

8-2011

## Gambling with lives: A history of occupational health in southern Nevada, 1905--2010

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GAMBLING WITH LIVES: A HISTORY OF OCCUPATIONAL  
HEALTH IN SOUTHERN NEVADA,  
1905-2010

By

Michelle Ann Turk

Bachelor of Arts  
University of California, Irvine  
2004

A dissertation submitted in partial fulfillment of  
the requirements for the

**Doctor of Philosophy in History  
History Department  
College of Liberal Arts**

**The Graduate College  
University of Nevada, Las Vegas  
August 2011**

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**THE GRADUATE COLLEGE**

We recommend the dissertation prepared under our supervision by

**Michelle Ann Turk**

entitled

**Gambling with Lives: A History of Occupational Health in Southern Nevada, 1905-2010**

be accepted in partial fulfillment of the requirements for the degree of

**Doctorate of Philosophy in History**

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**August 2011**

ABSTRACT

**Gambling with Lives: A History of Occupational  
Health in Southern Nevada,  
1905-2010**

By

Michelle Ann Turk

Dr. David Wrobel, Examination Committee Chair  
Professor of History  
University of Nevada, Las Vegas

In April 2009, the Pulitzer committee awarded its public service prize to the *Las Vegas Sun* for its coverage of the high fatalities on Las Vegas Strip construction sites. The newspaper attributed failures in safety policy to “the exponential growth in the Las Vegas market.” In fact, since Las Vegas’ founding in 1905, rapid development in the region has always strained occupational health standards. From transporting hazardous railroad cargoes to building Hoover Dam, chemical processing at Basic Magnesium, nuclear testing, and dense megaresort construction on the Strip, workers, residents, and tourists alike have been exposed to the threat of living in close proximity to large-scale industries. In the process, workplace injuries and fatalities became an accepted risk. The safety lapses produced several cataclysmic disasters— carbon monoxide poisoning at Hoover Dam, atmospheric nuclear testing and the Baneberry disaster at the Nevada Test Site, the MGM Grand and Hilton fires, and the Pacific Engineering Production Company of Nevada (PEPCON) explosion. After each disaster, public outcry prompted federal, state, and municipal governments to implement rigorous changes. But in the pro-business state of Nevada, laissez-faire always prevailed. Adherence to occupational health has therefore been historically boom and bust in southern Nevada.

This study examines the region's most hazardous industries, emphasizing how the medical community interpreted and responded to the risks they posed. While existing scholarship discusses the region's political, economic, and cultural history, none examines the intersections of medical and labor history. It advances the scholarship by providing the first comprehensive history of occupational health at southern Nevada's public works, defense, and resort industries. Since no other place contains this mixture of industrial and postindustrial sites, the region offers unique opportunities to evaluate the development of health care and safety in the twentieth century American workplace. By providing a deeper understanding of the history of occupational health crises and responses, the study informs efforts to address present and future crises in the region.

## ACKNOWLEDGMENTS

This dissertation is the result of support and friendship from many people. Since the passing of my original committee chair, Hal Rothman, I was fortunate to gain a mentor and friend, David Wrobel. As my committee chair, he enthusiastically supported my project, and provided the inspiration and advice I needed to finish. Committee member Eugene Moehring has been an important advisor as well, providing expertise on the history of Nevada. I am also honored to have worked with committee members David Tanenhaus, Andrew Kirk, and Robert Futrell, all of whom enhanced my graduate school experience.

Michael Green has been a great friend throughout the process, teaching me how to navigate southern Nevada's archives. I appreciate all the time he took to help me out. University of Nevada, Las Vegas Special Collections deserves much credit, providing most of my archival material. It became my second home and has an amazing staff, especially Sue Kim Chung and Thomas Summers. Crystal Van Dee and Paul Carson of the Nevada State Museum in Las Vegas were helpful as well, allowing me to come early and stay late to finish my research. Dennis McBride of the Boulder City Museum, as well as Shirl Naegle and Judith Irons, enhanced my chapter on Hoover Dam. Mary Palevsky of the Nevada Test Site Oral History Project produced an amazing collection, and I thank her for inviting me to tour the Nevada Test Site twice. My special thanks to Randy Thompson at the National Archives at Riverside, the University of California, Berkeley's Bancroft Library and University of California, San Diego's Mandeville Special Collections Library for accommodating my research. I am also grateful for financial support from the Harold L. Boyer and Judith Boyer Fellowship, the Charles

Redd Center Summer Award, the President's Fellowship at University of Nevada, Las Vegas, and of course, my husband, Don Turk.

This dissertation is dedicated to my family and friends. My grandfather, Kirk Cammack, inspired the topic. The southern Nevada medical community has been fascinating to me since I was little, thanks to my larger-than-life grandfather. Special thanks to my parents, Tom and Carol, for being wonderfully supportive of my creativity and fostering my education at a young age. My uncle and aunt, Kirk and Maggi, have always been an inspiration and showered me with love. Nick and Sue Alexopoulos taught me the importance of a university education, and I am a better person for knowing them. I owe my stepmother, Maggie, and in-laws, Don and Marge, for supporting me, as well as my siblings Diana, Kirk, and Samantha. I have wonderful friends that helped me throughout the process. Brianne Hunter's humor continues to make me laugh, and Catherine Brinks and Meghann Lowery inspired me to finish. I am grateful to Leisl Carr Childers, Michael Childers, Lincoln Bramwell, and Charlie Deitrich for being excellent friends as well, providing important advice during each phase of my project. Finally, I want to thank my husband, Don, for his encouragement throughout my doctorate. You helped me fulfill my dream. Thank you.



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## INTRODUCTION

### DEAD ROSES IN A BLOOMING DESERT

They died to make the desert bloom. The United States of America will continue to remember that many who toiled here found their final rest while engaged in the building of this dam.

Memorial at Hoover Dam (1935)

Harold “Rusty” Billingsley started his workday like any other. October 5, 2007 typified early fall in the desert, sunny and warm in temperature. After arriving at the CityCenter construction site, he began his normal duties as an ironworker. CityCenter was the hottest megaresort project on the Las Vegas Strip. Replacing the Boardwalk Hotel and Casino, architect César Pelli designed an “urban metropolis” consisting of high-rise hotels and condominium towers on 66 acres. With a projected cost of \$4 billion, it would have three boutique hotels, 550,000 square feet of retail shops, and 1,650 condominium units. CityCenter opened in December 2009 and was the largest privately-financed construction project in American history, with a final cost of 8.5 billion. It was an “exciting departure” from the past, according to MGM Mirage President Jim Murrin, and “the next evolution of Las Vegas.”<sup>1</sup>

CityCenter joined a \$32 billion construction boom on the Strip, alongside the Wynn and Encore, Palazzo, Trump International, Cosmopolitan, Fontainebleau, and Echelon. Each competed to construct the next greatest experience and finish the quickest. Since the Strip’s inception in the 1940s, construction always moved at a rapid pace. Contractor Del Webb encountered considerable pressure from Benjamin “Bugsy” Siegel at the Flamingo to finish early. While constructing the International and MGM

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<sup>1</sup> For the history of CityCenter, see Liz Benson, “MGM Plans Massive Strip Project” (November 10, 2004), “MGM Mirage Picks Perini to Build CityCenter” (May 13, 2005), “Boardwalk Closing to Clear Way for CityCenter” (September 16, 2005), in *Las Vegas Sun*; and T.R. Witcher, “How One Giant Casino Could Turn Around Las Vegas,” *Time Magazine*.(September 29, 2009).

Grand, the Taylor Construction Co. faced penalties for missing deadlines and was rewarded bonuses for finishing early. To manage 1990s megaresort construction, the contractors built the massive structures in phases. After imploding the Sands in 1996, the Las Vegas Sands Corp. established a master plan spanning over a decade. In 1999, it unveiled the first phase, the Venetian, and in 2003, the Venezia. By 2008, it opened the Palazzo and began constructing a condominium tower. But 2000s megaresort construction followed a more aggressive timeline. Under the same contractor, Pernini Building Co., CityCenter and Cosmopolitan sought to finish construction in three years. This meant building eight high-rise towers at the same time! Reminiscent of constructing Hoover Dam almost a century earlier, the nature of work reached a new level of complexity. To avoid costly penalties, Pernini instructed the crew to work rapidly under extremely crowded conditions. With everything happening at once, “everyone [was] fighting for real estate,” one foreman remarked. Pernini confronted a labor shortage as well, so it hired out-of-town workers, inexperienced in the demands of megaresort construction. The conditions made the workers stressed and exhausted. According to the foreman, MGM Mirage was “just asking for someone to make an error.”<sup>2</sup>

On October 5, 2007, CityCenter bustled with activity. Alongside his crew, Harold Billingsley worked on the second floor. Nicknamed “Rusty” for his red hair, Billingsley was a seasoned journeyman ironworker. In the early 1990s, he went into ironwork, helping construct the towering Stratosphere. Billingsley loved adventure, and ironwork provided plenty of thrills. Described as an “adrenaline junkie” by his family, he enjoyed balancing on high beams and other elements of danger. He took a job at Cosmopolitan in

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<sup>2</sup> Alexandra Berzon outlines the working conditions at CityCenter and other properties in a Pulitzer-winning series published in the *Las Vegas Sun*. The series exposes the lax construction safety standards on the Las Vegas Strip. See Berzon, “Pace is the New Peril,” *Las Vegas Sun*, (March 30, 2008).

2006 and began working 70 hours a week. But the work, entailing the alignment of support columns, scared him. Even though Billingsley took safety classes on preventing falls, he did not feel safe. Therefore, he decided to transfer from Cosmopolitan to CityCenter, working at the latter for less than a month. On the morning of October 5, Billingsley walked along a skeletal frame of temporary metal decking. He tripped. Normally, several safety measures should have protected workers from a fall. First, the decking would have caught him. But at that exact spot, there was a 3x11 hole. As Billingsley surged forward, he fell through it. Second, a safety harness should have stopped his descent. But it was not attached. Third, safety regulations required temporary flooring or netting, but neither existed. A simple trip thus ended his life. Billingsley fell 59 feet to his death. It was the fourth fatality at CityCenter in eight months.

Since early 2007, death had shrouded the project. In February, a 7,300-pound wall collapsed, crushing two workers to death. In August, an elevator “man-lift” system struck an operating engineer. Cosmopolitan experienced casualties as well. In November, an apprentice ironworker died after a beam broke, prompting a fall. His safety harness had been attached to the beam. In January, an iron post collapsed and a safety engineer plummeted five stories to his death. The Trump, Palazzo, Fontainebleau, and Echelon experienced similar tragedies. By 2008, the Strip’s dangerous working conditions had become infamous. Enduring the most fatalities, CityCenter employees started calling their workplace “City Cemetery” or “Cemetery Center.”<sup>3</sup>

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<sup>3</sup> For coverage of the death of Harold Billingsley, see Berzon, “Pace is the New Peril” (March 30, 2008), “OSHA Goes Easy” (March 31, 2008), and “Not In This City” (April 1, 2008), in *Las Vegas Sun*; Brian Haynes, “Iron Worker Falls to Death on Strip,” *Las Vegas Review-Journal* (hereby referred to as *Review-Journal*); and Arnold Knightly, “Workers Walk Off Job,” *Review-Journal*, (June 3, 2008). See also Berzon,

Within eighteen months, there were twelve fatalities at CityCenter, Cosmopolitan, Trump, Palazzo, Fontainebleau, and Echelon. Every six weeks, a worker died. Pernini accumulated the majority, totaling nine. CityCenter alone had six casualties. Not since Hoover Dam had a construction project in southern Nevada produced so much death. In early 2008, *Las Vegas Sun* reporter Alexandra Berzon began investigating the unusual number of deaths. By the end of the year, she had written 53 stories and 21 editorials. In her series, Berzon recounted the cramped, rushed, and unsafe conditions. She revealed federal and state regulatory agencies did not protect workers. In fact, the Occupational Safety and Health Administration (OSHA) actually weakened safety requirements. Even though the Nevada Occupational Safety and Health Administration (Nevada OSHA) investigated the accidents, it withdrew or reduced violations after meeting with the contractors, who blamed accidents on human error. Local unions also failed to advocate for workers as well. Berzon's reporting, coupled with editorials by David Clayton and Matt Huffman, led to congressional hearings and reforms in worker safety. The workers forced changed as well. Shocked by the *Las Vegas Sun* revelations, 7,000 workers at CityCenter and Cosmopolitan walked out in June 2008, shutting down the site. Pernini quickly negotiated a truce. By the end of the day, it agreed to create a rigorous, 10-hour health and safety training class, and periodic safety assessments. The combination of

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"Pace is the New Peril," "OSHA Goes Easy," and "Not In This City;" David Kihara, "Two Workers Killed at Project CityCenter," *Review-Journal*, (February 7, 2007); Francis McCabe, "Worker Killed on Strip Project," *Review-Journal*, (August 10, 2007); Tony Illia, "Rise in Construction Deaths Alarm Many, But Work Goes On," *Review-Journal*, (August 26, 2007); David Kihara, "Construction Worker Plunges to Death," *Review-Journal*, (November 28, 2007); and Arnold Knightly and Howard Stut, "Worker Dies on Strip," *Review-Journal*, (June 17, 2008), for the other Strip construction deaths.

events prompted a culture shift on the Strip, favoring occupational health and safety. The final death occurred at Echelon on June 16, 2008. After that, the deaths stopped.<sup>4</sup>

Berzon refers to the Strip construction deaths as a “disturbing trend” in Las Vegas. During the 1990s megaresort boom, she writes, only 9 construction workers died. By the 2000s, Las Vegas had “pinned its addiction to growth” and a subsequent “body count emerged.”<sup>5</sup> Indeed, it was disturbing, but the trend existed before the 2000s. In fact, the Strip construction deaths were consistent with the history of occupational health in southern Nevada. Since Las Vegas’ founding in 1905, rapid development continuously strained safety standards at the region’s industrial and postindustrial sites. Transporting hazardous railroad cargoes, building Hoover Dam, chemical manufacturing at Basic Magnesium Inc., nuclear testing, and dense megaresort construction exposed workers, residents, and tourists alike to the perils of living in close proximity to large-scale industries. The pressure to maximize profits, while providing the next greatest experience in technology and entertainment, consistently eroded the quality of occupational health. Injuries and fatalities became an acceptable risk. The lapses in safety eventually produced cataclysmic disasters – construction deaths and carbon monoxide poisoning at Hoover Dam, atmospheric nuclear testing and the Baneberry accident, the MGM Grand and Hilton fires, and the Pacific Engineering Production Company of Nevada (PEPCON) explosion. After each disaster, public outcry prompted the federal, state, and municipal governments to implement rigorous changes. For a

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<sup>4</sup> See Berzon, “Pace is the New Peril” and “Construction Worker Dies at Echelon,” *Las Vegas Sun* (June 16, 2008); Mary Watters, “Lessons Learned from Las Vegas,” *Occupational Health and Safety*, (June 3, 2009); Robert Gavin, “9 Deaths at Pernini Stir Questions,” *The Boston Globe*, (September 10, 2008); “Las Vegas Sun Wins Pulitzer Prize,” *Las Vegas Sun*, (April 20, 2009); Marshall Allen, “Sun Wins the Pulitzer Prize: Worker safety coverage honored for public service,” *Las Vegas Sun*, (April 21, 2009); and Tina Susman, “5 Pulitzers for NY Times: Vegas Paper’s Reporting on Worker Deaths Also Honored,” *Chicago Tribune*, (April 21, 2009).

<sup>5</sup> Berzon, “Pace is the New Peril.”

while, occupational health boomed. But it was usually brief. In the pro-business state of Nevada, laissez-faire always prevailed. Consequently, occupational health in southern Nevada was a boom and bust approach for over a century.

This dissertation examines southern Nevada's most hazardous industrial and postindustrial sites— the Los Angeles and Salt Lake Railroad, Hoover Dam, Basic Magnesium Inc., the Nevada Test Site, and the Las Vegas Strip. As a medical history, it emphasizes how the medical community interpreted and responded to the unique risks posed. While scholarly works by Eugene P. Moehring and Hal K. Rothman discuss the political, economic, and cultural history of southern Nevada, none examine the intersections of medical and labor history in the region. Additionally, most academic and popular books highlight the region's infamous association with corruption and vice. This dissertation advances the scholarship by providing the first comprehensive history of occupational health at southern Nevada's public works, defense, and resort industries. Since no other place contains this mixture of industrial and postindustrial sites, the region offers unique opportunities to evaluate the development of health and safety in the twentieth century American workplace. It examines the conditions and hazards at each site, along with the safety procedures implemented, evaluating the historical processes related to the Strip construction deaths. By providing a deeper understanding of the history of occupational health crises and responses, this dissertation informs efforts to address present and future crises in the region. Its findings should be of interest not only to historians, but also scholars of medicine, labor, and the law.

Occupational health has been a central issue in industrializing America. But most literature focuses on its origins during the nineteenth century and early twentieth,



neglecting its important development throughout the twentieth. For example, Dr. Leonard Kreisler, the medical director of Reynolds Electrical and Engineering Company (REECo) at the Nevada Test Site, listed occupational health as one of the most significant specialties of health services during the twentieth century. Trained in occupational medicine, Kreisler's job was to identify the risks associated with "man and his environment, and in the workplace" at the Nevada Test Site. Besides radiation exposure, the site had common workplace hazards: accidents, slips, trips, and falls, electrocutions and explosions, dust and chemical exposures, hearing loss, ergonomics, communicable diseases, and psychological effects. Kreisler sought to control the risks, outlining a program that protected workers, employers, families, customers, nearby communities, and anything impacted by the workplace.<sup>6</sup>

Occupational health is a vast subject matter, meriting an interdisciplinary approach to historical study. First, it is a history of medicine and science. This dissertation focuses on how physicians interpreted hazards in the workplace. Most worked as company doctors, treating workers at onsite hospitals, first aid stations, and local hospitals. The various occupational health departments, industrial hygiene, safety engineering, and health physics, also incorporated medicine and science. Second, occupational health is a history of industry, and the evolution of the industrial and postindustrial workplace. The founding of each industry, how it was established, and its function is integral to understanding its relationship with health and safety. Third, it is a labor history, providing descriptions of the nature of work, and how unions responded to the conditions. Fourth, occupational health is an environmental history, describing the

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<sup>6</sup> Interview with Leonard Kreisler, M.D., April 20, 2005, Conducted by Suzanne Becker, Nevada Test Site Oral History Project, Las Vegas, Nevada.

relationship between the human body and the workplace, and its effect on the environment. Finally, it is a legal history, discussing employer liability suits and changes in the law, including workers' compensation and regulatory agencies. Taken together, the interdisciplinary components of occupational health construct a rich and diverse historical narrative.

### Dying to Work

The Strip construction deaths reflect America's long history of exposing workers to dangerous and unregulated industries. Following the Civil War, the nation rapidly built an economy based on agricultural and industrial production. Adapting the European industrial model to fit their geographical and economic needs, Americans utilized technologically-advanced machinery to save time and labor. This significantly increased production. At the time, employer liability to safety was rare. The legal doctrine of the day, "assumed risk," stated that employees assumed all risk for injuries or illness at the job. Consequently, while their production methods were efficient, American industries were extremely dangerous. For example, the railroad industry emerged as one of the most hazardous. As early as the 1820s, railways developed simultaneously in the United States and Europe, evolving from little steam engines that hauled ore out of British mines. By 1873, American carriers operated the largest railroad network in the world, boasting over 70,000 miles of track. European technological innovations shaped much of the process, including safety. Coupled with little federal regulation, the United States created an institution that was exponentially more dangerous than in Europe. American

carriers also substituted cheap resources for expensive capital and labor, aggravating the risk.<sup>7</sup>

During the nineteenth century, workplace accidents were perceived by employers as the employees' fault. Edward Dickinson, General Manager of the Union Pacific, commented that 90 percent of railroad accidents were caused by "carelessness or rather willful, disobedience of well-defined rules" on part of an employee.<sup>8</sup> Generally, the railroad did not apply safety precautions because it was immune from employee liability suits. Workers assumed all risks when accepting employment; workplace hazards were negotiable only before the worker took the job. Most importantly, the employers were protected by legal precedent: *Farwell v. Boston & Worcester R.R. Corp.*<sup>9</sup> Nicholas Farwell, a railroad engineer, became disabled due to a coworkers' negligence. In the landmark decision, the court held that workers could not recover compensation from employers for injuries caused by coworkers. *Farwell* determined that allowing workers

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<sup>7</sup> See Mark Aldrich, *Safety First: Technology, Labor and Business in the Building of Work Safety, 1870-1939*, (Baltimore: Johns Hopkins University Press, 1997), xx; and Mark Aldrich, *Death Rode the Rails, American Railroad Accidents and Safety, 1828-1965*, (Baltimore: John Hopkins University Press, 2006), 10, 15. For coverage on technology and the American Industrial Revolution, see David Hounshell, *From the American System to Mass Production, 1800-1932: The Development of Manufacturing Technology in the United States*, (Baltimore: Johns Hopkins University Press, 1984); and Nathan Rosenberg, *Technology and American Economic Growth*, (New York: Harper and Row, 1972). The literature on the development of safety in the railroad includes Aldrich, *Death Rode the Rails* and "The Peril of the Broken Rail: the Carriers, the Steel Companies, and Rail Technology, 1900-1945," *Technology and Culture* 40, no. 2 (1999): 263-291; Robert Shaw, *Down Brakes: A History of Railroad Accidents, Safety Precautions, and Operating Practices in the United States of America*, (London: P. R. Macmillan, 1961); Steven Usselman, "Air Brakes for Freight Trains: Technological Innovation in the American Railroad Industry, 1869-1900," *Business History Review* 58 (1984): 30-50; and John White, *The American Railroad Freight Car*, (Baltimore: Johns Hopkins University Press, 1993).

<sup>8</sup> Maury Klein, *Union Pacific: Birth of a Railroad*, (New York: Doubleday & Company, Inc., 1987), 503.

<sup>9</sup> The Farwell opinion has been interpreted by some legal scholars as providing the financial stability necessary to secure the success of the railroad industry. However, legal historian Christopher Tomlins has argued that the decision was an attempt to preserve the status quo. By rejecting that assumption that labor law emerged out of "need" during the early phases of industrialization, Tomlins asserts that American capitalism was relieved of an enormous financial burden for industrial accidents. See *Farwell v. Boston & Worcester R.R. Corp.*, 45 Mass. 49 (Mass. 1842) and Christopher L. Tomlins, "A Mysterious Power: Industrial Accidents and the Legal Construction of Employment Relations in Massachusetts, 1800-1850," *Law and History Review*, Fall 1988, Vol. 6, No. 2.

to recover damages created a moral hazard in the workplace. Over the following decades, the courts continued to favor employers, assuming that hazards were the assumed risks that came with the job, or were the consequence of their own negligence. According to historian John Fabian Witt, the rulings made it difficult for injured employees to recover damages during the nineteenth century.<sup>10</sup>

Subsequent cases continued to broaden this defense. While employers were required to exercise care and warn employees about dangerous conditions, they did not have to fix them. In 1905, another landmark case, *Lochner v. New York*, held that the “right to free contract” was implicit in the due process clause of the Fourteenth Amendment. The Supreme Court established that the law in question did not protect the health of workers, calling it an “unreasonable, unnecessary, and arbitrary interference with the right and liberty of the individual to contract.” Ultimately, *Farwell* and *Lochner* determined that employers were not obligated to protect their employees. In *Accidental Republic*, John Fabian Witt finds that *Farwell*, *Lochner*, and other nineteenth century legal experiments ultimately shaped American accident law, laying the foundation for the welfare state during the twentieth century. The cases eventually caused a legal transformation from the “ideology of free labor” to the categories of “insurance and risk.”<sup>11</sup>

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<sup>10</sup> The best coverage of the transformation of American accident law from the nineteenth to twentieth century is John Fabian Witt, *The Accidental Republic: Crippled Workmen, Destitute Widows, and the Remaking of American Law*, (Cambridge, Mass.: Harvard University Press, 2004). See also William Novak, *The Peoples' Welfare: Law and Regulation in Nineteenth-Century America*, (Chapel Hill: University of North Carolina Press, 1996), James Willard Hurst, *Law and the Conditions of Freedom in the Nineteenth-Century United States*, (Madison: The University of Wisconsin Press, 1956); Christopher Tomlins, *Law, Labor, and Ideology in the Early American Republic*, (Cambridge: Cambridge University Press, 1993), 232-58; and John Fabian Witt, “Federal Employers' Liability Act (1908),” Brian K. Landsberg, ed., *Major Acts of Congress*, (New York: Macmillan-Thomson Gale, 2004).

<sup>11</sup> *Lochner v. New York*, 198 U.S. 45 (1905); Aldrich, *Safety First*, 31; and Witt, *The Accidental Republic*, 4-5.

By the late nineteenth century, the railroad entered a new phase of business. The industry had outgrown the capacity to handle its roads. Upper management directed capital towards new construction, ignoring the needs of existing lines. Radical cutbacks forced supervisors to overwork employees and run equipment until it fell apart. The policies did not go unnoticed. Railroad regulators, managers, and workers began campaigning for better equipment and tighter regulation. During the 1890s, George Westinghouse and Ely Janney developed new technology, air breaks and automatic couplers, fostering higher productivity. As an added bonus, the new technologies doubled as safety measures, improving the existing system. At the same time, Congress established the Interstate Commerce Commission (ICC), which published railroad fatality statistics. The campaign culminated in the Safety Appliance Act of 1893, mandating that all trains install the new inventions. While it took a decade for the equipment to be widely used, it was the first federal law that improved worker safety. It also has been credited with the decline of trainmen accidents in the early twentieth century.<sup>12</sup>

The drop of fatalities and accidents, and rise in productivity presented an interesting concept to reformers. Maybe they could expand federal regulation and coax the railroad to the safety cause in the interest of saving profits? This approach eventually prevailed. When Senator William Clark founded the San Pedro, Los Angeles, and Salt Lake Railroad in southern Nevada, occupational health experienced a major shift in policy. And it was needed. In 1908 alone, 281,641 employees were injured at work and

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<sup>12</sup> Federal Safety Appliance Act, 27 Stat. 531, (1893). Prior to the establishment of the ICC, state governments were not completely inactive. In 1850s, the New York State Railroad Commission began publishing casualty lists. For information about the founding for the ICC, see Interstate Commerce Act, 24 Stat. 379, (1887); Klein, *Union Pacific: The Rebirth*, 503; Aldrich, *Safety First*, 9; and Richard D. Stone, *The Interstate Commerce Commission and the Railroad Industry*, (New York: Praeger, 1991).

over 12,000 killed.<sup>13</sup> The reformers, known as the progressives, led the charge.

Progressivism refers to the broad attempt to address economic and social reform from the late nineteenth and early twentieth centuries. Progressives responded to industrialization and its social byproducts. Referring to it as a movement suggests more unity than there actually was. From Chicago's socialized progressivism at the municipal level to Robert La Follette's populist reform in the state of Wisconsin to Teddy Roosevelt's conservative progressivism in Washington D.C., it had many faces. Nonetheless, the label "progressivism" refers to one of the qualities they shared: the goal to realign their lives, communities, and nation towards progress.<sup>14</sup>

Progressive reformers inspired the installation of several occupational health measures on the federal, state, and municipal levels. In 1913, the federal government established its health and labor agencies, the Public Health Service (PHS), and the Department of Labor (DOL). While the departments oversaw occupational health in World War I defense industries, its powers shifted to state and local agencies during the 1920s, a reflection of the Republican desire for less federal regulation.<sup>15</sup> Progressive

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<sup>13</sup> Witt, "Federal Employers' Liability Act (1908)."

<sup>14</sup> Historians contest the composition and character of the Progressive Era, constantly adding new perspective to the subject. As a result, progressivism is recognized as an immense and diverse period in American history. One historian's progressive, champions of social welfare could be another's regressive, supporters of social control. This has made the historiography of progressivism somewhat disjointed. For the diverging interpretations of progressivism, see Richard Hofstadter, *The Age of Reform: From Bryan to FDR* (New York: Knopf, 1955); Gabriel Kolko, *The Triumph of Conservatism*, (New York: The Free Press of Glencoe, 1963); Samuel Hays, *The Response to Industrialism, 1885-1914*, (Chicago: The University of Chicago Press, 1957); Robert Wiebe, *The Search for Order*, (New York: Hill & Wang, 1967); and Daniel Rogers, "The Search of Progressivism," *Reviews in American History* 10 (4):113–132.

<sup>15</sup> The federal government established the Public Health Service (PHS) in 1798 to provide medical care for American seamen. The PHS's involvement expanded to address national public health needs in 1913 and gained authority during World War I after studying the unknown effects of new toxic chemicals like TNT and picric acid. During this time, congressional support directed the PHS to center their studies on occupational health in mining and steel industries. See Ralph C. Williams, *The United States Public Health Service, 1798-1950* (Washington, D.C.: Commissioned Officers Association, 1951); Bess Furman, *A Profile of the United States Public Health Service, 1798-1948*, (Washington, D.C.: Government Printing Office, DHEW Publication No. (NIH) 73-369., 1973); David Rosner and G. Markowitz, "Research or Advocacy: Federal Occupational Safety and Health Policies during the New Deal," *Journal of Social*

reformers also inspired significant federal legislation to safeguard the health of Americans as well as regulating its industries. They backed the Pure Food and Drug Act (1906) and Meat Inspection Act (1906), which required companies to accurately label ingredients in processed foods and ensure the cleanliness of meat processing plants. Moreover, the newly-created Food and Drug Administration (FDA) forced all drug companies to label their medicines, clearly listing all of their ingredients for the consumers. The federal government also approved the protection and harnessing of the natural environment. The Newlands Reclamation Act (1902) facilitated the building of dams and irrigation systems using money from the sale of public lands. This led to significant dam building in the arid American West, most notably Hoover Dam. At the same time, reformers raised the specter of job safety and urban epidemics. They worked with insurance companies, eager to hold down the cost of claims, to pressure lawmakers into creating municipal and state public health boards. As one of the most dangerous industries, the railroad instituted measures that ensured the safety of locomotives and freight cars. However, these initiatives were only moderately advantageous to workers until decades later.<sup>16</sup>

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*History*, Spring 1985, Vol. 18, Issue 3, 365-381. Like the PHS, the Department of Labor (DOL) also had roots prior to 1913. The Bureau of Labor, established in 1884, investigated labor disputes and acted as an arbitrator. It remained a department without a cabinet rank until Congress established the Department of Commerce and Industries (later Labor) in 1903, combining labor and capital to represent both interests. Of course, labor unions were not happy with the arrangement. They believed labor should be equally represented. Eventually, on March 4, 1913 President William Howard Taft signed the bill with “considerable hesitation;” but he felt the department would hinder efficient administration. See U.S. Department of Labor, *The First Seventy-Five Years, 1913-1988*, (Washington D.C.: U.S. Department of Labor, 1988); John Lombardi, *Labor's Voice in the Cabinet* (New York, Columbia University Press: 1942); Terrence V. Powderly, *Thirty Years of Labor*, rev. ed. (Cleveland, Ohio: Excelsior Press, 1890); Samuel Gompers, *Seventy Years of Life and Labor* (New York, Dutton & Co., 1925).

<sup>16</sup> See Aldrich, *Death Rode the Rail*, 186, for a lengthy description of this topic. American industries overlooked occupational health until health awareness was impossible to deny. As industrialization and urbanization created new health concerns, public health advocates such as Alice Hamilton began to speak out about disease epidemics and occupational health concerns. See Christopher C. Sellars, *Hazards on the Job*, (Chapel Hill and London: The University of North Carolina Press, 1997); Charles B. Lowman, “A

Workmen's compensation emerged out of progressive reform as well. Instead of suing for damages, the law automatically compensated workers at a fixed rate. The concept appealed to employers and employees alike. It provided injured employees compensation, and made costs predictable for employers and decreased the risk of labor conflict. Jurisdictions eventually adopted the gender-neutral label "workers' compensation," but the term "workmen's" reflected its true nature. Most compensation statutes only provided for dependant widows, not widowers.<sup>17</sup> In 1908, workmen's compensation first appeared on the federal level. The Federal Employers' Liability Act (FELA) provided liability "for the benefit of the [dead employee's] widow and children," paying death benefits in cases where employees left a "widow, or a child or children under sixteen years of age, or a dependant parent." Essentially, FELA administered conditions where injured workers of any interstate railroad could receive compensation. Additionally, it made several changes to the law, abolishing the rule established by *Farwell* that employers were not liable for a coworker's contributory negligence. Workers also received damages if an injury resulted from their own negligence. Of course, FELA had a catch. In order to take advantage of it, workers had to be engaging

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Brief History of the Origins of Occupational Health in the United States," *Origins of Occupational Health Associations in the World*, (Elsevier Press: New York, 2003); Robert Gottlieb, *Forcing the Spring*, (Washington D.C., Island Press: 1993); and John Duffy, "Social Impact of Disease in the later 19<sup>th</sup> Century," in *Sickness and Health in America: Readings in the History of Medicine and Public Health*, (Madison: University of Wisconsin Press, 1978), for scholarship on the origins of the occupational health movement.

<sup>17</sup>Early forms of compensation were for injured workmen, not all workers. Husbands of deceased working women typically could not bring claims for compensation. See Witt, *The Accidental Republic*, 133-134 and *Wengler v. Druggists' Mutual Insurance Co.*, 446 U.S. 142 (1980). For the best discussion on employers' liability and the origins of workers' compensation, see Witt, *The Accidental Republic*; and Price Fishback and Shawn Kantor, *A Prelude to the Welfare State: The Origins of Workers Compensation*. (Chicago: University of Chicago Press, 2000).



in interstate commerce, not intrastate, when receiving the injury. Establishing if an injury occurred interstate or intrastate became the key component in railroad liability suits.<sup>18</sup>

At the same time, many states enacted workmen's compensation legislation. In 1910, New York passed the first statute, providing compensation if an accident resulted in death to "widows or next of kin."<sup>19</sup> After 1910, a body of legal precedent gradually made it easier to hold negligent employers liable for job-related accidents and even pay compensation to injured workers—a dramatic shift from nineteenth-century practices. Consequently, insurance companies did a brisk business-selling workmen's compensation policies to employers during and after World War I. Employees also started gaining the benefit of early forms of health insurance. Some states provided insurance covering occupational diseases, providing an alternative to state-sponsored health insurance. The railroad, iron, lumber, and steel industries offered informal assistance as well, developing plans that placed physicians on the company payroll. Until the 1930s, workers' compensation emerged as the primary means to seek damages. By 1914, 26 compensation statutes were enacted in United States jurisdictions. One such state was Nevada.<sup>20</sup>

### The State of Contradictions

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<sup>18</sup> See Federal Employers' Liability Act, 34 Stat. 232 (1906); and Federal Employers' Liability Act, 35 Stat. 65 (1908).

<sup>19</sup> 1910 New York Laws Ch. 674 § 219a.

<sup>20</sup> The American Association of Labor Reform (AALL) successfully lobbied for worker's compensation in most states and campaigned for government health insurance laws. By 1915, the AALL drafted a bill calling for the protection of all workers by offering cash compensation as well as inpatient and outpatient medical care. At first, the American Medical Association and the Medical Hospital Association, as well as other unions, favored the bill, but it lost momentum by 1920. The issue of national health insurance did not resurface until the 1930s. Likewise, occupational health care initiatives remained confined to larger iron, steel, and lumber firms, as well as mining companies with employees working in remote locations without private hospitals and physicians. See Witt, *The Accidental Republic*, 67; Shonick, *Government and Health Services*, 268-270, and Sellars, *Hazards on the Job*, 29, 66-67, 70, 75, 80, 82-87, 98-99, and Lowman, "A Brief History of the Origins of Occupational Health in the United States."

There is no denying the state of Nevada is unique. The state is politically conservative, yet it hosts legalized gambling and prostitution. Its official slogan is “Battle Born,” but no soldiers fought on Nevada soil. 87 percent of the state is federal land that houses water, defense, and industrial projects, yet it prides itself on the concept of individualism. Nevada is the 7<sup>th</sup> largest state in geographical size, but it only has a population of several million, ranking 35<sup>th</sup> in population nationally. Indeed, these paradoxes make the state vastly interesting for historical study, especially in regard to its treatment of occupational health.<sup>21</sup>

Before discussing Nevada’s approach to protecting workers, it is important to understand three distinct features about industry in the state. First, the state has a close relationship with the private sector. Historically, Nevada has attracted aggressive investors because its economy revolves around lucrative and risky industries. In the nineteenth century, its main industry was mining. Mining attracted venture capitalists, businessmen, and bankers, all of whom became dominant forces in politics and industry. The private sector’s centralization of economic power and influence over politics eventually shaped Nevada’s future. As historian Hal K. Rothman argues, throughout the state’s history one economic source dominated nearly every era and its respective decisions greatly influenced the state’s political leaders. Second, Nevada is a federal state. It consists of 87 percent federally-owned land, the most in the United States. The state hosted numerous important reclamation and defense projects, and continues to house military bases. Nevadans are proud of this while loathing it at the same time. During the Cold War, the Nevada Test Site (NTS) was a major source of state pride for

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<sup>21</sup> These themes are covered in Michael Bowers, *The Nevada State Constitution: A Reference Guide*, (Westport, Conn.: Greenwood Press, 1993), xxv. In 2008, U.S. Census Bureau Population Division estimated that the population of Nevada was 2.6 million.

its contributions to national defense. Yet, the 1980s the “Sagebrush Rebellion” called for the return of federal lands to the state. Throughout Nevada’s history, federal lands posed interesting questions regarding jurisdiction. Did the state have the authority to enforce occupational health laws on federal lands located within its boundaries? The answer was typically no. Third, Nevada institutionalized the vice industry, including gambling, prize fighting, and prostitution. While the state outlawed the consumption of alcohol in 1918, it did not strictly enforce prohibition, and permitted marriages and divorces without major restrictions. Most notoriously, legislators passed a bill legalizing gaming during the 1930s. The vice stigma continues to define the state and affect all of its industries.<sup>22</sup>

While Nevada is a distinctive state, its constitution is “rather unremarkable” according to the political scientist Michael Bowers. Based on California’s and New York’s constitution, its state government is composed of the legislative, judicial, and executive branches, and the regulation of occupational health is shared among them. The legislative branch appropriated regulatory agencies and passed acts pertaining to occupational health regulations. The judicial branch, headed by the Nevada Supreme Court, dealt with employer liability cases. Nevada is one of the few states without a system of intermediate appellate courts. Additionally, the court lacks the power of discretionary review, so it must hear all appeals.<sup>23</sup> As a result, its judicial system is extremely overcrowded, affecting the speed and quality of employer liability suits.<sup>24</sup>

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<sup>22</sup> These ideas are explored in Hal K. Rothman, *Devils Bargains: Tourism in the Twentieth Century American West*, (Lawrence: University of Kansas Press, 1998).

<sup>23</sup> Discretionary review is the authority of appellate courts to decide which appeals they will consider from among the cases submitted to them. This offers the judiciary a filter on what types of cases are appealed. Judges have to consider in advance which cases will be accepted.

<sup>24</sup> See the Constitution of the State of Nevada (1864). For comprehensive analysis of the Nevada State Constitution, see appropriate sections of Michael Bowers, *The Sagebrush State: Nevada’s History, Government, and Politics*, (Reno, NV: University of Nevada Press, 1996), 16; Bowers, *The Nevada State*

The executive branch housed the state's regulatory agencies. The first agency created to safeguard the health of workers focused on public health. By the mid-nineteenth century, communicable diseases emerged as a serious threat to industrialization and urbanization. As the horrific conditions of Civil War threatened public health, urban centers in Europe experienced widespread epidemics. Overcrowded with human filth and corpses, an Asiatic cholera ravaged London. But little was known about what caused the disease, how to stop it from spreading, and how to cure it. Due to increased transcontinental travel, the spread of infectious diseases concerned the United States as well. By the 1870s, scientific breakthroughs reaffirmed the need for improved public health. Louis Pasteur's germ theory prompted Joseph Lister to spray his operating rooms with coal tar. The move spearheaded the use of antiseptics to prevent infections, inoculation vaccines, laboratory diagnostic work, and other hygiene measures. Nevada began distributing vaccines to local physicians, prohibited the reuse of the clothing and the exhuming of the human remains of those who had died of contagious diseases. But the measures were not enough. The state needed a regulatory agency. In response to an outbreak of cholera in the East, Nevada established the State Board of Health in 1893. At first, the underfunded agency had mixed results. While it recommended public health standards and threatened penalties to municipalities and industrial areas, it had little enforcement authority.<sup>25</sup>

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*Constitution*, and Eleanore Bushnell, *The Nevada State Constitution: Origin and Growth*, (Reno, NV: University of Nevada Press, 1965).

<sup>25</sup> Steven Johnson, *The Ghost Map: The Story of London's Most Terrifying Epidemic- And How It Changed Science, Cities, and the Modern World*, (New York: Riverhead Books, 2006), 45, 69, is a compelling interpretation of not only of the violent spread of cholera in Victorian London, but also the effects of rapid urbanization during the nineteenth century, and the development of modern scientific procedures. See also Louis Pasteur, *Scientific Papers*, Vol. XXXVIII, Part 7, *The Harvard Classics*, (New York: P.F. Collier & Son, 1909–14; Nevada State Library and Archives, "Nevada Executive Branch Agencies: Health Division (Formerly, Health Department)," Division of the Nevada Department of Cultural Affairs,

By 1909, legislators established the first regulatory agency devoted to occupational health: the State Inspector of Mines. Indeed, the mining boom prompted action. In 1909, Nevada ranked 6<sup>th</sup> in production of gold, silver, copper, and lead. Its dividends amounted to more than the mines in Montana, Arizona, Idaho, and Alaska combined. But three years prior, the state's output was smaller than any of those states. While the mining boom increased its production and profits, it also brought attention to working conditions. Lieutenant and Acting Governor Denver S. Dickerson noted that "the occupation of the miner is a hazardous one" and many managers failed "to properly safeguard the health and lives of employees." Therefore, the Inspector of Mines would "compel" the mining industry to "insure the fullest protection possible of the health" of workers. Besides safety inspections, the Inspector of Mines produced statistics on the mining industry and mineral resources, reporting to the State School of Mines at the University of Nevada, Reno. Of course, the Inspector of Mines was not well received at first. Several managers charged that the regulations placed "unrealistic burdens" on the industry. But the complaints eventually subsided. Since safety saved money, the Inspector of Mines had little trouble convincing the suggestions were necessary and practical.<sup>26</sup>

Nevada's biggest contribution to progressive reform was the establishment of workmen's compensation. In the 1890s, a group of America's leading businessmen, the

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<http://nevadaculture.org>, (Assessed February 5, 2010); "Report of the State Board of Health," *Appendix to Journals of Senate and Assembly*, Seventeenth Session, Vol. I, (Carson City, NV: State Printing Office, 1895), 3-4.

<sup>26</sup> "Governor's Message to the Legislature," *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Fourth Session, Vol. I, (Carson City, NV: State Printing Office, 1909), 19; "Report of Inspector of Mines," *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Fifth Session, Vol. II, (Carson City, NV: State Printing Office, 1911), 5-7; Nevada State Library and Archives, "Nevada Executive Branch Agencies: State Mining Inspector Administrative History," Division of the Nevada Department of Cultural Affairs, <http://nevadaculture.org>, (Assessed February 5, 2010).

National Civic Foundation (NCF), began discussing how “free contract” may contribute to cyclical recessions, strikes and lockouts, social distemper, and political unrest. The group determined that a “special tax” could meet the annual cost of compensating injured employees and death benefits. In 1911, Governor Tasker Oddie delivered the NCF report to the legislature, determining that “the root of much of the friction between employer and employee” lied in the “universal defeat of justice in the matter of compensating the victims of industrial accidents and fatalities.” Since there were “continual cases of flagrant injustice to maimed employees and their dependents,” a workmen’s compensation system would be “a rational system of atonement.” The legislature subsequently passed Nevada’s first workmen’s compensation bill. By 1914, it established the Nevada Industrial Insurance Act in 1913, a regulatory agency maintaining and dispersing the insurance funds. The agency became known as the Nevada Industrial Commission (NIC). At first, the NIC was remarkably cost efficient, as it did not require industries to provide medical care. However, the state soon realized that medicine was integral to quality occupational health, and began requiring industries to administer first aid and medical attention to accident victims. Most large companies already provided health care, but small businesses complained that it was financially burdensome. Consequently, the NIC started collecting “accident benefit” premiums, furnishing medical and hospital treatment to employers without health care.<sup>27</sup>

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<sup>27</sup> Witt, *The Accidental Republic*, 36; Martin J. Sklar, *The Corporate Reconstruction of American Capitalism, 1890-1916: The Market, Law, and Politics*, (New York: Cambridge University Press, 1988), 53. See also Kolko, *The Triumph of Conservatism*; “Governor’s Message to the Legislature,” *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Fifth Session, Vol.1, (Carson City, NV: State Printing Office, 1911), 28-31; “Governor’s Message to the Legislature,” *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Seventh Session, Vol.1, (Carson City, NV: State Printing Office, 1915), 10-11; “Report of the Nevada Industrial Commission: Reviewing the Administration of the Nevada Industrial Act for the Period of Three Years- July 1, 1913, to June 30, 1916,” (Carson City, Nevada: State Printing Office, 1917), 5; Nevada Industrial Commission, “Memorandum In Re Nevada

The final regulatory commission in the executive branch was the Labor Commissioner. Founded in 1915, the Commissioner facilitated “just contractual relations” in the workplace and prevented the “defrauding of workmen.” In the process, the agency protected occupational health by monitoring overall conditions in the workplace. At first, the Commissioner discovered wage laws were “very unsatisfactory” in the state. From 1915 to 1917, the agency received 33 complaints for nonpayment of wages. Moreover, the Commissioner enforced the 8-hour day, a slogan of organized labor “for years” in Nevada. In 1917, the agency reported that the 12-hour day was “rare” and the 10-hour day was “becoming a thing of the past.” Lastly, the Commissioner enforced a statewide ban on child labor. By the 1900s, most Americans objected to child labor. As historian David Tanenhaus reveals, states inspired by progressivism sought to ban the practice, passing compulsory attendance laws, enacting vaccination requirements, and establishing the juvenile court system. The state essentially became “a parent.” As early as 1912, the legislature banned child labor. Children under 14 years old needed a permit from a district court judge to work. Moreover, the legislators banned children under 18 from begging or “any indecent or immoral exhibition” that compromised their morality.<sup>28</sup>

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Industrial Insurance Act: Reviewing the First Year’s Operation of the Act, July 1, 1913 to Jun 30, 1914,” (Carson City, NV: State Printing Office, 1914), 3-6; “Report of Nevada Industrial Commission,” *Appendix to the Journals of the Nevada State Senate and Assembly*, (Carson City, NV: State Printing Office, 1919), 9-10; Nevada Industrial Commission, “Memorandum In Re Nevada Industrial Insurance Act: Reviewing the First Year’s Operation of the Act, July 1, 1913 to Jun 30, 1914,” 7-9; “Governor’s Message to the Legislature,” *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Eighth Session, Vol.1, (Carson City, NV: State Printing Office, 1917), 10.

<sup>28</sup> “Report of Commissioner of Labor,” *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Eighth Session, Vol.1, (Carson City, NV: State Printing Office, 1917), 5-9; Second Biennial Report of the Commissioner of Labor, 1917-1918, *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Ninth Session, Vol. II, (Carson City, NV: State Printing Office, 1919), 36, 75-74; David S. Tanenhaus, *Juvenile Justice in the Making*, (New York: Oxford University Press, 2004), 86; Governor’s Message to the Legislature,” *Appendix to the Journals of the Nevada State Senate and Assembly*, Twenty-Eighth Session, Vol.1, 26.

The executive branch's regulatory agencies eventually served as important mediators in occupational health-related disputes. But at Las Vegas' founding in 1905, the agencies did not exist. The railroad had embarked on a challenging feat, launching a railway link between Salt Lake City and Los Angeles. And situated between the cities was the arid desert of southern Nevada. It was a sparsely-populated wasteland, with scorching temperatures, limited water supply, and no medical infrastructure. But the railroad needed a half-way point and ultimately decided to make the desert "blossom as the rose." As it recruited thousands of workers to the region, the history of occupational health in southern Nevada began. The desert subsequently bloomed and flourished for over a century, but often with devastating consequences to the ones who created it.



CHAPTER 1  
THE RAILROAD

One of the leading railroad builders of the United States remarked to me that it takes nerve and a great amount of money to construct railroads under conditions prevailing in Nevada.

Governor John Sparks (1907)

August 1905 Las Vegas was busy, active, and full of the western spirit, with rowdy saloons and dives, and swaggering guns and prostitution. The town was in a valley surrounded by endless miles of desert, sagebrush, and cactus bloom. Three months prior, the San Pedro, Los Angeles, and Salt Lake Railroad created Las Vegas after auctioning off commercial and residential lots primarily to land speculators from southern California. The town closely resembled the tough towns that sprung up around the transcontinental railroad during the nineteenth century. However, Las Vegas is different. It was a company town in the broadest sense. The railroad had founded Las Vegas because it needed a division point between Utah and California with enough water for its steam engines, repair shops, and worker home sites. Desert prospectors filled the town bound for mining districts in Goldfield, Tonopah, Searchlight, Bullfrog, and Manhattan. One such prospector was Roy Martin, who was 32 years old. Since his mid-twenties, he had enjoyed a streak of moderate luck selling real estate in Oklahoma. Real estate, however, was a summer job. Martin was a physician. Intrigued with the American West and its endless financial potential, he had heard about the Goldfield boom and decided to try his luck at mining, settling on the Bullfrog Mining District in Rhyolite.<sup>29</sup>

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<sup>29</sup> Interview with Mazie Martin Jones, November 3, 1978, Conducted by Jane P. Kowalewski, University of Nevada, Las Vegas Special Collections.

When Martin arrived in Las Vegas, he noted that “there was only one train a day then. I was going to take it the same night.” During his wait, he learned from the locals that Bullfrog was a “has been” district. But the news did not discourage Martin. Something impressed him about the locals’ confidence in their fledging community. He met a disillusioned physician offering to sell his practice for 10 dollars, the cost of a railroad ticket to Los Angeles. Martin did not have the money, but he devised a plan. He found the fastest sprinter in town and challenged him to a foot race. An avid runner in college, Martin easily won the race, bought the practice, and remained in Las Vegas for 38 years. Within four months, Martin became the chief surgeon for the Las Vegas and Tonopah Railroad (LV&T) to augment his meager income as a local physician.<sup>30</sup> He held this position until the railroad closed in 1919. The LV&T provided a tent to operate the railroad hospital with ten cots and a makeshift operating room for minor surgery. By 1907, Martin established a “modest hospital” to meet the requirements of the community, the railroad, and the surrounding mining camps.<sup>31</sup>

In most cases, Martin worked alongside Dr. Hal Hewetson, a railroad physician for the Salt Lake Road. Arriving in October 1904, Hewetson established the first hospital in the valley.<sup>32</sup> The son of an Ohio doctor, Hewetson graduated from the University of

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<sup>30</sup> On September 22, 1905, Senator William A. Clark embarked on a second railroad venture, the LV&T. Completed in November 1907, it connected Las Vegas with Goldfield. The northern line operated from 1907-1914. During World War I, the northern track was removed, but it continued to serve the Bullfrog Mining District until 1918. In 1919, the remaining track was abandoned and scrapped.

<sup>31</sup> The hospital had a private office, operating room, and drug and stock room. See “Las Vegas Hospital,” *Las Vegas Age*, February 2, 1907; K.J. Evans, “Roy Martin: The Driven Doctor,” A.D. Hopkins and K.J. Evans, eds., *The First 100: Portraits of the Men and Women Who Shaped Las Vegas*, (Las Vegas: Huntington Press, 1999), 50.

<sup>32</sup> The original tent hospital only served workers. The railroad eventually replaced it with a permanent structure in the yard a year later. See A.E. Cahlan, “From Where I Sit,” *Evening Review-Journal*, March 28, 1930, Copied by Florence Lee Jones Cahlan, (October 8, 1974), Cahlan Collection, Box 24, Folder 99, Nevada State Museum and Archives, Las Vegas, Nevada.

Pennsylvania's medical school with honors.<sup>33</sup> In 1886, he joined the Army Medical Corps and organized a chair of pathology and bacteriology at the University of Omaha. While teaching, Hewetson became associated with Union Pacific Railroad and contracted pulmonary tuberculosis. To treat the disease, he decided to move west. Hewetson later claimed that the arid climate cured him. In 1901, Hewetson assumed a full-time position with Union Pacific, and joined the Salt Lake Road in 1903. After establishing a hospital tent near Fremont Street, Hewetson stayed until his death in 1930.<sup>34</sup>

According to Charles "Pop" Squires, the *Las Vegas Age* editor, Martin and Hewetson rarely performed surgeries in their hospitals. The standard procedure was to stabilize patients and send them to Los Angeles. However, the doctors carried out some surgeries at 4:00 am to beat the desert heat. Since there was no air conditioning, the operating rooms were located in the back of the hospital and next to shady trees, with installed windows for improved ventilation. While Hewetson usually only treated railroad workers, Martin made house calls, delivering babies throughout southern Nevada. His daughter, Mazie Martin Jones, recalled that he answered "calls for help from anyone, anywhere, anytime," driving to Mesquite, Moapa, Overton, and Death Valley. He always treated minorities, traveling on horseback to visit the Paiute Indian Reservation, and regularly visited Mexican railroaders and U.S. Gypsum workers in

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<sup>33</sup> Moehring and Green, *Las Vegas*, 11.

<sup>34</sup> In the early twentieth century, doctors treated pulmonary tuberculosis (TB) patients with bed rest. Many considered a dry climate was essential to recovery as well, and sanatoriums were built in the West at higher elevations. Clinicians promoted nutritional therapies, fresh air, sunlight, and mental tranquility for patients. See Interview with Clare Woodbury, M.D., September 12, 1974, Conducted by Dr. Ralph Roske, University of Nevada, Las Vegas Special Collections; "Hal Hewetson, Pioneer Vegas Passes in L.A.," *Evening Review-Journal*, (March 28, 1930), Cahlan Collection, Box 24, Folder 99, Nevada State Museum Historical Archives.

Arden. Martin's daughter described his practice as "pretty wild at times," treating mostly gunshot and knife wounds.<sup>35</sup>

One thing was certain about Martin. He loved Las Vegas. Years after his death in 1943, newspapermen John Cahlan wrote a narrative about Martin for the *Las Vegas Sun*. The doctor deeply influenced Cahlan and his dreams for Las Vegas. Cahlan wrote of a fictional "dream school" that had "a fraternity of followers," including Al Cahlan and John Cashman, Sr. In this school, Martin taught a curriculum that focused on how "to promote the city of Las Vegas into a metropolis." Cahlan reveals that the doctor was the "first person who planted the seed for a resort hotel in Las Vegas." While Martin built "at least" 10 resort hotels in his mind, he owned only one, the El Patio.<sup>36</sup>

Cahlan's narrative was more truth than fiction. During his lifetime, Martin actively put forward "idea of Las Vegas." He lobbied for a highway connection between Las Vegas and California. Highway 91 and later, Interstate 15, followed his proposed route. Martin also served on the first Colorado River Commission to promote Boulder Dam Project, traveling to Washington D.C. to promote the Swing-Johnson Bill.<sup>37</sup> Like Cahlan, Charles "Pop" Squires similarly interpreted Martin's legacy. According to Squires, "no citizen of Las Vegas during all those long, lean, and disappointing years had

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<sup>35</sup> Evans, "Roy Martin: The Driven Doctor," 51; "Tremendous Expansion of Hospital Facilities in Clark County Noted During Five Decade Growing Period," *Review-Journal*, (August 15, 1948); Interview with Mazie Martin Jones.

<sup>36</sup> Cahlan also actively supported resort and industrial development of southern Nevada. He helped found the Southern Nevada Industrial Foundation (SNIF) to study the potential for future industries in the region. SNIF was later renamed Nevada Development Authority (NDA) and helped develop a non-resort industrial base in the region. See John F. Cahlan, "Doc Martin's Dream School," Cahlan Collection, Box 23, Folder 36, Nevada State Museum and Archives, Las Vegas, Nevada; Florence Jones Cahlan about Southern Nevada Industries, September 16, 1943, Letter, Cahlan Collection, Box 7, Folder 38, Nevada State Museum and Archives, Las Vegas, Nevada; and Eugene P. Moehring, *Resort City in the Sunbelt: Las Vegas, 1930-2000*, (Reno, NV: University of Nevada Press, 2000), 95, 231-232.

<sup>37</sup> Interview with Mazie Martin Jones.

such supreme faith in the high destiny of Las Vegas, or sacrificed so much of him in the effort to bring destiny to fruition.”<sup>38</sup>

Las Vegas was more than a dusty railroad town to Martin. He saw the city’s immense potential to house various industries, and believed it could sufficiently support the health of workers, residents, and tourists alike. “Having lived in this vicinity for more than twenty-five years and as the consequence of my vocation,” he wrote in 1931, “I am somewhat of an authority on conditions that affect the health of the people residing here.” To say ‘the climate is healthy’ was entirely inadequate. It was much more than that. The sun shines continuously, producing a year-round climate especially conducive to outdoor living.<sup>39</sup> Martin knew Las Vegas was special. Eventually, the region produced vast public works and defense projects as well as the ultimate postindustrial resort site. And it began with the railroad.

### Desert Company Town

In the mid-1850s, it seemed impossible for southern Nevada to ever house major industries. While it contained an abundant water supply and fertile ground for crops, long-term settlement proved difficult. In 1855, Brigham Young ordered Mormon settlers to establish a homestead in Las Vegas, but the mission disbanded in 1858. By the late nineteenth century, the state as a whole emerged from a 20-year economic depression after the discovery of various lodes in central and eastern Nevada. Still, state politics

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<sup>38</sup> Evans, “Roy Martin,” 51.

<sup>39</sup> Roy W. Martin to the Federal Board of Hospitalization, 1931, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections.

continued to favor the northern mining industry. Nevertheless, the location of southern Nevada elevated the region to prominence, situated between Utah and California.<sup>40</sup>

At the turn of the century, there was no link between Salt Lake City and Los Angeles, and Senator William Clark of Montana wanted to get into the railroad business. Clark was a corrupt, mining king, described as “one of the strangest millionaires.” Mark Twain commented that he was “as rotten a human being as can be found anywhere under the flag... a shame to the American nation.”<sup>41</sup> At the same time, Union Pacific’s Southern Pacific Railroad wanted to build a rail between Salt Lake City and Los Angeles. Established in 1862, Union Pacific was founded under wartime pressure to link the Pacific Ocean. By the 1890s, it declared bankruptcy and a group of financiers bought the company. Headed by Edward Harriman, the financiers forced major improvements, a vision that ultimately created the modern American railroad. While Union Pacific had proposed building a southwestern route, the company abandoned the plan during the bankruptcy process. Consequently, Clark won title to the land. In 1900, Clark chartered the San Pedro, Los Angeles, & Salt Lake Railroad Company, organizing a construction company to build the line. But Harriman had other plans. By March 1901, Harriman and

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<sup>40</sup> For scholarship on early Las Vegas history, see Eugene P. Moehring and Michael S. Green, *Las Vegas: A Centennial History*. (Reno: University of Nevada Press, 2005), 4-9; Stanley Paher, *Las Vegas, As it began-as it grew* (Las Vegas: Nevada Publications, 1971); Ralph Roske, *Las Vegas: A Desert Paradise* (Tusla, OK: Continental Heritage Press, 1986). For Mormon influence in early Las Vegas, see Ray Reeder, “The Mormon Trail: A History of Salt Lake to Los Angeles Route to 1969” (Doctoral Dissertation: Brigham Young University, 1966); Francis Leavitt, “Influence of the Mormon People in the Settlement of Clark County,” (unpublished master’s thesis: University of Nevada, Reno, 1934). See also Glen S. Dumke, “Mission Station to Mining Town: Early Las Vegas,” *Pacific Historical Review* XXII (1953): 257-270.

<sup>41</sup> The most extensive biography of Senator Clark is William Managam, *The Clarks: An American Phenomenon* (New York: Silver Bow Press, 1941). There are several articles as well, including Michael P. Malone, “Midas of the West: The Incredible Career of William Andrews Clark,” *Montana: The Magazine of Western History*, Vol. 33, No. 4 (Autumn, 1983), pp. 2-17; and A.D. Hopkins, “William Andrews Clark,” *The First 100*, 22-25. See also Mark Twain, “Senator Clark of Montana,” (January 28, 1907), in Bernard DeVoto, ed., *Mark Twain in Eruption*, (New York: Harper & Bros, 1922), for the author’s opinion of Senator Clark.

Clark filed their claim in court, and began simultaneously constructing lines southwest of Uvada in the Clover Creek Canyon.<sup>42</sup>

Confrontation soon became unavoidable. Offering a significant pay raise, Union Pacific heavily recruited their rival crew. Union Pacific ultimately swept the Salt Lake Road off the grade. In response, the Salt Lake Road erected barbed wire, and barricades made of rocks and wood. The mood was “ugly, but not restless,” with both sides anxious to avoid violence. But a clash was inevitable. Some newspapers reported an “all out war,” but with the exception of bloody noses and harassment allegations, work continued without significant interruption. Eventually, the courts shut down production, and Clark and Harriman reached a compromise in 1902. Clark agreed to operate the railroad in exchange for furnishing Union Pacific with 50 percent stake in the company. By early 1905, workers completed the railway in Jean and special trains began running. Several months later, they applied the finishing touches and passenger service began on May 1, 1905.<sup>43</sup>

Finishing the track marked an important milestone for southern Nevada. The line not only ran through the region, it was also a division point between Salt Lake and Los

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<sup>42</sup> For a complete history of the Los Angeles and Salt Lake Railroad, see Signor, *The Los Angeles and Salt Lake Railroad Company*; Moehring and Green, *Las Vegas*; Moehring, *Resort City in the Sunbelt*. For comprehensive coverage of the Union Pacific Railroad, see Klein, *Union Pacific: Birth of a Railroad* and *Union Pacific: The Rebirth, 1894-1969*, (New York: Doubleday, 1989). See also the Pacific Railway Act of 1862 (12 Stat, 489) and “Report of the Selection Committee on the Pacific Railroad and Telegraph, Including a Minority Report and Proposed Pacific Railroads Act,” 34<sup>th</sup> Congress, 1<sup>st</sup> Session, Report No. 358, (1856); John C. Kenefick, *Union Pacific and the Building of the West*, (Princeton: Princeton University Press, 1985), 7-13.

<sup>43</sup> “Battle Royal Between Railroads,” *Los Angeles Times*, (April 10, 1901); Signor, *The Los Angeles and Salt Lake Railroad Company*, 28, 30, 38; Klein, *Union Pacific: The Rebirth*, 116; Union Pacific Railroad Company Annual Report- 1904, *America’s Corporate Foundation*, 1904, ProQuest Historical Annual Reports; “Talking up Clark’s Road,” *The Los Angeles Times*, (May 2, 1903); Union Pacific Railroad Company Annual Report- 1904, *America’s Corporate Foundation*, 1904, ProQuest Historical Annual Reports; “Talking up Clark’s Road,” *The Los Angeles Times*, (May 2, 1903); “Clark First From the Lake,” *Los Angeles Times*, (January 14, 1905); “First Train Through,” *Los Angeles Times*, (February 13, 1905); “Salt Lake in Two Months,” *Los Angeles Times*, (February 23, 1905); “Earnings of Clark’s Road,” *New York Times*, (March 21, 1907).

Angele, providing a railroad yard, repair shops, and residences. In 1902, Clark bought Helen Stewart's 2000-acre ranch in the Las Vegas valley with the intention of establishing a company town. After completing the track, Clark organized an action for commercial and residential lots, forming a subsidiary, the Las Vegas Land & Water Company (LVL&W Co.), to handle the land transactions. Las Vegas became a major transshipment site virtually overnight. Supplies from California and Utah were briefly stored and loaded onto wagons traveling northwest to construction camps. The town also benefited from Clark's decision to establish another railroad, the Las Vegas and Tonopah in 1907.<sup>44</sup>

As historian Michael Green shows, Las Vegas was "a company town in the broadest sense." The traditional view of a company town is an employer controlling every aspect of the town. Company towns typically covered all aspects of their employees' lives. Las Vegas did not use script, but the railroad was behind practically every feature of the town. It constructed a master planned community, complete with a station, ice houses, a meeting hall, and repair shops, increasing the local workforce from 175 to 400 workers. The railroad included paved streets on Fremont Street and oiled secondary streets to reduce dust, and a public school.<sup>45</sup> It brought water, building a network of redwood pipes to supply the steam engines. Moreover, the water lines boosted occupational health, serving as fire protection. The railroad installed several hydrants in the shops and various areas throughout town. But inadequate water pressure

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<sup>44</sup> See Moehring, *Resort City in the Sunbelt*, 4-6; Signor, *The Los Angeles and Salt Lake Railroad Company*, 441.

<sup>45</sup> Walter Bracken to W.C. Frazier, May 24, 1913, Letter; President of the Chamber of Commerce to W.H. Comstock, A.S. Halsted, W.R. Bracken, and J. Ross Clark, August 13, 1919, Letter; City of Las Vegas to Walter Bracken, September 11, 1919, Letter; Bill for the City of Las Vegas to the Las Vegas Land & Water Company, August 1, 1924, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Fire Protection, Box 10, File W16-3, University of Nevada, Las Vegas Special Collections; Moehring, *Resort City in the Sunbelt*, 7-8; Moehring and Green, *Las Vegas*, 7, 15.



was a frequent problem. When several fires erupted in 1919, the pressure was “of little, if any value in controlling the fires.” The railroad helped establish a more centralized government. It influenced the creation of Clark County in 1909, with Las Vegas as the county seat. Finally, historian Eugene Moehring notes that the railroad’s “paternal obligation” influenced it to provide employees with housing. The decision enhanced occupational health as well. To maintain a healthy workforce, the railroad provided employees with sanitary and comfortable housing. Since the railroad determined that homeowners fashioned better workers than free housing recipients, the workers applied for mortgages based on their salaries. It worked. The railroad reported that the program ultimately attracted “a more desirable class of men” to the workforce.<sup>46</sup>

By May 1920, Clark sold his interest to Union Pacific.<sup>47</sup> The transfer of power put Las Vegas in an interesting predicament. The leadership, located in Omaha and New York, was less paternalistic and more concerned with profits. Union Pacific instantly fired 60 repair shop employees. By the summer of 1922, tempers peaked and a strike became inevitable. The workers supported the railroad strike of 1922, stopping trains nationally. Violence flared in Las Vegas when the scabs arrived. Frank McNamee, the railroad’s counsel, wrote Governor Emmet D. Boyle about the situation. According to McNamee, pickets gathers to “intimidate” and “put fear” in strikebreakers. The railroad

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<sup>46</sup> Hewetson Deed to Home, December 14, 1914; and Hewetson Lease Agreement, July 1, 1915, Union Pacific Collection, LVL&W Walter Bracken Files, Box 8, Folder W12-3, W12-3-6, University of Nevada, Las Vegas Special Collections; H.E. Nutt to W.H. Bancroft, J. Ross Clark, November 3, 1912, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employee Loans, Box 8, Folder W12-3, W12-3-6, University of Nevada, Las Vegas Special Collections; F.H. Knickerbocker to Walter Bracken, January 23, 1931 Letter; and Walter Bracken to F.H. Knickerbocker, March 25, 1930, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employee Loans, Box 8, Folder W12-3, W12-3-6, University of Nevada, Las Vegas Special Collections.

<sup>47</sup> The Union Pacific Railroad Company acquired the remaining half of the stock and all but \$41,000 of the bonds of the Los Angeles & Salt Lake Railroad Company. Effective January 1, 1922, Union Pacific, the LA&SL became included as the same as other constituent companies. See Union Pacific Company Annual Report – 1922, *America’s Corporate Foundation*, 1922.

tried its best to rectify the situation. It filed a restraining order against picketing interference, and separated strikebreakers from strikers in the rooming houses. The federal court also served a temporary injunction. Regardless, the strikers continued to harass strikebreakers. McNamee reported nightly shootings and a trainmaster was assaulted, tarred, and feathered. While the assailants were identified, they fled town before being formally charged. Mrs. Andrews, the wife of a strikebreaker, was also assaulted by four women. The women beat her with their “hands, sticks, bottles, or whatever was available” as their husbands cheered them on.<sup>48</sup>

With the trains stopped, the local economy took a significant blow. After the strike, Union Pacific moved its repair yards to Caliente, which cost Las Vegas over 300 jobs. Eventually, the town recovered and the economy remain fairly strong throughout the 1920s. However, it was clear Union Pacific needed to establish its authority in Las Vegas. Another factor inhibited its ability to control the workforce. By the 1920s, the 8-hour day was practically universal in the railroad industry, increasing the amount of spare time. Union Pacific quickly noticed the danger of leisure in Las Vegas, with the local night life posing numerous problems. Even though the railroad limited gambling, liquor, and prostitution to Blocks 16 and 17 on Fremont Street, the area turned into a hot spot. During prohibition, most casino gambling was abolished, but the speakeasies masqueraded for clubs. Workers frequented Fremont Street, staying up all night.

Exhausted and fatigued, they performed poorly on the job. Workplace intoxication was

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<sup>48</sup> N.A. Williams to Walter Bracken, October 21, 1922, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employee Welfare, Box 16, File R-31, University of Nevada, Las Vegas Special Collections; Moehring, *Resort City in the Sunbelt*, 10; Frank McNamee to Governor Emmet D. Boyle, August 8, 1922, Letter; Frank McNamee to A.S. Halsted, August 8, 1922, Letter; Frank McNamee to A.B. Halsted, July 14, 1922, Letter; E.H. Calvin to W.H. Comstock and A.S. Halsted, July 14, 1922, Telegram; “News Release from the Railway Age,” July 27, 1922, Union Pacific Collection, Union Pacific Law Department, Assaults, Riots, Strikes, Box 56, Files 10, 10-5-4, 10-5-4H, University of Nevada, Las Vegas Special Collections.

problematic as well. The railroad decided it needed to “bring about a broader and more wholesome relationship,” determining that the situation fostered poor work ethic and “dissatisfaction and unrest of the masses.” Therefore, it founded welfare clubs, seeking to instill the following principles:

1. A sincere appreciation of the employees’ obligation to render faithful and loyal service to their daily work.
2. To teach and respect the laws of “our nation.”
3. To deal with each other in all matters as we would have dealt with us.

Eventually, the clubs offered sporting teams and entertainment features that encouraged social relationships between employees rivaling the “demoralizing influence” of Fremont Street.<sup>49</sup>

### Railroad Slaughter

The early twentieth century was a transition for railroad safety. As the railroad industry expanded, it upgraded existing lines to accommodate a rise in passenger and freight traffic. Yet, the expansion increased the frequency of accidents. Even though the railroad invested in high-tech breaks, couplers, signals, and other safety measures, worker and passenger fatalities rose 30 percent and 60 percent, respectfully. During the first years of Salt Lake Road operation, the Interstate Commerce Commission (ICC) reported over 5,000 deaths and 75,286 injured in railroad accidents nationwide, an increase of 755 deaths and 8,577 injured from previous years. To be sure, this spike in deaths and injuries sparked controversy for the railroad industry. Congress responded by briefly

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<sup>49</sup> Moehring, *Resort City in the Sunbelt*, 11; UPRR Letter on Employee Leisure Time, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employee Welfare, Box 16, File R-31, University of Nevada, Las Vegas Special Collections; “U.P. Employees Form Athletic and Welfare Club: New Organization Will Be Big Factor in Activities of Las Vegas,” *Las Vegas Age*, (March 4, 1922); “U.P. Employees Athletic and Welfare Club to Meet,” *Las Vegas Sun*, (April 8, 1922); Walter Bracken to E.H. Calvin, February 2, 1923, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employee Welfare, Box 16, File R-31, University of Nevada, Las Vegas Special Collections. See also appropriate correspondence in the “Employee Welfare” file, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Box 16, File R-31, University of Nevada, Las Vegas Special Collections.

assuming control of all railroads during World War I. It also passed the Accident Reports Act, which required the railroad industry to report all accidents involving injury or losses of over \$150.00 to the ICC. To combat the negative publicity, the railroad studied how to improve technology, investing in better track, communication devices, and control features. Additionally, it created comprehensive safety programs and created public positions on safety, hiring the American Railway Association (ARA) to speak on its behalf. The combination of higher accident costs and establishment of safety programs eventually improved conditions. Railroad worker fatalities steadily declined after 1910.<sup>50</sup>

This is not to say that accidents were infrequent on the Salt Lake Road. In fact, industrial accidents were very high in Nevada. This is most likely because the state hosted dangerous industries like mining and smelting in remote locations that lacked comprehensive occupational health programs until the 1920s. From 1913 to 1916, 4,145 accidents occurred in all industry classes. Comparatively, the railroad was not Nevada's most dangerous industry. Mining involved the most risk, with 4.84 out of 1,000 workers accidentally dying each year. But railroad workers also confronted frequent industrial hazards. 1.49 out of 1000 workers were accidentally killed, and 84.82 out of 1,000 experienced some form of injury.<sup>51</sup>

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<sup>50</sup> Independent to changes in technology was a dramatic change in the labor market. As labor turnover declined, there were also fewer new employees. See Aldrich, *Death Rode the Rail*, 181-182; "Railroad Slaughter," *Las Vegas Age*, (November 16, 1907).

<sup>51</sup> Part of the NIC's duties was to gather statistical data on industrial accidents in the state. According to the agency, "statistics of industrial accidents would serve for accident prevention, for the due administration and intelligent revision of workmen's compensation laws, and for the computation of compensation insurance rates." The NIC divided the industries into 7 general groups of classification: Class No. 1 – Mining, Class No. 2 – Ore Reduction, Class No. 3 – Nevada Consolidated Copper Company, Class No. 4 – Railroads, Class No. 5 – Public Utilities, Class No. 6 – State, Counties, Cities, Schools, and Class No. 7 – Miscellaneous (all industries not covered in the first six groups). While Class No. 4 consisted of the railroad industry, most of the systems engaged in interstate commerce. See Report of the Nevada Industrial Commission: Reviewing the Administration of the Nevada Industrial Insurance Act for the Period of Three Years – July 1, 1913 to June 30, 1916," (Carson City, NV: State Printing Office, 1917), 40, 42, 44, 48-49, 60, 66-67. See also "Report of Inspector of Mines," *Appendix to Journals of Senate and Assembly*, 26<sup>th</sup>

Most injuries on the Salt Lake Road resulted from equipment and human failures. The most visible accidents were derailments caused by weaknesses in road equipment, erratic desert storms, axel failures, inability to enforce speed, and track debris including livestock. Derailments plagued the American railroad industry throughout the nineteenth century, but steadily declined due to various technological advancements. However, the economic upswing of 1897 reversed the trend, increasing passenger and freight traffic. In 1902, 1,609 derailments occurred nationwide. By 1920, the total reached 11,172. Even though derailments had escalated, improvements in technology helped the casualties to simultaneously decline. In *Death Rode the Rails*, Mark Aldrich reveals that the railroad industry increasingly moved towards scientific technology to improve reliability, but rises in traffic and costs also encouraged investments in improved track and roadbed.<sup>52</sup>

The majority of derailments on the Salt Lake Road were directly caused by desert storms. As large clouds gathered and dumped “sheets of precipitation,” the track splintered and washed out. The trains literally plunged off bridges. This was a recurrent and very costly problem. From January 1 to June 15, 1910, it suspended all traffic due to numerous washouts. Quite frequently, the line was impassable for hundreds of miles, requiring the railroad to continuously rebuild the track. In 1907, Lou Martin, a trainman, described to a dramatic derailment 25 miles outside of Caliente. After heavy rainfall gradually washed away the roadbed, his “blood almost froze” when he saw “three cars next to the engine topple into the river.” He desperately tried to save two carloads of horses, releasing several before its slipped into the river. After water flooded the train, Martin and his coworkers walked back to Caliente drinking a quart of liquor. It was “all

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Session, Vol. I, (Carson City, NV: State Printing Office, 1913), 5-12; Second Biennial Report from the Commissioner of Labor, 1917-1918,” (Carson City, NV: State Printing Office, 1919), 45.

<sup>52</sup> Aldrich, *Death Rode the Rail*, 198.

they could do to get that liquor away from me,” he recalled. Several months later, portions of the train were found as far away as Moapa Valley. A year later, the railroad dug up the engine, submerged in deep mud.<sup>53</sup>

Derailments were caused by defective track, wheels, and electrical wires as well. The railroad blamed bad steel and construction defects for the accidents, while manufacturers countered that train weights, speed, and improper maintenance triggered the issue. In 1926, electrical wiring burst into flames on a sleeping Pullman man. The train stopped immediately, evacuating the passengers. Firemen subdued the blaze except for some smoldering sections of the roof. Assuming the risk passed, several passengers boarded the train to collect their belongings. They were smothered by carbon monoxide from the fire extinguishers and burning of curtains, cushions and inflammable materials in the car. All of them perished. In a trial to determine negligence, a jury found the Salt Lake Road innocent of criminal activity. But they determined it did not follow proper safety precautions to protect passengers, prohibiting reentry. Additionally, the jury mandated that the railroad needed to arm their trains with large fire extinguishers because small hand pumps were inadequate.<sup>54</sup>

As in most industrial workplaces, human failures were the biggest threat. Errors in operating machinery and equipment on the train and railway yards, fatigue, limited work experience, and inadequate hazard awareness caused most accidents. Trainmen in the railway yards often experienced crush injuries while switching operating doors and

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<sup>53</sup> “Traffic Blocked by Serious Washouts: Extensive Damage to Union Pacific Track Blocks Road for Five Days,” *Las Vegas Age*, (January 7, 1922); Train Leaps off Bridge: Wreck in Nevada Due to Flood,” *Los Angeles Times*, (August 6, 1929), Signor, *The Los Angeles and Salt Lake Railroad Company*, 67-69.

<sup>54</sup> Walter Bracken to W.C. Hussey, July 14, 1926, Letter; Verdict in the Matter of the Inquisition into the Deaths of Five Persons found in Tourist Pullman Car #1642, June 16, 1926, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Claims for Damages and Personal Injury, Box 15, File R-14, University of Nevada, Las Vegas Special Collections.

hatches, and loading cars. Miscommunication especially caused accidents, especially when there were limited lines of sight. Oncoming trains regularly struck trackwalkers, responsible for tightening bolts and clearing off track debris. Operators simply could not see them until it was too late. In 1918, trackwalker A.R. Nelson was hit outside of Las Vegas and transferred to the Hewetson Hospital. Dr. John Fuller was on-call and described his horrific condition:

I knew Nelson during his life. He was delivered to me in an injured condition. We removed him to the hospital and found he had a compound fracture on the front part of his skull. He afterward died in the hospital. There were two open wounds on the head from which brain matter was protruding - from one of them. He was bleeding from both wounds and from the nose. Every time he breathed the air escaped from the wounds in his head. He died at 8:30. There were no wounds on his body. He died from the fractures of the skull.

Traditional construction-type accidents plagued the workers on the line or the railway yards. Hoisting cranes toppled over while repairing flat cars and repairing washouts. Engine oil tanks exploded, fatally burning workers. A general foreman caught his shirt sleeve in a concrete mixer, was pulled in, and whirled around. He broke nearly every bone in his body and died several hours later. Workplace violence also attributed to deaths. During track construction, the postmortem remains of a worker was found in his bunk. While it appeared the man died of natural causes, a coroner from Los Angeles discovered he had been shot in the heart. The crime was committed after the man had been “paid off” to quit.<sup>55</sup>

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<sup>55</sup> Trackwalkers repaired small jobs and worked in pairs so that they could watch for each other’s safety. Burdett A. Rich, Henry P. Harnham, eds., *The Layers Reports Annotated*, New Series Book 47, (Rochester, N.Y.: The Lawyers Cooperative Publishing Company, 1914), 868; Clark County, NV Archives Obituaries, - Nelson, A.R., January 6 1918; Walter Bracken to W.H. Comstock, July 8, 1918, Memo Union Pacific Collection, LVL&W Co. Walter Bracken Files, Claims for Damages and Personal Injury, Box 15, File R-14, University of Nevada, Las Vegas Special Collections; “Two Are Killed: Falling Crane out Lives of Two Salt Lake Railroad Employees at Washout Near Alton Station,” *Las Vegas Age*, (March 30, 1907); “Death Results,” *Las Vegas Age*, (July 13, 1907); “Mixer Crushes, Whirls, Kills: Friends Learn of Death at

The most notable examples of carelessness and miscommunication were collisions. Head-on collisions were less frequent after the railroad industry began limiting the use of single tracks and enhanced signaled crossings. But reduced visibility due to extreme weather conditions, carelessness, and poor communication often led to collisions. In 1907 a night train traveled Caliente to fix a washout. After working all night, they forgot to move several cars loaded with timber off the main line. The crew also did not communicate that the washout had been fixed. Without the warning, a passenger train crashed into the loaded freight cars. Seeing the imminent disaster, several workers jumped off the train, experiencing slight injuries. However, most were not as lucky. The incident killed 4 workers and “horribly mangled others,” injuring 50. Drs. Hal Hewetson and Roy Martin arrived at the scene, treating fractures and performing numerous amputations. Las Vegans were furious about the accident. The *Las Vegas Age* demanded a “thorough investigation” be made “in interest of humanity” for the railroad’s plain negligence.<sup>56</sup>

Passengers were not always passive victims. Their own foolishness contributed to injuries as well. Passengers received injuries from falling off the unfenced platform or when trying to board moving trains. Their carelessness was often attributed to intoxication. In 1917, a passenger died after attempting to board a moving freight. The train decapitated him, mangling his body. The *Las Vegas Age* reported that he had been drinking heavily in the saloons for “several days” and the death was very “common here

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Las Vegas, NV,” *Los Angeles Times*, (October 19, 1909); “Divorce Suit and Tragedy-Murder in the Desert-  
Seventy Men of Salt Lake Railroad Construction Force Quit,” *Los Angeles Times*, (March 22, 1904).

<sup>56</sup> See “Deadly Crash: Salt Lake Train at Washout Collides with Tie Car,” *Las Vegas Age*, (March 2, 1907);  
“Wreck Due to Carelessness: Gang of Workmen Rushed into a Death Trap,” *Los Angeles Times*, (March 2,  
1907).



[in Las Vegas]” because it was due to “booze.”<sup>57</sup> Trespassers confronted numerous hazards as well. During the early twentieth century, vagabonds or “hobos” had become a terrible nuisance for the railroad industry. Trespassers were injured or died while boarding moving trains or crushed by heavy freight cargo. As the casualties rose, the railroad industry publicizing the dangers of “trespasser evil” to force action. Indeed, its motives were a mix of humanitarianism, economics, and politics. Trespassing was especially problematic on the Salt Lake Road because it was a transcontinental highway linking Los Angeles from the Mountain West. Migrant workers regularly hitched a ride to find work in southern California. In 1914 alone, 16 trespassers were killed and 30 injured. The railroad felt trespassers were responsible for the widespread belief that railways were dangerous, calling them a “menace to the lives of trainmen.” It was right. Most trespassers were killed in preventable manners, not by railroad negligence. Unfortunately, there was little the railroad could do. It was difficult to discourage trespassing in a legal manner, as federal laws did not exist and magistrates tended not to prosecute offenders.<sup>58</sup>

Local residents were also subject to railroad-related casualties due to unfenced lines and unguarded crossings. Crossings were traditionally only problematic in urban settings involving horses, wagons, and pedestrians. But after the invention of the automobile, rural areas became much more dangerous. The speed and noise of early automobiles increased dangers, especially when visibility was obstructed. By 1910, fatalities at crossings to non-trespassers rose 27 percent nationally. In response, the

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<sup>57</sup> “Cut to Pieces Under the Wheels,” *Las Vegas Age*, (October 20, 1917).

<sup>58</sup> See Barbara Young Welke, *Recasting American Liberty: Gender, Race, Law and the Railroad Revolution, 1865-1920*, (New York: Cambridge University Press, 2001), 47-48; Aldrich, *Death Rode the Rail*, 213; “Human Lives The Safeguard: Salt Lake Issues Remarkable Report Showing Scarcity of Fatalities,” *Los Angeles Times*, (November 22, 1914).

railroad industry installed bells at heavily traveled crossings to warn motorists. It also placed “Stop, Look, Listen” articles in local newspapers. As a rural town, Las Vegas was especially susceptible to crossing accidents. In 1938, a train struck a light Ford truck on Charleston Boulevard, killing the driver and seriously injuring his small daughter. The accident was caused by inadequate crossing protection; an arm on the railroad crossing sign had broken off. Local residents had complained about it for years, and the accident clearly indicated that improved safety measures were needed. The Salt Lake Road was ultimately sued for damages and the railroad installed proper crossing signs throughout the town thereafter.<sup>59</sup>

Public health threatened the Salt Lake Road as well. Throughout the state, the State Board of Health had great difficulty regulating Nevada’s industries. According to Dr. Simeon Lemuel Lee, Secretary of the Board of Health, most industries were “temporary” and “distant from other habitations,” like mining. The seclusion led to the dismissal of industrial hygiene. Additionally, Lee was frustrated with Nevada’s lack of concern for public health. “Diseases, endemic, and epidemic, as grave as the character and results of those Asiatic cholera or bubonic plague” confronted the state, but it did not study diseases, and report and tabulate findings. The “maintenance of health” was the “duty of the government,” and that physicians were “lawfully required to report promptly every death, every birth, and every cause of contagious disease in his practice.” At Lee’s urging, the Board of Health began publishing vital statistics in 1911. Clark County began reporting in 1913, with Dr. Roy Martin serving as the Chairman of the Clark County

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<sup>59</sup> Aldrich, *Death Rode the Rail*, 213-214; Ed. E. Bennett to W.H. Guild, November 11, 1938, Letter; Walter Bracken to Ed. E. Bennett, September 18, 1940, Memo, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Claims for Damages and Personal Injury, Box 15, File R-14, University of Nevada, Las Vegas Special Collections.

Board of Health. The statistics revealed Clark County was not the most dangerous county in the state; Washoe County had the distinction, leading in accidental deaths and suicides.<sup>60</sup>

At first, the Salt Lake Road was fairly sanitary because of its new construction. But conditions deteriorated in the 1930s due to environmental weathering, age, the economic depression, and influx of Hoover Dam-induced population. The yards were cramped, and the terminal was overcrowded and subjected to air and water contamination. Communicable diseases, however, always threatened workers, especially influenza, pneumonia, and tuberculosis. Las Vegas experienced its first endemic in 1918, the “Spanish flu” following World War I. Since the 1600s, influenza outbreaks occurred roughly three times a century. Influenza is a viral infection, affecting the respiratory tract. There are three types of influenza: ordinary, affecting humans during the winter months; avian, a wild bird virus; and pandemic, a strain of avian that develops the ability to infect humans. Since the latter is a new virus, humans do not have immunity and it spreads rapidly. While some pandemic strains resembled the ordinary flu, others mutate. This was the case in 1918, one of the most deadly disease events in human history. In one year, more humans died of influenza globally than died during all of World War I.<sup>61</sup>

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<sup>60</sup> Dr. Simeon Lemuel Lee became the Secretary of the State Board of Health in 1893. He actively promoted public health in Nevada, recommending the establishment of county boards of health and other improvements during his tenure. See Guy Louis Rocha, “Regulating Public Health in Nevada: The Pioneering Efforts of Dr. Simeon Lemuel Lee,” *Nevada Historical Society Quarterly* 29 (Fall 1986), 203-207; Annie Blachley, *Pestilence, Politics, and Pizzazz: The Story of Public Health in Las Vegas*, (Reno: Greasewood Press, 2002), 31; “Report of the State Board of Health,” *Appendix to the Journals of Senate and Assembly*, Twenty-Sixth Session, Vol. III, (Carson City, NV: State Printing Office, 1913), 37.

