 100 feet and 500 feet.¹⁹² Therefore, NTS tests predominantly produced fallout which returned to the earth's surface over a very short distance and period of time.

Testifying before the JCAE in 1959, Dr. John Wolfe stated that

Radiation has become an intensified factor in the environment of man and the living things upon which he is dependent for food and shelter. The ecological effects of this increase are not known. Nor can they be determined by experiment alone, nor by considering only a single source of increased radiation such as fallout. Determination of the total impact of this factor on man's biotic environment and the evolution of living organisms therein, is a continuing problem.¹⁹³

For residents living in the downwind area of Washington County, gamma radiation to the entire body from "short-lived radionuclides" represented the most serious immediate danger of fallout exposure.¹⁹⁴ The unpredictable nature of fallout meant that residents in rural locales were at higher risk of being exposed "to high doses from short-lived radionuclides and... pockets of intense long-lived radioactivity as well. The highly localized nature of hot spots and their remote location make it unlikely that they would be found without immense efforts and perhaps not even then."¹⁹⁵ The AEC certainly did not exert "immense efforts" to measure radioactive hot spots when deciding to limit their off-site monitoring program to roadways. Gordon Dunning even admitted that scientists understood that ingestion of fallout particles could cause health complications but stopped short of saying the AEC had failed downwind residents through limited monitoring practices which did not include pasture land or household gardens in Washington County.¹⁹⁶ The AEC completely neglected their responsibilities regarding public safety in this respect since, by the conclusion of the 1958 test series, the agency was not

¹⁹² Mikhailov, *Catalog*, pp. 14-32.

¹⁹³ Wolfe, "Ecological Aspects," p. 145.

¹⁹⁴ IPPNW, *Radioactive Heaven and Earth*, p. 8.

¹⁹⁵ *Ibid.*, p. 17.

¹⁹⁶ Dunning, *Health Aspects*, p. 18.

monitoring the degree to which downwinders were ingesting radioactive particles which filtered through the food chain.¹⁹⁷

The AEC, and Dunning in particular, often pointed to the size and frequency of Soviet weapons tests as the major contributing factor of above-average radiation levels while maintaining that U.S. weapons tests had a negligible effect on American citizens. However, in testimony before the JCAE, J. E. Campbell stated that general studies of radioactive contamination of the nation's milk supply showed that "concentrations of iodine-131, barium-140, and strontium-89 varied widely, the higher levels being associated with the number of nuclear weapons tests per month in the United States, while tests conducted elsewhere in the world had a noticeable but lesser effect on the values observed."¹⁹⁸ How much higher were the concentrations of radioactivity in Washington County's milk supply during NTS tests? The data is lost to history as a result of the AEC placing a higher premium on public perception of its activities than on the safety of Washingtonians.

There is no question that Washington County's cows were particularly susceptible to radiation contamination and thus to pass along I-131 to those people who drank milk from contaminated cows. I-131 was the most pervasive radionuclide in terms of ingestion exposure, as "ninety of the atmospheric tests at the Nevada Test Site (NTS) deposited high levels of I-131 (5.5 hexabequerels) across a large portion of the contiguous United States, especially in the years 1952, 1953, 1955, and 1957."¹⁹⁹ Washington County's proximity to the NTS meant that high

¹⁹⁷ Ball, *Justice Downwind*, p. 108.

¹⁹⁸ "The Occurrence of Strontium-90, Iodine-131, and Other Radionuclides in Milk," by J.E. Campbell, et al, in United States, Joint Committee on Atomic Energy, *Fallout from Nuclear Weapons Tests: Hearings Before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy*, 86th Cong., 1st sess., May 5-8, 1959, vol. 1, p. 195. Hereafter cited as Campbell.

¹⁹⁹ Bentley, "Residual Cesium 137," p. 9.

levels of radioactive particles contaminated pastures in agricultural and ranching areas.²⁰⁰

According to a 1999 National Research Council study, I-131 contaminates cows' milk when the animal ingests grasses from contaminated land. Whereas scientists recorded measurements for total fallout deposition, "few measurements of I-131 or total beta decay in cows' milk or in pasture were made during the testing."²⁰¹ The report also stated that a given animal's secretion rate of I-131 into its milk could range from one to twenty percent of the amount ingested, and that this rate is not constant, but fluctuates from animal to animal, as well as "in the same animal at different times."²⁰² Furthermore, it suggested that it is "probable" that milk from backyard cows would be produced at a lower rate and contain higher concentrations of I-131.²⁰³

Utah's federal representatives and senators were acutely aware of the concern of their citizens with regard to the weapons tests at NTS, particularly as they related to the effect of radioactive fallout on milk consumption. However, this awareness does not seem to be present until the early 1960s, after the conclusion of the vast majority of atmospheric tests at NTS. When tests resumed in 1961, citizens became more vociferous in questioning the AEC's methods. In July 1962, John and Mary Cary wrote Utah's U.S. Senator Frank Edward Moss (elected 1958) asking, "Why can't this be done out in the Pacific? When Russia made nuclear tests last winter there were many public reports of increased fallout in the United States. Now this debris is being blown in the air right out in Nevada and we don't hear a thing on the

²⁰⁰ Marvin L. Rallison, Terry M. Lotz, Mary Bishop, Wanda Divine, Kathy Haywood, J. Lynn Lyon, and Walter Stevens, "Cohort Study of Thyroid Disease Near the Nevada Test Site: A Preliminary Report," *Health Physics* 59, no. 5 (November 1990): 739-746. Hereafter cited as Rallison.

²⁰¹ National Research Council, *Exposure of the American People to Iodine-131 from Nevada Nuclear Bomb Tests: Review of the National Cancer Institute Report and Public Health Implications*, Committee on Thyroid Screening Related to Iodine-131 Exposure, Based on Health Care Services, Institute of Medicine, and Committee on Exposure of the American People to Iodine-131 from the Nevada Atomic Bomb Tests, Board on Radiation Effects Research, Commission on Life Sciences, National Research Council, Washington, DC: National Academies Press, 1999, p. 31. Hereafter cited as National Research Council—*Iodine*.

²⁰² *Ibid.*, p. 33.

²⁰³ *Ibid.*, p. 35.

increased radiation hazard. Who's kidding who?"²⁰⁴ Moss's reply to them is telling, in that he admitted he was ignorant of the technical details of radiation effects and would instead refer their letter to AEC Chairman Dr. Glenn Theodore Seaborg for an answer.²⁰⁵ Moss did try to reassure the Carys that they were in no danger, and imparted to them his "understanding that special precautions had been taken to help control the fallout in the United States."²⁰⁶

The issue of contaminated milk seems to have gained much public attention by the summer of 1962. Two weeks after Moss' reply to the Carys, Henry Harwood of Spanish Fork, Utah, wrote to Senator Moss with concerns about the economic impact that resumed testing and increased exposure would have on the dairy industry. Harwood wrote

I suppose you realize what the recent dispute over milk is going to do to the consumption. This along with new roads cutting [... unintelligible] in half is rather hard to swallow. I am certainly for our country and preparedness, but things must be considered. Damages should be paid to those who are damaged. It would appear to me that if we loose [sic] any market someone owes us some money. You remember the Geneva Steel Payments to the stockmen and farming! I see very little difference. Off [sic] course there is a chance things may not be to [sic] bad, and come out all right. It seems there is some place they could shoot those bombs off some place where they would cause less trouble. Those selling other drinks bring much of this publicity and can't Washington do something to see the dairy people through this thing?²⁰⁷

By Spring 1963, the outcry reached near-hysteria, as both Moss and W. H. Bennett, Director of the Extension Services at Utah State University, began lobbying Seaborg to delay the scheduled series of tests "during this grazing season so as to protect the milk users."²⁰⁸ Wynne Thorne, the Director of Utah State University's Agricultural Experiment Station, also wrote to Senator Moss, claiming that "Iodine 131 has only an 8-day half-life and is, therefore, of primary importance as a contaminant in market milk. Deferring testing to the winter months would in no

²⁰⁴ Cary to Moss, July 20, 1962, Frank E. Moss Papers, Box 52, Folder 10 (hereafter cited as Moss MSS).

²⁰⁵ Seaborg's response is not found in Moss' manuscript collection.

²⁰⁶ Moss to Cary, July 24, 1962, Moss MSS, Box 52, Folder 10.

²⁰⁷ Harwood to Moss, August 6, 1962, Moss MSS, Box 52, Folder 10. Moss' reply to Harwood was not found in the collection.

²⁰⁸ Moss to Seaborg, May 21, 1963, Moss MSS, Box 102, Folder 1. Moss also sent a letter to Bennett reiterating this message.

way reduce the value of the data obtained [from testing]. I can see no valid objection to such a course of action.”²⁰⁹

Seaborg responded to these requests with typical AEC dismissive condescension. More than one month after Moss’s letter to him, Seaborg replied by minimizing concerns regarding I-131 contamination of milk supplies. He continued by pointing out the lengths to which the AEC had gone in order to ensure public safety:

To keep atmospheric radioactive contamination as low as possible, nuclear testing at Nevada has been primarily conducted underground. The detonation time is carefully selected with respect to the weather as an additional safeguard should any radioactivity reach the atmosphere. Extensive computation and prediction techniques are undertaken to minimize the probability of any specific locality receiving repeated fallout.²¹⁰

Nearly three months later, Seaborg categorically rejected the possibility of restricting testing to winter months in order to eliminate the threat of I-131 in milk, since doing so “could place unacceptable restrictions on the conduct of important tests.”²¹¹ His attitude, coupled with the numerous fallout incidents and miscalculations it had committed, demonstrated that the AEC was far more dedicated to furthering nuclear weapons capabilities than to ensuring the safety of American citizens, despite its mandate to perform both duties with equal alacrity.

The self-sufficiency of Washington County residents in relation to their food sources meant that they were at much higher risk of harmful exposure to I-131. The AEC’s average exposure estimates and selective monitoring practices do not take into account Washington County’s residents, since, on an individual basis, “exposure depends on such critical factors as varying individual consumption of milk and other foods and variations in the source of those foods.”²¹² In fact, because there were significant numbers of young children in the community

²⁰⁹ Thorne to Moss, May 23, 1963, Moss MSS, Box 102, Folder 1.

²¹⁰ Seaborg to W.H. Bennett, June 27, 1963, Moss MSS, Box 102, Folder 1.

²¹¹ Seaborg to Moss, September 17, 1963, Moss MSS, Box 102, Folder 1.

²¹² National Research Council—Iodine, p. 2.

and most of this population drank milk from backyard cows and goats, Washington County's residents must have received considerable doses of I-131.²¹³ The evidence to establish this fact, however, does not exist because the AEC did not monitor contamination of food or milk until 1958, after scientists published irrefutable evidence that, of the radionuclides created in a nuclear explosion, exposure to I-131 presented the most significant danger to human health.²¹⁴ A Los Alamos Scientific Laboratories study from 1950 affirmed that "there appears to be no feasible means for salvaging unprotected food, either in the home, the store or in the fields, which has become radioactively contaminated," despite previous assertions from the AEC that thorough washing of contaminated vegetables could cleanse them of health risks.²¹⁵

I-131 is the most significant radionuclide relating to Washington County's experiences during nuclear weapons testing because scientists definitively discovered following the 1986 Chernobyl nuclear power plant disaster that I-131 has the potential to produce thyroid cancer.²¹⁶ By no means, however, was it the only radionuclide which presented significant problems for Washington County residents. Atmospheric nuclear weapons experiments also produced the radioactive isotopes strontium-90 (half-life 28.8 years) and cesium-137 (half-life 30 years) and spread them globally, although nearby downwind populations were at highest risk of hazardous contamination. Along with plutonium-239, these long-lived radioactive isotopes "constitute pervasive pollutants in our food and water" even to the present day.²¹⁷

Gordon Dunning reported in 1964 that "about 20 million curies of strontium 90 have been created by atmospheric nuclear tests with about 17 million curies of this being spread

²¹³ Ibid., p. 2.

²¹⁴ Ibid., p. 12.

²¹⁵ LASL, p. 330.

²¹⁶ National Research Council—Iodine, p. 81.

²¹⁷ IPPNW, *Radioactive Heaven and Earth*, p. 159.

globally. The other 3 million curies fell quickly in areas local to the testing sites.”²¹⁸ The 1965 Farmer’s Bulletin warned that “strontium-90 falls on the surface of plants and can be consumed with foods and forage. Some of it is deposited directly on the soil or washed into it, remaining indefinitely—for all practical purposes—in the top several inches of uncultivated land.”²¹⁹ In the same publication, under the heading “Would fallout permanently affect pasture grass and forage crops?” the article claimed that heavy accumulation of fallout could produce “external radiation [which] would prohibit use of the pasture.”²²⁰

Whereas strontium-90 is chemically similar to calcium and tends to accumulate in the bones, cesium-137 (Ce-137), while comprising only “about 0.05 percent” of total fallout yield from each test, distributes itself primarily throughout the soft tissues of the human body at a generally uniform rate.²²¹ This particular isotope of cesium “only exists in a manmade state either as a by-product of a nuclear explosion, or as a radionuclide produced in a nuclear reactor.”²²² Blair Bentley, a student at Oregon State University and native of Washington County, conducted a 2008 study which examined the Ce-137 levels in southwestern Utah. With eighty-five soil samples taken from Washington County, Bentley found that the average Washington County reading was 380.7 becquerels per square meter and concluded that the region is still contaminated with radioactive cesium, since “nearly 4 times the measured amount today, existed in the soil shortly after the [atmospheric] testing was complete.”²²³ Based on this study, Bentley proved that AEC estimates of fallout deposition in the county were far too low.

²¹⁸ Dunning, *Health Aspects*, p. 15.

²¹⁹ United States, “Fallout on the Farm,” p. 9.

²²⁰ *Ibid.*, p. 10.

²²¹ Bentley, “Residual Cesium 137,” p. 20.

²²² *Ibid.*, p. 2.

²²³ *Ibid.*, pp. 3, 34-5.

Ingested and inhaled alpha and beta particles are less penetrating than gamma particles, and are most harmful when the body assimilates them, thus injuring the organs and cells near the point at which they settle.²²⁴ While ingestion of contaminated food and water was a problem for the entire downwind population, farmers, schoolchildren, and anyone outdoors as fallout clouds passed, were at especially high risk of receiving high doses of radiation from both short- and long-lived radionuclides.²²⁵ This was a serious problem for St. George, since it received “the highest concentration of radioactive debris in the air in a populated area off-site” during the atmospheric testing period.²²⁶ Dunning estimated this concentration “was about 1.3 millionth of a curie per cubic meter averaged over the 24 hours the activity was present.”²²⁷

This was particularly pertinent to Washington County, since the *Washington County News* reported that St. George’s Dixie College experienced “heavy registration for Dixie’s famed outdoor classes” and had promoted itself as an ideal venue for outdoor courses and activities in March 1953.²²⁸ Two weeks later, an editorial by PTA member Montrue Larkin implored St. George residents to donate “\$1 per family” to help address the “dust and dirt problem” of local schools to plant a lawn in order to prevent schoolchildren who would “come home at the end of a school day, grimy with dust and dirt” from returning home so dirty.²²⁹ As fertile as Washington County is, it is still arid desert land in most places and is comprised of a great deal of dirt and subject to desert dust storms. By spring 1955, residents like Nora Lyman began speculating that there was a link between the nuclear tests at NTS and “dust storms such as we have never experienced in this country.... I believe that the A-Bomb detonations have been responsible to a

²²⁴ IPPNW, *Radioactive Heaven and Earth*, pp. 7-8.

²²⁵ IPPNW, *Radioactive Heaven and Earth*, p. 14.

²²⁶ Dunning, *Health Aspects*, p. 19.

²²⁷ *Ibid.*, p. 19.

²²⁸ WCN, “Spring Registration is Closed at Dixie College, Out-Door Classes Favored,” March 12, 1953, p. 9.

²²⁹ WCN, “Get Your Children Out of Playground Dirt; Help Improve a School Lawn,” March 26, 1953, p. 5.

large degree. The AEC admit, I am told, that these shots do cause wind, but not rain.”²³⁰ In August, Lyman again reported “freak storms and floods” in the area, stating, “Personally, I am wondering what effect, if any, the 42 atomic bombs, shot off on Yucca Flat this spring, had upon the wind and weather.”²³¹ Regardless of whether the experiments were creating dust storms, local residents, and especially children, were no doubt directly affected, since “children playing outdoors, and therefore possibly breathing heavily, would have been especially at risk of high inhalation doses.”²³² The Overview of the Department of Energy’s Off-Site Radiation Exposure Project (ORERP) of 1990 found that internal exposures from inhaled and ingested radionuclides “were comparable in magnitude to whole-body doses resulting from external γ [gamma] exposure.”²³³

The composition of the earth’s surface is a major factor in determining contamination levels from fallout. Rocky hillsides are generally more heavily contaminated than sandy valleys because there is a slower absorption of particulate debris; fallout settling in these areas tends to remain until rainfall washes it into lower-lying areas.²³⁴ Valleys comprised of loose soil tend to absorb fallout particles more quickly, where it is then taken into the roots of any present vegetation. During the summer months, when the AEC conducted most of the NTS tests, the southwestern corner of Utah experiences a wet monsoon which generally results in daily afternoon thunderstorms.²³⁵ These storms tend to produce rainfall which passes quickly over the surface of the soil, providing water to “shallow-rooted species” of plants. Thus, gardens and

²³⁰ WCN, “Observations,” May 19, 1955, p. 1.

²³¹ WCN, “Observations,” August 11, 1955, p. 1.

²³² IPPNW, *Radioactive Heaven and Earth*, p. 62.

²³³ B. W. Church, D. L. Wheeler, C. M. Campbell, R. V. Nutley, and L. R. Anspaugh, “Overview of the Department of Energy’s Off-Site Radiation Exposure Project (ORERP),” *Health Physics* 59, no. 5 (November 1990): 508. Hereafter cited as ORERP.

²³⁴ Bentley, “Residual Cesium 137,” p. 36.

²³⁵ Greer K. Cheshier and Michael Plyler, *Zion Canyon: A Storied Land*, Tucson: University of Arizona Press, 2007, pp. 48-9.

cultivated farmland would have had radioactive particles seep more quickly into the soil from which the flora derived water and nutrients.²³⁶ Any fallout debris remaining at the surface level when the gentle winter rains began would be washed from hillsides and accumulate in low-lying valleys and farmlands.

Despite the calamity and suffering inflicted upon all downwind populations during the testing years, AEC administrators continued to deny their negligent roles for decades. Contrary to overwhelming evidence of environmental degradation and human injury, the AEC publicly maintained the pretense that its scientists were helping to better the world for American citizens. In a September 1967 response to Margaret Marr Lambert's letter of August 21, 1967, John A. Harris, the Director of the AEC's Division of Public Information, refuted Lambert's assertion that the "atomic energy program... may be exploited for 'political and selfish commercial reasons.'" ²³⁷ Rather, he stated

I would like to assure you that this is not the case, just as it is not true that the atomic energy program is being conducted at the expense of the general public's health and safety or at the risk of polluting or contaminating the environment in which we live.... It is quite true that we don't know all of the facts about radiation and its effects, nor do we understand all that we do know.²³⁸

Harris pointed out that in twenty-five years of nuclear experiments knowledge had increased "to the point where the use of atomic energy is very much a part of our daily lives.... I hope that I have been able, to some degree, to overcome the concern expressed in your letter and to assure you that the Atomic Energy Commission is conducting all of its activities in a manner that is both safe and cognizant of the welfare and interests of the American people."²³⁹ There is no record of Lambert's response, whether these further reassurances from the AEC propaganda

²³⁶ Ibid., p. 49.

²³⁷ John A. Harris to M.M. Lambert, September 1, 1967, Moss MS, Box 221, Folder 15.

²³⁸ Ibid.

²³⁹ Ibid.

machine were enough to assuage her fears completely. It is clear, however, that the commission's activities were detrimental to the natural environment to a degree which it was unwilling to examine closely, and the political apparatus which purported to protect life, liberty, and the pursuit of happiness for Americans failed to reign in the AEC's experiments.

POLITICAL FALLOUT: THE DOWNWINDERS, AEC DUPLICITY, AND CONGRESSIONAL FAILURE

“Clever people may learn as much as they wish of the results of science—still one will always notice in their conversation, and especially in their hypotheses, that they lack the scientific spirit.... To have an opinion means for them to fantacize [sic] for it and thenceforth to press it in to their hearts as a conviction. If something is unexplained, they grow hot over the first notion that comes into their heads and looks like an explanation—which results progressively in the worst consequences, especially in the sphere of politics.”—Friedrich Nietzsche²⁴⁰

“Downwinders,” as the residents of communities impacted by fallout clouds from NTS experiments have come to be known, pleaded with politicians at all levels of government for relief from the injury raining down upon them from passing radiation clouds. By the time the military had established NTS in 1951, the medical and military communities had more than half a century of experience with the effects of radiation on both civilians and soldiers. However, a sociopathic culture developed alongside the promise of ever-greater applications of nuclear fission and fusion technologies, and this permeated the attitudes of AEC personnel during the atmospheric testing years. The commission’s declarations of the importance of public safety in their experiments became no more than lip-service paid to (initially) unsuspecting people with revelations that the monitoring system which it eventually employed was an utter failure. The AEC employed numerous propaganda campaigns, which began innocuously enough, in an effort to combat hysteria and conspiracy theories, but the deceptive measures which the commission developed ultimately reached astounding proportions with the support of respected congressional representatives and scientific and medical professionals who had access to the facts supporting the corrupted industry.

Scientists and medical professionals did not immediately understand the harmful effects of nuclear radiation on the human body. After W. C. Roentgen’s discovery of x-rays in 1895,

²⁴⁰ Friedrich Nietzsche, *Human, All-Too-Human*, in *The Portable Nietzsche*, edited and translated by Walter Kaufmann, New York: Penguin Books, 1976, p. 64. From Aphorism 635.

scientists began to associate radiation exposure with “burned skin, hair loss, and impaired vision;”²⁴¹ it was not until 1929 that “the American Medical Association passed a resolution condemning the use of x-rays to remove body hair.”²⁴² Marie Curie, who discovered radium in 1898, died in 1934 of leukemia caused by exposure to radium throughout her professional career.²⁴³ While it was unknown at that time that a direct link existed between radium exposure and cancer, harmful health effects as a result of exposure were well known. In addition to the aforementioned work of Harrison Martland and the highly publicized death of radium promoter Eben Byers, the case of the “Radium Girls” was well known to the scientific and medical communities. These were female factory workers who labored as dial-painters in watch factories, using paint containing radium which caused the watch faces to glow in darkness. During the painting process, they ingested small amounts of radium which eventually led to illness and death. Martland’s 1925 article established the scientific basis for ending the practice, but corporations using radium-based paints concealed evidence of radium poisoning and hired a group of “scientific consultants” who disagreed with Martland’s findings and placed the blame for the factory workers’ illnesses on other causes.²⁴⁴ Their cases ultimately led the American Medical Association to remove radium from a “list of remedies approved for internal administration” in 1932.²⁴⁵

Government officials were responsible for perpetrating the most insidious of the radiation experiments on its own citizens. Following the Trinity Shot in July 1945, Manhattan Project (and later AEC) scientists began conducting experiments on patients at hospitals for the mentally

²⁴¹ Fradkin, *Fallout*, p. 183.

²⁴² Walker, *Permissible Dose*, pp. 6-7.

²⁴³ Purdue University, Department of Physics, “Women in Physics: Herstory: Marie Curie,” Purdue University, <http://www.physics.purdue.edu/wip/herstory/curie.html> [accessed October 15, 2013].

²⁴⁴ Claudia Clark, *Radium Girls, Women and Industrial Health Reform: 1910-1935*, Chapel Hill, NC: University of North Carolina Press, 1997, p. 2.

²⁴⁵ Walker, *Permissible Dose*, p. 7.

ill. With the discovery of plutonium and its relative importance to nuclear explosions, scientists began experiments to discover how much of the element was absorbed into the body, since they did not fully understand many aspects of its associated dangers. These researchers administered plutonium injections to eighteen patients from four hospitals from 1945-1947, only one of whom signed a consent form. This was part of an exercise in helping “to calibrate body burdens,” and the research team did not anticipate the treatments to yield any medical advantages for the patients and intentionally conspired to ensure recipients did not discover the nature of the experiments.²⁴⁶ Worst of all, the AEC “sponsored” several series of experiments on children at the Walter E. Fernald State School in Waltham, Massachusetts, which served young boys with developmental and mental disabilities. In 1946, and again from 1950-1953, scientists administered radioactive tracers to the students, misleading parents into believing that the injections had the potential to be medically beneficial, even though “the experiments were not designed or expected to provide any health benefits to the subjects.”²⁴⁷

The Manhattan Project was not spared from exposure accidents during its development of the bomb, though they seem to have been more incidental than deliberate in nature. Project coordinators established exposure limits for employees based on the doses which the Advisory Committee on X-Ray and Radium Protection had established, although they actively encouraged workers to avoid any degree of irradiation.²⁴⁸ These dose restrictions also formed the guidelines for exposure limits used by the AEC upon its formation and takeover of nuclear experiment operations. Following the Trinity Shot, researchers discovered “a radioactive ‘hot spot’ ... about twenty-five miles from ground zero. This ‘hot spot’ was an area of high ground-level

²⁴⁶ Walker, *Permissible Dose*, p. 16.

²⁴⁷ *Ibid.*, p. 17.

²⁴⁸ *Ibid.*, p. 9.

radioactivity completely surrounded by areas of much lower activity.”²⁴⁹ Less than one year later, during a demonstration of a nuclear chain reaction at LASL, test director Alvin C. Graves and seven other men received a high dose of acute radiation when the experiment went awry. Dr. Louis Alexander Slotin, the scientist conducting the experiment, died nine days later, while the other men and Graves “received a whole-body dose of nearly 400 roentgens” although they received assurances from LASL director Norris E. Bradbury that it had been half that amount.²⁵⁰ This was not the only incident, and the subsequent scholarly articles detailing the incidents and the effects of ionizing radiation on humans was well-documented and widely disseminated throughout AEC ranks.²⁵¹ Deceit with regard to actual dose incurred from AEC accidents was not limited to those individuals who volitionally accepted the inherent risks associated with the assignment.

The U.S. Advisory Committee on X-Ray and Radium Protection, founded in 1929, reorganized in 1946 and took the name National Committee on Radiation Protection (NCRP). Not long afterward, the committee made the decision to discard the term “tolerance dose” when referring to the amount of radiation exposure considered to be harmful. Geneticists had shown that any amount of radiation could adversely affect human reproductive cells and that mutant genes which developed in a parent could be passed to offspring even if the parent had no indication of having suffered “obvious radiation-induced injuries.”²⁵² The NCRP adopted the new term “maximum permissible dose” in order to acknowledge the concept that there was no level of safe exposure to radioactive material. The new concept made unequivocal the

²⁴⁹ Jacobs, “Clouds,” p. 14.

²⁵⁰ Fradkin, *Fallout*, pp. 89-90.

²⁵¹ *Ibid.*, p. 91.

²⁵² Walker, *Permissible Dose*, p. 10.

committee's belief that there was always some potential of experiencing injury from radiation exposure below the allowable value.²⁵³

Within two months of the Hiroshima and Nagasaki bombings of August 1945, American and Japanese doctors were collaborating on the Joint Commission for the Investigation of the Atomic Bomb in Japan in order to study the human health effects of the bombs. According to Dr. James Nobuo Yamazaki, the U. S. government maintained the position that there were no or “minimal” health effects resulting from radiation exposure, even though there were reports from Australian and American reporters to the contrary.²⁵⁴ Yamazaki asserted that “the foremost scientific concern at that time was the genetic effect... and that was the initial and primary motivation to take a long-term study.”²⁵⁵ There was also a specific effort to study the effects on children. Yamazaki maintained that “at first the focus was what was happening to a young child; they knew that radiation had a stunting effect so they said to study how it'll affect the growth and development of a child.... Then it became obvious that the biochemical reactions of radiation was [sic] indeed a toxic reaction.”²⁵⁶

The U. S. military still controlled the atomic weapons testing program when Operation CROSSROADS commenced in June 1946 at Bikini Atoll in the Marshall Islands. Only two shots occurred that summer, but they were potent enough to require the evacuation of inhabitants of the islands. Yamazaki recounted that “all of the children under 10 [years of age] developed some thyroid abnormalities, almost 100 percent. And the ones that developed the most serious injury were those who were the youngest, say one years old, enough to... almost destroy the

²⁵³ Ibid., p. 11.

²⁵⁴ Nevada Test Site Oral History Project, “Interview with James Nobuo & Aki Yamazaki, October 14, 2005,” Digital Collections, University Libraries, University of Nevada Las Vegas, Las Vegas, Nevada, <http://digital.library.unlv.edu/u/?/nts>, 1215, accessed September 15, 2009, pp. 38-9. Hereafter cited as NTSOHP—Yamazaki. Dr. Yamazaki arrived in Japan in 1949 and was assigned to Nagasaki. He was a pediatrician there to study health effects, and he had his wife, Aki, and their infant son with him.

²⁵⁵ NTSOHP—Yamazaki, p. 46.

²⁵⁶ Ibid., p. 46.

thyroid.”²⁵⁷ According to Yamazaki, scientists also discovered “thyroid abnormalities, and... a[n] increased incidence of cancer of the thyroid” in adult Marshallese.²⁵⁸

By October 1946, understanding had advanced to the point that Colonel Stafford Warren, the military officer heading radiological safety at Bikini that summer, gave a lecture to radiological safety personnel regarding the dangers associated with their assignment. Col. Warren warned that

you need only to absorb a few micrograms... to develop a progressive anemia or a tumor in from 5 to 15 years. This is an insidious hazard and an insidious lethal effect hard to guard against.... [Radioactive fallout would be] all around you,... you couldn't eliminate it and it would get on your clothes, in your house, in the water, in the milk, and all the food. It would be in the dust and in the air you breathe. Filters couldn't keep it out.... You get it on your hands, you transfer it to your bread and jam, and you ingest it. You pile up the amount—although it is not readily absorbed you gradually pile up increasing amounts.²⁵⁹

Two days later, Col. Warren sent a memorandum to Gen. Groves in which he was unequivocal in his assertion that exposure to the smallest amount of radiation could have devastating health effects years later. He claimed that a radioactive fragment from a bomb casing is

probably the most toxic metal known, and... extremely small amounts deposited in the marrow will eventually cause progressive anemia and death years later. Tumor formation has a high incidence.... [The material] mixed with these fission products, beta and gamma emitters, is an insidious hazard—not immediately dangerous but if absorbed into the body it produces a long time hazard.... The amount necessary to cause this hazard is minute—measured in millionths of a gram. The harmful effects occur years later.... *I believe a frank statement of this sort should be made now to professional and intelligent lay groups as part of the general discussion on the effect of the bomb as a whole.*²⁶⁰

AEC officials, who had taken over nuclear weapons testing programs in August 1946, certainly had access to this information and purposely withheld the facts from the general public,

²⁵⁷ NTSOHP—Yamazaki, p. 60.

²⁵⁸ Ibid., p. 60.

²⁵⁹ *Alice P. Broudy, et al. v. United States* (U.S. District Court, C.D. CA, Civil No. 79-2626-LEW, *Memorandum in Support of Defendant's Motion for Summary Judgment*, November 12, 1985, Attachment 3, Classified SECRET. Stafford L. Warren's "Lecture to Radiological Safety Personnel," October 7, 1946, pp. 21-22), in Ball, p. 204.

²⁶⁰ *Alice P. Broudy, et al. v. United States* (U.S. District Court, C.D. CA, Civil No. 79-2626-LEW, *Memorandum in Support of Defendant's Motion for Summary Judgment*, November 12, 1985, Attachment 4, "Clearance of 'Discussion on Product Contamination after underwater bomb detonation' during part of informal talks at Bikini," 9 October 1946, pp. 1-2), in Ball, *Justice Downwind*, p. 204.

preferring instead to liken exposure to fallout with medical x-rays.²⁶¹ Furthermore, eight years later, Dunning claimed that there were not sufficient “vital statistics” or contaminated individuals following an exposure from a March 1954 Marshall Islands shot to determine whether there would be a “greater incidence of miscarriages and stillbirths” or stunted “growth and development of the children.”²⁶²

This attitude pervaded the AEC throughout the atmospheric testing period. AEC officials consistently adhered to their own cultural norm that what the public did not know could not prevent the commission from carrying on with the development of more advanced and destructive weapons. In fact, they believed that ignoring concerns or deceiving those who may object was the only way to ensure continued funding for their experiments. They were definitely knowledgeable of injuries associated with the historical abuses of x-rays and radium.²⁶³ The AEC, being an association of extremely ambitious and authoritative military, scientific, and industrial workers with their own distinctive mores, maintained an air of intellectual and technologically-minded superiority. This led to an internal culture which fostered secrecy, individual isolation, and institutional obedience; overconfidence in industrial technology and alienation from human frailty; and ritualized participation in unleashing vast power while performing the roles of demigods in a blossoming scientific field.²⁶⁴ As a result, the AEC, as well as the laboratories and industries associated with its experiments, veiled their activities and the human costs associated with them from both the American public and government representatives in an effort to avert any restrictions which may be placed on their activities.²⁶⁵

²⁶¹ Ball, *Justice Downwind*, p. 204.