<sup>61</sup> While the first cases occurred in the United States and western Europe before reaching Spain, the disease became known as the “Spanish Flu” because media outlets in Spain did not censor news on the disease. Since Alfonso XIII, King of Spain, died of the disease, the country produced the most accurate news coverage, giving the impression that Spain was the source and hardest hit by the flu. See “Report of the Board of Health,” *Appendix to the Journals of Senate and Assembly*, Twenty-Fifth Session, Vol. 1, (Carson City, NV: State Printing Office, 1911), 5-6, 8, 15; Science and Technology Committee, “Pandemic Influenza,” House of Lords, Fourth Report of Session 2005-6, (London: The Stationary Office Limited,

There is much debate over the epicenter. Some epidemiologists propose a Chinese or Vietnamese origin, but others theorize it spread eastwards to China from Europe.<sup>62</sup> In the United States, the first outbreak occurred at Camp Funston in Kansas. Within several days, hundreds were ill, with cases reported in every state. The first wave was highly contagious but not lethal. But the virus mutated. Over the next year, a second wave spread. Victims experienced more intense symptoms, accompanied with pneumonia or pulmonary consolidation. By 1920, the epidemic waned, with 20 million Americans sickened and over 500,000 dead. But it got worse. American soldiers transported the virus abroad, and the Spanish flu traveled from Europe to Asia to Africa to South America. 16 months after the initial outbreak, the Spanish flu was gone. In its wake, 25-30 percent of the world had contacted the disease. The estimate of deaths ranges from 21 million worldwide to 50 to 100 million! Dr. Anton Sohn, pathologist and medical historian, commented that commented that even the HIV Virus “has circled the globe and killed as many so quickly as the 1918 flu virus.”<sup>63</sup>

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2005), 9-10; John M. Barry, “The Site of Origin of the 1918 Influenza Pandemic and its Public Health Implications,” *Journal of Translational Medicine*, 2004, 2:3, (January 20, 2004).

<sup>62</sup> J.S. Oxford, “The So-Called Great Spanish Influenza Pandemic of 1918 May Have Originated in France in 1916,” *Philosophical Transactions of the Royal Society of London. Series B. Biological Sciences*, (December 29, 2001), 356 (1416):1857-1859; E. Jordan, *Epidemic Influenza: A Survey*, (Chicago: American Medical Association, 1927); D. Thomson and R. Thomason, *Influenza. Annals of the Pickett-Thomson Research Laboratory*, (Baltimore: Williams and Wilkens, 1934); and F.M. Burnet and E. Clark, *Influenza: A Survey of the Last Fifty Years*, (Melbourne: Macmillan Co., 1942).

<sup>63</sup> The mutation was attributed to circumstances surrounding the end of World War I. In civilian life, people with mild flu symptoms stayed home until they recovered. But in wartime, the pressure to stay in the trenches forced sick soldiers to continue fighting. Additionally, those with deadlier viruses traveled to local hospitals or rode trains to seek treatment. This was how the virus spread quickly and affected healthy adults. During modern pandemics, public health officials monitor location experiencing social upheaval to designate deadlier strains of viruses. See Malcom Gladwell, “The Dead Zone,” *The New Yorker*, (September 29, 1997): 63. See also Science and Technology Committee, “Pandemic Influenza,” 11-13; Barry, “The City of Origin of the 1918 Influenza Pandemic and its Public Health Implications;” Anton P. Sohn and Carroll W. Ogren, *People Make the Hospital: The History of Washoe Medical Center*, (Reno: NV: Greasewood Press, 1998), 12.

Like many western states, Nevada was hit hard by the second wave of the pandemic. The cases were diagnosed in Reno and Las Vegas in fall 1918. The State Board of Health reported that the Spanish flu spread until there was “scarcely a village or hamlet that did not pay toll to it in human life,” sickening nearly 5,000 and killing 734. Fatalities were few in uncomplicated cases, but the death rate was high in patients with pneumonia. When the virus hit, the medical community was “up in the air” about treating the disease because viruses resisted medications. Most doctors thought it was caused by “bacillus of Pfeiffer,” but the opinion faded by the end of the pandemic. To fight the disease, the Board of Health required that patients were quarantined and wore masks. Neither precautions were successful. In the end, most doctors felt “fear” was the greatest cause of the disease, as heightened anxiety reduced natural resistance. In fact, the Board of Health suggested “fear should have been entered into the death certificates” as the true cause of death. Likewise, Dr. Rupert Blue, Surgeon General of the Public Health Service (PHS), shared the sentiment, asserting the virus only felled 5,000 Americans and “fear and worry killed the others.”<sup>64</sup>

As a transient railroad town, Las Vegas was highly affected. Dr. Hal Hewetson had been commissioned to serve in the Medical Department during World War I, staying until Armistice. He arrived to a horrific sight. By October 1918, 150 residents had been sickened by the disease. 5 new cases were reported daily, mostly accompanied by pneumonia. As sick toll rose, local doctors were understaffed and overwhelmed, and there was not enough burial space or coffins for the dead. By December, 10 new cases were reported each day and 50 had died from the disease. As the Spanish flu heightened

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<sup>64</sup> “Report of the State Board of Health,” *Appendix to the Journals of Senate and Assembly*, Vol. II, (Carson City, NV: State Printing Office, 1919), 22-23.

public fear, the railroad was forced establish improved public health precautions. It enforced control measures, including isolation, personal hygiene requirements, the use of disinfectants, and prevented public gatherings. The railroad also issued a hygiene list to employees:

1. Ventilators in office should be kept freely open, and if there is heat in the building the temperature of the quarters would not be permitted to go over 68 degrees.
2. At noon all windows of offices should be opened and the rooms cleared of all clerical help possible during lunch time.
3. Avoid crowds and congregating in groups.
4. Elevators should not be crowded.
5. Everyone coughing and sneezing should do so in handkerchiefs.
6. Use individual drinking cups.
7. Keep hands clean by frequently washing, as they are conveyers of disease germs.
8. Do not visit anyone suffering from "Influenza," "Pneumonia," and "Epidemic Colds."
9. Remember that the germs of "Flu" and "Pneumonia" are found in the discharges from the mouth and nose of not only those so infected, often in persons who seem to be healthy.
10. Avoid getting feet and clothing wet.
11. Protect others by observing these health rules just as you would have others protect you.

The public health measures had little effect on isolating the virus. But by the end of 1919, the Spanish flu became less lethal and eventually disappeared from Las Vegas.<sup>65</sup>

Throughout the 1920s, the health of railroad workers and their families was generally fair. Respiratory diseases, such as pneumonia and tuberculosis, was the biggest menace, contributing to 20 percent of all deaths in Nevada. But there were no large-scale epidemics, thanks to the newly-instated public health precautions and advances in

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<sup>65</sup> The armistice, which ended World War I, occurred on November 11, 1918. See Doctor Commissioned for Military Service," *Las Vegas Age*, (July 21, 1917); "Dr. Hal Hewetson," Cahlan Collection, Box 24, Folder 99, Nevada State Museum Historical Archives; Philip I. Earl, "Spanish Flu Bugged Nevada in the Early 1900s," *Reno Gazette-Journal*, (May 14, 2000); Spanish Flu Precautions," 1919, Union Pacific Collection, Union Pacific Railroad Law Department, Employees General, Box 58, File 50, University of Nevada, Las Vegas Special Collections.

immunizations. The Public Health Service (PHS) instructed communities and industries to protect their water supply from sewage and industrial waste, preventing cholera and typhoid fever, and monitored residents for disease-carrying mosquitoes and flies. Additionally, the Board of Health distributed smallpox, diphtheria, and other vaccines to Clark County. Consequently, death rates in diphtheria declined significantly; Clark County reported only two fatal cases in 1927. While the vaccinations were beneficial, workers often elected not to take them. When news spread that poor protection of vaccination sores and impurities caused deaths, they refused treatment. Many were weary of advances in medicine.<sup>66</sup>

### Roadside Health

The Salt Lake Road's occupational health program emerged out of an effort to quell little accidents. Indeed, minor injuries were the biggest menace to workers. Even doctors were subjected to them. While jumping the track with a gasoline speeder, Dr. Hal Hewetson broke his leg. After setting the fracture himself, he traveled to Los Angeles with Roy Martin for treatment. In response, the railroad instituted a Safety First campaign in 1913. Safety First was the brain child of Ralph Richards, created for the Chicago and North Western Railroad in 1910. Since most workers died from little accidents, he proposed a program based on "common sense." If the railroad industry limited minor injuries, there would be an overall reduction of casualties. Richards created the motto: "It is better to cause a delay than an accident." The slogan Safety First

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<sup>66</sup> By the end of the decade, scarlet fever erupted in 4 counties, resulting in one death and 14 cases in Clark County. From 1927 and 1928, another influenza outbreak occurred, with 5,000 cases and 51 deaths. Clark County alone had eight cases and three deaths. Edward Hamer, the State Board of Health Secretary, expressed skepticism to the accuracy of these statistics; many physicians may have misdiagnosed cases as pneumonia when "without question that influenza was the primary cause of the condition resulting in death." See Biennial Report of the State Board of Health, *Appendix to the Journals of Senate and Assembly*, Thirty-First Session, Vol. II, (Carson City, Nevada: State Printing Office, 1923), 7; Annie Blachley, *Pestilence, Politics, and Pizzazz*, 20-22.

was genius, implying that safety was the most important part of the job. By all appearances, the workers' health was top priority. At first, the program was difficult to implement, as many managers continued to focus on production numbers. However, the technical press eventually publicized it, and Safety First appeared in most railroad companies. Ultimately, the broadening of workplace safety was tied to economics. Safety First corresponded with the Federal Employers' Liability Act of 1908, which made workplace injuries very expensive. Decades prior, the railroad industry took chances with long working hours and cheap equipment. But, facing mounting financial obligations, it slowly encouraged safety after the 1910s.<sup>67</sup>

Safety on the Salt Lake Road reflected national trends. From 1905 to 1913, accident rates were high and safety procedures loosely adhered to. But rising media scrutiny, traffic density, and collisions encouraged the railroad to install modern safety equipment. It invested in automatic signals and major extensions in block signaling, improving the ability to communicate and control trainmen. By 1916, the railroad spent \$400,000 on a block-signal system. It was very effective. Collisions significantly decreased and by 1922, the railroad had blocked nearly 45 percent of the main track and installed 21 percent with automatic signals. To augment the equipment, it also announced the inauguration of a Safety First campaign, writing a bulletin to employees:

We are each of us, in truth, our brother's keeper, and once convinced of the seriousness of the situation and the large field for intelligent effort, we believe that all will lend to the movement that mutual helpfulness and cordial cooperation which is so essential to the success of any undertaking.

The railroad described the Safety First campaign as removing "the causes of fatalities and accidents." It appointed a committee on safety and efficiency, which conducted studies

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<sup>67</sup> "Dr. H.L. Hewetson Injured," *Las Vegas Age*, (March 30, 1907); Aldrich, *Death Rode the Rail*, 190-191; Welke, *Recasting American Liberty*, 35-37, 38, 41, 59, 225.



on the cause and prevention of accidents, and provided recommendations. By 1914, the railroad submitted an annual report to the Safety and Efficiency Bureau. It revealed that employees were able to 50 percent of the recommendations. While 16 trespassers died, there were no passenger fatalities and 3 worker deaths. More importantly, only 30 workers received injuries, a one-third reduction from the previous year. While the Safety First campaign could not remedy the “trespasser evil,” the railroad achieved real results within a year.<sup>68</sup>

After the Union Pacific acquired the railroad, it expanded the “Safety First” program to comply with new Interstate Commerce Commission (ICC) regulations. The new program ultimately enhanced conditions on the road. The company formed a safety department headquartered in Los Angeles, hosting monthly meetings. In 1924 alone, it held 99 meetings, made 2,149 safety recommendations, and published 1,579 safety bulletins for workers. The company also created signal tests to demonstrate efficiency, observing signals by trains and engine crews, telegraphers, and dispatchers. In an effort to improve medical care, it built an emergency hospital in Los Angeles. While only used for short-term trauma, it also temporarily housed employees with serious injuries and illnesses on route to a main hospital. Lastly, the company improved overall maintenance of equipment and track, rehabilitating the main line and branches. It replaced bridges, installed firefighting equipment, rehabilitated decayed buildings, oiled tracks to settle the dust, and built safety railings. In southern Nevada, the company replaced zinc-treated/redwood ties with creosoted ones, reducing general maintenance cost and

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<sup>68</sup> “Salt Lake to Protect Men: Conservation of Lives Is the Watchword,” *Los Angeles Times*, (October 26, 1913); Block Signal on Salt Lake: Railroad Officials Announce Plans to Spend Large Sum for Safety,” (May 19, 1916); Human Lives The Safeguard: Salt Lake Issues Remarkable Report Showing Scarcity of Fatalities,” *Los Angeles Times*, (November 22, 1914).

bettering the track conditions. Unlike the past employer, Union Pacific constantly improved its equipment, purchasing heavier steel and applying higher standards for material. It organized inspections, utilizing research from Omaha on detecting broken metals, and investigated failures due to material or human error. Overall, Union Pacific's acquisition of the railroad changed the face of occupational health. By modernizing and adhering to stricter safety procedures, the company reduced engine failures, breakage, and personal injuries on the railroad, improving conditions for both workers and the public.<sup>69</sup>

The Union Pacific promoted occupational safety in several ways. First, it drew for their employees the analogy that workplace safety was similar to a baseball game. Players should know the rules of the game. Hiring a new employee was like choosing a player for your team. Someone with inferior sportsmanship would not be retained as a first basemen. This was also the case in selecting a trainman. If rules were violated in a game, players were thrown out. Similarly, workers that do not follow safety rules would be eliminated from the company.<sup>70</sup> Second, the Union Pacific involved employees in contests that promoted safety. The company submitted its units, Union Pacific Railroad, Oregon Short Line, Oregon-Washington Railroad and Navigation Company, and the Salt Lake Road, in nationwide contests such as the E.H. Harriman Memorial Medals and National Safety Council awards. Throughout the 1920s, the Union Pacific consistently

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<sup>69</sup> F.H. Knickerbocker E.E. Calvin, June 19, 1926, Letter, Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections.

<sup>70</sup> The American Railway Association (ARA) created the baseball analogy, an industry trade group founded in 1892 to represent railroads in the United States. The ARA established the "rules" based on the baseball analogy and disseminated the information to American carriers. See American Railway Association, "Committee on Education Safety Program, Schedule of Activities," July 1926, Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections.

won the E.H. Harriman Memorial Medal for Class A American Steam Railroads, rewarding “superior excellence in protecting the lives and health” of workers and the public. The National Safety Council also recognized the Salt Lake Road with an individual award. From 1923 to 1927, it established a Group D safety record: only 3.49 accidents per million man-hours worked, “one of the lowest ever attained” in the classification.<sup>71</sup>

To create healthy competition, the Union Pacific established a system-wide program to promote safety as well. Founded in 1921, the Safety Banner Contest awarded the system with the lowest number of injuries to employees, passengers, and contractors, and time-lost as the result of an accident. The contest was popular among workers. According to A.S. Halsted, General Solicitor of the Salt Lake Road, the Safety Banner Contest did a “great deal of good in stimulating interest in the safety movement.” But the program was also slightly counterproductive. Since ICC classification only reported injuries that resulted in over three days lost work, competitive workers often returned to their jobs before fully healing. Halsted called it a serious problem, stressing that “fraud should not be condoned.” During its first year participating, the Salt Lake Road won second place, experiencing 4,998 injuries. It narrowly lost out to Union Pacific Railroad. While the number of injuries were still high, it was an improvement from prior years.

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<sup>71</sup> F.H. Knickerbocker to E.E. Calvin, June 19, 1926, Letter; F.H. Knickerbocker to the Union Pacific System, December 10, 1926, Letter Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections. The National Safety Council based their award on the official figures of all American lines as filed with the Interstate Commerce Commission (ICC). The Union Pacific System was as a whole also won Group A, and the Oregon Shore Line won Group C. See “Rail Safety Prize Given Local Unit,” *Los Angeles Times*, (May 10, 1928); “Union Pacific Wins Contest: Salt Lake Union Trophy Arrives Here,” *Los Angeles Times*, (May 31, 1928).

Beginning in 1936, workers also participated in a system-wide Safety Emblem Contest, awarding individuals with no operating accidents for that year.<sup>72</sup>

Overall, safety contests worked well to promote occupational health in the railroad industry. American Railway Association (ARA) calculated that in 1923, 1,866 fatalities and 148,146 injuries occurred nationally among railroad workers. By 1929, the numbers dropped to 606 fatalities and 28,706 injuries. But by the 1930s, the National Safety Council declared the safety movement had “passed the ‘rah rah’ stage” and needed redirection. Since 99 percent of workers did not want to get hurt, it suggested that occupational health programs teach safety procedures to employees rather than focusing on “enthusiasm” for accident prevention. But according to the Union Pacific, its program was not based on enthusiasm, affirming that its safety program actively and efficiently promoted worker safety. Indeed, after decades of slaughter, the railroad had become one of the safest industries in the nation.<sup>73</sup>

Another component of the occupational health program was medical care. At Las Vegas’ founding in 1905, it had no existing medical infrastructure. In fact, most of the state lacked medical recourses. In his annual address to the legislature of 1907, Governor John Sparks stressed the importance of the railroad industry in Nevada. But he also knew

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<sup>72</sup> Rules and Regulations Governing Safety Banner Contests Year 1927, Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections; E.E. Calvin to A.S. Halsted, November 5, 1923, Letter; A.S. Halsted to E.E. Calvin, Letter, November 13, 1923, Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections; W.H. Comstock to All Employees, March 7, 1924, Letter Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections; American Railway Association, Safety Section, Circular No. 254, Committee on Statistics, January 20, 1930, Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections.

<sup>73</sup> F.H. Knickerbocker to W.R. Armstrong, J.F. Long, R.L. Adamson, and W.R. Spettigue, June 25, 1930, Letter; R.L. Adamson to A. R. White, C.B. Reynolds, F. Nicholson, and J.F. Gorham, June 26, 1930, Letter, Union Pacific Collection, Union Pacific Engineering and Industrial Development, Safety Matters, Box 82, Files 21-21, Vol.1-9, University of Nevada, Las Vegas Special Collections.

it was a risky business, commenting that it took “nerve” and a “great deal of money” to construct a railroad “under the conditions prevailing in Nevada.” Nevada was unpopulated and undeveloped, stretching for “hundreds of miles or more before an object of uncertainty can be reached at the other end.”<sup>74</sup> Certainly, one of the greatest concerns of the Salt Lake Road was the lack of medical facilities in southern Nevada. This was a common theme in the American West. There were simply no clinics or hospitals to care for workers and passengers. As a result, the remote setting prompted the creation of a uniquely western form of employee-funded hospital care.

Since its founding, the railroad industry provided medical care to their employees due to the hazardous nature of work.<sup>75</sup> At first, the programs were casual. The railroads hired a “railroad doctor” or contracted with local physicians on a need basis. There were no formal contracts. By the late nineteenth century, liability concerns and labor conflict eventually encouraged the railroads to establish a formal medical system. Consequently, as Mark Aldrich demonstrates, three distinct forms of medical organizations emerged in the 1880s reflecting “the differing economic and geographic circumstances” of each

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<sup>74</sup> See “Message of Governor John Sparks,” and “Report of the Board of Health,” *Appendix to the Journals of Senate and Assembly*, Twenty-Third Session, Vol. 1, (Carson City, NV: State Printing Office, 1907), 10.

<sup>75</sup> No comprehensive scholarship exists on railroad medical programs. The best coverage is Mark Aldrich, “Train Wrecks and Typhoid Fever: The Development of Railroad Medicine Organizations, 1850 to World War I,” *Bulletin of the History of Medicine*, Vol. 75, No. 2, Summer 2001, 254-289. See also Emory Johnson, “Railway Relief Departments,” U.S. Department of Labor, *Bulletin*, 1987, 8: 39-57; and Ronald Numbers, “The Third Party: Health Insurance in America,” in *The Therapeutic Revolution: Essays in the Social History of American Medicine*, Morris J. Vogel and Charles E. Rosenberg, eds., (Philadelphia: University of Philadelphia Press, 1979), 177-200. Railroad programs are covered briefly in Henry B. Selleck, *Occupational Health in America*, (Detroit: Wayne State University Press, 1962); John Duffy, *The Healers: A History of American Medicine*, (Urbana: University of Illinois Press, 1979); William Rothstein, *American Physicians in the Nineteenth Century: From Sects to Science*, (Baltimore: John Hopkins University Press, 1992); Paul Starr, *The Social Transformation of American Medicine*, (New York: Basic Books, 1982). Most railroad histories ignore medical programs, with the exception of James Ducker, *Men of the Steel Rails: Workers of the Atchison, Topeka & Santa Fe Railroad, 1869-1900*, (Lincoln: University of Nebraska Press, 1983), which briefly discusses the Santa Fe medical department. For details on other medical programs, see Henry J. Short, *Railroad Doctors, Hospitals, and Associations: Pioneers in Comprehensive Low Cost Medical Care*, (Upper Lake: CA, H.J. Short, 1986); R. Jay Jones, *The Old Central Pacific Hospital*, (San Francisco: Western Association of Railroad Surgeons, 1961); and Logan Eib, “Pacific System’s Big Human Repair Plant,” *Southern Pacific Bulletin*, 1921, 10: 3-5.

carrier. The first form existed in the East and Midwest. Most carriers established contractual arrangements with local physicians. But they did not build company-run hospitals or require employees to contribute to a health plans. The system only covered work-related injuries, not illnesses. The second model, instituted by the Baltimore & Ohio Railroad (B&O), was a mutual-benefit society. Following strike agitation in 1877, the B&O established a beneficiary plan offering health care and workmen's compensation to workers. The program contracted with hospitals in major cities to provide free medical care. Members were entitled to medical care for injuries and illnesses from several hundred doctors practicing on the B&O route, as well as relief payment for injuries. Ultimately, the program reduced lawsuits because employees that sued the company forfeited benefits.<sup>76</sup>

The third form existed in the West. Due to low population, carriers faced an almost complete lack of medical resources. As a result, they developed an employee-funded occupational health organization that provided medical services and built company-run hospitals. The carriers' motives were twofold. While humanitarianism motivated this workplace advancement, they sought to maintain a healthy labor force to protect profits. The Central Pacific Railroad was the first railroad to create such a medical organization, patterning its health plan and hospital after the U.S. Marine Hospital Service. In the late 1860s, the carrier employed a salaried chief surgeon and division/district surgeons, as well as contracting local surgeons for major emergencies. It established a temporary hospital in Sacramento and by 1870, built a permanent structure with 125-bed capacity. For the health care benefits, the Central Pacific charged employees 50 cents per month. The plan provided free medical care for all ailments apart

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<sup>76</sup> Aldrich, "Train Wrecks and Typhoid Fever," 258, 261-262.

from preexisting conditions or venereal diseases. All workers were required to participate except for the Chinese, who were excluded. Eventually, improvements in American hospital care prompted most large western railroads to emulate the CP model of occupational health care. In 1879, the Missouri Pacific and Texas Pacific set up identical services, and in 1882, the Northern Pacific established a hospital association and built facilities in Brainerd, Minnesota, and Missoula, Montana. By 1883, the Denver and Rio Grande joined forces with the Colorado Fuel & Iron Company to build a hospital in Salida, Colorado. The next carriers to follow suit were the Santa Fe, Wabash, Milwaukee, Great Northern, and Union Pacific. By World War I, hospital plans covered one-fourth of all railroad workers, providing medical care to nearly 2 million employees and employing 10 percent of American physicians on a full or part-time basis.<sup>77</sup>

Las Vegas posed many of the same problems for Senator Clark, along with searing heat and limited water supplies. The town's location ultimately forced him to establish a medical infrastructure in the company town, closely resembling the Central Pacific facilities in Sacramento. This move was voluntary. The Nevada Industrial Commission (NIC) did not require industries to furnish medical facilities until 1917. It also antedated the advent of workmen's compensation for interstate railroad employees. Clark's mining company also helped fund a miner's hospital in Butte, without being forced by the federal government. Before the town site auction, the railroad worked to established first aid services. Dr. Hal Hewetson arrived in Las Vegas in 1904, setting up a medical tent with four cots in the railroad yard. The railroad completed a permanent structure in 1905, officially establishing the Medical Department to "the care of sick and injured employees, but without gain or profit." For employment consideration, workers

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<sup>77</sup> Ibid., 258- 259, 264.

were required to contribute each month to receive medical benefits. In 1925, the payroll deduction was 75 cents per month. By the mid-1940s, it rose to \$3.00. The workers also signed a release discharging the company “of all liability of every character on account of any act or omission” connected to any “hospital, physician, surgeon, nurse, or any employee connected.” The monthly contributions often did not meet expenses, and management provided additional funds to ensure continued function.<sup>78</sup>

For the first few years, the workers maintained remarkably good health. There were no epidemics of small pox, diphtheria, typhoid and scarlet fevers. Hewetson remained the only railroad until the arrival of an assistant surgeon, Dr. John A. Fuller, practicing in Las Vegas from 1910 to 1917. When Fuller arrived in town, there was a full moon and the “desert seemed to pulsate with violet light glowing against the surrounding mountains. From Fremont Street, Fuller could see Block 16, the red light district, which he referred to as “the girls down the line.” “If a townsmen was down on his luck,” he recalled, “[the prostitutes] were always ready to pass the hat to help them out.” On one occasion, Fuller picked up a woman hitchhiker out of “desert courtesy,” even though he “knew what she was.” When the doctor reached the outskirts of town, the woman “insisted on getting out... because it would hurt [his] reputation to be seen in her company.”<sup>79</sup>

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<sup>78</sup> By the mid-1940s, the Union Pacific Employees Hospital Association took over the medical department. While the benefits remained the same, it adopted a Board of Directors and uniformed dues for contributors from the railroad and subsidiary/affiliated companies. See Union Pacific Railroad Employees Hospital Association; Frank Strong Letter to A.M. Folger, November 3, 1947, Letter; C.C. Barry to F.H. Knickerbocker, April 9, 1925, Letter; F.H. Knickerbocker to Officers and Employees, May 10, 1933, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employees, Box 7, File W8-1, University of Nevada, Las Vegas Special Collections.

<sup>79</sup> John A. Fuller, M.D., “Medicine in Nevada Half Century Age,” (unpublished memoir) in Blachley, *Pestilence, Politics, and Pizazz*, 17-18.



When Fuller arrived, there were no trained nurses, only untrained male attendants. He described the medical facilities as “pretty primitive.” The hospital did not have an x-ray, laboratory, or decent surgery facilities. Eventually, Hewetson rented a building to use as a hospital for 40 dollars a month, paying the cost of fuel, laundry, meals, and supplies for approximately \$500.000 per month, the amount necessary to hospitalize an of 4 patients for \$21.00 a week. The most severe cases were sent to Los Angeles or Salt Lake City. According to Fuller, doctors “accompanied patients themselves hoping to keep them alive until they reached “the City.” For example, when a worker “knocked out” his eye, Hewetson rode to Los Angeles with him. Upon his arrival, surgeons removed the worker’s eye, relieving “constant hemorrhage.” Since he made no claim, the company allowed him to draw his salary as usual, and met his railroad and hospital expenses.<sup>80</sup>

Since the company town had limited resources, the railroad hospital treated workers and their families. However, the latter was not covered under the health care plan and patients paid out-of-pocket. With limited paved roads, Fuller rode his bicycle to make house calls and deliver babies. At the same time, Dr. Roy Martin founded the Las Vegas Hospital to accommodate families. The *Las Vegas Age* described it as a “modest hospital that met the requirements of the community, the railroad, and surrounding mining camps.” By 1920, the Las Vegas Hospital installed state-of-the-art technology, including a x-ray machine similar to the equipment of any “metropolitan hospital.” All

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<sup>80</sup> Walter Bracken to K.E. Calvin, February 29, 1924, Letter; Hal L. Hewetson to Walter Bracken, April 9, 1924, Letter; and Walter Bracken Letter to Hal L. Hewetson, May 8, 1924, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Hospital Union Pacific, Box 18, File R2-56, University of Nevada, Las Vegas, Special Collections; Walter Bracken Correspondence with F.H. Knickerbocker, C.C. Barry, Guy Cochrane, and C.H. Bloom, January-March, 1925; “Martin Vetti Bill Payable to The Hospital of the Good Samaritan,” February 13, 1925, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employees Personal Injury, Box 5, File W5-6-5, University of Nevada, Las Vegas Special Collections.

the doctors worked together, routinely traveling to the various railroad sites to treat workers for heat prostration or other injuries. Once, Fuller went to Moapa to treat railroad workers “overcome with heat.” He found one man dead and another barely breathing, although “rigo moris had already set in.” The doctor was not surprised they died, given the scorching 135 degree temperature in the desert.<sup>81</sup>

As an enhancement to railroad medicine, several world-class physicians moved to Las Vegas to obtain a divorce. Nevada had liberal divorce laws, requiring six months residency for a divorce. Beginning in 1906, several well-publicized case in Reno revealed the state’s lenience on the issue. As historian James W. Hulse explains, the law permitted divorces on vague grounds such as “mental cruelty.” Entrepreneurs quickly capitalized on the industry, opening dude ranches or hotels designated for couples to establish residency and obtain a hassle-free divorce. At the same time, the marriage industry flourished. It was easy for couples to marry because Nevada did not require a waiting period or medical examinations. While Reno remained the divorce and marriage center, the budding town of Las Vegas capitalized on the industry as well. In May 1918, Dr. Silas Lewis, a prominent surgeon from New York, arrived in Las Vegas. Described as a “middle aged, distinguished looking man wearing a Van Dyke beard,” he brought his two children and a young nurse. After staying in the town for a week, Lewis decided to remain permanently and became associated with Martin’s Las Vegas Hospital. Local residents were flattered that a prominent physician chose to practice in town, especially since World War I created a scarcity of doctors and nurses. Lewis was ultimately instrumental in helping the town fight off the Spanish flu. Nonetheless, after remaining

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<sup>81</sup> Rigo Mortis is caused by coagulation of muscle proteins, causing a progressive stiffening of the muscles. This typically occurs after death. “Las Vegas Hospital,” *Las Vegas Sun*, February 2, 1907; “Can See Though Things Much Better Than Before,” *Las Vegas Age*, November 13, 1920.

in Las Vegas for six months, the doctor obtained a divorce from his wife, scandalously married his nurse, and left to establish a practice in Beverly Hills.<sup>82</sup>

During the 1920s, rumors of a proposed dam project enticed physicians to move to town, further supporting the medical infrastructure. Martin hired Dr. Forest Mildren, bought the Palace Hotel, and converted it into the Las Vegas Hospital. The hospital opened in 1920, with 8 rooms and operating facilities. At the same time, Hewetson, convinced the railroad to build a new hospital for workers. He suggested that Las Vegas' railroad medicine needed to reflect the standards in Los Angeles. For \$21.00 per week, Hewetson sought to provide between first aid and surgical care. He contented that it would "cost the company less than at present and give the employees the desired care and attention necessary." The railroad complied, remodeling a former rooming house. The Hewetson Hospital had 14 beds and a nursery, with a wing indigents. Hewetson lived on the ground floor of the building. Throughout the 1920s, the Las Vegas Hospital and Hewetson Hospital adequately served the community until dam construction demanded larger facilities.<sup>83</sup>

By 1929, the existing medical infrastructure could not adequately provide for the growing community. After Hewetson's retirement and subsequent death in 1932, the railroad contracted out medical care to Drs. Ferdinand Ferguson and R.D. Balcom,

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<sup>82</sup> In most states, it was difficult to obtain a divorce because the law required long separations before remarriage or other barriers. In the mid-1920s, columnists began covering Nevada's divorce industry and hundreds of women traveled to Reno to get "Reno-vated." By the late 1920s, the Nevada divorce trade boomed after Mexico and other jurisdictions relaxed laws as well. Moreover, the legislature reduced residency requirements to only three months in 1927 and six weeks in 1931. Celebrities, socialites and dignitaries flocked to the state to dissolve their marriages. See Hulse, *The Silver State*, 199-200; New Physician for Las Vegas Hospital," *Las Vegas Age*, (May 18, 1918); Elizabeth Harrington, "Dr. Martin and the First Las Vegas hospitals," *The Nevadan*, Supplement of the *Review Journal*, (February 6, 1977).

<sup>83</sup> Walter Bracken to K.E. Calvin, February 29, 1924, Letter; Hal L. Hewetson to Walter Bracken, April 9, 1924, Letter; Walter Bracken to Hal L. Hewetson, May 8, 1924, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Hospital Union Pacific, Box 18, File R2-56, University of Nevada, Las Vegas, Special Collections.

transferring them the Hewetson Hospital. Ferguson and Balcom sought to provide healthcare insurance to not only workers, but also their families. They organized the Guaranteed Medical Service, Inc., a health plan that provided medical, surgical, and dental attention to families at a yearly cost. But the situation continued to worsen for local medicine. After running into financial problems, Martin closed the Las Vegas Hospital. It could not have come at a worse time. Thousands of potential dam workers, seeking work during the economic depression, had flooded the valley. Las Vegas not only lacked housing but also medical facilities to accommodate the influx. The situation prompted Martin, Ferguson, and Balcom to form the Las Vegas Hospital Association. The doctors pulled together their resources, constructing a two-story structure in 1931. Costing \$100,000, it had 35 beds, a laboratory, maternity ward, x-ray machine, 5 treatment rooms, a tilting operating table, and advanced lighting system in the operating room. Drs. John R. McDaniel and Clare W. Woodbury later joined the Las Vegas Association. Mildren, mistreated by his associates, eventually broke away and opened the Mildren Clinic. The Las Vegas Hospital Association eventually dissolved over a series of disagreements between Martin and his associates, and the hospital was renamed the Las Vegas Hospital and Clinic, which served the community until the 1970s.<sup>84</sup>

While the railroad initially contracted with Ferguson, it actively sought a permanent replacement for Hewetson. It first appointed Dr. H.C. Vander Meulen, but was unhappy with his performance. Dr. J.C. Landenberger, Chief Surgeon of the Union

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<sup>84</sup> Walter Bracken to Phillip Stephens, September 23, 1929, Letter; Phillip Stephens to Walter Bracken, November 11, 1929, Letter, Walter Bracken Files, Hospital Union Pacific, Box 18, File R2-56, University of Nevada, Las Vegas, Special Collections; "Guaranteed Medical Service Inc., Service Certificate and Contract," A.B. Mortensen to Walter Bracken, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Proposed Medical Hospital, Box 8, File W121-6, University of Nevada, Las Vegas Special Collections; Hopkins and Evans, "Roy Martin," 52; "The Hospitals of Clark County: Development of Medicine in a Rapidly Growing Nevada Community," *Greasewood Tablettes*, Vol. VII, No. 4, Winter 1996-1997, 1.

Pacific, decided not to appoint a local doctor to the job, contending that it aroused “envy in the remaining doctors.” He decided to select an “outsider,” Dr. Hale B. Slavin, a young surgeon from Salt Lake City. Landenberger arranged for Martin to show him around town. Slavin’s first impression of Las Vegas was that it was rather “uneventful,” and the heat in Salt Lake was “far worse.” He found Martin to be “pleasant” and “not at all selfish,” and hopeful they might “cooperate to our mutual benefit.”<sup>85</sup> Slavin assumed the position in 1934 and became the county physician in 1939. Upon his arrival, the railroad rehabilitated the Old Hospital Building that Hewetson had occupied in the early 1920s, covering all renovation costs. They did not charge Slavin rent, but required him to cover electricity and water expenses.<sup>86</sup>

By the mid-1930s, railroad workers enjoyed more health care options than previous decades, as the Union Pacific expanded coverage and options. New doctors continued to move to Las Vegas with various specialties, and Slavin began referring injured patients to them. However, the policy was tricky. In order to receive treatment from a specialist, workers had to obtain an order from Slavin. Moreover, workers had to obtain a new order for each month of continued treatment. The railroad had a hard time enforcing the policy. The workers did not have acquire orders but continued to seek treatment and bill their employer. Consequently, the Medical Department had difficulty maintaining their financial records.<sup>87</sup>

#### Volenti Non Fit Injuria

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<sup>85</sup> Walter Bracken to Dr. J.C. Landenberger, April 20, 1933, Letter; J.C. Landenberger to Walter Bracken, April 24, 1933, Letter; Hale B. Slavin to Walter Bracken, June 14, 1933, Letter; Walter Bracken to J.C. Landenberger, Memo; LVL&W Co. Walter Bracken Files, Hospital Fund, Box 7, File W8-1, University of Nevada, Las Vegas Special Collections.

<sup>86</sup> F.H. Knickerbocker to Walter Bracken, July 24, 1933, Letter, LVL&W Co. Walter Bracken Files, Old Hospital Building, Box 16, File R-42, University of Nevada, Las Vegas Special Collections.

<sup>87</sup> H.H. Larson to All Employees, May 16, 1939, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employees, Box 7, File W8-1, University of Nevada, Las Vegas Special Collections.

As occupational health initiatives improved working conditions, personal injury suits also gained momentum. During the nineteenth century, most proceedings favored employers. Employees rarely won large settlements. Moreover, personal injury suits seldom occurred in remote industrial areas because attorneys typically lived in urban settings. But after the Civil War, the number of lawyers skyrocketed, especially among first and second generation immigrants specializing in personal injury litigation. As John Fabian Witt explains, the legal profession expanded nearly 150 percent from 1870 to 1900. From 1890 to 1900, the number of native-born lawyers with immigrant parents also grew 80 percent. The lawyers created a new group of professionals associated with the working class. As their numbers grew, competition inspired a new type of business. Lacking traditional connections, the lawyers solicited injured workers to file personal injury claims. Several created a system of “runners” who provided case leads, paying off workers and policemen alike. Others committed fraud, fabricating claims and accepting questionable settlements for under-the-table payments. At the same time, corporate defenders developed unethical strategies, exploiting overlapping jurisdiction rules of the federal and state courts. Some railroad carriers paid employees not to testify on a coworkers’ behalf, and insurance agents approached injured workers to sign off on settlements. Defense attorneys struck corrupt bargains with the plaintiffs’ counsel. By the twentieth century, personal injury litigation had developed a nasty reputation. Elon R. Brown, a New York politician and lawyer, observed in 1908 that personal injury litigation was “marked by a lower tone of professional ethics of the Bar.” It contributed to “the sentiment, all too prevalent, that litigation is speculative and that the views of the

lawyers and judges in any particular case are haphazard.” Likewise, Walter Bracken referred to lawyers as “sharks” that got a hold of workers.<sup>88</sup>

In response to rising personal injuries costs, the Salt Lake Road established a legal department in 1913, headed by attorney Frank R. McNamee. The son of Irish immigrants, McNamee moved from to mining boomtown Eureka in 1883 and was admitted to the Nevada Bar in 1895. Serving as District Attorney for Lincoln County from 1896 to 1903, he practiced in both Delmar and Caliente. After his son, Leo, passed the Nevada Bar and Las Vegas was established as the Clark County seat, the McNamees founded McNamee & McNamee in town, opening law offices in Los Angeles in 1912 and Las Vegas in 1913. The railroad ultimately appointed McNamee as General Attorney because of his experience with Nevada law, and his son as Assistant General Attorney in 1915. The McNamees eventually became a staple of the Las Vegas legal community, retained by Salt Lake Road and Six Companies, Inc., the builders of Hoover Dam. Additionally, after Union Pacific assumed control of the railroad, the McNamees worked alongside the company’s legal team until 1946. The McNamee’ law firm remained open in Las Vegas until 1978, spanning four generations of the family.<sup>89</sup>

The railroad’s legal department usually fought damage claims rather than settle, basing its cases on the general principles of American employers’ liability law. In 1910, journalist John Gitterman wrote on the dangers of working in the railroad industry, implying that fatalities were a part of daily operations and the American court system

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<sup>88</sup> Witt, *Accidental Republic*, 59, 62; Elon R. Brown, “Some Faults of Legal Administration,” in New York State Bar Association, *Proceedings of the Thirty-First Annual Meeting Held at New York, January 21, 24-25, 1908*, (Albany, NY: The Argus Company, 1908), 142; Walter Bracken to W.H. Comstock, July 8, 1918, Letter, Union Pacific Collection, Claims for Damages and Personal Injury, Box 15, File R-14, University of Nevada, Las Vegas Special Collections. For complete coverage of law of accidental injury, see Welke, *Recasting American Liberty*, 81-124.

<sup>89</sup> Finding Aid, Nevada State Museum, Las Vegas for MS-58 McNamee Collection, Nevada State Museum and Archives, Las Vegas, Nevada.

greatly mishandled accident litigation. Moreover, Gitterman revealed the law of employers' liability. If a person objected to working in hazardous conditions, he had "the privilege of throwing up his job." A worker was "not a slave." He could not "be compelled under his broiler, or have head scraped off while attempting to couple cars."<sup>90</sup> Therefore, employers' liability was based on employees' assumption of risk, or the Latin phrase *volenti non fit injuria*, "there is no injury to one who consents." A 1895 tort law handbook explained that "no action can be maintained for damages resulting from conduct suffered by consent." The McNamees based most of their cases on the assumed risk doctrine. In *Kuckenmeister vs. Los Angeles and Salt Lake Railroad Company*, a 16 year old worker lost his eyesight while grinding an emery wheel. The McNamees determined that the case would be based upon whether "the minor was warned" of the danger and if "goggles were available." They argued that assumption of risk was "wholly dependent upon the servant's knowledge." While the doctrine was negated if an employee was youthful and "did not know or appreciate the dangers [to which] he was exposed," the railroad had clearly revealed the "dangers of employment." The worker was injured "by a known risk of employment assumed by him." Since he knew "the risks of the work in which he [was] engaged," the worker could not "recover for injuries caused by his inattention to his surroundings, and failure to take due precautions against known or obvious dangers." The McNamees concluded that the "disobedience of rules or orders" do not "merit negligence" on the employers fault.<sup>91</sup>

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<sup>90</sup> The article also argued that the courts needed to create a coherent interpretation of accident laws and a system that did not exhaust the patience and resources of individuals bringing suit. See John M. Gitterman, "The Cruelties of Our Courts," *McClure's Magazine*, (June 1910), 151, 161.

<sup>91</sup> Witt, *Accidental Republic*, 50-51; Edwin A. Jaggard, *Hand-book for the Law of Torts*, (St. Paul, Minn.: West Publishing Co., 1895), 199; Frank R. McNamee to Leo A. McNamee, April 19, 1917, Letter, McNamee Collection, 1917 Legal File, Box 144, File 18, Nevada State Museum and Archives, Las Vegas,



While personal injury suits rarely provided compensation, workers had other options. Prior to 1913, the railroad offered life and disability insurance options through the National Causality Company. After the creation of the Nevada Industrial Commission (NIC) in 1913, it accepted the Nevada Industrial Insurance Act and allowed employees to purchase additional coverage with Pacific Mutual Life Insurance Company.<sup>92</sup> If an employer rejected the NIC provisions, he was denied all defenses in actions brought upon them. The courts would assume that all workplace injuries were caused by employer negligence. Consequently, Leo McNamee commented that it was “almost compulsory” for Nevada industries to accept the provisions. However, when the Union Pacific assumed control, it decided to reject the NIC. Since it was a larger company, the Union Pacific had established its own group insurance plan in 1917, covering life, permanent disability, accident, and health insurance.<sup>93</sup> It offered employees the insurance at a “very low cost” and “without medical examination,” providing they were under 60 year old and had no “lost time due to illness.” The plan deducted from their salaries in monthly installments, 60 cents per month. At the same

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Nevada; McNamee Legal Notes on *Kuckenmeister vs. Company*,” 1917, McNamee Collection, 1917 Legal File, Box 144, Folder 18, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>92</sup> The NIC stated that employees and dependents needed to file claims within 30 days of the injury and 60 days after a death. Failure to report jeopardized the right to compensation. The payment consisted of 60 percent of an employees’ monthly wage, and other statutory allowances for permanent disabilities. No awards were given if an injury was sustained from “intoxication or...willful intention to injure himself” and reduced by 25 percent if employees removed their safeguards. Moreover, “injurious practices to retard recovery or refusal to submit to surgical treatment” suspended compensation. See Leo McNamee to Walter Bracken, February 10, 1931, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Insurance, Employee Compensation Nevada, Box 7, File W9-2, W9-2-5, University of Nevada, Las Vegas Special Collections; “Information for Employers and Employees Within the Purview of the Nevada Industrial Insurance Act, Effective July 1, 1925,” Union Pacific Collection, LVL&W Co. Walter Bracken Files, Hospital Fund - Employees, Box 7, File W8-1, University of Nevada, Las Vegas Special Collection.

<sup>93</sup> By 1923, the railroad discontinued accident and health coverage, deeming it “burdensome” and too expensive. See Union Pacific System to All Officers and Employees, December 15, 1922, Letter; Union Pacific Insurance Plan for Employees, Los Angeles & Salt Lake Railroad Company Contract, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Box 16, File R-29, University of Nevada, Las Vegas Special Collections.

time, employees could purchase additional policies from several private insurance carriers.<sup>94</sup>

The final option was to rely on the Federal Employers Liability Act (FELA), which awarded damages to injured employees engaged in interstate commerce. FELA had its drawbacks. A worker could only collect compensation if the injury occurred while engaging “in commerce between any of the several States,” not commerce within a state. Eventually, FELA raised legal questions regarding the boundaries of interstate and intrastate commerce. From 1908 to 1934, the Supreme Court decided 45 cases on whether an injury occurred within interstate or intrastate lines. As John Fabian Witt explains, the court’s ad hoc decisions created contradictory legal precedents. Pumping water on an interstate train was determined interstate commerce. However, loading coal on the same train was considered intrastate commerce. Likewise, a nighttime watchman of an interstate train engaged in interstate. But if he received the injury while pursuing stolen goods from the train, it was intrastate. FELA ultimately led to much confusion.

Distinguishing between interstate and intrastate commerce for statutory or constitutional

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<sup>94</sup> See Assistant General Counsel to H.I. Bettis, June 9, 1909, Letter, Union Pacific Collection, Union Pacific Railroad Law Department, Employees General, Box 58, File 50, University of Nevada, Las Vegas Special Collections; Y.O. Yette to Dana T. Smith, December 23, 1918, Letter; E.E. Malton to Dana T. Smith, November 20, 1918, Letter, Union Pacific Collection, Union Pacific Railroad Law Department, Employees General, Box 58, File 50, University of Nevada, Las Vegas Special Collections; F.H. Knickerbocker to F.E. Pettit, November 15, 1927, Letter; Fred E. Pettit, Jr. to F.H. Knickerbocker, November 17, 1927, Letter, Union Pacific Collection, Union Pacific Railroad Law Department, Employees General, Box 58, File 50, University of Nevada, Las Vegas Special Collections. The LVL&W Co., a subsidiary of the railroad, did not receive these workmen’s compensation benefits, but were included in health benefits. By the 1930s, Union Pacific detached the LVL&W Co. from health benefits as well, officially ending the company town relationship between the railroad and Las Vegas. See Union Pacific System: Supplement to Announcement of May 2, 1933, Revision of Group Insurance Plan, June 9, 1933, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Insurance, Employee Compensation Nevada, Box 7, File W9-2, W9-2-5, University of Nevada, Las Vegas Special Collections; Union Pacific Company to W.R. Bracken, June 27, 1923, Letter, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Employee Welfare, Box 16, File R-29, University of Nevada, Las Vegas Special Collections; Leo A. McNamee to Walter Bracken, February 17, 1931, Letter; W.C. Barney to W.R. Bracken, August 2, 1932, Memo, Union Pacific Collection, LVL&W Co. Walter Bracken Files, Insurance, Employee Compensation Nevada, Box 7, File W9-2, W9-2-5, University of Nevada, Las Vegas Special Collections.

purposes was ultimately pointless. Many attorneys believed it was an unworkable concept.<sup>95</sup>

After a workplace accident, the McNamees immediately prepared to contest an form of compensation. If the injury occurred intrastate, an employee filed with the NIC. If it was interstate, he sought damages under FELA. Employees often filed under both. After the filing, the McNamees then determined “whether or not the employer and employee were engaged in interstate commerce at the time of the injury.” Since the Union Pacific rejected the NIC, FELA was usually a cheaper option. After repairman Juan Lomeli slipped on loose gravel at a railroad quarry, the District Court held that the rock was intended for repairing roadbeds in Nevada. Therefore, Lomeli engaged in intrastate commerce. This was not good for the Union Pacific. The state automatically assumed that employers were negligent, citing “the burden of proof ... upon the employer to rebut the resumption of negligence.” The McNamees did not have a case. Their only option was to argue that the injury occurred interstate, and that Lomeli assumed the risk of the job. The Union Pacific’s chief attorney, Fred E. Pettit, Jr., advised that McNamees that “a judgment would probably do against our company for the full amount of the plaintiff’s demands.” The company decided to settle. This pattern was typical among most workmen’s compensation cases, with the legal department advising the company to settle in intrastate cases. Under Nevada laws, Frank McNamee determined that the

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<sup>95</sup> By the 1930s and early 1940s, federal judges gave up on policing the boundary between interstate and intrastate commerce. In response to FELA and the Interstate Commerce Act, the Supreme Court articulated in 1938 that there was “no point” in creating a “mathematical line” between interstate and intrastate commerce. See Witt, *Accidental Republic*, 189-190; Federal Employers Liability Act, 35 Stat. 65 § 1 (1908); Lester P. Schoene and Frank Watson, “Workman’s Compensation on Interstate Railways,” 47 *Harvard Law Review* 389, 389 (1934); *Erie Railroad v. Collins*, 253 U.S. 77 (1920); *Delaware, L. and W. Railroad v. Vurkonis*, 238 U.S. 439 (1915); *Atchison, T. and S.F. Railway v. Industrial Accident Commission*, 220 P. 342 (California 1923); *Chicago and Alton Railroad v. Industrial Commission*, 125 N.E. 378 (Illinois 1919); *Alabama and Great S. Railroad v. Bonner*, 75 So. 986 (Alabama 1917).

railroad was “deprived of all ordinary defenses on account of not accepting the Compensation Act.” Unless the company exercised “great and extraordinary care” to prevent an injury, it was guilty of even slight negligence.<sup>96</sup>

### Ending the Road

By the end of the 1920s, the railroad industry had made significant strides in protecting its workforce. However, the occupational health movement as a whole was at a crossroads. While federal agencies such as Public Health Service (PHS) enjoyed broad power to oversee industrial health during World War I, its powers shifted to state and local agencies during the conservative 1920s. The enforcement of worker’s compensation laws also proved difficult. After 1910, a body of legal precedent gradually made it easier to hold negligent employers liable for job-related accidents and pay compensation to injured workers—a dramatic shift from nineteenth-century practices. As a result, insurance companies did a brisk business-selling worker’s compensation policies to employers during and after the war. However, the 1920s was predominately pro-business, as relations between the various Republican administrations and big business flourished. Employers held off reformers by lobbying sympathetic lawmakers, actively contesting suits in court, and hiring physicians who questioned whether workers’ diseases could be traced to the workplace rather than to the neighborhood and home. In most cases, conservative judges ruled in favor of management, a trend that discouraged

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<sup>96</sup> Walter Bracken to F.H. Knickerbocker, September 30, 1924, Letter, Union Pacific Collection, LVL&W Walter Bracken Files, Legal Matters, Box 15, File R-33, University of Nevada, Las Vegas Special Collections; F.R. McNamee to W.C. Hussey, July 3, 1925, Letter; F.R. McNamee to W.C. Hussey, June 19, 1925, Letter; F.R. McNamee to W.C. Hussey, June 19, 1925, Letter; Fred E. Pettit, Jr. Letter to F.R. McNamee,” October 13, 1925, Letter; F.R. McNamee Letter to F.W. Chiswell,” March 16, 1925, Letter; W.C. Hussey to Leo A. McNamee, April 5, 1926, Letter; Leo A. McNamee to W.C. Hussey, April 8, 1926, Letter; McNamee Collection, 1926 Legal File, Box 145, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

personal injury litigation. Still, legal pressures forced many big employers to invest in occupational safety and even fund academic research into occupational job issues.

At the onset of the great depression, the occupational health movement continued to wane. 25 percent of Americans faced unemployment, but the ones with jobs suffered too. Forced to accept low salaries and endure long hours, industrial workers confronted dangerous and unsanitary working environments to ensure their employers remained in business. While in previous decades workers fought to better their working conditions, most felt lucky to have a job. Additionally, towns and counties hosting highway construction, dam building, and other large public workers projects were confronted with massive increases in population they could not support. While Las Vegas had grown significantly since 1905, the announcement that Hoover Dam would be built 30 miles away prompted thousands of unemployed men to flood southern Nevada. Suddenly, the town's population spiked tenfold. After years of relative success in occupational and public health in the town, Las Vegas could no longer provide the adequate living arrangements, medical care, and public health standards needed to accommodate the new residents. Throughout the 1920s, the railroad had gradually relinquished its paternalistic responsibility to Las Vegas as well. Since it was no longer a company town, the railroad stopped protecting the town's public health. Las Vegas needed to fend for itself, turning to its county health department. However, it was understaffed and underfunded. When Chief Surgeon of the Union Pacific, Dr. J.C. Landenberger, visited the town in 1930, he was horrified. The doctor commented that Las Vegas was "probably the most unsanitary in the country" and if not the worst, "a decidedly close race for honors." The *Review-Journal* agreed, writing that conditions that existed downtown "would be permitted in no

other city in the United States.” It declared that the town was “courting disaster to the health of the community.” Las Vegas could no longer provide for the health of southern Nevada.<sup>97</sup>

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<sup>97</sup> Gerald Markowitz and David Rosner, “*Slaves of the Depression: Workers’ Letters About Life on the Job*, (Ithaca and London: Cornell University Press, 1987), 3; “They Court Disaster,” *Evening Review-Journal*, February 11, 1930.

## CHAPTER 2

### THE DAM

We make no contention that carbon monoxide is not dangerous under certain circumstances and in sufficient concentration. Our position is, and we have proved it, that there is no sufficient concentration of carbon monoxide in any said tunnels at any time to be in the slightest degree dangerous.

Six Companies Inc. (1931)

Nine states did not have a Veterans Bureau Hospital in 1931. All but four had medical institutions such as naval hospitals or services provided by the Public Health Service (PHS). Three of the remaining four, South Carolina, Vermont, and Delaware, had contracts with private hospitals to care for their disabled veterans. And then there was one.

Nevada was the only state with no federal hospital and no provisions made for the care of disabled veterans. The American Legion, a congressionally chartered veteran organization, launched a campaign to contract the creation of a hospital for the diagnosis, care, and treatment of Nevada's veterans. It presented the cause to the Subcommittee on World War Veterans in Washington D.C. on January 23, 1931, stressing the need for a hospital based on the impending reclamation project in southern Nevada. In 1928, Congress had passed the Swing-Johnson Bill, which authorized construction of a dam at Black Canyon to harness the Colorado River's enormous power. Southern Nevada's veteran population ranged between 5400 and 7000 men in early 1931. But the American Legion worried that the "Boulder Dam situation" would aggravate this number.<sup>98</sup> In fact, the U.S. Employment Service, in charge of hiring for the Boulder Canyon Project,

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<sup>98</sup> For a detailed account of the attempt to build a Veterans Hospital in Nevada, see "H.R. 10449 – A Bill to Authorize the Erection of a Veterans Bureau Hospital in the State of Nevada, and to Authorize the Appropriation Thereafter," January 23, 1931, Veterans Bureau Hospital for Nevada Area Report to Subcommittee of World War Veterans Legislation, January 23, 1931, Washington D.C., 1-3, 7-8, 11, George W. Malone Collection, University of Nevada, Las Vegas Special Collections.

advertized it would give preference to “ex-service men who have served in the World War, the Philippine insurrection, or the War with Spain... as far as practicable for employment...”<sup>99</sup> Southern Nevada did not have the medical infrastructure to accommodate the massive influx. A Veterans Bureau Hospital seemed the logical solution.

The campaign worked. Congress allocated a \$625,000 Veterans Hospital to the Nevada and began evaluating possible sites. Requirements included at least 30 acres for the building site, and close proximity to city water, sewer, power and electricity.<sup>100</sup> Reno, Ely and Las Vegas built their case for the hospital. Reno made a “particularly strenuous” effort, enlisting the help of the Southern Pacific Railroad, though they “indicated that they were sure of getting it.”<sup>101</sup> Nevertheless, Las Vegas had a persuasive case. The Las Vegas Chamber of Commerce appointed a committee to aid the local American Legion post. Next, it solicited the Union Pacific for help. If the railroad donated 30 acres of land, it would be “repaid from a financial as well as moral standpoint.” Passenger fare revenues from veterans visiting the hospital would pay for the land, and water rental by the government would be “very large.” The committee also stressed the threat of Reno, commenting that “their influence, both political and otherwise, is very great, and it will take great effort to obtain this hospital for Las Vegas.” Most importantly, if the hospital went to Reno, the Union Pacific could not “possibly get

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<sup>99</sup> Leonard Blood to J. Dayton Smith, April 11, 1931, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10; and Leonard Blood Collection at the University of Nevada, Las Vegas Special Collections.

<sup>100</sup> American Legion Post No. 8 to Carl R. Gray, March 24, 1931, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections.

<sup>101</sup> Las Vegas Nevada Chamber of Commerce to Carl R. Gray, March 25, 1931, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections.



any benefit from it.” The railroad accepted the offer, authorizing Walter Bracken to donate or require a “very reasonable charge” for over 20 acres north of the railroad yard.<sup>102</sup>

After securing the Union Pacific, the committee began preparing its case, arguing that it was a “practical and logical location” because of its railroad facilities and water supply. After the completion of the dam, southern Nevada would also have “the cheapest power in the world.” But above all, the region desperately needed a boost to its medical infrastructure. As a whole, the southwest had no veteran facilities. One conservative estimate had at least 1500 veterans living in southern Nevada, western Arizona, western Utah, and a great portion of southern Nevada. Additionally, southern Nevada had a bright future for growth, citing Hoover Dam. Swing-Johnson gave ex-servicemen employment preference under law, which would contribute to a sharp rise in veteran population. Leonard Blood, Superintendent of the U.S. Employment Office, expected “thousands” of veterans to apply, estimating the workforce would be 50 percent veteran.<sup>103</sup>

By 1931, the Las Vegas medical infrastructure was grossly insufficient. The American Legion described it as “extremely inadequate or more properly, entirely wanting.” In previous decades, personalized care provided by Drs. Roy Martin and Hal

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<sup>102</sup> The Union Pacific ultimately decided to donate the land. See Wm. L. Scott to Carl R. Gray, March 24, 1931, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections; F.H. Knickerbocker to W.R. Bracken, March 19, 1931, Letter; Walter Bracken to Carl R. Gray, April 1, 1931, Letter, Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections.

<sup>103</sup> J. D. Smith Proposal to the Federal Board of Hospitalization: In the Matter of the Application for the City of Las Vegas, Nevada for a Veterans Hospital; Ryland Taylor to J.D. Smith, April 11, 1931, Letter; Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections; Leonard Blood to J. Dayton Smith, April 11, 1931, Letter.

Hewetson were high regarded. But Las Vegas never fully modernized its hospitals, lacking surgical facilities and enough beds. The town was “completely reliant” on southern California, which was “crowded beyond capacity” as well. In one case, it took 45 days for a local veteran to get a bed. Since southern California was full, he had to travel to Wyoming. This was a common scenario. To be admitted in southern California, it took several weeks. The American Legion called the lack of hospital facilities in the southwest “notorious.”<sup>104</sup>

Local residents developed the theory that southern Nevada’s climatic and health conditions would offset the competition. The railroad worked on the “theory that climatic conditions are very much superior to the northern part of the state.” Even Dr. J.C. Landenberger supported the idea. While he considered the public health conditions to be unacceptable, Las Vegas was an ideal location for a “tuberculosis sanitarium” due its altitude and dry climate. Local doctors agreed. “To simply say the ‘climate is health’ is entirely inadequate,” wrote Dr. Roy Martin. Southern Nevada had the healthiest climate in the state. Dr. Ferdinand Ferguson emphasized that Clark County’s death rate was “one-half of the average death rate for the country.” Moreover, infections were “very rare” and mortality “practically negligible,” and patients enjoyed outdoor life “at all times of the year.” Drs. R. D. Balcom and Forest Mildren contended the dry climate was “conducive to the cure of tuberculosis” and better suited for a tuberculosis sanitarium than Arizona and New Mexico. Dr. John McDaniel also observed the climate was good for nephritics, asthmatics, and sinus conditions. Southern Nevada had an absence of fog, smoke and dust in the air, and high percentage of sunshine. These factors sped up a patient’s recovery. Lastly, Dr. H.C. Vander Meulen anticipated southern Nevada needed

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<sup>104</sup> J. D. Smith Proposal to the Federal Board of Hospitalization.

a hospital based upon dam construction and its aftermath, predicting that Las Vegas would grow into a “resort and tourist center,” and experience “industrial growth.” The location was also “readily accessible” to the railroad line. The doctor predicted that the workers would confront numerous hazards at the dam. “Already we are handicapped for accommodating disabled veterans,” he concluded, and with Hoover Dam, “this is going to increase.”<sup>105</sup>

Las Vegas ultimately lost the bid to Reno. While southern Nevada desperately needed to expand its medical infrastructure to accommodate dam workers, due to statewide politics the Veterans Bureau awarded the hospital to Reno. Indeed, this event would contribute to a North-South split in the Nevadan medical community, which persisted throughout the twentieth century. While it is impossible to determine if a veterans hospital would have saved lives at Hoover Dam, one thing is clear. Southern Nevada was completely unprepared to support of the health its workers.<sup>106</sup>

### The Boulder Dam Situation

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<sup>105</sup> Walter Bracken to C.R. Gray, July 7, 1931, Letter; A.L. Coey to W.R. Bracken, February 19, 1933, Letter; H.C. Vander Meulen to Whom It May Concern, March 31, 1931, Letter; Roy W. Martin to Whom It May Concern, Letter; F.M. Ferguson to Whom it May Concern, Letter; R.D. Balcom to Whom it May Concern, April 7, 1931, Letter; F.R. Mildren to Commander of the American Legion, April 11, 1931, Letter; J.R. McDaniel to Whom It May Concern, Letter; Forest R. Mildren to Whom It May Concern, March 25, 1931, Letter; Union Pacific Collection, LVW&L Walter Bracken Files, Proposed Veterans Hospital, Box 10, File W-16-3-10, University of Nevada, Las Vegas Special Collections.

<sup>106</sup> Southern Nevada did not receive a Veterans healthcare system until 1972. However, the service comprised of clinics and outpatient facilities. In 2006, the Veterans Southern Nevada Healthcare System broke ground of a New Las Vegas Hospital and Community Living Center. While the 1930s Veterans Hospital debate divided the Nevadan medical community, the establishment of the University of Nevada, School of Medicine further solidified the split. The politics of forming a medical school in Reno accentuated tensions, only allocating major clinical programs and residencies to Las Vegas. While the program was deemed “truly statewide and a school without walls,” many Las Vegas physicians resented Reno for housing medical education and research. The arrangement has ultimately hurt Las Vegas’ quality of health care. See “The Formulation of the School of Medicine,” Richard G. Pugh, *Serving Medicine: The Nevada State Association and the Politics of Medicine*, (Reno: Greasewood Press, 2002), 40-57.

In 1923, Congressmen Phil Swing and Senator Hiram Johnson led a legislative effort that introduced the first Boulder Canyon Project Act.<sup>107</sup> However, before Congress could appropriate funds, it needed to determine a location for the dam. Since 1902, government hydrographers and geologists identified potential sites on the lower Colorado River. As historian Joseph Stevens reveals, three factors influenced the location: the geological and topographical nature of the site, the water and silt-storage capacity of the reservoir, and proximity to the railroad and markets for hydroelectric power. Applying this criteria, the Bureau of Reclamation narrowed the choice to two sites: Black and Boulder Canyons, situated 20 miles apart and southeast of Las Vegas. During the study, the project experienced its first fatality. In 1922, a reclamation worker slipped off barge and drowned in the Colorado River. In a bizarre twist of fate, his son fell to his death from an intake tower 13 years later. Father and son were the first and last to die on the project.<sup>108</sup>

Congress deliberated on a bill soon after. By December 1928, President Calvin Coolidge approved the Boulder Canyon Project Act, which authorized the construction of a dam and reservoir by the Secretary of Interior. It was an ambitious project. Hoover

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<sup>107</sup> The name of the dam is often confusing. At first, Congress called it “Boulder Dam” because it assumed Boulder Canyon would be the construction site. In 1930, Secretary of Interior Ray Lyman Wilbur named the structure “Hoover Dam” to honor President Herbert Hoover. Three years later, President Franklin D. Roosevelt’s Secretary of Interior, Harold Ickes, renamed it “Boulder Dam.” In 1947, Congress officially titled it “Hoover Dam.” See David P. Billington and Donald C. Jackson, *Big Dams of the New Deal Era: A Confluence of Engineering and Politics*, (Norman: University of Oklahoma Press, 2006), 105, 144-146. In this chapter, “Hoover Dam” references all eras of the dam. Most workers and doctors never accepted the name change.

<sup>108</sup> Joseph E. Stevens, *Hoover Dam: An American Adventure*, (Norman and London: University of Oklahoma Press, 1988) is the best comprehensive coverage of the history of Hoover Dam. See also Guy Rocha, “The Death Throes of American Syndicalism,” *At The Point of Production: The Local History of the I.W.W.*, (Greenwood Press: Westport, Connecticut and London, England), 214-217, 221-222 and R.T. King, *Hoover Dam and Boulder City, 1931-1936: A Discussion Among Some Who Were There*, (Reno: Oral History Program, University of Nevada-Reno, 1987); “Fatalities – Boulder Canyon Project: Accidental Deaths on the Job,” Frank “Doc” Johnson Papers, 1 of 5, Boulder City Historical Society Museum Special Collections, and Stevens, *Hoover Dam*, 249-250 for a brief discussion of the workers’ theories regarding the vagaries of fate.

Dam would be the highest dam project in the world, towering 700 feet, and host the largest reservoir in the world. Reclamation expected the dam would take six years to complete. Construction was slated to begin in 1931, with the first units operating in 1935. To construct the dam “efficiently and economically,” Secretary of Interior Ray Lyman Wilbur determined that the dam site was a federal reservation in March 1931. Since it was located on the Colorado River between Nevada and Arizona, he recognized that workers would cross from one state to the other. Under these conditions, it would be difficult “to determine which system of municipal or statutory law is applicable” which would “increase the cost of the work.” The reservation afforded the federal government complete control, with limited interference from the states. Nevada complied, forfeiting authority and acquisition rights to the federal government.<sup>109</sup> The agreement began a lasting relationship between the federal government and the state, housing federal projects throughout the twentieth century.<sup>110</sup>

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<sup>109</sup> Memorandum for the Solicitor, December 14, 1931, RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part I, National Archives and Records Administration, National Archives at Riverside; Colorado River Basin, Hearing before the Committee on Irrigation and Reclamation, United States Senate, Seventeenth Congress, First Session, S. 728 and S. 1274, January 17-21, 1928, (Washington, D.C.: United States Printing Office, 1928); “General Information Concerning the Boulder Canyon Project,” July 1, 1933, United States Department of Interior, Harold L. Ickes, Secretary, Bureau of Reclamation, Elwood Mead, Commissioner, Cahlan Collection, Box 5, Folder 12, Nevada State Museum and Archives, Las Vegas, Nevada; Order Establishing Boulder Canyon Project Reservation,” RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part II, National Archives and Records Administration, National Archives at Riverside.

<sup>110</sup> In truth, all public lands in the state of Nevada were federally-owned, as the United States acquired the territory from Mexico in 1848. Nevada did not become a state until 1864. The Laws of Nevada of 1920 and 1921 repealed several acts enacted in 1883 and 1885 that defined the state’s relationship with the federal government. The first ceded “the jurisdiction of Nevada over certain lands owned by the United States,” approved January 18, 1883. The second was an act that ceded “the jurisdiction of this state over certain lands to be acquired by the United States” approved February 24, 1885.” See “Memorandum of Points and Authorities,” *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931. RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part I, National Archives and Records Administration, National Archives at Riverside.

After locating a site, the federal government contracted to the private sector to build it. Incorporated in February 1931, seven separate companies founded Six Companies Inc. The newly-formed corporation sought to control all aspects of the building design, constructing Hoover Dam, the power plant, and all other works. Bids for the project opened on March 4, 1931 in Denver. Six Companies submitted the lowest, \$49 million, and by March 11, Wilbur awarded them the contract, alongside Babcock & Wilcox Company, and the Allis-Chalmers Manufacturing and Newport News Shipbuilding and Dry Dock Companies.<sup>111</sup>

After winning the contract, Six Companies authorized engineer Frank T. Crowe, the nation's foremost dam builder, to hire workers to build a railroad to the site and temporary camp, and engineers to outline plans to begin construction. The contractor provided employment through the U.S. Employment Service in cooperation with the State of Nevada. Leonard Blood, appointed superintendant in charge, established a public employment office in Las Vegas. Since the formal announcement in 1930, the Boulder Dam Project attracted hundreds of prospective workers. The workers were a colorful group of characters, ranging from experienced construction workers to cowboys from Nevada and Utah. The largest group, factory workers, mechanics, sales clerks,

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<sup>111</sup> Six Companies constructed the dam and adjoining power plant, while Babcock & Wilcox furnished, erected, and painted the outlet pipes. At the same time, Allis-Chalmers Manufacturing Company of Milwaukee, and Newport News Shipbuilding and Dry Dock Company of New York supplied horsepower for the power plant. Six Companies was actually comprised of seven companies: Morrison-Knudsen of Boise, Idaho, Utah Construction of Ogden, Utah, Pacific Bridge Company of Portland, Oregon, Bechtel Corporation of San Francisco, California, and Henry J. Kaiser of Oakland, California, MacDonald and Kahn of Los Angeles, California, and J.F. Shea of Portland, Oregon. The federal government also hired the Lewis Construction Co., Anderson Brothers Supply Co., Boulder City Co., Newberry Electric Corp., The Babcock and Wilcox Co., and Eichleay Engineering Corporation. Since Six Companies had the majority of workers and obligations, all contractors are referred to as "Six Companies" unless otherwise specified. See Certificate of Incorporation: Six Companies Incorporated," February 18, 1931; Minutes of Adjourned Meeting of the Board of Directors, February 25, 1931; Minutes of Special Meeting of the Board of Directors, March 5, 1931; Six Companies Corporate Records, Vol. I, Bancroft Library, University of California, Berkeley.

lawyers, bankers, and students, had never experienced hard labor in the desert. The influx of people created a “pitiful and pathetic site,” according to Charles “Pop” Squires. While soup kitchens fed some potential workers and their family members, hundreds were starving. The situation became so dire that the Interior Department issued an official statement that the project would not begin for another year. It actually urged workers not to seek employment, citing that no worker should travel to Las Vegas without assured employment or “financially able to tide over an uncertain period of unemployment.” The warning did not stop workers. Thousands traveled to Las Vegas, resulting in a very large number of idle men. As mobs swarmed the employment office to submit applications, Blood struggled to maintain order. Within only a few months, he received 2,400 applications and over 12,000 letters inquiring about employment.<sup>112</sup>

Consequently, public health in Las Vegas worsened, prompting Dr. J.C. Landenberger to call it “probably the most unsanitary in the country.” The once neatly-organized company town looked more like a Hooverville.<sup>113</sup> Communities of tents and shacks scattered the desert landscape. One newspaper wrote that the “bonanza days of the Old West” were “being reenacted in the Nevada town.” It was “one of the strangest in the country today,” with people “streaming in from everywhere.” Thousands lived in tents, as there was not enough hotels, homes, or stores, and the two banks could not finance building construction. Journalist Edmund Wilson described the scene as a

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<sup>112</sup> Information to Applicants for Employment at Boulder Dam: Boulder Canyon Project,” June 1, 1933, Cahlan Collection, Box 5, Folder 12, Nevada State Museum and Archives, Las Vegas, Nevada; Stevens, *Hoover Dam*, 50-51.

<sup>113</sup> “Hoovervilles,” named after President Herbert Hoover, were ragtag shantytowns that sprung up across the United States to house the growing number of unemployed and homeless Americans during the Great Depression. Its residents stockpiled cardboard, glass, tin, lumber, and canvas to construct shelter. Others slept in water mains or outside. The largest Hooverville was located in New York City’s Central Park. While attempts to rid the nation of Hoovervilles existed in the 1930s, most were not eliminated until 1941. This corresponded with rising employment levels and increased efforts by the cities, states, and federal government to provide shelter and aid the homeless.

“battlefield.” Las Vegas was “thronged with wanderers looking for work” and the train station was “full of sleeping men.” The stark desert condition astonished several journalists, describing it as a “deadly desert place” with “unsympathetic mountains,” and “furnace-like winds.” But while conditions were poor, the dam was far worse. The Boulder Dam situation fostered extremely hazardous working and living conditions, grossly inadequate in the realm of occupational health.<sup>114</sup>

### The Deadly Desert Place

The workers were aware of the harsh conditions. Indeed, Leonard Blood commented that there were inherent “hardships of pioneering” a groundbreaking project. At first, workers were recruited by word of mouth. Supervisors found employees that fit their needs, and brought appointments to the U.S. Employment Office. Blood furnished men if a foreman could not fill the position as well. In spring 1931, only 28 percent of the dam workers were veterans, with an estimated 89 foreigners toiling on the project. After a strike in August 1931, the U.S. Employment Office took over all aspects, eliminating all but 19 foreigners. Eventually, 47 percent were veterans. Dr. Richard Schofield, Six Companies’ Chief Surgeon, reported that out of 22,000 men examined for work, 920 were rejected. Of the rejections, 33 percent had cardiovascular problems, 22 percent had hernias, and 20 percent had defective hearing. The rest had “manual deficiencies.” Blood received a fair amount of criticism for his hiring techniques, but maintained the practices were “entirely fair.” Workers were represented from nearly

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<sup>114</sup> “Wide Open Las Vegas Recalls Hectic Scenes of Old West,” *Phoenix Arizona Republic*, (May 14, 1931). See also Six Companies Corporate Records, Vol. VII, Oversize Folder, Bancroft Library, University of California, Berkeley for numerous clippings regarding the conditions in Las Vegas, the dam site, and other information pertaining to the project; and Stevens, *Hoover Dam*, 52.



every state, with California and Nevada providing the majority. Most were white and married, with a medium age of 31.6 during the summer and 35 during the winter.<sup>115</sup>

The sheer number of employees tested the contractors' commitment to occupational health. After construction began in April 1931, the workforce varied from 520 to 700 men in May. By 1932, the number increased from 800 to 3,000 men. At the height of construction in June 1934, it employed 5,128. Schofield described that the "occupations included practically every form of work done by man." The project employed engineers, miners, mockers, carpenters, plumbers, electricians, engineers, railroad employees, clerical force, commissary attendants, truck drivers, riggers, mechanics, chemists, steelworkers, cement workers, and all forms of general labor. Unskilled labor salaries ranged from 50 cents to \$1.00 per hour, working an average of 8 hours per day. Skilled labor, including engineers, and inspectional and clerical forces, earned \$1,400 to \$5,600 per annum.<sup>116</sup>

The workers and their families lived in a makeshift, rag-tag community along the riverbank. They were in no position to insist on their rights. Consequently, the contractor paid little attention to appropriate sanitary, healthcare, and housing needs.<sup>117</sup> The community was named Williamsville, but called Ragtown by workers. Indeed, Ragtown was a more suitable title. The workers and their families lived in flimsy tents,

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<sup>115</sup> "Report of the Commissioner of Labor," *Appendix to Journals of Senate and Assembly*, Thirty-Sixth Session, Vol. I, (Carson City, NV: State Printing Office, 1933), 12-15; Richard O. Schofield, M.D., "Industrial Medicine in Nevada: As Practiced in the Construction of Boulder Dam," in M.R. Walker, M.D., *A Life's Review and Notes on the Development of Medicine in Nevada*, (Reno, Nevada, 1944), 89-90.

<sup>116</sup> Schofield, "Industrial Medicine in Nevada: As Practiced in the Construction of Boulder Dam," 91; Progress Report- May 10 to May 31," Six Companies Corporate Records, Vol. I, University of California, Berkeley, Bancroft Library; "Information to Applicants for Employment at Boulder Dam: Boulder Canyon Project."

<sup>117</sup> The Great Depression expedited the Boulder Canyon Project. President Herbert Hoover and Secretary of Interior Ray Lyman Wilber pressed Elwood Mead, the director of the Bureau of Reclamation, to begin early because of unemployment. Therefore, the Bureau of Reclamation rushed engineers to complete the project plans and construction began in the spring of 1931. Consequently, the dam construction began before adequate housing was built for the workers and their families in Boulder City.

cardboard shacks, cars, and trailers, and endured extreme heat, strong winds, thunderstorms, and flooding. At its height, Ragtown housed over 550 residents. Although Six Companies built temporary housing for tunnel workers, both settlements offered little comfort. The camps were “more difficult to maintain” than Six Companies anticipated due to the “higher heat conditions along the river and humidity due to the location near the water.” However, it asserted that “every effort is being made to provide as much comfort” to the workers “as practicable.” Dr. John McDaniel, who made house calls out to Ragtown, described the temperature as “about 130 in the daytime and would not cool down much during the night.” The community did not have “adequate refrigeration for food or anything.” The residents bathed and drew drinking water from the Colorado River contaminated by bacteria, pathogens, and disease-producing bacteria and viruses. While no epidemics occurred at this time, waterborne diseases such as viral and bacterial gastroenteritis and typhoid fever contaminated the river and the drinking water tanks. McDaniel found that the other major problem “was dysentery from spoiled meat and vegetables.”<sup>118</sup>

Although Bureau of Reclamation Director Elwood Mead was aware of these brutal conditions, he did little to help. Mead thought the workers could survive the first summer without “great losses” and move to Boulder City in the fall. But he was wrong. On June 24, 1931, the *Review-Journal* reported that the dam site was 140 degrees Fahrenheit in the sun and 120 degrees Fahrenheit in the shade. The average temperature

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<sup>118</sup> Ragtown was located on the floor of Black Canyon. Lake Mead currently covers it. Estimates of its population in June to August 1931 range from 500 to 1400 people. See Interview with John R. McDaniel, M.D, October 24, 1974, Conducted by Daniel Malloy, University of Nevada, Las Vegas Special Collections; “Minutes of Regular Meeting of Board of Directors,” July 20, 1931, Six Companies Corporate Records, Vol. I, Bancroft Library, University of California, Berkeley; Rocha, “The I.W.W. and the Boulder Canyon Project: The Death Throes of American Syndicalism,” 216; Stevens, *Hoover Dam*, 54; Paul L. Kleinsorge, *The Boulder Canyon Project: Historical and Economic Aspects*, (Palo Alto, California: Stanford University Press, 1941), 206, 222.

during the summer of 1931 was 119.9 degrees Fahrenheit. Intense sweating subjected the workers to heat dehydration, also referred to as heat prostration or exhaustion, which resulted from a combination of thermal and cardiovascular strain. They experienced fatigue, dizziness, confusion, an increased pulse and respiration rate, and developed dry skin. The workers' condition often developed into heatstroke, experiencing high body temperature, convulsion, swelling of the brain, coma, and even death. In their reports, the doctors explained that their patient's "regulating center" rose above normal. Over the course of the next five years, numerous workers passed out or died of heatstroke. Although no one knows how many suffered acutely from the heat, Six Companies' records indicate that 17 workers died from "heat prostration" in the summer of 1931. It is unknown how many family members died during this time.<sup>119</sup>

To its credit, the contractor recognized the problem and revised the employees' schedules to limit exposure to the sun. But the summer heat made the labor situation "somewhat difficult" for them, increasing labor turnover and delayed construction progress. Six Companies generally blamed the high number of fatality on the workers, noting that it seemed "evident that the fatal cases were in fact due to a fundamental lack of vitality or induced overeating or some other ailment." Besides heatstroke, the workers experienced terrible burns on the skin from the sun and wind, leading many to believe they had caught a water-borne disease from the river. While no epidemics occurred in 1931, there was an outbreak of spinal meningitis as well as several pneumonia cases, with at least 4 dying from the former and 5 from the latter. During the first year of

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<sup>119</sup> The first death due to heat was Raymond R. Hopeland, dying in Las Vegas on June 25, 1931. See Six Companies Inc., "Summary of Fatalities by Employers – Boulder Canyon Project – To and including July 31, 1935," Frank "Doc" Jensen Papers, 1 of 5, Boulder City Historical Society and Museum Special Collections; Rocha, "The I.W.W. and the Boulder Canyon Project," 217; "Second Death of Heat Dies Here Last Eve," *Review-Journal*, (June 29, 1931).

construction, 46 workers and family members died on or near the dam site. Since Six Companies and the Bureau of Reclamation documents most fatalities as “accidents sustained on and off duty” as well as “heat prostration” and “natural causes,” it is difficult to determine the actual cause of death.<sup>120</sup>

Of course, the men and women who toiled on the Boulder Canyon Project contended with a variety of other hazards besides heat. Given the larger economic context, the workers were lucky to have a job and accepted the long hours, low wages, and inhuman working conditions. According to a 1932 Six Companies physical exam report, 100 out of approximately 3,000 employees received medical attention at either the Boulder City Hospital or the two first aid stations per day. More than 5,200 injuries occurred during this period of construction, with an average of four to sixteen accidents daily that required a physician’s help. The report also calculated that a fatal industrial injury occurred every 13,620 hours worked.<sup>121</sup>

The injuries were not isolated to the workers. As the “greatest peace time project since the building of the Panama Canal,” Hoover Dam became a popular tourist destination. Through the cooperation of the federal government, Six Companies and the Union Pacific, the railroad operated regular sightseeing excursions every Saturday night

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<sup>120</sup> The schedules shifted to 4 a.m. until noon and 4 p.m. until midnight (working with searchlights) because Six Companies could not afford losing any more workers to the afternoon heat. See King, *Hoover Dam and Boulder City*, 4; “Minutes of Regular Meeting of Board of Directors,” July 20, 1931, Six Companies Corporate Records, Vol. I, Bancroft Library, University of California, Berkeley; “Meningitis Rumor At Dam Denied,” *Review-Journal*, (September 28, 1931); “Dam Worker Has Spinal Meningitis,” *Review-Journal*, (October 7, 1931); “Dam Worker Dies at Local Hospital,” *Review-Journal*, (October 8, 1931); “Mahoney meningitis,” *Review-Journal*, (January 27, 1932); “Summary of Fatalities by Employers – Boulder Canyon Project – To and including July 31, 1935.”

<sup>121</sup> Historians Gerald Markowitz and David Rosner argue that employed Americans during the Depression were “only marginally more secure than the unemployed, for they lived in constant fear of losing their jobs, their homes, and their families.” Since the workforce comprised of mostly unskilled, part-time, or temporary employees, there was little promise of advancement, and wages did not guarantee more than subsistence. See Markowitz and Rosner, “*Slaves of the Depression*,” 2-3; “Boulder Canyon Project Employee Physical Exams, 1932,” Six Companies Inc., Garnett, Box 66, Folder 1, Boulder City Museum and Historical Society Special Collections.

from Las Vegas. Of course, visiting the site was highly dangerous. The contractor stressed that “no visitors, women, or children, shall be allowed to rise on cable ways, monkey slides, trains or trucks.” After several accidental fatalities and injuries, Six Companies discontinued the trips and increased their liability insurance “arising out to the public visiting the dam operations.” But tourists still could observe the dam site from afar at several viewing stations.<sup>122</sup>

Initially, the contractor went through the motions of promoting safety. It posted Safety First signs, held weekly first aid classes, and distributed safety helmets, belts, goggles, and protective mechanical devices. The Florence Nightingale Institute even awarded 6 honorary fellowships to encourage project safety. The fellowships were awarded to the foremen whose crews showed the least number of fatal accidents. As with most Safety First campaigns during the depression, Six Companies was more concerned with the rhetoric of safety than with ensuring safety. Although contractor distributed helmets, it did little to enforce or require use.<sup>123</sup>

Consequently, human error and carelessness was the leading cause of death. Failures in operating machinery and equipment, falling rock or cave-ins, and fatigue, lack of sleep, poor communication, lack of experience, or inadequate risk perception caused

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<sup>122</sup> Minutes of Regular Meeting of Board of Directors,” April 15, 1934, “Minutes of Regular Meeting of Board of Directors,,” May 21, 1934, Six Companies Corporate Records, Vol. II, Bancroft Library, University of California, Berkeley; “Hoover Dam Site Becomes Major Lure,” November 14, 1931, Los Angeles California Express. See Six Companies Corporate Records, Vol. VII, Oversize Folder, Bancroft Library, University of California, Berkeley.

<sup>123</sup> By the 1930s, the Safety First campaign had a questionable track record. While it worked in the railroad industry, studies show it was ineffective in steel production, where accidents increased from 1927 to 1933. See U.S. Department of Labor, Bureau of Labor Statistics, *Handbook of Labor Statistics*, (Washington, D.C.: Government Printing Office, 1936, 6, 290; Markowitz and Rosner, “*Slaves of the Depression*,” 118-120. See also King, *Hoover Dam and Boulder City* for a discussion on how Six Companies did not strictly enforce safety; “Dam Safety Encouraged,” *L.A. Examiner*, (May 26, 1931), Six Companies Corporate Records, Vol. VII, Oversize Folder, Bancroft Library, University of California, Berkeley.

most accidents. Speedups was also a severe hazard.<sup>124</sup> Dr. John McDaniel remembered treating numerous fall victims. One time, a worker slipped while scaling the cliff and waved goodbye to the doctor as he fell. Of course, McDaniel was unable to save his life. When he went to retrieve the body, “the worker was impaled on the rocks.” Constructing the diversion tunnels also exposed workers to indoor threats. Before dam construction began, workers diverted the Colorado River around the construction site. While carving the diversion tunnels out of the mountainside, blasting and falling rocks also threatened safety. Additionally, workers were exposed to air pollutants. While lead poisoning, silicosis, and asbestos posed some threat, carbon monoxide was the most lethal.<sup>125</sup> Gasoline-fueled trucks transported rocks and gravel from the tunnels, emitting exhaust and dangerous levels of carbon monoxide. The high concentrations of gas accumulated in the tunnels because of poor ventilation. Since the carbon monoxide was clear, odorless, and tasteless, the workers were unable to detect its existence. Long-term

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<sup>124</sup> All American workers contended with speedups during the Depression. Along with unsafe working conditions, companies wanted to maximize production. A worker in a steel foundry in Muskegon, Michigan complained that he and his coworkers were in “constant danger of being burned to death or by a heavy load dropping and crushing them to death” in order to make production numbers. See Markowitz and Rosner, “*Slaves of the Depression*,” 111-114.