²⁶² Dunning, *Health Aspects*, p. 6.

²⁶³ Walker, *Permissible Dose*, pp. 14-15.

²⁶⁴ Grahls, *Voices from Ground Zero*, p. 4.

²⁶⁵ *Ibid.*, p. 42.

Meanwhile, studies continued to emanate from non-AEC affiliated sources warning of the potential dangers associated with radiation exposure. A 1956 report of the National Academy of Sciences indicated that any exposure to radioactive materials, no matter how small the dose, had the likelihood of causing health problems in both individual instances and for large segments of a population over an extended period of time. Furthermore, genetic mutations would not necessarily appear immediately in individuals, but would dramatically increase the risks for abnormalities in genetic development of forthcoming generations.²⁶⁶

In Washington County, AEC-issued reports frequently appeared in the weekly publication of the *Washington County News*, lauding safety measures and emphasizing the delight of scientists with the progress of their experiments. Two days after the conclusion of the January-February 1951 RANGER series, an AEC announcement stressed the savings in “manpower, materials, money, and above all, invaluable time in the national atomic energy development program.”²⁶⁷ It further stated that AEC officials were entirely pleased with the management and results of the initial NTS experiment series.²⁶⁸ By 1955, following numerous accidents in prior operations, AEC officials were hedging their bets, announcing tests that were low-yield in order to quell fears. The press release stated that the test series would help “determine the safety of various weapons and experimental devices in the event of accidents... during handling or storage.... It is possible that even very low scale detonations such as these may release enough radioactive material into the air to affect very sensitive instruments or processes of certain industries and research institutions.”²⁶⁹ Again in April 1957, the press release claimed that the AEC would utilize NTS for “experiments related to the safety of atomic

²⁶⁶ Walker, *Permissible Dose*, p. 21.

²⁶⁷ WCN, “AEC Concludes A-Bomb Tests at Las Vegas Site,” February 8, 1951, p.6.

²⁶⁸ Ibid., p. 6.

²⁶⁹ WCN, “Los Alamos Scientific Laboratory to Use AEC Test Site on Nevada Flat,” October 13, 1955, p. 1.

weapons during handling and storage.... There will be no nuclear detonation.”²⁷⁰ So concerned were AEC officials about public outcry that they intentionally deceived nearby residents regarding the perception that residents’ health may be adversely affected from fallout and emphasized experiments which they knew would produce no measurable radiation.²⁷¹ According to Eugene Bridges, the AEC and supportive politicians “were *totally* committed and they were not going to let anything interfere with the continuance of that testing.”²⁷²

Despite the culture within the AEC, administrators very early recognized the necessity of maintaining positive public opinion. In addition to reaffirming constantly its commitment to public safety in all press releases, AEC officials were quick to point out the value of such experiments to maintain global stability. The theory seems to have been that the public would accept the AEC’s safety assertions if the agency sufficiently emphasized the importance of the tests to stave off Soviet advances.²⁷³ Still, the AEC did not miss an opportunity to point out the high importance placed on considerations of public safety, and Dunning was the most adamant spokesperson to this end. According to him, “the health and safety of persons was the major consideration in the original selection of the Nevada Test Site and this continues to be of paramount importance during the conduct of nuclear tests.”²⁷⁴ He went on to state that the paucity of inhabited land in the region offered “optimum conditions for maintenance of safety” and that on the “few occasions when persons have been asked to remain indoors for a few hours to reduce the radiation dose... the out-of-door exposure would have been far from hazardous.”²⁷⁵ He also lauded the AEC’s multi-field Advisory Panel, comprised of representatives from the

²⁷⁰ WCN, “AEC Issues Warnings of Test Operation April 10,” April 4, 1957, p. 4.

²⁷¹ Walker, *Permissible Dose*, p. 155.

²⁷² NTSOHP—Bridges, p. 50.

²⁷³ Jacobs, “Clouds,” p. 21.

²⁷⁴ Dunning, *Health Aspects*, p. 33.

²⁷⁵ *Ibid.*, p. 33.

fields of “public health, medicine, meteorology, fallout phenomenology, blast and thermal effects,” for considering “carefully all of the factors that insured safety” prior to each detonation.²⁷⁶ The outcomes of their deliberations were that “more than 200 delays in firing have been made at a cost of millions of dollars, to insure safety.”²⁷⁷ In addition to these expenditures, by 1964 the NTS budget for “operational and research studies directed toward safety at the Nevada Test Site” was \$8 million.²⁷⁸

The AEC’s public relations efforts were multi-faceted during the atmospheric testing period. It is hard to imagine that more energy and resources were devoted to any other single aspect of its operations. The commission had to juggle its mandate to develop and test new weapons with the requirement that it also establish and adhere to new safety standards for radiation exposure. It regularly cited its impeccable safety record, distorted its importance in maintaining national security, and made fallacious arguments about the threat of Soviet aggression. Further, scientists made specious arguments regarding the effect of naturally-occurring background radiation, while receiving a pass from the media and government representatives who regularly deferred to AEC expertise when reporting on the commission’s activities or answering citizens’ concerns. Finally, the AEC devoted large sums of money to promoting its activities through print, film, and educational propaganda in local newspapers, community gathering places, and primary schools in nearby communities, while partnering with the Federal Civil Defense Administration (Civil Defense) to promote its agenda and deflect attention and fears about nuclear weapons toward Soviet attacks. Given that the American public had high hopes for the potential of nuclear energy to have a positive impact on the world,

²⁷⁶ Ibid., pp. 33-34.

²⁷⁷ Ibid., p. 34.

²⁷⁸ Ibid., p. 43.

it is likely that they would have agreed with the need to persevere in the testing projects if they had been properly educated in protective measures.²⁷⁹

AEC propaganda was present from the founding of NTS, as officials used the term “atomic energy program” as often as possible when referring to the weapons testing program, emphasizing the beneficial potential for a civilian program over the malignance of devastating bombs. When the Atomic Energy Act of 1946 formed the AEC, it also assigned the commission the primary tasks of producing the uranium and plutonium supplies for the bomb cores, as well as the research, development, and experimentation for innovative bomb designs.²⁸⁰ The creation of NTS in 1951 implicitly placed responsibility for public safety in AEC hands, although it was not until the Atomic Energy Act of 1954 that this was made explicit.²⁸¹ There was, from the outset, tension between the explicit and implicit objectives, and the requirement of reporting to the Joint Commission on Atomic Energy and its control of AEC funding made nuclear regulation a political issue which could be bartered.²⁸² Paul Jacobs, a journalist and activist, pointed out in a 1957 article that “following the fundamental pattern of our government, the responsibility for weapons development should be separated from that of guarding public health.”²⁸³

LASL personnel had the principal responsibility within the AEC of assessing both “weapons effectiveness and offsite radiation hazards.”²⁸⁴ In court at the Allen trial, its director, Norris Bradbury, scoffed ““sure there are a few people with leukemia. More people get killed in automobile accidents every hour than will die of leukemia.””²⁸⁵ Bradbury’s hyperbolic statement ignored the fact that people volitionally get into automobiles and assume the risk associated with

²⁷⁹ Fradkin, *Fallout*, p. 25.

²⁸⁰ J. Samuel Walker, *Containing the Atom: Nuclear Regulations in a Changing Environment, 1963-1971*, Berkeley and Los Angeles: University of California Press, 1992, p. 2. Hereafter cited as Walker—*Contain*.

²⁸¹ *Ibid.*, p. 2.

²⁸² *Ibid.*, p. 4.

²⁸³ Jacobs, “Clouds,” p. 29.

²⁸⁴ Fradkin, *Fallout*, p. 80.

²⁸⁵ Quoted in Fradkin, *Fallout*, p. 83.

doing so, whereas they had no agency to choose exposure to cancer-causing radioactive fallout. His LASL released a report in 1950 which stated that fallout reaching the earth's surface "in appreciable amounts... may represent a serious physiological hazard."²⁸⁶ The real threat, according to this report, was that an enemy could use radiation from nuclear weapons tactically in order to render "certain areas uninhabitable."²⁸⁷ It went on to emphasize the variations from individual to individual of "the susceptibility to radiation" when considering levels above "the tolerance doses," a measure which the NCRP had abandoned four years earlier.²⁸⁸ LASL scientists recommended that "statistical averages must be used for practical purposes."²⁸⁹ While this may have been appropriate for certain studies, the average used was for the entire U. S. population and did not include a separate calculation for those citizens living within certain proximate distances from the test site. Seven years later, the AEC was still claiming it was conducting ongoing studies in relation to human health effects and touting its cautionary practices by postponing for two weeks experiments in order "to avoid unfavorable fallout on communities around the test site."²⁹⁰ The AEC intended that these declarations would placate local citizens.

AEC media reports regularly mixed in a healthy dose of national security rhetoric with its claims of placing priority on public safety. Public relations efforts in the downwind region accelerated drastically in 1955, after a year-long hiatus from experiments at NTS resulting from the disasters and scares of the 1953 series, including Shots Simon and Harry. A 1955 pamphlet the AEC distributed in downwind communities claimed that downwinders were "in a very real sense active participants" in the weapons testing experiments, "which have contributed greatly to

²⁸⁶ LASL, p. 248.

²⁸⁷ Ibid., p. 248.

²⁸⁸ LASL, p. 249.

²⁸⁹ Ibid., p. 250.

²⁹⁰ WCN, "1957 Atomic Shot Begins Radiation, Fallout Study at Nevada Testing Site," May 30, 1957, p. 1.

building the defenses of our own country and of the free world.”²⁹¹ Distributed ahead of Operation TEAPOT, the pamphlet further stated that “each shot is justified by national and international security need and that none will be fired unless there is adequate assurance of public safety.”²⁹² The citizens’ sense of pride and contribution was further stroked by the claims that despite the fact that “some of you have been exposed to potential risk from flash, blast, or fall-out... you have accepted the inconvenience or the risk without fuss, without alarm, and without panic... [which] has helped achieve an unusual record of safety.”²⁹³

While this may have helped to pacify downwind residents, some editors of the nation’s major publications remained unconvinced. Nora Lyman reported that at a 1957 press conference held by “a group of American editors,” they expressed concern over the announcement of penalties for the media which could prevent them from publishing information critical to ensuring that the American citizenry could make informed decisions about how the government should proceed.²⁹⁴ In the article, Lyman quoted Vermont C. Royster, senior associate editor of the *Wall Street Journal*, who asserted that if the media was not free to report the all of the relevant information, the “doors sealed by the rubber stamps will hide the facts from all of us. None of us will ever know what dark secrets are hidden behind those doors.”²⁹⁵ Lyman claimed that “it was pointed out that once the government had this authority, any information it did not wish made public could be ‘classified’ in the name of ‘national security.’”²⁹⁶

Not wanting to miss an opportunity to pat themselves on their backs, AEC officials often pointed to an established safety record in their public press releases as a means to justify the

²⁹¹ United States, “Atomic Test Effects,” under the heading, “A Message to People Who Live Near Nevada Test Site.”

²⁹² Ibid.

²⁹³ Ibid.

²⁹⁴ WCN, “Observations,” July 18, 1957, p.1.

²⁹⁵ Quoted in WCN, “Observations,” July 18, 1957, p. 1.

²⁹⁶ Ibid., p. 1.

commission's continued existence. The aforementioned AEC pamphlet heralded its record that "no one inside Nevada test site has been injured" and "no one outside the test site in the nearby region of potential exposure has been hurt" through the first thirty-one nuclear explosions at NTS.²⁹⁷ According to the document, the only casualties had been "some cattle and horses grazing within a few miles of the detonations [which] suffered skin deep radiation burns, but the damage had no effect on their breeding value nor the beef quality of the cattle."²⁹⁸ It explicitly denied the potential of ingestion exposure for the cattle and people who may consume them, but the AEC had still not *publicly* acknowledged this threat.

Under the section describing the upcoming TEAPOT series and procedural changes to the monitoring system, the AEC lauded the "considerable improvement" in safety measures by which it "expected to provide not only continued assurance of public safety but also... to reduce public exposure to a minimum."²⁹⁹ This begs the question whether what the AEC had been promising nearby residents during previous testing series was ever actualized, since minimum exposure was, presumably, already a norm. The public's role was not diminished, however, as "the potential exposure of the public will be low and... can be reduced still further by continued public cooperation."³⁰⁰ When a test shot occurred that did not result in any public concern, the AEC was quick to hold it up as a shining example, as in the case of Shot Zucchini of May 15, 1955: away from "the test site and the gunnery range all readings reported in populated communities were quite light, the heaviest being at Moapa, Nev., (estimated population 150) persons) where .68 roentgens was recorded."³⁰¹ In dealing with congressional representatives

²⁹⁷ United States, "Atomic Test Effects," under the heading, "The Record of Past Tests." This statistic consists of all detonations at NTS from 1951-1953. Thus, the AEC was effectively denying that nuclear fallout had caused injuries to anyone, even during the Simon and Harry Shots.

²⁹⁸ Ibid.

²⁹⁹ United States, "Atomic Test Effects," under the heading, "The Spring 1955 Test Series."

³⁰⁰ Ibid.

³⁰¹ WCN, "'Operation Teapot' Shot Fired at Yucca Flat; Is Fourteenth; Fallout Told," May 19, 1955, p. 8.

from the affected downwind communities, AEC officials always maintained the same assertions: “the Atomic Energy Commission constantly endeavors to minimize the amounts of atmospheric contamination from nuclear explosions. Further, we endeavor to keep the public fully informed on any biological dangers from radioactive contamination.”³⁰²

Perhaps the favorite public relations tool at the AEC’s disposal was the threat of an attack by the USSR. Early in the testing period, the AEC claimed that its weapons would deter the Soviets from attacking Americans on their home soil, but after their successful test of a thermonuclear hydrogen bomb in 1953, rhetoric turned to the imminent threat a Soviet bomb posed. It is not a coincidence that this escalation also occurred after the mishaps of the AEC’s UPSHOT-KNOTHOLE series in 1953. For the AEC’s purposes, “America is the one country standing in the way of Russia’s control of the world, and as long as it is a threat to the Soviet Union there is the danger of an all-out war.”³⁰³

While it is true that all three branches of government were involved in creating a national sense of fear of Communist infiltration, which led to the creation of the Civil Defense Administration, the AEC was able to harness public fear for its own purposes and survival most effectively.³⁰⁴ By teaming with Civil Defense, the AEC could deflect attention and concern from its testing program, which was a far closer but less insidious threat (or so they claimed). Numerous public relations pamphlets distributed by Civil Defense claimed that harmful fallout was a phenomenon of the explosion of a hydrogen bomb, implying that fallout is not hazardous if emanating from a standard atomic bomb like those detonated at NTS.³⁰⁵ Lending credibility to the AEC’s claims that “only when radioactivity is present in large amounts does it become

³⁰² Robert E. Wilson, acting AEC Chairman, to Frank Moss, June 28, 1963, Moss MS, Box 102, Folder 1.

³⁰³ WCN, “Five County Meeting of Civil Defense Workers Discuss Emergency Plans,” August 30, 1956, p. 1.

³⁰⁴ Titus, *Bombs in the Backyard*, pp. 72-73.

³⁰⁵ United States, Office of Civil and Defense Mobilization, *Facts About Fallout Protection*, Washington, DC: Government Printing Office, 1958, p. 3. Hereafter cited as United States, *Facts About Fallout Protection*.

dangerous” and “hydrogen bomb explosions create large amounts of radioactive fallout,” were reports that the Soviets were detonating extremely large hydrogen bombs which were contaminating the western U. S. as a result of prevailing winds.³⁰⁶ A 1959 Civil Defense pamphlet warned that “alpha and beta particles may be dangerous if they are ingested through contaminated food, water, or air, but they have low penetrating power.”³⁰⁷ The AEC had been aware of this for years but chose not to disseminate the information, instead leaving it to Civil Defense to present the facts in a manner which would lead people to believe the information was provided to protect them from an attack rather than the negligence of their own government’s agency.³⁰⁸

AEC scientists frequently turned to the presence of naturally-occurring background radiation when attempting to assuage public fears and debunk the claims of non-AEC scientific studies. AEC sources noted that, while mutations in the body’s cellular composition as a result of radiation did occur, these “changes... occur spontaneously under normal and natural conditions in all kinds of animals and plants. Normal radiation background is one factor in this process.”³⁰⁹ The AEC’s scientific assertion was that “radiation from fall-out from Nevada tests would have no greater effect on the human heredity process in the United States than would natural radiation in those parts of the Nation where normal levels are high.”³¹⁰ What the commission neglected to address was how much more the release of radiation from NTS would contribute to *normal background radiation*, especially when combined with the U. S. hydrogen bomb tests in the Pacific and Soviet experiments, all of which were releasing large amounts of radiation.

³⁰⁶ Ibid., p. 5.

³⁰⁷ United States, *Personal Preparedness*, p. 2-13.

³⁰⁸ Ibid., p. 2-13.

³⁰⁹ United States, “Atomic Test Effects,” under the heading, “Fallout Experience in Past Tests.”

³¹⁰ Ibid.

Beyond these statements, AEC arguments for the natural existence of radiation became ridiculous at best; completely disingenuous at worst. The non sequitur that most people are unable to “explain electricity, although we have learned to live with it and to use it,” therefore nuclear radiation can be safely utilized, was frequently used when facing angry citizens.³¹¹ Also popular as an AEC explanation was the proposition that people “willingly expose [them]selves to much heavier radiation when [they] undergo diagnostic X-rays.”³¹² Dunning also provided sleight-of-hand scientific analysis when he claimed that “fallout has not introduced a new and strange agent into our environment with completely unpredictable results.”³¹³ He continued by stating that “to these levels of radiation exposures are now added those from fallout—but these radiations (gamma rays and beta particles) are no different in kind from those emanating from natural sources. Nor is there any evidence that they produce any fundamentally different biological effects.”³¹⁴

Whether deliberately or through ignorance, media outlets and congressional representatives often repeated AEC reassurances verbatim and thus were complicit in the AEC’s deceptions. At the conclusion of the RANGER series, the *WCN* reprinted directly the AEC press release which claimed that “Reports received from field survey patrols have shown no indication of any radiological hazards.”³¹⁵ If the media questioned the commission’s directors on whether there was satisfactory off-site monitoring, it went unreported.³¹⁶ Again repeating an AEC release word for word ahead of the TEAPOT series in 1955, the local paper reported that danger existed only “for persons on-site,” but that off-site observers should take precautions

³¹¹ United States, “Atomic Test Effects,” under the heading, “Appendix: Guides to Understanding Fall-out: Radiation is Nothing New.”

³¹² *Ibid.*

³¹³ Dunning, *Health Aspects*, p. 1.

³¹⁴ *Ibid.*, p. 1.

³¹⁵ *WCN*, “A-Bomb Blast Queries Answered by Commission, February 1, 1951, p. 8.

³¹⁶ *Ibid.*, p. 8.

since “the flash of light... can cause temporary eye damage under some circumstances.”³¹⁷ It also stated that “radioactive exposure levels within the bombing range could be hazardous,” implying that no danger existed from radiation for persons outside the boundaries of NTS.³¹⁸ In an effort to reassure Washington County’s residents, the AEC invited “the mayors of Hurricane, Washington, St. George, and Santa Clara and the director of civil defense in Washington county [sic]... to witness the atomic bomb explosion near a typical townsite prepared on the Nevada proving grounds April 26.”³¹⁹ It is unclear whether they were able to attend, as there is no record of a test shot occurring on April 26.

Douglas R. Stringfellow, one of Utah’s U. S. House Representatives (1953-1955), had questioned the effects of weapons testing following shot Harry in May 1953, declaring that he would investigate on behalf of “alarmed” constituents. After visiting NTS to observe a test shot on May 25, 1953 (six days after Harry and at the AEC’s personal invitation), Stringfellow retracted his earlier skepticism and announced that the AEC was making every effort to protect downwinders from unnecessary exposure.³²⁰ Following this observation, Stringfellow informed AEC chairman Lewis Lichtenstein Strauss that he had given

several speeches and radio broadcasts in my district and also issued press releases in which I reassured the people of Utah that every precautionary measure was being taken to protect their health and welfare. I also attempted to allay their fears and reassure them that the degree of radiation from atomic fallout was so low that it could not have any adverse effect on their physical well-being.³²¹

William Adams Dawson, who served with Stringfellow in the U. S. House (1947-1949, 1953-1959), wrote to a senior case worker for the Utah County Department of Public Welfare in Provo, Utah, that he would not back a federal bill for cancer research funding since “the Federal

³¹⁷ WCN, “Warning Given by AEC of New Series Nuclear Tests at Nevada Site,” February 3, 1955, p. 4.

³¹⁸ Ibid., p. 4.

³¹⁹ WCN, “Five From County Bid to View AEC Tests April 26,” April 21, 1955, p. 1.

³²⁰ Fradkin, *Fallout*, p. 20.

³²¹ United States, *Battlefield*, p. 108.

Government through the Atomic Energy Program and through the National Science Foundation is at the present time making a sizeable contribution to cancer research.... This, of course, would create a new Federal bureau which is in itself wasteful. It would also have the effect of placing the entire burden of cancer research on the Government.”³²² In 1957, he responded to a letter from a concerned citizen of the Salt Lake City area, acknowledging “disagreements among the experts on the effect of fall-out,” but claimed that the “differences are of degree, not of kind, so that a pretty reliable range of values can be established.”³²³ He cited the AEC’s statistic that “1,500 to 9,000 children (of the two billion [born in the next generation worldwide]... will bear detectable defects owing to fall-out,” then asserted that, while he did not claim expertise, he did “believe that those tests are being conducted by competent and conscientious men who would not take unreasonable chances with our future generations.”³²⁴ Apparently he was blissful in his ignorance, as there is no evidence that he undertook any investigation as to the veracity of this claim.

Utah’s U. S. Senators also engaged with their constituency during this period on the effects of radioactive fallout. Wallace Foster Bennett (served 1951-1975), one of the members of the Joint Committee on Atomic Energy and vice-chairman of the Ethics committee, replied to a St. George high school principal in 1957 that there was not “any subject in which there is more emotion and less real knowledge than in this question: ‘What are the possible effects of atomic and nuclear explosions?’”³²⁵ His ethics work seems to have failed Bennett in this instance, since as a member of the JCAE he would have had access to classified scientific studies. Bennett

³²² William Adams Dawson, Papers, J. Willard Marriott Library, University of Utah, Salt Lake City, UT, to Bessie I. Meiling, August 10, 1953, Dawson MS, Box 21, Folder 23.

³²³ Dawson to Mrs. Albert L. Anderson, September 10, 1957, Dawson MS, Box 7, Folder 15.

³²⁴ Ibid.

³²⁵ Wallace Foster Bennett, Papers, J. Willard Marriott Library, University of Utah, Salt Lake City, UT, to Newell R. Frei (Principal, Woodward High School, St. George), May 23, 1957 (dictated May 17), Bennett MS, Box 8, Folder 4.

continued, claiming that the testing could not be eliminated since it offered “the only way to know [we] have created a weapon of a special type.”³²⁶ He also claimed that the Department of Defense would not relocate the experiments because “they have spent large sums of money in equipping the area with the necessary precautions and with the equipment needed to make the tests, and I am sure there are no justifications for abandoning this area, especially since they spent lots of time selecting the best site in the first place.”³²⁷ He concluded by professing his “personal impression that the damage of current and future tests will be less than those of some other tests in the past.”³²⁸

Senator Frank Moss was by far the most sensitive to the concerns of Utahns regarding the nearby testing, yet he tended to waver in the face of political pressure from his congressional colleagues and the AEC. However, he did not take office until 1959, and it would be unfair to assert that he possessed adequate political influence to make necessary changes during the atmospheric testing years. While he may have “seemed very much aware of the dangers to our children and to the unborn generations which have been created by the nuclear tests already completed,” Moss maintained that “explanations are no substitute for action that will help remove the threat of nuclear war.”³²⁹ Behind his office door, however, he undertook to pressure the AEC. In a 1963 letter to AEC chairman Glenn Seaborg, Moss noted the “very heavy contamination in parts of Utah from nuclear explosions” which resulted in calls “for intensified study of the health of children and others who live in the area.”³³⁰ Moss fully endorsed these proposed measures, stating his conviction “that we should arm ourselves with all the information

³²⁶ Ibid.

³²⁷ Ibid.

³²⁸ Ibid.

³²⁹ Mrs. Bruce Watkins to Moss, August 28, 1959, Moss MS, Box 5, Folder 15; Moss to Watkins, March 9, 1960, Moss MS, Box 5, Folder 15.

³³⁰ Moss to Seaborg, August 23, 1963, Moss MS, Box 102, Folder 2.

possible on the results of nuclear fallout,” and asked for future tests to be restricted to non-grazing seasons.³³¹ Seaborg responded to Moss’s letter by asserting that “we have no evidence that the levels of radioactivity resulting from the Commission’s testing activities at the Nevada Test Site have been the cause of any thyroid cancer or leukemia in any individual,” but noted that the AEC had requested the U.S. Public Health Service “to undertake studies in the Utah/Nevada area on thyroid cancer cases.”³³² Seaborg also averred that restricting testing to winter months would likely eliminate I-131 in milk, but claimed that this “could place unacceptable restrictions on the conduct of important tests.”³³³ Despite his position in this instance, Moss maintained a posturing stance to his constituents rather than attempting to build a coalition to oppose the AEC.

A likely reason that there was not greater public outcry during the early testing years is that the AEC began producing numerous pieces of propaganda for distribution among downwind communities early on, but drastically increased these efforts following the mishaps of the Spring 1953 test series. Although the AEC had moved all atmospheric tests to the Marshall Islands for 1954, by March of that year officials were distributing films to Civil Defense offices for public viewings. Washington County Civil Defense director LeRoy Bailey showed the films “Operation Crossroads” and “The Evacuation of Civilians” to various public groups in St. George, with the promise that other towns in Washington County would also have an opportunity to view them in their locales.³³⁴ In its *Atomic Test Effects* pamphlet the following year, the AEC wanted no ambiguity in the public’s understanding of its programs. It implored citizens to “understand that we are not talking about high yield A-bombs or H-bombs tested elsewhere. We are not discussing radiation from enemy bombs designed to do the most damage

³³¹ Ibid.

³³² Seaborg to Moss, September 17, 1963, Moss MS, Box 102, Folder 2.

³³³ Ibid.

³³⁴ WCN, “Civil Defense Director Will Show A-Bomb Films,” March 4, 1954, p. 1.

possible. We are talking only about low-yield tests, conducted under controlled conditions at the Nevada Test Site.”³³⁵ The commission attempted to boost morale in Washington County with a new film, released in St. George toward the end of the TEAPOT series:

Atomic ‘fallout’ in the St. George area about one year ago particularly when everyone was requested to stay indoors for almost two hours, caused so much concern that the AEC not only investigated carefully, but decided to make a film of the incident, incorporating some of the tests and other features as well. This week the picture, in Technicolor and showing St. George streets and residents, is having its premiere here and was shown in the chamber meeting.³³⁶

Lyman remarked in her “Observations” column the following week that the film would no doubt “travel all over the nation, and many of our former Dixieites will no doubt see it, and I venture a momentary pang of homesickness will possess them as they see our streets and the everyday activities going along.”³³⁷

The “peaceful” uses for atomic energy were also extolled. Standard Oil Company featured a full-page advertisement in the *WCN* in August 1956 which claimed that its close collaboration with the AEC was producing results in discovering “lubricants for atomic machinery able to withstand withering radiation... [which would] speed the day when commercial atomic power will help drive planes and ships, and generate electricity for your home.”³³⁸ One year later, the AEC launched a travelling “Atoms for Peace” exhibit, which it claimed would provide “a comprehensive picture of the ways in which the peaceful atom is playing an important role in everyday life.... There is no admission charge—every resident of Washington county [sic] is invited to visit the exhibit for an informative glimpse of the peaceful atom.”³³⁹

³³⁵ United States, “Atomic Test Effects,” under the heading, “Fall-Out From the Atomic Cloud.”

³³⁶ *WCN*, “Chamber of Commerce Hear Discussions, See A-Bomb Fallout Picture,” April 14, 1955, p. 1.

³³⁷ *WCN*, “Observations,” April 21, 1955, p. 1.

³³⁸ *WCN*, August 23, 1956, p. 3.

³³⁹ *WCN*, “AEC Travelling Exhibit To Be In Springdale,” August 8, 1957, p. 4.

While they may have been endangering adults and children of all ages, AEC officials did not neglect secondary school students in their indoctrination schemes. The Office of Civil and Defense Mobilization reported that 15,000 high schools nationwide would be receiving radiological kits by September 1958. It announced that with “the cooperation of the Department of Health, Education, and Welfare and the State Education Departments, science teachers in these schools are conducting instruction in radiological defense topics in connection with science courses. One million students will receive such instruction by June 1959.”³⁴⁰ Shortly after the atmospheric testing period ended, the director of the AEC’s Division of Technical Information, Edward J. Brunenkant, wrote David Sjordahl King, Utah’s U. S. Representative (1959-1963, 1965-1967) to inform him that

The Atomic Energy Commission has for several years sponsored lecture demonstration programs to acquaint secondary school students and their teachers with the basic principles and the peaceful applications of nuclear energy. In this activity, AEC-trained lecturers provide a basic introduction to the subject at student assemblies, utilizing colorful demonstration equipment. At most schools they meet also with selected science classes to help the teachers familiarize their students with specific aspects of nuclear science.³⁴¹

The Civil Defense program received greater emphasis in Washington County beginning in 1954, if frequency of *WCN* articles is an accurate indicator. The local division of the volunteer agency was showing Civil Defense films that spring in order “to make the residents of Washington county aware of the importance and significance of this nationwide project.”³⁴² By 1956, links to the AEC experiments became more prominent, as one article claimed that “fallout is now one of the principal nuclear dangers with which civil defense must contend. Civilians will be told to seek shelter in basements, ‘cyclone’ shelters and the like if fallout from a nuclear

³⁴⁰ United States, Office of Civil and Defense Mobilization, *What You Should Know About the National Plan for Civil Defense and Defense Mobilization*, Washington, DC: 1959 (1958), p. 19. Hereafter cited as United States, *National Plan*.

³⁴¹ David Sjordahl King, Papers, J. Willard Marriott Library, University of Utah, Salt Lake City, UT, Edward J. Brunenkant to King, March 30, 1966, King MS, Box 35, Folder 2.

³⁴² *WCN*, “St. George Firemen Assist in Showing Defense Film,” March 18, 1954, p. 4.

explosion is heading their way;” the implication here is that it would be fallout from a Soviet attack.³⁴³ The focus had turned to a Soviet hydrogen bomb attack, in which case Civil Defense would work “to assure survival of the greatest number of persons if some day an American sky lights up like a hundred suns.”³⁴⁴ Civil Defense members also stressed that “the most important people for civilian defense are those in the rural areas, such as Washington county [sic], who would be the actual survivors in the event of bombings of our country.”³⁴⁵ As well, they warned that windblown fallout from a high-yield “bomb on the west coast could be deadly in Washington county [sic].... America is the one country standing in the way of Russia’s control of the world, and as long as it is a threat to the Soviet Union there is the danger of an all-out war.”³⁴⁶

Speculation of the AEC’s manipulation of information is corroborated by its own internal documentation, some of which survived Department of Energy destruction. A 1948 AEC staff report, entitled “Location of Proving Ground for Atomic Weapons,” stated the belief that “a properly conducted public information program stressing radiological safety factors as a result of prevailing winds could overcome adverse public reaction” on a large scale, while nullifying localized opposition by questioning patriotism and suggesting Communist sympathies.³⁴⁷ Gordon Dean, AEC chairman when NTS was founded, held himself to a strict policy of only divulging information to direct questions and even then providing answers which left the issue “completely fuzzed up.”³⁴⁸ In the spring of 1953, the AEC provided advance warnings of possible fallout to the National Association of Photographic Manufacturers, but not to the

³⁴³ WCN, May 20, 1956, p. 8. There was no heading available for this citation, as there was a strip of photographs with captions underneath.