<sup>125</sup> Asbestos, silicosis and lead poisoning were common occupational diseases during the 1930s. Thousands of workers inhaled asbestos during World War II and beforehand, causing slow deaths from lung cancer, asbestosis, or mesothelioma. Silicosis, brown lung, black lung, and white lung, are fatal diseases caused by exposure to crystalline silica or other toxic particles. Likewise, lead was a toxic substance common in most industries. The effects increase blood pressure and caused nerve disorders, muscle and joint pain, infertility, and death. Worker poisoning occurred from phosphorous, benzene, and other industrial chemicals. By the 1930s, job-related illnesses increased because of expansions in the American economy. For example, the automobile industry presented new hazards to workers after the development of rubber and petroleum products. Rather than testing for long-term effects, the industries sacrificed workers’ lives to utilize the new materials. Hazards in the workplace were finally brought to national attention in the mid-1930s following the discovery of several hundred workers buried in a grave outside of Gauley Bridge, West Virginia. An investigation revealed that the men had died from silicosis while drilling tunnels. *Time* and *Newsweek* began covering hazards in the workplace and the government sponsored a colloquium in 1935 to study the prevention and treatment of silicosis. See Markowitz and Rosner, “*Slaves of the Depression*,” 120-121.

exposure produced mild symptoms for some workers, but had lasting neurological effects for others.<sup>126</sup>

At the same time, outbreaks of contagious diseases afflicted the project. From September 1931 to February 1932, Boulder City and Las Vegas experienced a spinal meningitis outbreak. Even though the Las Vegas board of education and Boulder City closed schools for 10 days to quarantine the disease, health officers referred to the disease outbreak as “not of the epidemic type.” But at least one worker and three children died of complications of spinal meningitis during the outbreak. In fall 1933, influenza affected over a thousand Boulder City residents. In the next year, scarlet fever and measles debilitated the community. Numerous cases of typhoid fever, scarlet fever, polio, tuberculosis, measles, mumps, gonorrhea, diphtheria, influenza, whooping cough, chicken pox, bronchitis, and syphilis also threatened the population intermittently over the next few years. Airborne disease certainly contributed to these epidemics, as did contaminants in the municipal water supply and pollutants spawned by the generally unsanitary conditions of the project.<sup>127</sup> A percentage of workers also contracted venereal diseases from prostitutes on Block 16 in Las Vegas, forcing city health officers to administer the workers and prostitutes alike with shots of arsphenamine for syphilis

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<sup>126</sup> Interview with John R. McDaniel.

<sup>127</sup> “Dam Worker Has Spinal Meningitis,” *Review-Journal*, (November 7, 1931); “Dam Worker Dies in Local Hospital,” *Review-Journal*, (November 8, 1931); “Mahoney Child Contacts Meningitis,” *Review-Journal*, (January 26, 1932); “Vegas Schools will Reopen Next Monday,” *Review-Journal*, (February 4, 1932). Vegas, Boulder Schools Close” and “Boulder Schools Close for While,” *Review-Journal*, (January 20, 1932); Ray Wilber Jr., “Boulder City: A Survey of its legal background, its City Plan and its Administration,” (unpublished thesis), Harvard University, 1935, Boulder City Museum and Historical Society Special Collections. See especially chapter XX on “Health and Sanitation;” Dennis McBride, *In the Beginning: A History of Boulder City, Nevada*, (Boulder City, NVL Boulder City Museum and Historical Association, 1992), 36-39.

prevention. Boulder City manager Sims Ely did what he could to prevent workers from going to Las Vegas to drink, gamble, and pay for sex, but it did little good.<sup>128</sup>

Occupational health problems on the dam site were inevitable, especially in the first year. By starting the project six months early, Six Companies was not equipped to provide adequate housing, sanitary facilities, and medical care. Certainly, if the Bureau of Reclamation or contractor had established an adequate occupational health system before starting the project, fewer workers would have died or been left disabled. In fact, the worst of the developments could have been avoided had the federal government honored its original industrial medicine contract.<sup>129</sup>

Federal officials began discussing providing hospital services to employees of the Boulder Canyon Project in 1930. As a medical doctor, Secretary of Interior Ray Allen Wilbur projected the project would pose considerable health risks. The inaccessibility of the work, magnitude of operations, and severe weather conditions would inevitably challenge “the health, comfort, and general welfare” of the workers. Therefore, Allen commissioned the establishment of a government town, Boulder City. Since it was a federal project, Elwood Mead assumed that the Public Health Service (PHS) would provide medical care. He wrote Dr. Hugh S. Cumming, the U.S. Surgeon General, asking if the PHS could staff and operate a hospital. The PHS, however, did not have

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<sup>128</sup> Thomas Wilson, a dam worker, remembered that instead of the arsphenamine shots, prostitutes were administered distilled water shots from Las Vegas health officials. This affirms that even through prostitution was legal in Nevada and popular among local men; the women were exploited and considered social outcasts. See Andrew J. Dunbar and Dennis McBride, *Building Hoover Dam: An Oral History of the Great Depression*, (Reno: University of Nevada Press, 2001), 242.

<sup>129</sup> For scholarship on health at Hoover Dam, see Michelle Follette Turk, “Dead Roses and Blooming Deserts: The Medical History of a New Deal Icon,” *The Nevada Historical Society Quarterly*, Volume 50, Number 3, Fall 2007, 239-264; Stevens, *Hoover Dam*, 60-69, 103-107, 132-141, 157-158, 164-169, 200, 205-214, McBride, *In the Beginning*, 36-39; Dunbar and McBride, *Building Hoover Dam*, 37, 129-134, 242-244, 261-264, 321; Rocha, “The I.W.W. and the Boulder Canyon Project,” 214-217, 221-222; and appropriate sections of King, *Hoover Dam and Boulder City*.



enough funding, and declined the offer. Consequently, the Interior Department and Bureau of Reclamation opened bids for the project's industrial medicine contract in March 1931.<sup>130</sup>

Local doctors jumped at the opportunity, with Drs. Roy Martin, Ferdinand Ferguson, and R.D. Balcom leading the charge. For decades, Martin had contracted out to southern Nevada industries, providing industrial medicine to the Las Vegas and Tonopah Railroad and local mining community. He also actively campaigned for the dam project in the early 1920s. Martin enlisted Ferguson and Balcom, established the Las Vegas Hospital Association, and submitted a bid for the contract. Moreover, he hired Drs. John McDaniel and Clare Woodbury. Since the federal government slated Las Vegas to be the central point of the project, they were initially awarded the contract. However, when Ray Wilbur visited Las Vegas, he determined that gambling, drinking, and prostitution was not the proper environment for workers. Consequently, Wilbur decided to build Boulder City and ordered Six Companies to create a comprehensive occupational health program, revoking Martin's contract.<sup>131</sup>

Six Companies offered informal assistance to their employees, developing health care plans that placed physicians on the company payroll. Ultimately, the contractor's team of doctors would promote a healthy workforce to boost production and protect the employer from workers' compensation and liability lawsuits. The doctors' most visible

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<sup>130</sup> Ray Lyman Wilbur to Postmaster General, January 21, 1931, Letter, RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part II, Holdings of the National Archives at Riverside; Elwood Mead to Surgeon General Hugh S. Cumming, November 3, 1930, Letter, RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part II, Holdings of the National Archives at Riverside.

<sup>131</sup> Interview with Clare Woodbury, M.D., September 12, 1974, Conducted by Ralph Roske, University of Nevada, Las Vegas Special Collections.

practice of defensive medicine was pre-employment examinations. By the 1930s, growing number of fraudulent liability cases led most companies to institute physical examinations. The practice began in the railroad industry in the late-nineteenth century in response to compensation insurance. Most railroad doctors rejected seven to thirteen percent of all applicants based on physical injuries or ailments. For example, the Santa Fe and Northern Pacific Railroads screened for not only injuries but also excluded individuals with venereal diseases, tuberculosis, or cancer. The companies' motives were not only for legal protection; they also prevented future accidents. Most examinations tested vision and hearing, and for hernias, loss of fingers, and heart or lung problems, all ailments that could prevent a worker from safely performing his job. By 1900, the American Railway Association instituted a standard physical examination and the tests were widespread among the railroad industry. After World War I, most industries required employment examination and periodic physicals to screen for disabilities. Although these examinations could have helped diagnose occupational diseases, many doctors were loyal to their employer and rarely reported their findings to the workers or their colleagues and medical journals. They also served as consultants on increasing production, concealed potentially harmful industrial hygiene issues, and reduced workmen's' compensation obligations. As a result, workers often mistrusted company doctors.<sup>132</sup>

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<sup>132</sup> The honesty of company physicians was a suspect in all American industries. Supervisors shifted workers from one to job to another before firing them, in order to "obscure the role play by a particular work site in the illness indentified by the company physician." See Markowitz and Rosner, "*Slaves of the Depression*," 146-147. See also Mark Aldrich, "Train Wrecks to Typhoid Fever: The Development of Railroad Medicine Organizations, 1850 to World War I," *Bulletin of the History of Medicine*, Volume 75, Number 2, Summer 2001, 273-276, for an excellent article on pre-employment physical examinations in the railroad industry.

Six Companies' physical examinations documented preexisting ailments and the overall health of an employee as well, a practice that proved useful in compensation hearings. It required workers to sign a disclaimer relinquishing the right to sue their employer for the compensation of preexisting conditions.<sup>133</sup> Moreover, the workers were required to pass the pre-employment examination to gain employment. Six Companies hired Dr. John McDaniel to administer the exams, paying him for \$250 a month. The workers were in bad shape, with most "starving pretty much before they got here." They also had high blood pressure. McDaniel attributed it to "their work or everyday lives" or worry that they would not find a job. Heat caused ailments as well. While at the River Camp, McDaniel noticed a thermometer in the shade. "The darned thing only registered 120 degrees," he recalled. "It broke on the first day I was down there." From 1931-33, McDaniel and other physicians ultimately rejected 101 out of 2000 men for ailments and disabilities.<sup>134</sup>

Besides physical examinations, the contractor provided limited care and first aid stations during the summer of 1931. Doctors administered physicals and staffed first aid stations, but on-site medical care was not available. However, Six Companies did establish a rudimentary medical facility on May 22, 1931, in Boulder City. It placed Charles Christal, the medical director for the California State Compensation Insurance fund, in charge. Though Christal referred to it as a "first class aid station," his assistants told workers their only job was to examine them to "see if they can do a day's work before we give them a job." The doctors never treated women or children. At the same

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<sup>133</sup> For an original copy of the disclaimer, contact the Boulder City Museum and Historical Society Special Collections.

<sup>134</sup> Interview with John R. McDaniel; "Report of the Commissioner of Labor," *Appendix to Journals of Senate and Assembly*, Thirty-Sixth Session, Vol. I, (Carson City, NV: State Printing Office, 1933), 12-15; Dunbar and McBride, *Building Hoover Dam*, 36-37.

time, Six Companies announced plans to build a hospital for Boulder City and bought two ambulances to transport seriously injured workers to Las Vegas. The ambulance ride was not complimentary. Until they finished the hospital in Boulder City, they contracted out medical care to Las Vegas Hospital Association. The contractor covered insurance for treatment in Las Vegas by deducting from workers' paychecks to cover the ambulance ride and all medical costs. The ambulance transported patients to Las Vegas Hospital. The facility, however, was inadequate for most trauma care; Dr. Roy Martin continued to send his most serious cases to Los Angeles. As an added inconvenience, patients had to travel to Las Vegas to fill their prescriptions at White Cross Drug. Of course, first aid stations were available at the dam site to treat injured workers, especially the "tunnel men" who worked near compressor number three. Six Companies ran these stations. In fact, the attendant in charge of the first aid station for "tunnel men" also worked for the Six Companies' insurance department.<sup>135</sup>

By July 1931, the hazardous working conditions, bad food, contaminated drinking water, and housing situation had become unsustainable. To rectify the situation, Six Companies made a few policy changes; it discontinued to practice of pumping the River Camp's drinking water from the murky Colorado and began fetching cool water from Las Vegas' artisan wells. It also transferred the blasting supplies to the Arizona side, away from hazardous electrical lines and machine shop welding equipment, and banned the use of gasoline as a cleaning fluid after several fatal explosions. However, one variable was out of the contractor's control: the blazing heat. July 1931 was one of the hottest on

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<sup>135</sup> Dunbar and McBride, *Building Hoover Dam*, 129; King, *Hoover Dam and Boulder City*, 5; "50-Bed Hospital Planned," *Review-Journal*, (May 21, 1931); "Here are the conditions under which Boulder City Hospital aid available," *Review-Journal*, (November 17, 1931); "First Aid Station For Tunnel Men" *Review-Journal*, (May 23, 1931).

record in the Las Vegas vicinity, with an average daily temperature of 119.9 degrees. The hottest days and nights reached 128 and 103 degrees respectively. On July 20 alone, heat prostration incapacitated five workers, and a worker's 15 year old daughter died in Ragtown. A few days later, several more Ragtown women died and four workers were overcome by the heat. The workers became angry and frustrated. After their shifts, they would return to Ragtown only to learn about more deaths and hospitalizations. Then, the workers would continue to fester in the evening heat, which averaged 95 degrees, and barely slept at night. Numerous workers began to contemplate the possibility of a strike. All they needed was a spark.<sup>136</sup>

On August 7, Six Companies provided them with one. As the swing-shift crew arrived to work, their foremen informed them of a wage cut implemented for all diversion tunnel workers. The unexpected announcement put the workers over the edge. For months, the Industrial Workers of the World (IWW), a radical labor union known as the Wobblies, had tried to solidify bargaining power on the project.<sup>137</sup> In general, the Depression's spiraling unemployment decimated union membership nationwide. From 1929 to 1933, trade membership fell 20 percent, from 3.6 to 2.8 workers.<sup>138</sup> The union jumped at the chance to stage a walkout. At 5:00 pm, the Wobblies addressed 400 workers at the River Camp cookhouse about the possibility of strike. The debate was

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<sup>136</sup> The best coverage of the 1931 strike is Guy Louis Rocha, "The I.W.W. and the Boulder Canyon Project." See also Stevens, *Hoover Dam*, 69.

<sup>137</sup> The Industrial Workers of the World, I.W.W. or Wobblies, was a radical labor union that began in Chicago in 1905. From 1906-1929, it organized 150 strikes, including a miners' strike in Goldfield, Nevada, from 1906 to 1907. But the union lost its strength in the early 1920s after federal and state repression. The August 1931 strike at the Boulder Canyon Project was an attempt to prove itself as a viable union again. It also tried and failed to organize a strike at Hoover Dam in July 1935. See Rocha, "The I.W.W. and the Boulder Canyon Project: The Death Throes of American Syndicalism;" and "Hoover Dam, Labor Strike, 1935" Cahlan Collection, Box 5, Folder 28, Nevada State Museum Historical Archives.

<sup>138</sup> See U.S. Bureau of Census, *Historical Statistics of the United States, Colonial Times to 1957*, (Washington D.C.: 1960), 98; and Markowitz and Rosner, "Slaves of the Depression," 3.

brief and the men voted unanimously. By 7:00 pm, 600 workers congregated at the Boulder City camp to vote in favor, and the following day, a delegation of strikers urged the crews preparing for work to remain idle. All project construction work stopped.

L.L. "Red" Williams, head of the strike committee, presented their demands:

1. Cancel the pay cut and establish a raise to \$5.00 for surface men; \$5.50 for tunnel workers; \$6.00 for miners; and \$6.00 for carpenters
2. Improvements in the sanitary conditions of the River Camp
3. All men be returned to their jobs without discrimination
4. Workers be supplied with ice water on and off the job until drinking fountains were installed
5. Rates for board set at \$1.50 flat per day
6. Strict adherence to Nevada and Arizona mining safety laws
7. Changing rooms be installed at portals in tunnels so the workers could get out of their wet, dirty clothes before traveling back to the camps
8. An eight-hour day included time spent traveling from camp to dam site
9. Safety miners be placed at each tunnel to provide first aid to injured workers

Of course, Frank Crowe publically denied any wrongdoing and criticized his workers for walking out. In an interview with the *Review-Journal*, he asserted that safety was the contractor's top priority and the July records showed "no reported accidents." Crowe did not acknowledge that 11 workers died from the heat, 2 from drowning and 1 in a car accident. Technically, he was right. Work activity had not "directly" caused any of the deaths. But his comments were dishonest nonetheless.<sup>139</sup>

By August 10, Six Companies rejected the strikers' demand and issued all the striking employees a notice of dismissal. The harsh response stunned the workers. Their solidarity began to crumble. The workers banned the Wobbly agitators from playing a formal role in strike negotiations, sending a telegram to Secretary of Labor William Doak that requested "protection on Hoover Dam in the case of deportation." The strike committee's plea was ignored. During the Hoover Administration, the federal

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<sup>139</sup> Rocha, "The I.W.W. and the Boulder Canyon Project," 223.

government's role was not to safeguard the workers' rights, but protect its investment and ensure efficiency. While the project was six months ahead of schedule, discontinuing dam construction posed a huge problem. Elwood Mead thought that the striker's demands were "impossible." Therefore, federal authorities began policing the reservation, establishing semi-martial law. Although it claimed to be neutral, the federal government clearly aimed to break the strike. Nevada also did not offer much help to the workers. Governor Fred B. Balzar flat out refused to help, replying to the workers that the Nevada was "absolutely neutral in all labor disputes" and that the "matter should properly be referred to Department of Labor, Washington."<sup>140</sup>

With no support from the state or federal governments, and Six Companies rehiring new workers to resume construction, the strikers accepted defeat. However, the walkout was not in vain. On August 13, Six Companies agreed to 4 of the workers' demands. It installed lights and drinking fountains at the River Camp, and built changing rooms in the tunnels. The corporation also accelerated work on the completion of Boulder City. While the weather was out of Six Companies' control, the heat abated to a tolerable level by mid-August. On August 15, the corporation rehired 750 workers involved in the strike and resumed construction.<sup>141</sup>

It is important to note that 163 workers did not strike. To be sure, most wanted improved working conditions, but it was the Great Depression. Many felt lucky to have a job. Bob Parker, a general laborer, thought the Wobblies were just "trying to stir up trouble" so they could "dictate" to Six Companies and the federal government about

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<sup>140</sup> Stevens, *Hoover Dam*, 74-76. For more on government by injunction, see William E. Forbath, *Law and the Shaping of the American Labor Movement*, (Cambridge: Harvard University Press, 1991), 59-97.

<sup>141</sup> "Minutes of Regular Meeting of Board of Directors," August 17, 1931, Six Companies Corporate Records, Vol. I, Bancroft Library, University of California, Berkeley.

“labor rules.” Additionally, residents of Las Vegas were not supportive of the strike or labor unions in general. The Union Pacific strike of 1922 continued to haunt them. Newspaperman John Cahlan remarked that the unions had “lost their hold in Las Vegas when they had the strike in 1922.” Some residents were still “absolutely fighting mad” about the 1922 strike because the Union Pacific moved its rail shops. They feared that the federal government would move the Boulder Canyon Project. The strike could have affected “the future of the city,” and residents were “determined that the labor unions were not going to get a big hold on the community.”<sup>142</sup>

After the strike, it was clear that the working conditions were inadequate. To hamper future strikes, Six Companies discussed how to improve operations. The consensus was to enhance sanitary conditions at the River Camp and to close Ragtown. Additionally, to initiate an occupational health program that stressed safety. The corporation decided that “no men should be put to work until proper living and sanitary conditions are provided.” The federal government also took action. It stressed that Six Companies’ production needed to become more efficient. The strike and poor health had been “contributing factors in the lower efficiency” during the summer months. Consequently, President Herbert Hoover personally enlarged the federal government’s role in Black Canyon by eliminating the wasteful practice of employing and maintaining unhealthy workers. The policies included workers receiving regular physicals and medical care, and having access to modern hospital facilities. To oversee the initiatives, Hoover authorized the Bureau of Reclamation to play a more active role in supervising occupational health at the site and in Boulder City. Consequently, the federal government gave Six Companies an ultimatum. The corporation had to build and

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<sup>142</sup> Dunbar and McBride, *Building Hoover Dam*, 53-57.



manage a comprehensive occupational health program improving living and health conditions or it would lose the contract.<sup>143</sup>

### Regulation and Research

Historians have often argued that until the New Deal, the states and cities regulated occupational health in America's industries. However, the Boulder Canyon Project's considerable health risks forced the federal government to force Six Companies to undertake major initiatives to protect its workers. In response, the corporation developed a system that provided job-related healthcare on the dam site and in Boulder City before the New Deal, actions which boosted the entire occupational health movement.<sup>144</sup>

The Bureau of Reclamation ordered Ragtown to close permanently in 1932 because of its insanitary conditions.<sup>145</sup> The agency not only required Six Companies to build a hospital, but also to construct a sanitary community by drafting a city plan that implemented federal recommendations pertaining to the water supply, waste disposal, and public health.<sup>146</sup> Six Companies deducted \$1.60 per day for board and lodging for

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<sup>143</sup> Washington also stressed that Six Companies had to finish their contract on time. See "Minutes of Regular Meeting of Board of Directors," August 17, 1931, Six Companies Corporate Records, Vol. I. Bancroft Library, University of California, Berkeley; William J. Barber, *From New Era to New Deal: Herbert Hoover, the Economists, and American Economic Policy, 1921-1933*, (Cambridge and New York: Cambridge University Press, 1985), 13.

<sup>144</sup> Established by President Franklin D. Roosevelt, the New Deal was a legislative agenda that created federally-backed social programs, social reform, and policies designed to pull the United States out of Great Depression. As a whole, in the 1930s the federal government had little authority to force companies to improve working conditions if the project was not an affiliated with the New Deal. However, by the Walsh-Healey Act (1936), it could directly regulate working conditions in companies operating under federal contract. The provisions were not widely used in safety and health management until World War II.

<sup>145</sup> There were other reasons why the Bureau of Reclamation and Six Companies wanted dam workers to move to Boulder City. The city was a form of social control to limit the radicalism that bred in unsupervised camps, as seen with the IWW strike in 1931. See King, *Hoover Dam and Boulder City*, 4-5.

<sup>146</sup> Eventually, President Franklin D. Roosevelt's New Deal brought upon changes to the Public Health Service (PHS), allocating money to state and local departments to improve health conditions, sanitary engineering, tuberculosis control, laboratory research, and mental hygiene. But in 1931, the PHS did not have enough funds to build a hospital for Boulder City and could not be as active in the project.

single men housed in their dormitories. Each had their own rooms. The workforce grew larger, as previously unemployed men not only built Hoover Dam, but also Boulder City's sewers, sewage treatment facilities, and water purification plants. The Bureau of Reclamation ordered the construction of a pumping, filtration, and distribution system to divert and purify the muddy waters of the Colorado River for use in Boulder City. Completed in 1932, the sanitation system pumped two million gallons of water to the town daily. Water analysts rigidly monitored the bacterial and chemical levels to maintain decent drinking water supplies. At the same time, Six Companies erected a sludge digestion sewage plant to chemically treat the disposal of a half million gallons of waste daily, which Las Vegans used as fertilizer for their lawns.<sup>147</sup>

Federal officials were also concerned with safeguarding food consumption. By 1932, regular inspections by the Bureau of Reclamation occurred at all establishments on the Boulder City reservation that sold, handled, or served food and drinks. The federal government also inspected bathrooms and toilets in houses, and public facilities. Additionally, the Board of Health took part in the health assessments. On May 11, 1932, it inspected the River Camp facilities and reported that conditions had changed dramatically. There were no flies present in the mess hall, and all facilities were equipped with heat, ventilation, and cooling. It also deemed the First Aid station to be adequate, with modern medical instruments, two cots, an emergency table, hot and cold water, and all necessary drugs. Overall, the Board of Health was impressed.<sup>148</sup>

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<sup>147</sup> "Information to Applicants for Employment at Boulder Dam: Boulder Canyon Project;" Schofield, "Industrial Medicine and Surgery As Practiced in the Construction of Boulder Dam," 87; Wilbur, "Boulder City: A Survey of its legal background, its City Plan and its Administration."

<sup>148</sup> "Report of the Secretary of the State Board of Health," *Appendix to the Journals of Senate and Assembly*, Thirty-Sixth Session, Vol. I, (Carson City, NV: State Printing Office, 1933), 8-10.

Finally, the Anderson Brothers Supply Company developed a state-of-the-art system for transporting milk through the desert from Logandale in refrigerated trucks. It even equipped its ranch with a water and sewage system, refrigeration plant, and steam plant. No cases of milk-borne infections occurred in Boulder City, with the exception of one case of typhoid that authorities traced to the homemade butter brought in by an Idaho family. Clearly, the sanitary practices pushed by Bureau of Reclamation officials in Boulder City greatly improved conditions on the project and symbolized the growing federal role in safeguarding occupational health in the early 1930s.<sup>149</sup>

Besides the sanitary standards, the Bureau of Reclamation also required Six Companies to erect a hospital. The estimated cost for building the hospital was \$52,420.00. The facility opened on November 15, 1931, equipped with portable X-Ray and fluoroscopic units, diathermy, infrared and mercury quartz lamps, a laboratory to process blood and urine tests, and housed a pharmacy. According to the *Review-Journal*, it was “as well equipped as hospitals in a large city,” with 20-beds, an orthopedic ward, and an 8-bed isolation hospital for contagious diseases. Initially, Dr. Charles Christal headed the hospital. Dr. Wales Haas of Elko replaced him as chief surgeon in 1932, and Dr. Richard Schofield succeeded Haas after his death in 1933. The chief surgeons made \$750.00 per month and did not have a formal written contract with the contractor. This proved useful for Six Companies in malpractice suits. If the doctors were not contracted, the corporation could renounce all liability.<sup>150</sup> By 1936, the hospital had grown into a 60-

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<sup>149</sup> “Peeling Studs for Three Thousand Hungry Men: The Job of Feeding a Peace Time Army at Hoover Dam,” *Los Angeles Times*, (March 13, 1932); Schofield, “Industrial Medicine and Surgery As Practiced in the Construction of Boulder Dam,” 87.

<sup>150</sup> The absence of a formal written contract aided Six Companies in malpractice liability suits. If the doctor did not have a contract, he was not an “official employee” of the contractor. It was more difficult to recover malpractice damages from Six Companies if the doctor was an “independent contractor.” See J.F. Reis to

bed facility, retaining a chief surgeon, 4 assistant surgeons, 10 nurses, 4 orderlies, a radiographer/pharmacist, and management staff, including a full-time auditor, office secretary, and chef.<sup>151</sup>

Most workers barely remember Christal, but Haas and Schofield were regular fixtures in their lives. Haas was a “rather big fellow,” weighing over 300 pounds. Bob Parker described him as an “awfully good-natured doctor” who served in World War I and was “a peoples’ doctor.” Haas concerned himself with caring for his patients, and was not interested in the business functions of the hospital. But in 1933, the doctor developed appendicitis and died. On his deathbed, he requested that Six Companies retrieve Schofield to perform the surgery. The surgeons were friends, having attended the same school and doctored together during the war. Unfortunately, Schofield did not make it in time, and another doctor performed the surgery. While Schofield was friends with Haas, he was the exact opposite in personality. According to Parker, the doctor made a “big city hospital” out of the Boulder City Hospital “in a hurry.” Schofield quickly garnered a bad reputation, often telling workers they faked their conditions. Most workers did not care for him.<sup>152</sup>

Schofield remained as the contractor’s chief surgeon for the duration of the project. In a memoir, he wrote a glowing review of the project’s industrial medicine program from 1933 to 1935. Schofield claimed it was successful because industrial medicine and surgery was “intimately associated with the State of Nevada.” In fact,

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Leo McNamee, April 28, 1942, Letter, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>151</sup> “Estimate of Preparatory Expenses to December 21, 1931,” Six Companies Corporate Records, Vol. II, Bancroft Library, University of California, Berkeley; “Equipment Put in For Opening Of New \$50,000.00 Plant of Sunday” *Review-Journal*, (November 14, 1931); McBride, *In the Beginning*, 36-39.

<sup>152</sup> Dunbar and McBride, *Hoover Dam*, 131-134.

individualism had made its medicine cutting-edge. Since the mining days, surgeons were forced to solve “perplexing problems.” Practicing in isolated places made the doctors resourceful, fostering research in industry surgery. In particular, the mining industry studied the “hazards of extreme heat in the hot weather caverns.” Schofield argued that these activities afforded future industrial groups to apply their groundbreaking methods. At the Boulder Canyon Project, he described Six Companies as “safety minded” and blamed the high number of deaths on “inadequacies” during the summer of 1931, namely the weather and “high pressure system of construction.” Despite Schofield’s assessment, there is little evidence that Nevada’s mining industry influenced the project’s occupational health. His assessment offered sweeping generalizations rather than careful evidence-based analysis. Certainly, any studies on the effects of heat and carbon monoxide had little effect on the contractor’s safety protocol.<sup>153</sup>

But Schofield had one point right. After the Bureau of Reclamation implemented changes in late 1931, Six Companies produced a remarkably comprehensive occupational health program. Eventually, the Boulder City Hospital and the project’s entire health care system served as a prototype for future industrial healthcare programs. Henry J. Kaiser, a contractor in Six Companies and founder of Kaiser Permanente, admired the project’s medical facilities and coverage so much that he modeled similar establishments after it under Kaiser Permanente.<sup>154</sup>

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<sup>153</sup> Schofield, “Industrial Medicine and Surgery As Practiced in the Construction of Boulder Dam,” 86-92.

<sup>154</sup> The major difference from Kaiser Permanente was that the program at Boulder City was limited to dam employees. Kaiser’s later programs included families too. See Dunbar and McBride, *Building Hoover Dam*, 132-133; Ricky Hendricks, *A Model for National Healthcare: The History of Kaiser Permanente*, (Rutgers University Press: New Brunswick and New Jersey, 1993), 1-40.

Six Companies' employees were afforded this health care by paying health insurance, deducting a \$1.50 monthly premium from paychecks.<sup>155</sup> The contractor deducted \$.50 per month for industrial medical in accordance to the Statutes of Nevada and Arizona, and \$1.00 per month for non-industrial medical. To be sure, the coverage was hardly comprehensive and did not cover health care at other hospitals. Moreover, it only covered workplace injuries, excluding treatment for mental disorders, venereal diseases, pregnancies, alcoholism, suicide, tuberculosis, preexisting conditions, and infections or diseases contracted within 72 hours of employment. The distinction between workplace and off-site injuries eventually became important in defining the contractor's legal obligations. While this medical coverage helped and maintained the worker's health, the program proved useful to Six Companies in workmen's compensation and employer liability suits. The corporation's health insurance provisions also demonstrated its commitment to offering employees just enough coverage to keep federal regulators off its back. The hospital was ultimately a lucrative venture for Six Companies. During operations up to February 1936, it reported a profit of over \$25,000. Of course, the proceeds transferred to the contractor and not their workers.<sup>156</sup>

As an added bonus to workers, occupational health was also augmented by academic research. Since heat felled so many workers in summer 1931, a research team from the Harvard Fatigue Laboratory traveled in Boulder City to study the "qualitative

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<sup>155</sup> A copy of an original pay stub with the insurance deduction is available at Boulder City Museum and Historical Society Special Collections. Six Companies matched the \$1.50 sum with \$1.00, totaling \$2.50 per month paid by Six Companies to the hospital fund. It continued this insurance policy after employees started treatment at the Boulder City Hospital. See Schofield, "Industrial Medicine and Surgery As Practiced in the Construction of Boulder Dam," 91.

<sup>156</sup>"Notice: To All Employees," December 17, 1935, McNamee Collection, Box 18, Folder 5, *Allbritton v. Six Companies*, Nevada State Museum and Archives, Las Vegas, Nevada; "Here Are The Conditions Under Which Boulder City Hospital Aid Available," *Review-Journal*, (November 17, 1931).

relationship between physical performance, heart rate, and external temperature.”<sup>157</sup> The researchers included Dr. David Bruce Dill, later of the Desert Research Institute (DRI) in Las Vegas. According to Dill, the Laboratory “quite naturally was devoted to fatigue,” focusing on the physiological, and applied physiological and sociological components of the human body.<sup>158</sup>

Prior to Hoover Dam, the Harvard Fatigue Laboratory conducted studies at the Panama Canal and Leadville, Colorado, studying tropical heat and high altitudes. Both studies tested working conditions, heat and humidity, and the reduction of efficiency. After Dill learned that 13 workers died at the dam during the summer of 1931, he decided to study high and dry temperatures. He contacted Secretary of Interior Ray Lyman Wilbur, a medical doctor himself, to make the necessary arrangements. During graduate school, Dill had sparked a friendship with Wilbur and used it “as an opening” to carry out his studies in Boulder City. It worked. After gaining the approval of Elwood Mead, Wilbur authorized the research venture.<sup>159</sup>

The Harvard Fatigue Laboratory arrived in June 1932, and set up a laboratory in a municipal building basement in Boulder City. There were 10 researchers. The Bureau of Reclamation assigned each a cabin, army cot, and stove for cooking. They ate most meals in the Anderson mess hall, paying 35 cents a day. The team consisted of clinical investigators and doctors, one of whom was a young physician named Dr. J.H. Talbott.

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<sup>157</sup> Interview with David Bruce Dill, May 4, 1976, Conducted by R.C. Turner, University of Nevada, Las Vegas Special Collections; “Boulder Chosen for Science Work,” *Review-Journal*, (February 4, 1932).

<sup>158</sup> D. Bruce Dill, Ph.D., “The Harvard Fatigue Laboratory: Its Development, Contributions, and Demise,” David Bruce Dill/Harvard Fatigue Laboratory Collection, Box 5, Folder 55, Mandeville Special Collections Library, Geisel Library, University of California, San Diego.

<sup>159</sup> Interview with David Bruce Dill, Ph.D., March 13, 1975, Conducted by Lusie A. Sohlt, University of Nevada, Las Vegas Special Collections; and A.V. Bock, M.D., and D.B. Dill, Ph.D., “A Resume of Some Physiological Reactions to High External Temperature,” August 21, 1933, David Bruce Dill/Harvard Fatigue Laboratory Collection, Box 1, Folder 42, Mandeville Special Collections Library, Geisel Library, University of California, San Diego.

Upon his arrival, Talbott established a relationship with Dr. Wales Haas, and began studying heat cramps among admitted workers at the hospital. All the researchers conducted experiments on themselves, workers, and dogs. They were interested in the workers who had consumed large amounts of water, and the “process of selection and adaptation” to the desert climate. The researchers concluded that industrial hazards occurred due to “hard work, high external temperatures, and profuse sweating.” They determined that the first 3 days were a crucial period for workers. Those with “physical deficiencies” and “poor mental stamina” usually quit. The workers that survived usually continued indefinitely because their cardiovascular systems could withstand the heat. Additionally, deaths occurred because workers lacked a “balance of electrolytes, particularly the loss of sodium chloride” and could not replace it.<sup>160</sup>

After the researchers’ arrival, Cornelius Van Zwalenburg, a medic, discovered that administering salt supplements prevented heat prostration. Throughout his career, Dill was credited for the discovery, a distinction he adamantly denied. By early 1930s, most academic medical centers recognized that human beings needed to consume salt to endure high temperatures. However, it was not a yet a common practice among American surgeons and industries. In Europe, the practice was empirically known. For generations, mill workers in Germany added salt to beer. Since they drank a great deal of beer, heat prostration was rare. England also recognized the need. Upon arrival in Boulder City, the researchers came “fully prepared to look for salt deficiency.” They

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<sup>160</sup> Interview with David Bruce Dill, May 4, 1976; and D.B. Dill, A.V. Bock, and H.T. Edwards, “Mechanisms for Dissipating Heat in Man and Dog,” Reprinted in the *American Journal of Physiology*, Vol. 104, No. 1, (April 1933), David Bruce Dill/Harvard Fatigue Laboratory Collection, Box 1, Folder 37, Mandeville Special Collections Library, Geisel Library, University of California, San Diego; J.H. Talbott, H.T. Edways, D.B. Dill, and L.D. Rastich, “Physiological Responses to High Environmental Temperature,” *American Journal of Tropical Medicine*, Vol. XIII, No. 4, July 1933. David Bruce Dill/Harvard Fatigue Laboratory Collection, Box 1, Folder 41, Mandeville Special Collections Library, Geisel Library, University of California, San Diego.



found that heat exhaustion and stroke occurred not because of lost body fluids. A loss of salt excreted in sweat was the culprit, triggering approximately 150 hospitalizations and 17 deaths in 1931. To circulate their findings, the researchers told Wales Haas that workers needed to add extra salt to their food. In the mess hall, Haas had posed a sign that said “THE DOCTOR SAYS TO DRINK PLENTY OF WATER.” Talbott wrote underneath “AND PUT PLENTY OF SALT ON YOUR FOOD.” Additionally, Haas instructed workers to acclimate their bodies to the heat prior to work and consume a half tablespoon of salt daily in addition to their usual food intake. Six Companies placed multiple salt dispensers at the site, urging workers to drink the cool, sanitized water from the water system throughout the day. Moreover, the Anderson Brothers started adding extra salt to its food. In addition to salt, the meals had a high caloric content designed to sustain the workers’ endurance. A typical breakfast consisted of cream of wheat, all bran, sausage, bacon, omelets, fried potatoes, and hot biscuits. For suppers and dinners, the chef served an assortment of meals, including roast leg of veal, Irish stew, fried veal steak with country gravy, and chili con carne. The meals were available to non-employees as well, with the Anderson Brothers charging \$1.00 per sitting.<sup>161</sup>

The changes reduced deaths and hospitalizations from June to October 1932. The researchers found that replacing salt and “a good night sleep” fostered improved worker health. They concluded that heat cramps fell into three categories. First, most workers had not been properly acclimated to the environment. Salt concentrations decreased in those who worked in the desert a while. Second, many participated in “weekend binges

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<sup>161</sup> Interview with David Bruce Dill, March 13, 1975; Medic Who Aided Dam Workers Dies,” *Review-Journal*, (July 25, 1935); Schofield, “Industrial Medicine and Surgery As Practiced in the Construction of Boulder Dam,” 89; Anderson Brothers Menu,” Cahlan Collection, Box 5, Folder 25, Nevada State Museum and Archives, Las Vegas, Nevada. “Minutes of Regular Meeting of the Board of Directors,” April 16, 1934, Six Companies Corporate Records, Vol. II, University of California, Berkeley, Bancroft Library.

and did a lot of drinking and not eating” in Las Vegas, depriving themselves of the proper level of electrolytes and naturally developed heat cramps. Third, some humans naturally excrete more salt in sweat than others. Consequently, they developed heat cramps. Although the greatly improved living conditions, sanitized, cool drinking water, and acclimation to the desert climate were crucial to the reduction of heat-related illnesses, the primary reason for fewer deaths were most probably milder summer temperatures in 1932. A smaller turnover rate also made it possible to retain workers who were in good cardiovascular shape and acclimated to the environment.<sup>162</sup>

Over the following decade, these findings went far towards protecting dam workers and their industrial counterparts. Even though the idea of administering salt supplements was not unique to the project, the Harvard Fatigue Laboratory published their findings, informing the entire industrial medicine community. The research appeared in several medical and scientific journals, including *American Journal of Tropical Study* and the *Journal of Clinical Investigation*. It is also noteworthy that despite the initial apathy of Six Companies and the Bureau of Reclamation to occupational health, the Boulder Canyon Project managed, through scientific research, medical expertise, and federal government and private support, to improve industrial hygiene conditions within a year.

After Franklin D. Roosevelt became president in 1933, the New Deal brought other advances in occupational health to the project. Unlike his predecessor Ray Wilbur, Secretary of Interior Harold Ickes held no great political affection for Six Companies. Ickes actively supported a federal investigation into the corporation’s adherence to the 8-

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<sup>162</sup> Interview with David Bruce Dill, May 4, 1976; Talbott, Edways, Dill, and Rastich, “Physiological Responses to High Environmental Temperature.”

hour day provision of their contract. John F. Wagner, a Six Companies auditor, informed the Secretary that company violated several U.S. codes. This included keeping two sets of books. One book recorded “regular time” and the other documented “emergency time.” The corporation never showed the Bureau of Reclamation the second set of books, which revealed that Six Companies continuously ignored the 8-hour day rule. Such violations constituted a fine. Wagner calculated that Six Companies owed the federal government over \$300,000 in penalties. While Ickes did not want to delay the progress of finishing Hoover Dam, he dispatched an investigator to study the matter. The allegations outraged Six Companies. Henry Kaiser, a sophisticated lobbyist, contended that the project was in “continuous emergency” and therefore not subject to the restrictions. He launched a vigorous media campaign against Ickes, conducting radio and newspaper interviews. Kaiser described the project as heroic for providing unemployment relief during the Great Depression. He called the violations unfounded and un-American, and bombarded Ickes with telegraphs that called to renounce the investigation. In the end, Kaiser’s campaign worked. In 1936, Ickes agreed to a \$100,000 fine, two-thirds of the original penalty.<sup>163</sup>

Under the direction of Francis Perkins, the Department of Labor (DOL) also expanded federal involvement in the project’s labor standards. However, the department did not mandate universal labor standards for all American industries. The DOL provided standards to clarify its role as advocates for workers, confirming that it sought to exercise influence at the state level, not assume control. By 1935, it evaluated safety at the dam, issuing a report on its findings. The DOL concluded what was known about the project. Six Companies had made little use of organized accident prevention,

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<sup>163</sup> Stevens, *Hoover Dam*, 232-234.

investigation, and analysis, and effective safety programs that enlisted foremen and workers. It recommended that the corporation keep detailed reports and investigate all major disabling accidents, appoint a full-time “Safety Engineer,” and enforce the 8-hour law. But although the DOL determined that death and accidents rates were “considerably higher” than justified, it noted that no major catastrophes or serious failures occurred because of inadequate safety measures after 1932.<sup>164</sup> Ultimately, New Deal regulations fixed the project’s remaining safety issues, and fostered a legal environment that favored the workers in workmen’s compensation, and employer liability suits.<sup>165</sup>

### The Big Six Suits

Although the labor force benefited from workmen’s compensation and employer liability suits, most lawsuits against Six Companies met limited success until 1935. While workmen’s compensation provided workers with compensation regardless of fault, often the system was not to their benefit during the 1930s. First, workers were denied damages through the courts to compensate for their injuries. Second, the premium incentives were generally not enough to force employers to enforce adequate safety improvements. Third, statistics during the 1920s and early 1930s reveal that most

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<sup>164</sup> “Division of Labor Standards: Its Functions and Organization,” (Clara Beyer, 1934), RG 100, Serial 1, 1934-1937, Box 24, National Archives and Records Administration, National Archives at Riverside; Rosner and Markowitz, “Research or Advocacy,” 365-382; Markowitz and Rosner, “*Slaves of the Depression*,” 191-194; Gerald Markowitz and David Rosner, “More Than Economics: The Politics of Workers’ Health and Safety, 1932-1947,” *Milbank Quarterly* 64 (Fall 1986): 331-351; Sidney J. Williams, “Safety at the Boulder Dam,” Special Representative to the Division of Labor Standards, the United States Department of Labor, January 29, 1935, MS 78, Morgan J. Sweeney Papers, Boulder City Museum and Historical Society Special Collections.

<sup>165</sup> Medical care in the non-industrial workplace also became a priority during the New Deal. The Farm Security Administration (FSA) provided for the “bottom third” of Americans indigents, making medical care a core element of its rehabilitation program. Since half of loan defaults attributed to sickness, the Public Health Service (PHS) indicated that chronic physical conditions hindered economic rehabilitation. At its peak in 1942, over 650,000 poor rural farmers enrolled in prepaid medical cooperative plans with the FSA. See Michael C. Gray, *New Deal Medicine: The Rural Health Programs of the Farm Security Administration*, (Baltimore and London: The John Hopkins University Press, 1999) for an overview of the FSA medical programs.

industries actively evaded liability payments to compensate for falling profits during the Depression.<sup>166</sup>

Six Companies was no different. It scrutinized each compensation hearing to pay the least amount possible. Like the Union Pacific, Six Companies provided workmen's compensation through the Nevada Industrial Commission (NIC). In addition, it contributed to the Arizona Industrial Commission (AIC) fund, covering worker injuries that occurred on the Arizona side of the dam site. Six Companies also purchased a policy with the Employers' Liability Assurance Corporation, protecting it against worker and outside party injuries on the federal reservation, and covering malpractice claims. For example, when an intoxicated worker struck and killed a pedestrian while driving a company car in 1934, the Employer' Liability Assurance Corporation provided death benefits to his family. Lastly, some workers purchased supplemental workmen's compensation from private insurance carriers.<sup>167</sup>

The AIC employed a full-time inspector to make safety inspections and represent the state in compensation hearings. The NIC did not provide an investigator until the final year of the project and only because it was forced to by the DOL. By 1934, the AIC and NIC settled numerous minor compensation cases. Nevada paid after 7 days of the accident, depending on its seriousness, and Arizona, 15 days. Additionally, since Arizona compensated workers with higher premiums than Nevada, workers fought hard

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<sup>166</sup> Markowitz and Rosner, "*Slaves of the Depression*," 110-111.

<sup>167</sup> "Biennial Report of the Nevada Industrial Commission," *Appendix to Journals of Senate and Assembly*, Thirty-Sixth Session, Vol. II, (Carson City, NV: State Printing Office, 1933), 7; John J. Haydon to Leo McNamee, January 21, 1938, Letter; John J. Haydon to Leo McNamee, January 21, 1938, Letter; McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada; Dan Costello to Ed Brockmann, August 17, 1934, Letter; Leo McNamee to Employers' Liability Assurance Co., August 3, 1934, Letter; John J. Haydon to McNamee & McNamee, July 27, 1934, Letter; Beament & Beament to Six Companies Inc., July 24, 1934, Letter; Leo McNamee to Employers' Liability Assurance Co., July 5, 1934, Letter, McNamee Collection, 1934 Legal File, Box 147, Folder 2, Nevada State Museum and Archives, Las Vegas, Nevada.

to claim that their injuries occurred on the Arizona side. However, the line between states was often blurred, so close it had to be measured. Altus “Tex” Nunley, a dam worker, recalled such an incident. While mucking out the center of the dam, a worker died. But it was unclear which side he died on. Nunley’s foreman gave him tape to measure the location and privately told him, “Tex, make it Arizona.” Nunley ultimately determined that he had died in Arizona, barely.<sup>168</sup>

Six Companies became quite concerned with the figures. Most of the dam site was located within the Nevada borders, and the numbers did not add up. Six Companies first discussed the problem in 1931, and determined a solution. To deter dependant payments, it would only employ single men in Arizona. But the corporation failed to pressure workers to accurately report injuries. Most conveniently experienced injuries on the Arizona side. As a result, Six Companies’ Arizona costs soared. The workers frequently dragged their coworkers injured bodies from Nevada to Arizona. For example, <sup>when a</sup> worker was critically injured in an upper penstock tunnel, his coworkers constructed a makeshift stretcher, carrying him to the Arizona side. The workers then called for first aid, as they knew Arizona compensated higher than Nevada. Eventually, AIC officials recognized the ploy and sometimes refused to approve payments, forcing the workers to contest the decision in court.<sup>169</sup>

As mentioned, Six Companies’ health insurance plan only covered workplace injuries. This was also the case with workmen’s compensation. The distinctions between “on-site” and “off-site” injuries, and “at-fault” or “accidental/natural causes” deaths

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<sup>168</sup> Williams, “Safety at the Boulder Dam,” 12; Dunbar and McBride, *Building Hoover Dam*, 262; Stevens, *Hoover Dam*, 166.

<sup>169</sup> Some accidents never even happened on the job. Leroy Burt indicated that a coworker, Denny Greenwood, broke his leg in a fight with his brother and went to the Arizona side to collect compensation. See Dunbar and McBride, *Building Hoover Dam*, 262-264; and Stevens, *Hoover Dam*, 164.

became important to define the contractor's legal obligations. The location of an injury determined compensation. Six Companies did not cover off-site injuries. Additionally, if a worker died of "natural causes," the contractor did not compensate. In fact, dependants only received benefits for "natural causes" if a worker purchased a private insurance policy. The policy infuriated workers. Many felt that Drs. Wales Haas and Richard Schofield listed "natural causes" to release Six Companies of its legal responsibility. For example, dam worker Eugene Schaver fell and hit his head on May 29, 1935. At the hospital, Schofield listed the cause of death as "complications of spinal meningitis," a non-job related illness and therefore not compensable. Schaver's coworkers were outraged. Highly suspicious of Schofield's allegiance, they demanded Clark County officials to investigate the death. But an autopsy confirmed that Schaver died of spinal meningitis. Schofield affirmed that the investigation "finally proved the thoroughness and integrity of the Boulder City Hospital, which in the past has been in question." Still, the workers continued to mistrust their doctors. They believed that Schofield assisted Six Companies in avoiding the payment of compensation.<sup>170</sup>

Private insurance carriers also fought compensation as well. One company, the Mutual Benefit Health and Accident Association, regularly contested benefits, citing a violation of the contract. Most contracts carried the clause: "If application has been falsified, the company will only be responsible to return of the premium." The clause denied coverage to numerous workers. Frederick Kassel, a jackhammer operator, purchased a standard form 60W contract from the Mutual Benefit Health and Accident Association in January 1933. The insurance company considered his occupation "standard" because he drilled holes for excavation. But there was a provision. Kassel's

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<sup>170</sup> Stevens, *Hoover Dam*, 237.

policy did not cover hazardous operations, including handling explosives or underground mining. Kassel died in July 1933 during a dynamite accident. When his widow filed a claim, the insurance company rejected it. Her husband, they asserted, had “misrepresented his profession” and never disclosed that he handled dynamite. This “barred his right to recovery under the provision of his contract.” His widow continued to fight for compensation. In the process, she gained an unlikely ally. Six Companies offered help, which probably did not want to pay more than the standard workmen’s compensation settlement. The company’s insurance division charged that it was a “matter of common knowledge” that jackhammers loaded dynamite and that the company was “willfully evading payment of a just claim” Dan Costello, a Six Companies insurance agent, commented that anyone that did not know a jackhammer handled dynamite “must be blind, or else in his ardent desire to sell policies, grossly misrepresented.” Six Companies eventually persuaded the insurance company to compensate his widow, offering \$750.00 in settlement.<sup>171</sup>

On a related front, some workers were able to extend the range of employer liability in once hostile courts, using the carbon monoxide cases to establish a beachhead. As early as 1916, the PHS warned industries about the dangers of carbon monoxide and published guidelines to limit emissions. Several studies also confirmed that cumulative small doses killed or seriously injured humans. In 1921, Yale University’s Yendell Henderson carried out scientific experiments in a chamber that gassed human volunteers

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<sup>171</sup> Ed C. Peterson to Brockmann Agencies, December 29, 1933, Letter, McNamee Collection, 1934 Legal File, Box 146, Folder 2, Nevada State Museum and Archives, Las Vegas, Nevada; F.S. Peterson to Dan Costello, September 22, 1933, Letter, F.S. Peterson to Dan Costello, September 22, 1933, Letter; Ed Brockmann to Sims Ely, November 10, 1933, Letter; Leo McNamee to Mrs. F.B. Kassel, March 31, 1934, Letter; McNamee Collection, 1934 Legal File, Box 146, Folder 2, Nevada State Museum and Archives, Las Vegas, Nevada.



to study the effects.<sup>172</sup> By 1931, carbon monoxide was an easily identifiable cause of death, a fact that immediately put Six Companies on the defensive. Even though a Nevada mining law prohibited the operation of gasoline-powered motor vehicles underground, Six Companies operated large trucks to haul rock out of the diversion tunnels. The trucks emitted carbon monoxide, which accumulated in the tunnels due to poor ventilation. The company contended that the operation was neither prohibited by Nevada law nor detrimental to worker's health.<sup>173</sup>

Andy J. Stinson, the Inspector of Mines, knew that operating gasoline-powered trucks underground would have deadly consequences.<sup>174</sup> But Nevada had no authority because the project was located on a federal reservation. After receiving numerous complaints, the state decided to make its move. On March 25, 1931, the legislature authorized Stinson to monitor the dam site's tunnels, drifts, and underground excavation. He inspected the dam site a month later, issuing several citations to Six Companies and the Bureau of Reclamation. In most cases, the company satisfied the recommendations, providing that Stinson did not interfere with the use of gasoline-powered trucks. The Inspector of Mines also examined safety in the diversion tunnels, and made several suggestions. The tunnels needed improved ventilation and the company needed to provide sanitary water barrels. Six Companies complied with these orders. But regarding the gasoline-powered trucks, the company took a different stance. Even though

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<sup>172</sup> The results of these tests revealed what scientists already assumed. Exposure made human subjects seriously ill. See Sellars, *Hazards on the Job*, 168.

<sup>173</sup> Six Companies claimed it had a \$300,000-500,000 investment in the trucks as well. It knew carbon monoxide was lethal, but honored the investment over the health of their workers. See "Higher Bond To Be Demanded in Big Six Dam Suit," *Review-Journal*, (November 18, 1931); and Billington and Jackson, *Big Dams of the New Deal Era*, 137-138.

<sup>174</sup> The Nevada Inspector of Mines outlawed the use of gasoline-powered trucks underground. See Section 4229 of Nevada Compiled Laws, Statutes Nevada 1931, c.167, 274; "Report of the Inspector of Mines," *Appendix to Journals of Senate and Assembly*, Thirty-Sixth Session, Vol. I, (State Printing Office, 1933), 32.

Stinson ordered Six Companies to discontinue to practice, the company avoided his recommendation until the state filed charges. Gray Mashburn, the Nevada Attorney General, recognized that the recommendation was a “considerable burden of expense.” However, it was his “earnest desire to protect the health and lives” of the tunnel workers. Experience had shown that it was dangerous to use “gasoline and gasoline engines in such underground workings.” The situation concerned other state government officials as well. Governor Fred Balzar complained of Nevada’s lack of authority, citing it was “impossible to enforce” labor and safety laws on the project. Senator Tasker Oddie was troubled by “more than a dozen fatalities” that occurred on the site due to the “lack of supervision and inspection as to safety of the men and proper working conditions.” He complained that there was “no reason why” Nevada was barred from enforcing occupational health within its state boundaries. While Oddie wanted to contest the decision in court, he assumed the project would be completed before a final decision was rendered.<sup>175</sup>

In November 1931, Six Companies applied for a temporary restraining order against Stinson, permitting it to proceed with tunnel construction. The corporation claimed that its contract stated that it was a federal reservation and not subject to state intervention. Therefore, Nevada lacked authority to enforce safety laws.<sup>176</sup> Six Companies also argued that the Nevada statute, authorizing Stinson’s expanded role,

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<sup>175</sup> “Application of State Laws Boulder Canyon Project,” 9-10; “Report of the Inspector of Mines,” *Appendix to Journals of Senate and Assembly*, Thirty-Sixth Congress, Vol. 1, 39-43.

<sup>176</sup> Since the dam site was a federal reservation, Nevada could not tax personal property for franchise within it. The purpose of the reservation was to help facilitate the dam’s construction, but local residents feared the federal government would create a permanent tax-exempt reservation, attracting industries that otherwise would be in taxable areas of Nevada. See “Application of State Laws Within Boulder Canyon Project Federal Reservation,” Hearing Before The Committee on Irrigation and Reclamation, United States Senate, Seventy-Second Congress, First Session on S. 2885: A Bill Providing for the Application of State Laws Within the Boulder Canyon Project Federal Reservation, June 14, 1932.

violated the Fourteenth Amendment of the U.S. Constitution. The states could not deprive a person of life, liberty, and property without the due process of the law. The statute in question would therefore deprive Six Companies of its property, the gasoline-powered trucks, without due process. Additionally, it denied equal protection of the law. Six Companies attorneys emphasized that there was no other “practical method of removing the dirt and rock,” and there was “no reasonable relation” between the trucks and violations in public safety. Consequently, it requested a writ of injunction to restrain Stinson from enforcement.<sup>177</sup>

The court approved the temporary restraining order and set the trial date for March 1932. Six Companies began assembling its defense. While the federal government helped improve occupational health at the dam, the Department of Interior and Bureau of Reclamation also fully supported Six Companies, probably because of the immense pressure to finish the project on time and provide unemployment relief. The federal backing was advantageous to the company. Ray Lyman Wilbur and Elwood Mead were particularly instrumental, providing assistance to Six Companies’ attorneys. While a medical doctor by trade, Wilbur seemed ambivalent to the threat of carbon monoxide. He even told Governor Balzar that state mining laws did not apply because intervention would “hamper the work.” Furthermore, he contacted William D. Mitchell, the U.S. Attorney General, to help with the case. Wilbur requested that he appear

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<sup>177</sup> Temporary Restraining Order and Order to Show Cause, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant Filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931; Bill of Compliant in Equity, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant Filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931, 2, 8-10; Memorandum of Points and Authorities, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant Filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931; RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part I, National Archives and Records Administration, National Archives at Riverside.

“amicus curiae” or “take such of the measures” to ensure “the protect of interests of the United States. Mitchell rendered all possible assistance to Six Companies. Ultimately, both the Bureau of Reclamation and U.S. attorneys aided Six Companies’ counsel. While the federal government could not interfere with the pending suits, its attorney’s appeared amicus curiae. However, attorney H.H. Atkinson established clear boundaries. “It would not be advisable,” he warned, “to become antagonistic towards the state,” causing “a real disagreement or dispute.” Along with the Bureau of Reclamation’s attorney, Richard J. Coffey, Atkinson met with Six Companies’ counsel in December 1931, and applied to appear amicus curiae in a statutory court.<sup>178</sup> The judges granted permission. Next, the attorney’s arranged an application for a preliminary injunction based on the following grounds:

1. That the defendants were acting and threatening to act under an unconstitutional statute of the state;
2. That the State of Nevada had ceded exclusive jurisdiction to the United States over the Boulder Canyon Project Federal Reservation;
3. That the United States could not be required to conform to State police regulations in the performance of its functions, and consequently the agents through which it functioned were also immune from state interference.

Finally, they gathered evidence affidavits from expert witnesses. A. H. Ayers, the chief engineer for Six Companies, stated that if the state enforced the recommendation, it would cost the company over \$1.5 million, delay work for “a number of months,” and force it to fire 700 men. Other witnesses contended that the air conditions were “clean” in the tunnels and did not affect the health of workers.<sup>179</sup>

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<sup>178</sup> “Amicus curiae” is Latin for “friend of the court.” The federal attorneys volunteered to assist Six Companies in the case, but were not an official party.

<sup>179</sup> Ray Lyman Wilbur to Fred B. Balzar, June 3, 1932, Letter, Ray Lyman Wilbur to The Honorable Attorney General, November 23, 1931, Letter; Richard J. Coffey to Commissioner, January 11, 1932, Letter; RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 5, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part I, National Archives and Records Administration, National Archives at Riverside; Elwood Mead, December

Both sides defended their case to a panel of federal judges on April 28, 1932. The judges needed to established if the United States had legally created a federal reservation. If so, Nevada statutes did not apply. The contractor's legal team also presented testimonies stating that the trucks were harmless. Ayers attested that "extreme care" had been exercised by the plaintiff to ensure proper ventilation. Next, it retained several chemical engineers, including L. H. Duschak, to inspect the air quality. Duschak revealed that the tunnels contained carbon monoxide from exhaust and dynamite, but the exposure varied. This was due to air currents in relation to the sources of carbon monoxide and the worker's location. He found a "natural circulation in the large tunnels," introducing fresh air throughout. Additionally, due to the high temperatures, the exhaust rose to the "upper stream of the outgoing air," naturally diffusing. Wind conditions and fans contributed to improved ventilation as well. In 58 tests, Duschak discovered that 48 revealed no carbon monoxide. The remaining 10 occurred above a muck pile after it had been blasted. But he assured that the concentrations were "momentary." Duschak concluded that the gasoline-powered vehicles were "not sufficient" enough to harm human health and there was a "fair margin of safety."<sup>180</sup>

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5, 1931, Telegram; H.H. Atkinson to Richard J. Coffey, December 7, 1931, Letter; RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6.1 General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part I, National Archives and Records Administration, National Archives at Riverside.

<sup>180</sup> Plaintiffs Opening Brief, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant filed in Eighth Judicial District Court of Nevada, In Equity No. G-191, 72-74, RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 5, Bound Booklet, General: Legal: Litigation: Six Companies Inc. Suit 1930-31 Part II, National Archives and Records Administration, National Archives at Riverside; Affidavit of L.H. Duschak, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931; Affidavit of Philip Samuel Williams, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931; RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 6, File 1.4.6.1 Boulder Canyon Project: General: Legal Litigation Six Companies Inc. v. A.J. Stinson [1/2], National Archives and Records Administration, National Archives at Riverside.

Six Companies' counsel also presented the affidavit of E.J. Brockman, head of the Six Companies insurance division. Brockman maintained that the company had a "fully equipped safety department" He further insisted that of all the injuries reported to him, there were no cases of carbon monoxide poisoning in the tunnels. Six Companies' counsel also provided affidavits of tunnel workers, denying any injuries or discomfort from the presence of gas. It concluded by acknowledging that carbon monoxide was a dangerous industrial hazard. However, there was "no sufficient concentration of carbon monoxide" in the tunnels.<sup>181</sup>

The extensive briefs presented surprised the state's lawyers. They had assumed that the hearing would only cover the facts set forth in the affidavits by the respective parties. Nonetheless, the state's lawyers presented their arguments, offering numerous affidavits that contradicted Six Companies' counsel. Overall, they claimed that Six Companies was not "blameless" in the situation. The mining laws were well-known, first enacted in 1929 and revised in 1931. Still, it purchased the trucks. Six Companies "arbitrarily, if not contemptuously" ignored the law and continued to operate the trucks. Furthermore, since the temporary restraining order was filed, it continued to operate the trucks underground. The "great delay" ultimately permitted the company to continue putting the workers at risk. In effect, the contractor wanted to finish the tunnels as soon as possible to make safety "a moot question." Moreover, the statute was not unreasonable. It was a viable measure to protect workers. The state's lawyers acknowledged that converting the vehicles to electric motors carried a heavy financial burden, costing an estimated \$150,000. However, it was imperative to enforce the safety laws. That was the purpose of the law. The corporation, existing for profits, did not

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<sup>181</sup> Plaintiff's Opening Brief, 72-76, 80.

protect the health and lives of workers to ensure it “monetary welfare.” The state’s lawyers also revealed Stinson’s findings. Unlike Duschak, determined that the ventilation was inadequate. The use of gasoline increased the risk of fire and explosions as well. Six Companies also failed to reported dangerously high levels of carbon monoxide on “at least two occasions.” The state’s lawyers continued to point of inconsistencies in Six Companies’ case, stressing that a few breaths of carbon monoxide was “fatal, or at least, very dangerous to man.” In fact, the American Engineering and Industrial Standards banned its use in all mining regulations, the reason Nevada enacted the statute. Clearly, carbon monoxide fostered unsafe working conditions. It was therefore imperative that the state intervened. Nevada wanted to project to thrive, but it was at a terrible cost.<sup>182</sup>

In the end, the judges ruled in favor of Six Companies, stating that under the terms of the injunction, the state could not enforce its labor laws or inspect conditions. However, the contractor agreed not to operate the trucks underground to a greater depth than 250 feet, satisfying provisions in the Nevada statute. Several months later, the judges ruled in favor of Six Companies again, making the injunction permanent. They sided with the contractor because they determined that Nevada mining laws were not applicable to constructing a dam, only mining. The judges also declared parts of the Mining Inspector Act unconstitutional, ruling the state had no jurisdiction over any aspect

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<sup>182</sup> Plaintiffs Opening Brief, 78-79; Defendants Reply Brief, *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant Filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931. RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 6, File 1.4.6.1 Boulder Canyon Project: General: Legal Litigation Six Companies Inc. v. A.J. Stinson [2/2], National Archives and Records Administration, National Archives at Riverside; “Higher Bond To Be Demanded in Big Six Dam Suit,” *Review-Journal*, (November 18, 1931); Stevens, *Hoover Dam*, 101.

of the project. In 1933, Stinson attempted to pass a rewritten bill, but it was defeated in the legislature.<sup>183</sup>

Six Companies assured its workers that it took every precaution to safeguard their lives, claiming the gas levels harmless and similar to New York's Holland Tunnel. Frank Crowe also publically proclaimed that the company "would rather take a loss of \$100,000 than to hurt one man." But the tunnels were not safe, and hundreds of workers were dead, sick, and dying from acute carbon monoxide poisoning. Since employer liability became easier to prove, especially with a disease like acute carbon monoxide poisoning, several workers began suing Six Companies for damages. At the same time, tighter government regulations during the New Deal would facilitate successful employer liability lawsuits. Personal injury lawyers ultimately forced courts to determine liability for ailments excluded from workers' compensation. Six Companies was not immune from this process.<sup>184</sup>

In 1933, attorney Harry Austin filed six personal injury lawsuits against Six Companies. The victims sought \$77,186 in damages for permanent ailments. The "gas cases" sparked a media firestorm. Austin alleged Six Companies did not properly protect workers from inhaling high concentrations of carbon monoxide. Consequently, they received permanent disabilities or suffered significant health problems. The first case to trial involved Ed Kraus, a 34 year old truck driver who hauled muck from the tunnels. Kraus testified that he lost 26 pounds, and suffered from headaches, chills and nausea

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<sup>183</sup> Mashburn Hurls Monkey Wrench in Big 6 Plans," *Review-Journal*, (November 4, 1931); *Six Companies Inc. v. Stinson, State Inspector of Mines, et al.*, 2F. Supp., 689-92, February 15, 1933; "Report of the Inspector of Mines," *Appendix to Journals of Senate and Assembly*, Thirty-Seventh Session, Vol. I, (Carson City, NV: State Printing Office, 1935), 6.

<sup>184</sup> Norman S. Gallison, "Construction of the Hoover Dam: Details of the Driving of the Four Tunnels Which Will Divert the Colorado River Around the Dam Site," *Compressed Air Magazine*, 37 (May 1932), 3810.



while working in the tunnels. Since that time, he also experienced weakness, blurred vision and loss of sexual desire. Kraus described the exhaust fumes in the tunnels as so thick that he could not see the truck's electric lights. Other workers testified that a blue cloud of gas drifted out of the tunnels each afternoon, and the men regularly evacuated the tunnels because of gas sickness. Instead of settling out of court, Six Companies decided to play hardball. *Ed F. Kraus v. Six Companies Inc.* was the most exciting trial Las Vegas had ever seen. Six Companies' attorneys, the McNamees and San Francisco-based trial lawyer Jerome White, argued that Kraus' symptoms were caused by the heat, preexisting conditions, and lifestyle choices. Additionally, they interviewed workers that testified the air quality were "acceptable" to breathe and at hazardous levels only a few times.<sup>185</sup>

Both sides enlisted physicians to testify about the origins of Kraus' health issues. As historian James Mohr demonstrates, doctors increasingly served as medico-legal expert witnesses throughout the nineteenth and early twentieth century. In the cases, they faced no greater conflict of interest. Do they side with their employer or their patients? Personal injury suits ultimately put doctors in an uncomfortable position. While the law required objectivity, it was often difficult to give a fair medical testimony without prejudice. Of course, the claims of neutrality were self-serving as well. It is impossible to access if employers influenced a doctor's diagnosis, but the high number of workers complaining of dishonest company physicians suggest the practice was common.<sup>186</sup>

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<sup>185</sup> When cross-examined by Austin, the workers admitted they also experienced headaches and nausea, but that Six Companies required them to testify. See "Workman on Dam Job File Suit," *Los Angeles Times*, (February 11, 1934); Stevens, *Hoover Dam*, 208-210.

<sup>186</sup> See James C. Mohr, *Doctors and the Law: Medical Jurisprudence in the Nineteenth-Century America*, (Baltimore and London: John Hopkins University Press, 1993); Aldrich, "Train Wrecks to Typhoid Fever," 269-270; Welke, *Recasting American Liberty*, 77-80.

Two points are clear about Six Companies' physicians. First, Drs. Wales Haas and Richard Schofield created an environment that was conducive to out-of-court settlements. These settlements were typically in the best interest of their patients. During the 1930s, workers rarely won large settlements and most received nothing at all. Second, as Mark Aldrich shows, most company physicians struggled to define their professional role in the framework of conflicting obligations to employers and patients. The logical outcome was to diagnose fraud. This was the case with Six Companies' physicians. Schofield described the medio-legal aspect of industrial medicine as the "foreground" of his job. Consequently, he played an intimate role in blocking attempts made by workers to establish a legal claim. According to Schofield, his job was to prove that disabilities were not connected with employment. The "best defense" was to maintain detailed records, documenting a worker's schedule, first aid visits, medication, hospital entries, and other important data. Schofield called the reports "a necessary part of the original industrial medical set-up." At the end of the project, the data was "summed" and studied to deduce any "interesting facts, figures, and statistics."<sup>187</sup>

There is little evidence that Haas and Schofield purposely concealed the carbon monoxide cases. But their primary job was to diagnose fraud first, and treat patients second. It is possible the doctors misdiagnosed their patients as contracting "pneumonia" or "tuberculosis" over "carbon monoxide poisoning" in the effort to protect Six Companies. To be sure, both diseases displayed similar symptoms to carbon monoxide poisoning. During the Stinson trial, Haas testified that J.C. Bowles, a shovel operator in the tunnels, contracted tuberculosis, which may have been "long standing." He denied that carbon monoxide caused tuberculosis. His ailment resulted from "a germ."

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<sup>187</sup> Aldrich, "Train Wrecks to Typhoid Fever," 269-270; Schofield, "Industrial Medicine and Surgery," 92.

However, Haas did find that Bowles had “irritated tissues of the lungs,” a symptom of carbon monoxide poisoning. But the doctor decided that the workers contracted the disease before employment. When asked why his preemployment exam did not discover the disease, Haas responded that Bowles may have falsified his medical history. Physical examinations, he insisted, were sensory. It would “not be likely” that an examining physician would discover tuberculosis unless a patient specifically directed attention to it. The examinations were “based upon the statement of the applicant himself” describing his health condition and past history. Haas suspected that Bowles contracted tuberculosis prior to the project, lying to gain employment. With 100 percent medical certainty, the doctor concluded that he did not contract his ailment from working in the tunnels.<sup>188</sup>

Because of such statements, the workers were convinced Haas purposely diagnosed their respiratory problems as “pneumonia” or “tuberculosis” to cover the Six Companies’ tracks. Since the workers suspected both doctors were protecting the company, a high level of bitterness brewed among them. The Boulder City Hospital became a hot topic of discussion among the workers because they felt their peers were “only dying of pneumonia” and “nothing else.” It became a standard joke among the workers: “Don’t go to the Boulder City Hospital, you’ll die of pneumonia!” The IWW’s

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<sup>188</sup> Of course, his testimony was moot considering that Haas did not arrive until 1932. Had the doctor examined Bowles prior to his sickness, his opinion may have held validity. See “Affidavit of Wales Haas, M.D.,” and “Affidavit of J.C. Bowles,” *Six Companies Inc. v. A.J. Stinson, Gray Mashburn and Harley A Harmon*, Compliant filed in Eighth Judicial District Court of Nevada, No. C-191, November 13, 1931. RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 6, File 1.4.6.1 Boulder Canyon Project: General: Legal Litigation Six Companies Inc. v. A.J. Stinson [1/2], National Archives and Records Administration, National Archives at Riverside.

*Industrial Worker* even publicly accused Haas of purposely diagnosing carbon monoxide poisoning cases as “influenza” and listing “pneumonia” as the cause of death.<sup>189</sup>

Of course, there was no way to prove this. During *Kraus v. Six Companies Inc.*, several doctors disagreed over the cause of Ed Kraus’ ailments. Dr. H.M. Behneman, a prominent San Francisco-based surgeon, testified that abdominal ptosis, a sagging of internal organs, caused Kraus’ condition because of his “tall and angular” build, not carbon monoxide. However, Drs. Walter Koebig and J.N. Van Meter argued that his symptoms were consistent with “extreme carbon monoxide poisoning.” To fight the opposing testimonies, Six Companies’ counsel employed unethical and illegal techniques. As Joseph Stevens asserts, the company engaged in “pimping, criminal conspiracy, intimidation of witnesses, and jury tampering.” Six Companies appointed an agent, Bud Bodell, to uncover evidence that contradicted the allegations. Luckily for the company, Kraus was a colorful individual. He not only had Utah police record, but had a reputation for partying and flirting with women. This hardly portrayed the picture of an ailing man.

To gather evidence, Bodell hired a petty criminal, Jim Moretti, to befriend Kraus. Bodell instructed him to “lure” him into “drinking bouts,” “sexual liaisons,” and criminal activity. Moretti spent three months with Kraus and testified that he was a fit man. In fact, Kraus was not sexually impaired due to carbon monoxide poisoning; he regularly engaged in sex “as though a well man” Moreover, he admitted to committing insurance fraud, and regularly using counterfeit money, engaging in blackmail, and stealing sugar to make bootleg whiskey. Most importantly, Kraus admitted that carbon monoxide

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<sup>189</sup> “Eugene F. McCarthy Tunnel Man Passes” *Review-Journal*, (December 11, 1931); “Iron Heel is Used to Stifle All Squawks,” *Industrial Worker*, (January 26, 1932); Rocha, “The I.W.W. and the Boulder Canyon Project: The Death Throes of American Syndicalism,” 213-234.

poisoning had not permanently impaired him and he could “look pretty sick for \$76,000.” The case was ultimately declared a mistrial. The following year, Austin took another case to court, *Jack Norman v. Six Companies Inc.* Like Kraus, Austin alleged Norman received carbon monoxide poisoning in the tunnels. But compared to Kraus, Norman was honorable and incorruptible. To win the case, Six Companies bribed at least three jurors, causing a mistrial. Austin lost both cases, but he continued to file suits. By August 1935, 48 plaintiffs sought a total amount of \$4.6 million in damages pending in Nevada courts. Due to the growing number of cases and project reaching an end, Six Companies finally accepted defeat. In January 1936, the cases settled out-of-court, and an undisclosed amount was distributed to 50 plaintiffs.<sup>190</sup>

The mid-1930s marked several watershed victories for the occupational health movement. In 1936, the legal system compensated dam workers for Six Companies’ negligence. At the same time, courts in West Virginia ruled in favor of Rinehart & Dennis Company workers poisoned by silicosis. The incident, referred to the “Hawk’s Nest Tunnel Disaster,” is considered the nation’s worst industrial massacre. To save costs, the company instructed black migrant workers to dry drill a diversion tunnel. The technique exposed them to high levels of silica dust. Upon examination, company doctors determined the men suffered from “tunnelitis” or “tuberculosis.” As with carbon monoxide poisoning, “silicosis” was a well-known industrial disease, so the workers filed suits against their employer. Of course, Rinehart & Dennis denied negligence. In January 1933, 157 lawsuits sought \$4 million in damages. However, both sides settled

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<sup>190</sup> *E.F. Kraus v. Six Companies, Inc. Frank Bryant and John Tacke*, Compliant Filed in Eighth Judicial District Court of Nevada, No. 4499, April 13, 1933. *Jack F. Norman v. Six Companies, Inc, Woody Williams, and Tom Regan*, Compliant Filed in Eighth Judicial District Court of Nevada, No. 5256, May 24, 1934. See Stevens, *Hoover Dam*, 207-213, for a full description of the trials.

for \$130,000 in June, half of which went to attorney fees. The workers were outraged, charging that the company struck a corrupt bargain with the attorneys. Consequently, an additional 202 workers filed suit, although the courts barred 142 case due to a one-year statute of limitations rule. After taking a test case to the Supreme Court and losing, the remaining workers settled out-of-court for \$70,000.<sup>191</sup>

The Hawk's Nest Tunnel Disaster was significant because unlike the Hoover Dam's "gas cases," it garnered a significant level of national exposure. By the late 1930s, *Time* and *Newsweek* published numerous exposés, opening America's eyes to dangers in the industrial workplace. To be sure, the Hawk's Nest Tunnel Disaster death toll was much higher than losses at Hoover Dam. According to a historical marker on the site, there were 109 deaths, however a Congressional hearing set the number at 476. Other sources estimate 700 to 3000 fatalities. As with Hoover Dam, the number is difficult to pinpoint. Both companies only recorded deaths they determined were workplace-related. Natural causes were overlooked. Additionally, many workers returned home to die. However, unlike the Hawk's Nest Tunnel Disaster, the Hoover Dam "gas cases" represent an overwhelming victory in employer liability cases in favor of the workers. The cases set a crucial precedent for future employer liability suits. Even though the federal government barred Nevada's mining laws, the courts eventually found

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<sup>191</sup> The Rinehart & Dennis Company, a contractor of the Union Carbide Corporation, employed hundreds of black and a few white workers to drill a tunnel through the Gauley Mountain to divert water from the New River. Similar to Hoover Dam, unemployed workers traveled to West Virginia upon news of the construction of a hydroelectric plant in 1930. In order to drill diversion tunnels quickly and cheaply, the contractor ordered to use of dry drilling techniques. While cost effective, it generated a plethora of silica dust, completely covering workers. Many men instantly choked to death or died within several months. Because of the extreme working conditions, the length of employment typically lasted a year. There is much scholarship on the subject. See David Rosner, *Deadly Dust: Silicosis and the Politics of Occupational Disease in Twentieth Century America*, (Princeton, New Jersey: Princeton University Press, 1991); Martin Cherniack, *The Hawk's Nest Incident; America's Worst Industrial Disaster*, (New Haven, Connecticut: Yale University Press, 1986); and *Congressional Record: Proceedings and Debates of the Second Session of the Seventy-Fourth Congress*, Vol. 80, Part 5, (April 1, 1936- April 21, 1936), (Washington D.C.: Government Printing Office, 1936, 4752.

the contractor liable for safety lapses. The civil trials were ultimately an embarrassment for the federal government. When Austin requested tunnel inspection reports from September 1931 to October 1932, the Bureau of Reclamation worried about the implications. If there was “just cause for criticism of the working conditions,” the federal government “must share the blame” because it fostered the situation. However, it denied the request. “While not admitting that such was one,” the Bureau of Reclamation decided “not expose the records in question to the scrutiny of partisan attorneys.” In the end, the Hoover Dam “gas cases” sent the message to industries and the federal government that it was cheaper to embrace occupational health.<sup>192</sup>

#### Dam Malpractice

Not all civil suits at the Boulder Canyon Project were successful, particularly with regard to medical malpractice. The malpractice phenomena in the United States, like other legal issues, were a reflection of the nation’s political, social, cultural, and profession trends. As historian Kenneth Allen De Ville reveals, medico-legal writings rarely referred to malpractice in the mid-nineteenth century. Patients typically sued for breach of contract. Malpractice cases were also rare because the legal profession had not defined it yet. Most lawyers used William Blackstone’s *Commentaries*, defining malpractice as an injury sustained due to “neglect” and “unskilled management” of the medical profession.<sup>193</sup> Following the court’s willingness to accredit malpractice

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<sup>192</sup> Cherniack, *The Hawk's Nest Incident*; and Patricia Spangler, *The Hawk's Nest Tunnel: An Unabridged History*, (Proctorville, OH: Wythe-North Publishing, 2008) provides newspaper clippings, personal interviews, congressional records, archival photographs, and other materials related to the Hawk’s Nest disaster. See also Billington and Jackson, *Big Dams of the New Deal Era*, 138; “R.F. Walter Letter to Commissioner,” January 7, 1934, RG 48 Records of the Department of Interior, Office of the Interior, Los Angeles, Boulder Canyon Project Files, Box 4, File 1.4.6 Boulder Canyon Project Files, National Archives at Riverside.

<sup>193</sup> William Blackstone, *Commentaries*, St. George Tucker ed. (Philadelphia: William Birch Young and Abraham, 1803), 122-123.

decisions in 1840, the rate intensified until the twentieth century. Technological advances in the medical profession also prompted newspapers to market malpractice suits as a solution to medical wrongdoing. By the turn of the century, the tenet of malpractice shifted from contract disputes to tortious liability actions. After *Pike v. Honsinger* (1898), the courts established a “standard of care” guideline for American physicians.<sup>194</sup> As historian Neal Hogan shows, twentieth century decisions on medical liability was founded on the legal definition of “standard of care.”<sup>195</sup> The central definition continues to remain the same. But other issues have changed, including amendments of tort law, interpretations of joint liability, and general court procedures.<sup>196</sup>

By the 1930s, public awareness of malpractice had dramatically increased. Numerous physicians and hospitals began purchasing insurance policies to protect them from malpractice suits. For example, Six Companies insured itself through the Employers’ Liability Group. Additionally, Richard Schofield purchased a personal malpractice insurance plan to cover his private practice. Medical journals also began publishing information on avoiding suits by improved record keeping.<sup>197</sup> Eventually,

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<sup>194</sup> In 1898, the New York State Court of Appeals decided *Pike v. Honsinger*, a landmark case that established a standard of medical care and highlighted problems in medical practice. For the following five decades, courts cited *Pike v. Honsinger* in most malpractice disputes. It not only defined and standardized medical care and error, but also helped transition the practice of medicine from a local to national profession. Regardless, the volume of malpractice claims to liability insurance companies remained low until the 1960s because most Americans viewed medicine as an evolving practice that involved inherent risk. See *Pike v. Honsinger*, 155 NY 201 (1898); Neal C. Hogan, *Unhealed Wounds: Medical Malpractice in the Twentieth Century*, (New York: LFB Scholarly Publishing LLC, 2003), 1-30.

<sup>195</sup> Physicians must fail to provide a “standard of care” and cause an injury out of negligence. If it was unclear the physician acted negligently, no malpractice occurred. Likewise, if the physician was negligent but no injury occurred, there was no malpractice. See Hogan, *Unhealed Wounds*, for a complete discussion of medical malpractice in the twentieth century.

<sup>196</sup> Kenneth Allen De Ville, *Medical Malpractice in Nineteenth-Century America: Origins and Legacy*, (New York and London: New York University Press, 1990), xii-xiii, 3, 224-230; James Mohr, *Doctors and the Law*; and Welke, *Recasting American Liberty* cover the emergence of nineteenth-century malpractice law.

<sup>197</sup> Defensive medicine is trying to avoid malpractice suits by not undertaking complicated procedures that might result in error. This is a problematic tactic because it hinders the medical profession from advancing and does not provide patients quality care, only the bare minimum to avoid lawsuits.



defensive medicine and attempts to block suits brought the role of professional experts to the forefront. The media occasionally covered malpractice suits during the 1930s. But major news organizations did not begin reporting on dramatic cases until World War II. While malpractice became a publically discussed issue during the 1950s, the volume of claims remained relatively low until the late 1960s. Most Americans simply viewed medicine as an evolving practice that involved inherent risk.<sup>198</sup>

Six Companies' doctors faced numerous malpractice suits. One case involved Oscar Allbritton, an African American steel worker. Six Companies hired very few minorities. In fact, the Boulder Canyon Project Act specifically prohibited employing "Mongolians." Moreover, neither the Hoover nor Roosevelt Administrations promoted the hiring of blacks at Hoover Dam.<sup>199</sup> In 1932, the National Association for the Advancement of Colored People (NAACP) and the National Urban League alleged that the dam and the Mississippi River Flood Control Projects either denied employment to blacks or abused those with jobs. An investigation by a NAACP representative confirmed the charges, reporting that Six Companies did not hire blacks because it feared dissent. Moreover, it did not want to pay the cost of building separate housing. Six Companies refuted the claims, and begrudgingly promised to hire blacks "when if they had the necessary experience." The company eventually hired 10 black veterans. However, throughout the project's duration, blacks represented less than 1 percent of the

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<sup>198</sup> Hogan, *Unhealed Wounds*, 33-95; *Time Magazine* published the first high-profile case of malpractice in 1941. See "The Doctor Loses," *Times Magazine*, 37 (26 May 1941): 47.

<sup>199</sup> The New Deal brought little improvement for African Americans at Hoover Dam. While Secretary of Interior Harold Ikes was an outspoken advocate of black rights, he could not alter Six Companies' hiring practices. Ikes convinced the company to allow blacks to live in Boulder City, but it never fulfilled the promise. See Leslie Fishel Jr., "The Negro in the New Deal Era," in *America's Black Past*, edited by Eric Foner (New York: Harper & Row, 1970); Harvard Sitkoff, *A New Deal for Blacks: The Emergence of Civil Rights as a National Issue, Volume I: The Depression Decade* (New York: Oxford University Press, 1978); Stevens, *Hoover Dam*; and Dunbar and McBride, *Building Hoover Dam* for scholarship on African Americans during the New Deal and Boulder Canyon Project.

workforce. Six Companies gave them the most arduous jobs, such as working in the gravel pits, the hottest and most remote area of the project, or brushing steel. Sims Ely also prohibited blacks from living in Boulder City. Consequently, they had to travel over 30 miles from the West Las Vegas slums to the dam site via the Interstate Transit Lines Bus, a subsidiary of the Union Pacific.<sup>200</sup>

Blacks daily faced the threat of accidents while commuting. On March 13, 1935, 66 year old Oscar Allbritton loaded the bus with his black coworkers to return to Las Vegas. Outside of Boulder City, the bus driver lost control and the bus overturned. Allbritton remained conscious, but the impact threw him from his seat. He struck his head. An ambulance arrived shortly after. Like white workers, blacks paid monthly for hospital care. But since it was an offsite accident, Six Companies was not required to furnish medical attention. Regardless, the ambulance transported the injured to the Boulder City Hospital. There were several possible reasons for his action. First, it was closest in proximity. Second, the accident may have been so serious that they thought the injured could not sustain the trip. Third, the private hospitals in Las Vegas rarely treated minorities.<sup>201</sup>

As the attending physician, Dr. Richard Schofield examined over 20 injured workers. Allbritton was dazed and confused. He had a “terrible headache” and did not

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<sup>200</sup> There is a lack of comprehensive scholarship on the minority experience at the Boulder Canyon Project. See Roosevelt Fitzgerald, “Blacks and the Boulder Dam Project,” *Nevada Historical Society Quarterly* 24 (Fall, 1981): 256; Steven, *Hoover Dam*, 176-177; and Dunbar and McBride, *Building Hoover Dam*, 140-144, 201, 239, 306-7.

<sup>201</sup> While Dr. Roy Martin treated minorities throughout house calls, Las Vegas Hospital and the Ferguson-Balcom Hospital did not extend the courtesy. Adele Baratz, a registered nurse, described Las Vegas in the 1930s as having a “strong color barrier.” She referred to the city as “the South of the West” because of strict segregation, as “black people had to sit in one place and white in the other.” See Interview with Adele Baratz, R.N., March 1978, University of Nevada, Las Vegas Special Collections; Nevada Industrial Commission to McNamee & McNamee, February 4, 1942, Letter, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

know what happened. After examining him, Schofield found that Allbritton suffered from shock. However, there were no major abrasions or swellings to his head, face, scalp, or neck. While Allbritton complained of pain in his left shoulder, Schofield noted that “no gross deformity” existed. The doctor hospitalized him for further examination for “probably a slight concussion.” The next morning, Allbritton’s headache was gone. But he complained of pain throughout his body, particularly his back, left shoulder, both knees, and feet. Schofield concluded he suffered from numerous contusions, but no fractures, dislocations, or bone injuries. His concussion signs had also disappeared. Allbritton was not satisfied with his diagnosis. He felt terrible and begged the doctor to examine him further. Schofield appeared to be annoyed with his patient. The doctor wrote in Allbritton’s chart that his apprehension was due to “the effects of nervous reaction or mild shock.” He also attributed Allbritton’s uneasiness to be “negro characteristics.” Since Sims Ely had a strict segregation policy in Boulder City, Schofield discharged Allbritton and advised to report to Dr. Hale Slavin, the county doctor. At this point, Allbritton was “assured that Dr. Slavin would again hospitalize him if it seemed necessary.”<sup>202</sup>

But Allbritton did not want to leave. He felt “excruciating pain and agony” throughout his body and knew something was wrong. Slavin advised Allbritton to seek immediate treatment in Los Angeles. On April 22, 1935, he arrived in Los Angeles and underwent immediate brain surgery “to save his life.” Allbritton never fully recovered.

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<sup>202</sup> As the railroad and county hospital physician, Slavin provided minorities with medical care. See W.M. White to Mr. R.A. Boyd, Re: 0 32396-A Allbritton vs. Six Companies, April 17, 1942, Memo McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada; R.O. Schofield for Six Companies Inc. Hospital, Boulder City, Nevada, Re: O.B. Allbritton, Report, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

The head trauma left him partially blind, deaf, and paralyzed. He was convinced that Schofield unjustifiably discharged him, which aggravated his injuries. Permanently disabled and unable to perform physical labor, Allbritton hired a Los Angeles-based attorney, J.S. Manning, to sue the bus company, and Six Companies and Schofield for malpractice.

At first, Six Companies did not take Allbritton seriously. Its counsel watched as *Allbritton vs. Union Pacific* pended in the U.S. District Court in Los Angeles, commenting that it was “quite likely” the case would “die of a natural death” and “no suit be filed.” Under these circumstances, Six Companies could “close out the file... without payment.” But the case did not disappear. In December 1935, a jury awarded \$25,000 in damages to Allbritton against the Interstate Transit Lines. However, it dismissed the charges against the Union Pacific and bus driver. Since Allbritton needed \$150,000 to cover his injuries, he moved forward with the malpractice claim against Six Companies. On March 11, 1937, Manning filed a complaint against Six Companies, the Boulder City Hospital, and Schofield at the Eighth Judicial District Court of Nevada. The lawsuit alleged that the Boulder City Hospital handled Allbritton’s case “negligently, carelessly, unskillfully, and unprofessionally,” leaving him “totally disabled.” Manning sought \$50,000 in damages.<sup>203</sup>

Six Companies’ tone changed. It hired Leo McNamee, who issued a demurrer challenging the case. McNamee argued that Allbritton’s permanent injuries were a result of the accident, not Six Companies’ negligence. Additionally, Schofield did not cause

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<sup>203</sup> C. Higgins Re: 0 32396-A Allbritton vs. Six Companies, June 18, 1936, Memo; E.J. Brockmann to Employers’ Liability Assurance Corporation, December 15, 1935, Letter; Leo McNamee to the Employers’ Group, May 27, 1939, Letter, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

the damages through malpractice. The complaint was “ambiguous” and needed to be dismissed. Next, McNamee attempted to remove the case on the grounds of diversity of citizenship.<sup>204</sup> However, since Allbritton and Schofield were California residents, it could not be moved. He tried to defame Allbritton as well. The Employers’ Liability Group, who insured Six Companies with malpractice insurance, found a “negro woman named Mrs. Turner” that knew Allbritton “did not sustain a serious injury” in a bus accident because he had “a previous injury to his head.” McNamee subsequently determined that the woman’s claim would not hold up in court.<sup>205</sup>

By the late 1930s, Allbritton’s legal battle was losing ground. In California, an appellate court reversed the judgment against Interstate Transit Lines and ordered a new trial. This stalled the malpractice case. Six Companies’ counsel motioned to terminate under a Nevada statute, but it was denied. But Allbritton did not give up. In 1942, he hired a new legal team, which served an amended complaint. In response, Six Companies’ counsel filed another demurrer. The most interesting feature of this case was how the company denied liability, revealing the ambiguous role of a company physician during the 1930s. First, Six Companies argued that there was no formal contract between Six Companies and Schofield. Consequently, it was unclear whether the doctor was an agent of the company or an independent contractor. In fact, Schofield had no written contract for employment of any kind with Six Companies. It employed him under the

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<sup>204</sup> Diversity of citizenship or diversity jurisdiction refers to federal court exercising their authority to hear a lawsuit. Cases involving state laws can be heard in federal court if the parties are from different states. But there must be a complete diversity in order for the federal court to exercise authority. If the plaintiff is a resident of the same state as the defendant, the state court must hear the case.

<sup>205</sup> “*Oscar B. Allbritton v. Six Companies Inc., Boulder City Hospital, a corporation, Dr. John Doe Schofield,*” Demurrer filed at the Eight Judicial District Court of Nevada, No. 7398, June 25, 1937, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada; John J. Haydon to Leo McNamee, Re: O.B. Allbritton vs. Six Companies, Inc., July 30, 1937, Letter, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

agreement that Six Companies “were to furnish all insurances to him and the hospital.” While Schofield had malpractice insurance of his own, it did not apply to work on the project. According to the doctor, he thought Six Companies would take care of it. Six Companies’ counsel argued that Schofield was free to engage in private practice and treat non-employees. Therefore, there was strong evidence he was an independent contractor whose malpractice had no liability attached to the company.<sup>206</sup> Second, was Boulder City Hospital charitable or for-profit? Since company records indicated the hospital was for-profit, Six Companies’ counsel argued that the hospital was ultra vires, or “beyond the powers,” due to the large number of deductions made from their workforce.<sup>207</sup> Schofield claimed he knew nothing about the hospital’s financial condition; his duties included bookkeeping and reporting expenses to Six Companies. The company then paid the bills. Schofield also stated he had no knowledge of deductions paid by employees toward hospitalization or medical treatment, or whether the hospital operated for a profit. Third, Six Companies’ counsel argued that since the hospital was for-profit, the enterprise was not part of the corporation. According to the original charter issued by the Bureau of Reclamation, they argued it was “possible to distinguish the hospital corporation cases.” Specifically, the charter organized to secure “all necessary

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<sup>206</sup> During the 1930s, numerous cases tried to define the role of the company doctor. *Schneiger v. New York Telephone Co.*, 292 N.Y. Supp. 399 (January 1937, Supreme Court, Appellate Division) found that the company physician was not a servant of his employer, but engaged in an “independent calling.” Therefore, the employer was not liable for malpractice. See *Irene H. Bennett v. Paramount Pictures, Inc., a corporation*, H.J. Strathern, et al, Memorandum of Defendant Paramount Pictures, Inc. In Support of Demurrer, No. 413975, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>207</sup> “Ultra vires” is a Latin phrase used in common law that means “beyond the powers.” Its inverse is “intra vires,” meaning “within the powers.” See *Allbritton v. Six Companies Inc*, Memo, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

equipment and service for the treatment of patients.” Since medical services were a “necessary incident,” Six Companies could not be held liable.<sup>208</sup>

Allbritton never received a settlement. In fact, Six Companies delayed the case until his death in 1948. Upon hearing the news, McNamee contacted Allbritton’s attorneys about dropping the case. He then prepared a motion to dismiss, citing a Nevada Statute stating that trials needed to occur within 5 years after plaintiffs filed an action.<sup>209</sup>

### The Aftermath

Although a memorial plaque at the Hoover Dam sets the number of workers killed during its construction at 96, the real figure was nearly double that. An analysis of fatality records kept by the Bureau of Reclamation and Six Companies indicates that the figure ranged from 114 to 187 individuals. The discrepancy is likely because the reports overlooked “pneumonia” victims poisoned by carbon monoxide and fatalities of workers not “officially” on the clock. Allbritton and his coworkers would have been denied workmen’s compensation because the accident occurred offsite. The reports also omitted fatalities associated with disease outbreaks, including Eugene Schaver’s demise from “spinal meningitis,” and the deaths of family members at Ragtown or tourists visiting the site.<sup>210</sup>

Despite a popular myth, no workers were buried alive in the dam. According to the myth, workers slipped and fell into the concrete as it was poured. Unable to stop the

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<sup>208</sup> Allbritton v. Six Companies Inc., Memo; W.M. White to R.A. Boyd, Re: 0-32396-A Allbritton – Six Companies, May 1, 1942, Memo, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas.

<sup>209</sup> Leo McNamee to The Employers Group, Re: 0-32396A Allbritton vs. Six Companies Inc., December 3, 1948, Letter; *Oscar B. Allbritton v. Six Companies Inc., Boulder City Hospital, a corporation, Dr. Richard Schofield*, Notice of Motion to Dismiss Filed at the Eight Judicial District Court of Nevada, No. 7398, December 4, 1948, McNamee Collection, *Allbritton v. Six Companies*, Box 18, Folder 5, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>210</sup> “Summary of Fatalities by Employers – Boulder Canyon Project – To and including July 31, 1935,” Frank “Doc” Jensen Papers, 1 of 5, Special Collections, Boulder City Historical Society and Museum.

flow of concrete, their coworkers continued pouring. The concrete submerged and suffocated them. Legend has it this happened numerous times during construction. It is nearly impossible to identify the source of the myth, but several workers provide accounts of its origin. According to Bob Parker, the myth began when workers found remains of a man who had drowned in the river. Before the lower cofferdam was laid, the man was buried in the concrete. The second version, told by William D. McCullough, was that the myth emerged after several men fell into the concrete. The workers instantly died, but were immediately jack hammered out. Lastly, Claude “Fat” Jackson claimed he told tourists that workers were buried in the poured cement to frighten them. Jackson privately maintained there were no buried men in the dam. Despite firm denial by historians, the Bureau of Reclamation, and Six Companies, popular memory continues to reinforce the myth. Since it is common knowledge that dam construction was extremely hazardous, it seems possible that workers would be buried in the dam. In many ways, the myth has become more compelling than historical fact.<sup>211</sup>

Hoover Dam has emerged in public memory as a coffin of dead workers. But the myth symbolizes reality. The construction was a dangerous enterprise that killed hundreds of workers. But the project not only represents failures in occupational health;

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<sup>211</sup> The three different accounts as to the origin of the myth provide insight to understanding the myth. According to Parker, it originated after workers found the remains of a body in the concrete. Similarly, McCullough claimed that several men fell into the concrete, but were jack hammered out. Both accounts represent visual descriptions of humans submerged dead or alive in concrete. Even though their remains were removed, the myth emerged because workers witnessed their peers buried in the concrete. This visual image created the basis of the myth. The last version, told by Jackson, represents the act of disseminating the myth. Although Jackson did not witness men buried alive in the concrete, tourists believed his stories because of his creditability as a dam worker. While Jackson or other storytellers may not have witnessed the burial or could identify specific dead workers, many believed the myth was true. This gave them and the myth a level of creditability. See Dunbar and McBride, *Building Hoover Dam*, and “The Men Buried in Boulder Story;” and Oral History of Louis A. Chadburn and Debbie Endsley, Interview Conducted by Dennis McBride, May 18, 1999, Boulder City Museum and Historical Association.



it also symbolized advances in construction safety and occupational health care. First, it dramatically transformed the federal government's role in financing and building big dams. Second, aside from its long unrecognized value as a jobs program, bringing much needed stimulus to the fledging Las Vegas economy, and status as one of the "man-made wonders of the world," Hoover Dam represented a giant step forward in American occupational health, setting a standard for later New Deal public workers jobs. Initially, concerns triggered by the unique factors that coalesced at the site in 1930-1931 forced the Hoover Administration and Six Companies to undertake health and safety reforms rejected in earlier decades and in less desolate locations. These actions provided vital momentum and support for advocates seeking to convince Congress, the states, the judiciary, and a growing number of employers to prioritize health and safety in the workplace. In the rapidly changing environment of the Depression, Six Companies gradually endorsed occupational health to enhance its corporate image and save money.<sup>212</sup>

In later years, New Deal dam projects in other western states replicated Hoover Dam's occupational health program. Six Companies bid on and won the contract to build Parker Dam, and several other contractors involved participated in building the Golden Gate Bridge and the San Francisco-Oakland Bay Bridge. All companies involved applied what they learned from their experiences in southern Nevada, including organizing and controlling a large workforce, and provided a medical infrastructure that facilitated efficient employees. Later, when Franklin D. Roosevelt authorized Bonneville Dam under the auspices of the National Industrial Recovery Act, and later projects Grand

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<sup>212</sup> Billington and Jackson, *Big Dams of the New Deal Era*, 9.

Coulee and Fort Peck, there was little time to focus on design work and occupational health planning. Certainly, Roosevelt's goal was to provide jobs to unemployed Americans. As a result, some engineering designs were constructed from precedent and not innovation. Ultimately, the rush had tragic consequences for Fort Peck Dam, which partially collapsed in 1938. However, no dam project after Hoover Dam experienced major crises in occupational health.<sup>213</sup> All contractors building dams in remote locations offered their employees decent living conditions, food, hospital services, and health insurance. As a costly cautionary tale, no contractor operated gasoline-powered trucks underground in its diversion tunnels. While some Fort Peck workers lived in shantytowns, the situation did not rival Ragtown. As historians David Billington and Donald Jackson argue, Hoover Dam is a symbol of the twentieth century just as the Brooklyn Bridge was for the nineteenth.<sup>214</sup> It played an essential role in western growth by appropriating water and power resources to the region. However, the dam also extended an innovative occupational health program to all New Deal projects. In the process, it transformed the face of federal industrial health. Indeed, it extended this precedent to thousands of industries across the nation, including a pioneering federal project manufacturing magnesium during World War II: Basic Magnesium Inc.<sup>215</sup>

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<sup>213</sup> There is a need for scholarship on occupational health at all the New Deal dam projects.

<sup>214</sup> Historians argue that the Brooklyn Bridge helped transform New York City into a major commercial center. See David McCullough, *The Great Bridge: The Epic Story of the Building of the Brooklyn Bridge*, (New York: Simon & Schuster, 1972), 547-548. Hoover Dam had a similar effect, transforming southern California and the southwest. See Billington and Jackson, *Big Dams of the New Deal Era*, 11, 218-219.

<sup>215</sup> Stevens, *Hoover Dam*, 231; Billington and Jackson, *Big Dams of the New Deal Era*, 9-10, 156-157.

## CHAPTER 3

### THE PLANT

You have read the story of BMI. Built by determined men. Operated by determined men. A big harsh job in a harsh land. No place for lace “panties.” Brittle men or prima donnas. This is a place where people take scorching heat. Lashing sand storms. This is a place where Japs and Germans will be defeated. Let’s make a “boom” town out of Tokio. Basic Magnesium Inc. Employee Manual (1943)

After the completion of the dam in 1936, southern Nevada suffered an exodus of population and decreased federal spending. While Hoover Dam continued to draw visitors, dam workers and their families vanished as well as federal services. Six Companies closed its hospital in Boulder City, forcing the local residents who remained to seek medical care in Las Vegas. After efforts to attract industry with cheap power failed, the city focused on tourism and its old standby, the railroad.<sup>216</sup> By the late 1930s, the divorce trade and gambling industry somewhat revived the local economy. But it was not enough. Without federal spending, the city seemed destined to bust. It appeared to Dr. Clare Woodbury that Las Vegas “would fold.” But instead, he watched with pride as the city “continued on.”<sup>217</sup> While abandoning the region a few years earlier, southern Nevada attracted the attention of Washington D.C. once again. This time, the region provided the ideal location to help build an arsenal of democracy.

#### The Desert Arsenal

Mobilization for World War II dramatically changed southern Nevada. It introduced the defense industry, a move that precipitated the construction of manufacturing plants, a gunnery school, and during the postwar period, the Nevada Test

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<sup>216</sup> Local politicians began a campaign to secure New Deal funding for a public power plant and transmission line from Hoover Dam to Las Vegas in 1934. They hoped to lure industries with the promise of cheap power. Ultimately, Southern Nevada Power’s opposition and a local recession in 1937 ended the public power initiative. See Moehring, *Resort City in the Sunbelt*, 27-30.

<sup>217</sup> Interview with Clare Woodbury.

Site and Nellis Air Force Base. Consequently, World War II mobilization profoundly affected the region, boosting its local economy throughout the twentieth century. Before discussing occupational health at Basic Magnesium Inc., it is important to understand how southern Nevada came to host the defense industry. Since the history of Basic Magnesium Inc. has merited little scholarly attention, this chapter will provide a description of the plant's origins and establishment in southern Nevada.<sup>218</sup>

Wartime mobilization dramatically transformed the United States, especially the West. As the closest region to the Pacific, the federal government invested over \$40 billion in western military and industrial development. California received 10 percent of all federal funds. As historian Gerald Nash shows, the New Deal ended the West's colonial relationship with eastern and international capital, but World War II charted its future.<sup>219</sup> Federal spending shifted the region's reliance on mining and agriculture to manufacturing and science. To be sure, the West was an ideal location for the defense industry. Since Japanese bombers threatened coastal city production, inland cities such as Las Vegas, Pocatello, Salt Lake, Phoenix, and Albuquerque were ideal locations for

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<sup>218</sup> The only literature devoted to the history of Basic Magnesium Inc. is Maryellen Sadovich, "Basic Magnesium, Incorporated and the Industrialization of Southern Nevada, (Master's Thesis, University of Nevada, Las Vegas, 1971); and William T. Dobbs, "Southern Nevada and the Legacy of Basic Magnesium, Incorporated," *Nevada Historical Society Quarterly* 34 (Spring 1991): 273-303.

<sup>219</sup> While progressive reforms affected the West, the New Deal fostered a permanent connection with the federal government and expanded during World War II. The New Deal had restructured the region's social order, envisioning a new relationship between people and land use. It created a legacy of government accomplishments in conservation, public power, and natural resource use. However, it remains questionable how well the federal government sustained these achievements, leaving a mixed legacy in water management, land policies, and relations with Native Americans. In the end, World War II revitalized the region, not the New Deal. The best scholarship on the subject is Richard Lowitt, *The New Deal and the West*, (Norman, OK: University of Oklahoma Press, 1993); and numerous works by Gerald D. Nash, *The American West Transformed: The Impact of the Second World War*, (Lincoln: University of Nebraska Press, 1985); *World War II and the West, Reshaping the Economy*, (Lincoln: University of Nebraska Press, 1990); and *The Crucial Era: The Great Depression and World War II, 1929-1945*, (Long Grove, Illinois: Waveland Press, Inc., 1998). For historiography on the New Deal and the West, see Karen Merrill, "The New Deal's West," William Deverell, ed., *A Companion to the American West*, (Oxford: Blackwell Publishing Ltd, 2004), 346-360.

manufacturing and military bases. The climatic conditions also accommodated year-round training for pilots, gunners, and bombardiers.<sup>220</sup>

Nevada was the perfect spot. Closely situated to the Pacific, the state had an abundance of federally-owned land. Ultimately, mobilization significantly improved Nevada's economic condition. In 1943, Governor E. P. Carville remarked that the "extraordinary conditions brought about by the war" fostered prosperity in Nevada.<sup>221</sup> In fact, the entire state thrived. In northern Nevada, the War Department built air bases in Tonopah and Fallon, and accelerated the use of an ammunition storage facility in Hawthorne.<sup>222</sup> However, southern Nevada mobilization had a most dramatic effect. As historian Eugene Moehring demonstrates, Las Vegas' support for Roosevelt, the New Deal, and promise of cheap water and electricity from Hoover Dam encouraged the War Department to utilize the region. In June 1940, the military constructed a marine auxiliary base and electrolytic manganese pilot plant in Boulder City.<sup>223</sup> The Civil Aeronautics Authority also helped Las Vegas purchase and upgrade the Western Air Express airport in January 1941, located northeast of town, to strengthen the western air defenses. The city leased it to the Army Air Corps for one dollar per year. In turn, the army invested \$25 million in the property, constructing hangars, storage facilities,

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<sup>220</sup> Moehring, *Resort City in the Sunbelt*, 31.

<sup>221</sup> "Message of Governor E. P. Carville to the Legislature," *Appendix to Journals of Senate and Assembly*, Forty-First Session, Vol. 1, (Carson City, NV: State Printing Office, 1943), 3.

<sup>222</sup> See James W. Hulse, *Nevada's Environmental Legacy: Progress or Plunder*, (Reno: University of Nevada Press, 2009), 71-80, for a closer look at the air bases and ammunition depot in northern and central Nevada.

<sup>223</sup> Manganese dioxide is a light metal. In September 1940, Roosevelt signed an order for the U.S. Bureau of Mines to make low-grade manganese oxide ore in three pilot plants at Boulder City, connecting the oxide beds with Hoover Dam's electricity. Prior to the war, the United States seldom produced more than 1 percent of its manganese needs, with the exception of 300,000 tons during World War I. Anaconda Copper produced most of the nation's manganese and the nation's foreign supplier was Russia. However, after the Nazis captured the Nikopol manganese beds in the Ukraine, Germans cut off Russian shipments, prompting the United States to increase manganese production. See "B.C. Manganese Pilot Plant Ok," *Review-Journal*, (September 30, 1940); "Science: Strategic Metal No. 1," *Time Magazine*, (October 13, 1941).

barracks, fuel tanks, and two runways. The War Department eventually turned the base into the Las Vegas Air Gunnery School, a training school for pilots and gunners in airborne combat.<sup>224</sup> The school boasted a high graduation rate. As the war raged in Europe and the Pacific in 1942, the gunnery school graduated 4,000 pilots every 6 weeks. In preparation for the battles of Iwo Jima, Okinawa, and Japan, the Army Air Corps continued to expand the training facility. By spring 1945, the base hosted approximately 13,000 workers.<sup>225</sup>

Moreover, dam building positioned the West and South as prime locations for war plants due to their accessibility to cheap power and water. Defense contracts quickly became big business, especially in southern Nevada. Secretary of War Henry Stimson candidly explained that if you are going to war in a capitalist country, you have to let “business make money out of the process or business won’t work.”<sup>226</sup> The wartime relationship between the federal government, the industrial sector, and the armed forces established what President Dwight Eisenhower called in 1961 the “military-industrial complex.”<sup>227</sup> Manufacturing and technology firms built shipyards, steel and aluminum mills, chemical plants, and research facilities. The process dramatically transformed the military. For example, government investment and military purchases advanced the infant aircraft industry into the largest sector of the war economy. The aircraft industry cost \$45 billion, employed 2 million workers, and produced 125,000 aircrafts during the war. Henry J. Kaiser, formally of Six Companies Inc., capitalized on western defense

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<sup>224</sup> The gunnery school is now called the Nellis Air Force Base.

<sup>225</sup> Moehring, *Resort City in the Sunbelt*, 31-32.

<sup>226</sup> Richard Overy, *Why the Allies Won*, (New York: W.W. Norton & Company, 1995), 198.

<sup>227</sup> The term “military industrial complex” was first used by Dwight D. Eisenhower in his Farewell Address as President of the United States on January 17, 1961. Eisenhower warned the nation about guarding “against the acquisition of unwarranted influence, whether sought or unsought, by the military industrial complex.”

contracts. After the completion of Hoover Dam, Kaiser helped construct the Bonneville and Grand Coulee Dams, and the San Francisco-Oakland Bridge. But under the mobilization program, he was busier than ever. In California, Kaiser's Permanente Co. won a government contract by underbidding his competition by 18 percent, and helped build a naval air base in Corpus Christi, Texas. But he was best known for shipbuilding. With Todd Shipyards, Kaiser entered the business in 1939 and became renowned for innovative production techniques. His yards in California, Oregon, and Washington built ships in less than 45 days. Kaiser built one ship in 4 days. Workers laid the keel of the *Robert E. Peary* on November 8, 1942 and it "slide into the water 90 percent complete" on November 12.<sup>228</sup>

A lesser known venture was Kaiser's production of magnesium.<sup>229</sup> Pure magnesium was weak and soft, but its strength increases when combined with aluminum. It was two-thirds as heavy as aluminum and one-fourth as heavy as steel. Consequently, magnesium was manufactured into bullets, flares, bomb casings, and bomber parts. Additionally, its powder was explosive and used in incendiary bombs.<sup>230</sup> During the war, the military utilized 5 percent of the nation's magnesium in military pyrotechnics and savaging, and 95 percent in nonflammable alloys, mostly aviation. There were two methods to manufacture the material. I.G. Farbenindustrie of Germany developed the

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<sup>228</sup> Air Force History Support Office; "Business: Kaiser's Circus," *Time Magazine*, (November 23, 1942); "Richmond Wonder Ship to Test Pre-Fabrication Work," *Oakland Tribune*, (November 11, 1942); "Kaiser Claims Second Record," *Oakland Tribune*, (November 17, 1942).

<sup>229</sup> The Permanente Magnesium Plant, located in California's San Jose Valley, experienced low production, chemical explosions, construction defeats, and numerous worker deaths. In early 1943, *Time Magazine* called the undertaking a "failure." But by February 1943, it reported that the plant was "finally over the hump," producing 4,5000 tons of magnesium a year, enough to make parts for 9,000 heavy bombers. In comparison to Kaiser's shipyard venture, magnesium production was not a huge success. See "Production: Permanente Squeaks Through," *Time Magazine*, (February 8, 1943).

<sup>230</sup> There were two types of incendiary bombs used during World War II. Some were a mixture of magnesium and iron powders, while others were composed of petroleum. See "Science: Science of Fire Bombing," *Time Magazine*, (February 17, 1941).

electrolytic process, extracting the metal from magnesite ores. Kaiser also acquired the rights to the carbothermic process, developed by Austrian scientist Fritz Hansgirg.<sup>231</sup> The latter method mixed oxide with carbon, quickly heating and cooling it.<sup>232</sup>

Throughout the 1930s, Dow Chemical, Inc. and Alcoa Aluminum held a monopoly over American magnesium production. Dow was the nation's only magnesium producer, shipping its output to Alcoa to fabricate into metal fittings. But the war ended this arrangement. In 1941, a federal grand jury indicted Dow-Alcoa, American Magnesium Corp., Magnesium Development Corp., and other companies for conspiring with Nazi-affiliated I.G. Farbenindustrie. The Justice Department claimed it had "startling evidence of German influence" discouraging the production and raising the price of magnesium in the United States. This created a shortage of magnesium. The firms pled no contest and paid a \$140,000 fine. They were also required to make their patents available royalty-free, opening the opportunity for other companies to enter the business. At the same time, the War Production Board authorized an enormous increase in magnesium production in 1942, calling for an output of 700,000,000 pounds annually, 75 percent more than previously planned.<sup>233</sup>

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<sup>231</sup> Fritz Hansgirg's process, used in England and Japan, differed from the electrolytic method by taking brucite clay (magnesium hydroxide) and baking it in rotary kilns to form magnesium oxide. The oxide was mixed with carbon and heated electrically into gas at 4,000° F. When the mixture was cooled suddenly by cold natural gas, and magnesium resulted. See "Metals: Magnesium—Lesson In Speed," *Time Magazine*, (March 3, 1941).

<sup>232</sup> United States Congress, House of Representatives, Charles H. Levy (D-Washington), "Metallic Magnesium Production Possibilities in the Northwest," Seventy-Seventh Congress, 2<sup>nd</sup> Session, January 5, 1940, *Congressional Record*, Vol. 88, (Washington D.C.: Government Printing Office, 1940), A 661.

<sup>233</sup> "Science: Revolution in Magnesium," *Time Magazine*, (November 17, 1941); "Government: Folklore of Magnesium," *Time Magazine*, (February 10, 1941); "Metals: Magnesium—Lesson in Speed," *Time Magazine*, March 3, 1941; "Company to Build Magnesium Plants," *New York Times*, (August 14, 1941); and William Dobbs, "Working at BMI: Reflections on Life and Labor at America's Largest World War II Magnesium Plant," (Unpublished Paper, 1984), 3-4; "Metals: More Magnesium," *Time Magazine*, (March 2, 1942).



Small firms also benefited from the wartime conditions, such as Basic Refractories, Inc. (BRI) of Cleveland, Ohio.<sup>234</sup> Howard Eells inherited BRI from his father in 1919, selling firebrick to steel companies throughout the 1930s. But the industrialist had bigger aspirations. Eells' firm held a patent for producing aluminum from refractory bricks. In order to capitalize on it, he needed raw materials. In 1933, Eells sent geologists to investigate magnesite claims in California and Nevada.<sup>235</sup> By 1936, they located rich deposits of magnesite and brucite in the eastern slopes of the Paradise Mountains in Nye County, Nevada. The geologists also discovered adjacent claims in Gabbs with extensive deposits of commercial grade ore. Eells purchased the claims, but his objective had changed. By 1940, he became interested in magnesium. In January 1941, Eells learned that a British magnesium firm wanted to build a plant in Canada. In the 1930s, Major John P. Ball, president of Magnesium Elektron, Ltd., purchased the rights for the electrolytic process from I.G. Farbenindustrie, enlisting German technicians to build a plant in Manchester. But after the blitz on London, Ball needed raw materials and protection from Nazi bombers. He attempted to negotiate with the Canadian government to build a plant in Quebec, but the deal collapsed. Eells contacted Ball and proposed a solution. If Ball provided the know-how, Eells could supply the raw materials.<sup>236</sup>

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<sup>234</sup> The history of Basic Magnesium Inc. has been given little scholarly attention. See appropriate sections of Moehring, *Resort City in the Sunbelt*, and Hulse, *Nevada's Environmental Plunder*; Sadovich, "Basic Magnesium, Incorporated;" an article by Christopher Currin on BMI in the *Review-Journal*, (May 1, 1983); and Dobbs, "Working at BMI."

<sup>235</sup> Howard Eells began the venture in 1926, but he did not acquire the claims until 1933. See A.P. Clark to M.W.S, February 10, 1965, Letter; Harley C. Lee to H.P. Eells, July 22, 1933, Letter, Box 3, Folder 2, BMI Collection, University of Nevada, Las Vegas Special Collections.

<sup>236</sup> Major John P. Ball was a member of the Disarmament Commission after World War I. He became interested in German magnesium production and in 1923, began selling German-made magnesium in Britain. Ball would have been able to manufacture magnesium in the United States if federal government had not lifted patent rights. Magnesium Development Corporation, a 50 percent owner of Farbenindustrie

Impressed with Eells' holdings, Ball agreed. The men incorporated Basic Magnesium Inc. (BMI) in Nevada, with Eells sitting as president and Ball as vice president. Next, they chose a location for the plant. The logical choice was to transport the raw materials from Eells' mining claims to California. Nevada did not have the industrial capacity to house a war plant. But Eells had a better idea. Southern Nevada was the perfect location for a plant due to its federally-owned land and close proximity to Hoover Dam. Eells assumed the electricity savings would offset the transportation cost. It was the first time an industrialist expressed interest in the region. Since the dam's completion, local residents aspired to promote their region as a haven for industry. However, there was one major problem. In order to bring power and water to Las Vegas, a company had to spend an estimated \$7 million to build a water line and power transmission system from Lake Mead and the dam. After Eells chose to build his plant in the region, the only problem was securing federal funding.<sup>237</sup>

Eells had several influential supporters. George Thatcher, western counsel for BRI, began discussing the subject with Senator Key Pittman in May 1940, six months before the Senator died. After Pittman's death, Thatcher contacted Senator Pat McCarran and Congressmen James Scrugham. By the time Eells traveled to Washington D.C. to secure funding, Nevada's congressional seat enthusiastically supported the project. In particular, Senator McCarran was a crucial ally, personally convincing President Roosevelt to fund the project. He also enlisted the help of former Nevada senator Charles

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and Alcoa, held the American patent. American Magnesium also held a patent used for fabrication at BMI. See Dobbs, "Working at BMI," 4; John Lowman to Howard P. Eells, September 24, 1940, Letter, Box 1, Vol. II, Chronology of Basic Magnesium Inc. Supporting Data, August 27, 1940 to June 11, 1941, BMI Collection, University of Nevada, Las Vegas Special Collections.

<sup>237</sup> Basic Magnesium Inc. stock distributed 52.4 percent to Basic Refractories Inc., 2.5 percent to George B. Thatcher, BRI's western counsel, and 45 percent to Magnesium Elektron. See Roy E. Thomas, "Factual History of Engineering, Basic Magnesium Inc., Henderson, Nevada," 1-2, Box 4, BMI Collection, University of Nevada, Las Vegas Special Collections.

B. Henderson. As the chairman of the Reconstruction Finance Corporation (RFC), Henderson oversaw the authorization of federal loans and investments in programs that encouraged the production of essential war materials. The relationship paid off handsomely. On April 15, 1941, BMI presented its plan to the Office of Production Management. After several meetings with the War Department and Industrial Planning Section of the Army Air Corps, Eells met with a subsidiary of the RFC, the Defense Plant Corporation (DPC), in June. By July, Eells signed a \$63 million contract for the construction of a 33.6 million pounds of magnesium per annum plant. When the contract finalized in August, the War Department expanded production to 112 million pounds per annum! The numbers were a huge boost to the war effort. In 1940, the United States only produced 6,000 tons. In comparison, Germany's output was 12,000 tons. The DPC contract stated the federal government owned all land, structures and equipment, and magnesium, and rights to approve all sales and stockpiling. Additionally, the U.S. Treasury compensated BMI for management services and paid employee salaries. Eells managed operations and received a salary of \$1 per ton of magnesium produced.<sup>238</sup>

With federal approval, Ball attempted to transport blueprints and chemical formulas to the United States from England. But they almost did not make it. A German torpedo ended the first attempt, sinking the ship. While the technicians escaped, they lost the plans. Ball creatively planned the second attempt. He transferred the plans to microfilm, sending them to Washington D.C. via plane. At the same time, his technicians boarded another ship to trick Germany spies. This time, the plans and technicians arrived safely. But the transportation issues did not end. The plans were flown from Washington

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<sup>238</sup> "Company to Build Magnesium Plants," *New York Times*, (August 14, 1941); Moehring, *Resort City in the Sunbelt*, 34-35; and Dobbs, "Working at BMI," 3.

D.C. to Las Vegas, the courier left them on the plane. They were found in a Seattle airport and delivered to Las Vegas. With the plans and financing intact, Eells' dream had come to fruition. Given the code name of "Plancor 201" for security purposes, the plant was born.<sup>239</sup>

### Wartown in the Desert

The war transformed southern Nevada. Like the dam before it, Las Vegas boomed from federal spending. While practicing at the Las Vegas Hospital, Dr. Clare Woodbury noticed a spike in tourism and Black Market gamblers. "World War II was essentially a boom for Las Vegas," he remembered. People with black market money "did not want to report their revenue," so they gambled and reported that their winnings came from the casinos. Moreover, the divorce trade thrived, mostly due to publicity garnered from the much publicized Clark Gable-Rita Langham divorce in 1939. But the gunnery school and Basic plant provided the biggest boosts to the local economy.<sup>240</sup>

Indeed, many American cities boomed from defense contracts. In Detroit, Michigan, General Motors, Ford, and Chrysler, producing 90 percent of the nation's automobiles, began supplying the war effort. In 1940, Willow Run, a creek west of Detroit, was a quiet area surrounded by woodlands and farmhouses. By 1942, Ford had built an airfield and aircraft assembly plant in the area, manufacturing four-motored Consolidated bombers and employing over 90,000 workers. The Census Bureau estimated from 1940 to 1942, the population of Detroit jumped 336,000 people, or 21

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<sup>239</sup> Chronology of Basic Magnesium Inc., 1937-1942, Vol. I, Box 1, BMI Collection, University of Nevada, Las Vegas Special Collections, especially Volumes II-IV. Eells and BMI management referred to "Plancor 201" when referencing the plant. See also Sadovich, "Basic Magnesium Inc.," 7-8; "Basic Magnesium Inc.," Cahlan Collection, Box 6, Folder 3, Nevada State Museum and Archives, Las Vegas, Nevada;

<sup>240</sup> Interview with Clare Woodbury; Moehring, *Resort City in the Sunbelt*, 29-30.

percent. In Mobile, Alabama, the federal government awarded a \$26 million contract to convert their municipal airport into Brookley Field, a major Army Air Force supply depot and bomber modification center. Mobile emerged as a major wartown, housing an Alcoa plant as well as numerous shipyard companies. The Brookley Field operation alone employed over 17,000 men and women.<sup>241</sup>

Like Detroit, Mobile and other martial cities, the population of southern Nevada grew as a result of defense spending. Las Vegas' population rose from 8,500 to nearly 50,000 residents. In comparison to Hoover Dam, the Basic plant was a far bigger operation. At its peak, the dam employed 5,128 workers. The plant had 13,000 workers on the payroll in July 1942. Everything was bigger at BMI, with a weekly payroll exceeding Hoover Dam's monthly one. To mobilize its workforce, military services drafted workers to construct the plant or produce magnesium. Since most dam workers had left the region, the plant recruited from neighboring states. According to Ragnald Fyhen, Secretary-Treasurer of the Central Labor Council of Clark County, "whole groups of men" were brought in by the "train-loads" from war recruiting centers, especially from Los Angeles and San Diego." The Employment Division of the Industrial Relations Division handled all recruitment and employment. One notable BMI employee was Jonreed Lauritzen, a western novelist. While working at the plant in 1943, he published *Arrows into the Sun*. Lauritzen also wrote a short story, "Hellbent on Victory," about his BMI experience.<sup>242</sup> When asked about working in the chemical lab, Lauritzen

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<sup>241</sup> "Battle of Detroit," *Time Magazine*, (March 23, 1942); "U.S. At War: War and Cities," *Time Magazine*, (December 14, 1942). See also the documentary, *The War*, American Lives II Film Project, Florentine Films and WETA Washington D.C, directed and produced by Ken Burns & Lynn Novick.

<sup>242</sup> "Chronology of Basic Magnesium, Inc.," 7/28/42; "The BMI Project Bigger Than Dam Job," *The Big Job*, Basic Magnesium News Letter, No. 6, Office of Publication, Department of Industrial Relations, (July 30, 1942); Ragnald Fyhen, "Labor Notes," University of Nevada, Las Vegas Special Collections, 15; Bulletin, J.G. Platt, "Employee Union Membership and Hiring Procedure," September 12, 1942, Basic

responded: “We of the West know freedom. Our obligation is therefore the greater to help preserve it. They won’t let me fight—but they will let me make magnesium. I consider that a privilege.”<sup>243</sup>

As most World War II industries, the BMI workforce comprised of men too old for military service, women, and minorities. Women in the workplace was not an entirely new concept. Women had always worked, especially among lower class whites and minorities. But prior to the war, two factors hindered women from seeking employment. First, cultural divisions of labor situated men in the workplace and white middle class women at home. Second, industries rarely hired women because they had an ample supply of men. During the depression, male labor shortages were unlikely and hiring women took jobs away from unemployed men. Pearl Harbor changed everything. Employers could not save a man from his draft board, no matter his industrial skills. While the 1930s motto was “train another,” “train a woman” became the wartime norm.<sup>244</sup>

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Magnesium Collection, Box 1, Vol. IV, Chronology of Basic Magnesium Inc., Supporting Data, April 3, 1942 to September 20, 1942, University of Nevada, Las Vegas Special Collections.

<sup>243</sup> The “Hellbent on Victory” manuscript was accidentally burnt and never published. Jonreed Lauritzen wrote numerous romantic novels about the Mormon experience in the West, including *Arrows in the Sun* (1943) and *Song Before Sunrise* (1948) as well as *The Rose and the Flame* (1951). He penned travel and descriptive articles for *Holiday*, *Family Circle*, *Westways*, and other magazines as well, and several children’s books. The Jonreed Lauritzen Papers are located at the Charles E. Young Research Library, University of California, Los Angeles. See also Jonreed Lauritzen, *Arrows in the Sun*, (New York: Alfred A. Knopf, 1943); “BMI Worker is Novelist,” *The Big Job*, Basic Magnesium News Letter, No. 29, Basic Magnesium Incorporated, Las Vegas, Nevada, January 14, 1943; and Sadovich, “Basic Magnesium,” 16.

<sup>244</sup> Numerous scholarship covers World War II working women and Rosie the Riveter. See Karen Anderson, *Wartime Women: Sex Roles, Family Relations, and the Status of Women During World War II*, (New York: Berkley Books, 2001); D’Ann Campbell, *Women at War with America: Private Lives in a Patriotic Era*, (Cambridge, MA: Harvard University Press, 1984); Melissa Dabakis, “Gendered Labor: Norman Rockwell’s Rosie the Riveter and the Discourses of Wartime Womanhood.” in *Gender and American History Since 1890*. ed. Barbara Melosh, (Routledge: London, and New York, 1993), p. 182-204; Sherna Berger Gluck, *Rosie the Riveter Revisited: Women, the War, and Social Change*. (Boston, MA: Twayne Publishers, 1987); Chester Gregory, *Women in Defense Work during World War II: An Analysis of the Labor Problem and Women’s Rights*, (New York: Exposition Press, 1974); Susan M. Hartmann, *The Home Front and Beyond: American Women in the 1940s*, (Boston, MA: Twayne Publishers, 1982); Maureen Honey, *Bitter Fruit: African American Women in World War II*, (Columbia, MO: University of

At first, the federal government had difficulty recruiting women, so it launched the “Rosie the Riveter” propaganda campaign. Rosie was the perfect working woman. She was attractive, reliable, competent, and patriotic. Women responded overwhelmingly to the Rosie campaign, especially among lower class whites and minorities. By 1945, the number of working women rose from 12 to 18 million. While most worked in the service sector, over 3 million women toiled in war plants. Certainly, patriotism motivated the women, but it was also the pay. In 1942, most female college graduates earned \$25 dollars a week. War workers started at \$25 to \$40 per week, and applicants needed no prior experience. After a training program of 2-6 weeks, a woman could begin work.<sup>245</sup>

Southern Nevada’s version of Rosie the Riveter had many names, including “Magnesium Maggie” and “Chlorine Kate.” In February 1943, BMI hired 16 women “as an experiment putting women workers in the production department.” Most were housewives or former office workers living in the Basic townsite. According to the *Review-Journal*, the women were the first employed in a magnesium production job in the United States. BMI quickly learned the benefits of hiring female workers. Their safety records exceeded most of their male associates; women exhibited greater finger dexterity, focused better, and excelled in inspection work. Moreover, they were less likely to strike and responded well to speedup campaigns. But there were some drawbacks. Women often needed assistance lifting heavy equipment, were prone to

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Missouri Press, 1999), and *Creating Rosie the Riveter: Class, Gender, and Propaganda during World War II*, (Amherst: University of Massachusetts Press, 1984); Leila J. Rupp, *Mobilizing Women for War: German and American Propaganda, 1939-1945*. (Princeton, NJ: Princeton University Press, 1978); and Emily Yellin, *Our Mother’s War: American Women at Home and at the Front during World War II*, (New York: Free Press, 2004).

<sup>245</sup> See “Army and Navy – Manpower: Women & Machines,” *Time Magazine*, (May 11, 1942), for an informative article on women in the industrial workplace during World War II; and Campbell, *Women at War with America*, 100.

fatigue, and had shorter industrial lives than men. They also were susceptible to small accidents because of lack of experience with the complex machinery. At first, BMI eagerly hired white women.<sup>246</sup>

Female workers assumed an array of positions, from driving forklifts to wrapping magnesium ingots, manufacturing asbestos gloves, and repairing gas masks. *The Big Job* and *Basic Bombardier*, the plant's newsletters, regularly highlighted Basic's working women. The newsletter described the "Hydrogen Women" who appeared "as though they'd stepped out of a Superman plot, with visors, masks, and gloves and weird-looking instruments. As a matter of fact, they're three of our splendid woman workers... taking cell voltages and cleaning out the glass tubes." Thelma Lindquist's coworkers called her "Chlorine Kate." Lindquist operated a cell making chlorine gas in a room that ranged from 130 degrees in the summer to freezing temperatures in the winter. She often crawled on top of the cells for warmth, which was hazardous and forbidden by safety regulations. In general, female workers tailored previous experiences to their work. One woman working alongside molten metal commented that it was "nothing more than working over a hot cook stove."<sup>247</sup>

The men had mixed reactions to women to the workplace. According to *Time Magazine*, their position was a "mixture of nose-out-of-joint and gallantry," either leaving the women alone or being too helpful. Surely, the concept was difficult to get used to. While a redhead female posed for a photographer, one workman commented: "I

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<sup>246</sup> "First Women Are Put on Production Line at BMI Plant," *Review-Journal*, (February 13, 1943); "Army and Navy – Manpower: Women & Machines."

<sup>247</sup> BMI distributed the first issue of *The Big Job* on June 26, 1942. It published the bulletin weekly until 1943, when it expanded the publication to a tabloid called *Basic Bombardier*. Editor-in-chief Guernsey Frazer published it every two weeks until November 17, 1944, recording the everyday activities of workers at BMI. See "Hydrogen Women," *Basic Bombardier*, Vol. I, No. 45, (May 21, 1943); A.D. Hopkins, "Magnesium Maggie," A.D. Hopkins and K.J. Evans, *The First 100: Portraits of the Men and Women Who Shaped Las Vegas*, (Las Vegas: Huntington Press, 1999), 129-130.



ran that machine [for] two years and nobody ever took my picture.”<sup>248</sup> But there was little discrimination. At the Basic plant, women received equal pay for equal work, approximately 90 cents per hour. Federal requirements ordered equal pay for female workers, and it appears BMI did not take advantage of them.<sup>249</sup> On a national scale, women in the workplace had a significant impact. Some companies wondered why they never employed women. Others separated female employees from the men. When asked the reason, an executive in Detroit responded: “You know how men are.” Some men enjoyed working alongside women. In a womanless aviation plant in Kansas City, the men complained that “the promised blondes had not arrived.” Additionally, most women did not experience inappropriate behavior from their coworkers. At the Basic plant, sexual harassment was rare. Most women claimed it never happened because they lived and worked in the Basic townsite, and the majority were married or met future spouses on the job or at a local bar.<sup>250</sup>

Besides women, BMI employed thousands of minority workers, mostly African Americans.<sup>251</sup> In response to pressure from civil rights activists, Franklin Roosevelt signed Executive Order 8802 on June 25, 1941, prohibiting racial discrimination in the defense industry. The Fair Employment Practices Committee (FEPC) was the first federal commission to support equal opportunity, barring discrimination at the federal

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<sup>248</sup> “Army and Navy – Manpower: Women and Machines.”

<sup>249</sup> This was not always the case among female war workers. A representative of the U.S. Women’s Bureau found that women at a large war plant received 60 cents an hour, while her male coworkers got 70 cents. In most cases, men earned 10 cents more an hour than women, even though the jobs were the same. See Marguerite J. Fisher, “Equal Pay for Equal Work Legislation,” *Industrial and Labor Relations Review*, Vol. 2, No. 1 (October 1948) 50-57.

<sup>250</sup> Hopkins, “Magnesium Maggie,” *The First 100*, 130.

<sup>251</sup> Besides African Americans, BMI employed a small number of Native Americans. Most lived off of Boulder Highway next to the Pittman neighborhood in Henderson, living in huts and tents, and cooking meals over campfires. Many were also Zuni dancers that entertained in Las Vegas hotels and casinos during the weekend. See Sadovich, “Basic Magnesium,” 16.

workplace. Throughout the war, FEPC rules ordered that there could be “no discrimination in defense industries or government because of race, creed, color, or national origin.” By 1943, Roosevelt strengthened the FEPC with Executive Order 9346, requiring all government contracts to have non-discrimination clauses. In 1940, only 664 blacks lived in southern Nevada. Of Las Vegas’ 8,422 residents, 165 were black. Dr. Clare Woodbury remembered treating “very few blacks” during the 1930s. But by 1941-42, BMI began recruiting black men, predominantly from the South, due to labor shortages. In 1943, over 3,000 blacks had moved to the region, making up 60 percent of all production personnel on the plant.<sup>252</sup>

While the FEPC prohibited discrimination to some degree in the North, the committee did not actively challenge segregation in the South and parts of the West. By the summer of 1943, shifts in demography and workplace desegregation had serious consequences. Rioting among whites, blacks, and Mexican Americans erupted across the nation. In particular, desegregation in the workplace provoked riots in the South. In May 1943, a riot erupted at the Alabama Dry Dock after FEPC officials forced the company to promote 12 black workers to skilled positions. The riot forced the FEPC to permit Jim Crow arrangements in job positions and segregate workplace activities. A few weeks later, false rape allegations triggered a similar riot at the Pennsylvania Shipyards in Beaumont, Texas.<sup>253</sup> BMI did not experience such dramatic opposition to minorities in

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<sup>252</sup> Sixteenth Census of the United States, 1940, Vol. II, Characteristics of the Population, (Washington, D.C.: United States Printing Office, 1943), 721, 756; “200 Negro Workers Walk Off Jobs at BMI Plant today,” *Review-Journal*, (October 20, 1943); and “Federal Agent Is Vegas to Sift Negro Walkout,” *Review-Journal*, (October 21, 1943); Interview with Clare Woodbury.

<sup>253</sup> William J. Collins, “Race, Roosevelt, and Wartime Production: Fair Employment in World War II in Labor Markets,” *American Economic Review* 91:1 (March 2001), 272-286; Frederic C. Lane, *Ships for Victory: A History of Shipbuilding under the United States Maritime Commission in World War II*, (Baltimore: John Hopkins University Press, 1951, 2001), 253; Harvard Sitkoff, “African American

the workplace, but several black workers protested workplace segregation. On October 23, 1943, 200 assembled a walkout in protest of the separate washrooms and toilet facilities. A day later, John Burke, an FEPC examiner, arrived in Las Vegas to investigate the allegations. It is unclear what happened to the strikers, although the *Review-Journal* reported that several were offered employment at the Hawthorne Naval Depot.

While BMI claimed it discouraged racial discrimination, white workers had higher earning potential than blacks. According to local union representative E.E. Ward, blacks were “being discriminated against with the support of management” even though they performed “identical work as white men receive lesser payment.” Louis Stricklan, a jeep driver, confirmed Ward’s accusation. He revealed that black workers received 50 cents less an hour and had little opportunity to advance their position. Stricklan also claimed BMI believed blacks workers’ wages were “too high” and it “didn’t want none of the colored fellows to get a chance” for advancement.” The *Review-Journal* also reported that blacks an “income range from \$1,500 to \$2,000,” while whites earned “\$1,500 to \$3,000.”<sup>254</sup>

Besides separate lavatories and unequal pay, BMI requested complete segregation of the plant. But the FEPC denied the request, noting that full segregation caused unrest and alluded to the riot in Alabama. The workers generally interacted well. Most blacks had issues with management, not their coworkers. However, the FEPC did not challenge the construction of separate housing units. Under the direction of the Federal Housing

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Militancy in the World War II South: Another Perspective,” Neil R. McMillen, ed., *Remaking Dixie: The Impact of World War II on the American South*, (Jackson, MS: University Press of Mississippi, 1997), 85.  
<sup>254</sup> United States Senate, “Hearings Before a Special Committee Investigating the National Defense Program,” First Session, Pursuant to S. Res. 6, 78<sup>th</sup> Congress, Part 20, August 19, 1943, 8349, 8359-8361; Sadovich, “Basic Magnesium,” 15; Dobbs, “Working at BMI,” 17.

Authority (FHA), BMI completed Carver Park in 1943, providing 324 apartments for families and dormitories for singles, a grammar school, recreational facilities, and a small business district. Another option was to live in the Westside, Las Vegas' black district, located across the railroad tracks from Fremont Street. But until the completion of Carver Park in 1943, most blacks and their families lived in army tents near the plant. Arriving in 1942, Viola Johnson lived in a tent with 7 family members. Her family rotated shifts during the day and night, and constant rainstorms and heat spells enhanced the cramped conditions. Johnson's recollection of the experience was that "it was awful living there."<sup>255</sup>

The housing situation was not only uncomfortable for black workers. Everyone experienced inadequate living conditions. As thousands of war workers flooded into southern Nevada for a paycheck, the situation was eerily similar to a decade earlier. Like the dam, accommodations were an afterthought. In fact, the entire nation experienced housing shortages. Some used local jails and churches to house workers. In Detroit "the symbol and seat of America's industrial genius," workers lived in tents, shacks, and trailers. *Time Magazine* called the situation "tragic, dirty confusion." Moreover, LIFE described Detroit's morale as "perhaps the worst in the U.S." The poor planning in Detroit eventually led to material shortages, short tempers, sit-downs, strikes, and a drop in war production.<sup>256</sup>

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<sup>255</sup> United States Senate, "Hearings," Part 20, 8353; "Modern Business District for Carver Park Approved," *Basic Bombardier*, Vol. 11, No. 12, Henderson, Nevada, January 15, 1944; Jacqueline Jones, *Labor of Love, Labor of Sorrow: Black Women, Work and the Family from Slavery to the Present*, (New York: Basic Books, 2010), 207; Interview with Viola Johnson, Conducted by Claytee White, March 12, 1996, University of Nevada, Las Vegas.

<sup>256</sup> Some historians restrict the Great Depression to 1929-1933, but hard economic times extended past 1941. Output continued to be lower than the nation's potential. Moreover, despite the extensive rearmament program, the 1941 unemployment rate was 9.9 percent, over 5.5 million people, compared to 3.2 percent in 1929. As a result, Hoovervilles continued to exist in many parts of the country, especially in isolated areas

When confronted with housing shortages in the 1930s, New Dealers created several relief programs, protecting private lenders against loss and subsidizing low-income public housing. By 1940, the federal government needed housing to build an arsenal, so they allocated millions to defense housing. The programs gave financial support to cities to construct their own housing, and housing developments were built under federal jurisdiction. After the attack on Pearl Harbor, legislation provided an additional \$300 million for housing.<sup>257</sup> Eventually, the competing programs led to numerous setbacks and delays. To remedy the situation, the federal government consolidated all activities into the National Housing Agency (NHA). Additionally, Roosevelt amended the Housing Act of 1934 to create Title VI, authorizing the mass construction of FHA-financed homes in defense industry areas. By June 1941, the FHA approved the financing of three housing developments under Title VI in Las Vegas.<sup>258</sup> The Biltmore, Huntridge, and Mayfair neighborhoods provided over 1000 homes for non-commissioned officers, and army gunnery school and white BMI employees. From 1940

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employing migrant workers. See Alexander J. Field, "Technological Change and U.S. Productivity Growth in the Interwar Years," *Journal of Economic History*, Vol. 66, Issue 1, March 2006, 207; "MICHIGAN: Hitler or the U.S.," *Time Magazine*, (August 24, 1942).

<sup>257</sup> Paul F. Wendt, *Housing Policy- The Search for Solution: A Comparison of United Kingdom, Sweden, West Germany, and the United States since World War II*, (Berkeley, CA: University of California Press, 1963), 154.

<sup>258</sup> Before the amendment, the FHA could only finance homes inhabited by owners. The new system allowed private builders to finance as many houses they could construct. Home owners could also buy a house without a down payment. Under Title VI, the FHA approved the purchase price of \$4,000 per single family home in Las Vegas. See "FHA Title VI is Approved Today For Las Vegas," *Review-Journal*, (June 23, 1941); and "FHA May Approve Title VI Housing for Las Vegas," *Review-Journal*, (August 24, 1945). The Vega Verde subdivision also provided housing, with 36 custom homes built from 1941 to 1945. Vega Verde did not receive funding under Title VI. The subdivision was not particularly successful; construction was slow and residents fought for improvements such as fire protection, streetlights, and pavement. See "Housing Relief Hope Dim," *Review-Journal*, (August 24, 1945); and "City Promises Cooperation in Vega Verde Improvements," *Review-Journal*, (August 7, 1947).

to 1947, the federal government financed nearly one million units of war, emergency, and defense housing nationwide.<sup>259</sup>

While the Biltmore, Huntridge, and Mayfair neighborhoods created some housing, BMI needed to provide accommodations as well. At first, Eells opposed the idea and did not want to build a company town. Indeed, there was little profit in the endeavor. Eells' original plans only provided for a plant and he wanted workers to commute from Boulder City's dam housing. But after military demands increased production, BMI needed to accommodate an additional 10,000 workers and their families. Eells faced relentless criticism for not providing suitable housing, but the situation was beyond his control. The federal government not only increased the size of the project, but also delayed selecting a townsite and supplying funding. After the War Department increased production, Eells contacted the Emergency Housing Coordination (EHC) and the Federal Works Agency (FWA) to secure housing funding. The FWA responded that there was a "tremendous national demand for similar civic needs." It suggested that the War Department file an application emphasizing "the importance of the Nevada project and the vital necessity for housing." Eells arranged for the War Department to submit a request and recruited Justin Hartzog, a Defense Housing Coordination planner, to collect information for his application.<sup>260</sup>

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<sup>259</sup> This included 625,505 units authorized by the Lanham Act (Public Law 849, 76<sup>th</sup> Congress, approved October 1940), 266,926 units of veteran re-use housing, and 83,007 units related statutes. See Margaret Crawford, "Daily Life on the Home Front: Women, Blacks, and the Struggle for Public Housing," Donald Albrecht, ed., *World War II and the American Dream: How Wartime Building Changed a Nation*, (Cambridge, MA: The MIT Press, 1995), 92-98.

<sup>260</sup> J.D. Platt, "Report on Permanent Housing Problem, Basic Magnesium Inc., Nevada Magnesium Project, D.P.C. Plancor 201," December 12, 1941, Basic Magnesium Inc. Collection, Box 1, Vol. III, Chronology of Basic Magnesium Inc. Supporting Data June 20, 1941 to March 30, 1942, 1-2, University of Nevada, Las Vegas Special Collections.

In July 1941, Hartzog traveled to southern Nevada with several federal representatives to determine a location for the housing development and the plant. The surveyors identified 2800 acres of unclaimed federally-owned land for the plant site. Located southeast of Las Vegas at Black Mountain, the site provided access to Hoover Dam and Lake Mead's power and water. In case of an attack, it also would be located a safe distance from the dam.<sup>261</sup> Besides the plant site, the surveyors also chose a housing location. They considered both Las Vegas and Boulder City, but determined both were inadequate. Boulder City was "operated as part of Boulder Dam plant and not intended to be a population center for industrial enterprises." Moreover, the town lacked sufficient electricity, water, and sewage, and the schools were already unsatisfactory. Las Vegas was also deemed unacceptable. To accommodate the growth, it needed more water, and new schools and an updated sewage system. Additionally, Las Vegas land value was "very high due to current rapid growth" and far away from the plant, which would cost workers "time and money from [a] transportation standpoint." The surveyors also cited the stigma of Las Vegas, determining that it was undesirable to industrial population "due to wide-open conditions— "booze, gambling, and brothels." The Basic townsite needed to be a regulated community, minimizing the "influences prevalent in Nevada." The surveyors found only one redeeming quality: its medical infrastructure. The hospitals were "probably enough to handle our needs even if we build a corporate town," with 182 beds between the county and private hospitals.<sup>262</sup> The surveyors also briefly considered

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<sup>261</sup>As a main source of power and water for defense industries in the West, the federal government believed the dam could be targeted by saboteurs. See "Chronology of Basic Magnesium Inc.," 7/21-7/24/41, Basic Magnesium Inc. Collection, Box 1, Vol. I, Chronology of Basic Magnesium Inc., 1937-1942, University of Nevada, Las Vegas Special Collections.

<sup>262</sup>J.D. Platt, "Report on Permanent Housing Problem," 3; Las Vegas Trip, July 21 to July 24, inclusive, Location Plant Site, Housing, Memo, Basic Magnesium Inc. Collection, Box 1, Vol. III, Chronology of

Paradise Valley as a possible townsite, located between the plant and Las Vegas. But they determined it “did not have an existing city as a nucleus” and would be expensive to build an infrastructure. Also, the cost of drilling trenches for a lengthy water line from Lake Mead to supply residents and cool the hot magnesium ingots when they came out of BMI’s ovens would have been too costly.<sup>263</sup>

Ultimately, the surveyors decided the housing should be located adjacent to the plant. The close proximity afforded the project access to fundamental civic facilities. Moreover, without a long commute, workers would show up on-time for their shifts. With a townsite selected, BMI needed more federal support. This was a difficult task. Since the original contract did not include housing, Eells did not budget for funding. Consequently, the Defense Plant Commission (DPC) handled the application. Mismanagement on part of the DPC contributed to the townsite delay. First, it postponed officially selecting the townsite until September 20. Second, the DPC did not file the application until October 12, requesting \$6 million. The FWA initially expressed anxiety over the request because of “very limited funds,” but approved the funding. After a month of deliberating, it offered \$3 million if the DPC covered the balance.<sup>264</sup>

The DPC authorized \$240,000 for housing, and McNeil Construction Co. erected army tents for its workers near the plant site.<sup>265</sup> The news infuriated Las Vegas leaders.

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Basic Magnesium Inc. Supporting Data June 20, 1941 to March 30, 1942, 1-3, University of Nevada, Las Vegas Special Collection.

<sup>263</sup> Paradise Valley was situated between the plant site and Las Vegas. The surveyors found the area had a “considerable volume of artesian water” and “attractive surroundings, trees, grass, [and] rolling terrain.” These qualities would be “important to employee morale,” as they believed the workers would confront “difficult conditions” at the plant. But they determined that it did not have “an existing city as a nucleus” and bringing infrastructure to the location would be costly.

<sup>264</sup> Chronology of Basic Magnesium Inc.,” 9/13-9/20/41, Basic Magnesium Inc. Collection, Box 1, Vol. I, Chronology of Basic Magnesium Inc., 1937-1942, University of Nevada, Las Vegas Special Collections; Moehring, *Resort City in the Sunbelt*, 35.

<sup>265</sup> “Chronology of Basic Magnesium Inc,” 11/17/41.



Their town had earlier missed out on housing dam workers, and now the federal government overlooked them once again. Many businessmen feared that the townsite would lure dam-bound tourism away from Las Vegas. They were also concerned about the new community interfering with local politics and wanted to improve Las Vegas' infrastructure. By December, Las Vegas accelerated its anti-Basic townsite campaign. The Las Vegas Taxpayers' Association called for a mass meeting, enlisting the help of Senator Berkeley Bunker, who had filled Senator Key Pittman's seat in 1940 until an elected successor qualified for the position.<sup>266</sup> He was the first southern Nevada resident to hold a congressional seat. Described as a "handsome," "dapper," "serious Mormon ex-Bishop," Bunker was usually "seen not heard on the floor of the Senate." But during this tenure, he made headlines on one subject: BMI. Unlike Senator McCarran, who called the plant a "permanent addition to southern Nevada's prosperity," Bunker charged the project with war profiteering. On December 11, he sent a letter to the DPC indicating that the townsite was "motivated by visions of personal financial profit." After an investigation, the DPC struck a compromise. BMI would build "temporary" housing, which could be removed after the war. In exchange, the federal government granted Las Vegas 1,000 additional building permits, facilitating the construction of the Biltmore, Huntridge, and Mayfair developments.<sup>267</sup>

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<sup>266</sup> There has been much speculation surrounding Key Pittman's death. A popular myth was that Pittman died before his final election in 1940, and Democrats kept his body "on ice" in a bathtub at the Riverside Hotel in Reno until reelection. This allegation has been disproven, however Pittman did suffer a heart attack before the election. While doctors determined he would eventually die, Democratic leaders kept it a secret. As a result, Nevadans reelected Pittman on November 5 and he died the Washoe General Hospital five days later. See "The Mysterious Demise of Key Pittman," *Nevada Magazine*, (October 1996), 88-83.

<sup>267</sup> "The Congress: Rebirth," *Time Magazine*, (January 13, 1941); "The Mood of the Statesmen," *Time Magazine*, (February 23, 1942); and "Business: Anaconda Magnesium," *Time Magazine*, (October 12, 1942); Dobbs, "Working at BMI," 4; Eells to Mann, December 15, 1941, Memorandum; Basic Magnesium Collection, Chronology of Basic Magnesium Inc., Supporting Data August 27, 1940 to June 11, 1941.

By December 23, the DPC authorized the construction of 1,000 demountable homes, dormitories, army tents, and a trailer camp. Additionally, the agency refused to allocate funding if the townsite did not meet Public Health Service (PHS) standards, requiring streets, stores, sewers, recreational facilities, power, water, and gas supplies. Confronting these regulations, the federal government forced Eells to erect an entire town. On February 17, 1942, construction finally began. BMI commissioned Paul R. Williams, a famed African American architect, to design the development, named Victory Village. Williams' plan provided for 1,000 homes, several schools, a grocery and meat market, a department store, beauty and barber shops, a recreation center, a mess hall, a drug store, and other amenities. In May, the McNeil crew finished and released 59 homes. But it was not enough. The workforce grew faster than homes could be built.<sup>268</sup>

Moreover, thousands of the workers were black. Since Victory Village adhered to strict segregation, they had nowhere to live. The situation forced the construction of Carver Park in 1943. Located east of the plant, Carver Park had 324 housing units, a school, recreation hall, and athletic field. While the plans for Victory Village and Carver Park seemed promising, both developments could not handle all the workers. By July 1942, BMI maintained 11,009 construction workers and 1,490 plant laborers. Remarkably, the turnover rate was 5 percent per week, mostly among unskilled laborers. These numbers surprised L.G. McNeil, president of McNeil Construction Co. "Considering the living conditions here in the past month," he assumed the rate "would be higher." Eventually, the housing situation attracted the attention of union leaders and political leaders. Congressmen Scrugham spoke to labor leaders about the "titanic

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<sup>268</sup> Hobson to Sullivan, December 26, 1941, Memo, Basic Magnesium Collection, Chronology of Basic Magnesium Inc., Supporting Data August 27, 1940 to June 11, 1941, University of Nevada, Las Vegas Special Collections; Moehring, *Resort City in the Sunbelt*, 35-36.

struggle” facing the nation, acquiring raw materials and recruiting labor. He stressed that BMI needed a bigger workforce. However, to attract workers, he contended the “living conditions” needed to “be improved and changed.”<sup>269</sup>

But the poor conditions continued throughout the fall. In October, only 1,000 workers lived in homes. Most lived in the tent city, housing 4,800 workers, the Anderson’s Camp barracks, or squatted in the desert. The *Saturday Evening Post* described the chaotic situation: “Anything larger than a parasol is rated a house. If it has lights, water and sewer it is a mansion, and anything beyond is pure paradise.” The workers encountered “picturesquely squalid discomfort,” living in “trailers and tents, abandoned mine shafts, or sleeping in cars scattered over twenty square miles of desert.” The tent city accommodated 4 workers per tent, providing cots, chairs and a writing table. Of course, the lodging lacked power, running water, and toilets. Most workers had difficulty sleeping during the hot summer nights. Some wrapped themselves in wet sheets and slept outside in the dirt. Others regularly visited Fremont Street’s clubs or the taverns that dotted Boulder Highway. Most workers tried to spend as little time in the tents as possible, often working double shifts or playing card games in the mess hall.<sup>270</sup>

Besides the tent city, workers doubled up accommodations with families in Las Vegas and Boulder City, participating in “share your home” programs with households with extra rooms. Others shared beds from coworkers on separate shifts. BMI also entered an agreement with the Boulder Dam Hotel and Hualapai Lodge for the rental of hotel rooms. Basic employees, government officials, military personnel overwhelmed the

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<sup>269</sup> Thomas, “Factual History of Engineering,” 81-82; “Chronology, Basic Magnesium, Incorporated, 1937-1942,” 7/28/42, Basic Magnesium Inc. Collection, Box 1, Vol. I, University of Nevada, Las Vegas Special Collections; “BMI Labor Force is at Peak, McNeil Reports Today,” *Review-Journal*, August 5, 1942.

<sup>270</sup> Wesley Stout, “Nevada’s New Reno,” *Saturday Evening Post*, (October 31, 1942); Moehring, *Resort City in the Sunbelt*, 37; Dobbs, “Working at BMI,” 8.

Boulder Dam Hotel. To provide beds, the hotel turned their dining room into a dormitory. War workers also slept on the lobby couches and staircase landings. The conditions lasted until April 1943 when BMI finally rented out 1,300 homes and 500 furnished apartments in Victory Village. However, most workers continued to reside in Las Vegas and other places. After the departure of most construction workers in early 1944, the majority of Basic employees lived in the townsite. The same year, its post office opened, officially naming the townsite “Henderson.”<sup>271</sup>

But housing controversy did not end there. During the process, Las Vegas realized it could not accommodate BMI workers, and the project benefited it economically. However, Bunker continued to probe the plant. All he needed was a spark. Conveniently, his opportunity appeared in the form of a fire. On the evening of March 6, 1942, guards noticed smoke in the southwest of the plant’s administration building. Word of the fire spread quickly. Over 3000 workers helped evacuate the building and attempted to extinguish the flames with a limited water supply. Several drove bulldozers into the blazing ruins, “pushing the fire away” from plant’s blueprints. According to the *Review-Journal*, one of the operators was “completely surrounded by fire on all sides as he pushed blazing piles of debris away from the important McNeil vault.”<sup>272</sup> High desert winds continued to fan the blaze. The building burned to the ground. Miraculously, the workers saved the blueprints and neighboring buildings, and there were no reported injuries. The next morning, BMI built temporary field offices and continued

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<sup>271</sup> The name “Henderson” honored the role RFC Chairman Charles Henderson played in bringing the project to southern Nevada. See “Chronology of Basic Magnesium Inc.,” 9/1/41; “Nevada War Workers Are Housed in 7,301 New Units,” *Review-Journal*, (September 11, 1944); “Rent Hiking in Las Vegas Faces Federal Probe,” *Review-Journal*, (July 18, 1941); Dennis McBride, *Midnight on Arizona Street: The Secret Life of the Boulder Dam Hotel*, (Boulder City: Hoover Dam Museum, 1993); Dobbs, “Working at BMI,” 9.

<sup>272</sup> “BMI Blaze Sabotage: Investigation Reveals Definite Proof of Arson, Officials Say,” *Review-Journal*, (March 7, 1942).

construction. Rumors of sabotage spread immediately. McNeil commented to the *Review-Journal* that the blaze was “the result of sabotage,” attempting to halt work on the important war project. A local investigation also revealed that it originated in the engineering department. Each afternoon, BMI disconnected the building’s gas and power sources. But investigators discovered the gas valves were open. This confirmed their suspicions. An arsonist had entered the room and ignited the gas.<sup>273</sup>

Bunker had all the evidence he needed. He believed that BMI set its administration building on fire. On March 10, Bunker issued a statement to the *Review-Journal*, charging the BMI’s corporate records were “conveniently burned” in the fire. Eells issued a statement that welcomed an investigation. Even though the Fire Companies Adjustment Bureau found “no indication that the fire was of incendiary origin,” the controversy had come to the attention of Washington.<sup>274</sup> By the end of the month, the Special Senate Committee Investigating the National Defense Program visited Las Vegas to examine Bunker’s allegations. In early 1941, Senator Harry S. Truman had heard rumors of mismanagement in America’s defense industry. An investigation revealed the allegations were true. Departing from the methods of the Congressional Joint Committee on the Conduct of War during the Civil War and the Nye Committee during World War I, Truman created a regulatory committee. He believed unrelenting

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<sup>273</sup> H.C. Mann to Howard Eells, March 7, 1942, Memorandum, Basic Magnesium Inc. Collection, Box 1, Vol. III, Chronology Basic Magnesium Inc. Supporting Data, June 20, 1941 to March 30, 1942, University of Nevada, Las Vegas; Fire Razes Magnesium Plant Building Near Las Vegas,” *Los Angeles Times*, (March 7, 1942); “Fire in Magnesium Plant,” *New York Times*, (March 7, 1942); “Defense Plant Sabotage Hinted,” *Los Angeles Times*, (March 8, 1942).

<sup>274</sup> “The Facts About BMI’s Company Town,” *Review-Journal*, April 10, 1942; H.C. Mann to Howard Eells, March 16, 1942, Memorandum, Basic Magnesium Inc. Collection, Box 1, Vol. III, Chronology Basic Magnesium Inc. Supporting Data, June 20, 1941 to March 30, 1942, University of Nevada, Las Vegas; “About the Fire At BMI,” Berkeley Bunker Political Advertisement, Basic Magnesium Inc. Collection, Box 1, Vol. IV, Chronology Basic Magnesium Inc. Supporting Data, April 3, 1942 to September 30, 1942, University of Nevada, Las Vegas Special Collections.

scrutiny of the military and after-the-fact investigations did little good. “The thing to do is to dig up this stuff now and correct it,” Truman noted. The Roosevelt administration was skeptical of a committee investigating activities concerning national defense. But it deemed Truman to be “friendly hands.” By March 1941, the Senate created the Special Senate Committee Investigating the National Defense Program, dubbed the Truman Committee, by unanimous consent. Until 1948, the committee revealed exploitation and mismanagement, abuses in cost-plus contracting, and faulty material production. Most historians agree it was a success, reportedly saving taxpayers over \$15 billion.<sup>275</sup>

In March 1943, the Truman Committee began its investigation. After several days of testimonies, it concluded that BMI was “one of the most fragrant attempts at war profiteering” observed by the committee. BMI received \$280,000 in ore royalties, \$560,000 for operating the plant annually, and \$300,000 for construction and engineering services. The Truman Committee called these “tremendous fees,” considering “miserable progress” under current management. It criticized Eells, noting that he had “little or no construction experience.” The committee stressed that magnesium was a critical war material and the nation needed the metal to advance its aircraft industry. It recommended a crackdown on mismanagement. Several days later, Bucker attacked BMI on the senate floor. He charged Secretary of Commerce Jesse Jones with committing “sinister fraud”

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<sup>275</sup> During the Civil War, the Joint Committee on the Conduct of War subjected Abraham Lincoln to unrelenting scrutiny. The committee investigated trade with the Confederate states, medical treatment of soldiers, military contracts, and the cause of Union defeats in battle, and supported the war by endorsing emancipation and the conscription of black soldiers. But it was one of the toughest in congressional investigations in history, leaking information to the press and discrediting generals. Truman cited the Joint Committee as an example of what he did not want to follow. For information on the Civil War committee, see Bruce Tapp, *Over Lincoln's Shoulder: The Committee on the Conduct of the War*, (Kansas: University of Kansas Press, 1998). Additionally, Truman blamed the Nye Committee for creating America's isolationist sentiment in the 1930s, leading to unpreparedness for World War II. After-the-fact investigations did little good, he asserted. See David McCullough, *Truman*, (New York: Simon & Schuster, 1992), 304.

and entering a “corrupt” contract with Eells. He alleged “unusual political ramifications” surrounded the refinery contract with the DPC. Jones denounced the allegations, calling Bunker “unworthy” of his senate seat. He formally denied the charges, reporting that “no irregularities” were discovered.<sup>276</sup>

Throughout the summer, Bunker continued to scrutinize Eells, regularly addressing the senate floor about BMI’s conditions. But the campaign did not save his political career. Bunker lost the Democratic nomination to Congressman Scrugham, a staunch supporter of BMI. Coincidentally, Eells’ attachment to the plant ended around the same time. His contract contained a clause that the DPC could discontinue the agreement “at any time after the expiration of 3 years.” At this time, it would pay Eells \$1 million for the plant. Additionally, the contract stated the DPC could fire Eells if he violated the contract or the plant was not “substantially in conformity with the plans, designs, specification, and schedules.” Most likely, the federal government ousted Eells with the latter clause. Among his numerous indiscretions, the plant lacked a coordinated engineering efforts, and general errors existed in its construction design and layout. Eells was also charged with “extravagances” and overestimating “the quality and quantity” of his ore reserves. The failures prompted his removal from the project. Eells ultimately got half the payout the federal government promised him. On October 27, 1942,

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<sup>276</sup> Bunker did not elaborate specifics, but *Chicago Daily Tribune* speculated the “unusual political ramifications” were that Eells paid lobbyist Joseph B. Keenan a fee of \$6,000 for “special services.” See Warren B. Francis, “Airplane Lag Laid to Poor Planning,” *Los Angeles Times*, (April 3, 1942); Chesley Manly, “RIP ‘Flagrant’ Profiteering in War Necessity,” *Chicago Daily Tribune*, (April 3, 1942); “Rigid Profit Curb Favored,” *Los Angeles Times*, (April 4, 1942); “Pact on Magnesium Hit; Jones Denies Charges,” *Los Angeles Times*, (April 10, 1942); “Denies DPC Laxity Over Magnesium,” Special to *The New York Times*, (April 24, 1942).

Anaconda Copper Company bought the management rights for \$75,000, and the DPC purchased his mining claims for only \$450,000.<sup>277</sup>

### BMI and Occupational Health

When BMI broke ground in September 1941, industries were considerably safer than a decade earlier at Hoover Dam. Throughout the 1930s, improvements in technology and public policy bettered working conditions. The New Deal also encouraged safety in the private sector.<sup>278</sup> Consequently, most large firms institutionalized occupational health programs, employing safety engineers to improve efficiency and save lives. The workers also benefited from the Fair Labor Standards Act of 1938, the standardization of the 8-hour workday, ending child labor in most factories, and from the National Labor Relations (Wagner) Act of 1935. At the same time, most industries experienced a decline in labor turnover. But mobilization for World War II stalled the movement. While the employment opportunities reduced the unemployment rate, it also increased labor turnover and thereby injury rates. After Pearl Harbor, intensified mobilization continued to strain conditions. The military drafted most of the experienced workers, including safety engineers. As a result, industries recruited workers with no prior experience in heavy industry. Given little instruction on safety measures, the workers were a danger to themselves and coworkers. Conditions worsened after

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<sup>277</sup> “About the Fire At BMI,” Berkeley Bunker Political Advertisement; “Anaconda Deal With BMI Near Completion,” *Review-Journal*, (September 29, 1942); Thomas, “Factual History of Engineering,” 4; “Anaconda Takes on BMI Plant Control,” *Review-Journal*, (October 27, 1942); “Anaconda Buys Control of Big Magnesium Firm,” *Chicago Daily Tribune*, (October 27, 1942).

<sup>278</sup> The Civil Works Administration promoted safety engineers and occupational health programs consisting of safety requirements, first-aid training, and education. At the same time, the Public Works Administration (PWA), Works Progress Administration (WPA), and the National Recovery Administration (NRA) created safety organizations, mandating all work to follow specific safety codes. In 1934, the Department of Labor established a committee to develop health and safety standards for the NRA, including machinery protection, physical examinations, and injury reporting. While most programs were discontinued or brief, they helped spread the safety movement to the private sector. See Aldrich, *Safety First*, 156-157.



companies extended the workweek and instituted speedups to increase production as well.<sup>279</sup>

The workers were exhausted, but regularly volunteered for double shifts or overtime to support the war effort. Industries producing iron and steel, ships, bombers, automobiles, concrete, slaughtering and meat packing, fertilizer and leather reported high disease and injury rates. Likewise, the production of ammunition, chemicals, electric goods, plastics, and rubber exposed workers to pollutants, dusts, and acids. While the federal government and companies were familiar with the effects of toxins, including benzene, toluene, asbestos, and silica, they often showed little concern in protecting workers. However, the urgent need for war material eventually forced the issue. Since accidents and injury-related absenteeism slowed production, the safety movement soon became synonymous with the war effort.<sup>280</sup>

Part of the hazardous work at the plant was its construction. It was a huge job; at one time, BMI employed 10 percent of Nevada's population. The company subcontracted with McNeil Construction Co. to build the plant and townsite, and a dozen subcontractors to construct power transmission lines from Hoover Dam, a 14 mile water pipeline, and other architectural and engineering services. The MacDonald Engineering Company also erected an oxide plant and housing development at Eells' mine holdings in Gabbs, Nevada.<sup>281</sup> Due to its success at Hoover Dam, BMI hired the Anderson Brothers

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<sup>279</sup> Ibid, 166, 271-272.

<sup>280</sup> Markowitz and Rosner, "Slaves of the Depression," 203-220. See also David Brody, "The New Deal and World War II," in *The New Deal*, ed. John Braeman, Robert Bremner, and David Brody, vol. I, *The National Level*, (Columbus: Ohio State University Press, 1975).

<sup>281</sup> See Thomas, "Factual History of Engineering," 41-48 for a list of contractors on the project. McNeil Construction Company had the largest contract; it leveled, graded, and drained the site, constructing all buildings, and installing electric power, lighting, plumbing, heating, ventilation, and housing. Numerous other companies contributed as well; the Fritz Ziebarth Company of Long Beach, California built power lines connected to the Hoover Dam switch and telephone lines from Luning, Nevada to the Oxide Plant at

Company to feed the workers. Its facilities opened in 1941, operating continuously throughout the project. At peak construction, the mess hall served 30,000 to 40,000 meals daily. The workers demanded an enormous quantity of food. They consumed 70 gallons of coffee and 90 dozen doughnuts every morning, 75 gallons of beef stew daily, and 3 tons of frankfurters a week. Anderson Brothers also provided beverage services at the plant, stocking canteen and coffee shops to ensure workers remained hydrated and alert. The company estimated that each worker drank over 2 gallons of water per shift.<sup>282</sup>

McNeil maintained the largest contingent of workers. In September 1941, the company began leveling and grading the plant site. By 1942, it erected several cells, installed electrical, plumbing, and heating, and constructed roads, fencing, foundations, machinery support, drains, and sewers. McNeil subcontracted with the Columbia Steel Company to fabricate 23 chlorination, electrolysis, chlorine, and preparation buildings. 40 percent of the plant was underground, with electrical transmission lines embedded in subterranean tunnels. The electrical equipment alone cost \$12 million and the workers poured over 200,000 yards of concrete. McNeil described the plant as a “veritable jigsaw puzzle” with “endless miles” of pipes, compressors, pumps, tanks, and heat exchangers. His workers “toiled through wind, sand, and heat to assemble” it. The job was often “complicated” that it resembled “a great pattern of lace.” His workers were generally efficient, setting new building records daily. The Fritz Ziebarth Co., which built the

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Gabbs. Likewise, Engineers Limited provided the labor, material, and equipment to construct the water intake and booster pumping station at Lake Mead, the pipe line, and reservoir at the plant site. Over a dozen contractors contributed to the construction of the BMI plant. Additionally, five additional contractors besides MacDonald Construction Company built the Gabbs plant and other facilities outside of Luning.

<sup>282</sup> In addition to the food department, the Anderson Brothers operated sleeping facilities to workers, housing 1300 single men for \$3.25 per week. See Florence Lee Jones, “Anderson’s Is Biggest Concern For Food In State of Nevada,” *Review-Journal*, (November 12, 1943); Moehring, *Resort City in the Sunbelt*, 36; Stout, “Nevada’s New Reno.”

power line from Hoover Dam, finished it 25 days ahead of schedule. Engineers Limited also completed the water system from Las Mead on time.<sup>283</sup>

At the same time, construction surged ahead at the mines in Gabbs. The MacDonald crew built an oxide plant and housing development, and loading area to transport the raw materials south. The Gabbs operation employed 900 workers. By June 1942, the oxide plant became operational. *The Big Job* described it as “a triumph of modern engineering,” processing the raw magnesite into magnesium through “a maze of conveyors and pipe lines in an uninterrupted flow.” The first shipment left the following week. At first, BMI transported the material from Gabbs to Salt Lake to Las Vegas on railroad freight cars. But the 1,100 mile trip was expensive. The cost eventually convinced the federal government to build a highway that connected Gabbs and Las Vegas. BMI hired Wells Inc., a trucking company, to drive 668 miles round trips every 28 hours. It was the biggest trucking operation in the nation, and the longest haul undertaken on a continuous basis.<sup>284</sup>

Construction did not officially end until October 1943, but BMI started producing chlorine in August 1943. Chlorine was an essential chemical in modern warfare. It provided a base in chemical warfare, purified water, and helped make magnesium. The first batch of liquid chlorine left the plant of August 9. At the end of the month, workers

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<sup>283</sup> “Power System for BMI Completed,” *Review-Journal*, (May 19, 1942); Thomas, “Factual History of Engineering,” 42-43; Sadovich, “Basic Magnesium Incorporated,” 23; “First BMI Product Moves to Market By Rail Yesterday,” *Review-Journal*, (August 10, 1942).

<sup>284</sup> “Magnesium Plant Contract Awarded,” *Los Angeles Times*, (October 20, 1941); and “To Build \$3,000,000 Plant,” *New York Times*, (October 20, 1941); Eells to Husbands, June 26, 1942, Telegram; and BMI Clippings “BMI Gabbs Valley Plant is Opened By Officials Today,” and “BMI Gabbs Plant Operation Starts,” June 27, 1942, Basic Magnesium Inc. Collection, Vol. IV, Chronology Basic Magnesium Inc. Supporting Data, April 3, 1942 to September 30, 1942, University of Nevada, Las Vegas Special Collection; BMI Wheels at Gabbs Roll For Victory,” *The Big Job*, No. 2, Office of Publication, Department of Industrial Relations, (July 2, 1942); Moehring, *Resort City in the Sunbelt*, 34; and “Largest Truck Job In U.S. Will Start Here,” *Review-Journal*, (November 12, 1943); “Wells Inc.,” *Basic Bombardier*, Vol. II, No. 10, (December 17, 1943).

began operating one section of the plant. Within 6 weeks, they loaded the first shipment of magnesium to southern California to make aircraft and bomb parts. A year later, BMI reached full production. It was the largest metal producer in the world. When the plant closed in November 1944, it had operated continuously for 807 days. The production numbers were astounding. In 1938, the total U.S. consumption of magnesium was 2,400 tons. In 1941, the output was 12,400 tons. During BMI's tenure, it produced over 83,000 tons of marketable, refined, or alloyed magnesium!<sup>285</sup>

The workers confronted a variety of hazards. Human error was the leading cause of accidents, resulting from carelessness, fatigue, poor communication, limited work experience, and inadequate risk perception. The construction crews experienced traditional working conditions for their line of work. Some workers fell to their deaths. In July 1943, a McNeil employee suffered fatal head and chest injuries after falling 50 feet.<sup>286</sup> Workers operated heavy machinery and other dangerous equipment. Driving on uneven ground, trucks and cranes frequently tipped over, crushing or trapping workers underneath. There were numerous automobile accidents, striking workers while they walked to work. In fact, traffic accidents in American industries were a widespread problem during World War II. In 1943, *Time Magazine* actually reported that the battlefronts were safer than working in America's war plants. Traffic accidents had

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<sup>285</sup> "McNeil Company Ends Construction Job at BMI Plant," *Review-Journal*, (October 11, 1943); "First BMI Product Moves to Market By Rail Yesterday," *Review-Journal*, (August 10, 1942); Ball to Eells, September 1, 1942, Telegram, Basic Magnesium Inc. Collection, Vol. IV, Chronology Basic Magnesium Inc. Supporting Data, April 3, 1942 to September 30, 1942, University of Nevada, Las Vegas Special Collection; "BMI Plant Now World's Largest Metal Producer," *Review-Journal*, (May 25, 1943); Sadovich, "Basic Magnesium, Incorporated," 26; "Government: Folklore of Magnesium," *Time Magazine*, (February 10, 1941).