³⁴⁴ WCN, “H-bomb Tests Vital to CD,” August 2, 1956, p. 5.

³⁴⁵ WCN, “Five County Meeting of Civil Defense Workers Discuss Emergency Plans,” August 30, 1956, p. 1.

³⁴⁶ Ibid., p. 1.

³⁴⁷ Quoted in Fradkin, *Fallout*, p. 85.

³⁴⁸ Quoted in Fradkin, *Fallout*, p. 99.

downwind population.³⁴⁹ By March 1953, there was no admission in the AEC's publicly disseminated information pamphlets that the potential of cancer development existed many years after exposure, although there was a plethora of extant and accumulating evidence from Hiroshima and Nagasaki.³⁵⁰ This is corroborated by the interview with James Yamazaki.

Additionally, the AEC continued to present publicly the threshold theory of harmful radiation, claiming that people suffer injury from radiation exposure "only if too many cells are damaged or destroyed at one time, or are destroyed continuously in certain organs of the body over a long period of time."³⁵¹ What scientists knew but did not admit was that this only applied to immediately observable maladies, and they ignored the long-term health consequences of exposure to the smallest amounts of radiation. The next section contained outright deception, as it claimed that the human body is capable of receiving "considerably greater doses of radiation [above normal-background] because the effects are repaired almost as rapidly as they are produced. Over a period of many years, a human may safely receive in small doses a total amount of radiation which would cause fatal illness if administered to his whole body within a period of a few minutes."³⁵²

The focus on misrepresenting the dangers of the AEC's experiments exacerbated problems with the offsite monitoring procedures. The AEC did not make necessary adjustments to its monitoring of downwind communities because its officials were concerned that increasing its presence in these areas would result in heightened public and political scrutiny of the necessity of operating a continental test site. The National Research Council's I-131 study found

³⁴⁹ Fradkin, *Fallout*, p. 105.

³⁵⁰ *Ibid.*, p. 105.

³⁵¹ United States, "Atomic Test Effects," under the heading, "Appendix: Guides to Understanding Fall-out: What Radiation Does to People."

³⁵² United States, "Atomic Test Effects," under the heading, "Appendix: Guides to Understanding Fall-out: The Range from Harmless to Serious Exposures."

that “the exposure of the public was inadequately monitored,” despite the many assertions the AEC made to the contrary.³⁵³ At the beginning of the RANGER series, the AEC prohibited flights over the test site and, by the end of the year, placed restrictions on “all aircraft entering or operating within a 200-mile radius from Las Vegas,” although ground monitoring did not extend more than a few miles offsite.³⁵⁴ By 1953, the AEC had extended the range of monitors, but they still only operated along highways and major unpaved roads, while receiving procedural directions in the field which limited their practical effectiveness. These monitors also often treated their responsibilities lightly. AEC officials and Public Health and Safety monitors joked years later that they were convincing downwind residents through public relations efforts that they were safe while the AEC was exposing off-site residents to radiation.³⁵⁵ The AEC’s *Atomic Test Effects* pamphlet directed downwind residents “to open windows and doors to equalize pressure” inside their homes in order to mitigate the force of the blast from detonations.³⁵⁶ There were no instructions to then reseal the home so that wind-blown radioactive dust would not enter the home as easily.

One complication resulting from the limited monitoring system was the inability of field monitors and aerial surveys to detect radioactive hot spots, “localized areas of enhanced fallout deposition that would be of radiological concern.”³⁵⁷ These hot spots were of particular concern to Washington County since it is such a large area and residents during the period could remain in remote areas away from population centers for extended periods of time. Later studies showed that people coming into contact with hot spots may have experienced radiation exposure

³⁵³ National Research Council—*Iodine*, p. ix.

³⁵⁴ WCN, “AEC Attempts Control of Flights Over Test Site,” October 18, 1951, p. 6.

³⁵⁵ Fradkin, *Fallout*, p. 113.

³⁵⁶ United States, “Atomic Test Effects,” under the heading, “Off-Site Warnings and Procedures for Blast.”

³⁵⁷ ORERP, p. 507.

levels which were “thousands or millions of times greater than average levels.”³⁵⁸ Rural residents and residents of the smaller hamlets in Washington County were particularly susceptible, since the AEC often neglected to warn them of the impending danger even though these areas often experienced heavier fallout levels than in St. George.³⁵⁹ In Gunlock, the local teacher reportedly had “no recollection of ever being told to keep indoors the dozen children who attended the one-room schoolhouse. Neither she nor the owner of the general store recalls ever seeing any monitors in or around Gunlock during the Upshot-Knothole tests of 1953.”³⁶⁰ Also, because rainfall is a precious occurrence in desert environs, thunderstorms in the area presented a serious threat because rain showers occurring in conjunction with passing radioactive clouds dramatically increase the prevalence of radioactive hot spots.³⁶¹

Even if monitors had notified all rural residents and detected all hot spots, it is likely the AEC would not have admitted to any existing danger. AEC pamphlets repeatedly diminished the potential dangers of fallout, likening burns from radioactive beta particles to “burns produced by heat, except that they appear only after one or two weeks and heal slowly and more imperfectly... barely penetrate the skin and produce no other damage to the body.”³⁶² When winds began to carry radioactive clouds toward the observation stations miles away during a 1957 shot, officials immediately ordered the withdrawal of “several hundred scientists and observers,” although, according to later AEC reports, the clouds carried ““only very light fallout”” and “there would have been no danger had the people remained.”³⁶³ Later studies determined that while “the official limit was 3.9 rads per year for the public downwind of the atmospheric tests... action

³⁵⁸ IPPNW, *Radioactive Heaven and Earth*, p. 16.

³⁵⁹ Jacobs, “Clouds,” p. 17.

³⁶⁰ *Ibid.*, p. 21.

³⁶¹ Chesher, *Zion Canyon*, p. 29; ORERP, p. 508.

³⁶² United States, “Atomic Test Effects,” under the heading, “Fallout Experience in Past Tests.”

³⁶³ WCN, “CAA Atomic Test Blast Nears St. George; Others Scheduled; Sunday Next,” June 20, 1957, p. 1.

tended not to be taken until doses reached or exceeded the level at which immediate radiation symptoms became manifest.”³⁶⁴ During the ‘Dirty Harry’ Shot, the AEC told people that the radiation level was not dangerous because there were no immediately observable indicators.³⁶⁵ This was a distinct “example of how public education became so mixed up with public relations that the official goal of safety was largely subverted.”³⁶⁶

When dealing with public safety concerns, the AEC employed several methods, generally according to which source was raising questions. At times, officials would attempt to discredit scientific studies which questioned the genetic and health effects of low-level radiation exposure, claiming the researchers had manipulated the results as a result of having been biased.³⁶⁷ At other times, the AEC withheld pertinent information by having documents classified due to the presence of “military information,” often citing matters of national security to shield its non-security-related practices.³⁶⁸ More often, the AEC exerted its considerable influence to ensure that medical research went unpublished or to keep local health practitioners from speaking about the associated dangers, thereby preventing mass panic in communities which had begun to speak openly about radiation dangers.³⁶⁹ When dealing with inquiries from Utah’s politicians, the favored practice of AEC officials was to send standardized form letters reiterating the necessity of the experiments to national security and always with some version of the caveat that “all precautions were taken in the Nevada tests to keep off-site radiation to a minimum. The addition to worldwide fallout would be negligible.”³⁷⁰ For citizens, the message remained unchanged (except in the case of a Soviet attack): “Your best action is not to be worried about fall-out.... If

³⁶⁴ IPPNW, *Radioactive Heaven and Earth*, p. 2.

³⁶⁵ *Ibid.*, p. 57.

³⁶⁶ *Ibid.*, p. 57.

³⁶⁷ Jacobs, “Clouds,” p. 11.

³⁶⁸ *Ibid.*, pp. 11-12.

³⁶⁹ Ball, *Justice Downwind*, p. 198.

³⁷⁰ Duncan Clark, AEC Director of the Division of Public Information, to Moss, August 14, 1962, Moss MS, Box 52, Folder 10.

you think that maybe you have been in fall-out, or if you have other questions, get in touch with our monitors or with the Test Organization. Your questions will be answered.”³⁷¹

Washington County residents did not have their questions answered accurately though, and given the degree of contamination and the problems associated with decontamination, their exposure became exponentially worse. LASL had published its findings relative to decontamination procedures in 1950 in a book prepared for and in cooperation with the Department of Energy and the AEC. It stated that there were no means by which to “neutralize the radioactivity;” it was only possible to “transfer the active material from one place to another.”³⁷² In order to make a contaminated area “habitable within a reasonable time,” all “loose material which might form dust that would be inhaled or ingested with food” would need to be disposed of or covered up.³⁷³ Rooftops would present a significant challenge, since they “would collect considerable amounts of radioactive material, but could not be easily decontaminated.”³⁷⁴ Decontaminating soil would also be extremely problematic, as “the radioactivity will remain in the uppermost few inches.”³⁷⁵ The suggested solution to the quandary was “to remove it or cover it with at least a foot of fresh soil.”³⁷⁶ Additionally, “clothing, as well as rugs, curtains, and upholstered furniture” which had been contaminated “would have to be discarded and buried or burned in proper incinerators designed to prevent the escape of radioactive smoke.”³⁷⁷ Washington County’s citizens never received these warnings or decontamination procedures from AEC officials who were concerned that public dissemination of these facts would spark an enormous public outcry.

³⁷¹ AEC—ATE, under the heading, “Procedures Related to Radiation Fall-out.”

³⁷² LASL, p. 329.

³⁷³ *Ibid.*, 329.

³⁷⁴ *Ibid.*, p. 330.

³⁷⁵ *Ibid.*, p. 330.

³⁷⁶ *Ibid.*, p. 330.

³⁷⁷ *Ibid.*, p. 330.

A few high-profile individuals, including politicians, scientists and activists, did speak out against the weapons testing program. The press and the constituency of a Nevada state legislator who called for an end to detonations at NTS excoriated him publicly; the state bill which he had introduced died while still in committee.³⁷⁸ Senator Edward Lewis Bartlett (D-Alaska, 1959-1968) gave a speech on the Senate floor in 1963 in which he outlined the plethora of issues facing his Alaskan constituents, as well as Americans in general. Entitled “Fallout Monitoring: We Must Do Better: We Could Hardly Do Worse,” Bartlett’s speech quoted a 1962 United Nations report which asserted that

It is clearly established that exposure to radiation, even in doses substantially lower than those producing acute effects, may occasionally give rise to a wide variety of harmful effects including cancer, leukemia and inherited abnormalities which in some cases may not be easily distinguishable from naturally occurring conditions or identifiable as due to radiation. Because of the available evidence that genetic damage occurs at the lowest levels as yet experimentally tested, it is prudent to assume that some genetic damage may follow any dose of radiation, however small.³⁷⁹

He claimed that the AEC’s “radiation surveillance and control program is no more than an ineffective gesture,” and called on the president “to stop treating radiation as once we treated cancer. It exists, it threatens us. It must not be hidden away as cancer once was.”³⁸⁰

American scientist Linus Carl Pauling, instrumental in proving that strontium-90 from atmospheric tests in cow’s milk was a significant public health threat, calculated in 1957 that fallout-induced leukemia was responsible for a minimum of ten thousand American casualties.³⁸¹

Rachel Louise Carson, an American marine biologist and preservationist, admitted to the presence of natural background radiation in her 1962 work, *Silent Spring*, but pointed out that

³⁷⁸ Titus, *Bombs in the Backyard*, p. 97.

³⁷⁹ Senator Edward Lewis Bartlett of Alaska, in a speech entitled, “Fallout Monitoring: We Must Do Better: We Could Hardly Do Worse,” presented to the U.S. Senate on May 14, 1963, 88th Cong., 1st sess., *Cong. Rec.* 109, pt. 7: 8423.

³⁸⁰ *Ibid.*, p. 8425.

³⁸¹ Titus, *Bombs in the Backyard*, p. 98.

living organisms had “millennia” to adapt to relatively constant levels of background radiation, whereas the rapid introduction into the atmosphere of new and increased levels of radiation destabilized the delicate balance which had been achieved over eons.³⁸² German physician Dr. Albert Schweitzer, who politicians frequently misquoted or whose quotations they often repeated out of context, stated in 1957 that

we are forced to regard every increase in the existing danger through further creation of radioactive elements by atom bomb explosions as a catastrophe for the human race, a catastrophe that must be prevented under every circumstance.... The end of further experiments with atom bombs would be like the early sun rays of hope which suffering humanity is longing for.³⁸³

Schweitzer’s statement, that “even today, we must concede to each nation the right to stand ready to defend itself with the terrible weapons now at its disposal,” which American politicians most often used to justify and defend the weapons testing program, went on to implore that humans needed “to take the first step along this new highway [of peaceful existence]. Not one of them will lose a fraction of the power necessary for their own defense.”³⁸⁴

The evidence of AEC negligence and deception is overwhelming. In the years of atmospheric testing, “105 tests were conducted above ground surface at NTS and 14 other tests were at depths where containment was not expected. The total nuclear yield of these detonations was approximately one megaton of TNT-equivalent explosive energy,” the same as an early hydrogen bomb being dropped on Nevada.³⁸⁵ While it is true that this was less concentrated over a thirteen-year period than a single hydrogen weapon detonation, one must also consider that because of variable winds the multiple detonations scattered fallout over a much greater area

³⁸² Carson, *Silent Spring*, pp. 6-7.

³⁸³ Quoted in Jacobs, “Clouds,” p. 26, from Dr. Albert Schweitzer, “Excerpts From Albert Schweitzer’s Statement of April 23, 1957.”

³⁸⁴ Albert Schweitzer, “The Problem of Peace,” Nobel Lecture, for the Nobel Peace Prize 1952, Oslo University, Oslo, Norway, November 4, 1954, http://nobelprize.org/nobel_prizes/peace/laureates/1952/schweitzer-lecture-e.html (accessed February 12, 2009).

³⁸⁵ ORERP, 503.

than that of a single detonation. Speaking to the JCAE in 1959 of the devastating results of the AEC's experiments, Dr. Charles C. Price of the University of Pennsylvania claimed that AEC researchers acceded that radiation exposures below the maximum permissible dose were not harmless. He continued his passionate speech by questioning the AEC's integrity:

Do the AEC scientists believe 100,000 additional cases of leukemia a year are permissible? Or is it only 10,000 cases a year? How many additional deformed children per year do they consider permissible?... It is not clear and obvious to the general public, nor even to scientists, which deformed children or which leukemia cases were the result of bomb testing rather than natural or other causes. It is therefore extremely important that the public be informed of and be willing to accept the degree of hazard which the AEC calls 'permissible.'... It seems extremely dangerous and undesirable to have the definition of what is 'permissible' so completely lodged with the AEC. It has been demonstrated in many serious instances that this agency is indeed capable of suppressing important information detrimental to its interests and of distorting news so as to mislead the public.³⁸⁶

Undeterred, AEC officials continued their deceptive practices and policy of suppressing accurate information. Douglas Grahn, a geneticist in the AEC's Division of Biology and Medicine, testified before the JCAE that "it can be assumed that a series of short duration high intensity exposures, even to low total doses," would pose serious health risks.³⁸⁷ In certain instances though, high intensity exposures led to high total doses. A 1962 AEC report found that, following Shot Harry in 1953, St. George children "may have received doses to the thyroid of radioiodine as high as 120 to 440 rads," far exceeding the limits proposed and allegedly upheld by the AEC.³⁸⁸ Even after the "scientific consensus" he claimed existed had been debunked years earlier; even after his own colleagues within the AEC produced evidence that residents, including children, had received exposures well in excess of the maximum permissible

³⁸⁶ "Statement Concerning Fallout by Charles C. Price," University of Pennsylvania, in United States, Joint Committee on Atomic Energy, *Fallout from Nuclear Weapons Tests: Hearings Before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy*, 86th Cong., 1st sess., May 5-8, 1959, vol. 3, pp. 2270-2271.

³⁸⁷ "Radiation Induced Life Shortening and Associated Effects," by Douglas Grahn, Geneticist, Division of Biology and Medicine, U.S. Atomic Energy Commission, in United States, Joint Committee on Atomic Energy, *Fallout from Nuclear Weapons Tests: Hearings Before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy*, 86th Cong., 1st sess., May 5-8, 1959, vol. 1, p. 97.