<sup>286</sup> For articles on construction worker deaths, see "Two Die of Hurts at BMI Plant," *Review-Journal*, (August 26, 1942) and "Workman Dies of Injuries in Fall," *Review-Journal*, (July 30, 1943). There are also numerous newspaper clippings located in the Basic Magnesium Inc. Collection at University of Las Vegas, Special Collection.

killed 22,500 war workers since Pearl Harbor, while 16,913 soldiers died in combat. Besides traffic, fires were a regular occurrence. In March 1943, the BMI administration building fire reduced the structure to a “mass of blazing embers and twisted metal” in an hour. Remarkably, no workers sustained major injuries. Several months later, a fire erupted in the electrolysis building. Subsequent fires in the peat pits and sheet metal shop burnt structures to the ground, costing a total estimated loss of \$85,000. The causes ranged from arson to “a curious quirk of nature.”<sup>287</sup>

Mining and the production line was also hazardous. Miners entered the Gabbs deposit by drilling and blasting, which afforded the greatest degree of selective mining. After extraction, the plant crushed, floated, and dried the raw material. Gabbs workers were subjected to numerous dangers, mostly concerned with risk associated with mining. They inhaled dust, and confronted fires, crush-related accidents, operating heavy machinery in the ore pit, and human error accidents. At first, the crushing unit did not make provisions to eliminate dust. After the Nevada Inspector of Mines cited the company, BMI corrected the problem. However, most accidents were incidental to the industry and not due to safety lapses. In fact, worker carelessness contributed to most injuries. While in the mining pit, a large boulder struck a worker. Later, the state determined the accident was due to “the carelessness on the part of the miners.” Anxious

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<sup>287</sup> “Battlefronts are Safer,” *Time Magazine*, (August 23, 1943); “BMI Blaze Sabotage;” “Small Fire Hits BMI on Saturday,” *Review-Journal*, (June 23, 1942); “Chronology, Basic Magnesium, Incorporated, 1937-1942,” 7/11/42, 9/26/42; Letter, “Mann to Snyder,” July 14, 1942, Basic Magnesium Inc. Collection, Vol. IV, Chronology Basic Magnesium Inc. Supporting Data, April 3, 1942 to September 30, 1942, University of Nevada, Las Vegas Special Collection; and “Fire in Peat Pits at BMI Brought Under Control Late Saturday Night,” *Review-Journal*, (July 13, 1942).

to finish work at noon, they had “overlooked the precautions.” The worker died from a cerebral hemorrhage triggered by a fracture to his skull.<sup>288</sup>

The Basic plant was also dangerous work. At first, labor turnover was high due to the summer heat, inhalation of suffocating chlorine gas, and housing situation. Under Executive Order 9301, the plant’s maximum work hours were 48 hours a week, 8 hour shifts. But manpower shortages and various emergency situations forced most BMI employees to work 7 days a week and in 10 hour shifts. The company paid double time for Sundays, providing an employee worked the 6 preceding days. All shifts rotated to ensure 24-hour production. The manufacturing process was complicated and most employees had limited industrial experience. After Gabbs workers converted the raw magnesite into magnesium oxide, Basic workers mixed it with peat moss, coal dust, salt, potassium chloride, and calcium chloride. Next, they cemented the compound into bricks, melting it in kilns and placing it in an electric furnace. Finally, the workers blasted the compound with chlorine, transforming the magnesium oxide into magnesium chloride bars. The product was then shipped off to war factories.<sup>289</sup>

The manufacturing process created very poor health conditions. One byproduct was the intense heat. Temperatures in the plant soared during the blazing desert summer. Inadequate ventilation and cooling equipment contributed to the problem. As the workers toiled in the heat, they handled dangerous chemicals. While chlorine gas was an essential part of the process, it was highly toxic. The use of chlorine marked the advent

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<sup>288</sup> “Report of the Inspector of Mines,” *Appendix to Journals of Senate and Assembly*, Forty-Second Session, Vol. I, (Carson City: State Printing Office, 1945), 26, 113-114.

<sup>289</sup> Drew Peterson, “Trouble Brewing in Las Vegas Merry-Go-Round Author Says,” *Review-Journal*, (November 1, 1943); Basic Magnesium, Inc., *Forman Manual*, “Company Policies – Hours,” Revised June 30, 1943, Basic Magnesium Inc. Collection, Box 4, University of Nevada, Las Vegas Special Collections; R.H. Ramsey, “The Why and How of Magnesium,” *Engineering and Mining Journal*, October, 1943, University of Nevada, Las Vegas Special Collections; and “Magnesium and You,” 6-7;

of chemical warfare during World War I. The “choking gas” killed over 800 soldiers on a battlefield in Belgium. Victims essentially suffocate in their own fluids. Chlorine was not longer used in combat, but was a component in chemical and biological weapons, and producing magnesium. Chlorine or sulphur gassings were regular occurrences. Exposed workers experienced coughing, chills, and fever, and allowed disability leaves for up to 3 weeks. The workers were understandably concerned about its harmful effects. In its employee manual, BMI stressed that medical authorities agreed that “chlorine gas positively [did] not result in tuberculosis” or lung trouble. With the exception of rare cases, the cure was a “few minutes of fresh air after exposure.”<sup>290</sup>

But BMI recognized the threat. To limit employer liability, its health care policy specified that it covered all injuries “including those arising from the effects of the gas... without cost to the employee.” However, the pressure of incompetent workers constituted the greatest danger in the BMI workplace. High labor turnover resulted in the hiring of numerous unqualified workers. This increased the number of gassings, especially in the electrical department. Indeed, the workers protected themselves with safety gear, wearing masks, gloves, protective eyewear, and wooden shoes. But accidents were still frequent. The Inspector of Mines reported numerous injuries, ranging from inhalation of dust to life-threatening burns from hot metals to explosions spattering workers with molten magnesium. In 1943, Clark County reported 356 accidents, the second most in the state. White Pine County, which produced 59 percent of Nevada’s five metals – gold, silver, copper, lead, and zinc – edged out Clark as the state’s most

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<sup>290</sup> Basic Magnesium, Inc., *Magnesium and You*, 15; Dobbs, “Working at BMI,” 22; Eric A. Cuddy, James J. Wirtz, and Jeffery A. Larsen, *Weapons of Mass Destruction: An Encyclopedia of Worldwide Policy, Technology, and History*, Vol. I, (Santa Barbara, CA: ABC-CLIO Inc., 2005), 102.

dangerous county to work. However, by 1944 the figures were nearly identical, both experiencing 724 accidents in one year.<sup>291</sup>

To make matters worse, the workers endured primitive living conditions. The housing shortage produced much discomfort. Additionally, the Anderson Brothers Co. quickly developed the reputation for bad sanitation and food preparation. On one occasion, ptomaine poisoning and food poisoning struck 123 workers after eating in the mess hall. Numerous workers were also sickened after eating Anderson's molded pies. A Board of Health investigation revealed the pies were spoiled and insanitary conditions in the mess hall. Besides contaminated food, recreation was problematic. The workers had nothing to do. Gas rationing virtually prohibited them from leaving the townsite. To entertain themselves, they drank and gambled at the clubs on Boulder Highway and Fremont Street. Consequently, their quality of work suffered. BMI immediately recognized the problem. The workers often reported to their shifts drunk or failed to show up at all. To promote wholesome leisure activities, the company established social activities, including dances, and arts and craft instruction, and chess games. BMI also sponsored church groups, fraternal organizations, and athletic teams. The recreational programs helped somewhat, but workers continued to overindulge in local vices, leading to high absenteeism. In fact, BMI had the highest absentee rate of any defense plant in the United States during the war. In the week of January 18, 1943, 3041 employees were absent out of 4000, averaging approximately 400 per day. *The Big Job and Basic*

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<sup>291</sup> White Pinot County was the leading mining producer in the state, with 59 percent of the total value of Nevada's five metals (gold, silver, copper, lead, and zinc), and was first in output of copper and gold. By sheer volume, it edged Clark County out as the most dangerous county in the state. However, by 1944, the numbers were identical. For a list of the various injuries experienced at the BMI plant, see Reports of Fatal and Nonfatal Accident in "Report of the Inspector of Mines," 7-9, 35-74, 116-153. See also Basic Magnesium, Inc., *Forman Manual*, "Company Policies – Hospital;" and Dobbs, "Working at BMI," 22-23.



*Bombardier* newsletters regularly condemned absenteeism, calling the practice “Old Man Absenteeism” and the “production enemy and ally of the Japanazi.” It warned that absent “war workers on the production line” killed American soldiers on the warfront.<sup>292</sup>

In April 1943, BMI decided to do something about it. Much like Sims Ely had done in Boulder City during the 1930s, the company attempted to police its workers to encourage good behavior. Partnering with the American Federation of Labor, it established a “Production Patrol Police” to prevent drunkenness, conserve man hours, and ensure proper treatment of workers. Besides ending absenteeism, the company sought to limit crime. During drinking binges, many workers were “robbed and abused” by various assailants. The Production Patrol Police were observers, not law enforcement, helping intoxicated workers to their homes. Additionally, BMI built a temporary jail at the plant for the workers to “sober up” and “work on schedule.” If an employees’ absenteeism continued, the company reserved the right to discharge anyone with over 7 days of unexcused absences. Ultimately, the Production Patrol Police and layoff threats did not end absenteeism. Throughout the project, it averaged 10 percent of the workforce per day. By August 1943, General Manager Francis O. Case announced the closure of all taverns between the townsite to curb the problem. Of course, the bar owners contested the move, promising to maintain a midnight closing time.<sup>293</sup>

The poor working and living conditions resulted in a high turnover rate. During its construction, the Las Vegas office of the U.S. Employment Service recruited 1,000

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<sup>292</sup> United States Senate, “Hearings,” Part 20, 8355-8356; “BMI Absentees,” *The Big Job*, No. 32, Basic Magnesium, Incorporated, Las Vegas Nevada, (February 4, 1943); “Absenteeism Falling Off But production Enemy Must Go Much Lower,” *Basic Bombardier*, (August 13, 1943); “Magnesium Bombs Rain Fire on Berlin,” *The Big Job*, No. 40, Basic Magnesium, Incorporated, Las Vegas, Nevada, (April 1, 1943).

<sup>293</sup> “Production Patrol Cuts BMI Absentees,” *Review-Journal*, (April 3, 1943); Basic Magnesium, Inc., *Forman Manual*, “Company Policies – Absence;” Dobbs, “Working at BMI,” 25, 29.

workers per month to compensate for turnover. Turnover declined after housing increased, but workers continued to quit at a rapid pace. Many suffered dust or gas infections, and left because of health reasons. E.E. Ward, a local union representative, testified to the Truman Committee that “hundreds of cases of workers, both white and black, left the plant feeling that their lives are endangered.” They did not want to take “any further risk.” Indeed, all industries experienced high labor turnover during World War II. In normal times, workers seek employment. But during World War II, employment was plentiful and companies competed for workers. Since labor turnover delayed production, employers had difficulty meeting production goals. Officials attributed labor turnover to several reasons. First, employees frequently transferred jobs for better pay. Competition between companies produced an inequality of wages. Second, workers quit because of housing and transportation arrangements, or unhygienic and dangerous working conditions. World War I labor turnover was particularly problematic. Some industries with a 200-300 percent annual turnover rate in peacetime experienced a 100 percent per week rate during the war.<sup>294</sup>

High labor turnover plagued World War II mobilization throughout the nation. In Seattle, an aircraft mechanics union lost 2,518 members in one month, mostly to the Army and higher-paying shipyard jobs. In an alloys plant with 50 employees, 19 left in one week. The War Manpower Board worked out a solution in the West and South, issuing a “freezing arrangement” with employers and unions. It stated that no worker could seek jobs elsewhere without obtaining a “certificate of separation.” To solidify the agreement, the War Labor Board raised mining wages. A mine operator commented that

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<sup>294</sup> United States Senate, “Hearings,” Part 20, 8350; Gordon S. Watkins, “Labor Problems and Labor Administration in the United States during the World War,” *University of Illinois Studies in Social Sciences*, Vol. VIII, September 1919, No. 3, 59-60.

it was the “perfect case of locking the barn door after the horse is stolen.” One-fifth of miners were already gone. In southern Nevada, the order prevented BMI workers, employees of the manganese plant in Boulder City, and miners in Goodsprings from terminating employment. But employers could terminate workers in cases of “gross misconduct” or an inability to “perform higher-skilled work.” Additionally, workers could quit if they had “compelling reasons” or their wages were “less favorable” than “prevailing in the community.” Consequently, BMI workers were denied discharge employment or allowed to quit at the rate of 240 to 250 per day.<sup>295</sup>

But the order failed and the plant continued to experience a shortage of workers. Each department lacked enough workers to perform their jobs. One employee estimated that his department was short “at least 15 men.” Figures in the *Basic Bombardier* demonstrate the severity of the problem. Throughout the project’s duration, there were 21,022 terminations and 22,514 hires at the plant.<sup>296</sup> The turnover rate was highest in 1943 to 1944, averaging 20 to 30 percent per month. To fix the problem, BMI recruited women and blacks. It also arranged a bargain with the legal system. Judges in Lincoln Heights, Las Vegas, and Los Angeles gave minor offenders the choice of jail time or employment at BMI. Most chose the latter and were transported to southern Nevada. Alcoholics were given the same punishment. In the preemployment medical examinations, company doctors discovered that a high percentage of alcoholics worked at the plant. Consequently, petty criminals and alcoholics arrived by the bus load, working long enough to draw their first pay and quitting. M. L. Reese, a former McNeil employee

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<sup>295</sup> “Manpower: M-Day Is Around the Corner,” *Time Magazine*, (October 5, 1942); “Vegas Defense Workers Are “Frozen” On Jobs,” *Review-Journal*, (September 8, 1942); United States Senate, “Hearings,” Part 20, 8352.

<sup>296</sup> This figure excluded construction hires and quits.

and BMI guard, recounted a situation while working at a sheriff in the Pittman area. He arrested a man who had recently spent 18 months in jail for “drunkenness and drunk-driving.” After an all night drinking bender, Reese found the man naked, taking a bath in a galvanized tub in broad daylight. He arrested him. Three days later, the man went to work for BMI in the mechanical maintenance department. Reese denounced the practice, commenting that BMI was hard work and workers needed to be alert, not addicts. Besides alcoholics and petty criminals, headhunters in Phoenix, Reno, Tucson, Barstow, San Diego, and Los Angeles offered recruits \$10 for getting on a bus headed for Las Vegas. The recruits often worked an hour and disappeared, while others lasted a week or two.<sup>297</sup>

The hiring practices did not foster the most competent workforce, which contributed to the high accident rate. But BMI management may have been partially to blame. One worker complained there was “no management” at the plant and that subordinate supervisors were “afraid to assume any responsibility.” No one was monitoring safety and working conditions. The plant also had poor working conditions, which contributed “very definitely” to the labor turnover. Yet, despite the situation, the worker asserted that most employees were proud to work at BMI. To help in the war, they offered to work double shifts and overtime. However, the underlying problems at BMI were the result of “incompetent management.”<sup>298</sup>

The working conditions at BMI could have been worse if not for a strong labor presence. To be sure, World War II strengthened the power of labor unions, especially in southern Nevada. At BMI, the American Federation of Labor (AFL) and the Congress of

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<sup>297</sup> United States Senate, “Hearings,” Part 20, 8351-8352, 8354-8357, 8361; Dobbs, “Working at BMI,” 30-31.

<sup>298</sup> United States Senate, “Hearings,” Part 20, 8359.

Industrial Organizations (CIO) represented the workers. But they were often at odds. Throughout the 1940s, the AFL and CIO fought to control the American labor market, and the struggle played out at BMI. The AFL maintained had a stronghold of southern Nevada, securing a contract with BMI to install AFL-affiliated unions to oversee the operation. However, the AFL was a conservative union and usually did not represent minorities. It also maintained a close relationship with corporate management. At BMI, the AFL barred black workers from membership, providing an opening for the CIO to assumed control. In December 1942, the International Union of Mine, Mill, and Smelter Workers (IUMMSW), a CIO affiliate, launched their campaign, printing newspaper ads directed towards employees to rethink their union representation.<sup>299</sup>

The federal government soon intervened. According to the National Labor Relations Act of 1935, employers were obligated to recognize a union chosen by the majority of its workers. But when BMI drafted its AFL contract, it had not hired workers yet. The National Labor Relations Board ordered an election to “determine whether production and maintenance employees shall be represented by the CIO, AFL, or neither.” The CIO won with a clear majority. The AFL expressed its disapproval, declaring the contract was still valid. It filed an objection with the National Labor Relations Board, and began protesting the switch. By July 1943, the National Labor Relations Board established that the AFL had “no merit” and officially granted certification to the CIO. At first, the National War Labor Board did not accept jurisdiction in the case. But eventually, the Truman Committee intervened. It invited the CIO to testify about the AFL and working conditions at BMI. The committee determined

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<sup>299</sup> Rothman, *Nevada*; 96-98; United States Senate, “Hearings,” Part 20, 8346; “Labor, BMI Reach Agreement for Plant Operation,” *Review-Journal*, (August 28, 1942).

that “the lack of decent labor-management relations, the effect on production, the effect on the cost of production and the effect on morale” produced the numerous problems at the plant. It called for a “speedy resolution.” In the end, the struggle between labor unions brought attention to discrimination and unsatisfactory working conditions at the plant. It prompted the federal government to intervene, enforcing tighter regulation and improved working conditions.<sup>300</sup>

### Basic Health

Like Hoover Dam, the occupational health program was lacking at first, but showed improvement as time progressed. BMI management posted “Safety Pays” signs and required workers to attend a training classes. Utilizing methods established by the War Protection Board, the program was designed to get “unskilled men into speedy production” and based upon four instruction steps: preparation, presentations, job tryout, and follow-up.<sup>301</sup> 90 percent of the workers were trained by foremen, assistant foremen, and experienced workers. Directed by safety engineers, the Safety Department oversaw the program, stressing that “prevention is better than cure.” It mandated that all employees to wear safety hats, dust respirators, gas masks, goggles or plastic face shields, and rubber gloves. The Safety Department also provided decontamination showers, and first aid stations and oxygen treatment for gassing cases.<sup>302</sup>

The plant had numerous divisions, including the Preparation, Electrolysis Cell Room, Chlorination, Refinery, and Recovery Departments, and the Neutralization and

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<sup>300</sup> United States Senate, “Hearings,” Part 20, 8345-8361; “Union Poll Ordered by NLRB For BMI,” *Review-Journal*, (April 17, 1943); “Work Stoppage Hits BMI When AFL Holds Meet,” *Review-Journal*, (May 31, 1943); “CIO Is Certified Bargaining Agent By NLRB Ruling,” *Review-Journal*, (July 15, 1943).

<sup>301</sup> Faced with the enormous pressure to do “overnight what Germany had done in nine years, and what Japan had planned for two decades,” the federal government designed the program to quickly train workers to get them on the production line as soon as possible.

<sup>302</sup> “Safety Engineer Is Hired By BMI,” in *Review-Journal*, Basic Magnesium Inc. Collection, Box 2, Folder 2, University of Nevada, Las Vegas Special Collections.

Chlorine Plant. The Safety Department adapted each division's program according to the specific work. In the Refinery Department, it required that fire blankets were readily available if the "clothing of an employee catches fire." The Safety Department also required workers to wear face shields, respirators, asbestos gloves, and asbestos aprons. In the Chlorine Plant, it advised employees to hold their breath and "walk unhurriedly away from the area into the wind" if they were gassed. If their breath could not be held, workers were to "breathe shallow and short breaths to avoid coughing." Of course, the Safety Department stressed that chlorine gas was "not cumulative" and "exposure effects wear off without permanent after effects." In all divisions, it encouraged "good housekeeping," prohibited smoking, drinking liquor, and all "horseplay," and requested that workers report unsafe conditions. Additionally, the Safety Department punished negligent behavior. If a worker was drunk, fell asleep on the job, dismissed safety requirements, or acted insubordinate, the actions were the grounds for dismissal.<sup>303</sup>

If workers sustained an injury, then the Nevada Industrial Commission (NIC) provided "full compensation benefits." After an accident, the BMI Legal Department's Claim Division assisted workers with making claims for medical benefits and compensation. Disabled employees received 60 percent of their average earnings, up to \$72.00 per month. But the NIC did not cover cases "caused by an unreasonable refusal or neglect to submit to competent medical aid." The compensation program was marginally successful. Like carbon monoxide exposure at the dam, chlorine gassings and

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<sup>303</sup> The BMI Forman manual provides a view of occupational safety at the Basic plant. See Basic Magnesium, Inc., *Forman Manual*, "Explanation of Job Breakdowns," "How to Instruct a Man on the Job," "Preparation Department Safety Rules," "Safety Rules for Electrolysis Cell Room Operatives," "Chlorination Department Safety Rules," "Refinery Department Safety Rules," "Safety Rules for Recovery," "Neutralization Plant Safety Rules," and "Safety Rules for Chlorine Plant." See also "Company Policies – Offense."

dust inhalation were not covered under the plan. According to union representative E. E. Ward, “if you get dust infection of the lungs or gas infection, the only way you get anything out of it is to die. If you are injured in your lungs by this dust and gas infection there is no compensation for it – if you die the estate may benefit by a few dollars.” To its credit, BMI attempted to meet the contingencies not covered. It adopted a “blanket insurance program,” providing accident and death benefits, and surgical and hospital care.<sup>304</sup>

Like the Salt Lake Road and Six Companies before it, BMI built an employee-funded hospital. Under Eells’ management, the hospital was conceived as a temporary structure that provided first aid to construction workers and plant employees. The most serious cases were sent to Las Vegas or Los Angeles. But BMI determined that the hospitals in Las Vegas could not accommodate the expanded workforce and family members. The lack of medical care fostered a “drastic” situation in 1942, according to Eells. Knowing the desert heat contributed to fatalities at Hoover Dam, Eells told the Truman Committee that BMI was in desperate need of “proper care” with the “hot weather approaching.” “I tell you this is a very dangerous and critical situation,” he pled. Still, McNeil did not begin construction until the summer.<sup>305</sup>

In two months, construction workers built the hospital near the plant. It was designed in cooperation with Dr. F. E. Clough, the chief surgeon of BMI. According to *The Big Job*, Clough was “busy as a tail gunner for months,” checking the details of construction and expediting the technical apparatus. The doctor had prior experience working in occupational health. He served as the chief surgeon of the Homestake Mining

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<sup>304</sup> Basic Magnesium Inc., *Forman Manual*, “Legislation,” 6; United States Senate, “Hearings,” Part 20, 8350-8351; “Blanket Insurance Plan at BMI Told,” *Review-Journal*, (July 17, 1943).

<sup>305</sup> United States Senate, “Hearings,” Part 13, 5623.



Company in South Dakota, and was recognized in the fields of industrial medicine, and bone and joint surgery. Clough affirmed the importance of occupational health on the project:

The big and important thing about the new hospital is that it represents something relatively new in American industry. Embodied in its physical structure and the apparatus and equipment which it houses, the hospital is a monument to the insistence of modern industry that health and safety of employees is of vital importance.

According to Clough, the hospital was “relatively new in the industry” and sought to provide medical care “with the utmost expedition” and “wholehearted personal service.” Built according to PHS code, it had a sprinkling system for fire safety, an air-cooling and heating system, x-rays, delivery and operating rooms, and an outpatient section. The hospital provided 24-hour ambulance service. All ambulance attendants were trained in first aid. Clough asserted that it was very well-equipped, with the “latest equipment” in medical science. BMI had spared no expense, he claimed, guaranteeing the workers had “the best.” Besides Clough, BMI hired Drs. Chauncey Baird, A. F. O’Conner, and Ned D. Miller, and 25 nurses. The hospital ultimately provided care to workers, and treated families when “space was available.” After a dedication ceremony, which Clough described as a mixture of “patriotism, medical ethics, and the concern for modern industry for the welfare of its employees,” the hospital opened in October 1942.<sup>306</sup>

The swift construction produced issues at the hospital. At the same time, Anaconda Copper Company acquired BMI, disrupting the workers’ health insurance

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<sup>306</sup> “Hospital Opens for Community Service,” *The Big Job*, No. 20, Basic Magnesium, Incorporated, Las Vegas, Nevada, (November 12, 1942); F.E. Clough, “Concerning B.M.I. Hospital at Las Vegas: F.E. Clough, M.D., Formerly of San Bernardino, in charge,” *California and Western Medicine*, December 1942, 57 (6): 391; Magnesium Plant Hospital Starts this Week,” *Review-Journal*, (May 25, 1942); “Hospital Opens for Community Service;” “Basic Hospital is Dedicated at Rites Yesterday,” *Review-Journal*, (October 30, 1942).

coverage. Anaconda did not offer a pay-deduction insurance plan. This caused mass confusion, because the workers did not understand the terms of their coverage. Clough was confused as well. By December, he received clarification from the company and issued a statement to *The Big Job*. Employees that sustained injuries on-the-job and “service-connected cases,” including chlorine gassings, were covered without charge. However, occupational diseases not covered under state laws were handled individually. For injuries and illnesses sustained off-duty, workers and their families paid out-of-pocket. The reduced rates ranged from \$5 to \$6 a day. Operating and delivery room fees cost \$15. The rates were “reasonable” and conformed “to accepted standards.” By summer 1943, organizational and billing issues prompted Anaconda to adopt a blanket insurance plan. Thereafter, the workers made hospital payments through pay-roll deduction authorization if the NIC did not provide coverage. In cases of short-term disability, employees could not return to work until they were cleared by the medical division.<sup>307</sup>

Working at the hospital was chaotic. The 50-bed facility did not have the capacity to treat thousands of construction and plant workers. They waited for hours or days to see a doctor. Overwhelmed with worker cases, the doctors rarely treated family members. Most workers were dissatisfied with the quality of care. It is likely the situation contributed to the high labor turnover. Moreover, the hospital was understaffed, a prevailing condition during the war. Most doctors had left private practice to enlist, leading to medical shortages across the nation. After Pearl Harbor, Washington D.C. required that all male physicians under 45 years old register for the draft. Those over 45

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<sup>307</sup> “Hospital Procedure Clarified,” *The Big Job*, No. 23, Basic Magnesium, Incorporated, Las Vegas, Nevada, (December 3, 1942); Basic Magnesium, Inc., *Forman Manual*, “Company Policies – Hospital.”

had to register to serve in civilian roles like at BMI. According to the *New York Times*, the military managed a ratio of 6.5 physicians per 1,000 soldiers. However, the rest of the nation dropped significantly, roughly 1 to 1,500. One response to the nationwide physician and nursing shortage was accelerating medical and nursing programs from 4 to 3 years of training. Retired doctors and nurses also filled the civilian population need. Despite these efforts, the military ultimately enlisted one-third of all licensed physicians, with two-thirds under 45 years.<sup>308</sup>

Rural regions, with limited pre-war health care, were particularly hard hit. As southern Nevada swelled to accommodate war workers, the ratio of local physicians to patients became highly disproportionate. In 1942, the Las Vegas Hospital and Clinic recruited doctors such as Gerald Sylvain, a state epidemiologist, to help resolve their physician shortage. Upon his arrival, Sylvain found that most hospitals were inadequate, except the Las Vegas Hospital. Just as during the preceding decades, little surgery was performed in town, with the most serious cases sent to Los Angeles. The influx of gunnery school and BMI workers made Sylvain's job busy, a stark contrast from his practice in Goldfield. "We were absolutely overworked in Las Vegas," he recalled. "We were short of doctors and we did everything." Sylvain worked around the clock, seeing patients all day and making house calls at night. While he rotated shifts, the work was overwhelming. In 1944, Sylvain was recruited for military service. He called it a "two-year vacation" compared his time in Las Vegas.<sup>309</sup>

Until the completion of the BMI hospital, all accidents and injuries at the plant were transported to Las Vegas, not Boulder City. While the Boulder City Hospital

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<sup>308</sup> Jonathan Engel, *Doctors and Reformers: Discussion and Debate Over Health Policy, 1925-1950*, (Columbia, SC: University of South Carolina Press, 2002), 189-191.

<sup>309</sup> Dr. Gerald Sylvain, M.D., as quoted in Blachley, *Good Medicine*, 30-34.

prospered during the Boulder Canyon Project, Six Companies Inc. closed the facility in 1935. Boulder City residents had to travel to Las Vegas for medical care, a long trip that sometimes proved fatal. In 1938, the National Park Service acquired the hospital building and turned it into a museum, abandoning it in 1941. By December 1943, the Public Health Service (PHS) reopened the hospital to treat wounded soldiers, but not locals.<sup>310</sup>

In Las Vegas, the Las Vegas Hospital and Clinic, and Clark County Indigent Hospital cared for war workers. Built in 1931, the county hospital mostly accommodated impoverished patients. By 1940, however, the facility opened surgical facilities and became the Clark County General Hospital. Several few years later, officials appointed Dr. Jack Cherry the house physician and administrator. But as the only nonprofit, public hospital in Las Vegas, it was grossly inadequate. Consequently, the Federal Works Administration assumed ownership of the hospital in 1943 and invested \$447,000 in its modernization. At completion, the Clark County Hospital had 146-beds. Despite the improvements, war workers continued to overwhelm the hospital, often lining the hallways. The physician shortage forced nurses to play a bigger role in treating patients. Mary Kennedy Rymer, a registered nurse, recalled that “there was nothing that was too big for us.” The nurses “tried it all,” taking x-rays, delivering babies, and assisting in surgery. Every morning, the hospital opened at 3:00 am to treat emergency cases. Most of the patients were construction workers at BMI. Rymer described them as “rough and tough,” frequently getting drunk, and crashing their cars or getting into bar fights. Unless

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<sup>310</sup> McBride, *In the Beginning*, 38.

cases were “very tragic or very major,” she never called the doctor because “he had to get some sleep too.”<sup>311</sup>

After the BMI hospital opened in October 1942, it alleviated the volume of cases in Las Vegas. However, the hospital faced its own issues. The staff was overworked and exhausted, working multiple shifts for days at a time. BMI also pressured them to get injured employees back to work as soon as possible, because lost time at work threatened production. The practice often clashed with medical ethics. When BMI requested that Dr. Arthur Miller clear an injured employee for work, but he refused. Miller responded that the worker needed more recovery time. The company ordered Miller to sign the certificate regardless. He refused and was subsequently discharged. This was one reason why the hospital was understaffed. Like to the plant, BMI’s hospital experienced a high turnover rate. The company routinely discharged staff members that did not comply with policy. But most doctors, fed up with the stressful working conditions, quit on their own accord. Even Cough had enough by 1944. He resigned and was replaced by Dr. David E. Hemington. The hospital was so understaffed that Dr. Roy Martin came out of retirement to work for BMI, administering physical examinations and delivering babies. Martin worked there until his death in 1943.<sup>312</sup>

Despite poor living, working, and hospital conditions, southern Nevada maintained a good health record during the war. The Clark County population had a low

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<sup>311</sup> Interview with Mary Kennedy Rymer, May 4, 1977, Conducted by Mary Fitzgerald, University of Nevada, Las Vegas Special Collections; “History of Southern Nevada Memorial Hospital,” *Southern Nevada Memorial Hospital News and Views*, Vol. 3, No. 5, (December, 1968), 3; Sandra Klimek, “A History of Hospitals: Clark County, Nevada,” (Unpublished Paper, 1985), 9; and “The Hospitals of Clark County: Development of Medicine in a Rapidly Growing Nevada Community,” *Greasewood Tablettes*, Vol. VII, No. 4, Winter 1996-7, (Reno, NV: Department of Pathology, Great Basin History of Medicine Division, University of Nevada School of Medicine, 1997), 1-2.

<sup>312</sup> United States Senate, “Hearings,” Part 20, 8351; “New Head Now at Basic Hospital,” in *Review-Journal*, Basic Magnesium Inc. Collection, Box 2, Folder 6, University of Nevada, Las Vegas Special Collections; Interview with Mazie Martin Jones.

mortality rate. According to the State Board of Health, the most pressing issue in the state were accident fatalities, not diseases. According to the agency, the high number of accidents in Nevada's industries indicated the state needed "a wide-spread safety campaign conducted in such a manner as to reach all the people of the State and make them accident conscious." Besides accidents, degenerative conditions like heart disease and cancer increased statewide. However, the increase was expected since the general population was "gradually aging."

There were no large scale epidemics because the state provided diphtheria, smallpox, and typhoid immunizations to control communicable diseases and regularly inspected labor camps and communities. But Nevada experienced one notable outbreak. The State Board of Health noticed a significant rise in venereal diseases, which arose "out of expanding military and industrial activities in the State." More people per capita died in Nevada from venereal diseases than any other state besides Wyoming. In 1943, syphilis infected 777 Nevadans and 351 contracted gonorrhea. Moreover, in the first ten months of 1944, 561 cases of syphilis and 460 cases of gonorrhea were reported. The outbreak was particularly serious in Clark County, affecting numerous Army personnel and BMI workers. In April 1944 alone, the Clark County Health Department reported 176 cases of venereal diseases.<sup>313</sup>

Venereal disease outbreaks were problematic nationally, hampering the war effort. Draftees that showed positive reactions to syphilis tests averaged a rate of 45.2 per 1,000 men. U.S. Surgeon General Dr. Thomas Parran, Jr. called syphilis "the next

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<sup>313</sup> "Report of the Secretary of the State Board of Health," *Appendix to Journals of Senate of Assembly*, Forty-Second Session, Vol. I, (Carson City, NV: State Printing Office, 1945), 11-10, 19-20, 29, 40; Betty Molignoni, "Nevada Has A Sorry Alarming Record of Venereal Disease Mortality," *Review-Journal*, (January 15, 1945); "Rise in Social Diseases Told," *Review-Journal*, (April 27, 1944).

great plague to go.” During World War I, 338,746 soldiers required treatment and over 40,000 registrants had syphilis. Syphilis was painless and difficult to recognize, so the disease was difficult to diagnose and treat.<sup>314</sup> By the 1940s, the medical profession understood the causes of syphilis and gonorrhea, and several treatments were available. But until the mass production of penicillin in 1944, which remained in short supply throughout the war, there was no speedy cure. To fight the outbreak, the Clark County Health Department established a VD Clinic, as well as controls of tuberculosis, food inspection and sanitation, school health, and other diseases. The VD Clinic applied advanced techniques to detect the diseases. Slides of gonorrhea were examined with a microscope and blood tests diagnosed syphilis. In cooperation with the military, the VD clinic also diagnosed gonorrhea by the culture method.<sup>315</sup>

Local residents combated venereal diseases by focusing on prevention. The most visible campaign sought to outlaw commercialized prostitution. In the early 1940s, there was little regulation of the Block Sixteen. Tourists and high school boys alike frequented the establishment. Dr. F. W. York, a city health officer, acknowledged prostitution was “one of the main attractions to tourists,” but it elevated the threat of venereal diseases. By the early 1940s, the county health department pushed for tighter regulation, enacting policies requiring all prostitutes to receive physical examinations. If the women did not get a clean bill of health, they were forbidden to work. The program did little good, and syphilis and gonorrhea continued to spread. The social stigma and health hazards of

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<sup>314</sup> The problem was that most patients were unaware they were infected. If left untreated, the disease damaged their hearts, brains, eyes, and bones, and could be fatal. See “Health Department Providing Aid to Affected Persons in Clinic,” *Review-Journal*, (April 27, 1944).

<sup>315</sup> “Report of the Secretary of the State Board of Health,” 19-20; Blachley, *Pestilence, Politics, and Pizzazz*, 44; Kevin Brown, *The Pox: The Life and Death of a Very Social Disease*, (Stroud, UK: Sutton Publishing Ltd, 2006); “Report of the Secretary of the State Board of Health,” 19-20.

prostitution eventually prompted a movement to permanently close the block. In November 1940, local attorney J. R. Lewis publically declared that “running, operating, and maintaining houses of assignation and prostitution” was “injurious to health.” By mid-1941, the justice court cited four brothels for violating a statute outlawing prostitution within four yards of a church.

By the time BMI construction began and the army gunnery school opened, federal authorities stepped in. A PHS surgeon, Dr. F. T. Ford, commented that “if we go to war, the red light district would be banned.” While the federal government was not interested in “the morals of any community,” it needed to stop the spread of infectious diseases. By the end of 1942, local authorities prohibited prostitution in Clark County. It also fined individuals who willingly transmitted venereal diseases. For example, a promiscuous local woman allegedly spread diseases to numerous Army personnel and war workers. When given the choice of a \$500 fine or jail time, she chose the latter. Other plans included education programs in high schools and the disbursement of condoms. The legislature even discussed requiring couples to take premarital blood tests, a requirement in many states. The programs were largely unsuccessful, mostly due to the social stigma of discussing sex and the use of contraceptives, and opposition to the impediment of Nevada’s hassle-free marriage industry.<sup>316</sup>

### The War Baby

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<sup>316</sup> “Health Safeguard Drive Starts, Ends at Board Meeting,” *Review-Journal*, (October 12, 1940); “District Attorney Moves in upon Battle on Block 16 Sanitation,” *Review-Journal*, (November 27, 1940); “Abandonment of Houses on Block 16 Is Requested,” *Review-Journal*, (April 10, 1941); “Four Block 16 Operators Are Haled [sic] to Court,” *Review-Journal*, (July 11, 1941); “U.S. Health Clinic in Vegas,” *Review-Journal*, April 10, 1941; and “Officials Move to Ban Prostitution,” *Review-Journal*, (May 28, 1942); Florence Lee Jones, “Nevada Has A Sorry, Alarming Record of Venereal Death Mortality,” *Review-Journal*, (January 15, 1945); and Blachley, *Pestilence, Politics, and Pizzazz*, 44-45.



Since Washington D.C. needed defense plants like BMI to be productive, it eventually instituted a greater emphasis on occupational health. Workers also realized their importance to the war effort and began using federal contracts as bargaining tools to improve working conditions. At the same time, a national safety movement mobilized. As Mark Aldrich shows, private safety associations worked alongside the National Safety Council to help staff and support occupational health at several federal agencies. The Council also convinced the National Committee for the Conservation of Manpower in War Industries to enlist defense-related companies to the cause, and the Maritime Commission to promote health and safety at its shipyards. According to Aldrich, a combination of these factors produced a “striking conclusion.” Injury rates rose due to wartime production increases, but fatality rates increased slightly. Still, the wartime workplace was very dangerous. From 1941 to 1945, 13,600 workers were killed and 171,100 permanently injured in American’s war plants. But without the mobilization of organized safety work, the number may have doubled.<sup>317</sup>

The national statistics reflect occupational health at BMI. The accident rate was remarkably high. During the first year of war production, Clark County reported 356 accidents, with the majority at BMI. By the second year, high labor turnover and other factors propelled the number to 723. But at the same time, the project experienced a decrease in permanently-disabling injuries. From July 1942 to July 1943, 75 workers were received permanently-disabling injuries. The following year, BMI reported that only 5 employees received such injuries.<sup>318</sup> Additionally, in comparison to the Boulder Canyon Project, few workers died. There are no statistics are available, but the number

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<sup>317</sup> Aldrich, *Safety First*, 271-272.

<sup>318</sup> Most likely the decrease in “disabling injuries” resulted because construction had ended. “BMI Sets Record For Safety in Part 12 Months,” *Review-Journal*, (August 17, 1944).

was fewer than 20, with the majority occurring during construction. Lastly, unlike heat and carbon monoxide poisoning at the dam, BMI experienced no major disasters.

One explanation for the low fatality rate was limited production time. It only operated for 26 months. In 1941, Eells envisioned southern Nevada rapidly emerging as “the Detroit” of the light metals industries. By 1943, BMI was the largest magnesium producer in the world in 1943, manufacturing 25 percent of American output. But despite its success, discussion regarding its permanency began in early 1943. Anaconda assured the *Review-Journal* that it was the company’s “ambition to build permanently.” Senator McCarran and Congressmen Scrugham joined the cause, working alongside RFC Chairman Henderson to research future uses of the plant. But in early 1944, McCarran learned of a plan to cut BMI production by 40 percent. The WPB argued that there was an “oversupply of magnesium” and the nation needed to conserve energy.

Of course, McCarran disagreed with the idea. He launched a campaign to save the plant, charging the federal government built BMI as a “wartime baby” with no postwar use. This was “more than coincidence,” he alleged. Similar situations occurred across western and southern states. “The time has come to declare economic independence from monopolistic industrial combinations attempting to stifle or control new development and industry in these states.” McCarran also charged that the WPB did not cut Dow Chemical’s production or eliminate aluminum plants in southern California despite over-surpluses. The fight to save BMI continued throughout the year. Despite McCarran’s efforts, the WPB ordered a nationwide reduction of magnesium in July. By September, it announced the curtailment of production, calling for the closing of BMI and International Minerals in Austin, Texas. After the order, layoffs began. In July

1944, BMI had 2,600 employees, By October, the number was reduced by half. On November 17, 1944, magnesium production officially ended.<sup>319</sup>

It appeared that the BMI plant was indeed a war baby. After the suspension of production, the federal government had no use for it. The RFC leased several warehouses to small industries, and contracted part of the facility to Stauffer Chemical Company in May 1945. Stauffer operated the caustic and chlorine plant, importing raw materials from California. At the same time, the RFC leased sections to the Western Electrochemical Company, a producer of missile propellants and electrolytic manganese. Both companies employed over 1000 workers. Nevertheless, by October 1946, the RFC relinquished custody of BMI, arranging a sale of the assets. Determined to ensure the future of southern Nevada industry, state political leaders, especially Senator McCarran, launched a campaign to save the plant. Senator McCarran made a deal with the Truman Administration for the state to buy half of the plant site. In turn, the state sold it producers of titanium, alkali, and other chemicals. The new companies, and the expanded army gunnery school, the Nellis Air Force Base, attracted numerous veterans seeking employment. The Basic townsite evolved as well. In 1953, Henderson was incorporated as a city. By November 1954, Henderson was one of the fastest growing

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<sup>319</sup> All producers were ordered to shut down production with the exception of Dow Chemical's Freeport Plant. For sources on BMI's closure, see "BMI Plant Not to Be War Baby," *Review-Journal*, (April 6, 1943); "Permanency of BMI Is Sifted," *Review-Journal*, (May 24, 1943); "McCarran Charges BMI Launched As 'Wartime Baby,'" *Review-Journal*, (February 14, 1944); "Plan to Curtail BMI Production Forestalled," *Review-Journal*, (February 28, 1944); Lorian Francis, "Power Bureau Called Foe of Basic Magnesium," *Los Angeles Times*, (March 12, 1944); "Big Reductions in Magnesium Output Ordered," *Chicago Tribune*, (July 30, 1944); "Government Cuts Magnesium Output," *The New York Times*, (July 30, 1944); "Basic Magnesium Gets WPB Curtailment Order," *Review-Journal*, (September 5, 1944); "Cut Magnesium Output 40 PCY; Close 2 Plants," *Chicago Daily Tribune*, (September 6, 1944); Dobbs, "Working at BMI," 32-33; and Sadovich, "Basic Magnesium" 33.

cities in the United States, boasting a population increase of over 100 percent in 18 months.<sup>320</sup>

Besides the plant, the federal government also liquidated the hospital. But unlike the Boulder City Hospital, it did not completely abandon the facility. When the project ended, the hospital continued to serve the general public. Local doctors could also treat patients at the facility. But the hospital was understaffed and residents received limited care. The hospital's future seemed uncertain. But Reverend Peter Maran, a priest at St. Peter the Apostle Church in Henderson, took up the cause. In 1946, he contacted the Adrian Dominican Sisters of Michigan to manage the hospital. The Sisters were well-known for managing hospitals. Maran successfully convinced them to take over the BMI hospital. After receiving endorsements from Clark County Medical Society and several local doctors, the Sisters contacted the federal government.<sup>321</sup>

The Sisters incorporated in the State of Nevada in 1947, and offered to lease the land, buildings, hospital equipment, and supplies. The RFC accepted the proposal. The Sisters signed a 25-year lease for \$1.00 per year. The only stipulation was they could not transfer ownership, and the operation provided 24-hour medical and surgical treatment for BMI employees and families, private contractors, and lessees of the plant. The Sisters renamed it St. Rose de Lima Hospital, staffing the hospital with nurses "advanced in the science of nursing." But doctors were harder to recruit. When the project ended, most had left town. The Sisters had difficulty staffing the hospital for nearly a decade. But the

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<sup>320</sup> R. Jackson Armstrong-Ingram, *Henderson*, (Charleston: Arcadia Publishing, 2002), 113; Sadovich, "Basic Magnesium," 35-36, 41; Hulse, *Nevada's Environmental Legacy*, 26.

<sup>321</sup> "BMI Hospital to Remain Open," *Review-Journal*, (November 10, 1944); Mother Mary Gerald to Reverend Peter V. Moran, January 6, 1947, Letter, McNamee Collection, Box 12, Folder 3, Nevada State Museum and Archives, Las Vegas, Nevada.

hospital continued on. By the 1960s and beyond, St. Rose de Lima played a crucial role in maintaining the health of the expanding city of Henderson.<sup>322</sup>

Even though BMI ended production in November 1944, the fruits of the workers' labor continued to bombard Europe and the Pacific. From August 1942 to November 1944, the plant produced 166,322,685 pounds of magnesium. According to *The Big Job*, "every drop of molten metal [was] on the first leg of its journey of destruction of Tokio and Berlin."<sup>323</sup> And it did. After leaving the plant, its alloy constructed bombs, supplying magnesium incendiaries and casings, and bombers. Next, Allied bombers rained Europe and the Pacific with the explosive incendiaries, seeking to dislocate the German and Japanese military, industrial, and economic system and the morale of the enemy. But the most dramatic bombs were used last. On July 26, 1945, the USS Indianapolis delivered a classified shipment to the Marianas. The warship was ultimately torpedoed and sunk by a Japanese submarine, but it delivered its important cargo: a uranium-based atomic bomb. The Manhattan Project tested its plutonium counterpart on July 16 in New Mexico. On August 6, 1945, the Enola Gay dropped the bomb over Hiroshima. The explosion changed the world, and southern Nevada, forever, ushering in a new era of defense in the desert.

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<sup>322</sup> Sisters of Saint Dominic Trustees to the War Assets Administration, May 1947, Letter; "Quitclaim Deed," May 19, 1948; Mother Mary Gerald to Reverend Peter V. Moran; McNamee Collection, Box 12, Folder 3, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>323</sup> "Magnesium Production Thrills Project," *The Big Job*, No. 12, Office of Publication, Department of Industrial Relations, (September 10, 1942); and "Magnesium Bombs Rain Fire on Berlin," *The Big Job*, No. 40, Basic Magnesium, Incorporated, Las Vegas, Nevada, (April 1, 1943).

## CHAPTER FOUR

### THE TEST SITE

It is of my opinion that we have gone past all reasonable effort to live with the current [radiation exposure] criteria... These conditions will continue to prevail as long as the unreasonable and unrealistic attitude considering low-level exposure of a non-producing variety to be more serious and more horrible than accidents and including death from convention operation and vehicle travel... It is my studied, professional opinion that the only sensible thing to do is to increase the maximum allowable exposure.  
Dr. Clinton S. Maupin, Radiological Safety Advisor (1961)

Arriving in Nagasaki in September 1945, Shields Warren, a Harvard pathologist and expert in medical radiation, was shocked by the carnage. The forty-seven year-old was a brilliant biomedical scientist with a calm and collective demeanor, and a mild speech impediment that seemingly vanished when he discussed his work. His most notable accomplishment to date was discovering that cancerous cells moved through the lymphatic system. The finding prompted the cancer treatment of removing lymph nodes near cancerous tissue. However, Warren's trip to Japan changed the course of his career. The doctor traveled through "the pastoral Japan of Madame Butterfly" to reach Nagasaki, a sharp contrast from the "start wreckage" left by the 22 kiloton plutonium bomb. "It was almost like stepping from the eighteenth century say, into the twentieth century," he later recalled, "the countryside on one side, and on the other, modern power."<sup>324</sup>

While research existed on the dangers of radiation, very little was known about the effect of large doses on the human body. Consequently, the American military had established three medical teams to study the medical effects of the bombs, working alongside a Japanese team led by Dr. Tsuzuki Maseo. Warren headed the Navy team,

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<sup>324</sup> Shields Warren, "Hiroshima and Nagasaki Thirty Years After," *Proceedings of the American Philosophical Society*, Vol. 121, No. 2 (Apr. 29, 1977), 97; Jonathan D. Moreno, *Undo Risk: Secret State Experiments on Humans*, (New York: Routledge, 2001), 143; and Eileen Welsome, *The Plutonium Files: America's Secret Experiments in the Cold War*, (New York: Dial Press, 1999), 115-116, 198.

while Drs. Ashley “Scotty” Oughterson and Stafford Warren directed the Army and Manhattan District teams.<sup>325</sup> As in Hiroshima, the bomb devastated Nagasaki, but the destruction was less because of a local mountain range shielded part of the city from the bomb’s heat, shock waves, and fallout. Upon arriving, Warren examined the survivors sheltered in schools, barracks, and hospitals, and collected clinical, laboratory, and also reviewed autopsy reports taken by Japanese doctors immediately following the bombing.<sup>326</sup> It was apparent to the doctor that the destructive power of nuclear weapons would create “unprecedented problems in the field of medicine.” Warren found the survivors’ injuries to be “diverse and confusing;” most resulted from ionizing radiation-blast effects, gamma rays, and neutrons rather than the explosion itself. In fact, ionizing radiation took hours, days, or weeks to appear. The importance of these injuries, according to Warren, were “masked” by the thousands killed by flash burns, fires, and wreckage. While his colleague Stafford Warren told Congress that radiation caused 5 to 7 percent of the deaths, Shields Warren concluded otherwise. Radiation produced *most* of the Japanese injuries and deaths. Its lingering effects would be the legacy of Hiroshima and Nagasaki.<sup>327</sup>

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<sup>325</sup> For a complete discussion of the Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan, see Ashley W. Oughterson and Shields Warren, *Medical Effects of the Atomic Bomb in Japan*, (New York: McGraw-Hill, 1956); Barton C. Hacker, *The Dragon’s Tail: Radiation Safety in the Manhattan Project, 1942-1946*, (Berkeley: University of California Press, 1987), 109-116; and M. Susan Lindee, *Suffering Made Real: American Science and the Survivors at Hiroshima*, (Chicago: University of Chicago Press, 1994), 17-38. Shields Warren and Safford Warren were not related, but often mistaken for one another. Stafford Warren was the chairman of the radiology department at the University of Rochester School of Medicine and Dentistry, and worked as a consultant to the Manhattan Engineering District.

<sup>326</sup> *Hibakusha* is the Japanese word that translates to “explosion-affected people” of Hiroshima and Nagasaki. See Warren, “Hiroshima and Nagasaki Thirty Years After,” 97.

<sup>327</sup> Oughterson and Warren, *Medical Effects*, xi; Shields Warren and R.H. Draeger, “Patterns of Injuries Produced by the Atomic Bombs at Hiroshima and Nagasaki,” *US Naval Medical Bulletin*, 1946 Sep; 46: 1350; and Shields Warren, “The Pathologic Effects of an Instantaneous Dose of Radiation,” *Cancer Research*, 1946, 6, 449-453; Welsome, *The Plutonium Files*, 115.

After completing his investigation, Warren reported to the American Association for Cancer Research on the latent effects of radiation exposure, revealing that over 14,000 *hibakusha* suffered from bomb-related hemorrhages, leukocyte destructions, bone marrow damages, anemia, and fertility problems. He advised that it was “necessary to follow the populations of Hiroshima and Nagasaki for many years.”<sup>328</sup> His associates “Scotty” Oughterson and Stafford Warren agreed; American scientists could use the Japanese cities as a laboratory to study the medical and biological effects of radiation. The doctors recommended that Washington create a “permanent American Control Commission” beyond the control of the military, which led to the establishment of the Atomic Bomb Causality Commission (ABCC).<sup>329</sup> By the spring of 1947, Warren returned to Japan to reexamine the survivors and their descendants, and found that most had recovered. “People were more alert,” he wrote in his diary, “many smiling, look fat, and well-fed. Striking change.” The Japanese census of 1950 recorded that a total of 283,000 survivors existed; however, most received “only minimal” radiation exposures “10 rads or less.”<sup>330</sup>

Over the next thirty years, Warren continued his research. His role in establishing the ABCC prompted the Atomic Energy Commission (AEC) to appoint him as its first director of Division of Biology and Medicine (DBM). From 1947 to 1951, Warren

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<sup>328</sup> Paul Boyer, *Fallout: A Historian Reflects on America's Half Century Encounter with Nuclear Weapons*, (Columbus: Ohio State University Press, 1998), 63.

<sup>329</sup> President Harry S. Truman ordered the Atomic Bomb Causality Commission (ABCC) in November 1946. Shields Warren and Lewis Weed, head of the National Research Council, penned a letter from Secretary of the Navy James Forrestal that convinced Truman of its importance. During the ABCC's tenure, the commission studied the effects of radiation of atomic fission. However, it was a scientific venture, not medical. As a result, the *hibakusha* and Japanese mistrusted the intentions of the ABCC because it did not provide medical treatment. As the distrust rose, the ABCC changed its name to the Radiation Effects Research Foundation (RERF), a joint venture between the United States and Japan. See M. Susan Lindee, *Suffering Made Real: American Science and the Survivors of Hiroshima*, (Chicago: University of Chicago Press, 1994), 32-34.

<sup>330</sup> Warren, “Hiroshima Thirty Years Later,” 98; Welsome, *The Plutonium Files*, 197.



directed all aspects of radiation safety of the AEC and contractor workers, and emerged as one of the commission's most influential biomedical scientists. His most notable accomplishments was persuading the AEC to fund cancer and atomic energy research. Eventually, the commission supported numerous fellowships and grants in life sciences, and the construction of the Argonne Cancer Research Hospital at the University of Chicago and other medical facilities at the Oak Ridge Institute for Nuclear Studies and the Brookhaven National Laboratory. Under the wing of federal support, research in radiation health and atomic energy flourished.<sup>331</sup>

But Warren was also something of a tragic figure in American medical history. His policies as the director of the DBM would affect the health of Americans for generations. Historian David Rothman called the period between 1945 and 1965 “the Gilded Age of research, the triumph of laissez-faire in the laboratory.”<sup>332</sup> The influx of federal funding, and advances in medicine and science prompted a shift in American medicine. Instead of saving a few lives, many doctors became biomedical scientists, hoping to discover medical secrets to save humanity from cancer and other diseases. In the name of scientific progress, human experimentation occurred in nearly every medical field. Certainly, Warren was “very much opposed to human experimentation” when it was not “for the good of the individual concerned” or “any other way of solving the problem.” The doctor challenged the use of military personnel in Exercise Desert Rock from 1951 to 1957 at the Nevada Test Site (NTS), although he was more concerned with blast injuries and negative press than fallout risks. Moreover, he shut down the TBI experiments, which sought to expose 200 volunteers to whole-body radiation to learn the

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<sup>331</sup> Boyer, *Fallout*, 69.

<sup>332</sup> David J. Rothman, *Strangers at the Bedside: A History on How Law and Bioethics Transformed Medical Decision Making*, (New York: Basic Books, 1991), 51.

threshold a soldier could sustain in combat. But Warren also continually suppressed information to prevent lawsuits and protect the AEC's public image. While the doctor was horrified that Manhattan Project scientists injected humans with plutonium to study the effects, he actively prevented the news from going public.<sup>333</sup>

Additionally, Warren had a checkered history of protecting humans from radioactive fallout. In an interview with former Secretary of Interior Stewart Udall, who represented downwinders from Nevada and Arizona in a class action lawsuit, the doctor admitted he knew "from 1947 on" that hazardous fission products contaminated the atmosphere during a nuclear explosion. He also suspected "food chain dangers" in Hiroshima and Nagasaki, a theory seemingly confirmed after scientists linked contaminated fish to the 1946 atmospheric tests in the Pacific. Not surprisingly, Warren initially opposed continental nuclear testing, arguing that it posed a great threat to the American public. But the AEC gradually wore him down, reassuring that the NTS would only detonate "relatively few" low-yield bombs.<sup>334</sup>

Unfortunately, by 1952 fallout from high-yield bombs began sprinkling the ranches and small towns of Nevada and Utah. One week after the 12-kiloton Easy test in 1952, Warren recommended that "we cannot risk any continental aboveground shots

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<sup>333</sup> Throughout American history, there were numerous experiments conducted on human beings in the name of scientific progress. The studies deliberately exposed patients with pathogens, disease, and biological warfare agents, or tested new surgical procedures. The human radiation experiments began during the Manhattan Project, designed to determine the effects of radiation on the human body. Researchers injected seemingly terminal patients with plutonium and uranium, although several turned out to be misdiagnosed. The purpose of the experiments was to develop a diagnostic tool to determine how the human body reacted to plutonium or uranium. Officials of the Manhattan Project thought the experiments were essential to protecting workers producing plutonium and uranium. The idea was to remove workers from the job if the doses reached an unsafe level. Throughout the 1950s and 1960s, the experiments continued, injecting or feeding pregnant women, children, inmates, mentally-ill, or impoverished persons with radioactive iodine, calcium and other radioisotopes. See William Moss and Roger Eckhardt, "The Human Plutonium Injection Experiments," *Los Alamos Science*, (Number 23, 1995); and Moreno, *Undo Risk* for a complete description of the experiments. See also Welsome, *The Plutonium Files*, 264, 323-324.

<sup>334</sup> Stewart L. Udall, *The Myths of August: A Personal Exploration of Our Tragic Cold War Affair with the Atom*, (New York: Pantheon Books, 1994), 222-224.

larger [than Easy].<sup>335</sup> His appeal fell on deaf ears. However, by the mid-1950s, Warren apparently changed his mind. The doctor had left his DBM position, but continued working as an AEC consultant. As public concern mounted over nuclear testing and fallout, Warren decided to align with prominent scientists like Ernest Lawrence and Edward Teller, publically advocating that the United States needed further nuclear tests to maintain superiority over the Soviet Union.<sup>336</sup> In 1956, he even wrote to Lewis Strauss, chairman of the AEC, that “distinct or worldwide radioactive fallout is not a controlling factor in bomb testing. To permit us to fall behind Russians in disastrous; to wait for them to catch up to us is stupid.”<sup>337</sup>

Warren supported the idea of a “permissible dose,” which maintained that low doses of ionizing radiation posed little health risks. It was not until radiation rose above a certain level that damages to human health occurred. The nuclear testing debate eventually faded after the Test Moratorium of 1958 and the 1963 Limited Test Ban Treaty, which banned atmospheric testing. But the effects of low-level radiation remained controversial. Was there a “safe” dosage for workers in the nuclear industry

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<sup>335</sup> Ibid.

<sup>336</sup> Numerous scholarship discusses the controversy surrounding nuclear testing. Barton C. Hacker, *Elements of Controversy: The Atomic Energy Commission and Radiation Safety in Nuclear Weapons Testing, 1947-1974*, (Berkeley: University of California Press, 1994) discusses the scientific, technical, and organizational bases of nuclear testing controversy. Robert A. Divine, *Blowing in the Wind: The Nuclear Test Ban Debate, 1954-1960*, (New York: Oxford University Press, 1978) focuses on the public debate of testing and Richard G. Hawlett and Jack M. Holl, *Atoms for Peace and War, 1953-1961: Eisenhower and the Atomic Energy Commission*, (Berkeley: University of California Press, 1989) reveals what happened during the Eisenhower administration. Mary D. Wammack, “Atomic Governance: Militarism, secrecy, and science in post war America, (Ph.D. Dissertation, University of Nevada, Las Vegas, 2010) examines the institutional impulses that drove the atomic program from 1945 to the 1958 moratorium. See also Richard G. Hewlett, “Nuclear Weapon Testing and Studies Related to Health Effects: A Historical Survey, in Interagency Radiation Research Committee,” *Considerations of Three Proposals to Conduct Research on Possible Health Effects of Radiation from Nuclear Weapons Testing in Arizona, Nevada, and Utah; and, Nuclear Weapon Testing and Studies Related to Health Effects*, National Institutes of Health Publication no. 81-507 (Washington: October 1980), 24-101. For an overview of public concern over nuclear testing as well as the debate on nuclear reactors, see J. Samuel Walker, “The Controversy over Radiation Safety: A Historical Overview,” *Journal of the American Medical Association* 262 (August 4, 1989), 664-558.

<sup>337</sup> Welsome, *The Plutonium Files*, 260.

and the general public? Beginning in 1956, numerous studies began linking radiation in pregnant women to childhood cancer, and the ingestion of radioactive fallout contributing to immune diseases. By the late 1960s, public debate surfaced regarding nuclear reactors and the threat of radioiodine. In 1971, Canadian physician Abram Petkau discovered that cell membranes suffered more damage with long-term, low-level radiation exposure than high-level exposures. Scientists in atomic research also began speaking out about the dangers of low-level radiation, arguing that low-level emissions from nuclear reactors posed a greater threat to human health than plant accidents. By 1978, President Jimmy Carter, himself a nuclear physicist, ordered the Department of Energy (DOE) to make their operational records public, leading to further government, journalistic, and scholarly investigations, including historian Barton Hacker's comprehensive study on radiation safety and nuclear testing, *Elements of Controversy*. Eventually, a two-year congressional hearing determined the unthinkable: "The greatest irony of our atmospheric nuclear testing program is that our only victims of United States arms since World War II have been our own people."<sup>338</sup>

A byproduct of the controversy was personal injury litigation. Downwinder ranchers began suing the government in 1955, claiming that fallout from the NTS's Harry shot in 1953 killed 4500 of their sheep. The ranchers lost their case, but government investigators reopened it in 1980, reversing the decision two years later. Other fallout cases followed. The public debate also prompted employees of the NTS and military personnel to charge negligence. Ex-soldiers with leukemia claimed that their exposure to

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<sup>338</sup> Hacker, *Elements of Controversy*, 276; Barton C. Hacker, "Radiation Safety, the AEC, and Nuclear Testing, *The Public Historian*, Vol. 14, No. 1 (Winter, 1992), 43; Welsome, *Plutonium Files*, 199, 260; Joseph J. Mangano, *Low-Level Radiation and Immune System Damage: An Atomic Era Legacy*, (New York: Lewis Publishers, 1999), 4; John May, "How the United States Turned the Bomb on Its Own People," *Sunday Age*, Late Edition, Melbourne, Australia, (May 23, 1993).

radiation during the 1957 Smokey Shot caused their diseases. Additionally, the widows of Harley Roberts and William Nunamaker, civilian employees at the NTS, alleged that a botched underground shot, code-named Baneberry, killed their husbands. The Baneberry case in particular shocked the public.

After the ban on atmospheric testing, most Americans assumed that underground testing was relatively safe. But of the 475 underground tests conducted, there were 62 official lapses in safety. Of these, 53 were classified as “leaks” and “seeps,” or a gradual escape of radiation, and 9 as “venting,” defined as “a massive release of radiation.”<sup>339</sup> Baneberry was the worst of them all. On December 18, 1971, a 10-kiloton nuclear device was detonated 910 feet underground in Area 8. Three minutes later, a dramatic venting occurred, releasing radioactive gas 8,000 feet in the air over the next 24 hours. Harley Roberts, a Wackenhut Services, Inc. (WSI) guard, died April 17, 1974 from leukemia. William Nunamaker, Reynolds Electrical and Engineering Co. (REECo) employee, also died on December 19, 1974 from leukemia. Baneberry was not only the worst industrial accident experienced at the NTS; it was the first time the hazard of low-level radiation was argued in a court of law. And the widows gained an unlikely ally: Shields Warren. Drawing upon 30 years of research on radiation, the doctor concluded that small amounts of radiation could have caused their husbands’ leukemia.

### Ranger in the Desert

By the end of World War II, the federal government terminated manufacturing at Basic Magnesium Inc. and deactivated the Air Force’s bombing and gunnery range. But Cold War tensions prompted it to reopen the base in 1948. At the same time,

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<sup>339</sup> May, “How the United States Turned the Bomb on Its Own People.”

groundbreaking developments in science had dramatically altered the defense industry.<sup>340</sup> During the war, the Manhattan Engineer District (MED) spent over \$2.2 billion on production facilities, communities, and research laboratories in Oakridge, Tennessee, Hanford, Washington, and Los Alamos, New Mexico to build an atomic bomb. MED functioned like a large corporation, relying on public/private partnerships. Oakridge and Hanford produced uranium and plutonium, the materials needed to build an atomic bomb. Private contractors built both the facilities and reactors in consultation with physicists at the University of California, Berkeley (Oak Ridge) and the University of Chicago (Hanford). Directed by physicist J. Robert Oppenheimer and in association with the University of California, the Los Alamos Scientific Laboratory (LASL) created the bomb design and conducted diagnostic experiments.<sup>341</sup> The site also hosted a proving ground, the Alamogordo Bombing Range. It exploded the first plutonium-based atomic weapon, codenamed Trinity.<sup>342</sup>

As tensions rose between the United States and Soviet Union regarding the postwar world, Congress enacted legislation to establish the United States Atomic Energy Commission (AEC), a civilian agency that directed peacetime developments of atomic

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<sup>340</sup> For an overview of early nuclear physics, see F. G. Gosling, *The Manhattan Project: Making the Atomic Bomb*, (Washington: U.S. Department of Energy, January 1999 edition), DOE/MA-0001, Atomic Testing Museum, Las Vegas, Nevada; Richard G. Hewlett and Oscar E. Anderson, Jr., *The New World, 1939-1946*, Vol. I, *A History of the United States Atomic Energy Commission*, (University Park, PA: Pennsylvania State University Press, 1962); and Richard Rhodes, *The Making of the Atomic Bomb*, (New York: Simon and Schuster, 1986).

<sup>341</sup> G.B. Kistiakowsky to J.R. Oppenheimer, Letter, October 12, 1944, NV0004059, Atomic Testing Museum, Las Vegas, Nevada.

<sup>342</sup> For a complete discussion of the Manhattan Engineering District, see Barton C. Hacker, *The Dragon's Tail: Radiation Safety in the Manhattan Project*, (Berkeley: University of California Press, 1987), Rhodes, *The Making of the Atomic Bomb*; Gosling, *The Manhattan Project*, Hewlett and Anderson, *New World*; and Fehner and Gosling, *Origins of the Nevada Test Site*. See also Project Trinity Fact Sheet, Defense Nuclear Agency, (Washington D.C.: Public Affairs Office, December 15, 1982), NV0760126, Atomic Testing Museum, Las Vegas, Nevada.

science and technology from 1946 to 1975.<sup>343</sup> On August 1, 1946, President Truman also signed the Atomic Energy Act, which transferred most of the MED's plants, laboratories, and offices in Oak Ridge, Hanford, and Los Alamos to the AEC. Seven-eighths of the 44,000 workers were employees of private contractors, a model that continued under the commission. But efforts to deter the Cold War were less successful. The United States, believing the Soviet Union threatened the future of Western Europe, refused to surrender its atomic secrets without adequate controls. The decision partially contributed to the onset of the Cold War.<sup>344</sup> By 1947, the iron curtain divided East from West.<sup>345</sup>

As the Cold War escalated, Los Alamos eagerly waited to resume testing. Since Trinity and Crossroads, theoretical developments had revealed new techniques to create more efficient and improved bombs. But the scientists needed more data to choose between the designs. Consequently, they appealed to the AEC to sponsor large-scale tests to evaluate the new bombs. Los Alamos narrowed the location to Enewetak, an atoll in the Pacific Ocean. The location became known as the Pacific Proving Grounds (PPG). But the logistical problems of testing in the Pacific, including unpredictable weather, pollution of the Pacific Ocean, the expense of transporting men and materials from the far West prompted the Pentagon to push for a continental proving ground. In 1948, the

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<sup>343</sup> See Alice L. Buck, *A History of the Atomic Energy Commission*, (Washington D.C.: Department of Energy, July 1983), 1, NV0410896, Atomic Testing Museum, Las Vegas, Nevada, for a history of the AEC.

<sup>344</sup> For literature on the Cold War, see William Appleman Williams, *The Tragedy of American Diplomacy*, (New York: W.W. Norton & Company, 1972); Walter LaFeber, *America, Russia, and the Cold War*, (New York: McGraw-Hill, 1987); Gar Alperovitz, *Atomic Diplomacy: Hiroshima and Potsdam*, (New York: Pluto Press, 1994); Joyce Kolko and Gabriel Kolko, *The Limits of Power: The World and U.S. Foreign Policy, 1945-1954* (New York: Harper and Row, 1972); and John Lewis Gaddis, *The United States and the Origins of the Cold War, 1941-1947* (New York: Columbia University Press, 1972).

<sup>345</sup> In 1946, Winston Churchill warned that an "iron curtain" would be descended on Eastern Europe if the Soviet Union continued to expand its influence.

Armed Forces Special Weapons Project (AFSWP) sponsored Project Nutmeg to search for a new site. The survey evaluated “phenomena concerning atomic clouds,” fallout patterns, and meteorology. The report concluded that it was “quite clear that there is no site within the United States nor within the North American continent that would ensure the absence of fallout on populated areas.” However, the western desert “would be more sound” than the eastern coastal area. But the report did not recommend a specific location. In the end, the AEC decided that a continental test site was “not desirable” due to domestic and international relations concerns. The commission decided to resume plans in the event of a national emergency.<sup>346</sup>

Following the detonation of the Soviet Union’s first nuclear weapon in 1949 and the outbreak of the Korean War in 1950, the AEC renewed its search for a continental site.<sup>347</sup> The location criterion required that there be no threat to any population, economy, or industry within a 125-mile radius. Public opinion, logistics, and security were also considerations. Thanks partly the influence of Senator Pat McCarran, the AEC ultimately decided that the Las Vegas Bombing and Gunnery Range held the most promise. Located northwest of Las Vegas, the site consisted of dry lakebeds, Frenchman Flat and Yucca Flat. It had “significant advantages,” situated near a government-owned airfield at Indian Springs and had natural barriers for improved security. But Las Vegas fell within the 125-mile radius criterion; the site was located only 65 miles from Fremont

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<sup>346</sup> Carroll L. Tyler to Dr. J.C. Bugher, August 20, 1953, Memorandum, NV0404908, Atomic Testing Museum, Las Vegas, Nevada; Project Nutmeg, NV0411323, Atomic Testing Museum, Las Vegas, Nevada; and Review of Project Nutmeg, NV0404131, Atomic Testing Museum, Las Vegas, Nevada; Sumner T. Pike to LeBaron, “Location of Proving Ground for Atomic Weapons,” March 8, 1949, as quoted in Hacker, *Elements of Controversy*, 40.

<sup>347</sup> See Hacker, *Elements of Controversy*, 36-49; and Fehner and Gosling, *Origins of the Nevada Test Site*, 37-78 for a complete discussion of how the test site came to be established in Nevada. See also J.P. Harahan and R.J. Bennett, *Creating the Defense Threat Reduction Agency*, (Washington D.C.: U.S. Department of Defense, 2002).



Street. This raised safety concerns. Consequently, a team of physicists conducted further studies, and determined that a “tower-burst bomb having a yield of 25 kilotons could be detonated without exceeding the allowed emergency tolerance dose.” However, while meteorologists could predict the wind patterns and limit offsite exposure, there was still a risk. The physicists concluded that people would undoubtedly receive “perhaps a little more radiation than medical authorities say is absolutely safe.”<sup>348</sup>

The AEC accepted the recommendation and the United States Air Force permitted use of the site “on a temporary basis only” in December 1950. Truman also approved the choice. At the same time, planning for Operation Greenhouse at the Pacific Proving Ground surged ahead. Despite the Korean conflict and logistical issues, Los Alamos and the AEC sought to explode the first thermonuclear bomb. But the scientists needed more tests to determine the design criteria. With Greenhouse beginning in summer 1951, the AEC organized the first continental test series in southern Nevada, Operation Ranger. The AEC established safety criteria that minimized participants to radiation exposure, restricting the permissible dose to 3.0 roentgens for a 13-week period.<sup>349</sup> A Radiological Safety Section also issued the AEC, Los Alamos, and DOD personnel film badges and protective equipment, and set up radiation monitoring and decontamination equipment.<sup>350</sup> Ranger’s first shot detonated at 5:45 a.m. on January 27, codenamed Ranger Able. The explosion was small, yielding only 1 kiloton. The following day, Ranger Baker produced

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<sup>348</sup> Mary Palevsky, “Establishing a Cold War Continental Test Site in Nevada,” *Online Nevada Encyclopedia*, <http://www.onlinenevada.org/>, (Assessed January 13, 2011); Hacker, *Elements of Controversy*, 41-42; Frederick Reines. “Discussion of Radiological Hazards with a Continental Test Site for Atomic Bombs, Based on Meeting Held at Los Alamos, August 1, 1950,” LAMS-1173, September 1, 1950, 5, 11-13, 21, 23-24; Fehner and Gosling, *Origins of the Nevada Test Site*, 44.

<sup>349</sup> Adopted in 1928, roentgen is a unit of measurement for exposure to ionizing radiation named after German physicist Wilhelm Roentgen.

<sup>350</sup> Fehner and Gosling, *Origins of the Nevada Test Site*, 50; Palevsky, “Establishing a Cold War Continental Test Site in Nevada;” Project Ranger Fact Sheet, February 26, 1982, NV0760122, Atomic Testing Museum, Las Vegas, Nevada.

a more spectacular explosion, yielding 8 kilotons. The *Los Angeles Times* reported that it was a “brilliant sunburst-like blast.” While both tests produced varying levels of radiation onsite, employees monitoring radiation safety only found trace readings offsite. But like Trinity, they did not discover until later that Ranger blasted radioactive debris into high-altitude winds, contaminating the snowfall in the Midwestern and Northeastern United States. In fact, fallout contaminated most of the United States throughout the decade years of atmospheric testing, not just the southwest. Ranger ultimately produced no serious accidents to personnel or significant radiation exposure, and ushered in 40 years of nuclear testing in southern Nevada. But it also introduced radiological hazards to the region, giving new meaning to the dangers associated with working in the desert.<sup>351</sup>

#### Anatomy of a Test Site

After Ranger, the AEC turned the Nevada Test Site (NTS) into a permanent proving ground.<sup>352</sup> From 1951 to 1992, the test site hosted 928 tests and 1,021 detonations.<sup>353</sup> The AEC maintained private partnerships, contracting with construction, architectural, and engineering firms, and laboratories. The anatomy of the NTS is often a confusing topic. It is unclear who actually ran the facility. In fact, the AEC did not conduct the tests. It owned all assets and had “absolute authority of all questions of security” and “labor expenses.” The AEC also set guidelines on safety, employee

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<sup>351</sup> Atomic physicists referred to low-yield atomic bursts as “tickling the dragon’s tail” rather than provoking a full-scale nuclear explosion. See “Nevada Atom Test Rocks Four States,” *Los Angeles Times*, (January 28, 1951).

<sup>352</sup> The test site was first titled the Nevada Proving Grounds (NPG), changing soon after to the Nevada Test Site (NTS). In August 2010, it was renamed the Nevada National Security Site (NNSS) to better reflect its goal of training troops rather than nuclear weapons. See Keith Rogers, “It’s Official: Test Site gets new name,” *Las Vegas Review-Journal*, August 24, 2010. For continuity purposes, this chapter will refer to the site as the Nevada Test Site (NTS).

<sup>353</sup> U.S. Department of Energy, *United States Nuclear Tests, July 1945 through September 1992*, (Washington D.C.: U.S. Department of Energy, Nevada Operations Office, December 2000), xviii, DOE/NV-206-REV15, Atomic Testing Museum, Las Vegas, Nevada.

relations, and working conditions. Despite some limitations, it ensured the test site reflected “the best experience of American industry,” aiming to achieve “stable, democratic labor-management relations.”<sup>354</sup>

The real operators were the laboratories, contractors, and the military. Los Alamos, the Lawrence Livermore National Laboratory, and Sandia National Laboratories designed the bombs and ran the tests.<sup>355</sup> Los Alamos and Livermore were the principal organizations at the NTS, while Sandia operated the Tonopah Test Range.<sup>356</sup> At the NTS, Los Alamos and Livermore were friendly rivals; competition frequently arose out of the need to score government contracts. When the military needed a nuclear weapon, it approached both laboratories, who created and submitted a design. The military then awarded the contract to its favorite.<sup>357</sup>

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<sup>354</sup> AEC Employee Brochure, Howard W. Cannon Papers, 90<sup>th</sup> Congress, Box 16, Folder 260, University of Nevada, Las Vegas Special Collections.

<sup>355</sup> Since 1945, Los Alamos grew to fill the needs of the nuclear economy. The Z Division, which manufactured atomic weapons designed and tested by Los Alamos, moved outside of Albuquerque to be in closer proximity to an airfield. In 1948, the Z Division’s growth prompted its designation as the Sandia Laboratory, a separate branch of Los Alamos. By the early 1950s, physicists Ernest Lawrence and Edward Teller stressed the need for a second laboratory to enhance the efforts of Los Alamos, leading to the establishment of a Livermore branch of the University of California Radiation Laboratory (renamed Lawrence Radiation Laboratory, the Lawrence Livermore Laboratory, and Lawrence Livermore National Laboratory) in 1952 and a second Sandia Laboratory in 1956, in Livermore, California. Los Alamos, Sandia, and Lawrence Livermore became national laboratories by 1979 legislation. See Sandia National Laboratories, “Sandia National Laboratories: A History of Exceptional Service in the National Interest,” [www.sandia.gov](http://www.sandia.gov), (Assessed November 17, 2010); “Nuclear Testing and Fallout Programs at the University of California Lawrence Radiation Laboratory,” NV0402480; and J.L. Heilbron, Robert W. Seidel, and Bruce R. Wheaton, “Lawrence and his Laboratory: Nuclear Science at Berkeley,” NV0724922, Atomic Testing Museum, Las Vegas, Nevada.

<sup>356</sup> The Tonopah Test Range, also known as Area 52, was on the northern fringe of the Nellis Air Force Range. Like the NTS, the site conducted nuclear tests, including stockpiling research, and the development of fusing and firing systems. See A Chronological History of Test Range Site Considerations Leading Up to the Selection of the Tonopah Test Range, ALSNLDE98056462; An Analysis of the Role of Tonopah Test Range in Sandia Laboratories' Programs, ALSNLDE98040395, Atomic Testing Museum, Las Vegas, Nevada.

<sup>357</sup> Interview with Elmer Sowder, April 29, 2004, Conducted by Mary Palevsky, Nevada Test Site Oral History Project, University of Nevada, Las Vegas.

As the winning laboratory built the test sequence, it enlisted construction and engineering firms to conduct the tests.<sup>358</sup> Therefore, the largest contingent of NTS workers were private contractors. The companies furnished labor, equipment, and materials, industrial hygiene and safety, radiation safety, sanitation, and fire protection, and medical care. They managed maintenance and operation, communication and mapping, engineering, and security as well. Reynolds Electrical and Engineering Company (REECo), was the prime contractor, sharing the responsibility with Edgerton, Germeshausen, and Grier, Inc. (EG&G), Holmes and Narver (H&N), and Federal Services, Inc. (FSI). REECo carried out construction, maintenance, support operations, and health and safety, while EG&G handled timing, firing, measurements, and other scientific functions.<sup>359</sup> H&N provided engineer services and FSI outfitted security guard services at the NTS and affiliated facilities in Las Vegas. Security was later assumed by Wackenhut Services, Inc. (WSI).

While several contractors ran the NTS, this chapter will focus on REECo due its involvement in occupational health, radiological safety, and medical program. Founded in 1932 by Lou J. Reynolds, REECo participated in Trinity as a subcontractor. By 1952, the company became the test site's prime support contractor. REECo gained the reputation as a "no problem" or "can do" contractor, "getting the job done" expeditiously for the laboratories, and military. It handled the majority of testing support.<sup>360</sup> It was a big job. The NTS spanned 1,375-square miles, and REECo provided power,

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<sup>358</sup> Ibid.

<sup>359</sup> *A Profile: Reynolds Electrical and Engineering Co. Inc: An EG&G Company*, (Wellesley, Mass: Corporate Communication and Information Department), NV0317251, Atomic Testing Museum, Las Vegas, Nevada.

<sup>360</sup> REECo maintained subcontractors as well, subcontracting to Robert E. McKee General Contractors, Inc. and J.S. Brown and E.F. Olds Plumbing and Heating Company in 1952, Eberline Instrument Company in 1955, and Lovelace Clinic in 1964. See Joe Ford, *REECo History*, NV0321540, Atomic Testing Museum, Las Vegas, Nevada.

communication, and water. It built and maintained facilities, roads, fences, and utilities, and operated the motor pool and maintenance repair shops, and craft support. The company also set up and fired the nuclear tests, and handled post-shot data collection and drilling. Lastly, it established elaborate comprehensive industrial hygiene and safety, sanitation, medical, and by 1955, radiation safety programs to protect workers and the public.<sup>361</sup>

REECo provided most of the workers at the test site. Total employment varied on the test series. For example, in June 1961, the NTS employed 2,300 workers, 1,320 of which worked for REECo. By November 8, 1961, the workforce swelled to 5,800 to accommodate Operation Nougat. At the height of nuclear testing in 1966, REECo employed 6,500 workers. To pool workers, most NTS contractors recruited local talent. A 1959 survey of Holmes and Narver employees revealed that most workers had lived in Nevada for at least two years prior to employment. Nonetheless, a common complaint was that the contractors imported workers from out-of-state. Some enacted qualifications for employment, including age limitations, but the practice was eventually terminated. For example, Wackenhut based employment decisions on a physician's opinion that the applicant could perform their duties rather than on their age.<sup>362</sup>

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<sup>361</sup> *A Profile: Reynolds Electrical and Engineering Co. Inc: An EG&G Company* for a summary of REECo's activities at the NTS. For a sample contract between REECo and the AEC, see *Reynolds Electrical & Engineering Co., Inc., Contractor At (29-2)-162*, NV0078994, Atomic Testing Museum, Las Vegas, Nevada; "Application of Construction Conditions to Non-Construction Work," Howard W. Cannon Papers, 86<sup>th</sup> Congress, Box 13, Folder 245, University of Nevada, Las Vegas Special Collections.

<sup>362</sup> Deputy General Manager of AEC to Howard W. Cannon, Letter, August 31, 1959, Howard W. Cannon Papers, 86<sup>th</sup> Congress, Box 13, Folder 245, University of Nevada, Las Vegas Special Collections. For letters regarding hiring complaints to Senator Howard W. Cannon, see Howard W. Cannon Papers, 86<sup>th</sup> Congress, Box 13, Folder 245, University of Nevada, Las Vegas Special Collections; Background Information on Nevada Test Site, November 13, 1961, Howard W. Cannon Papers, 87<sup>th</sup> Congress, Box 12, Folder 159-161, University of Nevada, Las Vegas Special Collections; H.T. Herrick to Howard W. Cannon, Letter, February 26, 1968, Howard W. Cannon Papers, 90<sup>th</sup> Congress, Box 16, Folder 265, University of Nevada, Las Vegas Special Collections.

REECO employees held various positions. Its occupational health and safety program employed doctors, medics, nurses, health physicists, and safety engineers. Ken Case, known as the “Atomic Cowboy,” began working at the test site in 1954 and became one of REECO’s first radiation safety monitors in 1955. By 1957, he worked under Captain Scott L. Reynolds of the U.S. Army Veterinary Corps, a veterinary advisor for radiobiological aspects of test activities. Case drove cattle over ground zero to study the effects of radiation on wildlife. After watching the test on horseback, he was often the first one to enter ground zero.

We would get over ground zero, the epicenter of the blast at ground level, and bang, [the monitors were] off-scale. When we went back over, about 30 feet off the ground, and the sand would be melted like glass. Those ground zeros in the spring bleed a big circle in the snow... Rabbits would run across there and they would be on fire. It was something.

Besides the health personnel, the majority of workers were laborers, including carpenters, masons, electricians, ironworkers, painters, and plumbers, as well as surveyors and architect-engineers. After the induction of underground testing in 1957, REECO hired miners and drillers. Numerous workers held culinary, housekeeping, and general office staff positions. Los Alamos and Livermore hired scientists and laboratory technicians to conduct the tests as well. Lastly, the Nye County Sheriff patrolled the grounds, writing speeding tickets and responding to car accidents and protestors. Security guards also managed the badge office, processing military and civilian clearances.<sup>363</sup>

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<sup>363</sup> For course, there were numerous other positions held at the NTS. For a complete list, see the various REECO, EG&G, H&N, and WSI contracts located at the Atomic Testing Museum, Las Vegas, Nevada. For example, *Reynolds Electrical & Engineering Co. Inc. Contract at (29-2)-162* outlines the company’s general organization, and its departments and available positions in 1957. See also *NTS News*, Reynolds Electrical & Engineering Co. Inc., Vol. VII No. 18, (September 6, 1963); May, “Expendable Americans;” and Interview with James Merlino, November 7, 2004, Conducted by Suzanne Becker, Nevada Test Site Oral History Project, University of Nevada, Las Vegas, for sheriff activities and issues with protestors.

Perhaps the most visible job were soldiers engaging in Exercise Desert Rock.<sup>364</sup> Instituted in 1951, the NTS exposed troops to “realistic” atomic warfare training. The military sought to learn how use nuclear weapons tactically in combat. Additionally, it studied its effects on military equipment and materials, and the troops, testing psychological and physical reactions. For example, during Desert Rock I soldiers watched a detonation 7 miles from ground zero. One soldier described it “like someone had sneaked up on me and breathed heavily on my skin.” The men inspected the damage and were herded into decontamination showers. Next, the Human Resources Research Organization (HumRRO) recorded their psychological responses. The soldiers filled out questionnaires, inquiring about nuclear warfare, the Cold War, and radioactivity. The questions asked: “Just how frightened would you say you were when the last test A-bomb went off?” Did you have physical reactions, such as “violent pounding of the heart” or “urinating in pants?” Most men answered no. One soldier remarked that he “wasn’t even that nervous.” The comments reveal the biggest problem with Exercise Desert Rock: a lack of reality. Despite the enormous health risk, the exercises continued throughout the 1950s.<sup>365</sup>

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<sup>364</sup> There is extensive literature on Exercise Desert Rock. For the best coverage, see Hacker, *Elements of Controversy*, 7, 67-70, 74-77, 89, 92-99, 166-167, 187, 191-192, 267-268. After television and newspapers began carrying the story of Paul Cooper’s leukemia, a participant in a Desert Rock exercise during the 1957 Plumbbob series, in the late 1970s, television and newspapers ran stories about the Desert Rock Exercises. Journalistic accounts and historical scholarship followed, including Michael Uhl and Tod Ensign, *GI Guinea Pig: How the Pentagon Exposed Out Troops to Dangers More Deadlier Than War, Agent Orange and Atomic Radiation*, Chicago: Playboy Press, 1980); Howard Rosenberg, *Atomic Soldiers: American Victims of Nuclear Experiments*, (Boston: Beacon Press, 1980); Thomas H. Saffer and Orville E. Kelly, *Countdown Zero*, (New York: G.P. Putnam’s Sons, 1982); Harvey Wasserman and Norman Solomon, with Robert Alvarez and Eleanor Walters, *Killing Our Own: The Disaster of America’s Experience with Atomic Radiation*, (New York: Delta Book, 1982). Other notable workers include A. Costandina Titus, *Bombs in the Backyard: Atomic Testing and American Politics*, (Reno: University of Nevada Press, 1986); and Welsome, *Plutonium Files*.

<sup>365</sup> Questionnaire from HUMMRO Psychological Tests, NV0750656, Atomic Testing Museum, Las Vegas, Nevada; “Armed Forces: Exercise Desert Rock,” *Time Magazine*, (November 12, 1951); Exercise Desert Rock I, NV0767719, Atomic Testing Museum, Las Vegas, Nevada.

The site provided several housing options. Camp Mercury began as a military camp during Operation Ranger, a name derived from its location in the Mercury Valley. The camp provided platform units with canvas roofs, and workers slept in bunks. Robert “Doc” Campbell, a Navy hospital corpsman, recalled that it was not “the Waldorf Astoria, but being military, they never did promise a rose garden.” During the evenings, the workers met for beer and food at the old Slop Shoot or drove to Las Vegas. When the testing program became permanent, the AEC invested \$6.7 million in Mercury, constructing temporary housing, office space, a cafeteria, recreation facilities, laboratory facilities, and administrative offices. With the addition of Nuclear Rocket Development System (NRDS) and the Plowshare Program in the 1960s, the AEC allocated \$15 million to build permanent housing and dormitories, and administration buildings.<sup>366</sup> Some workers resided there during the week, and returned to Las Vegas on the weekend. Although, many commuted everyday, leaving on buses from various points in the Las Vegas valley. As Mercury expanded, it provided all the needs of a small town, including a chapel, bowling alley, swimming pool, and “upscale” steakhouse. But unlike the federally-financed towns Boulder City and Henderson, the AEC restricted public access.<sup>367</sup>

Likewise, Camp Desert Rock housed troops participating in Exercise Desert Rock. George Younkin, a soldier, described it as a typical field camp “just like the ones overseas.” There was “a lot of tents and a lot of desert.” At first, there were few

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<sup>366</sup> The Plowshare Program sought to develop techniques to use nuclear explosions for peaceful construction purposes.

<sup>367</sup> Interview with Robert “Doc” Campbell, Jr., March 12, 2005, Conducted by Suzanne Becker, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Interview with William Flangas, November 12, 2004, Conducted by Mary Palevsky, Nevada Oral History Project, University of Nevada, Las Vegas; “Mercury, Nevada, Fact Sheet,” Nevada Site Office, U.S. Department of Energy, [http://www.nv.doe.gov/library/factsheets/DOENV\\_1094.pdf](http://www.nv.doe.gov/library/factsheets/DOENV_1094.pdf), (Assessed January 19, 2011).



luxuries. The soldiers slept on cots in squad tents and ate out of mess gear. The bathrooms were open trenches and there was no running water. The troops showered in canvas tents with suspended water pipes. The *Review-Journal* described the showers as “Camp Desert Rock’s most popular spot,” presumably because of the dusty, desert conditions. After the completion of Exercise Desert Rock III, the military built substantial upgrades, installing water storage and sewage systems, and electrical services. It also improved sanitation, constructing concrete bathrooms with flush toilets, showers, and sinks, and erected a small hospital and mess hall with a seating capacity of 500.<sup>368</sup> Given the isolation of Camp Desert Rock, the military made recreation a priority. It established various clubs, and arranged to bring entertainment to the camp. The Jimmy Durante Show performed during Operation Upshot-Knothole and Patti Page serenaded the troops before Operation Teapot’s “Doom Town” APPLE-2 shot in 1955. The military also set up shows in Las Vegas. But most soldiers disliked the post. They worried about radiation exposure and complained of the harsh desert conditions. One soldier called the sleeping bags “lousy.” At night “we froze our asses off,” he recalled. The wind was particularly annoying. To seek protection, the soldiers salvaged wooden boxes from trash areas to board their tents. To generate heat, they used potbellied stoves. In 1955, a violent wind storm flattened several barracks. The troops participating in the 1957 Plumbbob series confronted particularly difficult conditions. A flash flood inundated a portion of the camp, and summertime temperatures reached nearly 120

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<sup>368</sup> For a comprehensive study on the archeological history of Camp Desert Rock, see Susan Edwards, “Atomic Age Training Camp: The Historical Archeology of Camp Desert Rock,” (Masters Thesis, University of Nevada, Las Vegas, 1997), 121, 126, 131, 139-142.

degrees. Consequently, numerous soldiers were felled by heat exhaustion and food poisoning after the refrigeration storage facilities failed.<sup>369</sup>

### The Permissible Dose

Early living conditions were not desirable, but the situation improved with time. Occupational hazards, however, were always present. The AEC cited three classifications of accidents. The first included accidents in “no way related to atomic energy,” such as falls, electrocutions, and motor vehicle and construction accidents. The second involved accidents arising from “materials or the processes closely related to the program,” or fires/explosions caused by noxious non-radiation inducing materials. For example, in a shed housing a Kiwi-B IA reactor, an accidental hydrogen explosion occurred. Although the accident injured several men, it did not release radiation. Therefore, the explosion was not officially considered a nuclear incident.<sup>370</sup>

There were numerous instances that fell between the second and third classifications. The third were accidents where radiation was the prime factor. Most were caused by human error or faulty equipment. Additionally, entering hazardous test areas produced injuries; workers often entered exclusion areas during a test. Others incurred injuries because of safety oversight. In 1956, four workers, dressed in protective clothing, entered a test area to recover samples. A monitor should have been positioned there in advance to check for radiation levels, but was not. As a result, the employees received external exposures of 4 rads, 14, rads, 19 rads, and 28 rads, respectively. At the time, the

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<sup>369</sup> Interview with Robert Joseph Curran, July 18, 2005, Conducted by Suzanne Becker, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Edwards, “Atomic Age Training Camp,” 122, 126-128.

<sup>370</sup> Daniel F. Hayes, “A Summary of Incidents Involving Radioactive Material in Atomic Energy Activities, January-December 1956,” iii, NV0091411; “Press Release Accidental Explosion,” NV0143215, Atomic Testing Museum, Las Vegas, Nevada.

recommended permissible level was 3.9 rads in 13 weeks. Other opportunities involved radionuclides contaminating construction or laboratory areas, laboratory technicians handling radioactive material with torn gloves, or explosions occurring while conducting experiments.<sup>371</sup>

Radiation accidents had biological and physical effects, as well as psychological fallout. Injuries varied in severity and scope, depending on conditions related to the exposure. Doctors diagnosed two categories of radiation accidents. Most industrial, nuclear reactor, and medical accidents resulted from external exposure. But contamination also occurred internally by ingesting, inhaling, or directly absorbing radionuclides. The clinical name for external exposure is acute radiation syndrome (ARS), an illness caused by whole-body irradiation during a short period of time.<sup>372</sup> ARS cases include the people of Hiroshima and Nagasaki, and firefighters responding to the Chernobyl disaster. Historically, high-level, external radiation accidents in the workplace are uncommon. According to international registries, only 300 patients so far have contacted ARS worldwide, excluding the victims of Hiroshima and Nagasaki, and Chernobyl.<sup>373</sup> Fatalities are also rare; approximately 20 percent of all patients with ARS had fatal outcomes.<sup>374</sup>

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<sup>371</sup> “Press Release Accidental Explosion,” 4.

<sup>372</sup> Some authors use the term illness rather than disease or sickness, but the terms are synonymous.

<sup>373</sup> Events in Japan may have increased the number of ARS victims worldwide. On March 11, 2011, a 9.0 earthquake struck off the coast of Japan, creating a devastating tsunami that swept over cities and farmland. As the nation dealt with the rescue effort, it also faced the worst nuclear emergency since Chernobyl. Explosions and leaks of radioactive gas took place in three reactors at the Fukushima Daiichi Nuclear Power Station, suffering partial meltdowns. By July 2011, the count of dead and missing reached 22,000 people.

<sup>374</sup> Centers for Disease Control and Prevention, “Acute Radiation Syndrome: A Fact Sheet for Physicians,” <http://www.bt.cdc.gov/>, (Assessed January 26, 2011); Angelina K. Guskova, Alexander E. Baranov, and Igor A. Gusev, “Acute Radiation Sickness: Underlying Principles and Assessment,” I. A. Gusev, et. al., eds., *Medical Management of Radiation Accidents*, 2<sup>nd</sup> Edition, (New York: CRC Press, Inc., 2001), 34.

ARS was very infrequent at the NTS. In order to get an ARS diagnosis, patients had to have received a radiation dose over 70 rads. But mild symptoms can occur at as low a level as 30 rads. The AEC determined radiation doses according to curie, roentgen, rad, and rem units. The curie and roentgen evaluated radiation activity and exposure, while rad and rem determined the absorbed dose and dose equivalent that will cause biological damage to the human body. One rad equaled one rem.<sup>375</sup> While the lethal dose for humans was uncertain, Dr. Shields Warren theorized in 1950 that it equaled 450 roentgens. The number was an estimate and never tested experimentally, but scientists often referred to it as “Dr. Warren’s magic number.” Besides a dose of 70 rads or higher, ARS patients must have received an external dose that penetrated the entire body, affecting the organs. For example, most NTS radiation injuries involved exposure to the hands. Such localized exposure rarely caused ARS. Lastly, the dose was delivered in a short time period and at the same magnitude, usually in a matter of minutes.<sup>376</sup>

Throughout atmospheric testing, major radiation accidents resulted in a small percentage of injuries. From 1945 to 1964, 99.8 percent of all AEC and contractor employees received less than 5 rem annually. The majority of exposures over 5 rem resulted from accidents. The AEC determined that out of 7,693 injuries occurring, only

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<sup>375</sup> The distinction between the measuring units is confusing. The rad unit described the absorbed dose of radiation into the body, while the rem unit analyzed the rads and a weighing factor, *Wr*. Rem measurements ultimately determined if the radiation could cause biological damage. However, these units are no longer the standard measurement. The U.S. National Institute of Standards and Technology “strongly discourages the continued use” of the rad, rem, roentgen, and curie. The rad and rem equivalents are the Gray (Gy) and Sievert (Sv). While Gy and Sv superseded the rad and rem as industry standards, its use continues to be prevalent. See Barry N. Taylor and Ambler Thompson, eds., *The International System of Units (SI)*, (Gaithersburg, MD: National Institute of Standards and Technology, 2008), 37-38. This chapter uses the old units, as they were the standard for the majority of NTS testing.

<sup>376</sup> *Dorothy Roberts et. al. vs. United States of America*, (1979), Deposition of Dr. Clarence C. Lushbaugh, 4045, Baneberry Collection, Box 4, Folder 4, University of Nevada, Las Vegas Special Collections. Guskova, Baranov, and Gusev, “Acute Radiation Sickness: Underlying Principles and Assessment,” 33-51; and Centers for Disease Control and Prevention, “Acute Radiation Syndrome: A Fact Sheet for Physicians.”

36 were from radiation. Of the 36 workers involved in radiation accidents, 3 died, 11 were “without evidence of radiation effects,” and 22 showed clinical manifestations attributable to radiation. Of the latter group, 2 received permanent disability due to radiation and 2 required amputation. The workers did receive a fair amount of radiation exposure, but their tolerances varied significantly. According to Dr. Leonard Kreisler, medical director of REECo from 1973 to 1990, the amount of radiation was not indicative of potential damages to the human body. The reasons were multiple. First, there was a wide margin of safety. Second, individuals differed in dose tolerance, on top of the wide margin of safety. Third, the type of ionizing radiation [Alpha, Beta, Gamma, X-Ray, Neutron] was a factor. Fourth, the distance and shielding may have contributed to the level of exposure. Kreisler provided an example:

A radiation monitor was giving a class on how to handle a radioactive source... He came out and there is this lead-shielded box, a pig, and inside is radioactive material. The way you would normally take it out is you attach a cable to it, which is shielded, and this would pull out the radioactive material... This guy opens up the container and pulls the thing out with his bare hand. With his bare hand! They reconstructed the time that he was exposed, the type of radiation, whether it was alpha which will not penetrate the skin, whether it was beta which really gets penetration, whether it is nasty stuff like gamma. They calculated the dose and he had significant exposure to his hands from a physics point of view. We watched this guy for a month. We did blood tests. I looked at his daily for two weeks. He didn't even sunburn. He didn't even get redness! Nothing! He got no adverse medical findings. It just goes to show that there is a wide margin of safety, number one [and that] individuals differ.<sup>377</sup>

Therefore, the key issue was not exposure itself. The question was whether or not the workers received damage from the exposure. High doses of external radiation produced easily recognizable symptoms. But low-level effects were questionable.

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<sup>377</sup>United States Atomic Energy Commission, *Operational Accidents and Radiation Exposure Experience, 1943-1964*, (Washington D.C.: U.S. Government Printing Office, 1965), 10-12, NV0015614, Atomic Testing Museum, Las Vegas, Nevada; Interview with Leonard Kreisler, M.D., April 20, 2005, Conducted by Suzanne Becker, 19-20, Nevada Test Site Oral History Project, University of Nevada, Las Vegas.

During the 1950s, scientists started using the term “low-level radiation” to refer to doses of whole-body radiation ranging from 25 to 100 rads. At those levels, there were no observable effects. From the viewpoint of science, it is unclear if low-level effects pose significant health consequences. Certainly, all workers received low doses on a regular basis, sometimes so small that it defied detection. As a result, physicians treated exposures statistically rather than clinically. A worker blasted with high-levels usually exhibited ARS signs immediately. However, a smaller dose may cause leukemia several years later. As the time between exposure and injury increased, the causal link became blurred. Physicians therefore determined if injuries were caused by radiation based on probability. To be safe, in January 1961, the AEC required that all contractors limit worker exposure to 5 rem per year.<sup>378</sup>

While all levels of radiation posed an imminent threat to the workers, company doctors were more concerned with traditional industrial hazards. Dr. Clinton S. Maupin, Radiological Safety Advisor to REECo, felt the maximum permissible radiation exposure level was “exceedingly low.” In fact, he thought the standards were impeding occupational health at the site. Maupin called it “unreasonable and unrealistic” to consider low-level exposures more serious industrial accidents. Indeed, such hazards acquired the most injuries and fatalities throughout the AEC program. From 1943 to 1964, the commission experienced 15,790 injuries, 7,364 of which happened during construction activities. The most common injuries involved dust inhalation, burns, cuts and lacerations, hernias, infections, strains from improper lifting, and fractures.

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<sup>378</sup> J. Samuel Walker, “The Atomic Energy Commission and the Politics of Radiation Protection, 1967-1971, *The History of Science Society, Isis*, Vol. 85, No. 1 (March 1994), 61. See Hacker, *Elements of Controversy*, 272-276, for a complete discussion in radiation exposure versus radiation damage, and the low-level radiation controversy.

Additionally, out of 251 fatalities, the majority occurred in construction and production. Most deaths results from falls, electrocutions, and car accidents. The AEC attributed “lack of proper precautions, too much familiarity with the job, and failure to follow safety precautions” as identifiable causes. Motor vehicle casualties were particularly common. In fact, many workers identified “unsafe driving” as one of the biggest hazards at the NTS. Cars flipped, killing victims with burn and crush wounds, asphyxiation, or explosions. Onsite car accidents were widespread, but the most dramatic ones occurred on a two-lane road connecting the NTS and Las Vegas. Nicknamed the Widowmaker, thousands of workers traveled the road daily in the morning and at night. At first, the road was poorly constructed, with dips that prevented visibility. The workers were fatigued, in a hurry, or had stopped to drink at saloons in Cactus Springs or Indian Springs. They frequently crashed into oncoming traffic or sand embankments. In the early 1960s, the road was widened into a four-lane divided highway, but the accidents continued. By 1964, the Widowmaker had claimed 45 lives.<sup>379</sup>

To safeguard the lives of workers, the NTS outlined an extensive occupational health program. While much of the existing scholarship focuses on negligence in regards to health and safety precautions, the program was actually quite comprehensive.<sup>380</sup> The

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<sup>379</sup> Clinton Maupin to J.E. Reeves, November 15, 1961, Letter, NV0122450, Atomic Testing Museum, Las Vegas, Nevada; “Test Site Worker Dies, June 17, 1958,” Press Release, NV0034267, Atomic Testing Museum, Las Vegas, Nevada; United States Atomic Energy Commission, *Operational Accidents and Radiation Exposure Experience, 1943-1964*, 6-7. For information on the Widowmaker, see appropriate Nevada Test Site Oral History Project interviews, including Interview with James Donald Merlino, 35; and Interview with Leonard Kreisler, 46. “Widowmaker Records 44<sup>th</sup> and 45<sup>th</sup> Victims,” *Review-Journal*, (October 17, 1964), NV0195735, Atomic Testing Museum, Las Vegas, Nevada.

<sup>380</sup> The scholarship began with books written on atomic veterans during the 1980s, including Uhl and Ensign, *GI Guinea Pigs*; Rosenberg, *Atomic Soldiers*; Saffer and Kelly, *Countdown Zero*; Wasserman et. al., *Killing Our Own*; Titus, *Bombs in the Backyard*; Leslie J. Freeman, *Nuclear Witnesses: Insiders Speak Out*, (New York: W.W. Norton, 1981); and Jim Lerager, *In the Shadow of the Cloud: Photographs and Histories of America’s Atomic Veterans*, (Golden, Colorado: Fulcrum, 1988). See also Richard L. Miller, *Under the Cloud: The Decades of Nuclear Testing*, (New York: Free Press, 1986); John Fuller, *The Day We Bombed Utah: America’s Lethal Secret*, (New York: New American Library, 1984); and John May,

AEC established a partnership with the Public Health Service (PHS) to manage offsite radiological safety activities.<sup>381</sup> Additionally, it developed safety protocol to protect employees and the environment. The standards covered physical aspects of health, safety and fire protection, working practices, and radiation exposure. The AEC divided its program into four categories: general safety, and fire, nuclear, and health protection. General safety protected industrial work, such as construction, handling explosives, mining and tunneling, operating motor vehicles, aircrafts, and firearms, and transporting radioactive materials. Likewise, fire protection mandated fire and building codes, and conducted inspections of appliances, equipment, and materials, and nuclear safety involved AEC-owned reactor procedures. Finally, health protection has garnered the most scholarly attention, including occupational medicine, industrial hygiene, environmental sanitation, and radiological safety.<sup>382</sup>

The AEC required contractors to establish an occupational health program based on their nature of work and the Division of Biology and Medicine (DMB) set a guide of safety standards. The occupational health program included:

Emergency medical treatment, ambulance service, and preventive medical services.

Preplacement, periodic, and termination medical examinations.

Employee return to work and work restriction evaluations.

Survey-type psychological evaluations.

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*The Greenpeace Book of the Nuclear Age: The Hidden History, the Human Cost*, (New York: Pantheon Books, 1989).

<sup>381</sup>The objective of the PHS program was to “verify that the radiological situation associated... insured public safety,” to “obtain a complete record of the radioactivity” caused by the tests, to “establish and maintain public confidence” in the preservation of public health, and to “investigate reports of incidents related to radioactivity which could result in pecuniary claims against the Government or create unfavorable and unwarranted public opinion concerning continental tests.” See Understanding Between the U.S. Atomic Energy Commission and Public Health Service of the Department of Health, Education, and Welfare, January 25, 1954 and February 1, 1954, Memorandum, SF-54-373, NV0004597, Atomic Testing Museum, Las Vegas, Nevada.

<sup>382</sup> AEC Historical Manual Chapters, “AEC 0550 Codes for Standards for Health, Safety, and Fire Protection, 08/20/57” and “Operational Safety Standards, 11/08/68,” NV0092176, Atomic Testing Museum, Las Vegas, Nevada.



Health and hygiene education.  
Occupational hygiene, health physics, and sanitation control in all employee occupied areas.  
Maintenance of medical, sanitation, and occupational hygiene records.  
Medical procedures and advice on radiation incidents.<sup>383</sup>

Doctors were prominent members of the occupational health team. Trained in occupational medicine, industrial hygiene, or health physics, they inspected the NTS for health hazards, and recommended preventative and corrective safety measures.

Additionally, the doctors conducted physical examinations. The AEC required three types of examinations: preplacement, periodic, and separation. Like the Union Pacific, Six Companies Inc., and Basic Magnesium Inc., the commission required preemployment examinations to record preexisting conditions, occupational history, and personal and family medical history. The AEC insisted they were “preplacement” examinations, a means to “aid in suitable placement” in a job position. The periodic examinations were similar, but doctors also decided if an employee’s health was “compatible” with the work and if “any ill health” could be attributed to employment. In the event of a termination, doctors conducted separation examinations, especially if employees received significant radiation exposure or injuries. The doctors recorded skin lesions, cataracts, blood dyscrasia, and internal radioisotopes and other toxic materials. Indeed, the preplacement, periodic, and separation examinations aided in maintaining the health of the workers. However, they were also useful to the AEC and contractors in employer liability suits. Consequently, the commission mandated that each contractor maintain “accurate and

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<sup>383</sup> U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved May 2, 1962,” NV0058033, Atomic Testing Museum, Las Vegas, Nevada; U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved October 4, 1971,” NV0096021, Atomic Testing Museum, Las Vegas, Nevada.

complete” medical records, noting it was “highly desirable” that they record “data of exposures of hazardous physical (including radiation) and chemical agents” regularly.<sup>384</sup>

In the event of an injury, the AEC required the contractors to furnish medical care. However, the version at the NTS differed from its predecessors due to significant changes in American medicine and health insurance. Prior to 1950, employers provided health care through company doctors and onsite hospitals in exchange for monthly salary deductions. The plans were hardly comprehensive, only covering occupational-related injuries and diseases. However, at the same time, the concept of third-party health insurance companies gained momentum. Companies like Blue Cross and Blue Shield significantly increased market share during World War II.<sup>385</sup> The partial reason for the companies’ successes were wartime wage restrictions. The War Labor Board had declared that fringe benefits, such as health insurance, did not count as wages. Consequently, employers increased employees benefits and turned to third-party insurance companies. By 1960, approximately 70 percent of full-time employees received third-party health insurance benefits. Additionally, as insurance companies competed to provide the most comprehensive benefits, workers began viewing health insurance as a right and not a privilege. For the first time in American history, any employed person could acquire quality medical care, regardless of personal wealth. Coupled with increased federal spending in medical research, the introduction of third-party insurance companies led to an expansion of the American hospital system,

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<sup>384</sup> U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved May 2, 1962;” “\$3450 in Fees for AEC Doctor Told,” *Los Angeles Times*, (March 13, 1952).

<sup>385</sup> For a complete history of Blue Cross and Blue Shield, see Robert M. Cunningham III and Robert M. Cunningham, Jr., *The Blues: A History of Blue Cross and Blue Shield System*, (DeKalb, Illinois: Northern Illinois Press, 1997).

encouraging advances in medical technology, surgical procedures, and the quality of medical personnel training.<sup>386</sup>

At the NTS, occupational medicine resembled a merging of the old and new system. REECo controlled all aspects of onsite medicine, providing emergency diagnosis and treatment care, physical examinations, and immunizations. For all other services, it offered health insurance with third-party carriers such as Blue Cross. The workers also enjoyed a federal-state partnership, providing worker's compensation for disability or death from radioactive material or industrial injuries.<sup>387</sup> The health plan worked as follows: If a worker got a cold, he went to a Las Vegas doctor covered in his third-party benefits.<sup>388</sup> The AEC dictated that the diagnosis and treatment in non-occupational disorders were "not the responsibilities of an occupational health program." But there were some exceptions. REECo doctors treated minor disorders or prevented the loss of life or limb. Caring for workers on a "preventative basis," they sought to correct ailments that aggravated normal work hazards. All workplace injuries were treated in onsite medic stations, and the health, medicine, and safety building in Mercury, which housed a state-of-the-art hospital subsidized by the federal government. Critically injured workers were transported to Las Vegas or Los Angeles hospitals for further treatment. While onsite medical services changed throughout the years, the program was continuously directed by a "qualified physician (M.D.)" with training in occupational medicine. The

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<sup>386</sup> Jonathan Engel, *Doctors and Reformers: Discussion and Debate over Health Policy*. (Columbia: University of South Carolina Press, 2002), 316-317.

<sup>387</sup> For an example of the compensation for radiation workers, see Requirement Modification RE Workmen's Compensation for Radiation Workers, February 10, 1967, NV0091818; W.B. McCool, Secretary, Memorandum, March 1, 1967, NV0908018; *Atomic Energy Commission Workmen's Compensation Record Keeping for Radiation Workers*, July 18, 1967, NV091817; F.T. Hobbs to Charles F. Eason, August 9, 1967, Memorandum, NV0091815, Atomic Testing Museum, Las Vegas, Nevada.

<sup>388</sup> This practice changed by the 1970s, as Leonard Kreisler established a system that treated not only occupational injuries or diseases, but also everyday ailments to limit time-loss from work. See Interview with Leonard Kreisler, 20-21.

medical director dictated its development, interpretation, and implementation, managed medical units at the NTS, Groom Lake, the Tonopah Test Range, and Las Vegas, and hired doctors, nurses, and paramedics.<sup>389</sup> The staff was usually large, although it ranged considerably based on funding and need. To be considered for employment, training in occupational health was desirable, but not mandatory.<sup>390</sup>

During atmospheric testing, the medical staff provided 24-hour, 7 day a-week physician coverage during each series, which spanned 2 to 5 months. When testing expanded to year-round, underground series in the 1960s, it became harder for REECo to convince doctors to stay nights and weekends. Consequently, it limited coverage to weekdays. The workers did not appreciate the change. After prodding REECo for expanded medical care, it hired more “well-trained first aid men” to treat patients during the nights and weekends. The medics were ultimately the most visible members of the medical staff. Positioned in remote stations to active worksites, they provided immediate medical assistance to injured workers. The medics also received “around the clock” physician advice “via telephone or radio communication” in case of critical emergencies. The medical staff provided health education and counseling to the workers, educating about personal hygiene and health maintenance. The AEC considered health education to go “hand in hand with safety education,” teaching about cleanliness, weight control, nutrition, and mental health. “Experience has shown,” added the commission, “that health

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<sup>389</sup> Otherwise known as Area 51, Groom Lake is a military base located in the northeast corner of the NTS.  
<sup>390</sup> U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved May 2, 1962.” Howard W. Cannon to Bob O’Neil, Memo, November 10, 1964, Howard W. Cannon Papers, 88<sup>th</sup> Congress, Box 20, Folder 231, University of Nevada, Las Vegas Special Collections; U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved May 2, 1962;” Interview with Leonard Kreisler, 20; U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved May 2, 1962.”

education is most effective when the employer demonstrates his sincere and continuing interest in the health of his employees...”<sup>391</sup>

Even though industrial injuries caused the most injuries and fatalities, radiological safety remained the test site’s primary focus. Indeed, continental testing posed unique problems for the AEC, potentially exposing employees and the public to deadly levels of ionizing radiation. Radiation is an energy released from unstable atoms, and is classified as both natural and man-made. External radiation is emitted naturally in the environment from radium, thorium, and other materials. Radioisotopes also exist in water, food, and the air. But the levels are very low, producing little somatic effects. During the 1890s, the discovery of man-made radiation sources, namely the x-ray and radium, began exposing humans to high, dangerous levels.<sup>392</sup> By the 1920s, scientists discovered that radiation caused genetic mutations and radiologists experienced alarmingly high death rates, linking overexposure and mortality. Dr. Marie Curie, a pioneer in the field of radioactivity, had died from aplastic anemia, an illness caused by radiation exposure. By the 1930s, scientists linked radon gas to high cancer rates among Central European miners. When Dr. Shields Warren and his colleagues headed to Nagasaki, there was “hundreds of articles” written on the effects of radiation. However, most provided “qualitative rather than quantitative data.”<sup>393</sup>

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<sup>391</sup> Robert E. Miller to Howard W. Cannon, Letter, October 23, 1970, Howard W. Cannon Papers, 91<sup>st</sup> Congress, Box 28, Folder 348, University of Nevada, Las Vegas Special Collections; U.S. Atomic Energy Commission AEC Manual, “NV Chapter 0528 Occupational Health Program, Vol. 0000 General Administration, Part 0500 Health and Safety, Approved May 2, 1962.”

<sup>392</sup> The discovery of radiation occurred in incredible sequence in the last decade of the nineteenth century. German physicist Wilhelm Conrad Röntgen first discovered X-ray radiation in 1865, with French scientist Antoine Henri Becquerel discovering radioactivity in uranium salts the following year. By 1898, Pierre and Marie Curie discovered that polonium and radium emitted radiation. See J. Samuel Walker, *Permissible Dose: A History of Radiation Protection*, (Berkeley: University of California Press, 2000), 1-28.

<sup>393</sup> Qualitative data deals with descriptions and observations, while quantitative handles numbers and facts. See Ruth R. Harris and Richard G. Hewlett, “The Evolution of Scientific Understanding of the

During the 1920s, the field of radiology grew, as did the hazards. X-ray apparatuses began producing more penetrating types of ionizing radiation. Consequently, safety experts began setting exposure level guidelines. After 1928, the concept of a “permissible dose” emerged. According to Warren, there was a “high degree of probability” that a radiation worker would suffer “no harm” if the exposure did not exceed the permissible dose. During the Manhattan Project, thousands of workers were suddenly vulnerable to unprecedented doses of radiation. Historian Barton Hacker, in *The Dragon’s Tail*, demonstrates that the Manhattan Project anticipated the elevated hazards. In order to protect workers and the public from “undue exposure,” it instituted a comprehensive radiological safety program. But safety was never a priority; the scientists needed to help win the war and field-testing overshadowed it. At Los Alamos, the risk of exposing the southwest to fission particles seemed inconsequential. Testing in the Pacific produced similar results. Adhering to Manhattan Project standards, the Baker test blanketed the Bikini lagoon with radioactivity. It soon became clear that radiological safety needed to become a higher priority.<sup>394</sup>

The development of radiation safety in America’s nuclear program has been covered extensively by Barton Hacker in *Elements of Controversy*.<sup>395</sup> Two terms denoted

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Occupational Hazards of Ionizing Radiation,” June 1983, 1-2, NV067984, Atomic Testing Museum, Las Vegas, Nevada; Shields Warren, *The Pathology of Ionizing Radiation*, (Springfield, Illinois: Charles C. Thomas, 1961), 3-5; Hermann J. Muller, “Artificial Transmutation of the Gene,” *Science*, Vol. LXVI, No. 1699, July 22, 1929, 84-87.

<sup>394</sup> Warren, *The Pathology of Ionizing Radiation*, 10-11; Hacker, *The Dragon’s Tail*, 3-6; Hacker, *Elements of Controversy*, 31.

<sup>395</sup> As the controversy mounted in the 1970s regarding nuclear testing, REECo hired a professional historian, Barton Hacker, to write a “full-scale history of radiation safety in nuclear weapon testing” in 1978. For the first time in history, a historian gained access to classified memorandums, letters, studies, reports, and other documents outlining radiation protection and the AEC. His sought to “set the story straight” and keep his “analysis and criticism restricted.” The result is a comprehensive assessment of radiation protection. The first part of the manuscript became *The Dragon’s Tail*, published in 1987, and the second, *Elements of Controversy*, published in 1993. See Hacker, “Radiation Safety, the AEC, and Nuclear Weapons Testing,” 44-45.

the field of radiation protection. The first, “health physics,” emerged during the Manhattan Project, literally designating the physics section of the Health Division. After the war, it symbolized how the medical profession protected people and the environment from potential radiological hazards. The second, “rad-safe,” was the standard term that described radiological safety organizations. At the NTS, rad-safe handled the radiation protection program. It established safety standards, radiation detection, equipment monitoring, and decontamination plans in the event of radioactive fallout. It also issued safety equipment to workers, such as film badges to measure exposure levels.

Rad-safe evolved significantly throughout the 1950s. At Operation Ranger, the program was assembled in two months, based on Operation Greenhouse’s rad-safe at the Pacific Proving Grounds. Rad-safe management shifted considerably afterwards. During subsequent series, Los Alamos or the military handled its operations. Both faced numerous challenges. It was difficult to obtain firm safety policy due to urgent construction needs; construction workers were instructed to build testing support in close proximity to tests just conducted. While the levels were unsafe, workers needed to fulfill testing requirements. By 1957, REECo assumed control, establishing a full-time health and safety organization to accommodate Operation Plumbbob. To be sure, it was an ambitious endeavor. Plumbbob consisted of 24 nuclear detonations and 6 safety experiments and involved approximately 18,000 DOD personnel partaking in scientific and diagnostic experiments, observation exercises, and tactical maneuvers.<sup>396</sup>

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<sup>396</sup> For a complete history of rad-safe operations from Ranger to Teapot, see Hacker, *Elements of Controversy*, 44-102, 164-169; Seth R. Woodruff, Jr. to Given H. Dugger, Memorandum, January 6, 1953, NV0404118; Rad Safe Control, NV0307267; Seth R. Woodruff, Jr. to Given H. Dugger, Memorandum, January 6, 1953, NV0404118; H.E. Parsons to Los Alamos Scientific Laboratory, Letter, January 10, 1955, NV0121275; Basic Guides for Radiation Protection, February 26, 1954, NV092167; Procedures Governing Health and Safety Practices at Nevada Test Site, December 8, 1952, NV030520; Plumbbob Series Fact Sheet, September 15, 1981, RCC2.950425.007, Atomic Testing Museum, Las Vegas, Nevada.

While some DOD personnel assisted in scientific experiments, most participated in tactical exercises organized by Exercise Desert Rock VII and VIII. At shot Hood, the Marine Corps partook in a helicopter airlift and tactical air support. At shot Smokey, the Army conducted an airlift assault, and at shot Galileo, it tested the psychological reaction to witnessing a nuclear explosion. Rad-safe limited exposure to 5 roentgens for each 6 month period. Of this exposure, no more than 2 roentgens could be immediate radiation. The limit was higher than most NTS workers, which allowed 3 roentgens for a 13-week period, and 5 roentgens for one calendar year. The 50<sup>th</sup> Chemical Platoon supported Desert Rock's rad-safe section, providing materials, equipment, and rad-safe personnel. Before the shots, the soldiers attended orientations on safety procedures, and were issued film badges and protective equipment. During the shots, rad-safe performed surveys, limiting access to contaminated areas and provided decontamination support, removing hot material from personnel and equipment.<sup>397</sup>

At first, the tests went according to plan. On June 24, Priscilla involved large numbers of DOD personnel and an extensive military effects program. By July 5, Hood produced the largest atmospheric test explosion at the NTS, yielding 74 kilotons. Weather delays postponed Smoky until August 31. It performed differently than anticipated, producing a significant amount of fallout on ground zero. Shortly after, rad-safe entered the test area to determine radiation levels. Afterwards, the soldiers performed their exercises. The final test, Galileo, occurred a month later. While Smoky did not expose troops to significant radiation levels, its contaminated the Galileo area with radioactive fallout. Many soldiers, including Paul Cooper, were supposed to participate in Smoky, not Galileo. But scheduling issues and radiation concerns

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<sup>397</sup> Plumbbob Series Fact Sheet.



postponed their participation. The DOD ultimately approved the exercises for Galileo. After watching the explosion, the soldiers entered the trench area and performed the infiltration course test. By the end of Plumbbob, only 50 out of 14,880 soldiers received greater than 5 rem exposure. The rad-safe program appeared to be a success. Nothing suggested the controversy that would unfold two decades later.<sup>398</sup>

### Going Underground

Operation Plumbbob marked the end of the Desert Rock Exercises and the demise of atmospheric testing. During the mid-1950s, public concern over fallout began when radioactive dust sprinkled ranches downwind of the NTS and the Japanese fishing boat *Daigo Fukuryū Maru* in the Pacific. Eventually, an international campaign materialized calling for a comprehensive ban on nuclear testing. By 1959, the United States, Great Britain, and Soviet Union unilaterally halted nuclear testing and began negotiating a comprehensive test ban treaty. But President Dwight Eisenhower cancelled it at the end of the year, declaring that while Americans would refrain from regular testing, “we consider ourselves free to resume nuclear weapons testing.” Still, the NTS remained inactive until the de jure moratorium ended in 1961. After four years of failed negotiations, the parties reached an agreement. Abandoning talks on a comprehensive test ban treaty, they settled on a limited test ban, outlawing atmospheric, underwater, and

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<sup>398</sup> Interview with Elmer Sowder, June 23, 2004, Conducted by Mary Palevsky, 8, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Plumbbob Series Fact Sheet, September 15, 1981, RCC2.950425.007; Exposure of Military Personnel from Nuclear Weapon Test at Nevada Test Site, NV0705753; Analysis of Radiation Exposure for Task Force Warrior Shot Smoky, Exercise Desert Rock VII-VIII, Operation Plumbbob, May 31, 1979, DNA4747F; Advisory Committee Staff to Members of Advisory Committee on Human Radiation Experiments, Memorandum, April 4, 1995, ACH1.000013.046; Monitoring and Warning of Discharging Servicemen On The Long Term Health Effects Of Radiation Exposure, NV0755106, Atomic Testing Museum, Las Vegas, Nevada.

outer space tests. In 1963, the United States, Soviet Union, and Great Britain signed the Limited Test Ban Treaty in Moscow.<sup>399</sup>

The treaty ended atmospheric testing at the NTS, but ushered in a new era of underground testing. While most scholarship on the test site concerns atmospheric testing hazards and downwind radioactive fallout, underground testing was also profoundly dangerous, especially for workers. It fundamentally changed the nature of work, presenting new hazards associated with drilling and mining the test sites. The AEC began discussing the concept of underground detonations in 1946. Initially, it selected the island of Amchitka in the Pacific for the tests, but ultimately deemed the site unsuitable. After the inauguration of testing at the NTS, the topic resurfaced. Dr. Shields Warren, then-director of the DBM, openly objected to underground testing, citing that it was not possible “to disregard a potential long-term inhalation hazard.” The doctor cautioned that underground detonations could create “continually recurring problems of dust contaminated with material of long half-life being blown around by the winds.” Moreover, “the arid character of the region” would “increase this hazard.” Despite his reservations, the AEC authorized the testing of shallowly-buried, underground devices, hoping to use atomic energy for excavation and demolition purposes. In November 1951, the first underground test during Operation Buster-Jangle. By 1955, army engineers tested atomic demolition munition (ADM) underground. The *Chicago Daily Tribune* described the test as “the dirtiest of the series,” producing radioactive dirt that sprinkled

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<sup>399</sup> Numerous scholarship exists on the Limited Test Ban Treaty. See Robert A. Divine, “Early Record on Test Moratoriums,” *Bulletin of the Atomic Scientists*, Vol. 42, No. 5, May 1986 and *Blowing on the Wind: The Nuclear Test Ban Debate, 1954-1960*, (New York: Oxford University Press, 1978); Harold Karan Jacobson and Eric Stein, *Diplomats, Scientists, and Politicians: The United States and the Nuclear Test Ban Negotiations*, (Ann Arbor: University of Michigan Press, 1966); *Public Papers of the Presidents of the United States: Dwight D. Eisenhower, 1958*, (Washington, D.C.: Government Printing Office, 1959).

the test site. With the help of both laboratories, Operation Plumbbob hosted the first underground tests designed to be fully contained. Los Alamos conducted two tests, Pascal-A and Pascal-B, in unstemmed holes in Yucca Flat. Meanwhile, Livermore conducted a third test, Rainier, in the Rainier Mesa. Rainier was the first fully-contained explosion at the NTS, or no fission particles vented into the atmosphere.<sup>400</sup>

The test served as a prototype for all future tests. However, underground testing before the Limited Test Ban Treaty was rarely contained. In 1958, the NTS conducted 9 safety and 4 weapons underground tests during Operation Hardtack II. Out of the 13 tests, only 1 was fully-contained. When year-round underground testing began in 1961, the numbers remained grim, with half of its 113 tests fully contained. After the introduction of tighter safety controls, 1964 statistics showed slight improvements, with 55 percent containment out of the 29 tests. While venting was a safety concern, it was also legally problematic. According to the Test Ban Treaty, underground testing was legal if no radioactive debris was “present outside the territorial limits” of the country it was conducted. The AEC subsequently revised regulations, mandating deeper buried tests. At first, the changes did not fare well. A deep burial did not assure containment. During Operation Niblick, the deeply-buried Pike shot created a fissure in the ground, venting a black cloud of radioactive dust that drifted towards the California-Arizona border. Besides the obvious health concerns, if the radioactivity had reached Mexico, the United States would have violated its treaty. In the end, the crisis was diverted. However, the Pike shot forced the AEC to impose tighter regulations, mandating that

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<sup>400</sup> Dr. Shields Warren, as quoted in Welsome, *Plutonium Files*, 256-257; “7<sup>th</sup> A Blast in Exploded Underground,” *Chicago Daily Tribune*, (March 24, 1955).

firings occur during optimal weather conditions, limiting the spread of radioactive venting.<sup>401</sup>

Pike demonstrated that deeply-buried tunnels or shafts did not guarantee fully-contained underground tests. To provide proper treaty compliance and adequate safety for workers and the public, the NTS improved underground testing safety by the late 1960s. REECo, merged with EG&G since 1967, organized all drilling, mining, and tunneling. After Los Alamos or Livermore acquired funding, it decided between two methods to conduct the test. Vertical shafts were the most common, representing 90 percent of all tests. Assisting in the development of new weapon systems, the shafts housed smaller-yields in Yucca Flat and large-yields, requiring deeper holes, in the Pahute Mesa. Additionally, horizontal tunnels tested radiation and ground shock effects of military weaponry systems in a tunnel complex in the Rainier Mesa.<sup>402</sup>

Both underground test methods followed the same general steps. It took months to over a year to mine the test bed, field the experiments, execute the event, and reenter to collect the experiments. REECo workers often complained that Los Alamos and Livermore instructed them to create “impossible” design scenarios. But, according to mining superintendent John F. Campbell, they always delivered. The workers surveyed, staked, and core-drilled the site, conducting a geophysical, biological, and cultural inspections. After the preliminary steps, they mined or drilled the main experiment drift,

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<sup>401</sup> W.G. Flangas and L.E. Shaffer, “An Application of Nuclear Explosives to Block Caving Mining,” June 2, 1960, Lawrence Radiation Laboratory, Contract No. W-7405-eng-38, UCRL5949, Atomic Testing Museum, Las Vegas, Nevada; Bob Campbell, Ben Diven, John McDonald, Bill Ogle, and Tom Scolman, “Field testing: The Physical Proof of Design Principles,” *Los Alamos Science*, (Winter/Spring, 1983), 177; Hacker, *Elements of Controversy*, 206-207, 231-235; Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Underwater, signed August 5, 1963, Article I, Paragraph I.

<sup>402</sup> U.S. Department of Energy, National Nuclear Security Administration, “Underground Testing at the Nevada Test Site,” Nevada Site Office, Office of Public Affairs, July 2005, DOE/NV-1068, Atomic Testing Museum, Las Vegas, Nevada.

instrument alcoves, and containment plugs. In the tunnels, each event required 4 to 5 thousand feet of tunnel driving. Diesel locomotives pulled mine cars, hauling concrete underground and muck outside. The workers handled engineering and construction as well. They installed structural steel and concrete to create extensive grounding systems, and installed utility power, instrumentation cables, diagnostic and radiation monitoring systems, and shock mounting. On the experiment day, engineers transported an unassembled nuclear device in a pig. Pigs were used as a lead-containment vessel for transporting the devices. When the device reached its destination, rad-safe and industrial hygiene technicians checked for leaks and other safety requirements. Upon approval, the laboratory took the device out of the pig and conducted a diagnostic assembly. Afterwards, it reported its findings to the Containment Panel. If the panel accepted the designs and preliminary tests, the device was ready for detonation. Security operations insured that all nonevent workers were evacuated prior to the test. When the device was armed, rad-safe activated its monitors and aircrafts to track potential venting activity. The test controller then detonated the device remotely from the control room after a weatherman determined the wind direction and fallout patterns would not threaten offsite populations. Following the detonation, a reentry team, comprised of miners, laboratory technicians, and rad-safe personnel, check for appropriate ventilation and opening doors to enter the experiment area. Once safety was established, the workers continued according to the event requirements. They recovered experiment instrumentation, reentered the drifts to permit visual examination of ground zero, and occasionally mined back to the detonation site.<sup>403</sup>

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<sup>403</sup> Interview with John F. Campbell, January 31, 2006, 3-8; Interview with Leonard Kreisler, 23-24; *A Profile: Reynolds Electrical and Engineering Co. Inc.*, 4-9; Campbell, Diven, McDonald, Ogle, and

REECo drew an eclectic workforce to support underground testing. After the test location was chosen, it submitted work lists to local labor unions. After word spread among the transient mining and construction community, REECo hired miners, drillers, and other support workers. The miners were a rough group that tramped all over the world. “They had a circuit,” John Campbell recalled, traveling from water projects and mines in Bakersfield, California and Ely, Nevada, to the Coeur d’Alene District and Butte, Montana. At first snowfall, they headed to Arizona, New Mexico, and other warm weather locations. Campbell commented that most workers were single and did not have a “real social life” because they had the mentality: “I don’t know if I’m going to live tomorrow.” Many miners had been in the business for a long time. In fact, several were tunnel workers at Hoover Dam. After gaining employment, the work was intense and time-consuming. While the majority lived in a 600-bed camp established in Area 12, some commuted on the Widowmaker everyday. Early conditions in the Area 12 camp were rudimentary. One worker described an “atmosphere of discontent” among the men in 1962. While they were aware of the “vital and important work for the safety of the country,” the living conditions made it “difficult to be patriotic.” The worker complained that 4 adult men shared sleeping trailers, which had inadequate sanitary facilities. The nearest entertainment area was in Las Vegas, leading to “perilous driving” that was especially “dangerous if the men have spent even two our three hours in a bar.” There were also only two phones in the entire area, and they were often out of order. Food strikes were also threatened because of “outrageous prices (5 cents for a pat of butter)” and quantity issues. The problem was eventually resolved as the underground testing program intensified. With the perceived threat of fallout diminishing throughout the

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Scolman, “Field testing: The Physical Proof of Design Principles,” 164-179.

1960s, Area 12 eventually began providing more permanent living quarters with better amenities.<sup>404</sup>

Constructing underground tests presented new occupational hazards to workers at the NTS. But most miners considered the risk a natural part of their job and felt the danger was worth it because they were safeguarding America's security from Communist forces. Other than leaving work dirty everyday, they never worried about the heightened risk of their job. Campbell noted that if workers started "dying at once *en masse*" that would have "created panic." However, with only sporadic reports of cancer or cardiovascular disease cases, they carried out their work normally. Moreover, most enjoyed the thrill of manufacturing an underground test. A self-proscribed "adrenalin junkie," the tunnels gave Campbell his "fix," especially when handling big equipment and dynamite. Still, the conditions were dangerous. During the summer, very hot temperatures sometimes reached over 120 degrees. Since the tunnels and shafts were located 2,000 feet under the water table, the workers were threatened with water inflows. With very limited space, the workers could not apply standard safety procedures. Consequently, they invented new techniques, including communication equipment, and devices for filtering and cooling breathing air, to better accommodate the unique conditions of underground testing.<sup>405</sup>

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<sup>404</sup> Interview with John F. Campbell, July 23, 2004, Conducted by Robert Nickel, 14, 39, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Interview with John F. Campbell, January 14, 2005, Conducted by Mary Palevsky, 13, 58-59, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Interview with William Flangas; Interview with William Beam, January 20, 2005, Conducted by Mary Palevsky, 21-22, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Hacker, *Elements of Controversy*, 250; Harry Adams to Howard Cannon, Letter, March 19, 1962, Howard W. Cannon Papers, 87<sup>th</sup> Congress, Box 12, Folder 179, University of Nevada, Las Vegas Special Collections; Workmen Area 12 Nevada Test Site to Howard Cannon, Telegram, January 15, 1962, Howard W. Cannon Papers, 87<sup>th</sup> Congress, Box 12, Folder 179, University of Nevada, Las Vegas Special Collections.

<sup>405</sup> *A Profile: Reynolds Electrical and Engineering Co. Inc.*, 4-9.

But accidents were common. William Beam, a safety superintendent, saw “lots of bumps and back strains.” The indoor drilling and mining equipment created noise pollution. Ear protection, according to Beam, was the hardest to enforce, as many miners refused to wear earplugs. This contributed to cases of temporary or permanent hearing loss. Beam described the most dangerous job as drilling. They experienced the most fatalities and accidents, maneuvering large equipment underground. Miners were in close second. Once, a man lacerated his liver on a drill rig. Rigs often overturned and workers fell from derrick platforms or down the shaft as well.<sup>406</sup>

Environmental exposures were also prevalent. However, Campbell considered the conditions improved from the uranium, copper, and metal industry. The shafts and tunnels exposed workers to diesel and blasting smoke, chemicals (epoxies, silicone, exotic chemical hardeners), dust, asbestos, and radiation. Workers wore safety clothing, but regularly breathed contaminated air. Concrete dust accumulated on their noses as they poured concrete and mined. Marv Swena, a miner, remembered that “it was so god-danged dusty in there, you had to pick your nose with a nail.” Working alongside radiation also posed a significant risk. External radiation exposure was certainly a threat, but radionuclides were highly concentrated underground. During pre and post-shot drilling, workers regularly breathed tritium and radioiodine. In 1965, radioiodine escaped from an abandonment valve. While engaging in post-shot drilling, 2 received an estimated thyroid exposure of 31 and 27 rads, and 4 others reported smaller varying doses. Despite these conditions, Dr. Leonard Kreisler thought the tunnels were relatively

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<sup>406</sup> Interview with William Beam, 24-25; Worker Killed, November 14, 1968, Press Release, NV0325062, Atomic Testing Museum, Las Vegas, Nevada; “Operational Accidents and Radiation Exposure Experience Within the United States Atomic Energy Commission, 1943-1975,” NV0001783, Atomic Testing Museum, Las Vegas, Nevada; Interview with Leonard Kreisler, 35-36.



safe. During his tenure as medical director of REECo, he conducted a health track data of the miners. In comparison to the state of Nevada, he found no difference in the incidence of diseases, especially cancer and cardiovascular disease. In fact, Kreisler felt the “tunnels were cleaner than most of the casinos downtown.” Still, Campbell and the other miners believed “the cumulative dosage” affected them. While the conditions may have not directly killed anyone, it may have contributed to future ailments.<sup>407</sup>

As a new industry, accidents were fairly common during the underground testing era. Kreisler attributed most of accidents to “some workers [not listening] very well.” In 1964, the frequency rate of disabling injuries was 9.65 per million man hours worked. But the new safety procedures, enacted throughout the 1960s, eventually produced a safer workplace. By 1968, REECo had reduced the rate to 1.63, a drop from 3.15 in 1967. William Beam regarded 1967 to 1993 as “the best years of the test site” because “everybody worked hard” and “followed safety guidelines.” Kreisler agreed. The doctor declared the NTS “the safest place in the world,” with an accident rate “probably lowest in the industry.” Like atmospheric testing, REECo outlined a comprehensive occupational health program for underground testing, composed of radiation monitoring, industrial hygiene, and air and water sampling. It staffed industrial safety and safety training departments to handle everyday mining, drilling, and construction safety. The departments advised, inspected, recommended, and investigated, and offered safety training classes. In the Area 12 camp cafeteria, Beam taught mine rescue and first aid training, and blaster certification for handling explosives. All courses had to be renewed

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<sup>407</sup> “A Summary of Industrial Accidents in USAEC Facilities,” 1965-1966, 17, NV0704455, Atomic Testing Museum, Las Vegas, Nevada; Interview with Leonard Kreisler, 9-10; Interview with John F. Campbell, July 23, 2004, 19-20.

periodically. While the safety departments were not involved in the actual test, mining inspectors interfaced with rad-safe and industrial hygiene on the tunnel reentries.<sup>408</sup>

The medical department worked alongside all the safety departments. Dr. Savino W. Cavender, a REECo consultant and interim medical director from 1967-1973, noted that his personnel worked “very closely” with the industrial hygienists and radiological science department. “Throughout my years as a doctor,” Cavender recalled, he learned “if we can prevent injury or disease, it [was] a lot easier and more profitable to prevent than to have to treat.” Since he worked as a miner in undergraduate school, Cavender knew what the job entailed. The environment was “quite dusty” and workers were “exposed to a number of potential agents.” He also recognized that some men had worked as miners for decades, and therefore had been exposed to chemical solvents, hydrocarbons, and combustion residues for long periods of time. Cavender was a reckless doctor. In the event of an accident, he often left his film badge in the lunchroom because he “didn’t want to be taken off the job” if radiation levels exceeded the allowable dose. This was a common practice among all workers, not only the medical personnel. By the 1970s, REECo cracked down on the system, and all badges were collected on-time and processed. As with most employers, the company also discouraged time-lost accidents. Consequently, the medical staff strove to return patients back to work quickly. Of course, according to Leonard Kreisler, if a patient was “laying in the hospital with his

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<sup>408</sup> *NTS News*, Nevada Test Site, Mercury, Nevada, Vol. VIII, No. 12, June 19, 1964, Howard W. Cannon Papers, 88<sup>th</sup> Congress, Box 20, Folder 231, University of Nevada, Las Vegas Special Collections; Robert D. O’Neill to Howard Cannon, March 3, 1969, Letter, Howard W. Cannon Papers, 88<sup>th</sup> Congress, Box 20, Folder 231, University of Nevada, Las Vegas Special Collections; *NTS News*, Nevada Test Site, Mercury, Nevada, Vol. VIII, No. 12, June 19, 1964, Howard W. Cannon Papers, 88<sup>th</sup> Congress, Box 20, Folder 231, University of Nevada, Las Vegas Special Collections; Interview with Leonard Kreisler, 35-36; Interview with William Beam, 11-12; *NTS News*, Nevada Test Site, Mercury, Nevada, Vol. XII, No. 9, May 2, 1969, Howard W. Cannon Papers, 91<sup>st</sup> Congress, Box 28, Folder 338, University of Nevada, Las Vegas Special Collections.

liver lacerated,” the doctors did not clear him for work. But if a worker “came in with a broken arm,” he regularly “put a cast on it [and] sent him back to work.” Kreisler subscribed to the philosophy of an employee’s right to work. If he could “engage in meaningful work,” the doctor cleared him. He explained that workers’ compensation was compensation was a fraction of their salaries, and it was unfair to keep a man from doing his job.<sup>409</sup>

To diagnose and treat patients, the doctors had to get creative. Nuclear testing was a relatively new line of work, and associated diseases did not have a clear treatment plan. Testing underground only complicated matters. For instance, mining supervisor William Flangas recounted a situation in 1959. While toiling underground, he and nine miners got into a “tritium situation.” Tritium is an active isotope of hydrogen. It is a low-energy beta emitter and not dangerous externally. But tritium is a hazard if inhaled, ingested, or absorbed in the skin. While it occurs naturally in the environment, atmospheric and testing disburged qualities throughout the NTS. By the late 1950s, tritium had contaminated the test site’s underlying soil and groundwater. Underground testing aggregated the problem. When thermonuclear devices detonate in confined spaces like tunnels and shafts, gaseous and water-based tritium pass the permissible dose. The isotope never posed a significant threat to the public. It does not last long in the body, and flushes out within 10 days. However, regularly breathing large quantities underground posed serious health problems. Flangas’ “tritium situation” occurred after atmospheric conditions bled tritium into the tunnel, exposing miners to “a big dosage of it.” Since the exposure was a short-term and high dose, the effects could be limited if

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<sup>409</sup> *Roberts et al. vs. United States of America*, Civil LV 76-259 RDF, Reporter’s Transcript of Court Trial, 3867-27-3867-28, Baneberry Collection, Box 4, Folder 3, University of Nevada, Las Vegas Special Collections; Interview with Leonard Kreisler, 35-36.

they purged the isotope from their bodies. When rad-safe discovered the exposure, medical personnel began to treat them.

However, they ran into a problem. Tritium was a new material and treatment still undefined. Los Alamos and the other laboratories had conducted studies on animals and humans during the 1950s to understand “the routes or uptake and retention in the body.” But it was still unclear how to swiftly remove the material. Consequently, the laboratories began searching for a cure. In the meantime, the miners tried to flush it out by drinking large amounts of water, tea, coffee, and cola. But nothing worked. Two days later, the health physicists decided to recommend beer as a treatment. The theory was based upon alcohol increasing the rate of urine, which washed tritium out of the body. Human beings could also drink more beer than any other liquid because of the malt action. After learning the treatment plan, Flangas returned to his coworkers and instructed them to drink beer. They figured he had “lost it.” The men camped out in Area 12 and drank large amounts of beer for several days. Rad-safe acquired urinalysis samples every few hours, recording their tritium levels. The treatment worked. With the exception of one miner, they reached a tolerable dose within several days. However, one man refused to drink alcohol based on religious beliefs. Several months later, he still had traces in his system. In the early 1960s, beer continued to be the treatment of choice for tritium exposure and monitors regularly screened tritium levels in urinalysis. To limit gamma exposure, rad-safe reassigned miners to “clean” tunnels, free of gamma radiation. While it limited gamma exposure, the workers inhaled tritium from previous tests after accidentally breaking ground in adjoining tunnels. In response, rad-safe created a monitor

that recorded air concentrations of the isotope. The new technique proved very useful and subsequently limited tritium exposures from then on.<sup>410</sup>

By the early 1970s, it appeared that underground testing had achieved the goals of the Limited Test Ban Treaty. While minor issues existed, public concern over radioactive fallout hazards had ceased. From a public relations standpoint, the NTS safely conducted nuclear tests. In reality, most tests vented, but posed limited health risks to workers and the public. However, a byproduct of the safer conditions was an erosion of occupational health. Safety procedures had become routine. No major accidents had occurred since atmospheric testing. While rad-safe regularly dealt with crisis-type situations during the 1950s, its predecessors never experienced a major disaster. The NTS had seemingly perfected underground testing, and it appeared that observing basic safety requirements guaranteed a successful test.

Under these circumstances, the NTS began Operation Emery in 1970. As with other test series, rad-safe limited workers to 3 rem per quarter, with a maximum of 5 rem a year. The Livermore Laboratory planned a number of tests, including Baneberry. Geologist Richard D. McArthur selected the southwest corner of Area 8 for Baneberry's shaft hole, U8d. He predicted the location was 2,200 feet northwest of the nearest fault line, discovered during the Discus Thrower event in 1966.<sup>411</sup> REECo began drilling in October 1970, under the engineering supervision of Fenix and Scisson Inc. By November 14, it finished the 86-inch diameter hole, which stretched 980-feet

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<sup>410</sup> Interview with William Flangas, 44-48; Human Studies Project Team Fact Sheet, January 10, 1994, NV0701314, Atomic Testing Museum, Las Vegas, Nevada.

<sup>411</sup> In 1966, the NTS embarked on a major exploratory program in Area 8, drilling thirteen holes. One of the holes housed the Discus Thrower test, which detonated on May 27, 1966. The device created a scarp northwest for ground zero about 1,200 feet long due to a fault line, later named Discus Thrower fault. Although no venting occurred, an investigation revealed that the test had a high probability of venting. See Duckworth, *Baneberry: A Nuclear Disaster*, 8.

underground, and began an extensive cementing program. But the job did not run smoothly. REECo had to use large quantities of water to remove displaced dirt and rock, and clean drilling equipment. The company did not know it yet, but it had drilled U8d on top of a fault line. The excess water ultimately eroded the hole, causing breaks in the cement walls and depositing 100 feet of saturated clay. Due to the water use and other issues, the construction cost of U8d ballooned to \$586,564, five times its original budget.<sup>412</sup>

Despite the various issues, REECo finished the shaft and Livermore scheduled the test for Friday, December 18. The NTS was bustling with activity during the week of the test, conducting three separate tests. During the proceeding tests, safety procedures mandated the evacuation of Area 12. But Baneberry proceeded differently. Since the previous tests ran smoothly, rad-safe decided not to evacuate approximately 900 employees in the camp, situated 5 miles from the detonation point. During the early morning of December 18, most were reporting for work in the tunnels or awaiting permission to enter the Area 2 construction yard or other locations. At the same time, Wackenhut security guards and rad-safe monitors manned stations seven miles from the test. When Livermore assembled the device, its most experienced scientists were not there, supervising it remotely from Livermore and Las Vegas. Like previous tests, rad-safe positioned monitors and television cameras, and scheduled a helicopter to take aerial photographs and aircrafts for cloud sampling. They also positioned remote camera

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<sup>412</sup> Based on past experience at the NTS, shots were routinely conducted under the water table, even at 100 percent saturation of water content. Additionally, evidence revealed that under water shots in the Pacific contained the nuclear particles. Therefore, the REECo and the laboratories believed that water saturation was not important. See Summary Discussion of Test Series Applicable to Nevada Test Site and the Pacific, 3, NV0705726, Atomic Testing Museum, Las Vegas, Nevada; *Baneberry: A Nuclear Disaster*, 7-10; *Roberts et al. vs. United States of America*, 55-60, 75-78, Box 1, Folder 1.

stations at the trailer park 60 feet ground zero. The Baneberry test detonated at 7:30 am. During the explosion, Harley Roberts, a Wackenhut security guard, had arrived for his shift, relieving the night guard, Jack Cupples. Both men felt the vibrations of Baneberry, and watched a black cloud of dust swirl from the desert. At the same time, John Campbell was carpooling to work. Driving through the test site, he looked up “just in time” to see Baneberry, describing it as “the desert floor just kind of bubbled up and then *pshooo*.” Only five miles from ground zero, he “could see things flying through the air and it just kept going.”<sup>413</sup>

Three minutes later, the chaos began. The excess water had created a clay formation in the shaft. After its detonation, the device blasted through the clay and triggered a fault line, later named the Baneberry fault. The detonation dramatically shifted the earth, spewing molten rock and ash through a fissure measuring 315 feet. Radioactive gas burst 8,000 feet in the air and continued venting over the next 24 hours. Based on weather forecasts, rad-safe had determined that radioactive fallout would occur in the south and southeast to Area 3, and the north and northeast to Area 51. But after the detonation, the wind unexpectedly shifted, carrying low-level radiation from the base of the cloud towards Area 12. By 8:05 am, rad-safe determined that Area 12 fell within the fallout zone, and the Test Manager issued evacuation orders.<sup>414</sup>

As Roberts and Cupples watched the radioactive cloud, they received orders to evacuate Area 12. When they arrived, it was encased in a dark grey fog. Cupples walked into the first row of trailers, saw himself in the mirror, and did a double take. “My entire

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<sup>413</sup> Interview with John Campbell, July 23, 2004, 34-35. Duckworth, *Baneberry: A Nuclear Disaster*, 3-4; *Roberts et al. vs. United States of America*, Box 1, Folder 1, 60-70, 75.

<sup>414</sup> *Roberts et al. vs. United States of America*, Box 1, Folder 1, 95-97; and Hacker, *Elements of Controversy*, 248-249.

face was white,” he recalled. “It was in my hair and my lips were all clogged up.” With minimal rad-safe training, the guards entered without protective suits or masks. Working at the NTS for 15 years, Cupples first instinct was: “My God... I’m breathing this stuff.” He grabbed a towel and told his coworkers to “put something over their faces.” The evacuation took about an hour. But instead of going to a decontamination station, Roberts received orders to go to the Area 20 guard station. Stopping in Area 17, a rad-safe monitor commented: “You’re hot as hell. Get out of here.” Despite the warning, Roberts followed his orders, continuing to Area 20. While driving a radioactive truck and wearing contaminated clothing, he received an exposures of 2 rads/hour. Roberts continued working for 9 hours. By 5:00 pm, a rad-safe monitor insisted on relieving him, reporting he had received 200 milli-roentgen/hour, 30 inches from his chest. He ordered Roberts to decontaminate.

Meanwhile, Cupples and the evacuees reported to a rad-safe building, CP-2, located at the Control Point. Idle since atmospheric testing, the decontamination showers’ hot water heater was broken. Therefore, the workers had to take cold showers for over 30 minutes to scrub off the radioactivity. Afterwards, they were transported to the Public Health Service’s Radiological Health Building in Las Vegas for whole-body radiation and thyroid counts. Following his shift, Roberts went to CP-2 and took a cold decontamination shower. Rad-safe gave him a pair of gloves to cover his hands, which read 25 milli-roentgen. Out of all the workers, Roberts received the highest dose of whole-body radiation. Dr. Shields Warren later calculated the number was at least 15 rads. He never got whole-body or thyroid counts at the Radiological Health Building. In



fact, the AEC did not treat him until he checked into Oak Ridge Hospital on August 16, 1973, following the onset of preleukemia.<sup>415</sup>

To limit public concern, the AEC issued a statement that workers were “in no danger of radiation sickness.” Indeed, there were no cases of ARS, but plenty received low-level radiation exposure. Out of 900 personnel in Area 12 and those assisting in the evacuation, rad-safe detected 86 contaminations. Rad-safe technician Robert Friedrichs participated in the monitoring and decontamination process. Knowing it was a “once in a lifetime event,” he asserted that rad-safe got “accurate information on the level of their exposures.” It monitored 475 vehicles, and found that 413 were contaminated and ultimately impounded 33. Since Baneberry was close to the holidays, rad-safe also confiscated Christmas presents that had been stored the cars. It ultimately determined that 106 workers had radioactive clothing and 86 required showers. After monitoring, 68 needed additional decontamination and direct measurement of thyroid radioactivity in Mercury. Of those, 18 were transported to the Radiological Health Building for whole-body counts. To study offsite fallout, the Southwestern Radiological Laboratory handled rad-safe under the auspices of the Environmental Protection Agency (EPA). An evaluation of external gamma radiation revealed higher than normal radiostrontium, plutonium, and tritium levels in snow samples, air filters, and milk. However, the highest estimated doses were within the radiation protection standards. According to the AEC Chairman Glen Seaborg, no “health hazards resulted from the radioactivity” at Baneberry

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<sup>415</sup> Mary Manning, “Baneberry Decision Could Blast Legal Precedent,” *Las Vegas Sun*, (January 31, 1982); Duckworth, *Baneberry: A Nuclear Disaster*, 4-6; *Independent Guard Association of Nevada, Dorothy Roberts et al. v. Reynolds Electric and Engineering Company*, Deposition of Dr. Shields Warren, June 9, 1975, NV0705909, Atomic Testing Museum, Las Vegas, Nevada; Walter Pincus, “Rechecking 44 Exposed in '57 Urged,” *The Washington Post*, (August 11, 1977).

and the data did not “justify special field studies or the need for instituting protective actions.”<sup>416</sup>

After evaluating the film badges, thyroid and whole-body counts, and urine samples, rad-safe determined that no worker received external or internal doses exceeding the 3 rem/quarter and 5 rem/year limit. Moreover, it concluded that thyroid counts did not surpass 10 rem/quarter and 30/rem per year. According to Hacker, “prompt action seemed to have met the crisis.” But Dr. Shields Warren evaluated the monitoring and radiation procedures differently. “I’m sorry to say, I would have to call it bad,” testified the doctor in 1975, “judging by [Harley Robert’s] detailed counts.” The rad-safe monitors confronted various problems carrying out the evacuation. While evaluating the rad-safe notes, Warren noticed their apparatus, measuring devices, and uniforms were not “where they were supposed to be.” Additionally, “evacuation was not ordered adequately soon” and the monitors did “not agree with each other [about] readings.” A veteran in the radiology field, Warren knew the difficulties of crisis management. But had he been in charge, the doctor “would have raised hell with whoever was responsible for this.”<sup>417</sup>

### The Fallout Over Testing

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<sup>416</sup> *Roberts et al. vs. United States of America*, Box 1, Folder 1, 95-97; Interview with John Campbell, July 23, 2004, 35; Manning, “Baneberry Decision Could Blast Legal Precedent;” Interview with Robert Friedrichs, February 25, 2005, Conducted by Mary Palevsky, 6-8, Nevada Test Site Oral History Project, University of Nevada, Las Vegas; Summary Discussion of Test Series Applicable to Nevada Test Site and the Pacific, Topic A-5, 1-2; Hacker, *Elements of Controversy*, 248-249; Western Laboratory Research Laboratory, Environmental Protection Agency, “Final Report of Off-Site Surveillance for the Baneberry Event,” SWRHL-107r, Atomic Testing Museum, Las Vegas, Nevada.

<sup>417</sup> Summary Discussion of Test Series Applicable to Nevada Test Site and the Pacific, Topic A-5, 2; Hacker, *Elements of Controversy*, 249; *Independent Guard Association of Nevada, Local 1 as a class, Dorothy Roberts et. al, versus Reynolds Electric and Engineering Company*, Deposition of Dr. Shields Warren, 42-43.

After Baneberry, Robert Friedrichs described NTS operations as “hectic.” All testing ceased and the Area 12 camp closed. Baneberry had exposed safety lapses that developed during the underground testing program. While fallout had ceased, the NTS eased its occupational health protocol, allowing repair shops, field warehouses, and camp sites like Area 12 to be positioned close to the tests. While atmospheric testing conditions prohibited support facilities in forward areas, underground testing promised improved safety. Placing workers closer to the sites saved the AEC money as well. But Baneberry forced a reevaluation of policy. When testing resumed in June 1971, the Test Manager mandated that all personnel evacuate areas north of the Control Point during events. The AEC also founded the Containment Evaluation Panel, which reviewed plans prior to approving the event. According to Friedrichs, the panel provided a “far more sophisticated level of review” than its predecessors. After determining the device yield, it chose a location that ensured the best overburden for containment. Overburden was the quantity of soil above ground zero, usually between 700 and 1,000 feet.<sup>418</sup> The Containment Evaluation Panel created a synopsis of worst case scenarios and determined if the device could be reasonably contained. Baneberry ultimately forced the adoption of a new motto at the NTS: “Economy of operations is subject to overriding consideration of safety.” Friedrichs felt the changes assured that it would “never had a real serious leak again.” But Baneberry was “a shocking way to find out that things were not as straightforward as people thought.” The new occupational health standards transformed the NTS workplace and consistently contained underground tests thereafter. From 1961

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<sup>418</sup> Overburden is one of the many terms that miners used to describe their work. They invented most phrases themselves because there was no official name for what they did and how they did it. See Interview with John F. Campbell, January 31, 2006, Conducted by Charlie Deitrich, 3, Nevada Test Site Oral History Project, University of Nevada, Las Vegas.

to 1970, 122 tests had vented radioactivity. Throughout the 1970s, only 3 tests were not fully-contained.<sup>419</sup>

As occupational health improved at the NTS, its public image took a major hit. Baneberry sparked renewed interest in past rad-safe protocol, attracting intense criticism by the late 1970s. Hacker termed three general waves of testing concern in the United States.<sup>420</sup> The first centered around fallout during the 1950s and faded after the Limited Test Ban Treaty in 1963. While “safe” underground testing quelled the public debate, scientists continued to research the threats of low-level radiation. During the 1960s, nuclear power expanded, prompting a new debate focusing on low-level radiation and radioiodine threats. But mainstream science continued to agree that low-level effects posed limited health risks. The 1972 BEIR and UNSCEAR reports endorsed this view.<sup>421</sup> Meanwhile, the AEC split into two agencies in 1975. The Nuclear Regulatory Commission (NRC) focused on safety and regulation, and the Energy Research and

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<sup>419</sup> Interview with Robert Friedrichs, 6-8; Hacker, *Elements of Controversy*, 250-251.

<sup>420</sup> For literature on the public debate, see Hacker, *Elements of Controversy*, which discusses the scientific, technical, and organizational bases of nuclear testing controversy. Divine, *Blowing in the Wind* focuses on the public debate of testing; and Richard G. Hawlett and Jack M. Holl, *Atoms for Peace and War, 1953-1961: Eisenhower and the Atomic Energy Commission*, (Berkeley: University of California Press, 1989) reveals what happened during the Eisenhower administration. See also Richard G. Hewlett, “Nuclear Weapon Testing and Studies Related to Health Effects: A Historical Survey, in Interagency Radiation Research Committee, *Considerations of Three Proposals to Conduct Research on Possible Health Effects of Radiation from Nuclear Weapons Testing in Arizona, Nevada, and Utah; and, Nuclear Weapon Testing and Studies Related to Health Effects*, National Institutes of Health Publication no. 81-507 (Washington: October 1980), 24-101; and Walker, “The Controversy over Radiation Safety: A Historical Overview.”

<sup>421</sup> See the National Academy of Sciences-National Research Council Advisory Committee on the Biological Effects of Ionizing Radiation [BEIR], *The Effects on Populations of Exposure to Low Levels of Ionizing Radiation* (Washington, 1972); and United Nations Scientific Committee on the Effects of Atomic Radiation [UNSCEAR], *Ionizing Radiation Levels and Effects* (Geneva: United Nations, 1972). Not everyone agreed with the findings, most notably Harold A. Knapp, Jr., *Iodine-131 in Fresh Milk and Human Thyroids Following a Single Deposition of Nuclear Test Fallout*, Report TID-19266 (Washington: Atomic Energy Commission, 1963); Arthur R. Tamplin and John W. Gofman, “Population Control” through Nuclear Pollution (Chicago: Nelson-Hall, 1970; Ernest J. Sternglass, *Secret Fallout: Low Level Radiation from Hiroshima to Three-Mile Island*, (New York: McGraw-Hill, 1981). Hacker also provides a thorough discussion in *Elements of Controversy*. See “From Test Moratorium to Test Ban,” especially “Radiation Matters,” and “Testing Underground,” and “The Issue of Low-Level Radiation,” 211-226, 236-254.

Development Administration (ERDA) addressed development and promotion. Three years later, ERDA became the Department of Energy (DOE).<sup>422</sup>

The third wave of controversy began in the late 1970s, as the scientific community did not collectively agree that low-level radiation posed little threat. Beginning in 1970, low-level effects inspired historical studies on atmospheric testing. While the data was flawed, Harold Knapp, John Gofman, Arthur Tamplin, and Ernest Sternglass sparked renewed interest in the subject.<sup>423</sup> By the mid-1970s, Samuel Milham, Thomas Mancuso, Alice Stewart, and George Kneale began investigating the long-term health of Hanford facility workers. While working for the Washington State Public Health Service, Milham produced the first study. His paper argued that excessive cancer fatalities occurred among the workers due to low-level radiation. When the AEC learned of his findings, it requested that Mancuso publically refute them. A University of Pittsburgh epidemiologist, Mancuso had contracted with the AEC since 1964, researching the lives and deaths of 35,000 current and former Hanford workers. After declining the request, the AEC terminated his contract. A year later, Mancuso derived a similar conclusion to Milham. Hanford workers who received continued low-level exposures exhibited a 6 percent greater chance of developing cancer than the general public. By

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<sup>422</sup> Hacker, "Radiation Safety, the AEC, and Nuclear Weapons Testing," 32; Elizabeth S. Rolph, *Nuclear Power and Public Safety: A Study in Regulation* (Lexington, MA: Lexington Books, 1979); George T. Mazuzan and J. Samuel Walker, *Controlling the Atom: The Beginnings of Nuclear Regulation, 1946-1962* (Berkeley: University of California Press, 1984); and Llewellyn King, "The AEC is Dead; Long Live the AEC," *New Scientist* 64 (October 31, 1974), 328-329.

<sup>423</sup> See Knapp, *Iodine-131 in Fresh Milk and Human Thyroids Following a Single Deposition of Nuclear Test Fallout*; Tamplin and Gofman, "Population Control" through Nuclear Pollution; and Sternglass, *Secret Fallout*. For a critique Tamplin, Gofman, and Sternglass, see Robert W. Holcomb, "Radiation Risk: A Scientific Problem?" *Science* 167 (February 6, 1970), 853-855; Philip M. Boffey, "Ernest J. Sternglass: Controversial Prophet of Doom," *Science* 166, (October 10, 1969); and R.H. Romer, "Resource Letter ERPEE-1 on Energy: Resources, Production, and Environmental Effects," *American Journal of Physics* 40 (1972), 805-829, especially "The Low Level Effects Controversy."

December 1977, Mancuso and his colleagues, Stewart and Kneale, published their findings in the journal *Health Physics*.<sup>424</sup>

The Mancuso study rattled the scientific community, but it failed to arouse significant public concern. The controversy did not revive until allegations of negligence emerged among atomic veterans and NTS workers. In 1975, the Veterans Hospital in Salt Lake City admitted Paul Cooper, a retired Army sergeant. Cooper had acute myelogenous leukemia. Cooper participated in the Exercise Desert Rock VII and VIII during Operation Plumbbob. After witnessing Galileo, he completed the Smoky exercise course, which was contaminated with low-level radiation. According to Army records, 2,232 men participated in Smoky. The causal relationship between low-level radiation and cancer attracted Dr. Thomas Cosgriff, an epidemiologist. Since leukemia was associated with radiation exposure, the doctor wondered if there was a link. He contacted Dr. Glyn Caldwell, chief of the Cancer and Birth Defects Division of Epidemiology at the Centers of Disease Control, prompted an investigation. By May 1977, Caldwell identified 3 cases of leukemia among Smoky veterans, a higher rate than expected for a comparable group.

At the same time, the Veterans Administration denied Cooper's claim that leukemia was a service-connected disability. The ailing veteran took his case to the media, a move that afforded him considerable attention. The dangers of atomic testing

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<sup>424</sup> Walter Pincus, "Battle on Radiation Standards, Ever Bitter, Is Now Expanding," *The Washington Post*, (January 16, 1978); Hacker, "Radiation Safety, the AEC, and Nuclear Testing," 33-34; Hacker, *Elements of Controversy*, 276; Thomas A. Mancuso, Alice M. Stewart, and George W. Kneale, "Radiation Exposures of Hanford Workers Dying from Cancer and Other Causes," *Health Physics* 33 (1977), 369-385; Thomas Najarian and Theodore Colton, "Mortality from Leukemia and Cancer in Shipyard Nuclear Workers," *The Lancet* (June 1978), 1018-1020; Barkev S. Sanders, "Low-Level radiation and Cancer Deaths," *Health Physics* 34 (1978), 521-538; Terence W. Anderson, "Radiation Exposures Among Hanford Workers: A Critique of the Mancuso, Stewart, and Kneale Report," *Health Physics* 35 (1978), 743-750; George B. Hutchison, Brian MacMahon, Seymour Jablon, and Charles E. Land, "Review of Report of Mancuso, Stewart, Kneale of Radiation Exposure of Hanford Workers," *Health Physics* 37 (1979), 207-220.

suddenly reemerged as part of the public consciousness. Eventually, the media attention led to a proliferation of scholarship during the 1980s, accusing the federal government of willfully exposing soldiers to radiation.<sup>425</sup> The publicity prompted the CDC to authorize a detailed study on the fate of soldiers involved in the Operation Plumbbob. Caldwell contacted the men, and determined their health status and risk of developing leukemia or other radiation-linked diseases. In 1980, he completed the study, reporting the veterans contracted leukemia at a higher rate than expected. However, the cases did not correlate with dosages or assigned units. Out of 10 cases, only 3 participated in Smoky, with the rest involved in Exercise Desert Rock VII and VIII. An eleventh worked at the NTS during Plumbbob. Caldwell also identified a high incidence of a rare bone cancer disease among the participants. In the end, insufficient data opened the study to intense criticism and scientists continued to dispute the dangers of low-level radiation. But scientific indecision did not end the fear of low-level radiation. The slightest possibility that radiation exposure caused cancer was enough to fuel the fight for compensation.<sup>426</sup>

As the Veterans Administration denied most claims for alleged radiation-related disabilities, the atomic veterans first sought compensation in the courts. But they never won. In 1946, Congress passed the *Federal Tort Claims Act*, which permitted lawsuits

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<sup>425</sup> See appropriate sections of Uhl and Ensign, *GI Guinea Pigs*; Rosenberg, *Atomic Soldiers*; Corinne Brown and Robert Monroe, *Time Bomb: Understanding the Threat of Nuclear Power*, (New York: William Morrow, 1981); Leslie J. Freeman, *Nuclear Witnesses: Insiders Speak Out*, (New York: W.W. Norton, 1981); Saffer and Kelly, *Countdown Zero*; Wasserman et al., *Killing Our Own*; Titus, *Bombs in the Backyard*; and Lerager, *In the Shadows of the Cloud*.

<sup>426</sup> Glyn G. Caldwell, Delle K. Kelley, and Clark W. Heath, Jr., "Leukemia among Participants in Military Maneuvers at a Nuclear Bomb Test: A Preliminary Report," *Journal of the American Medical Association* 244 (October 3, 1980), 1575-1578; Victor P. Bond and L. D. Hamilton, "Leukemia in the Nevada Smokey Bomb Test," *Journal of the American Medical Association* 244 (October 3, 1980), 1610; Congressional Information of Operations, NV0755093; A History of the Nuclear Test Personnel Review Program, NV0051275; Military Participation in Atmospheric Nuclear Tests, NV705759; VA Assessment of Veterans with Military Service at Sites Temporarily Augmented Ionizing Radiation, NV0756892; Prepared Statement of Glenn H. Alcalay, NAAV Scientific and Medical Advisor to the House Committee on Veterans Affairs, May 24, 1981, NV0403135, Atomic Testing Museum, Las Vegas, Nevada.

against the government. However, the Supreme Court added an exception in 1950. The *Feres* doctrine, or doctrine of sovereign immunity, granted the government immunity from injuries that the armed forces sustained while on active duty.<sup>427</sup> Under these legal conditions, Stanley Jaffee sued for damages in 1979. In 1953, Jaffee had participated in Desert Rock V during Operation Upshot-Knothole. He developed terminal cancer several decades later. *Jaffee v. the United States* was the first case that applied the *Feres* doctrine to veterans alleging radiation-connected injuries.<sup>428</sup> The doctrine prevailed throughout the 1980s and was further solidified by the Warner amendment in 1985, which disqualified suits against AEC contractors. It also barred civilians from alleging contractor negligence. In comparison to veterans, civilians fared slightly better in the courts. However, they lost most cases. The biggest obstacle was a loophole in *Federal Tort Claims Act*, granting the government immunity from lawsuits regarding policy decisions. But federal courts defined nuclear testing as a policy decision. From the sheep case in the 1956, *Bulloch v. the United States*, to the 1980s, the courts regularly rejected government liability for testing-related damages.<sup>429</sup>

The first civilian case that alleged radiation-related injuries involved Baneberry. Prior to the accident, Harley Roberts was a healthy, 50 year old man. Working at NTS since 1966, REECo physical examinations revealed he was “essentially an average individual health-wise for his age” with “a few minor operative problems.” His blood counts were also a normal range. But within a few months of the accident, Roberts felt exhausted. As his condition worsened, he complained of fatigue, frequent nosebleeds,

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<sup>427</sup> *Feres v. United States of America*, 340 U.S. 135 (1950).

<sup>428</sup> See the succession of *Jaffee* cases: *Jaffee v. United States of America*, 592 F.2d 712 (1979); *Jaffee v. United States*, 468 F. Supp. 632 – Dist. Court, D. New Jersey (1979); *Jaffee v. United States*, 663 F. 2d 1226 (1981).

<sup>429</sup> *Bulloch v. United States*, (D.C. Utah 1955) 133 F. Supp. 885.



and bruising of the skin. By June 1972, Roberts visited a doctor at Loma Linda Hospital in California and was diagnosed with blood abnormalities. His cells had 45 chromosomes instead of the regular 46, lacking the C group chromosome. After an unsuccessful treatment, Roberts was transferred to Oak Ridge Hospital in August 1973. Oak Ridge diagnosed him with pancytopenia, too few blood cells, and indicated he was “in a possible preleukemic state.” They discharged him in September 1973. Over the next few months, Roberts’ condition deteriorated. He went back to Loma Linda Hospital and was diagnosed with myeloblastic leukemia, cancer of the blood. His treatment failed and he died on April 17, 1974. The immediate cause of death was progressive interstitial pneumonia due to a fungal infection. The primary cause was leukemia. Over the next year, REECo workers William Reed and William Nunamaker died from leukemia as well. The deaths exceeded the national leukemia mortality rate by 20 times.<sup>430</sup> On his deathbed, Roberts concluded that low-level radiation exposure from Baneberry caused his ailments. Nunamaker agreed. While administering treatment at Sunrise Hospital in Las Vegas, Dr. Russell Miller recalled his patient believed “he had been exposed to radiation, excessively” and the exposure induced his leukemia. Their widows, Dorothy Roberts and Louise Nunamaker, decided to fight for compensation. Represented by Alan and Larry Johns, they filed a \$1.1 million wrongful death suit against the federal government.<sup>431</sup> The Johns brothers were involved in the case since 1974, representing

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<sup>430</sup> At least one other person in the Area 12 camp during Baneberry contracted lymphoma and died, however a REECo physician was of the opinion that the lymphoma existed prior to Baneberry, based on his physical examinations. *Roberts et al. v. Reynolds Electric and Engineering Company*, Deposition of Dr. Shields Warren, 33-36; *Roberts et al. vs. United States of America*, Deposition of Dr. Shields Warren, 1876-188, Box 2, Folder 4; Manning, “Baneberry Decision Could Blast Legal Precedent;” “Summary Discussion of Test Series Applicable to Nevada Test Site and the Pacific,” Topic A-5, 3.

<sup>431</sup> See Dorothy Roberts to President Jimmy Carter, May 9, 1977, Letter, Howard W. Cannon Papers, 95<sup>th</sup> Congress, Box 24, Folder 664, University of Nevada, Las Vegas Special Collections, for Mrs. Roberts’ opinion on the Baneberry case and her husband’s death.

Dorothy Roberts and 12 Wackenhut guards that swept Area 12 after Baneberry. At first, low-level radiation was not central to the case. The Johns brothers filed a suit against REECo, ERDA, and Livermore for negligence, charging that the government suppressed information about Baneberry. They requested information that had been deleted from the Baneberry Summary Report, including the device yield, the nearby fault line, the workers' medical records, and geological reports on the emplacement hole. The federal government's counsel responded that the information was "classified" in the interest of "public defense." Dorothy Roberts and Louise Nunamaker filed their suit in 1976, charging "gross incompetence" in planning and "wanton and willful disregard for the safety of plaintiff's decedent." Their case focused on four main categories: site selection, drilling and related activities, evacuation procedures and radiation protection, and decontamination. Additionally, the suit addressed the long-standing medical dispute on low-level radiation for the first time in the court of law, arguing that small doses can stimulate biological damage in cell structures.<sup>432</sup>

Testimony rested upon whether or not low-level effects could have caused the workers' leukemia. To prove their case, the Johns brothers enlisted several expert witnesses. Dr. Shields Warren provided the highest-profile testimony. Based his research in Japan and other studies, he had changed his mind about low-level radiation. Under special circumstances, Warren determined that it was "highly probable" that a "smaller dose of radiation was adequate to induce leukemia." He disputed the level of radiation that the workers received, openly questioning the validity of the REECo

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<sup>432</sup> *Roberts et al. vs. United States of America*, Deposition of Dr. Russell F. Miller, M.D., 2357-2389, Box 3, Folder 1; Widows Lose Baneberry Radiation," *Review-Journal*, (January 21, 1983); "NTS Hit With Second Suit," *Las Vegas Sun*, (December 28, 1976); Barbara Larson, "Government Hiding Information On Baneberry, Attorney Claims," *Las Vegas Sun*, (September 4, 1975); Paul Duckworth "Baneberry Disaster," *Las Vegas Sun*, (May 21, 1976).

radiation records, which calculated that Roberts and Nunamaker received .4 rem and .1 rem. While rad-safe took 7 readings from Roberts' clothing, each varied considerably. The figures ranged from 200 mrad/hour to 50 mrad/hour, exhibiting a time-decay pattern. A reading at 4:00 pm recorded 1 rad/hour. Based on the latter figure, Warren determined that Baneberry fallout irradiated the Area 12 camp with 11 rads/hour, and Roberts received a dose of 15 rads. The testimony provided the basis of the plaintiffs' argument. Warren concluded that low-level radiation could have caused Roberts' leukemia because 1 rem and above "can produce a chromosomal change."<sup>433</sup>

Dr. John Gofman seconded Warren's findings. A physician and nuclear opponent, he adamantly rejected the threshold model and argued that Americans were "overirradiated." Like Warren, Gofman determined that the rad-safe futures were flawed. In fact, he found that the external dose was "100 times higher to the bone marrow" than the calculated amount. Finally, Dr. Alice Stewart provided a testimony. A coauthor of the Mancuso study, she provided statistical calculations on the population involved in Baneberry. In 1978, Stewart had conducted a follow-up study on the 86 workers who had required decontamination, observing the number of deaths. Stewart determined that 2 deaths from leukemia among 86 people was "almost unheard of." Statistically, there should have only been one. She concluded that the only possible reason for the statistical abnormality was radiation exposure. Moreover, Stewart argued that Roberts and Nunamaker were more susceptible to the disease because of their advanced age. Based

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<sup>433</sup> *Roberts et al. v. Reynolds Electric and Engineering Company*, Deposition of Dr. Shields Warren, 38-39; Buford L. Allen to Leon Silverstrom, January 24, 1977, Letter, NV0705897, Atomic Testing Museum, Las Vegas, Nevada.

on research in Japan, she also cited that it was “quite common among A-Bomb survivors” to develop leukemia four years later.<sup>434</sup>

Warren’s testimony concerned ERDA, noting that it would have a “potential problematic impact” on the testing program. Since Roberts’ exposure was less than the permissible dose, it called into question its methods of radiation protection and put “exposure guides under question.” ERDA resolved that an out-of-court or lost-in-court settlement was not an option. A settlement would disrupt NTS operations, increasing the cost of medical screenings and rad-safe procedures. Additionally, it would create a precedent for future damage claims, raise public fear of radiation, and hurt public and press approval of NTS operations. ERDA, and later the DOE, decided to play hardball. They hired expert witnesses to review Warren’s deposition. Health physicist Dr. William J. Brady, and physicians Dr. R. Evans, Clarence C. Lushbaugh, and Neil Wald unanimously disagreed with Warren’s claims. They argued that myelocytic leukemia had not been linked to radiation exposure and that the workers were “well within” the maximum permissible dose. Roberts received less than 5 rads to his thyroid, not enough to induce leukemia. Finally, the onset of their leukemia occurred too soon after Baneberry. The illnesses were “coincidental” to the exposure, not the cause.<sup>435</sup>

The three-month trial began in January 1979. It was a nonjury case, with Judge Roger Foley presiding in the Federal District Court of Las Vegas. In June 1982, he rendered a partial decision. Foley found the government negligent in evacuation and

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<sup>434</sup> *Roberts et al. vs. United States of America*, Deposition of Dr. Alice Stewart, M.D., Box 1, Folder 1, 143-183, Deposition of Dr. John Gofman, M.D., Box 5, Folder 4, 5217-5218.