³⁸⁸ Pat Ortmeier and Arjun Makhijani, "Worse Than We Knew," *The Bulletin of the Atomic Scientists* 53, no. 6 (November/December 1997): 49.

dose limit, Dr. Gordon Dunning continued to maintain that “only a few individuals have exceeded by small amounts the criterion of 10 roentgens in 10 years established for the Nevada Test Site.”³⁸⁹ The AEC deliberately manipulated records it released to the public, underestimated exposure levels, produced inaccurate fallout maps, and made a mockery of legitimate offsite monitoring procedures. Furthermore, according to a 1980 Federal Government report, the accuracy of the monitoring instruments themselves may have been off by as much as 30%.³⁹⁰ In 1991, the IPPNW reported it had found sufficient

evidence that conscious decisions were made to accept harm to people and to the environment in the pursuit of larger and more deadly nuclear arsenals. The need for military secrecy was inappropriately used to conceal information vital to protecting the public health. The report does not emphasize these observations about the morality of what was done. Rather, it tries to present the evidence. But for those who study the issue or read between the lines, this readiness to harm is omnipresent.³⁹¹

In light of the massive efforts which the AEC undertook to prevent full disclosure of the nature of the effects of fallout, it is not surprising that there was such limited public opposition to its activities. There is enough evidence to suggest that there was some awareness among Washingtonians that government officials were not entirely truthful, yet, most of the local population remained largely supportive of the AEC’s activities. Washingtonians had their own ideas about how best to prosper in their southwestern desert environment, and they developed correlative economic agendas pertaining to the AEC and its experiments that incentivized their reluctance to protest with much fervor.

³⁸⁹ Dunning, *Health Aspects*, p. 7.

³⁹⁰ Ball, *Justice Downwind*, 108.

³⁹¹ IPPNW, *Radioactive Heaven and Earth*, p. xi.

SILENCE DOWNWIND: THE PHILOSOPHY OF DESTRUCTIVE LAND USE, FEDERAL LARGESSE, AND PUBLIC ACQUIESCENCE

“Our grandsires freed this virgin continent, plowed it from east to west, and gave it to us. This land is for us and for our children to make richer and more fruitful.... Our rules are nature’s rules, the laws of God. We command the magic of the seasons and the miracles of science, because we obey nature’s rules.... We work with brains. We toil with muscles of steel, fed by the fires of lightning and by oils from the inner earth. We are partners with the laboratory, with the factory, and with all the people. We provide industry with ever-renewable raw materials from the inexhaustible world of plants.... We have proven a new pattern of abundance.”³⁹²

Underlying the public’s acceptance of a continental nuclear weapons test site was a cultural philosophy of the proper use of “worthless” land. A cultural imperative which had existed from the nation’s founding dictated that land and natural resources should be exploited for the benefit of industrial progress. The desert environment of the U. S. southwest, particularly in southern Nevada and Utah, contained immense mineral deposits, provided a great deal of sparsely populated land, and, as of 1941 when the United States entered World War II, had yet to see substantial economic development. In 1952, Nevada Governor Charles Hinton Russell stated, “It’s exciting to think that the sub-marginal land of the proving ground is furthering science and helping national defense. We had long ago written off that terrain as wasteland, and today it’s blooming with atoms.”³⁹³ His statement epitomizes contemporary attitudes many Americans held about the utility which the natural environment of the Southwest provided: it was a “wasteland” of “sub-marginal” real estate, and the prevailing idea was that there was simply nothing there. However, there were numerous ventures in which Washingtonians and their governmental representatives were involved, and it seems that the promise of local economic prosperity played a significant role in minimizing the degree to which these people were willing to voice publicly their concerns with regard to the activities at the nearby nuclear testing facility.

³⁹² WCN, “We Are American Farmers,” February 28, 1952, p. 4.

³⁹³ Quoted in Titus, *Bombs in the Backyard*, p. 97.

There was a distinct narrative in American culture during this period which promoted industrial advances as both the means for human progress and the means by which a communist takeover of the world might be averted. Politicians, media outlets, and federal agencies all were complicit in propagandizing the issue and enabling industrial ventures to exploit barren and underutilized land in pursuit of a better life for Americans. A 1961 *WCN* article promoted the use of chemical preservatives in food supplies, stating that “our U.S. Department of Agriculture and our Food and Drug Administration are still cooperating to keep our food supply the cleanest, the safest and most wholesome in the world today.”³⁹⁴ One week before the 1962 election, the *WCN* printed an advertisement for Republican pundits that lauded the economic prosperity resulting from fourteen years of Republican control of state affairs and promised further prosperity: “Dixie stands on the threshold of a new era with its prospects for industry and projects featuring our winter climate.... We live in an amazing period of change and progress. We want to keep in step with the times.”³⁹⁵

During the atmospheric testing period, prevailing public opinion held that private enterprise offered the optimal prescription for public land use. Shortly after President Dwight David Eisenhower appointed Oregon politician James Douglas McKay as Secretary of the Interior in 1953, Utah Representative William Dawson wrote to encourage him to support economic and commercial development of public lands in the West. Dawson asserted that previous Interior Secretaries had declared sizeable sections of public land in the West unavailable for private development.³⁹⁶ Dawson firmly supported opening these areas to such activity, as “both the Federal Government and the states are losing the opportunity of receiving the benefits of any metal or mineral resources that could be discovered and developed if the land

³⁹⁴ *WCN*, “Our Food is Better and Safer,” March 16, 1961, p. 3.

³⁹⁵ *WCN*, “Washington County Republican Party Platform,” October 25, 1962, p. 2.

³⁹⁶ Dawson to McKay, February 10, 1953, Dawson MS, Box 21, Folder 5.

were open to entry.”³⁹⁷ Dawson seemed to believe that the influence of lawyers from eastern states was having a detrimental effect on an audit of the Bureau of Land Management (BLM), and claimed that since “some 95% of the department’s business deals with the Western States,” the challenges facing the BLM “would be better understood by attorneys who are familiar with some of these problems first hand.”³⁹⁸ Essentially, Dawson believed these eastern pundits held higher regard for preserving western lands in pristine conditions for eastern tourists, rather than considering the impact of restrictive economic policies on local communities. He told one of his constituents that while he took pride in the results of his efforts at “preserving our scenic and wilderness areas” in the West, he believed there were certain “extreme proposals... [which] could be very damaging to our economy.”³⁹⁹

Nora Lyman used her *WCN* column to outline her attitude toward economic progress in western lands, claiming that the dam being built at Glen Canyon near the Utah border in Arizona, despite its distance from the area, would “bring untold revenue from many sources.”⁴⁰⁰ Furthermore, she rightly recognized that the “search for minerals and oil is fast proving profitable factors in the local economy, and I predict a real opening throughout the area in these industries, as well as others allied with them.”⁴⁰¹ Still, Lyman did not subscribe to unmitigated exploitation of the natural environment. In discussing the dichotomy of use and preservation inherent in the National Park System, she indicated that she believed natural resources in protected areas could be extracted while maintaining a wilderness character. To Lyman, an “expanding economy” demanded that human managers ensure that “wilderness contributes its proper part in meeting those [economic] demands,” and that pristine land should remain

³⁹⁷ Ibid.

³⁹⁸ Dawson to McKay, May 8, 1953, Dawson MS, Box 21, Folder 5.

³⁹⁹ Dawson to I. Bruce McQuarrie, M.D., July 30, 1957, Dawson MS, Box 21, Folder 8.

⁴⁰⁰ *WCN*, “Observations,” May 10, 1956, p. 1.

⁴⁰¹ Ibid., p. 1.

protected only as long as “the useful benefits that flow from its unimpaired natural scene are sufficient to justify its continuation.”⁴⁰²

Lyman’s opinion of wilderness preservation is representative of mainstream opinion in the period, and especially of Utah’s politicians. Representative Dawson responded to a letter from a Californian in 1955 by stating that while the writer’s “attitude of preservation of the *birthright* of every American citizen to the enjoyment and use of our lands is praiseworthy,” he would not support a specific piece of legislation to restrict further resource extraction on public lands since “I come from a state where mining and exploration for minerals is very important.”⁴⁰³ Furthermore, Dawson argued that “since human nature has not as yet reached an altruistic [sic] height, precautions must be obtained through legislation channels to keep for all the people of the present and our future generations these elements of our national inheritance.”⁴⁰⁴

Representative Sherman Parkinson Lloyd also supported “the proper use of wilderness areas for full benefit of society.”⁴⁰⁵ According to Lloyd, the government must guard wilderness “against excessive lockup of resources which would handicap the economic development of the west.”⁴⁰⁶ A month later, Lloyd wrote to a constituent that while he was “not committed to either side of the controversy, I certainly do recognize the need to preserve some of our land from commercial exploitation.”⁴⁰⁷ However, Lloyd declared that he would not support the wilderness bill being considered at the time, presumably because it would block certain economic and

⁴⁰² WCN, “Observations,” May 8, 1958, p. 1.

⁴⁰³ Dawson to Edward W. Lynch (Cecilville, California), June 6, 1955, Dawson MS, Box 20, Folder 25.

⁴⁰⁴ Ibid.

⁴⁰⁵ Sherman Parkinson Lloyd to Robert J. Heaney (Salt Lake City), February 7, 1964, Papers, J. Willard Marriott Library, University of Utah, Salt Lake City, UT, Lloyd MS, Box 3, Folder 5. Lloyd was originally from Idaho, though he attended Utah State University. He was a Republican who served as a Utah State Senator from 1954-1963 and U.S. Representative from 1963-1965.

⁴⁰⁶ Ibid.

⁴⁰⁷ Lloyd to Harold B. Lamb, M.D., March 16, 1964, Lloyd MS, Box 18, Folder 18.

industrial developments.⁴⁰⁸ Lloyd had initially refused to support a bill for an improved highway through an undeveloped canyon, but stated in a letter to a U. S. Forest Service employee that “there is absolutely no question in my mind but that the beautiful scenery can be appreciated more from a safe road than an unsafe road. Furthermore, it can not only be better appreciated, but the scenery itself is vastly improved when viewed from the improved highway.”⁴⁰⁹

While Lloyd tended to take a gentler tone, Representative Dawson was scornful in his appraisals of environmental activists. In a 1953 letter to Secretary McKay, Dawson claimed that the “nature lovers” who were opposing the construction of a dam at Echo Park in Dinosaur National Monument “just don’t know what they are talking about.”⁴¹⁰ He later intimated to House Interior and Insular Affairs Committee Chairman Arthur Lewis Miller that environmentalists were “persons who generally are unfamiliar with the effect of the Dam on the development of the [Dinosaur National] Monument” and who made opposition arguments “based upon emotion rather than fact.”⁴¹¹ To refute arguments made by opposition groups, Dawson included an itemized Fiction v. Fact list in his letter to Miller. He asserted that the reservoir the dam would create would not cause damage to fossil beds; that a 200-foot deep reservoir would not “affect the grandeur of the scenery” since the canyon walls were 3,000-feet high; that “the Dam would substitute still water in the bottom of the scenic canyon areas for rapids which now can be negotiated only under the guidance of experience river runners and always with risk to the traveler, and at an expense of time and money out of range of the ordinary tourist;” and that nearby residents had been assured in 1937, when the boundaries of the monument were extended, “that the enlargement would not interfere with power and water

⁴⁰⁸ Ibid.

⁴⁰⁹ Lloyd to Floyd Iverson (Regional Forester, U.S. Department of Agriculture, Forest Service, Ogden, UT), October 9, 1963, Lloyd MS, Box 3, Folder 9.

⁴¹⁰ Dawson to Douglas McKay (Secretary of the Interior), February 9, 1953, Dawson MS, Box 21, Folder 5.

⁴¹¹ Dawson to Miller, January 6, 1954, Dawson MS, Box 21, Folder 29.

projects in the river canyons.”⁴¹² To Dawson, the project would provide additional “power and water resources” to his state, and he believed the construction of a dam at that location would make “available to the public the beauty of the scenery of this area.”⁴¹³ Ultimately, politicians gave up on the Echo Park Dam Project, instead agreeing with activists to relocate the dam to Glen Canyon near Page, Arizona, as part of the Colorado River Storage Project of 1956.

While Dawson paid a degree of lip-service to environmental preservation concerns, his work on the dam project and his insistence on the importance of mining ventures to Utah’s economy revealed his true loyalties. Like other politicians from Utah, he felt that America’s strength and “national inheritance” were to be found in its mineral wealth and the ability of corporate interests to access and exploit these natural resources. The Utah Mining Association (UMA) frequently featured a small advertisement in the *WCN* (and likely in other community publications throughout Utah) entitled “Miner Mike says...,” which the association used as a platform to influence public opinion in favor of various mining ventures. Miner Mike seems to have been an everyman-type fictional character that worked for the mining industry and was the mouthpiece for promoting a “sensible” attitude of environmental exploitation. Mike claimed that his mining job provided “the satisfaction of earning a good living,” while at the same time “helping to transform what otherwise would be worthless material into metal products, mak[ing] life easier for others.”⁴¹⁴ In one patriotic piece, Mike states that “strong countries produce more, and the countries that produce more have won the wars they fought against their enemies. That’s why Utah’s mining industry is going all out for production. We know what our freedom cost... and we’re going to make sure we keep it.”⁴¹⁵

⁴¹² Ibid.

⁴¹³ Dawson to Mr. and Mrs. George H. Martinsen, February 16, 1954, Dawson MS, Box 21, Folder 17.

⁴¹⁴ *WCN*, “Miner Mike says...,” May 24, 1951, p. 8.

⁴¹⁵ *WCN*, “Miner Mike says...,” November 15, 1951, p. 3.

Following the 1952 election cycle, the UMA seems to have become concerned with the proposition of tax hikes and wage increases on its operations, as a Miner Mike ad appeared which claimed that a mine must remain profitable for corporations in order to be a worthwhile endeavor. The scare-tactic ad stated that “if costs of supplies, labor and taxes get too high, and profits disappear... no more mine, no more benefits to everyone in Utah. That’s happening right now in Utah!”⁴¹⁶ Mining operations did, in fact, continue to be profitable, and by the mid-1950s UMA had phased out the “Miner Mike says...” feature, though it continued to run ads. A 1960 advertisement asserted that “mining is the starting point for economic benefits that spread to every corner of Utah. Mining results in milling, milling calls for smelting, smelting brings refining and refining attracts fabricating plants. These widening economic circles produce more jobs, bigger payrolls, growing supply purchases and increasing tax payments.”⁴¹⁷

The Kennecott Copper Corporation was one of the largest mining companies operating in Utah from the 1940s through the 1970s. The Utah Copper Division of Kennecott promoted itself as “A Good Neighbor Helping to Build a Better Utah,” and purchased a two-page advertisement in the *WCN* in February 1952 featuring a picture of the open-pit Bingham Canyon Mine. According to the ad, the mine had produced more than 11 billion pounds of copper, 621 million tons of mined and milled ore, and 1.3 billion tons of removed ore and waste by the beginning of 1952.⁴¹⁸ Such was the manner in which the Bingham mine had ushered in “a new era in copper—an era that proved the mine at Bingham was not a worthless piece of Utah’s landscape, as some experts then believed, but a vast source of vitally needed copper.”⁴¹⁹ It claimed that Utah’s wasteland had actually been at the forefront for the industrialists to develop “a better way

⁴¹⁶ *WCN*, “Miner Mike says...,” January 22, 1953, p. 3.

⁴¹⁷ *WCN*, Utah Mining Association advertisement, February 18, 1960, p. 6.

⁴¹⁸ *WCN*, “Together we’ve come a mighty long way...,” February 21, 1952, pp. 6-7.

⁴¹⁹ *Ibid.*

to obtain copper,” thus ensuring that “the people of Utah live better.”⁴²⁰ Representative Sherman Lloyd wrote to the Kennecott Copper Corporation’s public relations division to request “a picture of Kennecott’s open-cut copper mine,” as he was planning on “decorating my office with significant photos of industry in my District.... Upon receipt, I would have it framed here, and it would occupy a prominent place in the outer office.”⁴²¹

While the Kennecott operation and other mining ventures were important for Utah in general, Washington County’s most important mineral resource in the 1950s and 1960s was uranium, and the federal government, in the form of the AEC, was the driving force for detecting, extracting, and manufacturing the metal. Its total control over the processing of uranium and nuclear weapons resulted in an “artificial mining boom” throughout the West.⁴²² As the Cold War grew more heated during the 1950s, the AEC increased uranium purchases, and by 1955 the AEC devoted over \$52 million per annum on uranium-related manufacture. From the establishment of the AEC in 1946 until 1971 when “the uranium program ended, the commission spent \$2.9 billion and bought 348 million tons of the ore,” all of which it spent in the West.⁴²³

Silver Reef, located about fifteen miles northeast of St. George, had been a silver mining town since the 1870s and became a ghost town until uranium was discovered there. Uranium mining began there in 1951 under the supervision of Frank L. Morgan, a mining operator from Springville, UT, who offered to consult with any prospectors who brought ore to his establishment and to help them operate their Geiger counters efficiently in order to promote the

⁴²⁰ Ibid.

⁴²¹ Lloyd to Public Relations Division, Kennecott Copper Corporation, Salt Lake City, July 18, 1963, Lloyd MS, Box 3, Folder 16.

⁴²² Nash, *The American West Transformed*, p. 65.

⁴²³ Ibid., p. 66.

search for the mineral and expansion of the industry in Washington County.⁴²⁴ By July 1952, Utah had become home to “three uranium ore processing mills” as well as “two ore buying stations,” with “a third Utah ore-buying station... scheduled for early operation at Greenriver.”⁴²⁵ The AEC owned two of the three mills. A report cited in the article of the “raw materials subcommittee of the joint congressional committee on atomic energy,” stated that “here is a great desert and mountain region essentially without roads or water, but containing many miles of outcrop, which, we are informed, encourages exploration for the development of uranium.”⁴²⁶ In September 1953, an article appeared which reported that “drilling for uranium opened up in a new area this week about ten miles east of St. George where gieger [sic] counters show heavy radioactivity.”⁴²⁷ Since there was no further mention of continuing mining activities at this location, and given the timing of the report, the “find” may have been the result of residual radiation from a hot spot deposited as a result of the Simon or Harry Shots a few months earlier.

By the late spring of 1954, Washington County was in the midst of a uranium boom, with reports of new veins and mining claims appearing almost weekly in the *WCN* from June through October. That May, Lyman reported on the importance of uranium mining to Utah in general and at the nearby Mt. Trumbull area just across the border in Arizona. She also remarked that “atomic energy commission geologists have been conducting tests on the properties for the past several weeks, and I predict that if this ‘find’ proves to be as rich as is estimated, roads will be built in a hurry.”⁴²⁸ A few weeks later, an article reported that two Washingtonians had announced “that they have the largest deposit of commercial uranium and copper ore ever

⁴²⁴ *WCN*, “Silver Reef Mining Area Interests Atomic Group; Vanadium, Uranium Tests,” May 31, 1951, p. 5.

⁴²⁵ *WCN*, “Uranium Ore Processing Plants Built in Utah; Other Development Eyed,” July 3, 1952, p. 5.

⁴²⁶ *Ibid.*, p. 5.

⁴²⁷ *WCN*, “Drilling for Uranium is Begun in Local Area; Heavy Equipment Used,” September 3, 1953, p. 1.

⁴²⁸ *WCN*, “Observations,” May 20, 1954, p. 1.

discovered in Washington county [sic].”⁴²⁹ After several more sites near St. George had “been reported excellent uranium finds,” Lyman reported a rumor she had heard that “the government is moving in on one of them for some exploratory work.”⁴³⁰ She also exclaimed that she “could get so excited and begin to do some prospecting myself if the Boss didn’t keep my nose to the grindstone all the time.”⁴³¹ She had regained her composure by the following week and offered a caveat:

Utah is going crazy over uranium. Maybe that’s all right, but while the fever is on, there’s going to be thousands of people invest [sic] their small savings in pretty certificates which won’t be worth the match that will some day burn them.... I do not wish to discourage thoughtful, wise investment or exploration, for if nobody blazed a trail, our resources would never be developed.⁴³²

Despite her admonishment for caution, the following page contained an article which reported that a local prospecting group had “sold a uranium showing mining claim on lower Kolob mountain for \$9000 to a Salt Lake company,” which announced its intention “to start work and develop the claim right away.”⁴³³ In August, Lyman reported that violence had erupted between prospectors, and she “wonder[ed] when the big find will develop and the shooting start.”⁴³⁴ Still, she asserted her “hope [that] somebody strikes it soon with proof,” and stated that the local court house had more than 100 mining claims filed.⁴³⁵

Despite the pandemonium surrounding uranium prospecting, it seems that none of St. George’s mining claims ever became large producers, though the speculation of striking upon a rich vein continued. In October 1954, a *WCN* article reported that Searchlight Uranium Company had purchased a large plot of land near Silver Reef, and the AEC had recently “drilled

⁴²⁹ *WCN*, “St. George Men Tell of Uranium Find in Region,” June 24, 1954, p. 1.

⁴³⁰ *WCN*, “Observations,” July 8, 1954, p. 1.

⁴³¹ *Ibid.*, p. 1.

⁴³² *WCN*, “Observations,” July 15, 1954, p. 1.

⁴³³ *WCN*, “Uranium Showing Claim on Kolob Reported Sold,” July 15, 1954, p. 2.

⁴³⁴ *WCN*, “Observations,” August 12, 1954, pp. 1, 6.

⁴³⁵ *Ibid.*, pp. 1, 6.

three test holes on the 32 claims and have tested the property with instruments and report finding uranium showings.... Indications are that the St. George area will shortly become an active producer of uranium ore.”⁴³⁶ The same publication contained an ad for a thirty-six page pamphlet, “Facts you should know about URANIUM,” which Uranium Publishers, Inc., was offering by mail order for one dollar.⁴³⁷ Two months later, in detailing a new uranium mine claim, Lyman professed “I sincerely hope that this discovery proves rich, indeed, and opens up employment for many who are not working in the mines at this time, as well as to remunerate well those who own the property.”⁴³⁸ The paper never reported a development to this end, however, and the following June the UMA ran an ad entitled “Uranium—Prosperity Producer,” which lauded Utah as the “country’s number one producer of uranium.”⁴³⁹ Having abandoned the “Miner Mike says...” feature and replacing it with the slogan “From the earth comes an abundant life for all,” the UMA claimed that uranium mining operations alone accounted for 1,500 jobs statewide, and promised that “as production increases, Utahns can look forward to more jobs and greater prosperity from this youngest member of the mining family.”⁴⁴⁰

The AEC announced prices and general requirements for uranium prospectors in November 1957. These included “commercial-type contracts” and bonus payments for “the prospector and small miner during the early stages of development and mining.”⁴⁴¹ The article claimed that these features had “sustained small marginal operations for considerable periods; and some of these have developed into profitable mines.”⁴⁴² By April 1961, the UMA reported that whereas “total U.S. ore production was 54,000 tons” in 1948, Utah alone had “produced

⁴³⁶ WCN, “Searchlight Uranium Co. Acquires Large Property Near Silver Reef Mine,” October 7, 1954, p. 1.

⁴³⁷ WCN, Advertisement for a pamphlet, “Facts you should know about URANIUM,” October 7, 1954, p. 5.

⁴³⁸ WCN, “Observations,” December 16, 1954, p. 1.

⁴³⁹ WCN, Utah Mining Association advertisement, June 9, 1955, p. 2.

⁴⁴⁰ Ibid., p. 2.

⁴⁴¹ WCN, “Uranium Procurement Program Establishment is Announced by A.E.C.,” November 28, 1957, p. 5.

⁴⁴² Ibid., p. 5.

1,071,000 tons, containing uranium oxide... valued at approximately \$50,000,000” in 1960.⁴⁴³

The ad further claimed that the industry was providing 1,550 jobs “in Utah, with an annual payroll of \$10,000,000. The uranium industry has come of age!”⁴⁴⁴ This is an interesting advertisement, since the UMA had featured an ad two years earlier which claimed “Uranium has been responsible for about 8000 jobs in Utah since 1950,” which presumably included the tertiary jobs sustained as a result of mining and milling enterprises.⁴⁴⁵ Still, the taxable property value of the industry for 1958 was around \$29 million.⁴⁴⁶

Washington County’s economy undoubtedly benefitted from the potential of a major uranium discovery in the area beyond the actual production of the mines. Local hotels and motels, restaurants and other food providers, and various other commercial businesses would have experienced a rise in revenue as a result of prospectors and corporate agents visiting the region in search of profits. The local population also would have been spending money in the search for uranium. In addition to providing standard hardware supplies for mining operations, Nelson Supply Company in St. George regularly advertised Geiger counters from 1953 to 1955. The earliest example from July 1953 advertised the P. R. I. Geiger counter under the heading, “Want \$10,000?”⁴⁴⁷ The ad promised a “super-sensitive” device which would render uranium “deposits... easily detected. Flasher, meter, earphones indicate presence of radioactive material and estimate quality and quantity of ore right in the field.... Win fortune, fame and lifetime security!”⁴⁴⁸

⁴⁴³ WCN, Utah Mining Association advertisement, April 20, 1961, p. 7.

⁴⁴⁴ Ibid., p. 7.

⁴⁴⁵ WCN, Utah Mining Association advertisement, May 21, 1959, p. 10.

⁴⁴⁶ Ibid., p. 10.

⁴⁴⁷ WCN, Nelson Supply Advertisement, July 1, 1953, p. 6.

⁴⁴⁸ Ibid., p. 6.

In a similar ad in October 1954, the heading had been changed to “Discover URANIUM” and the promise of winning “fortune, fame and lifetime security” had been omitted.⁴⁴⁹ A “New, Improved Model” was featured in March 1955, claiming that it was “the uranium prospecting Instrument you’ve been asking for.”⁴⁵⁰ Apparently, local prospectors did not use the devices solely for prospecting, as the AEC reported in 1955 that since Geiger counters “register only as high as 20 milliroentgens per hour... [they] can go completely off-scale in fall-out which is far from hazardous.”⁴⁵¹ The commission assured the downwinders that despite any strange readings they may receive from their devices, “if the fall-out is heavy enough to be of any significance, our monitors will be in the area and tell you what is happening.”⁴⁵² There is no doubt that AEC officials utilized the frenzy of Washingtonians to find large uranium deposits using Geiger counters to dismiss instances of radioactive hot spots and allay public fears.

Aside from AEC programs and the influx of prospectors, Washington County experienced economic benefits from other federal sources. In 1951, a group from the University of Chicago’s Land-Use Planning committee spent six months in the county in order to collect information which they used “to describe and evaluate the impact of government programs on the agriculture and rural life of a relatively isolated western community where the pressure of population on food and other resources is fairly high.”⁴⁵³ By March, the four-member group was reportedly “enjoying the weather, the scenery, and the people thus far contacted.”⁴⁵⁴ That Washington officials and residents counted this group as part of the community is corroborated in the article, which reported that “this group of new Washington county [sic] citizens are

⁴⁴⁹ WCN, Nelson Supply Advertisement, October 7, 1954, p. 5.

⁴⁵⁰ WCN, Nelson Supply Advertisement, March 31, 1955, p. 6.

⁴⁵¹ AEC—ATE, under “Prospectors and Miners.”

⁴⁵² Ibid.

⁴⁵³ WCN, “County is Chosen for Land-Use Study Plan,” January, 11, 1951, p. 8.

⁴⁵⁴ WCN, “Research Group Visits Washington County Area,” March 22, 1951, p. 7.

looking forward to a happy period of work here.”⁴⁵⁵ It seems that Washingtonians were quick to accept outsiders as members of the community, especially when they viewed the immigrants as productive members of society.

Washington County’s most significant source of non-nuclear-related federal dollars came from the Hurricane Supersonic Research Site (HSRS). The *WCN* reported in July 1954 that State Representative Owen Sanders of Hurricane had received a confirmation letter from Senator Wallace Bennett that the Air Force would construct a testing facility on Lower Smith Mesa between Hurricane and Virgin City, Utah. Bennett’s letter indicated that “between 20 and 40 men will be used in operation” of a high-speed track to “test air force ejection equipment.”⁴⁵⁶ The objective of the facility was to launch fighter jet ejection seats “at supersonic speeds along the track and then... hurtled into space from a 1500-foot mesa.”⁴⁵⁷ The facility, originally named Supersonic Military Air Research Track at Hurricane Mesa, was designed, constructed, and operated by Coleman Engineering Company, which had submitted the low bid of \$1,023,616.50.⁴⁵⁸ Coleman Engineering completed the project and conducted the first experiment on July 8, 1955, and at the height of its use as many as five aerospace corporations were experimenting at the facility at the same time.⁴⁵⁹ From the first test through August 14, 1958, companies had conducted more than 150 trials at HSRS while discovering ways in which to solve the problems associated with ejections from jet-propelled aircraft, which was “a vital part of the national defense program.”⁴⁶⁰

⁴⁵⁵ *Ibid.*, p. 7.

⁴⁵⁶ *WCN*, “Air Force to Start Work on Utah Testing Grounds,” July 8, 1954, p. 1.

⁴⁵⁷ *Ibid.*, p. 1.

⁴⁵⁸ Thomas G. Alexander, “Brief Histories of Three Federal Military Installations in Utah: Kearns Army Air Base, Hurricane Mesa, and Green River Test Complex,” *Utah Historical Quarterly* 34, no.2 (Spring 1966): pp. 128-9; *WCN*, “Bids Opened Tuesday for Supersonic Military-Air Research Track Contract,” December 23, 1954, p. 1.

⁴⁵⁹ Alexander, “Brief Histories,” pp. 128, 130.

⁴⁶⁰ *WCN*, “Missile Firing Underway at Hurricane Research Site,” August 14, 1958, p. 1.

The HSRS was also a vital part of Washington County's economy. Coleman Engineering reported that, in 1960, it had "employed 67 persons full time, in addition to 3,939 man days which temporary employees, most of whom were local people, worked;" this resulted in "\$400,000 in payroll checks annually."⁴⁶¹ Coleman also reported buying "more than \$200,000 worth of goods and services on the local market and paid \$50,000 for its utilities."⁴⁶² Additionally, an internal company estimate found that its staff "annually spent \$90,000 for food, \$50,000 for clothing and household necessities, \$30,000 for utilities, \$50,000 for car expenses, and additional amounts for medical care, entertainment, new cars, furniture, and other items."⁴⁶³ The facility did not last long, however, as the base had closed by December 1961, although there were efforts in 1963 to restore it. Stanley Aviation Company took control of the facility in July 1963 with intentions to "revive the rocket sled testing site employing between 12 and 100 persons."⁴⁶⁴ Representative Lloyd wrote to Secretary of Defense Robert Strange McNamara in August 1963, supporting the Dixie Project "as an aid to our defense effort through improvement of the *Hurricane Supersonic Test Track*."⁴⁶⁵ Lloyd also told McNamara that "I am anxious to have the project approved as a means of improving the economy of the area."⁴⁶⁶

In addition to the AEC's uranium program and the HSRS project, the Civil Defense Administration and other military and AEC programs helped to account for Washington County's share of over \$100 billion Congress allocated for military projects in the western United States from 1946 to 1973.⁴⁶⁷ In 1953, the AEC established one of six new microbarographic research stations at St. George as part of a project "to study the effects of

⁴⁶¹ Alexander, "Brief Histories," p. 131.

⁴⁶² Ibid., p. 131.

⁴⁶³ Ibid., p. 131.

⁴⁶⁴ WCN, "Clear Way for First Step of Mesa Revival," July 25, 1963, p. 5.

⁴⁶⁵ Lloyd to Robert S. McNamara, August 27, 1963, Lloyd MS, Box 3, Folder 24.

⁴⁶⁶ Ibid.

⁴⁶⁷ Nash, *The American West Transformed*, p. 78.

meteorological conditions on blast phenomena to make possible the prediction of where the blast [from NTS shots] might strike and what its strength might be.”⁴⁶⁸ The USAF opened a Strategic Air Command Radar Bomb Scoring location in St. George in 1963. Initial reports indicated “that military personnel of the unit would be made up of four commissioned officers together with 50 to 70 Air Force Technicians of varied uncommissioned [sic] military ranks [whose] families will add more than 100 children of school age to our community.”⁴⁶⁹ St. George’s Chamber of Commerce estimated “that the new payroll will add some \$25,000 to \$30,000 monthly to the purchasing power of our community.”⁴⁷⁰ The Bomb Scoring group began “electronically tracking bombers” in October 1963.⁴⁷¹ Major J. H. Zuidema issued a statement in which he claimed that “our 75 military people and their families will live in town; their children will attend the local schools, go to the local doctors and dentists and, in general, become an integral part of the community.”⁴⁷² With these substantial economic factors weighed into the equation, it would have been extremely costly for Washingtonians to protest in large numbers against the activities of the Atomic Energy Commission at the Nevada Test Site.