<sup>435</sup> Bruce W. Church and Paul B. Dunaway to Roger Ray, January 7, 1977, Letter, NV0075899, Atomic Testing Museum, Las Vegas, Nevada; Guy H. Cunningham III to James L. Liverman and Alfred D. Starbird, February 10, 1977, Letter, NV0705894, Atomic Testing Museum, Las Vegas, Nevada; Buford L. Allen to Leon Silverstrom; Leon Silverstrom to Guy H. Cunningham, January 24, 1977, Letter, NV0705896, Atomic Testing Museum, Las Vegas, Nevada; Pincus, “Rechecking 44 Exposed to Radiation in ’57 Urged.” See also appropriate testimonies in *Roberts et al. vs. United States of America*.

decontamination procedures, especially failing to fully decontaminate the workers. However, he determined that the government applied appropriate safety protocol in site selection, drilling activities, meteorological studies, and in not evacuating Area 12 camp prior to the test. But the issue of low-level radiation was harder to decide. Seven months later, Foley finally issued a verdict. Based on the testimonies, he determined that Roberts and Nunamaker's maximum doses were .42 rem and .08 rem respectfully. At those doses, radiation did not cause their leukemia. Foley based his opinion on "a reasonable degree of medical certainty," citing that there was "no credible proof" that low-level radiation causes leukemia or chromosome abnormalities. Additionally, the latency period following the workers' exposure was too short. Foley called the plaintiffs' theories of causation "experimental, speculative, and lacking in credible empirical support." Furthermore, the testimonies of Warren, Stewart, and Gofman had "little, if any, weight."<sup>436</sup>

The plaintiffs had proven negligence but not causation. But they continued to fight. In May 1984, the widows filed a motion requesting a new trial or reopening of the old one to introduce additional evidence. Foley denied the motion. But by the late 1980s, the tide turned in favor of compensating the NTS workers. In 1988, the widows took their case to the Ninth Circuit of Appeals in San Francisco, arguing that the Federal District Court in Las Vegas lacked jurisdiction. On October 27, 1989, Foley determined that his court had jurisdiction under the *Federal Tort Claims Act* and reaffirmed his 1983 ruling.<sup>437</sup> But on the same day, Foley decided *Prescott v. the United States*, a

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<sup>436</sup> *Roberts et al. vs. United States of America*, Conclusions of Law, Box 5, Folder 4, 104-118.

<sup>437</sup> Foley ruled that the act was "actionable negligence" under the *Federal Tort Claims Act*, as no immunity existed when the government's "choice" was a "failure or refusal to follow safety standards." In 1996, Roberts and Nunamaker's descendents attempted to reopen the case again, but the motion was denied.

consolidated radiation-related injury claim of 240 NTS workers. The government sought a pretrial motion to drop the claim, based upon immunity in the *Federal Tort Claims Act*.

However, Foley denied the motion because of two major developments. First, Alan and Larry Johns had revealed that the federal government and the Nevada Industrial Commission (NIC) had contracted a secret agreement in 1956. It stated that the AEC replaced the NIC in considering worker's compensation claims for radiation-related injuries. Additionally, it allowed REECo to bypass providing workmen's compensation insurance for such injuries. The agreement barred workers from benefits if they claimed to have radiation-related disabilities. Consequently, the only forum where they could seek damages was in court. Foley had ruled the agreement was illegal and void in 1981. The second development was an important Supreme Court opinion. In 1988, the court negated the clause in the *Federal Tort Claims Act* that protected nuclear testing as a policy decision. It ruled that federal officials and contractors were not protected from negligence while carrying out government programs. In *Prescott*, Foley determined that the government could be "held liable for breaching its duties to warn, train, and monitor, and provide medical treatment [at the NTS]." He recommended that a jury decide if the AEC failed to provide "objective standards of care for the protection of health and safety of human beings." The Ninth Circuit confirmed Foley's verdict in 1992 and remanded the case for trial.<sup>438</sup>

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<sup>438</sup> The widows' appeals included *Dorothy Roberts, et al. v. United States of America*, 887 F. 2d 899 (1986) and *James Randall Roberts et al. v. United States of America*, 724 F. Supp. 778 (1989). See also *Keith Prescott v. United States of America and Reynolds Electrical and Engineering Company, Inc.*, 523 F. Supp. 918 (1981); *Keith Prescott, et al., v. United States of America*, 724 F. Supp. 792, 798-99 (D. Nev. 1989); Keith Schneider, "Nuclear Tests; Legacy of Anger: Workers See Betrayal on Peril," *New York Times National*, (December 14, 1989); Tim Dahlberg, "Attorneys Wage Marathon Battle for Nuclear Test Compensation," *Review-Journal*, (December 16, 1989); "Was Workers Trust Betrayed?" *New York Times*, (December 14, 1989).

In the end, compensation fared better in Congress. As the courts continuously granted the government immunity, it emerged as the best avenue to seek damages. After Dr. Glyn Caldwell's investigation, Congress began hearings on the Health Effects of Ionizing Radiation in 1978. At the same time, organizations formed to help the fight. Founded by army sergeant Orville E. Kelly, the National Association of Atomic Veterans helped soldiers seek damages for health abnormalities and genetic mutations. Additionally, Benny Levy founded the Nevada Test Site Radiation Victims Association to present NTS workers. Both organizations faced a difficult task. Throughout the 1980s, the effects of low-level radiation continued to be contested. But Congress readily compensated high-level cases. It provided *ex gratia* payments, compensation admitting moral obligation but not legal responsibility, to numerous victims. In 1964, it appropriated nearly \$1 million to Japanese and Marshallese victims of the 1954 Bravo test during Operation Castle in the Pacific. Since 1977, it also compensated thyroid cancer victims with \$25,000 and provided up to \$100,000 death benefits. But atomic veterans and NTS workers had a harder time linking low-level radiation to their diseases. In 1981, Congress began meeting their demands. The 1981 *Veterans' Health Care, Training, and Small Business Loan Act* entitled veterans to medical care if they had service-related injuries. Since low-level effects were hard to prove, Congress passed the 1984 *Veterans' Dioxin and Radiation Exposure Compensation Standards Act*, which outlined how to connect low-level radiation to military service. This act was also ineffective because the doses were frequently too small to render compensation. The 1988 *Radiation-Exposed Veterans Compensation Act* finally eliminated the burden of proof. The act automatically awarded eligibility if 13 types of cancer manifested within

30 to 40 years after radiation-related service. Eventually, NTS workers benefitted from congressional action as well. The *Energy Employees Occupational Illness Compensation Program Act of 2000* compensated and provided medical benefits to all government, contractor, and subcontractor employees involved in the nuclear testing program. After a long and arduous process, military and civilian employees of the NTS finally received the compensation they deserved.<sup>439</sup>

### Ending an Era

Heavy defense spending changed the face of southern Nevada after 1940. By the 1950s, Nevada had become known as the “Atomic State,” housing major components of America’s defense program. Chet Sobsey, assistant to Senator Howard W. Cannon, penned an article about the “Atomic State,” writing that the state was a place where the “excitement of the frontier and the challenge of the laboratory” merged for the “benefit of mankind.”<sup>440</sup> But nuclear testing also had a dark side, contaminating the landscape with radioactive fallout and other toxic materials. Scholarship has been highly critical of AEC policies, especially regarding occupational health at the NTS. However, the NTS did orchestrate an elaborate occupational health program with a network of capable medical, rad-safe, and industrial hygiene and safety personnel. The program adequately protected workers from both traditional industrial injuries and high-level radiation exposure. The real issue centered around low-level radiation. Even today, the effects are still unknown.

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<sup>439</sup> “Were Workers Trust Betrayed?;” Titus, *Bombs in the Backyard*, 12; Ball, *Justice Downwind*, 99-100; Wasserman et al., *Killing Our Own*, 118-120; “Veterans’ Health Care, Training, and Small Business Loan Act of 1981,” P.L. 97-72 (1981), Title I, “Veterans’ Dioxin and Radiation Exposure Compensation Standards Act,” P.L. 98-42 (1984); “Radiation-Exposed Veterans Compensation Act of 1988;” P.L. 100-321 (1988); William J. Flor and Jerald L. Goetz, “DOD Experience with Dose Reconstructions for Atmospheric Test Veterans,” in proceedings of the HPS-ANS Symposium, “Environmental Radiation and Public Policy,” Las Vegas 1990; “Radiation Exposure Compensation Act,” P.L. 101-426 (1990); “Energy Employees Occupational Illness Compensation Program Act of 2000,” P.L. 106-398 (2000).

<sup>440</sup> Colin McKinley, “The Atomic State,” Ghosted by Chet Sobsey, Howard W. Cannon Papers, 87<sup>th</sup> Congress, Box 12, Folder 159, University of Nevada, Las Vegas Special Collections.



While there were no purposeful attempts to expose workers to radiation, the AEC, DOD, and laboratories knew the risk of nuclear testing. Hiroshima and Nagasaki clearly demonstrated the immediate and long-term dangers, and testing in New Mexico and the Pacific revealed the hazards of atmospheric testing. Moreover, biomedical scientists conducted thousands of human radiation experiments to determine the effects of radiation and radioactive contamination on the human body. Most of the tests were performed, funded, or supervised by the AEC or DOD. The past experience with radiation helped the respective parties establish an occupational health program at the NTS based on a permissible dose. But even though the guidelines protected workers from high-level radiation, it allowed for repeated exposure to low-levels. The AEC, DOD, and laboratories knew the stakes. Even though radiation was a relatively new occupational hazard, most scientists recognized that prolonged, small doses could possibly cause long-term damages. Still, the site's occupational health program continued to operate accordingly.<sup>441</sup> Therefore, while occupational health at the NTS was extremely comprehensive, it ultimately failed to completely protect workers. As research evolved in the 1970s, so did the program, expanding safety guidelines at the NTS. Disasters like Baneberry forced change as well, reminding the test site that its nature of work demanded strict and close attention to safety.

As the Cold War drew to an end, the United States entered another unilateral moratorium on nuclear testing in 1992. After extending the moratorium, President Bill Clinton began negotiating a treaty to permanently end testing in 1995. A year later, he signed the Comprehensive Nuclear Test Ban Treaty, prohibiting any nuclear weapons test

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<sup>441</sup> Wammack, "Atomic Governance," also discusses how the hazards of the atomic program were not due to ignorance, but based on the scientific boundaries of a permissible dose.

detonation. The treaty ended 40 years of atomic testing at the NTS, paving the way for another industry to reign supreme in southern Nevada and gamble with worker lives: gaming.

## CHAPTER FIVE

### THE STRIP

We have had ample evidence that health and safety of Nevada workers can be disregarded only to our ultimate cost and that the prevention of accidents and the maintenance of workplaces that are free of health hazards are not only desirable but achievable goals.

Senator Howard W. Cannon (1979)

As Operation Ranger began at the Nevada Test Site, Las Vegas felt the flash and roar of the atomic explosions. Testing only 65 miles away could have induced mass hysteria among the 24,000 residents. But not in Las Vegas. The people loved it. Ruthanne Welsh, a nightclub chorus girl, routinely watched the bright blasts light up the morning sky. Charles Smith, a casino dealer, felt that testing was “commercially the largest advertising feat any city of this size could hope for.” Publicity was the lifeblood of tourism and testing created plenty of it. Thousands of bomb watchers flocked to the desert to watch the explosions. To accommodate them, the Las Vegas Chamber of Commerce printed shot calendars and maps indicating the best viewing points. Moreover, the Las Vegas Strip developed an “atomic” marketing strategy. The Sands Hotel sponsored a Miss Atomic Bomb Contest, which featured beautiful women wearing mushroom cloud bathing suits. First styled at the Flamingo Hotel, the “atomic hairdo” also emerged as a popular request among hairstylists on the Strip. Likewise, hotels served “atomic cocktails” at breakfast parties after predawn shots and entertainers wrote atomic-themed musical numbers. But while the Strip welcomed the publicity, it also protected itself. Testing effects threatened gaming outcomes. The jolts could turn a dice or cause a roulette ball to jump its slot. Consequently, some casinos posted signs that house rulings were final. Despite the danger, tourists continued to visit. When

newspapers asked if the NTS would hurt the local economy, most tourists felt quite the contrary; it would actually draw business to Las Vegas. Tony Lucy, a colorful tourist dressed in western garb, put a shot glass to his mouth and responded: “No, sir. The people are going to drink and they are going to gamble—regardless.”<sup>442</sup>

The atom not only brought business to Las Vegas. It changed the face of southern Nevada industry. The arid desert had emerged as a giant laboratory, hosting cutting edge experiments in science and medicine that were vital to the American defense industry. It also attracted a new kind of workforce to the region. As with the Boulder Canyon Project and Basic Magnesium, the largest contingent consisted of general laborers. But testing also drew top scientists and physicians to its tables. Henry DeWolf Smyth, a renowned physicist and member of the Atomic Energy Commission from 1949-1954, often frequented the Strip’s gambling establishments. Yet, despite the important research being conducted outside its limits, Las Vegas continued to be stigmatized as “sin city.” In 1959, Las Vegas bid to host two conferences concerning employment in the nation. As a region employing workers in various industries, the city seemed an obvious choice. While it won the bids, opposition emerged from the Department of Labor. Secretary of Labor James H. Mitchell called Las Vegas “the den of iniquity of the nation,” objecting to a meeting in the city. Despite his request, the committee upheld the selection. Mitchell continued his campaign, threatening to not send a representative if the conference remained in Las Vegas. Robert C. Goodwin, director of the Federal Bureau of Employment Security, prevented the bids as well. Both conferences were ultimately moved to other cities. While Mitchell denied making the “den of iniquity” statement,

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<sup>442</sup> Gaber Davidson, “Las Vegas Enjoys Those Atom Jolts,” *Los Angeles Times*, (February 11, 1951); Gladwin Hill, “Atomic Boom Town in the Desert,” *New York Times*, (February 11, 1951); Titus, *Bombs in the Backyard*, 93-94.

Goodwin asserted there were simply “too many distractions” to hold a meeting in Las Vegas.<sup>443</sup>

Dr. Carl Kaufman, a local dermatologist and onetime public health official, strongly opposed Mitchell’s comments. He requested that Senator Howard Cannon “vigorously protest” the Secretary of Labor and remind Mitchell that “part of his salary comes from the Nevada taxpayers.” According to Kaufman, Las Vegas was not the den of iniquity. The doctor thought it was an excellent locale to practice medicine. The region promised “blue skies, wide open spaces, beautiful weather, and wonderful friendly people,” and “a sense of freedom that [was] not expected elsewhere.” But while Kaufman enjoyed practicing medicine in Las Vegas, the medical community was stigmatized the city as well. In 1961, the American Medical Association (AMA) chose Portland over Las Vegas for its convention site. AMA officials issued a public statement that Las Vegas was “not a fit place to hold their annual convention.” Senator Cannon immediately denounced the statement, suggesting that the association needed to change its “antique notions” of Las Vegas, and launched a campaign promoting Las Vegas as a medical conference destination. The controversy prompted doctors throughout the nation to write letters of support. Most expressed affection for Las Vegas. Leslie S. Cornfield, a physician from Inglewood, California, wrote he would rather visit Las Vegas than attend an AMA conference, and the association did not “truly represent the rank and file

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<sup>443</sup> “Las Vegas in More Than the Strip,” *New York Times*, (March 16, 1958); Nevada Employment Security Department to Howard W. Cannon, August 8, 1959, Telegram, Howard W. Cannon Papers, 86<sup>th</sup> Congress, Box 12, Folder 240, University of Nevada, Las Vegas Special Collections.

of doctors.” Evidently, the doctor loved Las Vegas so much that he integrated the city in his practice, recommending visits as “therapy to a great many patients.”<sup>444</sup>

The stigma of being a “sin city” was a blessing and curse for Las Vegas.<sup>445</sup>

Although the stigma successfully promoted the city’s tourist industry, it hampered the growth of its medical community. While the test site recruited renowned scientific and medical professionals to its ranks, few stayed permanently in Nevada. Until Sunrise Hospital offered major incentives in the 1960s, Las Vegas had a hard time recruiting top medical talent. The image of a corrupt gambling town was undoubtedly a factor. In terms of postwar population growth, the medical infrastructure also lagged behind and could not provide adequate care. Moreover, the region still did not have a Veterans Administration Hospital. During the 1960s and 1970s, the American Legion continued to push for a hospital. The government responded that it only built new hospitals near medical schools or in large metropolitan areas. Las Vegas fit neither criterion. As the city struggled to provide adequate medical talent and health services, its burgeoning hospitality industry emerged as a very dangerous place of work. The nature of casino

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<sup>444</sup> Carl K. Kaufman to Howard W. Cannon, July 7, 1960. Letter, Howard W. Cannon Papers, Box 12, Folder 240, University of Nevada, Las Vegas Special Collections. For AMA meeting correspondence, see Howard W. Cannon Papers, 87<sup>th</sup> Congress, Box 11, Folder 151, University of Nevada, Las Vegas Special Collections, especially Howard E. Cannon, “Las Vegas: Ideal Convention Site,” Delivered in the Senate of the United States, 1961; Nevada Senator Hits AMA Switch, *Review-Journal*, July 28, 1961; Leslie S. Cornfield M.D. to Howard W. Cannon, July 31, 1961, Letter; Desmond Kelly to Howard W. Cannon, September 13, 1961, Letter; Las Vegas Convention Bureau, September 13, 1961, which includes a partial listing of medical conventions held in Las Vegas; John G. Walsh to Howard W. Cannon, August 8, 1961, Letter; Howard W. Cannon to John G. Walsh M.D., August 25, 1961, Letter; Friedman Weinberg M.D. to Howard W. Cannon, July 28, 1961, Letter.

<sup>445</sup> For an examination how cities have been stigmatized by historical events portrayed by the media and opinion setters, see Jonathan Lavon Foster, “Stigma Cities: Dystopian Urban Identities in the United States West and South in the Twentieth Century,” (Doctoral Dissertation, University of Nevada, Las Vegas, 2009), especially Chapters 7 and 8, which cover Las Vegas, Nevada.

work coupled with the pressure to maximize profits continuously strained safety standards on the Strip, creating considerable risk for employees and tourists alike.<sup>446</sup>

### Desert Hospitality

Until the 1970s, Nevada was the only state that allowed casino-style gambling. New Jersey approved gambling in Atlantic City in 1978. By the 1990s, Louisiana, Illinois and other states legalized riverboat casinos. A decade later, internet gambling exploded in popularity. But despite legal gambling (commercial, Indian, and racetrack casinos) in nearly every state, Nevada remained the only one that legalized it statewide. Indeed, gambling played an important role in the state's history. Gambling was common in mining camps during the nineteenth century. In 1869, the legislature broke from precedent and formally legalized gambling, providing for its regulation. Over the next 40 years, Nevada was a legalized gambling jurisdiction. But by the turn of the century, anti-vice movements gained momentum across the nation. As the state enthusiastically supported various progressive reform measures, it passed a bill prohibiting all forms of gambling in 1909. By 1915, considerable public protest prompted the legislature to add an amendment allowing card games and slot machines. The law was unevenly enforced, leading to the proliferation of illegal gambling establishments. But everything changed

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<sup>446</sup> Senator Howard W. Cannon's Papers at University of Nevada, Las Vegas chronicle the fight to construct a veterans hospital in southern Nevada. See The American Legion to Howard W. Cannon, February 28, 1961, Letter; Howard W. Cannon to Andrew V. Ruckman, Jr., July 7, 1961, Letter; Howard W. Cannon Senatorial Papers, 86<sup>th</sup> Congress, Folder 469 and 470, University of Nevada, Las Vegas Special Collections; "Lets Be Practical," *Las Vegas Sun*, (July 30, 1961); Howard W. Cannon to Samuel Ashjian, April 20, 1970, Letter; Howard W. Cannon to Anthony Shupel, March 19, 1970, Letter; Press Release from Senator Alan Bible; Joseph P. Wagner to Howard W. Cannon, April 24, 1971, Letter; Press Release from Senator Howard W. Cannon; John Podgursky to Howard W. Cannon, July 26, 1972, Letter; Howard W. Cannon to John Podgursky, August 9, 1971, Letter; Joseph H. Friedenthal to Howard W. Cannon, April 1973, Letter; S. 363, a bill to provide for the construction of the Veterans' Administration Hospital in the State of Nevada, January 13, 1973; S. 240, A bill to provide for the construction of the Veterans' Administration Hospital in the State of Nevada, January 27, 1975; Floor Statement by Senator W. Cannon; Howard W. Cannon Papers, 95<sup>th</sup> Congress, Box 26, Folder 700, University of Nevada, Las Vegas Special Collections.

in 1931. As depression, drought, and unemployment gripped the nation, the legislature explored options to stimulate the state economy. Since the federal government owned 87 percent of the land, ranchers and farmers opposed increasing property taxes and agricultural development could not generate enough revenue. Therefore, the legislature entertained a more controversial option. Since illegal gambling was hard to suppress, Nevada could legalize it to capitalize on the tax and economic benefits, and tourism. The bill passed in March 1931, ushering in a new era of industry in the state.<sup>447</sup>

After the establishment of Basic Magnesium Inc. and the gunnery school, World War II revitalized the region. But the gambling industry did not experience big profits until the postwar period.<sup>448</sup> South of Fremont Street sat 4.2 miles of vacant land on Highway 91. Since the land was not incorporated in the city of Las Vegas, it was not subject to municipal government taxes. In 1941, hotelier Thomas Hull visited Las Vegas

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<sup>447</sup> The development of gaming in Nevada is covered in Ralph Roske, "Nevada Gaming, First Phase, 1861-1931," (Unpublished Paper) and *A Desert Paradise*, 84-86; Elliot, *History of Nevada*, (Lincoln: University of Nebraska Press, 1973), 248, 278-279; James Hulse, *The Nevada Adventure*, (Reno: University of Nevada Press, 1978), 250-256; Moehring, *Resort City in the Sunbelt*, 20-21; Shannon Bybee, "History, Development, and Legislation of Las Vegas Casino Gambling," in Cathy H. C. Hsu, ed., *Legalized Casino Gaming in the United States: The Economic and Social Impact*, (Binghamton, NY: Haworth Hospitality Press, 1999), 3-22; Nevada Counsel Bureau, "Study of Gaming," Bulletin No. 93-4, (December 1992), 2-5. For a general history of gaming, see David G. Schwartz, *Roll the Bones: The History of Gambling*, (New York: Gotham Books, 2006).

<sup>448</sup> For scholarship on Las Vegas during the postwar period, see Perry Kaufman, "City Boosters, Las Vegas Style," *Journal of the West* (1974), 46-60; Jonreed Lauritzen, *Las Vegas, Nevada for Fun and Sun*, (Las Vegas: Unknown Binding, 1947); Wesley Stout, "Nevada's New Reno," *Saturday Evening Post*, 215, (October 31, 1942), 12-13, 68-71. See also Earl Pomeroy, *Search of the Golden West: The Tourist in Western America*, (New York: Knopf, 1957) and Hal K. Rothman, *Devils Bargains*, (Lawrence: University of Kansas Press, 1998) for tourism during the postwar period. For popular literature on Las Vegas, see appropriate sections of John M. Findlay, *People of Chance: Gambling in American Society from Jamestown to Las Vegas*, (New York: Oxford University Press, 1986); Julian Halevy, "Disneyland and Las Vegas," *Nation*, (June 7, 1958), 510-513; "National Affairs: Las Vegas: It Just Couldn't Happen," *Time Magazine*, (November 23, 1953); Ed Reid, *Las Vegas: City Without Clocks*, (Edgewood Cliffs: Prentice Hall, 1961); Mary K. Hammond, "Legalized Gambling in Nevada," *Current History*, XXI, (1951); 177-179; Gladwin Hill, "Klondike in the Desert" and "Las Vegas is more than 'The Strip,'" Lucius Beebe, "Las Vegas," *Holiday*, XII (December 1952), 106-108, 132-137; Katharine Best and Katharine Hillyer, *Las Vegas: Playtime U.S.A.*, (New York: D. McKay Co., 1955); William F. French, "Don't Say Las Vegas is Short of Suckers," *Saturday Evening Post*, (November 5, 1955); "Gambling Town Pushes Its Luck," *Life*, (June 20, 1955); 20-27; "Gambling: Wilbur's Dream Joint," *Time Magazine*, May 8, 1950; Paul Ralli, *Viva Vegas*, (Hollywood, CA: House-Warren, 1953); Jack Murray, *Las Vegas: Zoomtown U.S.A.*, (Phoenix: Lebeau Printing, 1962).



to expand his “El Rancho” hotel chain, located in Sacramento and Bakersfield, California, to the city. In a surprise move, he decided against Fremont Street, opting for the Highway 91 location. The El Rancho opened in 1941, emerging as a prototype for the roadside hotels that characterized the 1950s and 1960s. The western-themed hotel not only offered gaming, but also a restaurant, swimming pool, and entertainment. Thanks to wartime business from defense workers, the El Rancho prospered at first. But various managerial issues led to labor turnover, prompting Hull to sell in 1942. Over the following decades, it changed ownership numerous times. By 1960, a devastating fire closed the property for good.<sup>449</sup>

While the El Rancho enjoyed marginal success, the property influenced the future of Las Vegas. It inspired the first “casino suburb” and revealed the profitability of combining casinos with resort hotels. Guy McAfee, a former vice policeman and entrepreneur, dubbed the area the “Las Vegas Strip” because of its likeness to the Sunset Strip in Hollywood, California. McAfee helped solidify the site as a tax shelter as well. In December 1950, the unincorporated township of Paradise in December 1950 was established.<sup>450</sup> The Strip eventually became synonymous with gambling and entertainment in the United States. Over the following decades, it expanded from small hotels with large neon signs to the dense megaresorts that today define Las Vegas’ iconic cityscape. In the process, the Strip shifted American perceptions about gambling. While

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<sup>449</sup> Moehring, *Resort City in the Sunbelt*, 45-46.

<sup>450</sup> The unincorporated township of Paradise eventually split into two. The town of Paradise “A” was founded in April 1951, followed a Paradise “B” in January 1952. In 1953, Paradise A became Winchester, Nevada and Paradise B became Paradise, Nevada. The Strip exists in both Winchester and Paradise. At the 2000 census, Paradise was the largest unincorporated community in the United States. See Rothman, *Nevada*, 106-118; Moehring, *Resort City in the Sunbelt*, 43-45, 47, 49, 50, 55, 65, 108, 112, 116-117, 124; Moehring and Green, *Las Vegas*, 111-112; Bybee, “History, Development, and Legislation of Las Vegas Casino Gambling,” 7-10.

“gambling” was associated with criminals and sin, it provided “gaming,” a legitimate recreational activity.<sup>451</sup>

Occupational health on the Strip varied considerably based on each individual resort’s management and financial support, and can be divided in two general periods. The first period was directed by organized crime and the International Brotherhood of Teamsters.<sup>452</sup> By the mid-1950s, much of the Strip was mob-owned, but not all. Organized crime flourished because it was hard for casino owners to get big bank loans. During the postwar period, the economy had boomed because banks and bond issues provided loans to support the nation’s growth. But most financial institutions did not fund vice. Only in rare cases did regional banks fund casinos. The stigma was far too great. Consequently, capital was the biggest obstacle that faced the Strip.

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<sup>451</sup> For further discussion on American perceptions of the gambling industry and its emergence as the “gaming” industry, a legitimate form of recreation tourism, see Rothman, *Devils Bargains*, 287-337, Rothman, *Nevada*, 101-124; and *Neon Metropolis*, (New York: Routledge, 2003). For America’s relationship towards gambling and Las Vegas, see Findlay, *People of Chance*; Charles W. Fisher and Raymond Wells, *Living in Las Vegas: Some Characteristics, Behavior Patterns, and Values of Local Residents*, (Las Vegas: Unknown Binding, 1967); William T. White, Bernard Malamud, and John E. Nixon, *Socioeconomic Characteristics of Las Vegas, Nevada*, (Las Vegas: UNLV Center for Business and Economic Research, (1975); Don R. Murphy, “The Role of Changing External Relations in the Growth of Las Vegas, Nevada, (Doctoral Dissertation: University of Nebraska, 1969); William R. Eadington, ed., *Gambling and Society: Interdisciplinary Studies on the Subject of Gambling*, (Springfield, IL: Thomas, 1976); Henry Sciullo, “Las Vegas: A Study of Short and Long-term Economic Effects on Community of Legalized Gambling,” (Unpublished Paper); and Philip Richardson, “Effects of Legalized Gambling on Community Stability in the Las Vegas Area,” (Unpublished Paper: Sponsored by Twentieth Century Fund, 1974). During the 1990s, literature emerged arguing that Las Vegas had become an “All American City,” or the rest of nation had become more like it. See Kurt Anderson, “Las Vegas, U.S.A.,” *Time Magazine*, (January 10, 1994); Rothman, *Neon Metropolis*; M. Gottiener, Claudina C. Collins, and David R. Dickens, *Las Vegas: The Social Production of an All American City*, (Malden, Mass. And Oxford: Blackwell Publishers, 1999); and John Hannigan, *Fantasy City: Pleasure and Profit in a Modern Metropolis*, (London: Routledge, 1998).

<sup>452</sup> Literature on the organized crime era on the Las Vegas Strip is covered extensively by popular literature. See especially Ed Reid and Ovid Demaris, *The Green Felt Jungle*, (New York: Pocket Books, 1964); Ovid Demaris, *The Las Manifesto*, (New York: Bantam Books, 1981); Carey McWilliams, “Legalized Gambling Doesn’t Pay,” *Nation*, 171 (November 25, 1950); Hank Messick, *The Silent Syndicate*, (New York: MacMillan, 1967); David Hanna, *Bugsy Siegel: The Man Who Invented Murder, Inc.*, (New York: Belmont Tower Books, 1974); and Sally Denton and Roger Moore, *The Money and the Power: The Making of Las Vegas and its hold on America*, (New York: Vintage Books, 2001).

But mob funding bypassed the problem. From 1950 to 1958, it invested heavily into the Strip. But after 1958, the construction boom lulled after an economic downturn in Las Vegas.<sup>453</sup> Moreover, the federal government began investigating the mob's involvement in gambling operations. The investigation prompted Nevada to institute stricter gaming regulations, establishing the Gaming Control Board in 1955, the Gaming Commission in 1959, and the Gaming Policy Committee in 1961.<sup>454</sup> It soon became apparent that illegitimate capital could no longer support the Strip. Blending illegal and legal practices, the Teamsters stepped in. In the late 1950s, the union began investing in commercial development until shifting its attention to the Strip. Instead of gangsters reaching for shoeboxes of money, the Teamsters arranged to provide loans from legitimate institutions, such as the Bank of Las Vegas.<sup>455</sup> The union helped construct Caesars Palace, Aladdin, and Landmark. Opening in 1966 at the cost of \$19 million, Caesars Palace inaugurated a new era on the Strip, outshining the first generation of resorts.<sup>456</sup>

The second period reflected the shift to corporate ownership. Howard Hughes began an unprecedented buying spree in 1967, purchasing the Frontier, Sands,

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<sup>453</sup> "Las Vegas Hedges its Bets," *Business Week*, (August 11, 1956), 157-158, for an overview of Las Vegas' economic downturn during the mid-1950s.

<sup>454</sup> For the difficulty to regulate gaming in Nevada, see John Cahlan, *Reminiscences of a Reno and Las Vegas, Nevada Newspaperman, University Regent, and Public-Spirited Citizen*, University of Nevada, Reno Oral History Program, 1970; Oscar Lewis, *Sagebrush Casinos: The Story of Legal Gambling in Nevada*, (New York: Doubleday, 1953); Frank H. Johnson., *Legalized Gambling in Nevada: Its History, Economics and Control*, 2<sup>nd</sup> Edition, (Carson City: Nevada Gaming Commission, 1970); Jerome Sholnick, *House of Cards: Legalization and Control of Casino Gambling*, (Boston: Little, Brown, 1978); Paul Ralli, *Nevada Lawyer: A Story of Life and Love in Las Vegas*, (Dallas, Mathis, Van Nort, & Co., 1946); United States Senate, Hearings Before the Permanent Subcommittee on Investigations, Gambling and Organized Crime, Part 1 and 2, (Washington D.C.: Government Printing Office, 1961).

<sup>455</sup> See Jack Sheehan, *Quiet Kingmaker: E. Perry Thomas*, (Las Vegas, NV: Stephens Press, 2009), which details the Bank of Las Vegas' (Valley Bank) relationship with Jimmy Hoffa and building the 1950s and 1960s Strip hotels.

<sup>456</sup> Rothman, *Nevada*, 115-118, 127, 131, 133, 136, 137, 149; Moehring, *Resort City in the Sunbelt*, 86-87, 117, 119, 243; Steven Brill, *The Teamsters*, (New York: Pocket Books, 1978), 213-219; Reid and Demaris, *The Green Felt Jungle*, 85-88.

Castaways, Landmark and Silver Slipper. The eccentric billionaire provided a symbol of change to the gaming industry, legitimizing investment on the Strip. By 1968, entrepreneur Kirk Kerkorian began constructing the largest hotel in the world, the International. He also acquired the Flamingo, reportedly to train his workers for the opening of the massive resort. Kerkorian was the first person to benefit from the 1969 Corporate Gaming Act, which allowed for corporate involvement in the gaming industry.<sup>457</sup> Historian Hal Rothman calls the 1969 act “the most important event in the history of modern Las Vegas,” ushering in the corporate era.<sup>458</sup>

After completing the International, Kerkorian sold his interest in the resort and the Flamingo to the Hilton Corporation in 1970. The sale marked the first time a publically-owned corporation owned a casino. Its financial success changed the hotel industry’s perception of the Strip, inspiring Sheraton and Holiday Inn to invest in casinos. Kerkorian also continued to reinvent the Strip. In 1973, he opened the MGM Grand, setting a new industry standard of size and luxury. Costing \$120 million, the hotel was the first megaresort on the Strip.<sup>459</sup> Despite its success, the MGM Grand was the only property constructed on the Strip from 1969 to 1989. Various factors inhibited new

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<sup>457</sup> From 1955 to 1969, the Gaming Commission preformed background investigations of each casino stockholder, a practice discouraging corporate ownership. But Kerkorian found a solution. Unlike a traditional corporation, he was the sole stockholder of International Leisure Corporation. Therefore, he was the only person required to pass the gaming inspection. After reporting the Flamingo flourished under his legitimate management, the Securities and Exchange Commission permitted the sale of 17 percent of his stock to the public. Offered at \$5 a share, the stock jumped 600 percent in three days. See “Kerkorian Unit’s Stock Jumps 600% in 3 Days,” *Los Angeles Times*, (February 18, 1969).

<sup>458</sup> “News of Reality: Las Vegas Sale,” *New York Times*, (August 15, 1967); “Hughes Sinks Another \$55 Million in Vegas,” *Los Angeles Times*, (August 27, 1969); “Las Vegas is Getting a Huge Hotel,” *New York Times*, Special to the New York Times, (October 27, 1968); “Largest Resort Hotel Under Construction,” *Los Angeles Times*, (February 18, 1968); “Las Vegas Rivalry Escalates,” *Los Angeles Times*, (June 30, 1969). Rothman, *Nevada*, 125-146; Rothman, *Devils Bargains*, 287-288; John Wilen, “LV Historians Compile Top Gambling Event,” *Las Vegas Sun*, (June 10, 1999); Moehring, *Resort City in the Sunbelt*, 118-122.

<sup>459</sup> A megaresort is a huge hotel that offers gambling and non-gaming entertainment options, including shopping and fine dining, and applies fantastic or mythical themes throughout the property.

development, including a nationwide recession. Moreover, the MGM Grand had elevated the amount of capital needed to construct a comparable resort.

Steve Wynn provided a solution, redefining corporate ownership on the Strip. With the help of financier Michael Milken, he constructed the site's second megaresort: the Mirage. A marked departure from its predecessor, The Mirage was a new kind of resort. Double the size of the MGM Grand, it cost \$630 million to build, with the resort experience as the main source of entertainment. Wynn's tropical-themed, volcano-fronted hotel had expensive décor and luxury hotel rooms, numerous entertainment options, a wildlife habitat, and luxury villas. His vision revitalized the Strip, making it a fashionable destination once again, prompting corporations to invest billions in the site during the 1990s and 2000s. Most existing resorts were imploded or demolished, and dense megaresort construction defined the Strip, completing the iconic city skyline. But the corporations not only transformed the site. Las Vegas expanded as well, from 842,737 million people in 1990 to 1.5 million in 2000. By 2010, the population had swelled to nearly 2 million.<sup>460</sup>

Both periods of ownership required a large workforce. In 1955, 6,000 of the county's 30,000 wage earners worked on the Strip. By 1975, 40,000 out of 150,000 wage earners worked in Las Vegas' hospitality industry. The Desert Inn and Sahara employed 1,200 each, with MGM Grand retaining the most, 4,500 workers. After 1990, employment rates skyrocketed. In 2005, the Strip accounted for 109,689 employees, distributing a \$4.2 million annual payroll. The same year, 19 of the largest casinos on the

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<sup>460</sup> U.S. Census Bureau, "Population Change and Distribution, 1990 to 2000," Census 2000 Brief, Issued April 2001, CZKBR/01-2. The 2010 population estimate of the Las Vegas metropolitan area was 1,951,269. See Brian Haynes, "The Face of Nevada," *Review-Journal*, (February 25, 2011).

Strip employed 34.5 percent of the state's gaming employees and produced 47.4 percent of the statewide revenue!<sup>461</sup>

As historian James Kraft outlines in *Vegas at Odds*, employees worked in four general categories. The first category involved professionals or semiprofessionals with previous training, including executive chefs and orchestra leaders. The second category included white-collar workers— secretaries, clerks, and switchboard operators. The third category comprised of blue-collar workers, maintaining the gardens, slot machines, and security systems. Lastly, the fourth, and largest, category consisted of workers with guest contact, working in gaming areas, restaurants, retail services, lounges and bars, and entertainment. The resorts staffed enough employees to maintain 24-hour, 7-day a week operations. They worked in departments based on functionary lines: casino, rooms, food, beverage, management, entertainment, retail, and others. All the departments interacted with one another. The casino required workers to perform various tasks at the same time. The casino host, a member of the management department, delivered complimentary services to players. Meanwhile, the casino department managed gambling operations. The pit boss and floormen supervised the dealers, cashiers in the cage cashed out gaming chips, and slot attendants supervised the machines on the floor. At the same time, cocktail waitresses, from the beverage department, served drinks to the players.<sup>462</sup>

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<sup>461</sup> James P. Kraft, *Vegas At Odds: Labor Conflict in a Leisure Economy, 1960-1985*, (Baltimore: Johns Hopkins Press, 2010), 34; Las Vegas Report, 1965, A Compendium of Statistical Commercial and Social Facets of Las Vegas for Year 1964, Complete Through December 31, 1964, (Las Vegas: Research & Statistical Bureau, Las Vegas, Nevada Chamber of Commerce, 1965); David G. Schwartz, *Las Vegas Strip Casino Employment: Productivity, Revenues, and Payrolls, A Statistical Study, 1990-2009*, (Las Vegas: Center for Gaming Research, University Libraries, University of Nevada, Las Vegas, 2010), 3; Hsu, *Legalized Casino Gaming in the United States*, 17.

<sup>462</sup> For information about the various jobs and departments at the resorts, see The Department Series, Boxes 21 and 23; Miscellaneous Series, Box 155; Stardust Collection, University of Nevada, Las Vegas Special Collections; Employee Records, Box 27, Folders 3-20, Box 28, Folders 3-17, Box 29, Folder 7, Sands Collection, University of Nevada, Las Vegas Special Collections; Series 2: Employees, Box 4, Dunes

For most positions, educational requirements were minimal. As historian Hal Rothman argues in *Devil's Bargains*, Las Vegas solved the major problem associated with transitioning from an industrial to a postindustrial economy. The city successfully emerged from a railroad town to the "Last Detroit," hiring unskilled workers with barely a high school education if that. Throughout the two periods, this feature remained constant. Most resorts also required applicants to submit to physical examinations to ensure they were in good health. At the El Rancho, doctors determined whether applicants were "likely to be all hands and feet," examining dexterity. Steady hands, good eyesight, and the "ability to hear accurately and speak distinctly" were essential. The resort did not want to hire employees prone to "accidents, harming themselves or others, breaking or damaging furnishings and equipment." Some positions required a special skill set. All casino workers needed to have good dictation, memory, and mathematical skills. The resorts administered preemployment exams, testing for basic math skills, and required certification from a gaming school.<sup>463</sup>

In general, employee policies were fairly constant as well. After gaining employment, employees obeyed strict policies regarding appearance and conduct. The El Rancho wanted employees to be "wholesome" and "clean," which was the "result of good health." The Stardust told employees they represented the company, "regardless of position," and stressed the importance of "neat dress, grooming, courteous behavior, and a smile and friendly word." Female employees needed to apply makeup in "good taste at all times" and hairstyles "appropriate to business standards." All employees were

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Collection, University of Nevada, Las Vegas Special Collections. Kraft also outlines the various categories in *Vegas At Odds*, 34-35.

<sup>463</sup> Rothman, *Devils Bargains*, 314-316; "Chapter V: Selection of Employees," *Housekeepers' Guide to Selecting and Training Employees*, El Rancho Collection, Nevada State Museum and Archives, Las Vegas, Nevada.

expected to be polite, friendly, and dependable. Conversations had to be brief and limited to times that did not interfere with work, as “prolonged conversations [resulted] in unnecessary errors,” and employees must “maintain vigilance and alertness at all time.” Drinking during working hours and repeated tardiness resulted in termination. Employees were required to maintain a good image at all times, even while off-duty.<sup>464</sup>

During the organized crime period, upward mobility was achievable. Based on job performance, dealers easily rose to the management level.<sup>465</sup> The mob famously treated employees like family, extending work opportunities to employees’ children and relatives. But during the corporate period, employment became stratified. Management was reserved for employees with business or hotel school degrees. The move alienated existing employees and employment patterns ultimately shifted. As industrial jobs had done in previous generations, employment became a transitional step to white-collar status. The poor and uneducated, and immigrant populations began working on the Strip, eventually sending their children to college. If their children wanted to work in gaming, they returned with the qualifications to snag a management job. As a result, the working environment changed profoundly under corporate management.<sup>466</sup>

During the 1950s and 1960s, the resorts mostly hired young, white males to work in the resorts. In 1960, Nevada had the most young and middle-aged adults in the nation. A third of the population had only lived there for 5 years. Most immigrated from California and Texas, with the rest from east of the Mississippi River and the Northern

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<sup>464</sup> “Chapter V: Selection of Employees;” Employee Orientation Program, Stardust Collection, Box 155, University of Nevada, Las Vegas Special Collection; General Procedures: All Employees and *You and Your Job*, Harrah’s Entertainment Collection, University of Nevada, Las Vegas Special Collections.

<sup>465</sup> For a good source on networking in the casinos, see Alan Balboni, *Beyond the Mafia: Italian Americans and the Development of Las Vegas*, (Reno: University of Nevada Press, 2006).

<sup>466</sup> Rothman, *Devils Bargains*, 314-316.



Plains. Since the majority of jobs were unskilled labor, turnover was high. Men held the jobs with the highest paychecks and power, and given ample opportunity to move up the employment ladder. Women were not as lucky, and had little chance of becoming a dealer or advancing to management. These patterns reflected the postwar society. After World War II, most industries discriminated against women and minorities in the workplace, offering separate pay scales and job positions. Until 1970, the Strip did not hire female dealers. The city of Las Vegas officially endorsed the practice on November 5, 1958, passing a public ordinance recommending against the practice. A year later, North Las Vegas banned the employment of female bartenders as well.<sup>467</sup>

Until the corporate period, women were limited to working as housekeepers, cashiers, cocktail waitresses, keno runners, restaurant workers, and retailers. However, female sexuality also played an important role in the Strip's image. Instead of overtly selling sex, it sold the possibility. Pretty white women were hired to entertain guests in shows and topless revues. According the Dunes, its "Casino de Paris" show boasted the "Perfect Showgirl:" 5 feet 10 inches, 134 pounds, and "harmonizes with the globe's curvature with 37-25-37 measurements." Most Casino de Paris showgirls were approximately 23 years old and had blue or hazel eyes. In fact, only two women had brown eyes.<sup>468</sup> While female employees had some privileges, they endured long working

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<sup>467</sup> Kraft, *Vegas At Odds*, 34-36; Natasha Zaretsky, "Feminists in the 1960s and 1970s," in Crista DeLuzio and Peter C. Mancall, eds., *Women's Rights: People and Perspectives*, (Santa Barbara, CA: ABC-CLIO, 2010), 192; Moehring, *Resort City in the Sunbelt*, 201-202. For the debate surrounding Las Vegas' decision to ban women dealers, see City Commission, *Minutes*, XI, November 5, 1958; and Roske, *A Desert Paradise*, 122. The complaint was filed on January 13, 1981 and is entitled "U.S. Equal Employment Opportunity Commission v. Nevada Resorts Association et al. – Case No. CV-LV-81-12 RDF."

<sup>468</sup> "Vital Showgirl Statistics Stagger Vegas Showgoers," Box 9, Folder 16, Information for Publicity Releases, Box 9, Folder 8, Dunes Collection, University of Nevada Las Vegas Special Collection. For sample showgirl contracts, see the Folders 2, 4, and 5 in the Virginia James Collection, University of Nevada, Las Vegas Special Collections. Virginia James danced as a CopaGirl and Flaminoette at the Sands and Flamingo in the late 1950s.

hours, sometimes abusive bosses, and uninvited sexual advances from coworkers and guests. Those who became pregnant had no rights and could be fired immediately. Other women turned to freelance work on the Strip, working as strippers, escorts, or prostitutes.<sup>469</sup>

The Civil Rights Act of 1964 eventually helped end gender discrimination on the Strip.<sup>470</sup> During the corporate period, Las Vegas ended its citywide ban on female dealers in August 1970, and the same month, the Silver Slipper hired the first female dealer on the Strip. By the mid-1970s, the resorts eventually conceded under Affirmative Action pressure, employing women in traditionally male jobs. Despite these advancements, male dealers continued to dominate. In September 1976, only 25 percent of 2,616 dealers were women. The situation finally improved during the 1980s. On January 13, 1981, the Equal Employment Opportunity Commission filed a complaint on behalf of a woman's group. By the end of the month, 19 Strip resorts and 4 unions settled out-of-court, agreeing to end sexual discrimination.<sup>471</sup>

At most resorts, while discrimination certainly hindered women, management restricted minorities to the lowest-paying jobs. In the 1940s, the resorts recruited blacks

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<sup>469</sup> For literature on prostitution in Las Vegas and the state of Nevada, see Barbara Brents, Crystal Jackson, Kathryn Hausbeck, *The State of Sex: Tourism, Sex, and Sin in the New American Heartland*, (New Jersey: Routledge, 2009); Timothy Hursely, *Brothels of Nevada: Candid View of American's Legal Sex Industry*, (New York: Princeton Architectural Press, 2004); Sarah Hall Washburn, "Changing Images: The End of Legalized Prostitution in Las Vegas," (Masters Thesis, 1999).

<sup>470</sup> The 1964 Civil Rights Act prohibited discrimination on the basis of race, sex, and national origin in employment and created the Equal Employment Opportunity Commission to fight such discrimination. Enforcement was assigned to the U.S. Justice Department. See Nancy MacLean, *Freedom is Not Enough: The Opening of the American Workplace*, (Cambridge: Harvard University Press, 2006) for a discussion on the profound changes in the American workplace as a result of racial and sexual equality.

<sup>471</sup> For corporate records on hiring the first women holding traditionally-male positions, see Roger Wagner to Al Guzman, Letter, June 6, 1976, Box 27, Folder 11; Al Guzman to Forrest Duke, *Review-Journal*, Press Release, (October 1, 1975); Box 28, Folder 3, Sands Collection, University of Nevada, Las Vegas Special Collections. The Equal Employment Opportunity Commission complaint was filed on January 13, 1981 and is entitled "U.S. Equal Employment Opportunity Commission v. Nevada Resorts Association et al. – Case No. CV-LV-81-12 RDF."

for menial jobs, usually cleaning and housekeeping. By the 1950s and 1960s, black entertainers headlined on the Strip, but were ushered out the back door to sleep at boarding houses on the Westside. A January 1962 investigation by the Nevada Equal Rights Commission reported that no black dealers, waitresses, waiters, bellmen, or office personnel worked on the Strip, and the resorts only employed a “scattering of Orientals.” A year later, minorities consisted of less than 20 percent of the workforce, and the resorts only hired blacks as maids, porters, kitchen help, and busboys. The Riviera was the only property that employed two black bartenders. The resorts attributed the situation to not having enough access to qualified non-white applicants.<sup>472</sup>

The local civil rights movement and Civil Rights Act of 1964 eventually improved the situation. But the process took time. Local activism started during the 1950s, spearheaded by the NAACP and two black physicians, Drs. James McMillan and Charles West. Threatening a massive protest in 1961, McMillan convinced the Strip and downtown operators to end segregation. After the Civil Rights Act of 1964, the Equal Employment Opportunity Commission investigated minority discrimination. At the same time, local riots garnered negative publicity, bringing attention to the Strip’s employment practices, and the Nevada Equal Rights Commission continued to prod the site. The Nevada Resorts Association, comprised of the Strip’s largest resorts, conceded in 1970. It offered a plan to promote blacks to higher-paying jobs. It was a positive step forward, but did not end discrimination. By June 1971, the resorts entered meaningful

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<sup>472</sup> The black experience and civil rights in Las Vegas is covered in Moehring, *Resort City in the Sunbelt*; 171-201; Kraft, *Vegas At Odds*, 117-138; Moehring and Green, *Las Vegas*, 197-204; Elizabeth Nelson Patrick ed. “The Black Experience in Southern Nevada,” *Nevada Historical Society Quarterly* 22 (Summer 1979): 128-140; 22 (Fall 1979): 209-220, comprising of interviews with Las Vegas residents which “document life in the community from 1933 to 1978;” Perry Kaufman, “The Best City of Them All: A City Biography of Las Vegas, 1930–1960,” (Doctoral Dissertation, University of California, Santa Barbara, 1974). A number of oral histories at University of Nevada, Las Vegas Special Collections also discuss the topic.

negotiations for black males, after the NAACP filed a complaint with Judge Roger Foley at the U.S. Federal Court, and signed a consent decree the same day.<sup>473</sup> The decree for all women did not occur until 1981. By the 1980s, the work environment improved greatly for minorities, including rising numbers of Asians and Hispanics. The latter population increased over the following decades, and eventually dominated the workforce.<sup>474</sup>

### Hazards in Wonderland

Gaming is one of the largest sectors of the hospitality industry. By 2000, a casino existed within a 200-mile radius of 95 percent of all American households. But no other place rivaled the gaming experience on the Strip. The site offered all segments of the industry, incorporating lodging, food services, conference planning, theme parks, and other services. However, unlike other southern Nevada industries, the Strip did not produce tangible goods. Instead, it trafficked in escape, pleasure, and self indulgence. This was often a difficult task. While managers at Basic Magnesium Inc. could stop the assembly line to fix a defect, Strip workers continuously created and delivered experiences in a scripted environment but uncontrolled health setting. The experiences

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<sup>473</sup> “Casinos Silent on Discrimination, *Review-Journal*, (November 17, 1969). The federal complaint was filed on June 4, 1971 in the U.S. District Court, District of Nevada, “Civil LV No. 1645, Complaint” and “Civil Action LV No. 1645 Consent Decree,” Court Clerk’s Office at the Foley Federal Building, Las Vegas, Nevada.

<sup>474</sup> John N. McCarthy to Howard B. Gundersen, November 10, 1969, Letter, Howard W. Cannon Papers, 91<sup>st</sup> Congress, Box 30, Folder 378, University of Nevada, Las Vegas Special Collections; “Casinos Silent on Discrimination, *Review-Journal*, (November 17, 1969); Moehring, *Resort City in the Sunbelt*, 184-202; “Las Vegas Negroes Rap Lack of Job Opportunity,” *Reno Evening-Gazette*; Cy Ryan, “CEP Dragging Heels in Vegas,” *Las Vegas Sun*, (May 14, 1969); Earnest N. Bracey, “The African Americans,” in Jerry L. Simich and Thomas C. Wright, eds., *The People of Las Vegas: One City, Many Faces*, (Reno: University of Nevada Press, 2005). For information about the first blacks hired to management. For Bertha Young, see Box 27, Folder 8; and Dan Napier, see Box 28, Folder 17, Sands Collection, University of Nevada, Las Vegas Special Collections.

were also produced and consumed at virtually the same time, allowing little margin of error. Success required a high level of commitment from all employees.<sup>475</sup>

During the process, workers faced numerous hazards. According to the Bureau of Labor Statistics, hotel workers experience higher rates and more severe injuries than other employees in the hospitality industry. Additionally, they are 40 percent more likely to be injured on the job and sustain injuries requiring more days off, job transfers, and medically-restricted work.<sup>476</sup> While numerous aspects regarding the nature of work and management shifted from organized crime to corporate ownership, the risks associated with the workplace remained fairly constant. But dangers became increasingly more present during the megaresort construction boom after 1990, simply because there were more services provided and a greater number of employees.<sup>477</sup>

While the Strip was exciting and glamorous, the work was physically demanding. The resorts required employees to toil nights, weekends, and holidays. Most jobs required them to stand for longer periods of time. It was a high stress environment as well. Due to the pressure to work efficiently under a tight schedule, many employees experienced mental health issues. They were required to tolerate rude and insulting behavior from guests on a regular basis. As an added tension, most employees depended on gratuities for income. Physical stressors, such as poor air quality and noise, also contributed to the problem. Secondhand tobacco smoke filled the hotel interior, and the casinos provoked audio and visual overload, crowded with people, tables, and slot

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<sup>475</sup> See Clayton W. Burrows and Robert H. Bosselman, *Hospitality Management Education*, (Binghamton, NY: Haworth Hospitality Press, 1999), 21-28, for a description of the hospitality industry.

<sup>476</sup> Bureau of Labor Statistics, "Survey of Occupational Injuries and Illnesses," 2002, 2005, and 2007.

<sup>477</sup> Since this chapter covers the story from the Strip's inception to 2010, it is impossible to list every accident or fatality that occurred at the site. Instead, this section offers a general description of hazards on the Strip, providing examples covering the entire time period.

machines. The resorts deliberately omitted windows as well as clocks, and decorated the rooms with flashing lights and bold colors to generate action among the players. High noise levels dominated the workplace, produced from the excitement of the games, music in lounge areas, and coins dropping and automated music from slot machines. Such stressors prompted the onset of headaches, racing hearts, ulcers, irritability, depression, and insomnia among employees.<sup>478</sup>

The lifestyle associated with the Strip increased the prevalence of stress. Few resort employees had stable salaries; many lived off tips. Their schedules were irregular, often including late hours or all-night graveyard shifts. Since the jobs made it difficult to interact with people with normal working hours, employees socialized among themselves. Barbara Ann Barnett, a registered nurse, worked as a cocktail waitress at the Hacienda during the 1960s. Casino employees “tended to be like a group,” she remembered, mimicking the behavior of guests. They “partied a great deal” and “only thought of the thrill of the moment.” Personal relationships changed quickly and “it was not unusual to see one person being involved with two or three different people at the same time.” Consequently, the spread of sexually transmitted diseases among coworkers was common. Barnett remembered “a lot of drinking and a lot of partying,” which is why she left casino work.<sup>479</sup>

Since the environment exposed employees to vice, many developed addictions.

Studies reveal that casino workers had a higher prevalence of pathological gambling

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<sup>478</sup> Bureau of Labor Statistics, “Gaming Service Operations,” (2010-2011 Edition); I. Posner, LA Leitner, D. Lester, “Stress in Casino Floor Employees,” *Psychol Rep*, 57:246 (August 1985); Jon Nordheimer, “Behind the Lights, Casino Burnout,” *New York Times*, (August 5, 1994); William N. Thompson and Michele Comeau, *Casino Service the Win Win Game*, (Las Vegas, NV: Performance Unlimited, 1992), 204-205.

<sup>479</sup> Interview with Barbara Ann Barnett, Conducted by Charles Moore Chesnutt, March 8, 1981, University of Nevada, Las Vegas Special Collections;

behavior than the general public, given their proximity to and knowledge of the games. The threat was especially high in the casino department; constantly handling money lessened its value. Depression, bipolar personality, and substance abuse were also common. The prevalence of depression was significantly higher among casino workers than the general population. Alcohol and cigarette dependency was widespread as well, partly due to Las Vegas' 24-hour party culture. During his tenure at the Clark County Health Department, Dr. Otto Ravenholt noticed there was "no doubt a freer atmosphere for indulgence of alcohol [among his patients]... the same historically was true as far as cigarettes go." In a random sampling of casino employees in 1999, 2 out of 5 casino employees smoked, approximately 50 percent higher than the rate among the general population.<sup>480</sup> Taken together, gambling, depression, and substance abuse produced innumerable health issues, including insomnia, intestinal disorders, hypertension, cancer, cardiac problems, suicide, and potential criminal behavior, which contributed to disability, morbidity, and premature death.<sup>481</sup>

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<sup>480</sup> Otto Ravenholt, M.D., as quoted in Blachley, *Pestilence, Politics, and Pizzazz*, 139; HJ Shaffer, JV Bilt, and MN Hall, "Gambling, Drinking, and Other Health Risk Activities Among Casino Employees," *American Journal of Industrial Medicine*, 36: 365-378 (1999); and L Freidman, NF Fleming, DH Roberts, SE Hyman, eds., *Source Book of Substance of Substance Abuse and Addiction*, (Baltimore: Williams and Wilkins, 1996), 348.

<sup>481</sup> See Charter Hospital of Las Vegas Compulsive Gambling Treatment Program, Box 1, Folder 1; Overview of Compulsive Gambling, Box 1, Folder 2; White Knuckling Syndrome, Box 1, Folder 8; Darrell W. Bolen, M.D., "Gambling: Historical Highlights, Trends, and Their Implications of Contemporary Society, (1974), Box 1, Folder 14; Robert L. Custer, M.D., "Russian Roulette with Lives," Box 1, Folder 19; The Nevada Council on Compulsive Gambling Inc., "More About Soft Signs," Box 1, Folder 18; Robert L. Custer, M.D., "A Profile of Pathological Gamblers," Box 1, Folder 22; Charter Hospital Collection, University of Nevada, Las Vegas Special Collections, for how compulsive gambling and addiction affected Las Vegas. Shaffer, Bilt, and Hall, "Gambling, Drinking, and Other Health Risk Activities Among Casino Employees;" B Gambino, HJ Shaffer, TN Cummings, "Compulsive Gambling: An Overlooked Problem," *EAP Digest*, 13 (1):32-35, 46-47 (1992); HR Lesieur, SM Blume, RM Zoppa, "Alcoholism, Drug Abuse, and Gambling," *Alcohol Clin Exp Res*, 10:33-38 ((1986); J Ryan, C Zwerling, EJ Orav, "Occupational Risks Associated With Cigarette Smoking: A Prospective Study," *American Journal of Public Health*, 82:29-32 (1992) discusses addiction rates in the casino industry.

Most job positions required a level of physical fitness. Employees were on their feet for 8-hour shifts, performing repetitive movements that required awkward positions. Accidents and injuries were common, reflecting the national average in the hospitality industry. Based on the Occupational Safety and Health Administration (OSHA) 300 logs in 2003-2005, hotel workers experienced injury rates of 5.2 injuries per 100 worker-years. Trauma accounted for 52 percent of the injuries, 39 percent were musculoskeletal disorders, and 9 percent were not classifiable. Trauma disorders entailed injuries from a single event, resulting in lacerations, fractures, or contusions. Musculoskeletal disorders were repeated trauma onset by repetitive strain, causing carpal tunnel syndrome, tendinitis, and back injuries. Female employees experienced higher injury rates, with housekeeping experienced the highest injuries.<sup>482</sup>

Numerous studies reveal an association between poor working conditions and reduced health among hotel room cleaners in Las Vegas. Room cleaners and janitors alike reported high workloads, stress, and work-related pain. After the 1980s, most of these workers were immigrants who did not speak English and had limited literacy. They also were unfamiliar with workplace rights, received little training in occupational hazards, illnesses, or injuries, and rarely used protective equipment. Almost all reported work-related pain at some point in their career. The El Rancho's housekeepers commonly developed arthritis as they got older, which "forbade them to work any longer

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<sup>482</sup> S Buchanan, P Vossen, N Krause, J Moriarty, E Frumin, JM Sgimek, F Miller, P Orris, and L Punnet, "Occupational Injury Disparities in the US Hotel Industry," *American Journal of Industrial Medicine*, 53: 116-125 (2010).



in damp atmospheres.” Likewise, janitors, window washers, and painters experienced high blood pressure, dizzy spells, and even lead poisoning.<sup>483</sup>

While the resorts were generally clean, some employees encountered unsanitary working conditions. In the early 1960s, the resorts imported second-hand restaurant equipment from Los Angeles to cut costs. The old appliances had a hard time running in the desert, and did not foster sanitary food storage. When they did not keep perishables at the proper temperature, a string of food poisoning outbreaks occurred. The situation prompted the Clark County Health Department, led by Dr. Otto Ravenholt, to intervene. Ravenholt banned the use of second-hand equipment in Las Vegas. By 1964, the Flamingo tested his authority. After an inspection of a Flamingo kitchen revealed faulty equipment and unsanitary conditions, Ravenholt threatened to shut it down. The resort immediately complied.<sup>484</sup>

The most prevalent occupational diseases on the Strip were dermatological and respiratory disorders. In the kitchens, dermatitis, a mild irritation of the skin, was extremely common. The condition was never fatal or disabling. Nevertheless, dermatitis was an annoyance and took a long time to heal. Practicing in Las Vegas since the early 1950s, Dr. Harold Boyer, a dermatologist, “saw a lot of occupations with dermatitis among anyone who worked on the Strip.” Most cases were culinary workers “because of wet work,” handling “soap and water” and “fish and meat juice.” There were two types

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<sup>483</sup> T Scherzer and N Kraus, “Work Related Pain and Injury and Barriers to Workers’ Compensation Among Las Vegas Hotel Room Cleaners,” *American Journal of Public Health*, Vol. 95, No. 3 (March 2005); BJ Burgel, MC White, M Gillen, N Krause, “Psychosocial Work Factors and Shoulder Pain in Hotel Room Cleaners,” *American Journal of Industrial Medicine*, 53(7): 743-756 (July 2010); N Krause, T Scherzer, and R Rugulies, “Physical Workload, Work Intensification, and Prevalence of Pain in Low Wage Workers: Results from a Participatory Research Project With Hotel Room Cleaners in Las Vegas,” *American Journal of Industrial Medicine*, 48(5): 326-337, (November 2005). See also “Chapter VIII - Shifting Employees to Fit Jobs,” *Housekeepers Guide To Selecting and Training Employees*, El Rancho Collection, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>484</sup> A.D. Hopkins and K.J. Evans, eds., “Otto Ravenholt,” *The First 100*, 270-271.

of dermatitis: atopic and contact. Atopic dermatitis resulted from allergies from food, biological factors, or intake of other allergens, and developed in individuals living in urban areas with low humidity. In contrast, contact dermatitis developed from touching irritating substances such as high alkaline soaps, detergents, and other cleaning products. Employees handling food and cleaning products were instructed to regularly wash hands and clean with ammonia-based solutions. Boyer noted that “even doctors began to have dermatitis on their hands from scrubbing so much,” and he even knew one doctor who “had to give up surgery because he could not scrub.” While doctors prescribed cortisone to heal skin conditions, they often received repeated visits because the disease resurfaced.<sup>485</sup>

Respiratory disorders accounted for occupational diseases as well. Many workers, including bakers, hairdressers, and animal handlers, handled chemicals, gases, fumes, and dust. They subsequently developed occupational asthma, an inflammation of the lungs. But the principal cause of respiratory disorders was indoor air pollution. Combustion sources, oil, gas, kerosene, coal, and wood, contaminated the air, along with deteriorating building materials and furnishing, asbestos-containing insulation, and faulty central heating and cooling systems. Microbial contaminants, gases, fungi, and mold also created adverse health conditions.

On July 15, 1977, the Landmark Hotel experienced a disaster involving carbon monoxide. The resort was filled to capacity with delegates to a national convention of Disabled American Veterans, hosting over 900 guests and employees. At 4:10 am, a

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<sup>485</sup> Interview with Harold Boyer, M.D., Conducted by Claytee White, November 14, 2000; Interview with Lucius Blanchard, M.D., Conducted by Claytee White, October 2, 2003; University of Nevada, Las Vegas Special Collections; Pieter-Jan Coenrads and Henriette Smit, “Dermatoses,” *Epidemiology of Work-Related Diseases*, (London: BMJ Books, 2000), 175-178.

water pipe burst in the sub-basement, short-circuiting the main power panel, telephone system, air conditioning, and all but one elevator. The power surge also ruptured a refrigerator line in the butcher shop, releasing toxic gas. After the emergency auxiliary generator turned on, carbon monoxide, phosgene, a poisonous nerve gas, and freon traveled through the ventilation ducts. A guest, Don Thompson, described the fumes as “smelling sweet” and “invisible,” but he “knew something was there.” An hour later, Thompson’s friend, Robert Schriver, was stricken with a mysterious sickness, with “beads of sweat breaking out all over him.” Thompson tried to call the telephone operator for medical assistance, but the lines were dead. The elevators were out of order as well. Taking the stairs, he ran down to the lobby to get help. When Thompson ran back up the stairs, he experienced extreme shortness of breath. Knowing something was wrong, Thompson started knocking on room doors on each floor to alert other guests. Meanwhile, Schriver’s wife, Sue, collapsed and had to be carried out of the room “with a wet cloth over her nose and mouth.” Sue Schriver remembered the air smelling “stale” and “sickening.” By 7:00 am, hotel manager Robert Anthony began evacuating the resort, instructing security guards to rouse sleeping guests and gamblers in the casino. Anthony remarked that there was “no panic” among the evacuees. Fifteen minutes later, an ambulance was called for Robert Schriver and the fire department sent an intensive care unit to inspect the situation.

Five ambulances, three intensive care units, and the police soon arrived. The authorities put “Operation Disaster” into effect. Firefighter wearing gas masks entered the resort, evacuating hundreds of unconscious and semi-conscious victims, and providing oxygen bottles to those sickened by the fumes. Most evacuees sat on the

resort's front steps and lawn, gasping for air, crying, and vomiting. The critically injured were loaded on stretchers or wheelchairs, and transported to local hospitals. Since many guests had been sleeping, the hospitals admitted them as "John Doe" and "Jane Doe." A Sunrise Hospital spokesman reported that many patients "felt the effect hours after being treated." One person had eaten breakfast at the resort, went to another hotel and "came down with the symptoms later." In the end, few individuals experienced serious complications. According to Dr. Thorne Butler, a toxicologist at Southern Nevada Memorial Hospital, carbon dioxide levels varying from 10 to 20 percent were found in 106 people treated. Most were middle aged and elderly. But the event produced one casualty, Frank Gulla, who was attending the convention. Dr. Sheldon Greene, the county medical examiner, reported the victim had a heart ailment, but no signs of recent activity. The cause of death was determined to be carbon monoxide poisoning.<sup>486</sup>

Such dramatic events, fueled by high concentrations of air pollution, were rare. The most prevalent threat to employees was long-term exposure to secondhand smoke. As most of the nation banned indoor smoking, the Strip emerged as a haven for smokers. Las Vegas was commonly referred to as "California's smoking section." While working at the Nevada Test Site, Dr. Leonard Kreisler determined the tunnels had "better air quality than some of the old downtown casino hotels." Until the 2000s, the Strip did not designate non-smoking areas for restaurants and gambling areas. Dr. Harold Boyer remembered that "sometimes you couldn't see across the casino because there was so

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<sup>486</sup> For information on the carbon monoxide disaster at the Landmark, see "Generator Exhaust Found as Hotel Disaster Cause," *Las Vegas Sun*, (July 16, 1977); "Strip Hotel Becomes Towering Death Trap," *Las Vegas Sun*, (July 16, 1977); "Heavy Carbon Monoxide in Hotel Guests," *Las Vegas Sun*, (July 16, 1977); "Hotel Poisoning Probe Scheduled," *Las Vegas Sun*, (July 19, 1977); "Gas in Las Vegas Hotel Kills One, Hospitalizes 100," *Los Angeles Times*, (July 16, 1977); "900 Flee Vegas Hotel Gas," *Chicago Tribune*, (July 16, 1977); "Probe is Continuing Into Toxic Death at Landmark," *Review-Journal*, (July 16, 1977).

much smoke-filled air.” During the 1950s, women wore beautiful gowns to the casinos, but when they came home they “smelled like a tobacco pot.” But “that was the way it was, so you can imagine what it was like smoking and having it in our lungs.” According to the Office of Surgeon General and the Centers for Disease Control and Prevention (CDC), there was “no risk-free level of exposure to secondhand smoke.” Burning tobacco released nicotine, particulates, carbon monoxide, tars, and chemicals, helping regulate the burning rate. The compound attaches to the air, was inhaled by employees, and deposited onto surfaces as a film.<sup>487</sup>

Sophisticated ventilation technology did not reduce the risk. While the systems removed large particles, small particles and gases remained in the air. Furthermore, operating heating, ventilating, and air conditioning systems distributed secondhand smoke throughout the building. Even a “well-ventilated” casino contained metabolized nicotine levels 300 to 600 percent higher than other smoking workplaces. Breathing secondhand smoke affected the heart, blood, and vascular systems, increasing the prevalence of heart disease. Brief exposure contributed to respiratory symptoms as well, irritating and damaging airway linings and triggering asthma, cough, phlegm, wheezing, and breathlessness. Secondhand smoke was a human carcinogen as well, containing over 50 chemicals that cause lung, breast, and other cancers. In fact, smoke-filled casinos contained 50 times more cancer-causing particles than highways and city streets congested with diesel traffic during rush hour!<sup>488</sup>

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<sup>487</sup> Interview of Leonard Kreisler 16; Interview with Harold Boyer, 16; U.S. Department of Health and Human Services, *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*, (Washington DC: Government Printing Office, 2006).

<sup>488</sup> D Trout, J Decker, C Mueller, JT Bernert, J Pirkle, “Exposure of Casino Employees to Environmental Tobacco Smoke,” *Journal of Environmental Medicine*, 40(3): 270-276 (March 1998); K Anderson, et. al, “Metabolites of Tobacco-Specific Lung Carcinogen in Nonsmoking Casino Patrons,” *Cancer Epidemiology, Biomarkers & Prevention*, 23:1544-1546, (December 2003); J. Repace, “Respirable Particles and

Secondhand smoke was a significant hazard for employees, especially dealers, waitresses, and security guards. Guests had the option to smoke outside, but employees could not leave to breathe clean air. Indeed, the resorts outlined strict regulations regarding how to deal with smoking patrons. Management prohibited many employees from asking a guest not to smoke, blow away from the tables, or move ashtrays. They could not fan the smoke away because it might annoy players. The resorts worsened the problem, selling tobacco products on the casino floor and gift shops. They provided free cigarettes and cigars to high rollers as well. Despite the health risk, the resorts did not monitor employees for secondhand smoke complications, arguing they were not liable; the law specifically allowed patrons to smoke freely indoors. By 2005, a group of blackjack dealers from Bally's, Paris, and Caesars Palace, concerned about the effects, contacted the National Institute of Occupational Safety and Health (NIOSH) and requested a confidential study of their workplaces. NIOSH performed three onsite evaluations at each resort, conducting indoor air quality tests and biomarker assessments of more than 100 non-smoking dealers. The results were not surprising. NIOSH found numerous tobacco components in the air, including nicotine, 4-vinyl pyridine, respirable dust, solanesol, benzene, toluene, p-dichloromethane, naphthalene, formaldehyde, and acetaldehyde. They determined that dealers were in the 90<sup>th</sup> percentile of exposure to secondhand smoke in comparison to the general population. While dealers had a higher incidence of respiratory symptoms compared to administrative and engineering employees, the difference "was not statistically significant." NIOSH reported that

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Carcinogens in the Air of Delaware Hospitality Venues Before and After a Smoking Ban," *Journal of Environmental Medicine*, (September 10, 2004). See also Earle C. Clements to Howard W. Cannon, November 25, 1969, Letter; The Cigarette Cancer Committee to Howard W. Cannon, November 13, 1969, Letter; Howard W. Cannon Papers, 91<sup>st</sup> Congress, Box 19, Folder 241, University of Nevada, Las Vegas Special Collections.

tobacco components were found in all areas at levels above the Environmental Protection Agency (EPA) safety threshold. Secondhand smoke traveled through air currents and the resorts' air ducts to adjacent areas, contaminating the air that employees and guests considered to be safe.<sup>489</sup>

The poor indoor air quality, coupled with dry air, heavy air conditioning, and strenuous show schedules, posed hazards to entertainers as well. Many developed laryngitis, or "Vegas Throat." During or following a performance, entertainers experienced swelling and inflammation of the larynx, rendering them unable to talk or sing. During the 1970s, headliners such as Dionne Warwick and Neil Sedaka complained of the disorder. According to Warwick, the "only way" she kept singing in Las Vegas was "to shut up." Offstage, she spoke as little as possible. Likewise, Sedaka turned off his room's air conditioning unit and set up humidifiers. However, other entertainers called the disorder a farce. Wayne Newton contended it was "a lot of crap." He worked 14 days "without a day off" and never contacted the disorder. Newton contended that many entertainers did not follow proper health regimens. They partied with friends, drank heavily, and stayed up too late, and were not used to playing 2 shows a night, 7 days a week. Bad behavior strained their vocal chords, not the desert climate. To combat the problem, the resorts hired ear, nose and throat specialists to treat singers before their performances, at intermission, and after the show. While building the *Colosseum*

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<sup>489</sup> "Smoke Exposure at Work Killed Casino Dealer, Suit Says," *Westlaw News and Insight*, National Litigation, (March 15, 2011); Steven Green, "Casino Dealer's Suit Over Smoking Dangers at Wynn Moves Forward," *Las Vegas Sun*, (October 13, 2010); "Study Shows Secondhand Smoke Increases Risk of Stroke," *Reno Gazette-Journal*, (August 18, 1999); Trout et al., "Exposure of Casino Employees to Environmental Tobacco Smoke;" U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, *Environmental and Biological Assessment of Environmental Tobacco Smoke Exposure Among Casino Dealers*, Health Hazard Evaluation Report, HETA 2005-0076; 2005-0201-3080, Bally's, Paris, and Caesars Palace Casinos, Las Vegas, Nevada (May 2009); NL York and K Lee, "A Baseline Evaluation of Casino Air Quality After Enactment of Nevada's Clean Indoor Air Act," *Public Health Nursing*, 27(2), 158-163, (2010).

*Showroom* in the early 2000s, Caesars Palace installed special technology, including a \$2 million humidifier, to protect Celine Dion's voice.<sup>490</sup>

Besides vocal issues, entertainment was exceedingly dangerous overall, risking the health of all the employees involved. While entertainers played large venues, lounges, and bars, stage crews worked behind the scenes. They unloaded and dismantled sets, working on elevated platforms, scaffold structures, and ladders, and underground in the stage pit. Objects regularly fell from the elaborate sets and inadequate ventilation diminished the air quality. Concert devices posed hazards, as some utilized lasers, pyrotechnics, fog and smoke machines, and water onstage. Performance interaction was also dangerous. Productions often involved dancing and fighting scenes, aerial aerobatics, and the use of roller blades, stilts, and cycles.<sup>491</sup>

Other shows used wild animals as décor or entertainment, risking animal trainers, the audience, and animals. Animals had long been a staple in Strip productions, especially at the Stardust's "Lido de Paris," where even elephants were used. The Ruppert Bears appeared in Frederic Apar's "Casino de Paris" at the Dunes during the 1970s. Led by Paul Ruppert, 200-pound Scandinavian brown bears drove cars, rode bicycles, and walked on a tightrope. Between the shows, a bear named Susie "played" the slots, baccarat, and craps on the casino floor. Her trainer helped count her winnings.<sup>492</sup> The Tropicana and Flamingo had exotic birds outside in the 1980s, and by

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<sup>490</sup> "Vegas Throat Like the Plague for Some Singers," *Jet*, Vol. 54, No. 17, (July 13, 1978), 61; Eliot Tiegel, "Call Wayne Newton Mr. Las Vegas," *Billboard*, (December 8, 1973); Gina Kolata, "Body and Mind: The Lost Voice," *New York Times*, (January 15, 1989); "Vegas Beat – Timothy McDarrah: Dion's Caesar Show a Mist-See," *Las Vegas Sun*, (October 23, 2002).

<sup>491</sup> See "Entertainment and the Arts," Jeanne Mager Stellman, ed., *Encyclopedia of Occupational Health and Safety*, Fourth Edition, Vol. III, (Geneva: International Labour Office, 1998), 96.2-96.7.

<sup>492</sup> For the Ruppert Bears at the Dunes, see "All in a Nights Work," *Las Vegas Sun*, (September 21, 1973); "Casino Attraction," *Vegas Visitor*, (August 30, 1974); "Casino Hit," *Las Vegas Sun*, (June 27, 1975); "Bear Hug," *Review-Journal*, (October 5, 1974); "Dog Talk: Some Bear Facts," *The Plain Dealer*,



1989, The Mirage also put animals on display, thanks to the cooperation of the resort's headliners Siegfried and Roy. During the mid-1990s, the MGM during the mid-1990s put a lion habitat in its casino and Mandalay Bay even built a Shark Reef exhibit with fish and reptiles.

While the animals attracted business, disturbances could provoke them to attack. Besides flesh wounds, bites and scratches spread diseases, increasing the risk of infections and infestations. The highest profile animal attack occurred among tigers. Ray Horn and his partner, Siegfried Fischbacher, had headlined at the Mirage for over 13 years. "Siegfried and Roy" blended illusions with exotic animals, attracting worldwide attention. The show was so popular that they signed a lifetime contract in 2001. Fischbacher worked as a traditional magician and Horn handled the animals. Pat Dingle, director of the Las Vegas Zoo, described Horn as "fearless among animal trainers." But in reality, they were "still wild cats." During a 7:30 pm show on October 3, 2003, a tiger lunged at Horn's neck, dragging him offstage. Audience members said "he looked like a rag doll" in the tiger's mouth and could hear Horn's screams from behind the curtains. He was immediately ambulated to University Medical Center's trauma center. Horn was critically injured, suffering substantial blood loss, a stroke, and partial paralysis. Doctors performed a decompressive craniotomy, removing part of his skull to relieve pressure on his swelling brain. They transferred him to UCLA Medical Center in Los Angeles for long-term recovery and rehabilitation. According to Dr. Stephen Miller, Horn's personal physician, the situation could have been much worse if the tiger had bit a major artery. The incident demonstrated the risk of working with wild animals.

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(October 3, 1971); and pictures and other material in the Dunes Collection, Box 9, Folder 12, University of Nevada, Las Vegas Special Collection.

Additionally, the resorts needed to enact improved safety measures to protect guests. No barriers existed between the tigers and the audience. In fact, the audience may have provoked the attack. Steve Wynn claimed the tiger had been distracted by a woman with a “big hairdo” sitting in the front row. When the woman tried to touch the tiger, Horn jumped between them. Both Wynn and Fischbacher defended the tiger, claiming he was trying to protect Horn, not kill him, dragging his trainer offstage like a cub.<sup>493</sup>

According to the Department of Labor, violence was the leading cause of fatalities in the hospitality industry. Moreover, the hospitality industry was one of the most dangerous industries in the United States, with a higher rate of occupational violence even than that experienced by police officers. Two types of violence occurred on the Strip. Explicit violence directed towards an employee or patron, while implicit violence was not intended for them. An example of the latter were casino robberies. During the organized crime period, robberies were relatively rare, as most thieves deemed it too risky to steal money from the mob. But after corporate ownership, take-over style robberies increased in popularity. During the 1990s, “robbers became more blatant, people more violent,” explained Lt. John Alamshaw. Armed men approached the cashier cage, demanding cash payments. Some robberies involved minimal violence. The thieves collected the money and disappeared. But others inflicted bodily harm on employees or ended in shootouts. From 1998 to 2000, a series of heists occurred at the Treasure Island, Bellagio, New York-New York, Mandalay Bay, Desert Inn, and MGM Grand. At the Treasure Island on October 30, 2000, a gunman undertook a casino heist,

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<sup>493</sup> “Siegfried and Roy Bring Illusions Into Your Home,” *Review-Journal*, (November 6, 1994); “Tiger Attack Not Unprecedented” *Las Vegas Sun*, (October 6, 2003); Miguel Marquez, “Roy of Siegfried and Roy Critical After Mauling,” *CNN Report*, (October 4, 2003); “Horn Still Critical After Attack,” *Las Vegas Sun*, (October 6, 2003); “Roy Still Critical, Show Is Cancelled Indefinitely,” *Las Vegas Sun*, (October 7, 2003); “Siegfried: Tiger Confused, Tried to Protect Roy,” *Las Vegas Sun*, (October 9, 2003).

jumping over a casino cage at 12:30 am. After pistol-whipping a cashier in the head, he collected the money, and fired shots at security guards as he fled. The cashier was treated for non-life threatening injuries. After the incident, the Treasure Island installed bars on the cage to prevent robbers from entering. A month and a half later, another robbery attempt occurred. The robber, surprised to see the bars, fired shots into the cage. However, the cashiers had taken cover under the counter. Frustrated, he shot Mauro Torres, a security guard, in the back. Torres was transported to a local hospital and listed in fair condition.<sup>494</sup>

The social environment of the Strip encouraged other acts of violence. The site sold sin. Patrons were expected to spend large sums of money, gamble, and consume copious amount of alcohol. In return, the Strip promised “what happens here, stays here,” offering partying during the day and night, sex, and fantasy, with no consequences for bad behavior. The chaotic setting led to high incidences of violence, fueled by inebriation, fatigue or lack of sleep, loss of income, aggression, or other social issues. Casino parking lot and hotel room muggings were very common. All employees were susceptible to unruly guests, even headliners. When Elvis Presley preformed a midnight show at the Las Vegas Hilton on February 18, 1973, four inebriated men attempted to jump onstage. Presley’s bodyguards and hotel security intercepted three of them, but one man made it onstage. The startled singer offered to shake his hand. Instead, the man lunged at him and began an assault. A fight quickly ensued onstage. Presley, a self-proclaimed “karate expert,” dropkicked the attacker, sending him flying offstage and

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<sup>494</sup> “Rash of Casino Robberies Tied to Trend Toward Violence,” *Las Vegas Sun*, (December 2, 2000); Lisa Snedeker, “Lone Gunman Robs Treasure Island, Injures Cashier,” *Las Vegas Sun*, (October 30, 2000); Jace Radke and Keith Paul, “Suspect in Casino Guard Shooting,” *Las Vegas Sun*, (December 13, 2000); Mark Beattie and Jacinta Gau, “Workplace Violence in Hotels,” Michael J. O’Fallon and Denney G. Rutherford, eds., *Hotel Management and Operations*, (Hoboken, New Jersey: John Wiley & Sons, 2011), 227-228.

breaking a table. One witness said the singer was “so upset that it took all of his guys to hold him back once the fight got started.” Presley later apologized to the audience: “All I can say to any of you is, if you want to shake my hand, fine. If you want to fight, I’ll whup your ass.” All four men were arrested on drunk charges, but eventually filed a \$4 million suit against Presley and the Las Vegas Hilton charging battery. Other lawsuits from the incident followed. Rose Marie Leach, an audience member, suffered an eye injury while one of the men climbed onstage. In her suit, Leach alleged that the resort “negligently failed” to protect her from the “riotous guests.” The Las Vegas Hilton settled out of court.<sup>495</sup>

### Sin City Health

Considering the occupational hazards, the Strip was a fairly dangerous place of work. To ensure operations ran smoothly, the resorts exercised different management patterns, varying considerably from the organized crime period to corporatization. During the former, the Strip ran like a family business with offsite investors demanding quick returns. The mob’s pattern of financing, ownership, and management became institutionalized at the Desert Inn in 1950. Wilbur Clark, part owner of the El Rancho, bought land on the Strip in 1945. He envisioned building a luxury resort that rivaled the Flamingo, but ran out of money during its construction. Clark turned to a group of Cleveland businessmen, led by mobster Morris “Moe” Daliz. The group invested \$1 million in the Desert Inn in return for 74 percent ownership. Clark became the “front

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<sup>495</sup> “Elvis Presley in Stage Fight With Four Men,” *Las Vegas Sun*, (February 21, 1973); “4 Try Rough Play Elvis Proves Karate Expert,” *Review-Journal*, (February 22, 1973); *Rose Marie Leach and Lynn Leach v. Hilton Corporation and Elvis Presley et. al*, Eight Judicial District Court of the State of Nevada, Filed February 16, 1975, Case No. A137307. See McNamee Collection, Box 136, Folder 45, Nevada State Museum and Archives, Las Vegas, Nevada. McNamee and McNamee represented Rose Marie Leach in her case.

man” of the Desert Inn, a locally-respected businessman and owner of the resort. But in reality, he had limited control. At the Desert Inn and its predecessors, the resorts functioned as two separate entities: the casino and all other departments. At the Desert Inn, Daliz moved to Las Vegas to oversee gaming operations, employing others to run the hotel. In comparison to corporate ownership, their management style was simplistic, but mobsters managed their businesses well. Despite popular belief, almost all ran honest games. The working environment was also harmonious. The resorts engaged in an almost familial relationship with their employees, paying them well and offering numerous opportunities for upward mobility. The relationship was thanks to Culinary Union Local 226, representing Strip and downtown employees in most job classifications. Negotiations with the Culinary were generally easy, since the resorts were not overly concerned with the cost of operations; they made plenty in the casinos. No one signed a contract and no one broke a deal. The system worked because employer and employee had common ground. Both wanted to make money, a relationship reflecting quintessential Las Vegas. Additionally, the mob was quite familiar with unions, which were key institutions for hyphenated American immigrant neighborhoods in cities back East.<sup>496</sup>

Occupational health during the organized crime period reflected its management pattern. While the program was limited in scope, it was based on industry standards. The resorts offered health and life insurance policies, and unions provided benefits as well. The American Guild of Variety Artists (AGVA), an entertainment union representing the showrooms and cabarets, offered “welfare benefits” to participating

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<sup>496</sup> Kraft, *Vegas at Odds*, 16-17; Michael Green, “Las Vegas Mob,” *Nevada Online Encyclopedia*, <http://www.onlinenevada.org>.

members. Its employment contract mandated a contribution from all the resorts, with the employees' duration of engagement days determining the amount. The resorts also offered worker's compensation through the Nevada Industrial Commission (NIC). However, workplace safety was not a high priority. This was not its fault though. In comparison to other industries, hospitality appeared to be relatively safe. Indeed, the resorts instituted safety protocols, outlining proper lifting and how to avoid slips, trips, and falls. But they did not devote much effort to instructing employees about workplace safety. The resorts were aware of the various hazards, thanks to high numbers of NIC claims and frequent labor turnover. To combat both problems, the El Rancho shifted disabled employees, unable to perform their original job, to other positions. Painters sometimes became "affected by lead poisoning" and with advancing years, could not stand on high scaffoldings "because of dizzy spells." Protocol suggested transferring them "to jobs as wall washers or furniture polishers—work not too far removed from their former work without its hazards." In theory, the policy solved turnover issues and potential workers' compensation claims. The thinking was that longtime employees would have "greater loyalty" to the resort, which limited "hospitalization, profit sharing plans, or benefit payments."<sup>497</sup>

After corporatization, employees experienced a drastic restructuring of their workplace. While elected corporate officials handled management, they determined policy and profitability, not daily operations. For instance, Baron Hilton explained that his company was "not involved in the day-to-day operations," but monitored "the profit

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<sup>497</sup> AGVA Standard Form of Artists Employment Contract, drafted for Mary Menzies on April 12, 1955 to work as a "Dunes Dancers" at the Dunes Hotel, Dunes Collection, Box 1, Folder 14, University of Nevada, Las Vegas; and Slack, Jessie - Claim No. 61-801, McNamee Collection, Box 97, Folder 17, Nevada State Museum, Las Vega; Housekeepers' Guide to Selecting and Training Employees.

and loss statements of the hotel.” In contrast to the organized crime period, the corporations took “a truly long-term outlook.” Hilton was not interested in quick returns. The corporations reorganized the Strip, tightening management control to create an efficient and productive workforce. The management pattern resembled most corporately-owned American industries. Other southern Nevada industries, including Union Pacific, Six Companies Inc., Basic Magnesium Inc., and Reynolds Electrical and Engineering Co. Inc., implemented similar structures. As a result, the Strip’s management pattern closely resembled the industrial workplace. The corporations streamlined policy, establishing departments overseeing marketing, accounting, auditing, and financial and legal needs. Kirk Kerkorian’s management at the MGM Grand was particularly intricate, featuring a board of 7 corporate officers, 9 senior directors, and 57 lower-level managers and supervisors. Each supervisor had clear job descriptions and authority, and communication between the levels were defined clearly.<sup>498</sup>

The corporations incorporated human resources management (HRM) as well, a concept that gained popularity among American industries in the 1960s.<sup>499</sup> HRM merged personnel management with modern psychology, seeking to maximize the resort’s return on human capital investment and minimize financial risk. The department set up numerous strategies and policies. It recruited, hired, and fired employees, and handled training and development, performance conduct and behavior management, and conducted studies on employee retention and loyalty. HRM managed compensation and

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<sup>498</sup> Kraft, *Vegas at Odds*, 16-17, 29-31.