Nationally, there were blossoming peace and environmental movements which preached “there is not peace—real peace—while more than half of our federal budget goes in an armament race... and the earth’s atmosphere is contaminated from week to week by exploding hydrogen bombs.”⁴⁷³ However, Utahns in general, and Washingtonians specifically, clung to a divine mandate for human progress: “Day by day since time began, God sees the steady gain of

⁴⁶⁸ WCN, “Microbarographic Group Establish St. George Onsite Station, Five Others, and Mobile Unit,” June 4, 1953, p. 1.

⁴⁶⁹ WCN, “St. George Selected for Air Force Radar Bomb Scoring Location,” January 31, 1963, p. 1.

⁴⁷⁰ Ibid., p. 1.

⁴⁷¹ WCN, “Air Force Bomb Scoring Group to Begin Operations in October,” September 26, 1963, p. 1.

⁴⁷² Ibid., p. 1.

⁴⁷³ Bernstein, *Nuclear Weapons*, quoting presidential candidate Adlai Stevenson II, p. 185.

man.”⁴⁷⁴ In an editorial column which frequently appeared in the *WCN* and featured various authors, George Peck outlined his criteria for “sound ethical religion,” among which was the necessity for humanity to acknowledge

God as the supreme being, the author of life and creator of all things—of God to whom man is accountable for the constructive or destructive use of his life—of God with whom he finally hopes to be united in Eternity as a reward for making the proper use of his life—of God from whom he may be forever separated as punishment for failure to properly exploit his opportunities.⁴⁷⁵

For Washingtonians, economic prosperity followed from adherence to the divine plan for human progress. It would be unthinkable for these people to question the scientific progress the AEC was achieving at NTS publicly, and it would be questioning God’s providence to refuse the economic benefits that progress rendered.

⁴⁷⁴ This quote is from a historical marker at Quail Creek State Park, Hurricane, Utah, visited December 2008.

⁴⁷⁵ *WCN*, “The American Way: Formula For Survival,” April 26, 1956, p. 10. Peck was quoting an earlier article he had written and published in this particular section of the paper. According to the Editor’s Note, Peck was the “Chairman of the Board of the National Labor-Management Foundation and Executive Editor of its official publication, *Partners*.”

LIVING IN THE SHADOW OF THE BOMBS

“The greatest irony of our atmospheric nuclear testing program is that the only victims of the United States nuclear arms since World War II have been our own people.”⁴⁷⁶

Following Japan’s capitulation in August 1945 to end World War II, the U. S. government began gathering data and analyzing the effects of radiation released by atomic weapons. Eventually establishing the Atomic Energy Commission in 1946, the federal government continued to study chemical and biological changes in the natural environment’s flora and fauna while it conceived and developed more powerful weapons and stockpiled a large nuclear arsenal. After testing began at the Nevada Test Site in 1951, residents of Washington County largely remained patriotic in their support of the government’s national security programs. However, a series of mishaps and the public’s perception of strange weather patterns led these people to question the impact of the experiments on their local environment. The AEC’s public relations specialists and Utah’s federal and state politicians worked feverishly to quell Washingtonians’ fears, and the economic impact of primary and secondary industries helped to alleviate any residual complaints of the citizenry.

The U. S., U. K., and U. S. S. R., signed the *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*, at Moscow on August 5, 1963, thus effectively ending atmospheric experiments by countries which possessed nuclear weapons technology. The treaty proclaimed the existence of a mutual understanding among the powers to work toward “the discontinuance of all test explosions of nuclear weapons for all time.”⁴⁷⁷ This did not completely eliminate the practice of experimenting with weapons, however. The signatories

⁴⁷⁶ United States, Congress, House of Representatives, Committee on Interstate and Foreign Commerce, Subcommittee on Oversight and Investigations, “The Forgotten Guinea Pigs,” *A Report on Health Effects of Low-Level Radiation Sustained as a Result of the Nuclear Weapons Testing Program Conducted by the United States Government*, 96th Cong., 2nd sess., Washington: U. S. Government Printing Office, 1980, p. 37.

⁴⁷⁷ U.S. Department of State, *Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water*, August 1963, from Department of State Website, <http://www.state.gov/t/ac/trt/4797.htm> (accessed March 13, 2007).

simply moved further experiments underground until 1992, when the Comprehensive Test Ban Treaty forced all future tests in the U. S. to be conducted by computer simulations.⁴⁷⁸

The Energy Research and Development Administration (ERDA) replaced the AEC in 1975, and produced a report in 1977 on the environmental impact of nuclear weapons tests at NTS. At the beginning of this report, the ERDA vowed that operations at NTS would “continue to include a variety of both nuclear and nonnuclear projects and experiments... [that] take advantage of the facilities available, the climate, the remoteness, and the controlled access.”⁴⁷⁹ The administration believed that “the probable impact on the environment” from underground nuclear tests would be “small in comparison” to atmospheric detonations.⁴⁸⁰ Subterranean tests created radioactive cavities underground, but officials anticipated that all radioactivity would be contained underground. The report claimed that “since 1971, the nuclear testing program has maintained a satisfactory degree of competency and consistency for containing radioactivity underground both during and following the nuclear detonations.”⁴⁸¹ It then listed the last two cases when leaks were detected, both of which preceded the report by seven years or less.⁴⁸² This seemed to be an admission that, if the program was indeed consistent, there would be future leaks.

More than 100,000 civilians resided in areas which fallout clouds from NTS traversed, and the tests (including those conducted at the Pacific Proving Ground) also contaminated around 205,000 military personnel.⁴⁸³ A 1997 investigation conducted by the National Cancer

⁴⁷⁸ Jon Hunner, *Inventing Los Alamos: The Growth of an Atomic City*, Norman: University of Oklahoma Press, 2004, p. 231.

⁴⁷⁹ U. S. ERDA, *Final Environmental Impact Statement*, pp. 1-4.

⁴⁸⁰ *Ibid.*, p. 1-6.

⁴⁸¹ *Ibid.*, p. 1-7.

⁴⁸² *Ibid.*, p. 1-7.

⁴⁸³ Ball, *Justice Downwind*, p. 85; Charles R. Loeber, *Building the Bombs: A History of the Nuclear Weapons Complex*. Lorna Gail Clark and Phil Brittenham, eds. 2nd Edition. Albuquerque: Sandia National Laboratories, 2002, p. 193.

Institute reiterated that a danger of contracting thyroid cancer existed as a result of exposure to radioactive fallout from atmospheric detonations of nuclear weapons.⁴⁸⁴ The remaining survivors and many of their families, friends, and community members affected by the experiments at NTS have joined to become a voice of opposition to nuclear experiments and enterprises in the American West.

On March 30, 2006, the Pentagon issued a press release that announced plans for Operation DIVINE STRAKE, which was to be conducted at the Nevada Test Site in June of that year. The operation derived its name from “divine”—in this sense meaning “altogether excellent or admirable; godlike”—and “strake,” which is “planking along the side of a boat...for controlling” the flow of water around the vessel. The stated intention of the operation was to further the development of “so-called bunker-buster weapons” in order to allow for greater accuracy in forecasting the effectiveness of such weapons “against granite, hard structures.”⁴⁸⁵ The experiment was to consist of one, non-nuclear, 700-ton, fuel oil and ammonium nitrate bomb.⁴⁸⁶ The spokesperson’s comment that “‘it is the first time in Nevada that you’ll see a mushroom cloud...since we [the Department of Energy] stopped testing [atmospheric] nuclear weapons” in 1963, exacerbated concerns that the explosion would create a mushroom cloud extending 10,000 feet above the earth’s surface. The public outcry was enormous, with large public gatherings in cities and towns in Nevada, Utah, and Idaho to protest the proposed test.

Why would the testing of a non-nuclear weapon on lands designated as a military installation invoke such ire in the surrounding population? The residents’ prior experience with the government’s nuclear weapons establishment is the only explanation. These people were

⁴⁸⁴ Valerie L. Kuletz, *The Tainted Desert: Environmental and Social Ruin in the American West*. New York and London: Routledge, 1998, p. 76.

⁴⁸⁵ *Deseret Morning News*, “Conventional Bomb Test Set for June in Nevada,” March 31, 2006.

⁴⁸⁶ *Ibid.*

well aware that experiments conducted within the borders of Western military installations did not always produce results which *remained* within those borders. Furthermore, information included in a flyer distributed by protest activists claimed that DIVINE STRAKE was only the beginning of a larger DOE effort to overhaul the U. S. nuclear weapons complex. Representative James David Matheson (2nd District, Utah), in an April 2006 letter to Dr. James A. Tegnelia, the director of the Defense Threat Reduction Agency (DTRA), stated:

You are well aware that at 700 tons... this demonstration will not simulate an actual conventional bomb because no bomber in the U. S. fleet has the capacity to carry a weapon of this size. Based on publicly available unclassified information, the 0.6 kt simulation is much smaller than any nuclear weapon the U. S. currently possesses. Therefore, in spite of your public assurances... that this test is not part of plans to develop a new nuclear weapon, I remain greatly concerned that DTRA is in fact working to assist in the development of a low-yield nuclear weapon.⁴⁸⁷

If this had been the case, it would have violated the Nuclear Non-Proliferation Treaty of 1968 which the U. S. helped to formulate, as the treaty called for “the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons.”⁴⁸⁸

According to *Deseret Morning News*, “two Utah anti-nuclear activists... [and] members of the Winnemucca Indian Colony” had filed a lawsuit at the U. S. District Court in Nevada by mid-April to prevent the execution of the operation. The plaintiffs claimed that the detonation would “create a 10,000-foot mushroom cloud” that would disperse the radioactive nuclides from the ground at NTS into the atmosphere and create another health hazard for communities downwind from the test site.⁴⁸⁹ While some politicians, such as Utah’s Governor Jon Meade

⁴⁸⁷ Jim Matheson, *Letter to the Director of the Defense Threat Reduction Agency*, April 7, 2006, http://www.house.gov/matheson/pdf/DTRA_Divine_Strake_letter.pdf (accessed March 11, 2007).

⁴⁸⁸ U.S. Department of State, *Nuclear Non-Proliferation Treaty*, (1968), as amended, December 1998, <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr/0980/ml022200111-vol2.pdf> (accessed March 13, 2007).

⁴⁸⁹ *Deseret Morning News*, “Activists and Tribe Sue to Avert Blast,” April 23, 2006.

Huntsman, Jr., and Representative Matheson, requested the operation be aborted outright, others simply asked the DOE to provide the citizens of Utah public forums at which they could voice their concerns.⁴⁹⁰ The government disputed the claims of the critics, and claimed that “the explosion will not harm humans or the environment.”⁴⁹¹ However, the DTRA announced on May 26 that it would indefinitely suspend the commencement of the test “until questions about its safety are answered.”⁴⁹² At the beginning of August, DTRA Director Tegnalia told Utah Senator Orrin Grant Hatch that “the agency may opt to move the experiment somewhere else.”⁴⁹³ Hatch remarked that he felt Tegnalia “now clearly understands the unique sensitivities that the people of Utah have regarding this subject,” but the DTRA was awaiting a new Environmental Impact Statement.⁴⁹⁴ It remained unclear whether Tegnalia was concerned about people from other states.

On December 22, 2006, the DTRA released its environmental assessment. The authors of the report stated that it “was conducted to *support* [my emphasis] assessment of potential impacts.”⁴⁹⁵ Perhaps this is over-scrutinizing semantics, but the wording is such as to give the impression that the report was biased from the beginning. The report continued, stating that DTRA “targeted radionuclides present at the site without regard to source (natural or man-made, local or distant sources)... The results from these samples confirmed that” the soils “potentially affected by the experiment did not contain areas of radioactivity that are” above normal

⁴⁹⁰ *Deseret Morning News*, “Huntsman Opposes Blast Test,” April 28, 2006.

⁴⁹¹ *Deseret Morning News*, “‘Divine Strake’ Test Fuels Dixie Protest,” May 14, 2006.

⁴⁹² *Deseret Morning News*, “Kanab Residents to Rally Against Blast,” June 16, 2006.

⁴⁹³ *Deseret Morning News*, “Divine Strake Weapons Test Postponed for Further Study,” August 2, 2006.

⁴⁹⁴ *Ibid.*

⁴⁹⁵ U.S. Department of Energy, Defense Threat Reduction Agency, *Divine Strake Characterization Report, Executive Summary*, December 2006, <http://www.nv.doe.gov/library/publications/Environmental/DivineStrakeCharacterization.pdf>, p. ES-1, ES-2 (accessed March 11, 2007).

background levels.⁴⁹⁶ Speaking to the *Deseret Morning News* on December 23, Robert R. Hager, a “lawyer representing an Indian tribe and people living downwind” with Hager & Hearn Law Office in Reno, Nevada, said that the government had admitted and “‘issued an apology [in 1990] to downwinders Americans for causing tens of thousands of cancers with the same material that’s in the soil at the test site.... The downwinders I represent are terrified at the prospect of history repeating itself.... Yet this government seems committed to this very thing.’”⁴⁹⁷

The governor’s office held two public hearings in Utah in January 2007, the first of which occurred in St. George. At that meeting, the mayor of Sprindale declared that if the experiment held the potential to “affect even one person in the public, this test should be halted.”⁴⁹⁸ Paralee Eckman named her two sisters as cancer victims, as well as other friends and acquaintances from Washington County who she knew personally to have contracted cancer in the years following the atmospheric testing period.⁴⁹⁹ Retired physicist and Ivins resident Raymond Cyr noted that government officials had revised their initial assessment that the experiment would not disperse radioactive materials to admitting that, in fact, some material would be dispersed and could potentially make its way downwind.⁵⁰⁰ Claudia Peterson, employed at the Dixie Regional Medical Center, asserted that she lost her father, sister, daughter, father-in-law, and mother-in-law to various cancers, and had several nieces and nephews who were battling cancer.⁵⁰¹ Many more wrenching personal accounts of loss suffered as a result of NTS atmospheric tests followed, as well as understandable incredulousness at the assertions of

⁴⁹⁶ U.S. Department of Energy, Defense Threat Reduction Agency, *Divine Strake Characterization Report, Executive Summary*, December 2006, <http://www.nv.doe.gov/library/publications/Environmental/DivineStrakeCharacterization.pdf>, p. ES-1, ES-2 (accessed March 11, 2007).

⁴⁹⁷ *Deseret Morning News*, “New Report Clears Test Blast,” December 23, 2006.

⁴⁹⁸ DIVINE STRAKE Project Public Hearing Transcript, Dunford Auditorium, Dixie State College, St. George, Utah, January 18, 2007, <http://www.scribd.com/doc/13770/Divine-Strake-Public-Hearing-St-George-1182007> (accessed February 6, 2014), p. 6. Hereafter cited as DIVINE STRAKE.

⁴⁹⁹ *Ibid.*, pp. 11-12.

⁵⁰⁰ *Ibid.*, p. 14.

⁵⁰¹ *Ibid.*, pp. 25-26.

the environmental assessment which claimed that there would be limited or no impact on surrounding areas.

The DTRA officially announced the permanent cancellation of Operation DIVINE STRAKE in March 2007, so history will have to wait to repeat itself. The agency finally caved to public protest over the resumption of large detonations at NTS. There were many different people protesting for very different reasons, including land disputes, health concerns, and the fear of advancing nuclear weapons research. The complexity of the world situation prior to and during World War II created a complex set of circumstances in which the United States was forced to bring to bear all its available resources. These complexities, in turn, led to the development of the nuclear military-industrial complex in the deserts of the American West, and thus the necessity (or, temptation) to conduct experiments of capability. It is true that the tests harmed thousands of innocent people who are still living (or grieving) the effects of these tests. At the time, however, they were considered to be necessary to national security. The federal government still controls many “barren” lands in the western American deserts, although the legality of this situation has been in question for many years. But, while this persists, and as long as interests of national security are being threatened by “enemies of democracy,” we have no guarantee that the national security interests will not outweigh the supremely delicate nature with which nuclear matters should be handled, no guarantee that a complex history will not repeat itself.

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