<sup>499</sup> While the term “human resources management” (HRM) did not garner widespread use until the 1960s, personnel management existed since the late nineteenth century. During the 1950s, the term HRM designated the expansion of personnel management to include modern psychology. Behaviorists working in psychology determined that employees could not be regarded as replaceable; they needed job security, self expression, communication, and recognition. Nurturing an employee’s psyche thus created a more stable and productive workforce. See Rudiger Pieper, *Human Resource Management: An International Comparison*, (Berlin: Walter de Gruyter & Co., 1990), 42-43.

employee benefits as well, offering retirement benefits, and medical, prescription, vision, dental, and life insurance for employees and their dependents. Some resorts provided legal assistance, a credit union, child care, and transportation benefits, and employee discount programs. When the MGM Grand hired an employee, HRM outlined the resort's personnel policies, administering a pamphlet signed by President Alvin Benedict. The pamphlet specified the resort's "objective and philosophy," emphasizing that employees were part of the MGM Grand "family," and employer and employee had similar goals. "The secret to a successful organization is teamwork," the pamphlet explained, "where people work together for common interests and goals." To boost morale, the MGM Grand promised "positive personal recognition" and other perks if employees performed exceptional work.<sup>500</sup>

In terms of occupational health, the corporations streamlined safety awareness and threat protocol, adopting programs similar to other corporately-owned industries. While none devoted entire departments to safety, they hired inspectors to investigate conditions, and outlined policies in employee manuals, pamphlets, and flyers. The corporations established emergency procedures for fires, bomb threats, violence, and civil disturbances, and stressed accident prevention. The Summa Corporation's Landmark emphasized that it was "good business and sound leadership to prevent accidents." Safety was more important than "expediency and short cuts," and employees needed to

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<sup>500</sup> See the Stardust Collection, especially Jill Heintz to All Department Heads, November 5, 1991, Memorandum; Definitions of Hiring Standards and Interviewing Manual; Jim Hippler to Distribution, March 2, 1992; James W. Hippler to Employees Covered Under The Boyd Group Employee Benefit Plan (PERCS), October 5, 1992, Memorandum, Stardust Collection, Box 21, University of Nevada, Las Vegas Special Collections; and Housekeeping Retreat Material, Stardust Collection, Box 23, University of Nevada, Las Vegas Special Collections; Emergency Procedures to All Departments, May 5, 1988, Memorandum; Emergency Recall Roster to All Departments, March 23, 1987, Memorandum; Miscellaneous Series, Box 155, University of Nevada, Las Vegas for a sample HRM program; and Kraft, *Vegas At Odds*, 31.



reduce the chance of accidents and “show good faith” by complying with the ordinances. They were instructed to report all accidents immediately to their department heads and fill out reports at the security department and worker’s compensation illness claims. The Landmark’s ultimate goal was to “suffer no accidents in any of our operations.” The Stardust ordered employees to report all hazards and injuries immediately to supervisors, regardless of “how slight you may consider them.” To teach about workplace safety, the corporations offered classes, covering essentials such as lifting heavy objects. The Sands hosted a fire prevention class in its parking lot in 1968. Employee graduates received a certificate of completion.<sup>501</sup>

While corporatization prioritized occupational health on the Strip, national and state developments also boosted the cause. The 1960s were defined by social revolution. At the forefront, Americans protested the Vietnam War and engaged in the civil rights and women’s rights movements. The environmental movement gained momentum as well, increasing public attention to the degradation of the natural environment by humankind and technology. In particular, it highlighted the impact of chemicals polluting the air, water, animals, and plant life, and eventually boosted efforts in occupational health.<sup>502</sup> As American industry evolved during the 1950s and 1960s,

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<sup>501</sup> See Memorandum to All Employees, October 29, 1983, Landmark Hotel and Casino, Las Vegas, Landmark Collection, Box 1, Folder 7, Nevada State Museum and Archives, Las Vegas, Nevada; Orientation Handbook, Miscellaneous Series, Box 155, Stardust Collection, University of Nevada, Las Vegas; John Miner to Department Heads, August 5, 1992, Memorandum; Cathey Shanklin to Susan Rhodes, December 6, 1991, Memorandum; Cathey Shanklin to Distribution, July 24, 1992, Memorandum; Cathey Shanklin to Distribution, July 30, 1992, Memorandum; Cathey Shanklin to Distribution, August 20, 1992, Memorandum; Cathy Shanklin to Distribution, August 25, 1992, Memorandum; Cathey Shanklin to Distribution, August 20, 1992, Memorandum; Department Series, Stardust Collection, Box 21, University of Nevada, Las Vegas Special Collections; Fire Prevention Class, Dunes Collection, Box 2, Folder 5, University of Nevada, Las Vegas Special Collections.

<sup>502</sup> No work was more important in raising public awareness to chemicals in the environment than Rachel Carson, *Silent Spring*, (Boston: Houghton Mifflin Co, 1962). Carson outlined the effects of DDT, linking preservationist and human health concerns, and raising questions about the relationship between science, technology, and the consequences of controlling nature. Other key works that boosted the environmental

occupational injuries and illnesses increased in frequency and severity. The federal-state partnership, established by Frances Perkins during the New Deal, no longer adequately dealt with modern threats in the workplace. The environmental movement's attention to chemicals prompted the Public Health Service (PHS) to produce a report revealing that new chemicals were emitted in the workplace every 20 minutes, and linked cancer to occupational pollutants. The report prompted health and labor advocates to call for a national effort to fight hazards in the workplace. By 1968, Congress began deliberating a series of bills devoted to the cause and reached a compromise in 1970, passing the Occupational Safety and Health Act. The act created the Occupational Safety and Health Administration (OSHA), a federal agency authorized to set and enforce safety and health standards across the nation.<sup>503</sup>

OSHA encouraged the states to follow suit. Nevada originally passed the Nevada Occupational Safety and Health Act in 1955, but it was completely redrafted in 1973. The state became one of 27 states to approve its own Occupational Safety and Health Administration (Nevada OSHA), operating under the NIC. OSHA authorized and monitored the state plan, providing up to 50 percent of its operating costs. While the Strip was not immediately impacted by both agencies, Nevada OSHA demanded changes to its current occupational health program. The agency mandated that every resort furnish a workplace "free from recognized hazards" that could cause "serious injury or

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movement are Barry Commoner, *The Closing Circle* (New York: Alfred Knopf, 1971) and Paul Erlich, *The Population Bomb*, (New York: Sierra Club/Ballantine Books, 1968).

<sup>503</sup> For events leading to OSHA, see George Meany to Howard W. Cannon, October 8, 1970, Letter; I.W. Abel, "The Time Is Now For Job Safety Law," IUD Special Report on Occupational Safety and Health; Harry Allen to Howard W. Cannon, November 17, 1970, Letter; Select Subcommittee on Labor, Dominick V. Daniels, Chairman, "Answers to Charges Made Against the Occupational Safety and Health Bill, H. R. 16785; Occupational Safety and Health Act, Report to Accompany H. R. 16785; Howard W. Cannon Papers, 91<sup>st</sup> Congress, Box 30, Folder 376, University of Nevada, Las Vegas Special Collections; Benjamin W. Mintz, *OSHA: History, Law, and Policy*, (Washington D.C.: Bureau of National Affairs, 1984); and U.S. Department of Labor, "Twenty Years of OSHA Federal Data," (January 1993).

death to his employees.” It required that each hire an employee or department devoted to health and safety. Nevada OSHA outlined its program based on four components: employee education, self-inspection, accident investigation, and recordkeeping. It distributed handbooks on accident prevention, began conducting inspections, and published a pamphlet, “Occupational Safety and Health Standards,” for all industries.<sup>504</sup> Eventually, OSHA and Nevada OSHA enhanced occupational health on the Strip, but the process took time. The resorts were initially uncooperative and fought some of the new standards throughout the 1970s. But any resistance was based on financial cost, not an obvious lack of concern for employee health. The resorts did comply with suggestions that enhanced existing programs, devoting more energy to education about the importance of OSHA and workplace safety.<sup>505</sup>

While occupational health varied based on an individual resort’s management, employees experienced minimal changes in medical care. The resorts contracted health

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<sup>504</sup> Legislature Counsel Bureau, “Workmen’s Compensation Through Private Insurers,” Bulletin No. 83-5 (Carson City, NV: State Printing Office, November 1982); Occupational Safety and Health Administration, *Review of the Nevada Occupational Safety and Health Program*, (San Francisco, CA: U.S. Department of Labor Occupational Safety and Health Administration Region IX, October 20, 2009); Nevada Industrial Commission, “Rules of Procedure of Occupational Safety and Health Review Board,” Adopted Pursuant to the Nevada Administrative Procedure Act and Chapter 591 of the Statutes of Nevada, (Carson City, Nevada: State Printing Office, 1973); Department of Occupational Safety and Health, “Accident Prevention Handbook,” (Carson City, NV: State Printing Office, 1978); Department of Occupational Safety and Health, “Occupational Safety and Health Standards for General Industry,” (Carson City, NV: State Printing Office, 1977).

<sup>505</sup> For southern Nevada industries struggling to deal with OSHA policies, see Claude Evans to Howard W. Cannon, September 27, 1979, Letter; Howard W. Cannon to Claude Evans, October 10, 1979, Letter; “OSHA Completes First Phase of Verticalization Process,” ACG National Newsletter, Vol. 31, No. 7 (February 14, 1979); J. R. Henderson to Howard W. Cannon, December 4, 1978, Letter; Robert B. Lagther to Howard W. Cannon, Letter; H. J. Wurzer to Howard W. Cannon, September 28, 1978, Letter; Kenneth E. Tobin to the President of the United States, November 22, 1978; OSHA Announces Revision in Electrical Standards, Press Release, September 24, 1979; Lloyd McBride to Howard W. Cannon, July 6, 1979, Letter; William W. Winpingsinger to Howard W. Cannon, June 6, 1979, Letter; G. R. Stewart to Howard W. Cannon, October 30, 1978, Letter; Howard W. Cannon to G. R. Stewart, November 14, 1978, Letter; Eula Bingham to Howard W. Cannon, January 4, 1979, Letter; J. W. Walters to Howard W. Cannon, August 6, 1979, Letter; Rosemary C. Smith to Howard W. Cannon, March 6, 1980, Letter; “Labor Launches Holy War on Legislators To Block Proposed Rewrite of OSHA Act,” *The Wall Street Journal*, (March 21, 1980); James H. Skaggs to Howard W. Cannon, July 22, 1980, Letter, Howard W. Cannon Papers, 96<sup>th</sup> Congress, Box 57, Folder 847, University of Nevada, Las Vegas Special Collections.

insurance to third-party insurance carriers, or workers received union benefits. They typically sought medical care at Las Vegas' two major hospitals: Southern Nevada Memorial Hospital (renamed University Medical Center) and Sunrise Hospital. Thanks to federal funding during World War II and the Hill-Burton Act, Southern Nevada Memorial rose to prominence during the postwar period.<sup>506</sup> Hill-Burton loaned federal funds to improve America's hospital system, designating monies to achieve a minimum of 4.5 beds per 1000 people. Southern Nevada was an ideal candidate. Due to the postwar population influx, local hospitals were overcrowded and in need of modernization. Hill-Burton invested over \$2 million in Southern Nevada Memorial, which helped the hospital become southern Nevada's most innovative medical facility. In the late 1960s, the hospital opened a burn treatment unit, one of 24 in the nation and the only of its kind in a 10,000 square mile radius, serving parts of Arizona, California, and Utah. According to founding physicians Drs. John Batdorf and Kirk V. Cammack, since there were "few facilities" like the burn unit, "doctors from UCLA and other hospitals came to see it to pattern their facilities after ours." With 285 beds, an intensive care unit, and emergency and cardiac care equipment the hospital hosted sophisticated surgeries as well. Dr. Harold Feikes, a thoracic surgeon, acquired the first heart-lung machine and performed the first open-heart surgery in Las Vegas at the same time. Throughout the 1970s, the hospital continued to advance, functioning as a major medical

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<sup>506</sup> The county hospital went through several name changes throughout during the twentieth century. During the 1930s, it was the Clark County Indigent Hospital and by World War II, it became the Clark County General Hospital, and in 1956, Southern Nevada Memorial Hospital. By 1986, hospital officials changed the name to University Medical Center (UMC) of Southern Nevada to reflect its affiliation with the University of Nevada Medical School of Medicine.

center in the West and teaching institution for physicians, nurses, and ancillary specialties associated with the University of Nevada School of Medicine.<sup>507</sup>

By the 1960s, Sunrise Hospital emerged as the top for-profit hospital. Most physicians that moved to Las Vegas during the postwar period had established their practices at Southern Nevada Memorial. However, since it was a county hospital, they were obligated to care for indigents. Some doctors resented the arrangement, desiring a private hospital to expand their practices and profits. The Strip agreed. The resorts wanted to send guests and headliners to a luxurious hospital, not a place serving the poor. Consequently, several local physicians in the 1950s approached a group businessmen and investors, including investor Irwin Molasky, casino executive Moe Dalitz, and others, to build a state-of-the-art hospital, designed to become the most magnificent medical center in the southwest. The group received funding from First Western Savings and Loan Association, and the Teamsters Union, purchasing a tract of land on Maryland Parkway. The site was purposely close to the Strip and the Las Vegas Country Club, providing upscale housing for physicians and a golf course. Since the Teamsters funded its continued expansion, Sunrise was commonly called the “Teamsters Hospital.” The facility opened in 1958, with 60 beds, a rose garden, fountain, mosaic tile, and a slab from the Valley of Fire decorating the entryway. The hospital offered perks for doctors, including free office space and cars if they used the facility. The promotion worked.

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<sup>507</sup> See Interview with J.C. Cherry, M.D., March 20, 1978, Conducted by Cheryl Mawinney, University of Nevada, Las Vegas Special Collections; Southern Nevada Memorial Granted Federal Monies, Press Release, Howard W. Cannon Papers, 87<sup>th</sup> Congress, Box 8, Folder 118, University of Nevada, Las Vegas Special Collection; Hill-Burton Update, 1947-1968, Howard W. Cannon Papers, 91<sup>st</sup> Congress, Box 20, Folder 254, University of Nevada, Las Vegas Special Collections; “History of Southern Nevada Memorial Hospital, *News and Views*, (December 1968); Dee Oakey, “Southern Nevada Memorial Hospital – It’s First 50 Years,” Supplement to the *Las Vegas Sun*, (May 1981); Klimek, “A History of Hospitals: Clark County, Nevada,” 7-11; “The Hospitals of Clark County,” *Greasewood Tablettes*, Vol. VII, No. 4, (Winter 1996-1997); “Ed Koch, “Lions Burn Unit: Healing Wounds for 35 Years,” *Las Vegas Sun*, (March 22, 2003).

Sunrise easily recruited young physicians from all over the nation. Within a year, the hospital staffed 58 physicians and surgeons.<sup>508</sup>

The hospital was an immediate success, thanks to the Teamsters and thousands of captive patients. Sunrise functioned, at least at first, as a company hospital for the Strip. To ensure its profitability, Jimmy Hoffa mandated that the International Brotherhood of Teamsters and Culinary Union Local 226's medical funds only paid for medical treatment at Sunrise. Like other employee-funding health care systems, Hoffa deducted the cost each month from the workers' paychecks. Besides caring for employees, the hospital provided added benefits. According to popular myth, Sunrise allegedly aided in casino skimming operations, however the practice has never been confirmed.<sup>509</sup> Another benefit provided was complementary surgeries. During the 1950s and 1960s, comps were extremely popular among the Las Vegas medical community. Doctors performed surgeries for the various crime syndicates in exchange for discretion and under-the-table cash. The practice became less frequent after the corporatization of hospitals during the 1970s. Dr. Kirk Cammack, a trauma surgeon, performed numerous comp surgeries, usually at Sunrise. The doctor referred to Las Vegas as the "last wild West of medicine" and epitomized young physicians practicing in the city. Las Vegas changed them. Dr. Leonard Kreisler referred to it as becoming "Vegasized."<sup>510</sup> Many doctors were family

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<sup>508</sup> See Interview with Adele Bratz, March 19, 2007; Interview with Barbara Ann Barnett; Interview with Lucius Blanchard; Interview with Harold Boyer, Interview with Joseph Rojas, M.D., February 25, 1980, Conducted by Suzanne Lubritz; Interview with John P. Watkins, M.D., March 4, 1979, Conducted by Brian Watkins; University of Nevada, Las Vegas Special Collections; Klimek, "A History of Hospitals," 15-16; Leonard Kreisler, as quoted in Blachley, *Good Medicine*, 150.

<sup>509</sup> Casino skimming entailed illegally siphoning off gambling profits to avoid paying federal taxes. Crime syndicates in Las Vegas infamously routed pre-tax profits across the nation throughout the 1950s and 1960s. The largest skim recorded by the Federal Bureau of Investigation occurred at the Stardust during the 1970s. By some estimates, it took \$7 million/year from the slots alone. See Rothman, *Nevada*, 137; Michael Green, "The Jews," *The Peoples of Las Vegas*, 167.

<sup>510</sup> Leonard Kreisler, M.D., as quoted in Blachley, *Good Medicine*, 150.

men, well-trained in their specialties. But the lifestyle – money, sex, and glamour – corrupted them. Cammack divorced his wife and went on to marry four more.<sup>511</sup>

By the late 1960s, Teamsters funding helped Sunrise become the largest proprietary hospital west of the Mississippi. After a five-story expansion in 1966, the hospital had 325 beds, and the first intensive care and coronary units in Las Vegas. In 1969, American Medicorp (AMC), a hospital corporation in Philadelphia, Pennsylvania, bought the hospital. The purchase marked a shift in southern Nevada medicine, ushering in the expansion of for-profit, corporately-owned hospitals to meet the needs of the growing community and rising medical costs, providing increased business management. Without the Teamsters mandating that employees use the hospital, corporatized Sunrise developed programs to attract patients during the 1970s. It embarked on an aggressive advertising marketing campaign. Hoping to entice patients on the weekends, one program offered a “revolving charge courtesy card” that provided a 5.25 percent rebate and recuperation trip for Friday and Saturday admittance. If patients scheduled for surgery on Monday checked in on Saturday, another program entered them in a Mediterranean cruise lottery. Since managed care did not exist yet, it was the “golden opportunity” for Sunrise, as there was very little oversight. Dr. Otto Ravenholt said it was “like getting customers into your casino who had a credit card that you could charge

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<sup>511</sup> Dr. Kirk V. Cammack performed a comp surgery on Perry “Golddollar” Rose, “the bodyguard of a Texas gambler” (Benny Binion), who suffered a gunshot wound to the abdomen. Golddollar was a 6’6 tall African American and “very quiet, but at the same time very intimidating.” While waiting for a follow-up appointment in Cammack’s office, Golddollar overheard an irate family “screaming and hollering” at the doctor. Threatening a malpractice suit over the death of their drug addict daughter, family members stormed out of his office. But several days later, they changed their mind. The family told Cammack they dropped the lawsuit and asked him to “please tell Mr. Perry Rose that we are not going to sue and there will not be any problem.” When the doctor asked Golddollar what happened, he said “ Doc, I don’t know what you’re talking about.” Cammack never mentioned the subject again, calling it “a malpractice suit avoided by Frontier Desert Justice, Texas Style.” See Kirk V. Cammack, M.D., F.A.C.S., “Frontier Desert Justice,” *Greasewood Tablettes* (Winter 1998-9).

everything to—and they did!” The programs were nevertheless controversial, garnering national attention for “attracting” patients. But eventually advertising became a staple in the medical community, increasingly gaining popularity during the 1980s and 1990s.<sup>512</sup>

For onsite injuries and ailments, the Strip retained “in-house” and “on-call” physicians to treat workers and guests. The in-house concept gained popularity during the 1960s, becoming a staple during corporatization. Mirroring other corporately-owned industries, the resorts retained physicians as members of the staff. Usually trained in internal medicine, they maintained offices on the property, providing basic medical treatment to workers and guests. A full-time physician benefitted the resorts twofold. The doctors monitored and treated employees to ensure the resorts retained a healthy workforce. As added luxury, they provided premier and immediate care to entertainers and guests. Dr. Thomas Newman, the Hilton company doctor, was nicknamed “Flash” because he seemingly appeared instantly to treat patients. Meanwhile, Dr. Joseph L. Fink, the Caesars Palace company doctor, treated patients in the “Caesars Palace Medical Center” for over three decades, administering emergency aid throughout the property.<sup>513</sup>

The Strip retained on-call doctors as well, a service typically reserved for guests and entertainers only. The most famous was Dr. Elias Ghanem, dubbed by the media as the “physician to the stars.” Moving to Las Vegas in 1971, he administered medical care to entertainers, including Elvis Presley and Robert Goulet. “I think it is the personal touch they like,” said Ghanem. “They call at 2 o’clock in the morning and I go.”

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<sup>512</sup> See appropriate interviews at University of Las Vegas, Special Collections with members of the local medical community, including Interview with Adele Bratz; Interview with Barbara Ann Barnett; Interview with Lucius Blanchard; Interview with Harold Boyer; Interview with Joseph Rojas; Interview with John P. Watkins; Klimek, “A History of Hospitals,” 17-18; Michael E. Porter, *Cases in Competitive Strategy*, (New York: The Free Press, 1983), 257; Dr. Otto Ravenholt, as quote in Blachley, *Pestilence, Politics, and Pizzazz*, 113.

<sup>513</sup> Interview with Patrick McCann, July 3, 2010, Conducted by Michelle Turk.



Ghanem established the first of many outpatient clinics in 1977, Las Vegas Medical Centers, located behind the Hilton. He also contracted with 9 resorts, providing on-call services. To boost business, Ghanem allegedly bribed security guards on the Strip to send emergency cases to his clinics. Besides treating guests, he cared about the health of employees, showing unprecedented compassion to striking laborers. The Frontier strike, lasting 1991 to 1998, was the longest successful hotel strike in American history. 550 workers, protesting wage cuts and elimination of their pension plan, respected the picket line for the entire strike. The resort revoked health insurance privileges, but Ghanem offered complementary medical care at his clinics, delivering over 100 babies for free. He protected the Strip's boxers as well. During his tenure with Nevada Athletic Commission, Ghanem instituted new safety measures, mandating testing for HIV, Hepatitis B, and Hepatitis C, and enhancing protection in the boxing rings. When reports surfaced that Evander Holyfield had a hole in his heart, Ghanem refused to let him fight until he sought testing at the Mayo Clinic. "I have to wear hats because I am on the commission and we generally want fights," he explained, but "I am also a doctor" and was obligated to protect the fighter's life.<sup>514</sup>

### The Strip Ablaze

While corporatization improved aspects of occupational health on the Strip, the induction of megaresort construction by Kirk Kerkorian at the International and MGM Grand presented new risks. Prior, the resorts resembled beachfront hotels, built low and sprawling. As the resorts grew, so did the hazards, and construction-related injuries

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<sup>514</sup> Jane Ann Morrison, "Ghanem Succumbs After Long Battle With Cancer," *Review-Journal*, (August 28, 2001); "Nevada Boxing Official, Physician Ghanem Dies," *Las Vegas Sun*, (August 27, 2001); Barbara Wilkins, "'Call Doctor Ghanem,' Elvis and Other Stars Gasp When They Get Vegas Throat," *People Magazine*, Vol. 5, No. 10, (March 15, 1976); "Hundreds Bid Farewell at services for Ghanem," *Las Vegas Sun*, (August 31, 2001); "Nation's Longest Strike Comes to An End," *Las Vegas Sun*, (February 1, 1998).

increased in frequency. At the International and MGM Grand, Kerkorian contracted with Taylor Construction Company, a company that constructed Caesars Palace and Riviera. Workers built the largest resorts in the world, 1,512 rooms at the 30-story International and 2,200 rooms at the 26-story MGM Grand. During the construction process, the workers faced the same hazards as before, just on a grander scale. Similar to megaresort construction at CityCenter, electrocutions and falls for scaffolding were common, as well as injuries from heavy equipment and inhalation of dust or other particles. Workers were also pressured to finish in record time. This led to inadequate risk perception, trying to get the job done as soon as possible.<sup>515</sup>

While the megaresort size increased construction hazards, it also created new building code deficiencies, a problem evident during the MGM Grand and Las Vegas Hilton (formally the International) fires in 1980 and 1981. While not the first on the Strip, they were the most deadly. In earlier years, fires were not as common. On June 16, 1960, a kitchen in the El Rancho burst into flames at 4:30 am. The resort's trademark, a 50-foot windmill, dramatically crashed through the casino after the roof collapsed. Structural damage closed the El Rancho permanently. However, there was only one reported casualty, a fireman with a cut hand. The sprawling building design helped minimize human health damages, allowing employees and guests to easily locate exits. Additionally, most guests were far away from the blaze, sleeping in cottages 150 feet from the main building. Four years later, a welder's torch ignited a fire on the Sahara's rooftop during an air conditioning install, resulting in \$1 million in damages.

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<sup>515</sup> "Architect Appointed For Las Vegas Hotel," *Los Angeles Times*, (July 9, 1967); Agreement Between Carrar Marble Company of America, Inc. and Taylor Construction Company For MGM Grand Hotel, Inc., Contract No. 25, December 19, 1971, MGM Grand Fire Collection, University of Nevada, Las Vegas Special Collections.

As with the El Rancho, the hotel portion of the expansive property was not affected and guests were never in immediate danger. In fact, the *Las Vegas Sun* reported that “life went on as usual at the swimming pool” as “swimmers splashed and floated on their backs while firemen scampered along the roof fighting the flames.” Smoke inhalation felled several victims, including hotel executive Herb McDonald, an employee, and a few firemen. Small fires continued throughout the next decade. In 1969, a blaze at the Stardust injured 17 people; one died from a heart attack. Several years later, a Holiday Inn manager died from smoke inhalation after falling asleep while smoking in a bed at the resort.<sup>516</sup>

Fatalities were few because the Strip resorts were still mostly horizontal; vertical construction, especially after 1965, changed everything. The MGM Grand fire and its deadly aftermath was directly related to deficiencies in the new megaresort design. During construction from 1970 to 1973, the resort adhered to the Uniform Building Code (UBC) Standard, 1970 Edition. But in an effort to save money, it only met the minimum requirements. The resort ignored suggestions by Clark County Fire Marshall Carl Lowe to include a comprehensive sprinkler system, and only installed sprinklers in the basement, showrooms, and a 26<sup>th</sup> floor high roller casino converted to meeting rooms. “The building code was a little outdated for that time in Las Vegas,” Lowe explained, “I would have loved to have seen sprinklers [in the MGM Grand].”

While the UBC Standard mandated that all materials were of fire resistant or noncombustible construction, the MGM Grand utilized flammable cellulose acoustical ceiling tiles and adhesives throughout the resort. At the time of construction, compelling

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<sup>516</sup> “Fire Destroys Plush Casino in Las Vegas,” *Chicago Daily Tribune*, (June 18, 1960); “Million Dollar Fore Belts Hotel Sahara,” *Las Vegas Sun*, (August 26, 1964); Mary Manning, “Deadly Casino Fires Helped Rewrite Safety Standards,” *Las Vegas Sun*, (January 25, 2008).

evidence existed that the latter was a fire-spread substance; the state of Connecticut actually banned its use. In terms of décor, the MGM Grand also had to present “sufficient technical data to substantiate the proposed use of any plastic material” to satisfy the UBC Standard. It somehow received approval to use carpets and slot machines containing harmful plastics, materials that fueled the flames and created a deadly mixture of toxins. During the fire, the construction design turned the stairwells and Heating, Ventilating, and Air Condition (HVAC) system into chimneys, spreading smoke throughout the casino and upper floors. There were no clear exits, and many emergency doors and exit routes were locked. Moreover, the resort did not have an automatic smoke detection system, and installed a faulty fire system amplifier, delaying notification to employees and guests. There was no paging system to order evacuation instructions, or a fire control room to pinpoint its point of origin and vent smoke out of areas.<sup>517</sup>

It was a recipe for disaster. On November 21, 1980, an electrical fire ignited in a pie display case at the Deli restaurant. The fire incubated for several hours before its detection. When an employee opened the door, it quickly spread, prompting the resort to call the fire department at 7:15 am. When the firefighters arrived, the cellulose acoustical ceiling tiles burst into a massive fireball. Fed by plastics in the carpet, wallpaper, PVC piping, and adhesives, it spread 19 feet per second. When the fire reached the entrance on Las Vegas Boulevard, it burst through the front door, injuring valet attendants and

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<sup>517</sup> See Leland E. Backus to Alan Case, Letter, September 2, 1982; Uniform Building Code (1970 Edition); Universal Mechanical Code (1970 Edition); MGM Fire Litigation Materials, especially Volume I - Deli Furnishings and Restaurant Core; Volume II – Casino Furnishings; MGM Fire Collection, University of Nevada, Las Vegas Special Collections See also Ed Koch and Mary Manning, “MGM Fire Altered Safety Standards,” *Las Vegas Sun*, (November 18, 2000); Jeffery S. Tubbs and Brian J. Meacham, *Egress Design Solutions*, (Hoboken, NJ: John Wiley and Sons, 2007), 74; Chris Woodward, “MGM Nixed Improved Sprinkler System in '73,” *Las Vegas Sun*, (November 23, 1980).

guests, and engulfing parked cars. As the casino became a deadly inferno, horrified firefighters watched as oblivious players continue to gamble. But the most dangerous place was not in the casino. It was the 18<sup>th</sup> to 26<sup>th</sup> floors. The smoke raced up the stairwells and elevator shafts, creating heat conditions on the 18<sup>th</sup> floor and above. Faulty smoke dampers also circulated fumes through the HVAC system, accelerating the spread of the poisonous air. Guests were completely unaware, as no fire alarm sounded. However, as a National Fire Protection Association (NFPA) study reveals, they did not exhibit panic behavior, rationally attempting to save their lives. After smelling or seeing the smoke, they alerted each other, offered refuge, put towels around doors to limit smoke, and opened balcony doors or broke windows to foster better ventilation. Groups traveled together to the stairs to escape, but were unable to leave after the doors locked behind them. Trapped, many succumbed to the heat and smoke. Others fought the conditions and reached the roof. The 20<sup>th</sup> and 23<sup>rd</sup> floors ultimately claimed the most lives, with 14 each.<sup>518</sup>

At 8:00 am, Dr. Otto Ravenholt learned that an all-alarm fire had broken out on the Strip. As director of the county emergency medical services (EMS) system and coroner, he was directed to tend to the injured and collect the dead. When Ravenholt arrived, it was a shocking, “chaotic sight.” Firefighters and victims scrambled around equipment pieces, and “dark plumes of smoke” rose from the MGM Grand. “One didn’t need details to know that this was a major disaster in progress,” he recalled. Along with

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<sup>518</sup> See Volume I, outlining MGM Grand Fire Litigation employee and firefighter testimonies for a complete description of events, especially Victoria Bernliner-Harris, Linda Allen, Patricia Jo Allsbrook, Alton Anderson, Emmett Barnes, Wayne Bonine, Gordon Carey, James Corbett, Peter Dobbs, Helmut Herbrechtsmeir, Louis Miranti, Rex Schnleehagen, and Joseph Charles Westably, MGM Grand Fire, University of Nevada, Las Vegas Special Collections; Richard Best, “Investigation Report on the MGM Grand Hotel Fire,” National Fire Protection Association, (Revised January 15, 1982).

the fire department, Nellis Air Force Base sent helicopters to fight the fire and rescue victims. The resort had been filled to capacity, housing over 5,000 employees and guests. By the time of Ravenholt's arrival, two-thirds had been evacuated. Most guests had no shoes on and were in their night clothing. All were in a state of shock. At one point, the temperature inside the building approached 10,000 degrees, almost enough to melt the steel gliders and collapse the building.<sup>519</sup>

At 9:00 am, Ravenholt entered the property with firemen to help evacuate victims. It struck the doctor how many supposedly "noncombustible" materials had fueled the fire. Even sculptures that were not very flammable burned because the temperatures were so high. The rescue mission was a very "physically demanding task," according to Ravenholt. The 26-story resort had no working elevators, so rescuers climbed the stairs. At Ravenholt's request, firefighters moved the deceased to a side room instead of the front of the hotel; he did not want to feed the "intense media" coverage. Additionally, physically moving the dead competed with saving lives. Ravenholt described the evacuation process as "very dramatic business." As firemen extended their ladders to rescue the first 10 floors, the helicopters attempted to evacuate floors 11-26. People leaned "out of the windows with black soot coming from their nostrils or towels over their faces" and the helicopters tied ropes around them, pulling them to safety. Ravenholt ultimately helped evacuate over 700 people, but encountered many casualties. He found a bell captain sitting in a chair, looking out an open window. The chair had tipped back, but the man was still "sitting on the chair with his toes sticking up, dead." "That was the case with 10 to 20 people," he recalled, dying "completely unsuspecting in their rooms"

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<sup>519</sup> Otto Ravenholt, M.D., "Eyewitness to Disaster: The Worst Fire in the City's History," in Blachley, *Pestilence, Politics, and Pizzazz*, 105-106.

or waiting for the emergency to pass. The victims that did survive were “essentially walking wounded”; few were brought out stretchers, but most had been poisoned by gasses and lack of oxygen.<sup>520</sup>

When Ravenholt joined the temporary fire department headquarters at the Barbary Coast, he determined the total number of deceased. The doctor started the figure at 20. By 10:30, he had raised it to 70. “One would have to see the pictures of the deceased to get a sense of how difficult it was to make the count,” Ravenholt explained. “Only the bodies in the casino had been burned; a half dozen were severely charred, having been near the registration area when the fire swept across the top of the casino.” Helicopters had also transported bodies to the morgue before the count began. In the end, 85 employees and guests died, with 83 identified on the day of the fire. Two days later, a female employee was found in a service elevator on the 26<sup>th</sup> floor. The 85<sup>th</sup> died several weeks later. Fatalities in the towers resulted from asphyxiation secondary to carbon monoxide poisoning; the carbon monoxide levels ranged from 25 to 66 percent saturation. The rest succumbed to smoke, burns, and myocarditis.<sup>521</sup> One woman died of a massive skull fracture after jumping from the tower. Over 600 people suffered major fire-related injuries, mostly due to smoke inhalation, and were transported to local hospitals for treatment.<sup>522</sup>

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<sup>520</sup> Ibid, 105-110; “Otto Ravenholt,” *The First 100*, 269; Best, “Investigation Report on the MGM Grand Hotel Fire.”

<sup>521</sup> Myocarditis is an inflammation of the heart muscle and is the principal cause of heart disease and sudden cardiac death. It is often caused by infection from a coxsackie virus. While most people recover from viral myocarditis with no ill effects, a small number develop autoimmune myocarditis. The body’s own immune system attacks the heart muscle, eventually leading to heart failure. Panic most likely triggered this form of death at the MGM Grand fire.

<sup>522</sup> Peggy Leen, Esquire, to Taylor adv. MGM, “Testimony Summary of Dr. Sheldon Green,” October 12, 1982, Memorandum; Alan Case to MGM Grand Litigation Team, “Deposition of Dr. Thorne Butler,” Memorandum, MGM Grand Fire Collection, University of Nevada, Las Vegas Special Collections; Ravenholt, “Eyewitness to Disaster;” Best, “Investigation Report on the MGM Grand Hotel Fire.” See also

After the MGM Grand fire, Governor Robert List appointed a “blue ribbon panel” chaired by Kenny Guinn and Thalia Dondero to recommend reforms to prevent future hotel fires. But at the urging of several state senators and other casino power mongers, they did not recommend installing and retrofitting hotels with room sprinklers. It took another tragedy, the Las Vegas Hilton fire, to force change. After the MGM Grand fire, two arson attempts occurred at the Royal American and Dunes. Both erupted after an arsonist ignited drapes and bedspreads, but the flames were extinguished before any extensive damage. On February 10, 1981, Philip Bruce Cline, a busboy at the Hilton, claimed he dropped a marijuana cigarette while engaging in a homosexual act. The cigarette torched nearby drapes, burst out the window, and quickly roared up the side of the 30-story resort. Smaller fires also erupted in a storage room and service elevator on the 2<sup>nd</sup> and 3<sup>rd</sup> floors, and in a 9<sup>th</sup> floor hose stuffed with combustible material. The existence of the smaller fires discredited Cline’s story, clearly pointing to arson. Like its predecessor, the Hilton had no sprinklers, smoke detectors, or public-warning systems. It only had a manual pull alarm, which malfunctioned. But unlike the MGM Grand, mass panic ensued. Frantic guests broke windows, scaling the tower on makeshift ropes of sheets and rushing stairwells to escape the suffocating smoke. In the end, 242 people were injured and 8 people died; one jumped or fell to his death on the tennis courts. The others succumbed to smoke inhalation.<sup>523</sup>

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MGM Grand Fire File, in Howard W. Cannon, 97<sup>th</sup> Congress, Box 30, Folder 430, University of Nevada, Las Vegas Special Collections.

<sup>523</sup> “Around the Nation: Las Vegas Busboy Gets Life in Fatal Fire,” *New York Times*, (February 18, 1982); Margot Hornblower, “Eight Die in Blaze: Busboy Arrested in Las Vegas Hotel Arson,” *The Washington Post*, (February 12, 1981); Melinda Beck and Joe Contreras, “Fire in Las Vegas – Again,” (February 23, 1981); “Around the Nation: Big Holes in Busboy Story of Las Vegas Fire Reported,” *New York Times*, (February 15, 1981).



Several weeks later, another arson fire broke out at Caesars Palace, but the flames were confined to one hotel room. The Strip had turned into something of a war zone. During Cline's trial, "copycat" arsonists set dozens of small fires at adjoining complexes to the Strip. On one weekend alone, 16 blazes erupted at two resorts and an apartment building. Acts of violence continued to threaten the Strip, including bomb threats. The bombing at Harveys Wagon Wheel at Lake Tahoe in August 1980 had put the Strip on high alert, because for weeks afterward dangers of callers threatened to bomb major resorts in northern and southern Nevada. By 1984, the resorts refused to negotiate improved health insurance coverage for their employees, prompting a violent strike of 17000 employees. "It was an interesting time, but a difficult one," remembered Senator Richard Bryan. "It was protracted, and it was ugly. Las Vegas received a lot of negative publicity." The picketers were volatile and the police investigated bomb threats at several resorts. On April 12, an explosive detonated in the MGM Grand swimming pool. Luckily, the blast only caused minor damage and there were no injuries. Police also discovered a small explosive between two slot machines at the Tropicana.<sup>524</sup>

As the resorts increased security, the legislature frantically deliberated how to make the Strip safe. The UBC Standard, used at the MGM Grand and Hilton, contained codes dating back to the 1940s. It did not deal with the problem of high-rise buildings. Indeed, the megaresort was a new kind of beast, with high-rise towers, shopping malls, atriums, and widespread use of plastic materials. But the MGM Grand and Hilton were not the only resorts that lacked fire protection. A Clark County manager report named 11 others that lacked comprehensive sprinkler system, including the Flamingo, Desert Inn,

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<sup>524</sup> "Ex-Busboy Convicted of Murder and Arson in Las Vegas Hotel Fire," *New York Times*, (January 16, 1982); Kraft, *Vegas At Odds*, 180-185; Jeff Simpson, "Strike Zone," *Review-Journal*, (May 12, 2002).

and Riviera. Five months after the MGM fire, the legislature passed the strictest fire protection standards in the nation, mandating sprinkler systems in buildings higher than 55 feet and requiring sprinklers. At the MGM Grand, the resort installed a \$5 million fire and life safety system, promising employees that they worked at “one of the safest hotels in the world.” While it had been a “long trying time,” the resort assured that the MGM Grand was the “most luxurious,” and safe, hotel in the world.<sup>525</sup>

The MGM Grand and Hilton fires inspired an unprecedented industry-wide response to raise protection standards. The resorts were newly-built and code-complacent, debunking the myth that fires were only a concern in older and poorer facilities. In 1981, NEPA published a detailed overview of the MGM Grand fire, exposing the chronic threat of fires in the hotel industry. The organization, charged with creating and maintaining minimum standards for fire protection, issued a set of code compliance and safety requirements. In 1980, U.S. fire departments reported that only one out of nine hotel and motel fires had sprinkler systems. Detectors existed in one-fourth. By 1997, two-thirds of high-rise towers had sprinkler systems and three-fourths had installed fire detectors. The heightened level of protection led to a dramatic drop in hotel and motel fires, and fire-related deaths. After 1983, only two hotel or motel fires killed 10 people or more nationally. The influence of Nevada’s law spread globally. Hilton and other hotel corporations voluntarily retrofitted their hotels in New York City,

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<sup>525</sup> See Highlights of the Biennium; Office of the Governor; State Fire Marshal Division, in Governor’s Office of Planning Coordination, *Biennial Report of Nevada State Agencies*, 60<sup>th</sup> Session, (1980 Edition); Bernard J. Rothkopf to MGM Grand Employees, March 24, 1981, Letter; Howard W. Cannon to the Senate Floor; “Tax Incentives for Hotel Retrofit,” Washington Report from Senator Cannon, (April 1981); Cannon Hails MGM Grand Reopening, July 10, 1981, Press Release; The Congressional Record on MGM Grand Hotel, July 21, 1981; Alvin Benedict to Howard W. Cannon, June 29, 1981, Letter; Multimillion Dollar Life-Safety System Being Installed at Grand-Las Vegas, MGM Grand Report (April 1981); Howard W. Cannon Papers, 97<sup>th</sup> Congress, Box 30, Folder 430, University of Nevada, Las Vegas Special Collections.

Chicago, and other cities with sprinklers. Many nations also mandated the use of sprinklers in high-rise resorts as well.<sup>526</sup>

The MGM Grand restitution trial and subsequent retroactive insurance case had profound legal ramifications. The restitution trial had 2000 plaintiffs and over a hundred defendants, including the MGM Grand and its construction contractors, architects, engineers, and suppliers. The claims consolidated into 1,327 lawsuits against 118 companies. Attorney Michael Cherry, appointed “Special Master” of the litigation, supervised the scheduling and handling of over 4 million documents and 1,400 depositions, and U.S. District Judge Louis Bechtel of Philadelphia presided. Meanwhile, the MGM Grand realized that its existing insurance policy, a \$30 million premium, would not adequately handle the claims. Consequently, it negotiated and obtained a retroactive insurance policy, securing an additional \$170 million coverage. This type of supplementary insurance, backdated to November 1, 1980, was unprecedented, involving approximately 30 carriers in 4 different insurance layers.<sup>527</sup>

The insurance companies assumed it would be a long settlement process. In the meantime, they could make money from other investments. But Kerkorian wanted to settle quickly, as the lawsuit was bad for business and the victims had suffered enough. In 1983, he took matters into his own hands, directly settling all wrongful deaths, personal injuries, and property damage and business lost claims. The “global settlement,” which included most of the defendants, totaled \$134 million. MGM Grand

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<sup>526</sup> Arthur E. Cote, *Organizing for Fire and Rescue Services*, (Quincy, Mass: National Fire Protection Agency), 26.

<sup>527</sup> *In re MGM Grand Hotel Fire Litigation*, 570 F. Supp. 913, (1983); Koch and Manning, “MGM Grand Fire Altered Safety Standards;” Jane Ann Morrison, “In Depth: MGM Grand Hotel Fire: 25 years Later,” *Review-Journal*, (November 25, 2005); “Getting Insured the Morning After,” *Business Week*, (August 17, 1981); Matt W. Holley, “The Fortuity Doctrine: Misapplying the Known Loss Rule to Liability Insurance Policies,” *Texas Tech Law Review*, 41 *Tex. Tech L. Rev.* 529 (Winter 2009).

alone settled its claims for \$30 million and agreed on \$75 million for the remainder. But not one defendant admitted negligence. After the settlement, the retroactive insurance carriers refused to reimburse Kerkorian, claiming he paid too much. Kerkorian hired Bill Shernoff, a bad faith lawyer, to seek full reimbursement and punitive damages. However, before the trial began, the insurance companies approved an \$87.5 million out-of-court settlement. In the end, retroactive insurance was “just bad policy,” according to Shernoff, because it made insurers “insensitive to settling quickly.”<sup>528</sup>

The MGM Grand restitution trial and retroactive insurance suit were landmark cases in the realm of legal history. *In re MGM Grand* established an important legal precedent in mass tort litigation, cases in which hundreds of plaintiffs sue multiple defendants for negligence in matters involving toxic substances, catastrophic events, or faulty pharmaceutical products and medical devices. According to Michael Cherry, later an Associate Chief Justice, “the things we learned from [MGM Grand] paved the way for how we conduct today’s massive consumer trials.” Over the following decades, mass tort litigation, involving breast implants, tobacco, radioactive fallout, chemical plant explosions, and airplane crashes, cited *In re MGM Grand*. Moreover, the retroactive insurance case was the first and last of its kind in the United States. Since it was such a huge loss, the investment was not sound. Carriers never sold retroactive insurance again.

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<sup>528</sup> For a complete discussion of the MGM Grand fire litigation, see MGM Grand Fire Collection, University of Nevada, Las Vegas, which outlines testimonies and other pertinent material to the case. See also *In re MGM Grand Hotel Fire Litigation; American Protection Insurance Company v. MGM Grand Hotel Inc.*, Nos. CIV-LV-82-26, HEC CIV-LV-82-96, HEC (1983); *American Excess Insurance Company v. MGM Grand Hotels Inc.*, 102 Nev. 601; 729 P.2d 1352 (1986); Shernoff, “The Cases We Remember: MGM Grand Retroactive Insurance Case.”

Fortunately for Kerkorian, he also had interruption insurance, which helped him renovate his resort and open it by August 1981.<sup>529</sup>

### Great Expectations

Following the MGM Grand and Hilton fires, occupational health became a top priority on the Strip, with the new standards producing a dramatically safer workplace. There were close calls, but not major disasters. Most problems originated from electrical malfunctions, kitchen grease, or the careless flick a lit cigarette, and arson continued in isolated cases. In 1986, a jury convicted Thomas Edward Little Owl for starting a series of small fires, including one at the Sands. During the 1990s, the under-construction Stratosphere caught fire and another Hilton blaze reported \$1 million in damages, forcing the evacuation of six floors. By 2003, a lit cigarette ignited a laundry chute, with 6 people treated for smoke inhalation. But the most dramatic event since the MGM Grand and Hilton fires occurred in 2008 at the Monte Carlo, also a Kerkorian-owned hotel. On January 25, welders were constructing a bridge on the roof of the resort. While using hand-held cutting torches, molten matter ignited a flame that spread to the architectural façade. The fire alarm did not go off because no detectors existed on the roof. When Monte Carlo President Aton Nikodemus noticed the flames and smoke, he manually triggered the fire alert system and ordered an evacuation. The resort evacuated 5000 guests and 950 employees from the premises. Security guards and engineers knocked on and entered 3,002 rooms to make sure every guest evacuated. However, the fire itself was short-lived. Thanks to the quick response of the fire department, it was extinguished

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<sup>529</sup> *In re MGM Grand Hotel Fire Litigation*; Koch and Manning, "MGM Grand Fire Altered Safety Standards;" Jane Ann Morrison, "In Depth: MGM Grand Hotel Fire: 25 years Later; Holley, "The Fortuity Doctrine;" "The Law MGM Grand Fears," *Business Week*; Shernoff, "The Cases We Remember: MGM Grand Retroactive Insurance Case."

in only 74 minutes. At a press conference, Fire Chief Steven Smith remarked that the MGM Grand fire had dramatically changed fire protection on the Strip, bragging that “we have the best fire safety in the world in the resort corridor of Las Vegas.” In the end, the Monte Carlo fire produced no life-threatening injuries, with only 5 guests and 8 employees treated for smoke inhalation. Still, the hotel remained closed for several weeks due to water damage sustained on virtually all 32 floors.<sup>530</sup>

Besides fire protection, the 1980s were also a major adjustment period for worker’s compensation and employee-funded healthcare. During the 1970s, critics began to scrutinize the NIC and worker’s compensation in Nevada. Employees regularly complained about its incompetence, mostly regarding evaluation of injuries, delay in hearings, and approval of surgical procedures. Frustrated with the high costs, employers also wanted the state to allow “three-way system” coverage: the state fund, and options for self-insurance and private insurance. Reform measures ultimately addressed both grievances.<sup>531</sup> In the early 1980s, legislators voted to allow qualified employers to purchase self-insurance. They also abolished the NIC and replaced it with the State Industrial Insurance System (SIIS), a public corporation providing worker’s compensation, and safety and rehabilitation services. However, the reform measures did little good. During the 1980s, worker’s compensation costs for medical care and

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<sup>530</sup> One-alarm, two-alarm, and three-alarm fires were categories that articulated the level of response by local authorities. The higher the alarm, the more fire stations are needed. See Mary Manning, “Deadly Casino Fires Helped Rewrite Safety Standards,” *Las Vegas Sun*, (January 25, 2008); Mark Whittington, “Unclear When Fire Damaged Monte Carlo Can Be Reopened,” *Las Vegas Sun*, (January 25, 2008); Tom Gorman, “From the Inside: How They Coped,” *Las Vegas Sun*, (January 26, 2008).

<sup>531</sup> For examples of difficulties with the NIC, see Margaret Howard to Mike O’Callaghan, January 20, 1978, Letter; Howard W. Cannon to Margaret Howard, January 31, 1978, Letter; Kenneth R. Johnston to Howard W. Cannon, February 8, 1978; Howard W. Cannon Papers, 95<sup>th</sup> Congress, Box 25, Folder 655, University of Nevada, Las Vegas Special Collections; Douglas D. Dailey to Howard W. Cannon, March 8, 1979, Letter; Howard W. Cannon Papers, 96<sup>th</sup> Congress, Box 49, Folder 683, University of Nevada, Las Vegas Special Collections; *NIC v. Tropicana Garden Estates*, McNamee Collection, Box 84, Folder 24, Nevada State Museum and Archives, Las Vegas, Nevada.

indemnity benefits increased tenfold. The average SIIS premiums, per \$100 of payroll, rose from \$2.47 in 1988 to \$3.31 in 1991 alone. By 1993, legislators proposed measures to remedy the SIIS's financial crisis as well as increase benefits to injured workers. In 1999, it authorized the privatization of SIIS, doing business as Employers Insurance Company of Nevada (EICON). With privatization, Nevada began operating in a "two-way" worker's compensation market composed of private carriers and self-insured employers. While EICON alleviated some issues, employees continued to complain about problems inherent in the system.<sup>532</sup>

The treatment of employee-funded healthcare also shifted. While the resorts had offered health insurance, they purchased fully insured plans. In short, companies hired health insurance companies to assume the financial risk. While the plans reduced liability, they were expensive. At the same time, the American health care system reached a crisis point. With no mechanisms to control prices, medical inflation skyrocketed during the 1970s, rising costs of medical care, hospital construction, physician salaries, and pharmaceuticals. Fully insured plans subsequently rose as well. In 1973, President Richard Nixon attempted to fix the problem. The Health Maintenance Organization Act institutionalized the use of Health Maintenance Organizations (HMOs), which required employers with 25 employees or more to offer federally-backed managed

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<sup>532</sup> Legislature Counsel Bureau, "Nevada Industrial Commission Study, Bulletin No. 104, (Carson City, NV: State Printing Office, December 1972); Legislature Counsel Bureau, "Administrative Procedures Followed by the Nevada Industrial Commission and Alternative Methods of Providing Workmen's Compensation Coverage," Bulletin No. 79-1 (Carson City, NV: State Printing Office, October 1978); Legislature Counsel Bureau, "Workmen's Compensation Through Private Insurers," Bulletin No. 83-5 (Carson City, NV: State Printing Office, November 1982); Legislature Commission of the Legislature Counsel Bureau, "Study of Industrial Insurance, Bulletin No. 93.8, (Carson City, NV: State Printing Office, January 1993); Legislature Counsel Bureau, "Legislative Committee on Workers' Compensation," Bulletin No. 01-19, (Carson City, NV: State Printing Office, January 2001), Legislature Counsel Bureau, "Study of Nevada's Industrial Insurance Program, Bulletin No. 05-7, (Carson City, NV: State Printing Office, January 2005).

care plans. Modeled after plans like the Kaiser Permanente Medical Care Program, HMOs reduced costs by setting guidelines under which doctors could operate and limiting the range of treatment available. By the 1980s, the Reagan Administration continued to encourage HMOs, pushing them to engage in private capital sources, and passed the Preferred Provider Healthcare Act of 1985, easing restrictions on Preferred Provider Organizations (PPOs). Participating providers agreed to provide services at a discounted rate. In turn, PPOs paid a high percentage of costs when subscribers used in-network providers, allowing them to seek health care outside the plan at a higher rate.<sup>533</sup>

The medical community was initially resistant to managed care because it threatened profit levels. But as the number of organizations increased, doctors became active participants for the guaranteed income. In Las Vegas, Dr. Elias Ghanem took it one step further, founding his own PPO-style organization, Prime Health. At the same time, the Strip felt the financial burden of offering fully insured benefits. By April 2, 1984, tensions rose to a boiling point between the unions and management after the latter refused to negotiate improved health insurance coverage and wages. The 1984 strike was violent, prompting hundreds of arrests, bomb threats, assaults, and serious economic repercussions for the resorts. Several months later later, the parties reached a compromise. Employees received most of their demands, resulting in the Culinary Health plan that members used for the following decades.<sup>534</sup>

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<sup>533</sup> Nancy J. Niles, *Basics of the U.S. Health Care System*, (Ontario: Jones and Bartlett Publishers, 2011), 83-184; Philip D. Pierce, "Understanding Managed Care Health Plans: The Managed Care Spectrum," Jerry S. Rosenbloom, ed. *The Handbook of Employee Benefits: Design, Funding, and Administration*, Sixth Edition, (New York: McGraw-Hill, 2005) 115.

<sup>534</sup> Culinary Workers Union Local 226, Strike Bulletin #1, Picket Guidelines, Picket Pay, April 20, 1984, Las Vegas Labor Unions Culinary Union Vertical File, Strikes, Nevada State Museum and Archives, Las Vegas, Nevada; Iver Peterson, "Strike Dims the Glitter of Las Vegas," *New York Times*, (April 22, 1984); Jess Simpson, "Strike Zone," *Review-Journal*, (May 12, 2002); Culinary Workers Union Local 226,



But the strike did not fix the rising health insurance costs. Ghanem offered a solution. To lower costs, he proposed providing self-insured plans, in which employers took on the financial risk. The self-insured market had grown substantially since the Employee Retirement Income Security Act of 1974, recognizing the plans as a viable option and exempting them from most state-mandated benefits. In 1984, Ghanem and his associates proposed to Circus Circus Enterprises to enroll employees in a self-insured plan with Prime Health. William G. Bennett, head of Circus Circus, accepted the offer. The program was a success, reportedly saving the resort \$1 million in its first year. A year later, the Culinary Union entered a multimillion dollar contract with Ghanem to provide health care to over 30,000 union members and their families. By the 1990s, managed care programs like Prime Health increased in popularity. Initially, self-insured and managed care programs helped decrease medical costs. But the influence was short-lived, with the cost of healthcare premiums increasing 98 percent from 2000 to 2007.<sup>535</sup>

After the advent of managed care, the Strip's occupational health program received another boost in the effort to curb medical costs: employee wellness programs. Employee wellness was hardly a new concept, employing practices reminiscent of earlier occupational health programs. During the 1920s, the Los Angeles and Salt Lake Railroad provided to workers onsite health care, health screenings, and to limit alcohol abuse and late-night partying, recreational activities to support a healthy body and mind. In turn, the it expected its healthy workforce would produce greater profits and cut costs.

Beginning in the 1980s, the Strip and numerous corporations nationwide began

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Culinary Health Fund, Brochure, Las Vegas Labor Unions Culinary Union Vertical File, Benefits, Nevada State Museum and Archives, Las Vegas, Nevada.

<sup>535</sup> "Ghanem Succumbs After Long Battle With Cancer;" "Nevada Boxing Official, Physician Ghanem Dies;" "Hundreds Bid Farewell at services for Ghanem; Niles, *Basics of the U.S. Health Care System*, 83-184; Pierce, "Understanding Managed Care Health Plans: The Managed Care Spectrum," 115.

employing the same techniques, only expanded. MGM Resorts sought to create “a culture of health,” citing that its “commitment to the health and wellbeing of our employees runs deeper” than typical health packages. Besides health and saving plans, it offered a “Healthy Living Wellness Program” to help employees “make positive choices in their life.” MGM Resorts sought to “foster emotional wellbeing” and provide financial incentives to encourage the maintenance of a healthy lifestyle. Employees had access to an on-call nurse who answered questions about health and nutrition, and assisted in finding a physician and triage. Health professionals also provided free health screenings, such as monograms, dental care, and blood pressure checks, and a confidential Employee Assistance Program, covering substance abuse, gambling addiction, grief, and weight and stress management.<sup>536</sup>

By the mid-2000s, Harrah’s Entertainment, later Caesars Entertainment, took a more proactive approach to employee wellness. The largest gaming corporation in the world developed a two-pronged plan, offering employees better health services, and subsequently cutting costs. The result was Harrah’s Health and Wellness Center, a \$2.5 million venture operated by Whole Health Management, Inc. Opening in 2007, the 19,000 square-foot health and wellness center boasted a fitness complex and medical clinic. Clinical staff diagnosed and treated chronic conditions, providing vaccinations, prescriptions, nutrition education, counseling, and physical therapy. Meanwhile, employees practiced yoga, ran on treadmills, and lifted weights in the gym. According to Chairman Gary Loveman, Harrah’s sought to provide “easily accessible and affordable health and wellness service directly to our employees.” With the new employee wellness

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<sup>536</sup> Gregory O. Ginn and L. Jean Henry, “Wellness Programs in the Context of Strategic Human Resource Management,” *Hospital Topics*, (Spring/Summer 2003) 23-28; MGM Resorts International Benefits, “Creating a Culture of Health;” MGM Mirage, Voluntary Benefits Brochure.

programs, the Strip reused old techniques to maintain a healthy workforce. As employers learned nearly a century before, the best way to safeguard employee health and profits was to offer occupational health programs in-house.<sup>537</sup>

By the mid-2000s, Strip executives and boosters had great expectations. It appeared the place had the capacity for unlimited growth and profits. In terms of occupational health, the Strip had developed a highly innovative program, pioneering nationwide standards that ranged from comprehensive fire protection to employee wellness programs. Indeed, its ideas served as a benchmark for the entire hospitality industry. But the success was short-lived. In the 1990s, several construction workers died while building the Luxor pyramid, the Stratosphere, and the Venetian. But fatalities were extremely rare in comparison to the demanding work the job entailed. However, in 2006, a succession of construction worker deaths at CityCenter, the Cosmopolitan, and other properties revealed serious problems in occupational health. While the contractors blamed the deaths on worker carelessness, investigators discovered numerous safety violations. Inexperienced workers, not trained properly in workplace safety, regularly operated faulty equipment and walked on hazardous scaffolding. Meanwhile, OSHA had actually weakened requirements, not enhanced them, removing standards that could have prevented the deaths. Nevada OSHA failed to protect the workers as well. While it investigated the deaths, Nevada OSHA withdrew or vastly reduced fines after meeting privately with the contractors. Nevada unions, the workers' major advocate, failed to push for improved conditions as well. Even with the help of regulatory agencies, unions,

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<sup>537</sup> Arnold M. Knightly, "A Healthy Harrah's," *Las Vegas Business Press*, (September 7, 2007); Press Release, "Harrah's Opens Employee Health and Wellness Center," Harrah's News Release, (January 3, 2007).

and safety standards enacted during the twentieth century, occupational health continued to fall second to profits.<sup>538</sup>

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<sup>538</sup>Berzon, "Pace is the New Peril;" Marshall Allen, "Sun Wins the Pulitzer."

## EPILOGUE

### THE EXPLOSION

Properly regulated, industries that handle hazardous materials need not pose safety threats to their employees or the general public. Nevada's economic development future is bright, and our remarkable population growth will continue well into the 21<sup>st</sup> century. The Commission feels that the recommendations on the following pages will create a desirable environment in which all Nevadans can live and work without fear for their safety.

Bob Miller, Chairman of the Henderson Commission (1988)

Roy Westerfield started his workday like any other. May 4, 1988 typified early summer in the desert, sunny and warm in temperature. After arriving at the Pacific Engineering Company of Nevada (PEPCON) plant, he began his normal duties as a comptroller. PEPCON was one of two American companies that produced ammonium perchlorate, an oxidizing chemical used in high performance solid propellants. The chemical was a critical component in the National Aeronautics and Space Administration (NASA) program, providing a reaction that boosted space shuttles into orbit. PEPCON housed its operations in an industrial center in Henderson west of the Basic Magnesium Industrial Complex. Founded by a former BMI manager in 1955, the company began producing ammonium perchlorate at the request of the Department of Defense (DOD) in 1959. Over the following decades, PEPCON ran its business in a relatively isolated part of town. But urban sprawl in the 1980s situated a new subdivision, Green Valley, dangerously close to the plant. At the same time, PEPCON lost its primary client. At liftoff on January 28, 1986, the Challenger disintegrated after its right solid rocket booster failed. The disaster killed 7 astronauts on board and prompted NASA to put its program on hold. Yet, PEPCON still maintained its lucrative government contract, so it continued with business as usual. With the production lines still running, the company

filled its aluminum storage bins to capacity. To create more space, it stored the overflow in stacked polyethylene drums situated around the property. Taken alone, ammonium perchlorate and polyethylene did not present a hazard. But together, they formed a “classic fuel and oxidizer scenario,” according to Dr. Michael Fox, an explosion expert, burning “like a roman candle.”<sup>539</sup>

On May 4, 1988, PEPCON had approximately 8 million pounds of ammonium perchlorate onsite. At 11:30 am, a welding torch ignited a small fire in a batch house building, which quickly spread to the polyethylene drums. Five workers tried to douse the flames, but high winds and ammonium perchlorate residue hampered their efforts. By 11:45, the situation had quickly escalated and most workers fled for their lives. But Roy Westerfield, along with wheelchair-bound Bruce Halker, stayed behind. Westerfield called 911 to notify the authorities, telling the dispatcher: “Emergency! We need the fire department. All of you can get here. Immediately!” When asked the problem, he chillingly responded: “Oh, we’ve got... everything’s on fire.” Those were perhaps his last words. The fire traveled rapidly along the polyethylene bins, finally reaching the main storage unit. The explosion was massive, reminiscent of an atmospheric nuclear test at the Nevada Test Site. It was the equivalent of 250 tons of dynamite and registered 3.5 on the Richter scale in California! Spewing a toxic glass cloud hundreds of feet in the air, the explosion ripped a gas line out of the ground. A powerful shockwave followed.

Employees of PEPCON and a nearby marshmallow factory, Kidd and Co., desperately

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<sup>539</sup> Florence Lee Jones, “PEPCON,” PEPCON Brochure, and Pacific Engineering & Production Company, (Annual Report 1978) in Cahlan Collection, Box 6, Folder 41, Nevada State Museum and Archives, Las Vegas, Nevada; Warren Bates, “The Day Southern Nevada Shook,” and “Shattered Windows, Lives,” *Review-Journal*, (May 3, 1998); United States Fire Administration, “Fire and Explosion at Rocket Fuel Plant, Henderson, Nevada, May 4, 1988,” *Technical Report Series*, Investigated by J. Gordon Routley, National Fire Data Center, (1988), 1-4; “Legislative Commission’s Subcommittee On Industrial Explosions,” Legislative Counsel Bureau Bulletin No. 03-9, (January 2003), 5-6; Michael Fox, PhD, “Rocket Fuel Plant Explosion,” Chemical Accident Reconstruction Services Inc., (2008).

tried to outrun it, dodging smoldering scrap metal and huge shards of glass. The shockwave decimated Kidd and Co., and spread to Green Valley, violently shattering windows, flipping cars, and buckling garage doors.<sup>540</sup>

Then it was over. With nothing left to burn, the explosions subsided by noon. Emergency medical services and the fire department arrived at the scene, evacuating a five-mile radius around the plant. An hour later, authorities determined the airborne gas was a respiratory irritant but not highly toxic. Crews in protective clothing began the clean up process, hampered by leaking anhydrous ammonia and acid residue. By 8:00 pm, they found the body of an unidentified man. It was Bruce Halker. “The clothes were blown off the body,” recalled County Fire Chief Roy Parrish, “it was not a pretty sight.” Roy Westerfield’s body was never recovered. At their funerals, the men were remembered as martyrs, opting to stay behind to call for help even though death was imminent. While the death toll was remarkably low, the disaster injured 372 employees and bystanders, mostly treated for lacerations, concussions, and burns. Property damage to surrounding businesses and homes in Henderson was also extensive. Like MGM Grand, PEPCON did not have enough insurance, with only \$1 million in coverage. A courtroom battle resulted in a \$71 million settlement divided among the victims and their families. PEPCON tried to pin the accident on Southwest Gas Co., but a jury concluded the explosions did not result from a natural gas leak. After the incident, the company retreated to Utah. Changing its name to Western Electrochemical Co., it built a plant in

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<sup>540</sup> Jeff German and Mary Manning, “We’ve Got A Miracle On Our Hands,” *Las Vegas Sun*, (May 5, 1988); Bates, “The Day Southern Nevada Shook,” and “Shattered Windows, Lives;” Donald L. Shalmy to Richard H. Bryan, Letter, July 14, 1988, in *The Governor’s Blue Ribbon Commission To Examine The Adequacy of Existing Regulation Pertaining to the Manufacture and Storage of Highly Combustible Materials (The Henderson Commission)*, Final Report, Presented to Governor Richard H. Bryan, (August 10, 1988), 93-95.

an isolated area outside of Cedar City. Unfortunately, history repeated itself in the new locale. On July 30, 1997, another explosion killed one worker and injured four.<sup>541</sup>

The PEPCON disaster was a grim reminder that southern Nevada's industries were profoundly dangerous. The incident brought into question the positioning of heavy industry in an urban area. It also exposed that the state of Nevada, in an effort to attract industry, was virtually laissez-faire in its regulation of occupational health. As evidenced by PEPCON, the longstanding policies threatened the wellbeing of employees and residents alike. When Governor Richard H. Bryan toured the devastation, he declared Henderson a disaster area. "It's a miracle there weren't more deaths," he said. To ensure it never happened again, Bryan assembled a commission to examine the state of heavy industry in Nevada. The Henderson Commission, chaired by Clark County District Attorney Bob Miller, held nine hearings, receiving testimony about health and safety, fire prevention, zoning, insurance, and the transportation of hazardous materials. According to the final report, the results were "unsettling." The state had very limited information about its industries. It could not identify the location, utilization, and transportation of hazardous materials. At its current state, the Commission determined Nevada could not "completely insure the safety of its residents." The report found numerous failures in policy. Heavy industry was not inspected enough. There were also "literally hundreds of hazardous materials" transported on Nevadan highways and roads everyday.<sup>542</sup>

Based on the testimonies, the Commission developed 43 recommendations to improve health and safety in the workplace. To establish industry accountability to the

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<sup>541</sup> German and Manning, "We've Got A Miracle On Our Hands;" Bates, "The Day Southern Nevada Shook," and "Shattered Windows, Lives;" "In 1988, disaster struck as explosions rocked PEPCON," *Las Vegas Sun*, (July 31, 1997); Warren Bates, "July Rules Against PEPCON in Blast," (December 15, 1992).

<sup>542</sup> State of Nevada, Office of the Governor, Executive Order, May 12, 1988; Bob Miller, "Statement of the Chairman;" in *The Governor's Blue Ribbon Commission*, 1-12, 14.



community, it recommended that companies provide detailed analysis of their operations and safety programs, and the Nevada OSHA open records to the public. The Commission proposed to bar hazardous industries from residential areas and apply steeper penalties for violations. If a company could not reduce hazards, it had to relocate out of state. To implement the Commission's recommendations, Governor Bryan established a Task Force headed by the State Fire Marshall and later, the Division of Emergency Management. By 1991, most of the recommendations were enacted by legislative action, the various regulatory agencies, and OSHA mandates. But a follow-up investigation, ordered by now-Governor Bob Miller, revealed continued lapses. One of the biggest problems was the federal government. In the name of national security, the federal government remained evasive about its hazardous materials installations in the state. Moreover, companies under federal contract maintained they were exempt from state fire and health codes, a complaint reminiscent of Hoover Dam and the Nevada Test Site. Another concern was funding. Most municipal fire departments, charged with inspecting heavy industry, had the support to provide only one inspection annually. The Commission had recommended four inspections.<sup>543</sup>

While PEPCON redirected occupational health and safety in a positive direction, its influence was short-lived. On January 7, 1998, a succession of explosions at the Sierra Chemical Company, located east of Reno, killed 4 workers and injured 6. Governor Miller responded by creating the Commission on Workplace Safety and Community Protection, which outlined 29 additional recommendations, but they did little good. On September 17, 2001, an explosion at Depressurized Technologies International

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<sup>543</sup> Bob Miller to Peter G. Morros, Letter, January 21, 1991; Peter G. Morros to Bob Miller, Letter, April 24, 1991; "Final Report;" in *Report by the 1991 Governor's Task Force on Implementation of the Recommendations of the Henderson Commission*, Presented to Governor Bob Miller, (April 1991), 1-24.

(DTI) in Minden resulted in a death and 4 critical injuries. An investigation revealed numerous safety violations. By October 15, Las Vegas experienced its first major disaster since PEPCON. AutoTech Inc. manufactured high-powered model rockets, and housed 2,500 pounds of ammonium perchlorate and 800 pounds of magnesium. At 12:15 pm, two explosions erupted in the plant. Firefighters immediately arrived and extinguished the blaze with high-pressure hoses. While they battled the blaze, water seeped into a drum of magnesium, a water-reactive element. The contaminated drum “flashed” at 4:20 pm, resulting in a third explosion. The fire burned all night, destroying the 60,000 square-foot building and five surrounding businesses. In its aftermath, one worker died and four received medical attention for varying degrees of burns. Three firefighters were treated for smoke inhalation. Las Vegas were shocked to learn that ammonium perchlorate, the chemical implicated in PEPCON, was stored in their backyard. One resident summed up the sentiment: “They put our lives and our homes at risk— whoever issued those permits should have their brains examined.” In reality, AeroTech did not have a permit to manufacture hazardous materials. A regulation loophole allowed the company to bypass authorization because it did not generate hazardous waste. After a thorough investigation, Nevada OSHA determined that AeroTech did not “disclose the true nature of [its] business” to county licensing and regulatory agencies. Moreover, it found that the company’s safety program did not meet Nevada Administrative Code.<sup>544</sup>

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<sup>544</sup> Legislative Commission’s Subcommittee on Industrial Explosion, Legislative Counsel Bureau Bulletin No. 03-8 (January 2003), 2-5; Keith Paul, “AeroTech Officials Criticize Handling of Blaze,” *Las Vegas Sun*, (February 8, 2002); Adrienne Packer, “Reilly Calls County’s Fire Investigation ‘Horrible,’” *Las Vegas Sun*, (August 13, 2002); Mary Manning and Launce Rake, “Aero facing no criminal charges,” *Las Vegas Sun*, (February 10, 2003); Adrienne Packer, “Reilly Calls County’s Fire Investigation ‘Horrible,’” *Las Vegas Sun*, (August 13, 2002); Adrienne Packer, “Frequency of Plant Inspections Questioned,” *Las Vegas Sun*, (August 12, 2002).

Taken together, PEPCON and AeroTech reveal historical trends in southern Nevada's occupational health program. PEPCON was a monumental disaster that brought considerable attention to safety in the workplace. The new standards recommended that municipal fire departments inspect high-risk industries at least once annually. Clark County initially complied and conducted regular inspections of AeroTech and other hazardous installations. But after 1995, the inspections stopped. For five years, AeroTech was not inspected once. According to Fire Chief Earl Greene, the megaresort construction boom contributed to the fire department's negligence. To ensure the MGM Grand fire never happened again, inspectors focused their attention on the massive resorts. They did not have the time or resources to regularly inspect Clark County's 1,800 high-risk facilities. Greene cited that "it [had] been a major headache keeping up with the growth." After the AeroTech incident, Clark County acknowledged the system needed major improvements, increasing the inspection staff by 50 percent and ensuring that high-risk installations were inspected annually.<sup>545</sup>

PEPCON and AeroTech illustrate southern Nevada's boom and bust approach to occupational health. Since Las Vegas' founding in 1905, industries in the region consistently strained safety standards, an action fostered by the conservative nature of state politics. Nevada is a pro-business state. To stimulate the economy, it actively pursued new industry, promising limited intervention and a favorable tax structure. Under this model, occupational health was destined to fail, and laissez-faire subsequently eroded the quality of workplace safety. With the exception of Six Companies and arguably the contractors and federal agencies operating the Nevada Test Site, nobody intentionally put their employees in harm's way. Failures resulted from the capitalist

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<sup>545</sup> Packer, "Frequency of Plant Inspections Questioned."

spirit. For over a century, southern Nevada industries famously provided cutting-edge technology and the next greatest experience in entertainment. But because of the pressure to maximize profits, occupational health suffered and continued until a cataclysmic disaster. Marked failures in occupational health – carbon monoxide poisoning at Hoover Dam, atmospheric nuclear testing and the Baneberry disaster, the MGM Grand and Hilton fires, and PEPCON – forced change. Faced with bad publicity and public outcry, southern Nevada scrambled to rebuild its image and occupational health program. Federal, state, and municipal agencies led the movement by reviewing existing policies and mandating new ones. Occupational health boomed. But the success was fleeting. Because the state was pro-business and promised limited intervention, transitioning to a regulatory state was highly unpopular. As a result, the new standards were difficult to enforce. The state and municipal governments also faced longstanding budgetary issues, lacking adequate funding for inspections and implementation. In some respect, the federal government hampered efforts as well, undermining the authority of state and municipal regulatory agencies. Yet, each boom in occupational health experienced some successes. The new regulations and institutions undoubtedly encouraged a safer workplace; even with limited funding and undermined authority, the Mining Inspector, Nevada Industrial Commission, and Nevada Occupational Safety and Health Administration improved conditions. The underlying problem is that occupational health in southern Nevada is a cyclical process of remembering and forgetting. When 12 construction workers died in 18 months on the Strip from 2006 to 2007 while constructing CityCenter and the other megaresorts, people were horrified. It seemed unprecedented. Unfortunately, the deaths were consistent with the region's history of

occupational health. In a place where profit is king, safety has consistently been overlooked until it is too late.

Failures in southern Nevada's medical infrastructure also attributed to the substandard quality of occupational health. When the railroad founded Las Vegas' first hospital in 1905, it functioned as a temporary medical facility, sending its most serious cases to Los Angeles. A century later, the practice continued to exist. The poor reputation of southern Nevada medicine has been well documented, infamously leading governors, mayors, and numerous community leaders to seek treatment in other states. The situation was caused by rising costs in medicine during the 2000s, sending health care in the United States into a tailspin. Southern Nevada was particularly hard hit. In 2004, the American Medical Association (AMA) listed Nevada as one of 19 states experiencing a crisis in medical liability coverage. Some insurance rates increased 300 percent in 2002! The cost increase was credited to excessively costly malpractice litigation. Consequently, southern Nevada medicine experienced a mass exodus, as doctors were forced to raise prices, retire, or move. Most chose the last option. The crisis reached a breaking point on July 4, 2002. After nearly all of its 58 surgeons resigned, the UMC trauma center closed. The exorbitant premium costs made performing high-risk surgeries impractical. While the trauma center reopened 10 days later, medical liability coverage continued to plague southern Nevada throughout the decade.

A byproduct of the crisis was a diminished quality of health care. In 2007, Nevada ranked last in quality of care, 47<sup>th</sup> in access to care, and 41<sup>st</sup> for mortality rates. Its residents had limited access to physicians, with one of the lowest physician to

population ratios in the nation. It was ranked 49<sup>th</sup> in nurses, 25 percent below the national median, and last in immunization coverage to children under 3. Ultimately, the low quality of care hurt patients. In a groundbreaking two-year investigation, *Las Vegas Sun* reporters Marshall Allen and Alex Richards analyzed a state database that detailed every inpatient hospital visit from 2000 to 2010, totaling 2.9 million cases. The information, coupled with over 150 patient and medical insider interviews, produced troubling results. Preventable injuries, life threatening infections, or other damages occurred 969 times in Las Vegas hospitals in 2008 and 2009. Additionally, the hospitals had higher-than-expected incidences of surgical injuries, ranging 34 to 174 percent over the national average. One physician blamed the crisis on “a culture of mediocrity” in southern Nevada medicine, comparing his coworkers to world-class sprinters satisfied with running slow. “The standards are so low they don’t even recognize a problem that’s starting them in the face,” said the doctor.<sup>546</sup>

How did the quality of health care become so poor? The southern Nevada medical infrastructure was founded by the railroad, a pattern similar to that found in other western towns. In fact, the Los Angeles and Salt Lake Railroad modeled its employee-funded hospital after Sacramento, California. What separated Sacramento from Las Vegas? While Sacramento experienced crises in health care, its quality of care remained intact. Why? The city had numerous academic medical centers at its disposal, including

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<sup>546</sup> Joelle Babula, “Medical Malpractice Crisis: Insurance Costs Driving Doctors Away with Skyrocketing premiums as high as \$200,000 per year,” *Review-Journal*, (January 23, 2002); Joelle Babula, “Liability Concerns: Trauma Center Closes; ER gear up” *Review-Journal*, (July 4, 2002); “Trauma Center Reopens Doors,” *Review-Journal*, (July 14, 2002); and Barbara E. Buckley, Shelia Leslie, and Susan I. Gerhardt to Thomas O. Barnett, Letter, Re: Acquisition of Health Plan of Nevada, Inc. by UnitedHealth Group, Incorporated, November 21, 2007. See also the *Las Vegas Sun*’s “Do No Harm: Hospital Care in Las Vegas” series Marshall Allen and Alex Richards, “A Breakthrough in Medical Transparency,” (June 27, 2010); “Health Care Can Hurt You,” (June 27, 2010), “A Hidden Epidemic,” (August 8, 2010); “Patients At Risk Under the Knife,” (September 19, 2010), and “Why We Suffer,” (November 14, 2010.”

University of California, Davis, University of California, San Francisco, and Stanford University. Academic medical centers consisted of three interrelated parts: a medical school that trained physicians; clinical trial and laboratory science research; and the delivering of health care services. The benefits were endless. They fostered leading-edge medicine, raising standards in innovation, excellence, and research. While training future doctors, academic medical centers studied their surrounding community's needs, developing innovative treatments accordingly. Additionally, they provided patients that needed the most assistance with access to care.

Most metropolitan areas, including Sacramento, had access to both public and private centers, promoting healthy competition. The combination of these factors prompted a rise in quality of health. Southern Nevada was the only American metropolitan area of its size that did not have an academic medical center, thanks to University of Nevada, Reno. Consequently, the region developed a so-called "culture of mediocrity." While UMC was a teaching hospital, working with University of Nevada School of Medicine in Reno, little research occurred there. The hospital's primary goal was to serve indigents and the poor. Without an academic medical center, the region did not have enough residency and fellowship programs to convince locally-trained doctors to stay. Furthermore, America's best doctors did not practice there because it lacked cutting-edge medicine.<sup>547</sup>

Of course, southern Nevada did not have an academic medical center because northern Nevada controlled the legislature and Board of Regents during the 1970s.

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<sup>547</sup> The Brookings Institution, "The Path Forward for Academic Medical Centers: Innovation, Economics, and Better Health," (Washington D.C.: The Brookings Institution, April 27, 2009); Henry J. Aaron, ed., *The Future of Academic Medical Centers*, (Washington D.C.: The Brookings Institution, 2001), 1-2; Allen and Richards, "Why We Suffer;" and Marshall Allen, "Teaching Hospital is Slightly Different From the One that Teaches Medical Students, Residents," *Las Vegas Sun*, (January 14, 2010).

According to Kathy Silver, the CEO of UMC, the lack of academic medical centers and the region's unrestricted capitalist culture had eroded the quality of health care. Las Vegas, according to Silver, had "a lot of dedication to building infrastructure that generated money." In contrast with academic medical centers, private hospitals were not "mission driven as it relates to research and academics." They sought profits. Southern Nevada medicine was, and has always been, an industry. The system was founded and cultivated by the region's major industries: the railroad, Six Companies, Basic Magnesium, and the Strip. Its development was fragmented, with no overarching evaluation of the region's needs and no plan for future growth. As a result, the medical infrastructure established could not adequately serve the rapidly growing demographic.

In 1905, the railroad built the first hospital in southern Nevada, designed to ensure workers' health. At the same time, Dr. Roy Martin established a for-profit hospital, capitalizing on something the company town lacked: health care for families. Eventually, a county hospital emerged to meet the needs of indigents and the poor. The system worked until the 1930s. But when thousands of dam workers arrived, the hospitals were overwhelmed with patients. After Six Companies built a hospital in Boulder City, the situation improved somewhat and the crisis subsided when the project ended. However, World War II prompted another population spike. To serve workers and families, Basic Magnesium built a hospital. After the war, thousands of Nevada Test Site and Strip employees continuously migrated to the region, which the hospitals could not support. The Teamsters responded by providing a solution, funding the construction of Sunrise Hospital.



But by the 1970s, the various industries could no longer adequately support southern Nevada medicine. Therefore, it evolved, becoming its own industry. Southern Nevada embraced the nationwide trend towards corporate healthcare. By the 2000s, the region had the highest concentration of for-profit hospitals of any urban area in the nation. Under corporate direction, the hospitals were very profitable. During the 1980s, Humana Sunrise Hospital reported 25 percent profits. But corporate leadership directly hindered the ability to offer quality care. According to Larry Matheis, executive director of the Nevada State Medical Association, southern Nevada hospitals were “shaped by market forces – entrepreneurship, cutthroat competition, and the bottom line.” The culture of seeking profits led to the largest public health notification in American history. In 2008, unhygienic practices exposed 40,000 patients of the Endoscopy Center of Southern Nevada to infectious diseases, including Hepatitis C and HIV. The staff reused syringes, allowing viruses to transfer from one patient to another. According to reports, the Endoscopy Center authorized the negligent practice to cut costs.<sup>548</sup>

Since 1905, southern Nevada transformed from a railroad outpost to the site of a dynamic metropolis that captivated the world. In measurements analyzing 1993 to 2007, the Brookings Institution ranked Las Vegas’ economy fourteenth among 150 metropolitan areas in the world; but by the late 2000s its future seemed unclear. Confronting a nationwide recession, the state’s unemployment rate reached 13 percent in 2010. The same year, the Brookings Institution reversed its ranking of Las Vegas, citing

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<sup>548</sup> Allen and Richards, “Health Care Can Hurt You,” “Patients At Risk Under the Knife,” and “Why We Suffer;” Ashley Powers, “Hepatitis C Outbreak Tied to Alleged Cost-Cutting; 40,000 Patients Of A Clinic That Reused Vials and syringes Are Told To Get Tested For HIV Too,” *Los Angeles Times*, (March 16, 2008); “Hepatitis C Outbreak Springs For Endoscopy center of Nevada; 40,000 at risk,” *Las Vegas Sun*, (February 27, 2008); and Marshall Allen, “Officials: Clinic Procedures Put Thousands At Risk,” (February 28, 2008).

it as one of the worst economies in the world, and the city's dependence on domestic tourism and construction directly hindered its recovery. Southern Nevada faced a chronic foreclosure crisis, with the second-highest bank-owned properties in the nation. Environmental concerns, including water scarcity, threatened the region as well. In this context, the prospect for improved occupational health in southern Nevada is dim. Until it reforms policy to consistently promote workplace safety, companies will continue to gamble with lives.<sup>549</sup>

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<sup>549</sup> Buck Wargo, "Las Vegas Economy Among Worst in the World, Report Says," *Las Vegas Sun*, (December 1, 2010).

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"Dead Roses and Blooming Deserts: The Medical History of a New Deal Icon," *The Nevada Historical Society Quarterly*, Volume 50, Number 3, Fall 2007, 239-264.

"Memory and Politics: *Perceptions of the Past*," *Psi Sigma Historical Journal 1* (Summer 2005).

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